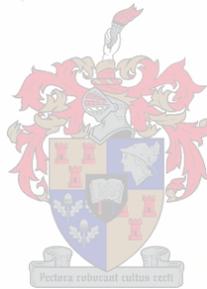


THE IMPLEMENTATION OF A MODEL FOR THE REHABILITATION OF SPORTS INJURIES

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Declaration

I, the undersigned, hereby declare that the work contained in this dissertation is my own original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

Summary

The present study was undertaken with the aim of developing and implementing a model for the rehabilitation of sports injuries. Injury is, without a doubt, one of the most significant obstacles to athletic performance. Very few, if any, athletes escape injury and it seems that regardless of experience and ability, all physically active individuals are prone to injury at some stage of their careers. The ability to resist injury and to rehabilitate well when injury does occur is fundamental to longevity in sport.

Previous injury rehabilitation interventions commonly addressed only the physiological dimensions of injury, excluding the psychological dimensions. Only very recently has there been a shift in focus to include psychological principles in the treatment procedures, with Heil (1993) and Pargman (1993a) some of the first authors to publish works on the subject.

A comprehensive literature review was done. In the first chapter attention was paid to the role of personality in injury occurrence and rehabilitation outcome, with special emphasis on the model of stress and athletic injury of Andersen and Williams (1993). An extension to this model, taking into account the role of personality, coping resources, cognitions, interventions and other injury and treatment related factors in the rehabilitation process was added by Grove (1993).

The next chapter was devoted to the causes and stresses of sports injuries. Topics that were covered include the over-training syndrome, understanding injuries from the athlete's, physician's and psychologist's points of view and a study of what exactly the stresses involved in athletic injury are. Special attention was paid to the concept of pain and all its dimensions, the social well-being of the injured athlete and the impact of injury on the athlete's self-concept and identity.

In the following chapter psychological adjustment to athletic injury was discussed. The concepts of loss and grief and applicability of grief response models in particular were discussed. In response to grief response models, cognitive appraisal models (Brewer, 1994) and an integrated model by Wiese-Bjornstal et al. (1998) were also discussed. Attention was given to the factors associated with rehabilitation adherence with particular remarks on malingering athletes. Peer modelling as a coping strategy in injury rehabilitation also came under scrutiny, as did the role and effect of social support.

The next chapter focused on the development of the service-provider model for sports injury rehabilitation. From the initial literature review it was clear that of all the treatment providers involved with injured athletes, physiotherapists and biokineticians (athletic trainers) are probably those who spend the most time with them. In the development of the model for injury rehabilitation, special emphasis was therefore placed on the role of the physiotherapist and biokineticians. As a basis for developing the model, the traditional medical model was used, but it was adapted to incorporate psychological principles. A computer program was written to assist physiotherapists and biokineticians in treating injured athletes through the use of psychological principles. This program was constructed using psychological instruments that already exist, but they were adapted to be used as non-pen and paper tests. The tests used were the *Emotional Responses of Athletes to Injury Questionnaire* (ERAIQ), the *Incredibly Short POMS* (ISP), a Pain Drawing Instrument, a Visual Analogue Scale and the Affective subscale of the *McGill Pain Questionnaire*. Provision was made for handouts to be included in the program which can then be given to patients after each therapy session.

To be able to determine whether the program was successful in assisting physiotherapists and biokineticians in their treatment of injured athletes, the program was evaluated in the next chapter. Feedback from both patients, physiotherapists and biokineticians using the program were received. Two short questionnaires were used for this purpose.

Finally, conclusions were drawn from the information received from the program and recommendations based on these conclusions were made.

Key words: Sports injuries, injury rehabilitation

Opsomming

Die doel van die huidige studie was die ontwikkeling en implementering van 'n model vir die rehabilitasie van sportbeserings. Beserings is, sonder twyfel, van die belangrikste struikelblokke in die weg van sportprestasie. Baie min, indien enige, atlete spring beserings vry. Dit wil ook voorkom of alle fisiek aktiewe individue, ongeag hulle ondervinding en vermoë, op een of ander stadium van hulle loopbane 'n besering opdoen. Fundamenteel aan volgehoue deelname aan sport, is die vermoë om beserings te vermy en om atlete suksesvol te rehabiliteer indien 'n besering wel opgedoen word.

In die verlede het rehabilitasie-intervensies hoofsaaklik die fisieke dimensies van beserings aangespreek sonder inagnome van die sielkundige dimensies. Slegs onlangs het daar 'n klemverskuiwing begin plaasvind deurdat daar begin is om sielkundige beginsels in te sluit in behandelingsprosedures. Heil (1993) en Pargman (1993a) was van die eerste skrywers wat werke oor hierdie onderwerp gepubliseer het.

'n Uitgebreide literatuuroorsig is onderneem. In die eerste hoofstuk was aandag geskenk aan die rol wat persoonlikheid speel in die voorkoms van beserings en die suksesvolle rehabilitasie daarvan, met spesiale klem op Andersen en Williams (1993) se model van stres en sportbeserings. Hierdie model is deur Grove (1993) uitgebrei deur inagnome van die rol van persoonlikheid, hanteringsvaardighede, kognisies, intervensies en ander beserings- en behandeling-verwante faktore in die rehabilitasieproses.

Die volgende hoofstuk was gewy aan die oorsake van, en die stres verbonde aan, beserings. Onderwerpe wat aangespreek is, het ingesluit die ooroefeningsindroom, begrip van beserings soos gesien vanuit die atleet, medikus en sielkundige se oogpunte, asook presies watter faktore stres tydens beserings veroorsaak. Spesiale aandag is aan die konsep van pyn en al sy dimensies, die sosiale welstand van die beseerde atleet en die impak van beserings op die selfkonsep en identiteit van die atleet geskenk.

In die volgende hoofstuk is die sielkundige aanpassing by beserings bespreek. Die konsepte van "verlies" en "rou" en die toepaslikheid van rouresponsmodelle in besonder, is bespreek. In antwoord op rou responsmodelle is kognitiewe waarderingsmodelle (Brewer, 1994) en die geïntegreerde model van Wiese-Bjornstal et al. (1998) bespreek. Aandag is ook geskenk aan faktore

wat 'n rol in volgehoue deelname aan rehabilitasieprosedures speel, met klem op atlete met skynsiektes. Navoring van voorbeelde deur eweknieë as 'n hanteringsvaardigheid is ondersoek, asook die rol en effek van sosiale ondersteuning.

Die volgende hoofstuk het gefokus op die ontwikkeling van die diensleweraar-model vir sport-beseringrehabilitasie. Vanuit die aanvanklike literatuuroorsig het dit geblyk dat van al die persone betrokke by die behandeling van beseerde atlete, dit waarskynlik fisioterapeute en biokinetici is wat die langste by hulle betrokke is. Tydens die ontwikkeling van die model vir rehabilitasie van beserings, is as basis die tradisionele mediese model gebruik, maar met sekere aanpassings om sielkundige beginsels in te sluit. 'n Rekenaarprogram is geskryf om fisioterapeute en biokinetici te ondersteun in die behandeling van beseerde atlete. Die program het gebruik gemaak van bestaande psigometriese toetse, maar dit was aangepas om as nie-potlood-en-papiertoetse gebruik te kan word. Die toetse wat gebruik is, is die *Emotional Responses of Athletes to Injury Questionnaire* (ERAIQ), die *Incredibly Short POMS* (ISP), 'n pyntekeninginstrument, 'n visueelanalogskaal en die affektiewe subskaal van die *McGill Pain Questionnaire*. Voorsiening is gemaak na afloop van elke behandelingsessie om uitdeelstukke aan pasiënte beskikbaar te stel.

Om te bepaal of die program suksesvol was om fisioterapeute en biokinetici tydens behandeling van beseerde atlete te ondersteun, is die program in die volgende hoofstuk kortliks geëvalueer. Terugvoer vanaf beide die pasiënte, fisioterapeute en biokinetici wat die program gebruik het, is verkry. Twee kort vraelyste is vir dié doel gebruik.

Laastens is gevolgtrekkings op grond van die terugvoer gemaak en aanbevelings vir aanpassings is gedoen.

Sleutelwoorde: Sportbeserings, rehabilitasie

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Chapter One

STATEMENT OF THE PROBLEM

INTRODUCTION

Injury is, without a doubt, one of the most significant obstacles to successful sports performance. No athlete, regardless of experience and ability, is immune to injury and most physically active individuals find it difficult to avoid injury (Durso-Cupal, 1998). Sports injury is a serious and expensive health problem that, in spite of improvements in equipment and physical conditioning techniques, has not abated (Bergandi, 1985). For the elite athlete, a great deal of time and energy are invested in obtaining optimal performance in sport, hence any significant injury is likely to be perceived as a traumatic life event with physical and psychological ramifications. For some athletes a promising career can even be prematurely terminated because of serious injury (Quinn & Fallon, 1999).

The ability to resist injury and to rehabilitate well when injury does occur, are fundamental to longevity in sport and to the full realisation of sports potential. Many articles, books and research papers have been written on the importance of minimising the physical and mental debilitation that injured athletes have to endure. Many of these early efforts, however, focused on the prediction and prevention of sports injury, with considerably less attention given to rehabilitative considerations. For instance, Andersen and Williams (1988) developed a multi-component theoretical model of stress and injury. This model proposes that athletes with a history of many stressors, personality characteristics that exacerbate the stress response and few coping resources will, when placed in a stressful situation, be more likely to appraise the situation as stressful and will exhibit greater psychological activation and attentional disruptions. The severity of the resulting stress response is the mechanism proposed to cause the injury risk. The model also proposes certain interventions for reducing the risk of injury (Williams & Andersen, 1988).

Until the last decade, interventions usually addressed the physiological dimensions of sports injury to the exclusion of psychological dimensions (Petitpas & Danish, 1995). Injuries were mostly viewed from a structural, anatomical, or physical environmental direction with little regard for

affective, perceptual/cognitive and personological factors (Pargman, 1993a). Often omitted are interventions that facilitate injury prevention or coping with the threat to self-concept, beliefs, commitments and values (Danish, 1986; Steadman, 1993). Recently, however, the sports medicine community has become increasingly aware of the integral role that psychosocial factors play in injury occurrence and the recovery processes (Brewer, Jeffers, Petitpas, & Van Raalte, 1994b). The emphasis also shifted from trying to predict how certain factors may lead to injury, to the process of coping with injury. A number of effective, creative, therapeutic methods structured on established, or at least widely accepted, psychological theory have been advocated (Pargman, 1993a). The psychological effects on an injured athlete include the initial emotional response of experiencing an injury, the psychological factors that influence the recovery process and the psychological impact of an injury on the individual's future performance (Grove & Gordon, 1991; McDonald & Hardy, 1990).

Many factors can influence the recovery process of an injured athlete. Some authors (Gieck, 1990; Gordon, 1986; Rotella, 1985; Silva & Hardy, 1991) suggest that injured athletes progress through a grief cycle similar to that experienced by the terminally ill. They have therefore adapted the stage model originally proposed by Kübler-Ross (1969) to be used with injured athletes. This approach does not however, account for individual differences. Research to date has also not supported the major claims of stage models, and the notion of a stereotypic pattern of distinct emotional responses to loss has not stood up to empirical scrutiny (Brewer, 1994).

Cognitive appraisal models, in contrast with stage models, have been developed to account for individual differences in responses to sports injuries (Brewer, 1994). Some examples of cognitive appraisal models, which have relevance to psychological responses to injury, include: the transactional model of stress (Lazarus & Folkman, 1984); the psychophysiological stress model (Weiss & Troxel, 1986) and the cognitive-emotional-behavioural model (Wiese-Bjornstal & Smith, 1993). Responses to injury, in each of these models, are analysed in the context of the stress process. It is proposed that the way the athlete appraises his/her injury determine the emotional response, which in turn is thought to affect the behavioural outcomes. There are, however, little or no experimental or empirical data available to support the applicability of these models to the recovery process (Quinn & Fallon, 1999).

THE PROBLEM

To date, according to Durso-Cupal (1998), only 4 empirical psychological prevention and 13 empirical psychological rehabilitation intervention studies have been conducted. Consequently there is only a preliminary understanding of the complex interplay of psychological and physiological variables that contribute to prevention and rehabilitation of sports injuries. Current sports injury interventions, according to Durso-Cupal (1998), appear to be conceptually and theoretically primarily based on an amalgam of models advanced by Andersen and Williams (1988), Cohen and Wills (1985), Lazarus and Folkman (1984), Moos and Tsu (1977) and Weiss and Troxel (1986). Wiese-Bjornstal and Smith (1993) have probably made the most significant contribution to the theoretical foundation for psychological interventions with their integration of the Andersen and Williams (1988) pre-injury psychosocial model with the Wiese and Weiss (1987) stress model of injury.

According to Heil (1999), however, most of these theoretical models remain just that – theoretical models. There are very few, if any, that provide a practical instrument for therapeutic use. Heil (1993) contends that medical treatment and rehabilitation have an important psychological impact on the athlete, and as such physicians and sports medicine specialists have unique roles to play in the psychological management of the athlete. However, most theoretical psychological rehabilitation intervention models disregard the importance of physicians and sports medicine specialists. Injury is most effectively managed with a team approach between physicians, sports medicine specialists and psychologists, which provides better continuity of care as well as better quality of care (Heil, 1993). For the purpose of effectively integrating physical treatment with psychological treatment, a so-called “service provider model” (SPM) will be developed.

AIM OF THIS STUDY

The aim of this study is to provide treatment providers, other than sport psychologists, with a useful instrument in the treatment of injured athletes. Through personal observation it seems that the treatment providers who spend the most time with rehabilitating athletes, are physical therapists. The main thrust of this study is therefore to provide physical therapists with an instrument based on psychological principles. Prerequisites for this instrument are that it must be user friendly and must provide timely feedback on whether an injured athlete has made any progress or not in rehabilitation.

on the subject will be done to determine the full scope of the problem. From this review it will become clear that of all the treatment providers dealing with injured athletes, physiotherapists and biokineticians (athletic trainers) spend the most time with them. Because physiotherapists usually do not have extensive psychological training, it seems logical that a way will have to be found to adequately prepare physiotherapists for this task.

Secondly, a service provider model (SPM) will be developed to assist treatment providers, particularly physiotherapists and biokineticians, in their task of helping injured athletes rehabilitate. This model will be related to the traditional medical treatment provider model, with the exception that treatment will be provided based on psychological principles. To put this model into practice, computer technology will be utilised. A Sports Injury Management (SIM) computer program will be developed to monitor the progress of an injured athlete during the course of rehabilitation.

Thirdly, this computer program will be evaluated by physiotherapists, biokineticians and their patients. The program will be evaluated on ease of use and the ability to help athletes rehabilitate from injury.

Lastly, conclusions and recommendations based upon the evaluations will be made.

Chapter Two

INTRODUCTION TO SPORTS INJURIES

All athletes, at one or other stage of their careers, are injured. Tuckman (in Pargman, 1993a) contends that an “athlete” is someone who bases his or her sense of self on the competitive performance of sports endeavour. By using this definition it would seem that many people around the world could be considered “athletes”, whether they are people who derive their livelihood from sports performance, or just serious weekenders taking part in sports activities. It also follows that many people will be injured at some or other stage in their careers.

To be able to understand the significance of injuries to athletes, one must appreciate the fact that sport is a subculture where rules that are implicitly understood but seldom spoken, guide behaviour. In the world of sport, small differences in behaviour can be of great importance and nowhere are constant expectations of high performance more prevalent. It is marked by the pursuit of excellence, emotional intensity, and expectations regarding risktaking. In modern sport, athletes are constantly reminded “no pain, no gain, no fame”. Therefore attitudes and expectations in sport, combined with the inherent risk of sport itself, make injury a common event (Heil, 1993). Pargman (1993a) contends that although physical injury is essentially a negative experience athletes typically and fervently try to avoid, sport is clearly a breeding ground for physical injury.

THE INCIDENCE OF INJURY

Studies in the United States of America indicate that more than 70 million injuries that require medical attention or at least a day of restrictive activity, occur annually. The incidence of injuries among children and young adults is so serious that it replaced infectious diseases as the leading cause of death and disability (Boyce & Sobolewski, 1989). According to Kraus and Conroy (1984), conservative estimates indicate that at least 3 to 5 million of these injuries occur within sports or recreation. In a study of almost 55 000 school children, Boyce and Sobolewski (1989) claimed sports participation accounted for 44% of the injuries to students 14 years and older. Hardy and Crace (1990) found that each year within amateur athletics, nearly half of all participants suffer an injury that precludes participation. According to the *United States Consumer Product Safety Commission*, one quarter of these injuries require at least one week of nonparticipation (Hardy &

Crace, 1990). Booth (1987) puts the sports injury figure in the United States of America at an estimated 17 million per year. Among these are an estimated one million injuries in high school football alone and also includes about 10 fatalities (Mueller & Blyth, 1987). According to Zemper (1989), almost one in two collegiate football players suffers an injury severe enough to lose playing time each year. It is not only football players who suffer injuries. Nearly half of habitual runners in the USA experience lower extremity injuries every year (Macera, Pate, Powell, Jackson, Kendric, & Craven, 1989). Samples (1989) found that annually almost 1000 spinal cord injuries occur as a result of swimmers diving into pools and other bodies of water.

According to Pargman (1993a) various operational definitions of the term “injury” becloud descriptive statistics. Nevertheless in the United States alone published estimates for injuries at secondary and collegiate levels are close to 750 000 per year (Bergandi, 1985). Other researchers like Noble, Porter and Bachman (1982), and Wrenn and Ambrose (1980) put the number of injuries at high school alone at more than 850 000 per year. Ironically Tator and Edmonds (1986) forecast that these numbers are expected to rise despite improvements in sports equipment and rule changes. This may be due to an ever-increasing number of participants, greater societal interest in sport and greater availability of leisure time. Despite the well-intentioned efforts of the amateur and professional sport establishments, sports injury continues to undermine the aspirations and achievements of some participants (Pargman, 1993a). It is, however, not only physical injuries that put athletes at risk, but also medical and psychological “injuries” as a consequence of sports participation. Examples of these are overtraining syndrome, eating disorders and drug abuse (Heil, 1993). Sports injury details in the United States of America are continually being updated by the *National Centre for Catastrophic Sports Injury Research* (Mueller & Cantu, 1990). Their aim is to identify the frequency and circumstances of serious injury, which has resulted in effective injury-reducing changes in some sports.

In the past emphasis has often been placed on the physical rehabilitation of sports injuries. Surgical techniques and rehabilitation procedures have improved to the extent that formally seriously injured athletes are sometimes physically capable of competing again in about half the time possible 10 years ago (Rotella & Heyman, 1986). However, the psychological impact of injuries has not been well researched and documented (Leddy, Lambert & Ogles, 1994). The importance of this has not yet been fully recognised by the athletes themselves, coaches, the family of injured athletes, team members and even sports medical practitioners.

The psychological impact of a serious injury on an athlete could be devastating. If the athlete is a professional sportsperson an injury would most certainly mean a loss of income to some extent, but insurance or medical aid cover could usually offset this. What is more important is the potential loss of self-image, loss of participation in a team activity, loss of important social structures, etc.

Often athletes have not been adequately prepared for such an event and when they are injured, they experience it as being quite traumatic. The sport psychologist can play a large part in supporting athletes in three ways in particular, namely preparation for possible injuries or operations, assistance and support during rehabilitation from injury and after-care and follow-up after rehabilitation.

To date the rehabilitation process has been largely driven from a medical perspective, with relatively little input from the sport psychologist. Because injuries appear to be increasing in frequency (Meewisse & Fowler, 1988), concerns over the potential negative emotional effects of sports injury are increasing. Weiss and Troxel (1986) were amongst the first researchers to attempt to identify athletes' psychological responses to injury. Athletes' responses to injury included fear, tension, fatigue, disbelief, depression and somatic complaints (e.g., insomnia, loss of appetite, and upset stomach). They also found that many athletes expressed an inability to cope with their injury, the long rehabilitation which followed, the restriction of their activities and the sense of being controlled externally by the injury. Other researchers (McDonald & Hardy, 1990; Pearson & Jones, 1992; Smith, Scott, O'Fallon & Young, 1990a) have identified similar reactions.

These findings clearly indicate that the rehabilitation of the injured athlete cannot be driven from a medical perspective alone. The sport psychologist will have to be included as a very important contributor to the healing process. Coaches and sport psychologists especially, will have to teach athletes to respond psychologically to injury in a positive and growth-orientated manner, rather than in a negative and self-defeating way (Rotella & Heyman, 1986). In applied research on the speed of injury rehabilitation, Ievleva and Orlick (1993) found that those athletes who recovered quicker had adopted positive mental attitudes towards rehabilitation and had assumed active, involved roles.

According to Heil (1993), when psychological interventions are applied in the context of a carefully designed and systematic programme, the health and well-being of the athlete are enhanced and speedy return to optimal functioning is facilitated. This is most effective when there is a team approach and when psychological principles guide all aspects of treatment. The approach

recommended is performance-orientated, proactive, and preventative, with the sport psychologist taking an active part. When treatment takes such an approach, psychological adjustment problems are less likely to develop. When problems do occur, they can be identified and treated timeously, thereby limiting their overall impact (Heil, 1993).

Although many injuries are caused by physical factors, such as equipment used, fitness levels, body build, overtraining, playing conditions and others, psychological factors also play a role in injury vulnerability and resiliency. It is therefore necessary not only to look at the role of personality in the cause of injury, but also in the rehabilitation of that injury.

PERSONALITY

Although it is extremely difficult to define the concept of personality precisely, there are two interpretations that had withstood the test of time (Cox, 1994). Allport (1961) defined personality as “the dynamic organisation within the individual of those psychophysical systems that determine his characteristic behaviour and thought” (p. 28). Hollander (1971) gave a similar, yet simpler definition of personality when he said that it is “the sum total of an individual’s characteristics which makes him unique” (p. 394). It does not matter what definition is selected, because the important point to remember is that the personality of each individual is unique (Cox, 1994). Hollander (1971) outlined a structure by which personality can be understood. This was adapted to sport psychology by Martens (1975).

A schematic view of that structure is given in Figure 1.

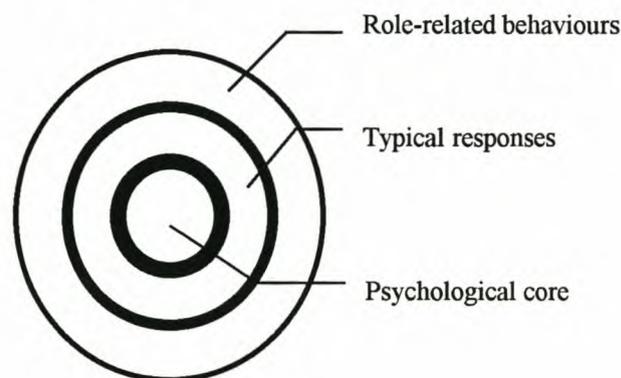


Figure 1 Structure of personality (Martens, 1975)

Personality, as illustrated, can be divided into three separate, but related levels. These are (1) the psychological core, (2) typical responses, and (3) role-related behaviours. The psychological core is represented as being internal and consistent in nature, while typical responses and role-related behaviours are considered external and dynamic (Cox, 1994). The thickness of the lines separating each of the levels, reflects the relative effect of the social environment. The thicker the line, the less effect the environment will have on that specific level. It follows then that role-related behaviours are most susceptible to the influence of the environment, while the psychological core is to a certain extent insulated from the environment (Cox, 1994). The psychological core represents the centre piece of a person's personality, the basic attitudes, values, motives and interests that holds that person's image of what he or she is really like. This includes the person's self-concept (Cox, 1994).

People usually respond to environmental situations in a certain way. This is reflected in "typical responses" in Figure 1. Typical responses are learned ways of interacting with the environment and will be a valid indicator of a person's psychological core. If a person consistently responds to all types of environmental situations with feelings of tension and apprehension, it may be concluded that this is an anxious person. It would, however, be very wrong to conclude that a person is aggressive from a single observation where he or she displayed aggressive behaviour (Cox, 1994).

Role-related behaviour reflects behaviour we deem to fit our perception of our environment. This represents the most superficial aspect of our personalities. Role-related behaviours are not typical responses, but are behaviour changes in response to changes in the environment or the perception of changes in the environment. They are therefore not valid indicators of the psychological core (Cox, 1994).

When looking at an athlete's personality, what we are in effect doing, is trying to get to the real person, or the psychological core. In terms of Hollander's personality structure this can best be done at the level of typical responses (Cox, 1994).

Theories of Personality

According to Cox (1994), there are three major theoretical approaches to the study of personality, namely the psycho-dynamic theory, the social learning theory and the trait theory approach. Each will be discussed shortly.

Psycho-dynamic Theory

Sigmund Freud (1933) is perhaps the most influential proponent of psycho-dynamic theory, but a number of psychoanalytic theorists known as the neo-Freudians, such as Carl Jung, Erich Fromm and Eric Erickson have proposed modifications to Freud's original theory (Mischel, 1986).

Freud's psycho-dynamic theory and his method of treating personality disturbances were based largely upon self-analysis and extensive clinical observation of neurotics (Cox, 1994). In Freud's view, there were two distinguishing characteristics of the psycho-dynamic approach to personality, namely its emphasis upon in-depth examination of the whole person and upon unconscious motives. Instincts are central in the Freudian approach. The term "libido" was originally used to refer to sexual energy, but Freud later broadened the term to include the energy of all the life instincts. These instincts serve the purpose of the survival of the individual and the human race; they are orientated toward growth, development, and creativity. Freud saw the goal of much of life as gaining pleasure and avoiding pain. At times, Freud asserted, people manifest through their behaviour an unconscious wish to die or to hurt themselves or others. This led him to postulate the concept of death instincts, which accounted for the aggressive drive. He also believed that both the sexual and aggressive drives are powerful determinants of why people act as they do (Corey, 1986).

Although, according to Freud (1962), there may be conflicts between the life and the death instincts, human beings are not condemned to be victims of aggression and self-destruction. His book, *Civilization and its Discontents* outlines the major challenge of the human race as finding ways to manage the aggressive drive (Corey, 1986).

According to the psychoanalytic view, personality consists of three systems: the id, the ego and the superego (Corey, 1986). The id, ego and superego should however not be seen as real entities or "small individuals within the individual" that governs behaviour. They are simple concepts or abstractions without reality. Humans do not possess an id, ego or superego, but according to the psychoanalytic theory, these are qualities of the personality that can be described in terms of these concepts. They are thus abstractions or facets of true personality in terms of which the functioning of the personality can be described (Möller, 1987). The id, ego and superego form a tripartite structure of personality, with the id representing the unconscious, instinctual core of the personality. The ego, in contrast, represents the conscious, logical or reality orientated aspect of the personality, with the superego representing the conscience of the individual (Cox, 1994).

According to Freud, the id and the ego are constantly in conflict, with the superego aiding in the resolution of those conflicts (Cox, 1994). It also follows that the individual's personality is the sum total of the dynamic conflicts between the impulse to seek release and inhibition against those impulses (Mischel, 1986). The unconscious sexual and aggressive instincts of the individual are major determinants of behaviour, according to Freud (Cox, 1994).

Social learning theory

The origin of social learning theory can be traced to Clark Hull's 1943 Theory of Learning (in Cox, 1994). His stimulus-response theory of learning was largely based on laboratory experimentation with animals and stated that an individual's behaviour in any given situation is a function of his or her learned experiences (Cox, 1994). From this viewpoint, behaviour is not simply a function of unconscious motives or underlying pre-dispositions, but is rather a function of social learning and the intensity of the situation (Cox, 1994). Depending on environmental constraints, an individual will behave according to how he or she has learned to behave. If the environmental situation is prominent, the effect of personality traits or unconscious motives upon behaviour should be minimal (Cox, 1994). According to Hull (1943), individuals primarily learn through two mechanisms, i.e. modelling and social reinforcement. Modelling is nothing more than imitative behaviour and refers to learning through observation. Social reinforcement on the other hand, is based upon the notion that behaviours that are rewarded are likely to be repeated (Cox, 1994). Social reinforcement can either be the verbal or non-verbal communication passing between two people that can increase the strength of response (Martens, 1975).

The work of Hull is closely related to the work of B.F. Skinner, known as operant orientation, which paved the way for Behaviour Therapy as we know it today. The behavioural approach had its origins in the 1950s and early 1960s as a radical departure from the dominant psychoanalytic perspective of Freud (Corey, 1986). The behaviour movement includes three major areas of development, namely classical conditioning, operant conditioning and cognitive therapy. Today the approach is enormously diverse (Corey, 1986). Contemporary behaviour therapy encompasses a variety of conceptualisations, research methods and treatment procedures to explain and change behaviour (Kazdin & Wilson, 1978).

Modern behaviour therapy does not rest on the deterministic assumption that humans are mere products of their sociocultural conditioning, but rather that the person is the producer and the product of his or her environment (Bandura, 1977). According to Corey (1986), behaviour therapy

is separated from other approaches by its strict reliance on the principles of scientific method. Concepts and procedures are stated explicitly, tested empirically and revised continually. Treatment and assessment are further interrelated, for they occur simultaneously.

Trait theories

The basic position of trait theory is that personality can be described in terms of traits possessed by individuals. These traits are considered synonymous with pre-dispositions to act in a certain way. Traits are considered to be stable, enduring and consistent across a variety of differing situations. A predisposition toward a certain trait does not mean that the individual will always respond in this manner, but a certain likelihood that he will, exists (Cox, 1994).

According to Möller (1987) one of the best known psychologists to advocate trait psychology, is Gordon Allport. Allport's definition of personality was mentioned at the beginning of this chapter. To be able to understand the full extent of that definition, each of the key concepts will be discussed further. To recapitulate, Allport (1961) defined personality as "the dynamic organisation within the individual of those psychophysical systems that determine his characteristic behaviour and thought" (p. 28).

Allport (1961) uses the term "psychophysical systems" to emphasise the unity of personality. Personality is neither exclusively physical nor exclusively psychological. The physical and chemical processes in the glands and nervous system, as well as the psychological functions, form a whole that determines personality. Examples of such systems are habits, attitudes, sentiments, motives, etc. These systems play an important role in behaviour. They can be latent or be active on a given moment and will then motivate behaviour (Möller, 1980).

With the term "organisation", Allport (1961) wants to emphasise that there is a definite coherence or relationship between the parts of the personality structure. The psychophysical systems are not isolated from one another, but each is in a specific relation to the rest of the personality. It is therefore important to realise that, according to Allport (1961) the personality is more than just a sum total of all the elements of systems. The relationship is also important and to understand a specific personality, the underlying relationship must also be understood. An adult personality can thus be seen as an organised, integrated personality (Möller, 1980).

With the term “dynamic” Allport (1961) wants to emphasise that changes are continually taking place in the personality. Through the processes of growing and learning the personality structure becomes more complex, but changes can also take place from one moment to the next. This means that personality can differ from situation to situation. This does not necessarily mean that the personality changes fundamentally, but rather that the intensity with which the different traits come to the fore, changes. It also does not mean that the changes will be permanent (Möller, 1980).

“Characteristic” points to the expression of the pattern of organisation of the various systems in the personality. Each individual’s personality is a unique blend of characteristics. According to Allport (1961) personality is a universal phenomenon that is, however, only seen in individual form.

The term “determines” refers to the motivational function of personality. The psychophysical systems activate behaviour and the direction thereof. An impulse activates a specific attitude, habit or trait. This psychophysical system leads to behaviour that is typical of that individual. In other words, behaviour is not a synonym for personality, but personality determines behaviour (Möller, 1980).

It is important to realise that Allport (1961) defines personality in terms of processes inside a person. Some theorists place personality “outside” the person, because they equate personality to the social roles people fulfil. Some see personality as learned reactions to stimuli, as the behaviourists do (Möller, 1980). Allport, according to Möller (1980), saw personality as “something” inside a person, rather than merely a necessary theoretical construct. He felt compelled to dedicate personality to intra-organismic structures, because of the consistency of behaviour people display. If a person is known, his behaviour could be predicted with a certain amount of certainty. Such consistency and stability can only be explained if the existence of physiological systems is accepted (Möller, 1980).

As mentioned early in this chapter, the need to look at personality stems from the fact that it contributes to injury vulnerability and resiliency (Williams & Roepke, 1993). The psychological factors that have been researched can be classified as personality or psychosocial variables. Of these, the most frequently studied psychosocial variables are life event stress and various personal and environmental variables that might influence the stress-sports injury relationship (Williams & Roepke, 1993).

PERSONALITY FACTORS AND INJURY RISK

Early studies, such as those done by Rosenblum (1979), were concerned with personality traits or states. Rosenblum contended that many injuries are a consequence of depression, guilt, or fear of success (Williams & Roepke, 1993). According to Cox (1994) several comprehensive literature reviews have attempted to clarify the relationship between personality and sport performance. Most studies since 1960 concluded that there is a positive relationship between personality and some aspect of sports performance, but in the majority of cases the relationships were correlational and do not prove a cause and effect relationship.

To date it would appear that the most comprehensive and significant review of the relationship between motor performance and personality was provided by Morgan (1980b). According to Morgan (1980b) the view that personality traits can account for between 25 and 50 percent of the variance in sport participation among men and women, is supported. This would mean that between 50 and 75 percent of the variance in performance by athletes would be unexplained by personality traits which would make it inappropriate to rely on a state, trait or state-trait model alone in attempting to predict behaviour (Morgan, 1980b).

According to Williams and Roepke (1993), controlled and quantifiable studies on personality and injury proneness have been conducted, but the results have been largely inconsistent. When Jackson, Jarrett, Bailey, Kausek, Swanson and Powell (1978) used Cattell's *Sixteen Personality Factor Questionnaire* (16-PF) to study high school football players, they found that tender-minded, dependent players received more injuries than tough-minded, self-reliant players. Valliant (1981) obtained similar results with competitive male distance runners, but Irvin (1975) failed to find any tender vs tough-minded differences in a study conducted in high school football players. The fact that injured players in the Irvin study were found to be more reserved (vs outgoing) than non-injured players were, was echoed in the Jackson et al. (1978) study.

Several other studies, such as those conducted by Brown (1971) and Abadie (1976) failed to show any personality differences between injured and non-injured athletes as measured by the *California Psychological Inventory* (CPI) and the 16-PF (Williams & Roepke, 1993). The general (as opposed to sport-orientated) nature of the CPI and the 16-PF, as well as the trait approach underlying the development of these questionnaires, may have contributed to the minimal ability of these instruments to identify personality factors related to injury occurrence (Williams & Roepke, 1993).

Other personality traits that received some attention in research are locus of control and self-concept. According to Rotter (1966), the locus of control concept deals with the degree to which an individual perceives his/her life and environment as being under his/her personal control. An internal orientation would be characterised by a belief that one's own actions control personal outcomes in life whereas an external orientation is indicative of an individual who feels himself/herself a victim of chance or circumstances (Williams & Roepke, 1993). Some studies in this field yielded mixed support for differences in locus of control influencing sports injury outcome. Passer and Seese (1983) found no relationship between locus of control and injury occurrence in football players, while Dalhauser and Thomas (1979) reported that fewer injuries occurred in players with an internal locus of control when assessed with a specific football scale derived from Rotter's general scale (Williams & Roepke, 1993).

Self-concept, according to Samuels (1977), is thought to affect the emotional, physical, social and cognitive life of the individual. This could mean that differences in self-concept play a role in injury vulnerability. Some studies, such as the one done by Young and Cohen (1981), found that injured athletes in a female high school basketball tournament had a higher overall self-concept prior to the tournament than non-injured. Injured players also had a positive view about themselves in terms of their identity, physical self and personal self. This led Young and Cohen (1981) to believe that these self-concept characteristics may have led the injured players to take more risks and thus they found themselves in more situations that could result in injury (Williams & Roepke, 1993). Lamb (1986) obtained contradicting results in a study of female college varsity field hockey players. Players with low self-concept scores, as measured by the *Tennessee Self-Concept Scale*, tended to have more injuries than players with a higher self-concept. The author suggested that the injury rates of the athletes with low self-concepts may have reflected a desire on their part not to play in upcoming competitions, or to have an excuse for not playing well, thereby protecting their self-esteem (Williams & Roepke, 1993). However, the number of subjects ($N = 21$) in that study makes generalisation of the results rather difficult.

LIFE STRESS AND SPORTS INJURY RISK

According to Williams and Roepke (1993) the most extensively researched area in the psychology of injury, is the study of life stress and its relationship to injury occurrence. Early research on the relationship between psychological factors and sports injury risk often came about as a result of coaching or clinical experience (Ogilvie & Tutko, 1966). However, scientific advances have been

made in determining what psychological factors and potential mechanisms are involved in injury risk (Andersen & Williams, 1993).

Andersen and Williams (1988) postulated that the mechanism behind the life events-injury relationship was in an individual's stress responsivity. They quote, as an example in cardiac medicine individuals who react to stress tests with large and prolonged stress responses are at greater risk for later cardiac problems. They are of the opinion that in sport a similar relationship exists between life events, stress responsivity and injury (Andersen & Williams, 1993).

A MODEL OF STRESS AND SPORTS INJURY

A model was proposed by Andersen and Williams (1988) by which way a framework could be provided for assessing injury risk. Interventions for reducing the likelihood of injury for high-risk athletes were also suggested. This model owed much to earlier stress research done by Allen (1983) and Smith (1979) and was developed from a synthesis of the stress-illness, stress-injury and stress-accident literatures (Andersen & Williams, 1993). A diagram of this model is presented in Figure 2.

According to Williams and Roepke (1993), the presence of certain psychological, environmental, or behavioural variables might moderate the potentially detrimental effects of life stress on injury occurrence. On the other hand, the mere presence or absence of certain variables may well increase vulnerability to injury (Williams & Roepke, 1993). Based on research by Cohen (1988) and Garrity and Marx (1985) a clear relationship can be seen between life events and physical and mental health when differences in the variables that moderate the relationship are considered.

The stress response

As can be seen, central to this model is the stress response with its mutually influencing cognitive and physiological/attentional elements (Andersen & Williams, 1993). In sports situations, participants will experience different cognitive responses, either positive or negative. Examples of positive feelings are that of challenge, excitement or joy, while negative feelings may be experiences such as anxiety, discomfort or dread. The type of affective response an athlete experiences can easily influence injury risks, with negative feelings more likely to lead to injury (Andersen & Williams, 1993). The relationship between the physiological and attentional responses is found in changes in the endocrinological system and autonomic nervous systems. The effect that stress has on the endocrinological system, could be the following: elevated levels of

adrenocorticotrophic hormone (ACTH) and catecholamine and the release of glucocorticoids. The autonomic nervous systems on the other hand, may react with changes in activation of the sympathetic nervous system. The result of these changes may be very observable, or less observable, but it can include an increase in respiration, pupillary dilation, increased perspiration, generalised muscle tension, increased distractibility, emotional lability, changes in the vasoconstriction in the viscera, nausea and tunnel vision, to name but a few. From all of these physiological changes, changes in attention may follow which may result in the athlete being injured (Andersen & Williams, 1993).

Cognitive Appraisals

As previously stated, the central core of the model is the stress response. This is a bi-directional relationship between the athlete's cognitive appraisal of a potentially stressful external situation and the physiological and attentional aspects of stress (Williams & Roepke, 1993). The athlete makes some appraisal of the (1) demands of the situation, the (2) adequacy of his or her ability to meet those demands, and the (3) consequences of failure/success in meeting the demands. It is not important for the generation of the stress response whether the cognitive appraisal is accurate or distorted by irrational beliefs or other maladaptive thought patterns. If it is perceived by the athlete that he/she has inadequate resources to meet the demands of the situation (and it is important to succeed), the stress response will be activated and be manifested physiologically and attentionally (Williams & Roepke, 1993). An athlete's attitude about competition may also influence the likelihood of injury. If the athlete views competition as challenging, exciting and fun, an elevated stress level may help him/her to remain on task and to stay focused. Injury risk would probably be lower in this sort of situation. However, when the athlete views competition as anxiety producing, or as potentially embarrassing with much associated negative stress, the injury risk will probably be much higher (Andersen & Williams, 1993).

Demands

The confidence levels of athletes are important. If confidence is down, the athlete may feel that he/she does not have the resources to meet the demands of the situation. Feelings of inadequacy can easily contribute to an acute stress response and the accompanying physiological/attentional changes that set up the athlete for injury (Andersen & Williams, 1993).

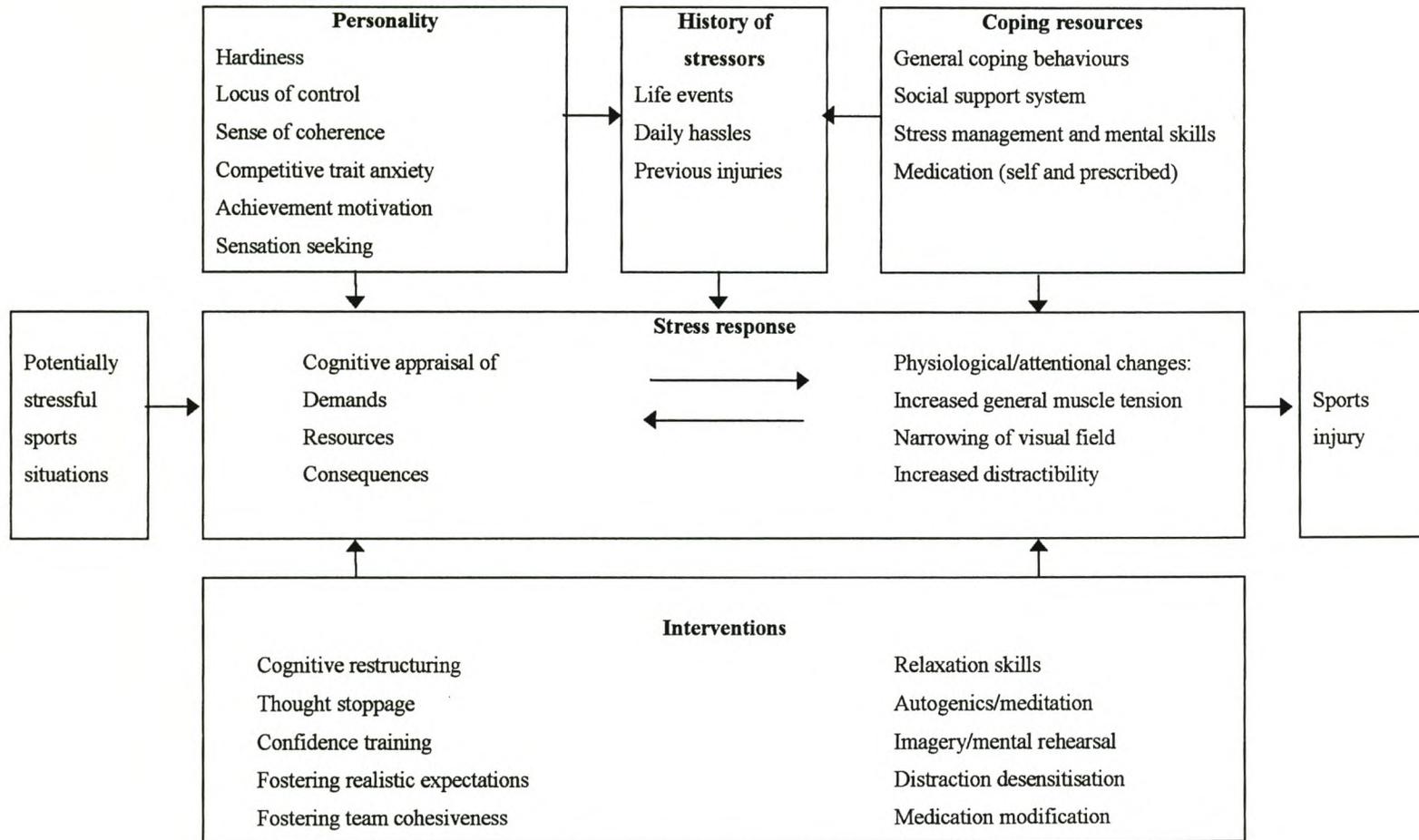


Figure 2 A model of stress and sports injury (Andersen & Williams, 1993)

Resources

It would be important for the athlete to feel that he/she is in control of the situation and having the necessary resources to cope with the situation. Thoughts of losing, or not about to do well, will probably contribute to the stress response (Andersen & Williams, 1993).

Consequences

Also of great importance is what the athlete's perception of the consequences of performance. If the athlete thinks that if he/she is not going to do well and will be left out of the team, exaggerated stress responses may follow (Andersen & Williams, 1993).

Physiological/Attentional changes

As can be seen from the model, when athletes are placed in a stressful situation such as a demanding practice or a crucial competitive situation, the athlete's history of stressors, personality characteristics and coping resources contribute interactively to the stress response. It is the severity of the resulting stress response that puts an athlete at increased risk of being injured. The model bases its predictions on the assumption that two of the basic mechanisms behind the stress-injury relationship are increases in general muscle tension and loss of attention during stress. The central hypothesis of the model is that athletes with personality characteristics that tend to worsen the stress response and with few coping resources will, when placed in a stressful situation, be more likely to assess the situation as stressful and exhibit greater muscle tension and changes in attention. The end result is that these athletes are at greater risk of injury compared to athletes with the opposite profile (Williams & Roepke, 1993).

Increased muscle tension

According to Nideffer (1983) the most common changes that take place during the stress response are generalised muscle tension and disruptions in attentional focus. Unwanted simultaneous contraction of agonist and antagonist muscle groups is a common response to stressors. This generalised muscle tension can lead to fatigue, reduced flexibility, motor co-ordination and muscle efficiency. An end result of this could be a greater risk for incurring injuries such as sprains, strains and other musculoskeletal injuries (Williams & Roepke, 1993). Andersen and Williams (1993) describe the athlete's muscles as "fighting" themselves and this would therefore make it difficult for the athlete to quickly generate the motor patterns necessary for moving out of harm's way in a dangerous situation (e.g., a baseball or squash-ball approaching the face).

Narrowing of visual field

Stress also causes the attentional field to narrow involuntarily and to become more internally focused. The result is that the athlete's ability to analyse, to deal with information, to make rational decisions, and even to be aware of what is going on in the environment, is severely restricted (Williams & Roepke, 1993). This can ultimately lead to injuries to the athlete who is not able to respond to cues in the periphery. Disruptions in attention could be the result of preoccupation with stressful events and their possible negative consequences, or the blocking of adaptive responses. If such disruptions lead to a narrowing of peripheral vision, a potential injury could result if the athlete does not pick up or respond in time to dangerous cues in the periphery. Attentional disruptions may also cause the athlete to miss or fail to respond to vital cues in the central field of vision because of attention to task-irrelevant cues. Awareness of the physiological and attentional aspects of the stress response may also have an effect on the athlete's cognitive appraisal of stressful situations (Williams & Roepke, 1993).

Increased attentional distractibility

The cause of peripheral narrowing under stress is not clear. It may be that the demands of a situation exceed the athlete's resources, that available resources are allocated to more central tasks, leaving the periphery with fewer resources for processing information. Recent research on peripheral vision and stress suggest that in a dangerous situation an athlete fails to respond as quickly as in a less stressful situation. This delay or hesitation could set the athlete up for injury (Andersen & Williams, 1993). Attentional distractibility may also predispose the athlete to injury if attention to irrelevant cues diverts him/her from the task at hand. This shift in attentional focus may lead to injury through slips, falls, and poor landings (Andersen & Williams, 1993).

Psychosocial Factors

In the Andersen and Williams model there are three psychosocial factors that influence the stress response, namely personality traits, personal history of stressful experiences and coping resources (Andersen & Williams, 1993). Each of these will be discussed briefly.

Personality traits

According to Williams and Roepke (1993) any comprehensive model of the relationship of stress to sports injury would not be complete without considering personality. The stress-illness literature identifies many personality variables for their role in moderating the stress-illness relationship. Variables such as hardiness (Kobasa, 1979), locus of control (Rotter, 1966), and sense of coherence

(Antonovsky, 1985) are shown to be related to health outcomes (Andersen & Williams, 1993). Competitive trait anxiety (Martens, 1977), sensation seeking (Zuckerman, Kolin, Price, & Zoob, 1964) and achievement motivation are also included in the model because of their direct relevance to sport (Andersen & Williams, 1993).

Hardiness

The trait of psychological hardiness moderated the stress-illness relationship in several health studies (Kobasa, Maddi & Pucetti, 1982). Psychological hardiness is a constellation of characteristics such as curiosity, willingness to commit, having a sense of control over life events, and seeing change as challenging and a stimulus for development (Williams & Roepke, 1993). This concept will be discussed in more detail later in this chapter.

Locus of control

This variable was included in the list of personality variables because of its closeness to the hardiness concept. Athletes with an internal locus of control were found to be less likely to be injured (Andersen & Williams, 1993).

Sense of coherence

Like locus of control, sense of coherence closely resembles the concept of hardiness. According to Williams and Roepke (1993), individuals with high life events stress who scored high in either hardiness or sense of coherence, or who were more internal in their locus of control, experienced fewer health problems than individuals with high life event stress and none of the mentioned personality traits. They would also probably be less likely to be injured.

Competitive trait anxiety

Trait anxiety could be described as a general disposition or tendency to perceive situations as threatening and to react with an anxiety response (Spielberger, 1966). Athletes with a high need to avoid failure or with high competitive trait anxiety, exhibit strong stress responses when placed in stressful situations, thus increasing the likelihood of injury. Athletes with lower competitive trait anxiety were less likely to experience severe injury (Andersen & Williams, 1993).

Achievement motivation

Achievement motivation addresses both the need to succeed and the need to avoid failure (Williams & Roepke, 1993). Athletes who rate high on achievement motivation may be at risk in certain situations. When the athlete feels a strong need to excel, but lacks adequate skills, he/she might

become frustrated and stress may result. When confronted by a superior opponent, a high-achiever athlete may also experience relatively greater stress (Andersen & Williams, 1993).

Sensation seeking

This variable is hypothesised as moderating the influence of stress on health. Sensation seekers are those individuals who like taking risks and enjoy the strange and unfamiliar. Sensation avoiders, on the other hand, do not like the unfamiliar, and tend to stay away from risky activities. At the moment the role of sensation seeking in sports injury is not completely clear. Sensation seekers may be at greater risk of injury through their willingness to take chances, but alternatively they may be at lower risk because they are less likely to cognitively appraise extremely demanding situations as stressful (Andersen & Williams, 1993).

History of stressors

This includes life events and daily hassles. A major weakness of earlier stress-injury studies is the fact that only major stressful events were considered (Williams & Roepke, 1993). In fact, stress may also stem from minor daily problems, irritations, or small changes an individual may encounter such as heavy traffic, bad weather or unchallenging work. The importance of smaller crises is underlined in the fact that a number of researchers (Burks & Martin, 1985; Kanner, Coyne, Schaefer & Lazarus, 1981) found that the measurement of daily hassles resulted in better prediction of the effects of stress on psychological symptoms and illness than the measurement of life events.

Life events

In 1967 Holmes and Rahe undertook a now classic study on the relationship of major life events to health outcomes. These researchers demonstrated a connection between the number of major life changes a person experience and his/her likelihood of becoming ill. Originally they developed the *Social Readjustment Rating Scale* (SRRS) to measure life events. This scale listed 40 major events ranging from death of a spouse as the most stressful to minor violations of the law as the least stressful. Within a few years the life-events approach to health research was inevitably also applied to sports injury. Holmes (1970) found a positive correlation between major life events and injury in football players. Since that study more than 20 other studies on stress and sports injury risk have been conducted, with 18 of the studies finding some kind of positive correlation between life stress and injury (Andersen & Williams, 1993). In general research it was shown that the level of life-event stress is directly related to being injured. Although the strength of the life stress-injury relationship varies considerably across studies, it would seem that athletes with high life-event

stress are at least two to five times more likely to be injured than athletes with low life-event stress (Andersen & Williams, 1993).

Daily hassles

Daily hassles are those every day stresses and strains of living that may or may not be connected to major life events. These hassles have been shown to be predictors of health outcome (Kanner et al., 1981), psychological distress (Monroe, 1983) and stress responsivity (Williams, Tonyman & Andersen, 1990, 1991), but not injury vulnerability (Blackwell & McCullagh, 1990).

Previous injuries

The previous history of injuries may also be a significant consideration. Athletes may return to competition before being physically fully recovered on the one hand, or on the other hand may be physically ready for participation, but not psychologically ready to return to play (Andersen & Williams, 1993).

Coping resources

There is evidence that coping resources influence injury outcome both directly and indirectly (Andersen & Williams, 1993). Coping resources comprise a wide variety of behaviours and social networks that help the athlete deal with the stresses of life, problems and disappointments, but also joys. Coping resources may be environmentally based (e.g., social support) or of a personal nature, such as personal control and good nutrition. The stress-illness literature largely supports the view that coping resources and general health are closely related (Williams & Roepke, 1993). Williams, Tonyman and Wadsworth (1986) found the strongest predictor of injury among volleyball players was a low level of coping resources. Generally researchers found that individuals with high life-stress levels and high coping resources have fewer health problems than high life-stress individuals with low coping resources (Williams & Roepke, 1993).

General coping behaviours

In the Williams et al. (1986) study the *Vulnerability to Stress Questionnaire* (Miller & Smith, 1982) was used to measure general coping resources such as eating, sleeping and exercise habits. Social support resources, such as social activities and friendships were also measured. It was found that lack of good general coping behaviours easily lead to higher levels of stress and thus a greater risk of injury.

Social support system

The extent and kind of social support system is a more specific coping resource. Social support typically considers the presence of others whom we know value and care for us and on whom we can rely (Sarason, Levine, Basham & Sarason, 1983). It would seem that individuals feel more capable of dealing with stress when they believe they are part of a caring network of significant others. In a study by Coddington and Troxell (1980) it was found that football players who had their social networks disrupted by family instabilities (e.g., divorces, deaths), showed more injuries than those players who did not suffer the same instabilities. The mere presence of a good social support network seems to inoculate athletes against injury or may soften the effects of every day life events, daily hassles and stress (Williams & Roepke, 1993).

Stress management and mental skills

Other coping resources that may influence an athlete's response to stress are stress management techniques and mental skills (also referred to as psychological skills). These may include the ability to concentrate, stay positive and regulate arousal (Andersen & Williams, 1993). These psychological techniques are not only resources, but are also interventions for dealing with stress (Williams & Roepke, 1993). In a study done by Smith, Smoll and Ptacek (1990c) it was found that male and female high school athletes who were low in both social support and mental skills, exhibited a great injury risk. It would seem, however, that the athletes most at risk are those individuals who are low in all three variables of coping resources, social support and mental skills (Williams & Roepke, 1993).

Medication (self selected and prescribed)

The last coping resource included in the model is that of medication. This could either be prescribed or self-selected medication. Drug use is common in many societies and the use of these substances may influence the cognitive perception and physiology of an athlete, thus also affecting the stress response and injury probability. It is often difficult to assess the extent to which drugs are used, because of the clandestine nature of drug use or abuse. However, programmes for the modification of drug use and abuse should not only help in injury prevention, but in almost all aspects of the athlete's life (Williams & Roepke, 1993).

Interventions

In the Andersen and Williams model (see Figure 2) there are two groups of interventions that are hypothesised to attenuate the stress response by addressing either the cognitive appraisal or the

physiological/attentional aspects (Williams & Roepke, 1993). As most of the interventions will be discussed in more detail further on in this work, it will suffice to just mention them at this time. Under the cognitive interventions the following are found: Cognitive restructuring, thought stoppage, confidence training, fostering realistic expectations and fostering team cohesiveness. Under the attentional/physiological interventions, relaxation skills, autogenics/meditation, imagery/mental rehearsal, distraction desensitisation and medication modification are addressed.

The list does not exclude other interventions that may influence moderator variables of coping resources and personality factors. Some of the techniques that should receive more attention are the improving of coach-athlete communication, techniques to improve confidence and a sense of belonging and techniques to eradicate stress-creating thought patterns. Interventions aimed at lowering arousal and enhancing concentration should also be considered (Williams & Roepke, 1993).

Assessing injury risk

Andersen and Williams (1993) propose a two-step evaluation process that includes physiological and attentional factors to strengthen the predictive power of injury risk management. As a first step they propose the obtaining of a combination of measures of personality, history of stressors and coping resources that are pertinent to the athletes assessed. Sport-specific measures should be used whenever possible.

The second step would be a physiological and attentional assessment comprising of a measurement of generalised muscle tension that includes measurement of a non-involved muscle (e.g., frontalis), while the athlete performs a complex visual motor task under baseline and stress conditions. Stress conditions may include a combination of environmental conditions, crowd noise, or any other factor that under normal circumstances causes stress for that athlete. An increase in muscle activity in a non-involved muscle group during stress would indicate an overall pattern of excess muscle tension. If performance in the visual-motor task deteriorates during stress, it would indicate a disruption of motor skills, with the accompanying increase of injury risk and diminishing performance (Andersen & Williams, 1993).

Methods such as these should however not be used to label athletes as “injury prone” or to exclude athletes from sport, because it may result in a self-fulfilling prophecy. Only high-risk individuals whose health and performance could be jeopardised should be identified in this way (Andersen & Williams, 1993).

EXTENSION TO THE MODEL OF STRESS AND SPORTS INJURY

In the Andersen and Williams (1988) model, the end-result is “sports injury”. It is very important not to think of sports injury as an end result, but rather as a starting point for injury rehabilitation. Grove and colleagues have suggested a modified form of the above-mentioned model (Grove & Gordon, 1991; Grove, Hanrahan & Stewart, 1990) of which a diagram is presented in Figure 3. The most important difference is that this modified model has an end result of “recovery and return to competition” by the injured athlete. It is also important to realise that this extension of the model considers the stress response to be one manifestation of the interplay among cognitions, physical reactions and behaviours during rehabilitation. Two general influences on the psycho-physiological aspects of the rehabilitation process are also included. They are “injury-related factors” and “treatment-related factors” (Grove, 1993). Any of the general factors mentioned may be a legitimate research area, but Grove (1993) suggests that attention should be directed to personality variables that may influence the athlete’s thoughts, feelings and behaviours during injury rehabilitation. Therefore injury-related factors and treatment-related factors will not be discussed any further.

Important personality variables

Of the number of personality variables that may have health-related consequences, it would be reasonable to assume that some of them will affect the injured athlete’s thoughts, physical reactions, and/or behaviours during rehabilitation (Grove, 1993). According to Grove (1993) there are three important personality factors that would especially influence rehabilitation, namely explanatory style, dispositional optimism and hardiness. These will each be discussed briefly.

Explanatory style

Explanatory style is a relatively permanent tendency for an individual to explain significant events in a certain way. Individuals may exhibit a “pessimistic explanatory style” and would tend to explain negative events as personally caused, stable over time and global in nature. Examples of this could be “It’s my own fault I got injured”, “I will not be able to compete for a long time” and “This injury is going to disrupt my whole life”. Pessimistic individuals tend to explain positive events as externally caused, unstable over time and specific in nature. For instance, statements like “Healing just takes time”, “My progress is likely to fluctuate”, and “If I am to recover, I will have to be treated by this particular therapist” are common (Grove, 1993).

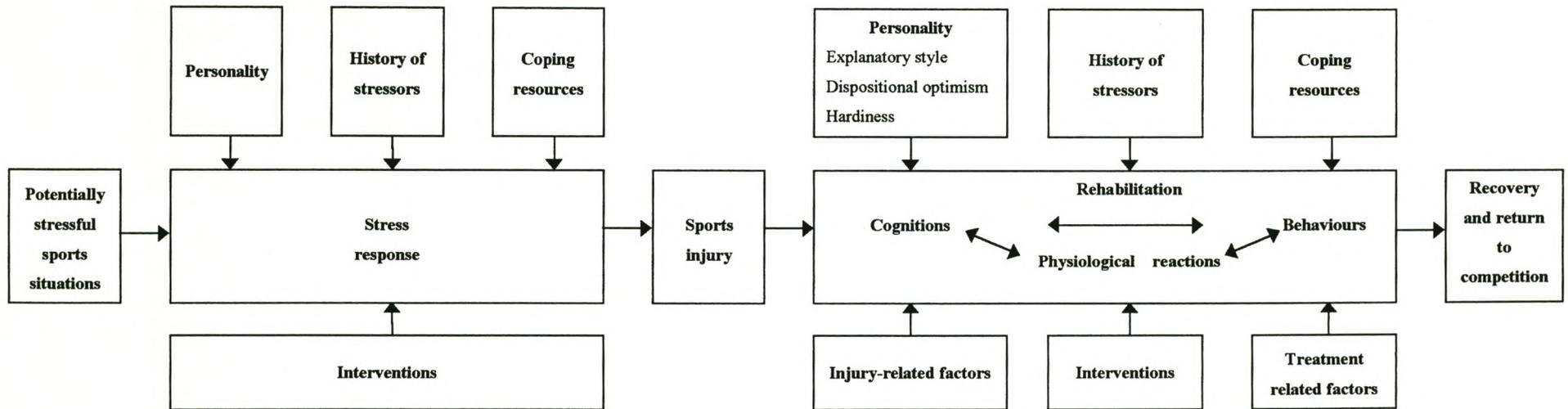


Figure 3 An extension to the model of stress and sports injury (Grove, 1993)

Peterson and Seligman (1987) reported that there are a growing number of studies that show various components of pessimistic explanatory style to be connected with undesirable health consequences. These researchers suggest that a number of mechanisms may be responsible for this relationship. There is a possibility that the fatalistic outlook of pessimists causes them to experience more negative life events, to neglect their basic health care and to become passive in the face of injury. Pessimistic explanatory style may also increase the chances of social isolation, loneliness, and/or depression. According to Gordon et al. (1991a) all three of these factors have been noted as negative indicators of psychological adjustment to injury among athletes.

Hardiness

As mentioned earlier in this chapter, the concept of “hardiness” was defined by Kobasa (1979) as being a constellation of personality characteristics comprising different components with the three most important being: commitment, challenge, and control. Commitment entails a strong belief in one’s own value and self-worth as well as a sense of purpose and involvement in whatever one is doing. Individuals scoring high on challenge show a tendency to view difficulties and change as problems to be overcome rather than threats to one’s personal security. They also exhibit a high degree of cognitive flexibility that permits effective appraisal of potentially threatening events. Control refers to a strong feeling of having personal power over the events in one’s life. Individuals with a strong sense of control assume responsibility for their actions and use effective thinking, decision-making and coping strategies to avert feelings of helplessness.

Dispositional Optimism

In contrast, but still bearing some resemblance to explanatory style, is the variable “dispositional optimism”. This variable refers to the general expectancy for good rather than bad outcomes to occur (Scheier & Carver, 1987). It is believed that such general expectancies influence health because they determine the extent to which an individual is willing to initiate health-orientated behaviours and persist with them while faced with difficulties.

Compelling evidence for the link between optimism and health was obtained in a study of recovery from coronary bypass surgery by Scheier, Matthews, Owens, Magovern, Levebre, Abbott and Carver (1989). They assessed mood and coping strategies before surgery, physiological reactions during surgery and progress after surgery of one group of optimists and one group of pessimists. It was reported that the optimists reported less depression and hostility than the pessimists did just prior to surgery. Optimists also had more positive consequences before, during, and after surgery. It

would also seem that optimists were more inclined to make plans and set goals for their recovery prior to surgery than the pessimists were. There was also a general tendency for optimists to recover faster than pessimists would.

Scheier and Carver (1987) suggested that both behavioural and physiological mechanisms could be responsible for the apparent connection between optimism and health. From a behavioural perspective it would seem that pessimists cope less effectively with stress than optimists. Optimists show a tendency to accept the reality of negative situations, use more problem-focused coping strategies and seek more social support, while pessimists on the other hand, show a tendency to deny the reality of negative situations, disengage from their coping efforts and become preoccupied with their emotional distress.

From a physiological perspective it would appear that pessimists are more reactive than optimists are. Van Treuren and Hull (1986) suggested that optimists and pessimists exhibit differential changes in blood pressure and pulse rate when exposed to success and failure feedback. It is, however, not only cardiovascular reactivity that differs between optimists and pessimists. According to Levy and Wise (1987) there is evidence that an optimistic orientation may be positively related to natural killer cell activity, whereas a pessimistic orientation may be associated with progression from pre-cancerous to cancerous states (Goodkin, Antoni & Blaney, 1986). Both these findings imply that immunological functioning may be related to dispositional optimism (Scheier & Carver, 1987).

The effect of these variables on injury recovery

Grove et al. (1990, October) explored the influence of explanatory style, dispositional optimism and hardiness on a sample of 21 sport performers who required anterior cruciate ligament (ACL) surgery. For three months following surgery the athletes completed several personality scales and responded to a mood inventory once a week. Periodic explanations for rehabilitation progress were also obtained and transformed into an index of explanatory style. Athletes scoring high or low on the concept of hardiness were then compared in terms of their emotional states during rehabilitation. The findings of this investigation suggested that personality did indeed affect certain mood states during the recovery process. Athletes with a pessimistic explanatory style showed greater amounts of depression and anger during the first month of rehabilitation than those with an optimistic style. It was also shown that dispositional optimism tended to influence mood, but for the full 12-week period rather than just the first month. Injured athletes with high optimism scores displayed a tendency toward less depression and lower levels of confusion than did athletes with low optimism

scores. Less overall mood disturbances were also reported for athletes with high total hardiness scores than did those scoring low in total hardiness.

In conclusion, it would seem that injuries form a significant part of athletes' lives. In the past, emphasis has often been placed on the physical rehabilitation of sports injuries, with little regard for the psychological impact of injuries. The role of personality and psychological factors that impact on injury vulnerability and resiliency has also largely been ignored. Life stresses seem to play a large part in the occurrence of sports injuries, continually becoming a focus of attention for many researchers. The use of coping resources in influencing injury outcome is also receiving increasing attention.

Chapter Three

CAUSES AND STRESSES OF SPORTS INJURIES

CAUSES OF INJURY

Physical injury, according to Brewer (1998a), is an unfortunate by-product of sport participation and exercise. Increasing numbers of people are regularly participating in physical activity and as a result sports injury has emerged as a significant public health concern. The causes of sports injury vary a great deal, with physical factors such as over-training, equipment failure and poor playing conditions believed to be major contributing factors (Cox, 1994). Heil (1993) also includes factors such as eating disorders and drug abuse. Williams and Roepke (1993) believe factors such as body build and level of conditioning are also important, but emphasise that psychological factors also contribute to injury vulnerability and resiliency.

Most of the mentioned physical factors that could cause injury are beyond the control of the athlete, except over-training. This factor should therefore receive some further attention.

Over-training syndrome

Physical exercise, according to Froehlich (1993), induces physiological reactions that result in adaptive changes within the individual. These changes may be maintained for a few hours or even days and may parallel transitory symptoms of fatigue and decreased performance until such time that a higher level of adaptation is established. Athletes are faced daily with physical and mental stresses, which according to Selye (1956), could give an individual the capacity to achieve a higher level of adaptation. However, if the balance between load and coping capacity is disturbed, the individual is in danger of developing over-training syndrome (Froehlich, 1993). There is no accurate and universally accepted definition of over-training (Ryan et al., 1983), but terms such as staleness, burnout, overwork, over-training and overreaching are also commonly used to describe the condition.

According to Kuipers and Keizer (1988) athletes are at risk of experiencing over-training syndrome when they are subjected to heavy training loads for a long time, moving them beyond a critical point and resulting in a prolonged period of decreased performance and a profound feeling of

fatigue. Israel (1976) differentiated between two types of over-training syndrome: sympathetic and parasympathetic. The sympathetic type is characterised by increased activity of the sympathetic nervous system and shows symptoms similar to those of hyperthyroidism. It has an enormous effect on the health of an athlete, because it literally makes the athlete feel sick. Females, beginner athletes and athletes taking part in non-endurance sports are most susceptible to this syndrome.

The parasympathetic type, on the other hand, only shows nondescript signs, making it much more difficult to recognise, which often delays diagnoses. The parasympathetic over-training syndrome is preceded by a short period of increased activity of the sympathetic nervous system, with parasympathetic activity subsequently dominating. Highly trained endurance and elderly athletes are particularly at risk from this type of over-training syndrome (Froehlich, 1993). Symptoms common to both types of over-training syndromes are the following: decreased performance, rapid onset of fatigue, generalised pervasive fatigue, loss of motivation, emotional instability, reduced concentration, increased susceptibility to infections, and most importantly, increased incidence of injuries.

According to Froehlich (1993) there appear to be two different patterns of over-training syndrome involved in the incidence of injuries. Firstly, injury and over-training occur in parallel as separate consequences of the same underlying mechanisms, or secondly, injuries occur as a secondary effect of over-training symptoms. When injury and over-training occur in parallel, all the factors contributing to over-training syndrome may simultaneously affect the musculoskeletal system, which could result in overuse injuries. According to Stanish (1984) this is, for example, reflected in the predisposition of over-training athletes to stress fractures. Nervous co-ordination of working muscles and the perception of movement and fatigue could be affected by chronic muscle soreness (in conjunction with mental and emotional instability), leading to injury. Athletes may not be able to identify risky situations adequately or quickly enough to respond with appropriate action, especially during bouts of intensive exercise or in sports that involve high speed or direct body contact (Froehlich, 1993).

UNDERSTANDING INJURIES

Serious athletes devote a great deal of time and energy to obtaining optimal performance in sport. When any significant injury occurs, it is thus very likely to be perceived as a traumatic life event with physical, as well as psychological implications (Williams & Roepke, 1993). Individuals may experience injuries in different ways, some athletes adjusting to the stressful event with little difficulty, while others are almost devastated by the experience. According to Petrie (1993) serious

injury is one of the most emotionally and psychologically traumatic experiences suffered by any athlete. It can deprive an athlete of his/her career at any time and because athletes are so dependant on their physical power and skills, having that taken away can be tremendously threatening to them. Some injuries are so severe that a highly competitive athlete cannot recover from it to return to previous levels of competition, changing his/her life forever. The sense of loss is potentially greatest for top-level athletes at the peak of their competitive careers, because the more time invested in sport and the greater the success achieved the harder it is to face serious injury.

It has been suggested by Roepke (1990) that psychological interventions that address the troubling aspects of injury may greatly contribute to physical rehabilitation. Support for psychological factors being related to enhanced healing also comes from a study by Ievleva and Orlick (1991). They found that athletes who healed quickly were more likely to have used goal setting, positive self-talk, stress control and mental healing imagery compared to athletes who healed more slowly.

In order to determine which psychological interventions are likely to benefit an athlete in the management of his/her injury, it is essential to first try and understand the injury from the athlete's perspective. This would include the meaning the injury has for the athlete as well as the impact the injury has had on the athlete's life. Treating injured athletes from a psychological perspective would mean that clear and open channels of communication must be established between such athletes and the treatment providers (Williams & Roepke, 1993). The athlete has to feel assured that he/she is interacting in a supportive environment in which revealed information will be treated confidentially. Members of the treatment team must try to create a supportive environment so that athletes will be more likely to disclose distressing thoughts and feelings related to their injuries. Members of the treatment team can include sport psychologists, coaches, sports medicine physicians, physiotherapists or sports trainers, but importantly they should all possess good listening skills. They must be able to respond to the athlete in an empathic, non-judgmental, non-threatening manner (Williams & Roepke, 1993).

When learning about an injury as much information as possible has to be obtained. The athlete's personal history of injury should be ascertained. Factors that are likely to influence the intensity of the athlete's psychological reaction to the event should be identified. According to Sanderson (1978) the nature of the injury, type of sport, level of competition, and personality structure of the athlete should be identified. Weiss and Troxel (1986) add to this the time of the season and the context in which the injury occurred, because these might all impact on recovery. The way in which the athlete perceives and handles the injury may be influenced by the way the athlete handles stress,

his/her lifestyle habits, his/her abilities and skills, defensive techniques, emotional factors, and coping skills (Yaffe, 1983).

Sports participation may have physical, psychological, and social significance for an individual, making it important to explore the motivation for his/her involvement in sport, or meaning the athlete has assigned to it (Wiese et al., 1991). There may be several reasons for the athlete to take part in sport: it may provide him/her with a sense of personal mastery, independence, autonomy and self-control (Eldridge, 1983). It could also provide him/her with a sense of personal attractiveness (Sanderson, 1978). Alternatively, exercise may function as a stress reducer and promote emotional catharsis (Raglin & Morgan, 1987; Robbins & Joseph, 1985). According to Milliner (1987) people may be drawn to sport involvement by the fantasy of athletic sexual prowess or may participate because sports activity allows one to engage in aggressive behaviour that is socially condoned. Social status could be derived from sports participation if that is one's primary source of social interaction (Eldridge, 1983). If the reasons for taking part in sport are so diverse, it stands to reason that the losses associated with the inability to participate may be similarly diverse and widespread. According to Astle (1986) losses may be experienced in such areas as social roles, self-worth, attractiveness, and occupational self-image. Understanding and exploring the meaning of the injury may help to uncover whether there are secondary motives or underlying feelings of psychological distress associated with the injury (Williams & Roepke, 1993).

It is important to remember that injury presents not only a physical problem, but also a challenge to maintain emotional equilibrium in the athlete's mental game. The nature of injury can be viewed from different perspectives. In this chapter injury will be approached from the following three perspectives: the athlete's, the treating physician's and the sport psychologist's. Each will now be discussed in more detail.

Injury from the athlete's perspective

Athletes take part in sport for various reasons. One of the major forces drawing millions of people all over the world to engage in sports, is the health-related benefits that have been documented through many varied areas of research. Athletes vary tremendously in their level of competence, from the elite professional athlete to the weekend participant. All athletes though, share common ground in that when injury strikes, each is denied the opportunity to train or compete and are denied access to the benefits sport provides to them (Petrie, 1993).

As previously mentioned, serious injury is one of the most emotionally and psychologically traumatic events that an athlete may experience. Injury can end an athlete's career at any moment, threatening the feelings of invincibility and immortality that all young people have to some degree. Some athletes refuse to give up sport after an injury and keep on searching for a solution to the limits imposed on them by the injury. Unfortunately a solution to this rarely exists, and in the process tremendous frustration is experienced. One of the problems of injury is that whether it is minor or serious, it presents a challenge that goes beyond the physical aspect of rehabilitation. Other factors, such as the expectations and reactions of others (team-mates, coaches, medical staff and media) complicate the issue. Negative media reaction to slow injury recovery can be a cruel blow to a player (Petrie, 1993).

Living with injury

Not all injuries prevent athletes from competing. Athletes live with injuries all the time and if they were to stop playing every time they got a bump or bruise, they would never achieve their maximum potential. Athletes are usually very motivated to compete and have a strong desire to continue to do so in spite of injury. Add to this the cold reality that there are many other athletes to replace an injured player and you get the situation that athletes do whatever they can to return to play as soon as possible. Sometimes they opt for radical or aggressive treatment procedures that provide the possibility of a quicker return to play, even though these procedures may carry a greater risk of re-injury. According to Petrie (1993) the best treatment strategies are mostly conservative by nature, but because there are so many options available, it is important that coaches and physicians who can provide an objective point of view advise the athlete.

It is also good if the injured athlete can remain close to team-mates and other people in the sport organisation to provide encouragement. However, athletes should be allowed the freedom to choose whether they want to continue attending team practices, because some injured athletes find it painful watching other people take part in a sport they love when they themselves cannot.

The doctor-patient relationship

The doctor-patient relationship is very important, because the bond that is the basis of this relationship is built around the special needs of the injured athlete and the ability of the physician to meet those demands. Athletes need to feel confident that they are going to recover fully, while the physician needs to remain positive yet realistic about rehabilitation. Sport psychologists need to establish similar bonds with injured athletes if they are to be a successful part of the treatment team. Athletes should not be pressured into seeing a sport psychologist, because that may imply that the

athlete has problems he/she does not acknowledge. Athletes must feel that their interaction with the sport psychologist is for their own benefit and not for the benefit of the team management.

Members of the treatment team need to play a number of different roles aside from providing purely medical services. They must sometimes function as educators, carefully spelling out different treatment options to enable the athlete, who does not necessarily have the medical background, to make decisions that are in his/her best interest. Other times they may have to protect the athlete from others putting pressure on him/her to compete while not yet fully recovered, or in other instances, rein in an athlete who wants to compete, protecting him/her from the danger of re-injury (Petrie, 1993). The treatment team also has another important task in preparing athletes for surgery. Most athletes have concerns about surgery, mostly because of a fear of the unknown. It is therefore very important for the treatment team to build up a good relationship with the injured athlete. If an athlete has trust and confidence in the team, as well as a positive attitude from the team, working through the possibilities and ultimately making the right decisions will be so much easier.

Returning to play

According to Petrie (1993) there are three types of injuries an athlete can experience. Depending on the type of injury, the decision to return to playing can be very difficult. The first type of injury makes it physically impossible for the athlete to continue participating in his/her sport and the decision is therefore quite simple. The second type of injury involves a great deal of pain and discomfort for the athlete, but no real danger of re-injury. This situation could cause problems for the athlete in deciding whether to return to play or not. The third and last type of injury falls into, what Petrie (1993) calls, a “grey area” where there is no clear best decision about whether to compete again or not.

There are two possible scenarios with regards to the last two types of injury. The first being that the athlete is not physically ready to compete yet, but he/she wants to return to play. The second scenario is that the athlete is physically able to return to play, but is reluctant to do so. Much depends on what time of the season the injury occurred, because if the athlete had been doing well up to the injury, he/she might feel that playing a few more games even though injured would not be such a big a risk. In a situation like this all the options must be discussed openly and the associated benefits and risks examined thoroughly. When there is a significant medical risk involved the final decision whether to return to play or not should purely depend on the player and the medical staff. Athletes should not be put under pressure to compete while injured. When the medical team believes that the athlete is ready to return to play and he/she is reluctant to do so, the athlete should

again not be pressured to compete. Such reluctance may reflect the makeup of a particular athlete. The help of the sport psychologist in determining the cause of the reluctance could be invaluable in a situation like this.

The sport psychologist also plays a large part in assisting athletes to cope with retirement. Retirement from sport is very difficult, especially when it is caused by injury. The fact that serious athletes are seldom prepared for retirement makes it even more difficult (Petrie, 1993). As previously stated, the more time invested and the greater the success, the harder it is to deal with retirement, especially when it is a sudden, unexpected event due to injury. In this respect counselling can assist athletes to adjust to a new lifestyle and cope with the emotional trauma. Counselling should also focus on helping the athlete apply the skills he/she used as an athlete in pursuing other careers. Counselling can even benefit athletes before retirement, because it can help them keep their lives in balance and encourage them to develop other interests so they do not become absorbed in focusing solely on their sport participation (Petrie, 1993).

Injury from the physician's perspective

Traditionally physicians and sports medicine specialists provide the first line of intervention when sports injuries occur. They are also recognised as having the leadership role on the medical team and the overall responsibility for treatment planning and decision making. Physicians are usually the first to encounter psychological adjustment problems in the injured athlete, whether they are related to the injury or not. However, medical health professionals typically lack systematic training in psychological intervention and they usually have to rely on their own experience to deal with situations like this (Heil et al., 1993). In addition to providing direct medical care, the physician is also called upon in varying degrees to serve as educator, protector and counsellor, with the psychological management of the injured athlete implemented as the physician fulfils these roles. Rehabilitation of the injured athlete can, according to Steadman (1982), be divided into three areas: (1) general physiological rehabilitation (e.g., aerobic conditioning, regaining overall strength and flexibility), (2) specific rehabilitation of the injured area and (3) psychological rehabilitation.

In all three of these areas the role of the physician as educator is increasingly emphasised. Athletes need to understand the *what*, *why* and *how* of their treatment and to feel that their sports medicine provider understands them. The sports medicine specialist who treats injury as a learning experience for athletes by involving them in the rehabilitation process, enhances their understanding of physical function and helps them to behave more safely in future. The role of the physician as educator can also be found in the explaining of medical conditions, procedures and terminology to

injured athletes. Graphic explanation of the basics of anatomy in relation to injury and the healing process, supplemented by use of medical illustrations and explanations of the methods of treatment, optimises understanding (Heil et al., 1993).

The sports medicine specialist also has a role as protector and it can usually be played in three different ways. Firstly the physician must protect the injured athlete from pressure to return to play before he/she is ready. Secondly the physician must protect the injured athlete from being maligned by others when rehabilitation does not proceed as expected. Thirdly, the physician must protect the athlete from himself/herself, given the fact that athletes face tremendous internal/external pressure to take risks to return to play (Heil et al., 1993).

One of the most fundamental roles of the physician, however, is that of counsellor. In this role the cultivation of trust and a sense of support is of paramount importance. The physician must make every effort to gain the confidence of the patient through careful listening to an athlete's concerns and accepting them at face value at first. By doing this, the emotional concerns of the patient are eased. Many athletes do not want to be referred to psychologists for counselling because of stigma attached to it, leaving the physician with the dilemma regarding the best use of his time and talents in optimal patient care (Heil et al., 1993).

Injury from the psychologist's perspective

Clinical sports medicine has developed in response to the large number of sport- and recreation-related injuries experienced by athletes all over the world. Booth (1987) and Kraus and Conroy (1984) put the annual figure of sports injuries in the United States alone at 3-17 million. Although the domain of sports medicine has traditionally been dominated by medical treatment providers, sport psychologists are more often included as members of sports medicine treatment teams (Heil, 1993; Silva & Hardy, 1991; Wiese-Bjornstal & Smith, 1993). Sports medicine treatment teams traditionally include physicians, physical therapists, sports trainers, chiropractors, exercise physiologists, massage therapists, nutritionists, optometrists, podiatrists and strength coaches, with sport psychologists being a more recent addition (Heil, 1993).

When an athlete sustains an injury, a wide variety of therapeutic modalities may be applied to treat and rehabilitate him/her. The initial physical trauma of the sports injury has to be addressed, either through first aid or emergency medicine and, depending on the nature of the injury, surgical intervention may be warranted. Once that is done, a period of rehabilitation is likely to follow, including regimens designed to enhance strength and flexibility of the injured area (Steadman,

1993). Although a number of empirical research findings indicate the relevance of psychological factors in the recovery from sports injuries, psychological intervention is not currently a customary practice in clinical sports medicine (Brewer, 1998c). However, it would seem that the role of the sport psychologist in the clinical sports medicine arena is likely to expand once sports medicine practitioners become more aware of the relevance of psychological factors in the rehabilitation of sports injuries. Not only can sport psychologists contribute to the rehabilitation of sports injuries, but also in the prevention of such injuries. A few studies have been conducted in which psychological interventions designed to reduce the risk of sports injury have been implemented and evaluated (Davis, 1991; DeWitt, 1980; Kerr & Goss, 1996; May & Brown, 1989).

According to Brewer (1998c) psychological factors have been shown to influence the rehabilitation of sports injury. Depending on the nature and magnitude of the trauma, sports injury may require both physical and psychological adjustment by the athlete. Research has shown that sports injury can be a major source of stress and can produce emotional disturbance (Brewer & Petrie, 1995). Recent estimates suggesting that approximately 5-13% of patients with sports injuries experience clinically meaningful levels of psychological distress (Brewer et al., 1995a; Brewer et al., 1995b; Brewer & Petrie, 1995). Brewer (1998c) suggests that psychological services may be a most appropriate course of action for those athletes who experience high levels of emotional distress.

STRESSES OF INJURY

Pargman (1993a) asks the question: "Is there anything redeeming about athletic injury?" (p.5). He proceeds to answer that question by stating that at least from an athlete's point of view, anything redeeming about it would be of a secondary or indirect nature. Good things can come from physical injuries. Athletes may be forced to reorder their lives and life-styles or to develop creative and fulfilling strategies to meet the demands of these physical challenges. New and meaningful relationships may be established with caregivers, but given all of this, physical injury is essentially a negative experience that athletes typically and fervently try to avoid.

The stresses of injury can typically be divided into four categories, namely the physical, emotional and social well-being of the injured athlete, as well as the effect of an injury on the self-concept of the athlete. Each of these categories will now be discussed in more detail.

Physical well-being

When one looks at the physical well-being of an athlete with an injury, it is first of all important to understand what the sensation of pain means to the athlete. Important also is the physical rigors of

treatment and rehabilitation, what it means to be temporarily physically restricted, what happens when there is permanent physical damage and lastly what happens when the injury is so severe that the athlete has to retire from sport as a result of it.

Pain of injury

Minor aches and pains are a routine part of the life of any athlete. Although they may be frustrating and irritating, they are generally accepted as part of the game. More serious injury however, is another matter, because it can result in downtime and has a generally disruptive influence on an athlete's life (Heil, 1993). The sufferer can largely see pain as a private and subjective experience. It cannot be precisely measured or objectively assayed and can at best be relatively scaled, qualified and described. It is a complex phenomenon that is often grossly oversimplified. Therefore, to study pain is not an easy task, but it would be clinically appropriate to assume that what a person says "hurts" (physically) is "pain" and that the bodily system responsible for the painful sensations is the nociceptive system (Fine, 1993).

According to Fine (1993) this has important implications for sport psychologists, because the perception of a sensation of pain is rarely isolated from an emotional response. In most acute pain situations, significant behavioural changes may occur, manifesting in sleep disturbance, alterations in libido and appetite, and frank depression. An individual may start with a discrete leg injury with localised pain and, over time if the problem is not corrected, end up with his/her whole being "hurting". Heil (1993) states that pain begins as a biological event that gives rise to psychological awareness. From this follows a search for meaning rooted in cognitive and affective processes, which subsequently serves as a guide for action.

Biology of pain

To understand the biology of pain, one first has to understand the various anatomical and physiochemical components that constitute the nervous (and pain) system. The basic operating unit of the nervous system is the nerve cell, or as it is usually called, the neuron. The vast majority of the approximately 15 billion neurons in the human nervous system are located in the brain and the rest distributed throughout the spinal cord and peripheral nervous system. A single neuron can be interconnected with thousands of other neurons, creating a network of neural connections of which the complexity is almost beyond human comprehension (Schneider & Tarshis, 1980).

Although the neuron is in many respects not much different from other kinds of cells, it has a very special purpose – to transmit information from one part of the body to the other. This information is

in the form of an electro-chemical signal, or the neural impulse. The neuron has a soma, or cell body, where it produces energy and protoplasmic fibres, called dendrites and axons, that extend from the cell body. These dendrites are responsible for the neuron's capacity to transmit information over long distances. Dendrites and axons differ in function, with dendrites being the "antennae" or receivers of information of the neuron and axons the "communication lines" of neurons, delivering information to other cells. Yet another difference between axons and dendrites is in the material surrounding them. Most axons are covered in a fatty sheath, called the myelin sheath, while no such sheath surrounds the dendrites. The myelin sheath is important. It not only speeds up the process of conduction through the nervous system, but also prevents signals from adjacent neurons from interfering with one another. Bundles of neurons form nerves that are the pathways of communication between the central nervous system (CNS) and the periphery (Schneider & Tarshis, 1980).

When a mild stimulus is applied to either the cell body or the dendrites of the neuron, it will produce an impulse that decreases in magnitude the further it travels from the point of stimulation. This type of neural activity in the neuron is called a graded (because its magnitude depends directly on the intensity of the stimulus) and decremental (because it diminishes as it travels from the point of excitation) impulse. However, the situation is different for axons. When a mild impulse is applied to the axon, it will not produce a neural impulse. In order to generate electrical activity in the axon, the stimulus must exceed a certain level of intensity, or in other words, it must pass a certain threshold. When this threshold is exceeded, the neuron will fire and transmit an electrical impulse that does not diminish as it travels along the axon. This can be seen as an all-or-nothing principle of neural activity (Schneider & Tarshis, 1980).

Current concepts define pain as essentially a psychological event that is triggered by a neurophysiological process. The purpose of pain is to initiate aversive action to protect the individual from different types of sensation and injury. A certain group of fibres, called receptors, contributes to more than one kind of sensation. There are essentially three different types of receptors: pressure, heat and what are known as wide dynamic-range fibres that carry many types of sensation (Addison et al., 1989).

The pressure receptors (mechanoreceptors) are primarily A-alpha fibres, which tend to carry the modalities of touch and pressure rather than pain itself. The heat receptors (thermoreceptors) are primarily A-delta and some C-fibres. The wide dynamic-range fibres (nociceptors) are polymodal

C-fibres. The polymodal nociceptors respond to noxious heat, to strong mechanical stimuli and to irritation of the skin by chemical agents (Addison et al., 1989).

There are a number of differences between the A- and C-types of neurons involved in transmitting pain sensations. One of the differences is that C-fibres (slow conducting neurons with unmyelinated axons) produce the sensation of dull, poorly localised and often lingering pain. A-alpha and A-delta axons (with myelinated sheaths) on the other hand produce well-localised and sharp pain. Both these specialised sets of neurons ultimately transmit information from the periphery to termination points within the dorsal horn of the spinal chord. This is the first modulating level of the CNS that affects the input of noxious stimuli (Torebjork & Ochoa, 1980).

The question can now be asked: What is the neural coding for pain? According to Schneider and Tarshis (1980) the “pattern” theory of pain is the most widely accepted theory in this regard. Instead of supporting the notion that the brain has a single area for pain, the pattern theory proposes that pain depends on the amount of neural activity, or the pattern of firing that engulfs the brain. There is always neural activity taking place in the brain, but according to the pattern theory, pain is only experienced when this activity reaches a particularly high level. As long as stimulation is intense, the stimulus need not be specific to any one sensory modality or to any one area in the brain in order to produce pain. Although the pattern theory of pain emphasises the amount of neural activity in the brain as the code for pain, specific neurons are still thought to play a role in the coding process. These specific neurons are important – not because of the place they go, but because of their pattern of fire. Pain results when an area of the body is intensely stimulated, causing many more neurons to fire than would under normal circumstances. These newly activated neurons are also presumed to have a higher threshold than the neurons that respond under normal circumstances. It is, however, important to note that it is not the activity of the high-threshold neurons alone that produces pain, but a combination of activity in the high-threshold neurons with the already existing activity in the low-threshold neurons. It is especially high-threshold polymodal C-fibres that seem to play a role in the experience of pain (Schneider & Tarshis, 1980).

Although pain is experienced by just about all people, surprisingly little is known about its nature. It is generally recognised that pain is produced by an injurious stimulus and that the removal of the stimulus produces relief from pain. According to Schneider and Tarshis (1980) at least three pain syndromes seem to defy this generalisation. One is phantom-limb pain experienced by amputees long after limbs have been removed and healing has occurred. The second example is that of causalgia, a burning pain associated with bullet wounds that often continues after the wound has

healed. Neuralgia, or pain that persists after disease or infection in the peripheral nerves has cleared up, is a third example. In many of these instances the pain produced by the injury is often far worse than the injury itself. The important question to ask here is how it is possible for the sensation of pain to be present without a corresponding stimulus to produce it. According to Melzack and Wall (1965) the answer lies in polymodal C-fibres and their unique relationship with other somesthetic circuits in the nervous system. This led them to their so called “gate-control theory” of pain. See Figure 4.

The key aspect of Melzack and Wall’s (1965) gate-control theory is the proposal of a neurological “gate” within somesthetic circuits. Pain is said to be experienced when this gate is open. In their view, pain is initiated by slow-conducting, high-threshold polymodal C-fibres, but the firing of these fibres alone is not enough to cause the sensation of pain. The C-fibres must also trigger the firing of neurons known as dorsal horn cells, which are connected to the brain. The high firing rate of these dorsal horn cells (See “Spinal gate” in Figure 4) is seen as the opening of the hypothetical gate. Fast-conducting A-fibres also play an important part in the gate-control theory.

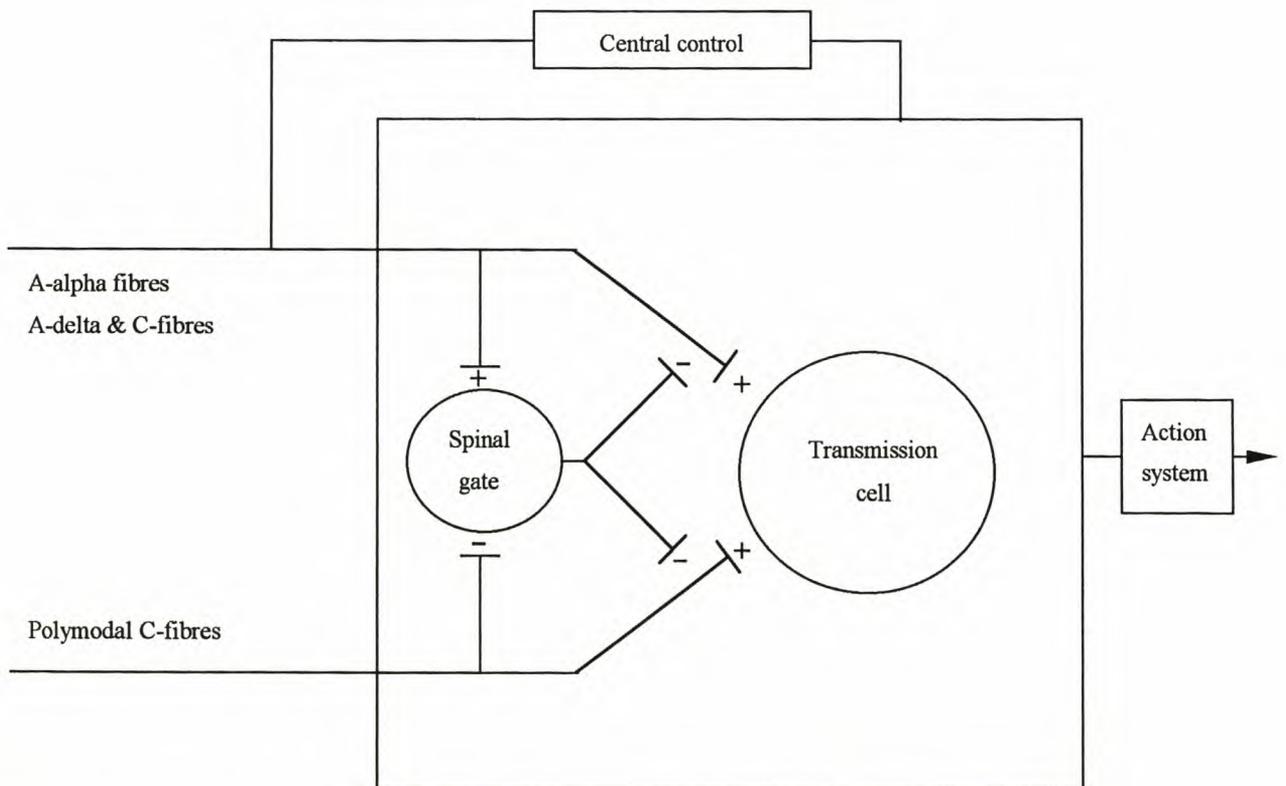


Figure 4 Gate control theory of pain (Addison et al., 1989)

These fibres, contained in the spinal nerves, are capable of inhibiting the firing of the dorsal horn cells, acting in effect as a lock on the gate. The inhibitory effect of the A-fibres is mediated by a group of interneurons located in the *substantia gelatinosa*. When these interneurons are stimulated by A-fibres, they inhibit the firing of dorsal horn cells. This leads to the situation that when both A- and C-fibres are active together the dorsal horn cells will fire less, resulting in less pain than there would be if the C-fibres were firing alone. The faster the A-fibres are firing, the less the pain experienced by the individual. However, when A-fibre activity slows down or the fibres are destroyed or damaged through injury, almost any stimulation of C-fibres will result in the sensation of pain. The experience of phantom-limb pain, causalgia and neuralgia seems to support this theory, because these conditions are usually accompanied by selective damage to A-fibres, with the resultant loss of normal inhibition exerted by the gate-control system. The remaining C-fibres continue to transmit activity to the dorsal horn cells, resulting in excruciating pain (Schneider & Tarshis, 1980).

Neural mechanisms in the dorsal horn of the spinal chord that are activated by non-pain-producing peripheral nerve inputs, can thus serve to increase or decrease the flow of pain-producing impulses from the site of injury to processing centres in the CNS. This gating effect can inhibit pain signals before they reach those cortical regions of the brain that register pain as a specific perception. For example, pain experienced when an individual bumps his/her head, can be alleviated by rubbing the surrounding area. This mechanical stimulation causes A-fibres to fire, gating, or blocking the nociceptive impulses. This has important implications for sports participation, because pain due to injury or extreme exertion may be transiently “gated” by continued physical activity (Fine, 1993).

Chronic pain

As was mentioned previously, polymodal nociceptors are responsive to thermal, chemical and mechanical stimuli. They have a relatively small receptive field and will continue firing for several seconds even after the activating stimulus has ceased. After these receptors have been activated, they also retain a lower threshold to firing for subsequent stimuli. This property is known as sensitisation. According to Roberts (1986), sensitisation may also be a key physiological feature in the development of certain chronic pain disorders. Under certain circumstances, groups of peripheral receptors in the CNS may become so spontaneously reactive as a result of stimulation, that a pain-producing stimulus is no longer required for them to fire. This could result in the perception of pain without a pain-producing stimulus or event. In contrast to the polymodal

nociceptors, high-threshold mechanoreceptors have relatively larger overlapping receptive fields and rapidly signal strong mechanical stimuli.

Myofascial pain and sympathetically maintained pain syndromes may evolve as consequences of injury, causing pain that persists beyond routine healing time. It is of vital importance that members of the sports medicine treatment team recognise any of these syndromes early, in order to support injured athletes to resume playing confidently and avoid further re-injury.

Undiagnosed and untreated pain syndromes, such as the above mentioned, may result in conflict between treatment providers (who may suspect poor motivation for recovery from the athlete) and the athletes themselves (who might fear they are not receiving proper treatment). It also seems that athletes who are subject to recurrent injury are more at risk of persistent pain syndromes (Fine, 1993).

The myofascial pain syndrome is characterised by both localised areas of hyperirritability, or trigger points, that produce generally consistent patterns of referred pain, as well as by associated musculoskeletal dysfunction (Fine & Petty, 1986). Myofascial trigger points (MTPs) originate in skeletal muscle or in its investing fascia, and their compression via physical activity, passive muscle guarding, or direct palpation will generate a characteristic pattern of referred pain in a location often distant from the trigger point. The ongoing pain generated by these trigger points may leave the affected body area weak, stiff, and immobile (Travell & Simons, 1983).

Myofascial trigger-point pain is extremely common and the most regularly affected areas are those that support weight and maintain posture, such as the neck, shoulders and low back. The pain caused by these trigger points restricts the range of motion of the affected muscle groups. In the acute stage a specific injury usually causes the pain, but in the absence of perpetuating factors, spontaneous healing may occur, or a once active and painful MTP may become latent. However, if the latent MTP is reactivated by any one of a number of factors, such as a mild injury, minor exertional stress or even psychomotor tension from emotional distress, episodes of pain and dysfunction may reoccur. Even relatively mild cases of weakness, stiffness, and decreased mobility may interfere with the biomechanics of skill execution, thus undermining sport performance.

The experience of MPT pain may have other effects as well. For instance, chronic muscular guarding of painful areas can cause secondary MTPs to develop in areas remote from the initial injury. According to Fine (1993) many athletes, through years of heavy use or actual abuse of their

muscles, develop latent multiple trigger points that are reactivated when their levels of fitness and muscle tone decrease through age or injury. Athletes who, as a result of hospitalisation or injury, experience periods of prolonged enforced inactivity seem to be particularly at risk. On the other hand, athletes who engage in a vigorous programme of physical activity immediately post-surgery, seem to limit the activation of trigger points and this may explain the remarkable recovery of these athletes as reported by some authors, such as Steadman (1981).

There are also other forms of chronic pain. Sympathetically maintained pain (SMP) refers to a group of syndromes characterised by persistent pain that is only relieved by the sympathetic blocking of the injured body part. Sympathetic blocking refers to the procedure of using chemical means to inactivate the sympathetic nervous system, usually by injecting local anaesthetic near the sympathetic nerves (Fine, 1993). The most common mechanism underlying the development of SMP is an initiating traumatic event, activating peripheral nociceptors, and sensitising pain-receiving neurons within the dorsal horns of the spinal cord. After the injured tissue has healed and nociceptive input has stopped, these neurons continue to fire either spontaneously or after sensory stimulation that would not ordinarily produce pain. The activity of these neurons is then perceived as a painful experience.

The two most common syndromes that appear to be maintained by sympathetic nervous system activity, are reflex sympathetic dystrophy (RSD) and causalgia. Fine (1993) defines RSD as continuous pain in a portion of an extremity following even minor trauma that does not involve apparent nerve injury. RSD progress may show the same signs of sympathetic hyperactivity and physical changes as causalgia. Causalgia, or the experience of a burning pain caused by light touching or mechanical stimulation to the affected area, has most frequently been described in an arm or leg following nerve surgery. As the syndrome progresses, signs of cool, clammy skin, atrophy of skin, changes in hair growth and texture, and depletion of underlying bone may occur.

The most common way of identifying SMP is by reports of spontaneous pain and skin hypersensitivity that can lead to a severely dysfunctional and impaired extremity (Fine, 1993). Treatment of this syndrome is a combination of chemically blocking the sympathetic nervous system, re-mobilising the affected body part with physical therapy, and cognitive techniques such as relaxation.

Pain tolerance

As has been previously stated, pain is a complex and ever-present challenge to all athletes. The nature of sport participation constantly reminds athletes of the slogan “no pain, no gain, no fame” and athletes are sometimes even actively encouraged to play with pain. Serious athletes also seem to develop an ability to tolerate the severe pain of acute injury, the degree of suffering depending on the meaning pain has for the patient. Beecher (1956) in his work with soldiers wounded in combat situations, concluded that there was no dependable relationship between the severity of a wound and the pain experienced by the patient. Rather, much depended on the meaning the wounded soldier ascribed to the injury.

Athletes are subjected to routine performance pain, the nuisance of minor aches and soreness, the intense pain of sudden severe injury, and the uncertainty of chronic injury. According to Heil and Fine (1993) there are always high expectations that athletes will tolerate pain effectively. One of the problems with understanding and tolerating pain, is that the word pain describes so many things to so many people. Healthy athletes must learn to differentiate performance pain from injury pain. When they are injured they must also learn to discriminate between benign pain and harmful pain. Pain can sometimes dominate the lives of athletes, because they must deal with the distraction of minor aches and pains, the extreme pain of acute injury at its occurrence, the recurring pain of overuse injury, and the persistent pain of unresolved injury (Heil, 1993). In whatever form, pain presents a challenge.

The important issue for health professionals is to help athletes understand the difference between routine performance pain and the pain associated with injury and to cope with it. If the athlete has an inability to tolerate chronic pain, it can eventually cause problems in his/her personal life. The longer pain persists, the more likely it is to lead to pervasive emotional disruption and the greater the likelihood that it will interfere with rehabilitation (Heil, 1993).

Physical rigors of treatment and rehabilitation

Athletes generally tend to rehabilitate well and return to play without too many complications. Generally, factors that influence performance during competition, such as pain or fear of injury or re-injury, also affect the process of rehabilitation. Fear may diminish concentration and self-confidence and the athlete may become preoccupied with physical sensations arising from the site of injury, perceiving them as signs of re-injury (Heil, 1993).

In essence, when an athlete is injured, he/she is transformed from an active, athletic person to a sometimes bedridden person. When an injury occurs, it is necessary to initiate a programme of rehabilitation goals from both a physical and a psychological perspective (Fordyce et al., 1986). Setting appropriate goals helps the athlete maintain aerobic conditioning and, in addition, permits him/her to take an active part in, and assume a level of control over treatment. The value of the sport psychologist can never be underestimated during this process.

There are basically three reasons why injured athletes should receive psychological counselling. First, the athlete's prolonged absence from sport participation can spark fears of not being able to return to play. Second, the athlete may feel that peers have passed him/her by and that he/she will not be able to catch up again. Third, the athlete may be afraid that he/she will not be able to return to a pre-injury level of participation. Psychological counselling can help the athlete deal with his/her altered status as an athlete, especially during long periods of inactivity (Steadman, 1993).

Severity of injury

According to Heil (1993) injury is perhaps the ultimate stressor in the life of any athlete. Injuries occur frequently and could severely impact on the athlete's ability to participate in sport. It may sometimes be very difficult for athletes to return to play after a serious injury, as normal daily functioning is simply not good enough. Performance demands of sport are just too high, and due to the great investment of time, energy, and emotion, athletes potentially experience a threat to their self-esteem through injury.

Temporary physical restriction

All athletes are, at one stage or another in their careers, injured. Although not all athletes are injured severely enough to miss practices and/or games almost all athletes are injured to the extent that they need medical treatment at least once during their careers (Sachs et al., 1993). This means that almost all athletes are at one stage or another, prevented from taking part in their chosen sport. In general, some but not all, injured athletes manifest a variety of negative emotional reactions, such as mood disturbances, elevations in depression, tension, and anger. The extent of these changes usually depends on the severity of the injury, with greater changes witnessed in athletes with more serious injuries. It would, however, be incorrect to assume that all injured athletes will experience psychological trauma, and that they will experience the same cognitive and emotional responses. Many athletes, according to Wiese-Bjornstal and Smith (1993), may deal with the injury experience quite well.

Permanent physical damages

Permanent physical damage through injury can have a devastating effect on the life of an athlete. It should be understood that sport termination trauma as a result of serious injury often initiates a life crisis for which very few athletes are prepared (Henschen & Shelley, 1993). When an elite athlete is injured, he/she initially receives a great deal of publicity, attention, and support, but as time goes by the newsworthiness of the injury tends to fade away. The athlete is then left to deal with the trauma alone, or with the help of a family or intimate support group. Many times the long-term consequences of such an injury can be devastating. Permanent physical damage through injury may significantly hamper the athlete's ability to lead a productive and fulfilling life. Not only is high-level sports participation no longer possible, but other possible career options may also be limited (Ogilvie & Howe, 1986).

Career terminating injury

Retirement may occur at any stage in an athlete's life and is, in reality according to Baillie and Danish (1992), a point of transition from an activity in which there had been a commitment of time and energy and role identification. Irrespective of the specific cause of sports career termination, many retiring athletes must address a crucial period of adjustment with only limited skills or techniques gained through past experience or personal growth. Any injury is mentally, emotionally, and behaviourally challenging, with the athlete's state of mental health, prior to the injury, of paramount importance to his/her reaction (Samples, 1987). The problem of adjusting to a career-ending injury is most dependent upon the strength of the athlete's identification with sport, his/her perceptions about self-worth, and the importance he/she has placed on the expectations of others. For many their identity as athlete is an important part of their feelings of self-worth as well as important for their interpersonal needs (Henschen & Shelley, 1993). Sports participation has a great influence on the development of an athlete's sense of self. When the foundation of self-esteem is based on sports excellence, ending the sports role may be very difficult. Such an individual has thrived on the recognition and accolades derived from competition, and when deprived of these reinforcements, the injured athlete suffers a serious loss (Ogilvie & Howe, 1986).

Threat to the athlete's self-concept and esteem

The process of identifying oneself as an athlete may begin at an early stage. According to Danish et al. (1990) physical activity, teamwork and competition have important implications for social, physical and personal development of young participants at all levels of sport. Early sport participation contributes to the development of physical abilities that in turn, results in more

effective peer and family interaction (Nelson, 1983). Leadership skills can be enhanced by sport participation, and according to Ambron and Brodzinsky (1979), athletic children are more likely to be seen as leaders. Early participation in sport may, therefore, lead to accomplishing certain developmental tasks and, simultaneously lead to a heightened sense of self (McPherson, 1980).

Many authors have written on the specific influences sports participation may have on the development of the self-esteem of young players. Koocher (1971) reports an increase in self-concept through the acquisition of a new physical skill, while Kay et al. (1972) contend that individuals with higher levels of sports competence show an enhanced level of self-concept. McPherson (1980) suggests that in some cases so much mental energy may be directed towards sports that the individual's self-esteem becomes based on sports performance with little energy remaining for other areas of personal development. This would make the athlete blind to suggestions from others that his/her sports career is likely to be brief. As a result he/she does not develop any contingencies or post-career plans. Forced retirement for such an athlete, especially through injury, would pose a serious threat to his/her identity (McPherson, 1980).

Career transition

The injured athlete's perceptions of self are crucial in making a smooth and healthy transition from athlete to non-athlete (Henschen & Shelley, 1993). Contrary to popular belief many athletes, even world-class competitors, do not have high levels of self-worth and require much positive reinforcement from significant others (Henschen, 1992; Poole et al., 1986). When the athlete can no longer successfully compete and such positive reinforcements cease, there may be a further decrease in self-worth and difficulty in coping with the demands of transition. Perceptions of helplessness regarding the physical self may undermine the entire concept of self (Henschen & Shelley, 1993). When athletes experience a career terminating injury they no longer have the opportunity to showcase their talents, or are acknowledged in the same manner by other athletes, peers, significant others and a previously adoring mass media. However, they must still deal with the unfair expectations to which they have been exposed for so many years: the expectation that they must be "tough", "play with pain" and "never quit" (Henschen & Shelley, 1993).

Emotional well-being

According to Heil (1993) many psychological and physical factors interact to influence the risk of injury and the effectiveness of rehabilitation. Factors such as loss of playing time, pain, and the rigors of rehabilitation contribute to the psychological distress arising from serious injury.

Emotional responses at injury occurrence

Chan and Grossman (1988) examined the emotional responses of athletes who sustain injuries when they compared the self-esteem and psychological mood of consistent runners with a group of runners unable to participate because of injury. They found that there was decreased self-esteem and increased depression, tension, and confusion in the injured group. Weiss and Troxel (1986) interviewed 10 injured athletes of collegiate or elite status, ranging from basketball to wrestling, and found the following responses to injury very common: disbelief, fear, rage, depression, tension, fatigue, insomnia, and loss of appetite. May and Sieb (1987) listed 40 emotional reactions to physical injury that have been observed clinically, including depression, restlessness, difficulty with relaxing, reduced body image, reduced self-esteem, increased feelings of anger, and inability to concentrate. Scott (1984) noted that some emotional responses might be quite severe, with depression often present in injured athletes. Little (1969) reported that of athletes in who developed neuroses, 72,5% had suffered a recent threat to their physical well-being, whereas only 10,5% of non-athletes with neurotic symptoms had a recent injury or illness.

Fear and fear response

Many people take part in physical activity for positive health benefits, but such activity is not without risks. According to Rose and Jevne (1993) one of the risks of physical activity is physical injury. The dangerous nature of many sports (e.g., gymnastics) and the opportunity for injury exacerbate the typical competitive pressures experienced by many athletes and contribute to the increased tension and worry that these athletes often experience (Cogan & Petrie, 1995). Psychological distress can also sensitise athletes to pain, especially when recovery from previous injury is not proceeding as expected. As a result of anxiety and fear, many athletes also tend to try and protect certain muscle groups from re-injury, a situation known as “muscular guarding” (Heil, 1993).

Nideffer (1983) contends that psychological stressors, such as fear of injury or re-injury, may elicit a cycle of physical and psychological effects that result in worsened performance. This self-perpetuating cycle can start off in the following way: firstly, because of fear the athlete may find it difficult to concentrate and his/her self-confidence may diminish. This could lead to physiological changes such as increased muscle tension and over-arousal. Physical sensations arising from the site of the injury may also become the focus of attention for the athlete. All of these sensations could be intensified by the psycho-physiological dynamics of the fear response, and the athlete may perceive them as signs of injury. In turn these perceptions affect performance. The efficiency in the

biomechanics of skill execution may be decreased, therefore energy resources are not utilised effectively, and less attention is given to performance-related factors. The athlete's sense of poor performance may then worsen the initial preceding physiological and psychological factors, thus completing the cycle. This phenomenon may manifest acutely, or in a more chronic form, in which the same general pattern of physiological and psychological changes take place, but in a more subtle and prolonged form (Heil, 1993).

Once athletes have recovered from injury, fear of re-injury may become a problem. According to Ievleva and Orlick (1993) athletes who recover from injury quickly, are generally less fearful or worried about re-injury when compared to slower healers. Faster healers also tend to be more positive in their attitude and have a greater desire to look for positive lessons, exercise greater caution, and exert greater personal control in future than slower healers. Slow healers tend to dwell just on the negative possibilities.

In treating injured athletes like these, a combination of relaxation techniques and systematic desensitisation has been reported useful in counteracting the fear of re-injury (Nideffer, 1976). This technique is based on the principle that it is impossible to be both relaxed and anxious at the same time. The athlete is asked to identify the fear, then a relaxed state is elicited using a relaxation technique. Following that, the athlete is asked to visualise the situation he/she is fearful of, thereby creating a relaxed state through an anxiety-provoking scenario (Ievleva & Orlick, 1993).

Threats to future performance

Injury can have a tremendous influence on the athlete's mental readiness for future performance. A so-called sub-clinical adjustment syndrome can result from injury, especially when the injury was severe, required surgery or a long period of rehabilitation, or was perceived as a threat to the athlete's career. Psychological intervention is usually limited to clearly defined cases of overt adjustment problems, manifested in large deviations from the accepted norm. According to Bortz (1984) smaller deviations from the norm are less likely to be immediately disruptive to the individual, and thus receive less attention, either resolving naturally or continuing unnoticed for long periods. Kerlan (1978) states that the sub-clinical syndrome is identified by those relatively small deviations that predict diminished performance and health, but fall short of being a disorder as traditionally defined.

The underlying mechanism for sub-clinical syndrome is a relatively retarded process of emotional reorganisation following injury. Retarded physical recovery, ongoing psychological distress, or a

delay in mental readiness for competition may result from this. The seriousness of the situation may only be discovered after careful scrutiny. The athlete may be afraid of appearing weak and may intentionally hide the distress, or could deny his/her distress so strongly at a personal level that he/she is unaware of the emotional impact of the injury, even though it may be apparent to others.

The sub-clinical syndrome could manifest in the following subtle, behavioural signs: unusual pain complaints, sleep disturbances, fatigue, moodiness, situational anxiety, rehabilitation setbacks, excessive or awkward optimism about rehabilitation, and poor understanding of the rehabilitation process. Most athletes who suffer sub-clinical syndromes will recover effectively, but there are those who will never quite return to their previous levels of ability. Some may even go on to develop full-blown clinical syndromes (Heil, 1993).

Demands of treatment and rehabilitation

Demands placed on injured athletes during their rehabilitation are sometimes extremely taxing and definitely unpleasant (Fisher, 1990). With respect to physical injury, adherence to rehabilitation is obviously critical to an injured athlete's ability to return to play (Duda et al., 1989). According to Heil (1993) there are three repeating elements in the cycle of affective response to injury, namely that of distress, denial and determined coping.

Distress recognises the inherently disrupting and disorganising impact of injury on emotional equilibrium and may include shock, anger, anxiety, depression, isolation, guilt, preoccupation, and humiliation. Denial refers to a sense of disbelief, including varying degrees of outright failure to accept the severity of the injury. Determined coping implies acceptance of the severity of the injury and its impact on the short and long-term goals of the athlete. Coping resources are deliberately used in working through the process of recovery. In this process there may be continual shifts between the various elements, with any one element dominating at a given stage of the rehabilitation process. There is, however, generally a shift towards determined coping as rehabilitation progresses. In general it would seem that an athlete's emotional well-being is dependent on his/her subjective sense of progress through rehabilitation.

Social well-being

When one looks at the social well-being of an injured athlete, it is important to remember that sport participation provides opportunities for individuals to develop sports skills, measure their abilities, build confidence and engage in social interaction (Petitpas, 1987). Many individuals, however, ascribe such a great deal of psychological significance to their involvement in sport and exercise

activities that they may identify too strongly with the sports role (Eldridge, 1983). Brewer et al. (1993) share this point of view when they suggest that sports identity stem from the degree to which an individual identifies with the sports role.

It has been suggested that self-concept is a multidimensional entity (Gergen, 1971; Harter, 1990; Markus & Wulf, 1987; Marsh & Shavelson, 1985), with people making domain-specific judgements of personal worth and competence. For instance, a child may perceive that he/she possesses high ability in social activities, yet possesses low ability in academic pursuits. Harter (1990) contends that although the content domains comprising the self-concept develop over time, it has been shown that self-evaluation in the physical and sports domains are prevalent across the life span. It has been proposed that the value or importance attributed to a given self-concept domain determines the extent to which perceived competence or incompetence in that domain influences self-esteem, affect, and motivation (Harter, 1990; Rosenberg, 1979). Incompetence in a domain of low perceived importance is unlikely to have an impact on a person's self-esteem, but on the other hand, incompetence in a domain of high perceived importance can profoundly affect a person's feelings of self-worth. Thus, a person with strong sports identity ascribes great importance to involvement in sport/exercise and is especially attuned to self-perceptions in the sports domain.

Loss of important social roles

Sheldon (1977) suggests that retired individuals who experience the most doubt and anxiety are those who feel that they are no longer important to others. Retirement has also been associated with the loss of status and social identity by Pollock (1956) and Tuckman and Lorge (1953). Many athletes have only learned to assume certain social roles specific to the sports setting and are only able to interact with others within the narrow context of sport (Ogilvie & Taylor, 1993). Pearlin (1983) contends that in its broadest sense, sports identity can be seen as a social role. According to Heyman (1987) the extent to which a person labels himself/herself as an athlete, may be strongly influenced by family, friends, coaches, teachers, and the media. Sadalla et al. (1988) suggest that the social nature of sports identity is revealed in the assertion that individuals may be making a social statement about themselves simply by choosing to participate in a particular sport or exercise activity.

There are many potential risks for individuals with a strong sports identity, especially when they have to deal with making sport career transitions. This could be even more difficult when the career transition is as a result of injury. It is thought that an sports injury, particularly when it is career

threatening, disrupts the self-identity of individuals with a strong sports identity, and there is an increased risk of emotional disturbances (Brewer et al., 1993).

Lifestyle disruptions

Fisher (1990) contends that injured athletes face considerable disruption to their lifestyle. All the effort they have invested and all the goals they have sought come crashing down around them. According to Etzel and Ferrante (1993), when athletes become injured or disabled their lives may change in various ways, including psychologically. Over time they often become isolated from their peers, and may experience changes in their social status. Athletes, who can no longer participate in sport as a result of injury, become separated from their team-mates, coaches and others with whom they would normally interact. Their previously predictable and supportive social network may suddenly become untangled when they can no longer function in their customary roles as athletes. Insensitive coaches or peers can criticise or even intentionally ignore them. The time once spent on participating in sport activities is replaced with time spent in medical rooms or sitting on the bench watching others performing. Although injuries may make athletes the focus of public attention for a while, as time passes they fade from the spotlight and healthy athletes take centre stage. Many times injured athletes are confronted with the reality of assuming radically different, usually unanticipated, life-styles (Etzel & Ferrante, 1993).

Necessity of depending on others

Athletes are accustomed to seeking control over opponents and game situations, but when they are injured, their own helplessness can be an overwhelming experience. In much the same way as healthy athletes need technical information from coaches in order to develop certain skills, so too do injured athletes need guidance from medical treatment providers so that their recovery process can be as comprehensive as possible (Flint, 1993). Once the injured athlete has initially seen a physician, there should be an exchange of information between the athlete and all other parties involved concerning the injury. These concerned parties make up the treatment team and can consist of sports medicine specialists, team trainers, coaches, psychologists and the athlete himself. The structure of the rehabilitation programme should be discussed, including the expected time of recovery, and general parameters of the physical as well as mental programmes to be used during rehabilitation (Green, 1993). The resulting programme should reflect a mind-body approach to the process of recovery and the athlete should have complete faith in the treatment team.

Self-concept

According to Pargman (1993b) the concept of self derives essentially from the delicate interaction among three general categories of factors. These are (1) the real capabilities of an individual, (2) the products of his/her cognitive thoughts in which information about the self, emanating from social and physical environments, is processed and (3) the social environment itself, including the information it generates. Other considerations, such as personal values, assessment of personal behaviour, and feelings about the compatibility between values and behaviour, also contribute to perceptions about the self. Self-concept is obviously an unstable psychological entity and is expected to fluctuate across situations. According to Brustad (1988) and Ornes (1970), however, individuals with strong and positive self-concepts are inclined to be assured and assertive in actions with others. They also tend to demonstrate comparatively low levels of anxiety.

People are not born with a self-concept, but self-worth emerges and assumes changing direction and strength in keeping with momentary and daily interactions with other persons and events (Fitts, 1971). Hurlock (1972) contends that motor-skill performance is a vital contributor to this development, since concepts about physical self contribute to strong overall self-efficacy and to personal development and functioning in general. It would thus follow that perceptions about the self, and in particular perceptions about the physical self, will bear meaningfully upon personality and mental health.

If an athlete is injured, it could have a marked positive or negative effect on his or her self-concept. Leonardson (1977) reported a significant positive correlation between perceptions about physical fitness and self-concept. Many researchers (Albinson, 1974; Sonstroem, 1978; Stoedefalke, 1977) who in several studies have found that there is a positive correlation between self-concept and exercise behaviour support this view. Young and Cohen (1981) reported a significant difference in total self-concept score and four sub-scale scores between injured and non-injured female high school basketball players. The injured players demonstrated a more positive view of themselves, their state of health, their physical appearance, and physical skills as well as a more positive sense of personal worth than did the non-injured players with the injured players' overall self-concept also higher. In contrast to this, Chan and Grossman (1988) found that injured runners exhibited significantly more depression, anxiety, confusion, and lower self-esteem than non-injured runners exhibit. Similarly Kleiber et al. (1987) suggested that any career-ending injury resulted in changes in life satisfaction and self-esteem.

Threat to identity

Individuals with a strong sports identity face several potential risks, mostly when encountering sport career transitions. Several authors have suggested that individuals with a strong and exclusive sports identity are vulnerable to emotional difficulties when they experience a serious injury that prevents them from performing at their optimum level in their chosen sport or exercise activity (Deutsch, 1985; Eldridge, 1983; Heyman, 1986; Ogilvie, 1989; Pearson & Petitpas, 1990). These authors hypothesise that career-threatening injury disrupts the self-identity of those individuals with a strong sports identity, and when they lack other sources of self-worth and self-identification as well, there is an increased risk of emotional disturbance.

Self-complexity is the extent to which a person cognitively organises information about himself/herself in terms of many distinct self-aspects (Brewer et al., 1993). Linville (1987) examined the impact of self-complexity on depression and found that high self-complexity served as a buffer against stress-related depression. Individuals low in self-complexity were more prone to depression following high levels of stressful events, than individuals high in self-complexity. This, according to Brewer et al. (1993), implies that an athlete, who organises self-knowledge primarily in terms of an sports self-schema and maintains little distinction between the athlete self-schema and other components of the self, is vulnerable to depression following sports injury. A number of authors have suggested that a strong, exclusive sports identity could be a risk factor for emotional disturbance upon termination of a sports career (Baillie & Danish, 1992; Blinde & Greendorfer, 1985; McPherson, 1980; Ogilvie & Howe, 1986; Orlick, 1980; Pearson & Petitpas, 1990; Schafer, 1969; Werthner & Orlick, 1986). It is also suggested that a strong sports identity may prompt individuals to engage in a sport or exercise activity to the extent that their physical health is jeopardised. Continuing to participate while injured, excessive training, and other such behaviours may in some cases negate the potential health/fitness benefits of a strong sports identity (Brewer et al., 1993).

Loss of sense of control

According to Kauss (1980) participation in sport requires two things: arousal and control. The athlete must have arousal to perform with speed, strength and endurance. He/she must have control to perform with precision, skill and accuracy. Nideffer (1983) states that an athlete needs to be in control of what is going on. Often, when athletes are injured, they lose the sense of control they felt previously. Weiss and Troxel (1986) interviewed a number of injured athletes and found that many of these athletes expressed an inability to cope with injury, the long rehabilitation period following

injury, the restriction of activity, and the sense of being externally controlled by injury. Leddy et al. (1994) warn treatment providers of injured athletes to be acutely aware and particularly sensitive to the fact that sports injury can result in psychological consequences. This can leave some competitors feeling depressed, anxious, confused, frustrated, angry and, importantly, uncertain about themselves and without control over their situations.

Altered self-image

Research has shown, according to Brewer et al. (1993), that individuals who highly value the sports component of the self, are more likely to engage in exercise behaviour than those who place less value on the sports component of self-identity. Kendzierski (1988) found that individuals who rated several exercise-related descriptors as both extremely self-descriptive and extremely important to their self-image, engaged in an array of exercise behaviour to a greater extent than either individuals who do not, or individuals who evaluate themselves in terms of the extent to which they do not exercise. When athletes with such strong sports self-images are injured, there is a strong possibility that they will be vulnerable to emotional difficulties when faced with an inability to perform in their sport or exercise activity (Deutsch, 1985; Eldridge, 1983; Pearson & Petitpas, 1990).

Chapter Four

PSYCHOLOGICAL ADJUSTMENT TO SPORTS INJURY

INTRODUCTION

Increased participation in sports is associated with increased related injuries (Smith et al., 1990a). Since the 1960s investigators have studied the relationship between psychological factors and sports injury. Although earlier studies focused on the effort to identify factors such as personality and life stress that predisposed athletes to injury or the relation to the occurrence of injury, prediction and prevention of injury have proved elusive (Leddy et al., 1994). According to Meewisse and Fowler (1988), injuries appear to be increasing in frequency and the potential negative emotional effects of sports injury have become an increasing concern.

Much has been written on the psychological antecedents of sports injury, with relatively little research being done on the psychological consequences of sports injury (Brewer, 1994). This trend seems to be changing, as several empirical studies on emotional responses to sports injury have been published in the last few years (Chan & Grossman, 1988; Crossman & Jamieson, 1985; McDonald & Hardy, 1990; Pearson & Jones, 1992; Smith et al., 1990a). It has been assumed that athletes, following physical injury, experience predictable psychological reactions, such as depression, anxiety, impaired self-esteem, tension and confusion, which may reach clinically meaningful proportions (Crossman, 1985; Eldridge, 1983; Smith et al., 1990b; Wiese & Weiss, 1987). In a study with injured runners, Chan and Grossman (1988) found that as a group they exhibited significantly more depression, anxiety, confusion and lower self-esteem than non-injured runners did.

Greenspan et al. (1991) state that sports injuries can seriously threaten athletes' ability to exercise or compete and may result in the loss of those athletes' main source of self-esteem and identity. According to Little (1969) overly ego-involved athletes may suffer an "athletic neuroses", which could be described as a bereavement reaction to the loss of a part of the self, namely the overvalued physical prowess. Several conceptual models provide frames of reference for understanding psychological response to sports injury, with stress process and grief response models the most prevalent (Wiese-Bjornstal et al., 1998).

Stage models of adjustment are generally based on the premise that the disability associated with injury constitutes a form of “loss” of an aspect of the self (Peretz, 1970). Although the concept of grief and loss has been studied extensively in the clinical literature for a number of years (Averill, 1968; Kübler-Ross, 1969; Lindemann, 1944; Rodgers & Cowles, 1991), it has only been referred to superficially by sport psychologists (Evans & Hardy, 1995).

Before grief response models to sports injury can be considered in more detail, certain concepts like “loss” and “grief” have to be discussed first.

Loss

In the clinical literature, loss is usually emphasised through the bereavement of a significant other, but it could also be occasioned by the loss of any significant object, the significance of which is determined by the individual’s own value system. Loss is a state of deprivation, or being without something one has had (Evans & Hardy, 1995). According to Peretz (1970), loss is simultaneously a real event and a symbolic event; symbolic in that it carries with it the threat and representation of more future loss. Such real or potential loss may include loss of health, loss of skills, loss of a job, loss of role and real or anticipated loss of respect from others. The more individuals have invested emotionally in the lost object or aspect of themselves, the more threatened they are likely to feel in anticipation of that loss and, when experiencing it, respond with grief. For example, role loss from injury may entail a loss of self-esteem or deprive the injured person of meaning and rationale for his or her actions (Averill, 1968; Karl, 1987; Peretz, 1970). Athletes, like any other group, are prone to experience loss. Experience of loss can seriously affect an athlete’s performance both on and off the playing field and if left unresolved, will continue to prevent optimum performance (Astle, 1986).

Peretz (1970) outlined four different types of loss people may experience. The first is the loss of a significant loved or valued person, which may occur through death, divorce or separation. In the sports injury context, this kind of loss may be invoked by isolation from, or loss of contact with valued team members and coaches.

The second type of loss is the loss of some aspect of the self. Peretz (1970) describes the self as the overall mental representation or image each of us has of our body and person. This self-representation includes ideas and feelings about the self, its worth, attractiveness, special qualities and capacities. Loss of health is usually experienced as a change in some aspect of the self. Athletes as a group could especially be prone to experiencing this type of loss, particularly when injured

(Astle, 1986). Eldridge (1983) points out that visible lacerations sometimes accompany orthopaedic injuries, which can seriously affect an athlete's often-fragile body image. According to Gruen (1966) sports-related injuries often drastically impede harmonious, efficient and productive physical performance. An athlete, who is accustomed to moving his/her body in a smooth, controlled way can experience this loss of control as terribly upsetting. Peretz (1970) also includes the loss of self-definitions under this category. For example, the occupational self-image of an athlete suffering from an injury would be affected, as would his/her position in a team. However, probably the loss most frequently encountered in sports, is the loss of competition. By not being able to compete, an athlete is denied the chance of being a "winner" and his/her self-image may be affected by that.

A third type of loss described by Peretz (1970) is the loss of external objects. This could include possessions, home or homeland, money, or treasures. In an athlete's case, relatively simple things like the loss of favourite equipment (e.g., a pair of running shoes) or seemingly insignificant objects, such as a good luck charm, could dramatically affect his/her state of mind.

The fourth type of loss described by Peretz (1970) is developmental loss or that loss which occurs in the process of human growth, development and ageing. Developmental loss is a feature of many high intensity sports; for instance male gymnasts lose range of movement as they grow older, while female gymnasts lose their strength-to-weight ratio after puberty. In many other sports, losses from this type typically include the loss of flexibility, speed and general athletic capabilities through the normal ageing process.

According to Astle (1986) the losses experienced by an athlete are often complicated and do not fit neatly into one of the four previously mentioned categories. Rather, a loss may have implications that extend into several of the mentioned categories. The loss experienced by a retiring athlete could involve the loss of identity, a position in a team, an occupation, status, as well as the loss of physical abilities associated with ageing (Astle, 1986).

Grief

Brown and Stoudemine (1983) define grief as the process of dealing with all the emotions one may encounter following a significant loss. According to Engel (1964), grief occurs as a result of the loss of anything that a person has come to consider a part of his or her natural environment and, therefore, a source of psychological gratification. Rodgers and Cowles (1991) contend that the concept of grief is preceded "by any situation in which there is a perceived loss, such as separation from any object of attachment whether it be a person, pet, or physical object of significance to the

individual or change in the satisfaction of an abstract personal need” (pp. 449-450). Simos (1977) on the other hand, suggested that grief can be defined as “an intense emotional suffering set off by a loss” (p. 337). In the context of injury, grief should be considered a normal reaction to a distressing situation rather than viewing it as dysfunctional or pathological. It may thus be viewed as an emotional response to a perceived loss, which can best be seen as a process characterised by behavioural and psychological manifestations (Evans & Hardy, 1995).

Attachment theory

Researchers, in an effort to conceptualise grief, have proposed a number of theories, one of which is provided by the attachment theory. Bowlby (1961, 1978), one of the major proponents of the attachment theory, viewed grief as an adaptational response to the loss of an attached object. Grief, according to this theory, also applies to “the condition of a person who is experiencing distress at loss and experiencing it in a more or less overt way” (Bowlby, 1991, p. 18). The attachment theory further stresses that a person can be expected to operate effectively only within his or her environment of adaptedness (Evans & Hardy, 1995).

In order to understand the meaning of grief in response to injury within the framework of the attachment theory, it is important to consider the “self” as an attachment object. Werner-Bland (1980) and Worden (1991) believe there is support for the conceptualisation and application of attachment behaviours when dealing with loss of self and identity through injury and disability. Peretz (1970) suggests that injury may threaten important attachments in terms of bodily function, self-image, self-esteem, the context of important relationships and the basis for many forms of reinforcement and self-gratification.

The grief process

In an early study Lindemann (1944) identified five typical responses in the normal process of grief. These responses are: (1) somatic distress, (2) guilt, (3) anger, (4) preoccupation with the image of the deceased and (5) agitated or non-goal-directed behaviour. Since then research has yielded many different approaches to the grief process, namely that of stage (Averill, 1968; Engel, 1961; Kübler-Ross, 1969; Parkes, 1991), component (Bugen, 1977; Ramsay & Happee, 1977), phase (Bowlby, 1991; Karl, 1987) and task (Worden, 1991). It would appear that most sport psychologists base their comparisons of grief responses to injuries in sport upon the five-stage model proposed by Kübler-Ross (1969).

GRIEF RESPONSE MODELS

There are certain limitations to the present research base of psychological adjustment to sports injury (Brewer, 1994). In the absence of empirical data a number of authors (Astle, 1986; Lynch, 1988; Pederson, 1986; Rotella, 1985; Rotella & Heyman, 1993; Wehlage, 1980) have relied upon stage models of grief and loss (Brown & Stoudemine, 1983; Kübler-Ross, 1969) to explain psychological reactions to injury as experienced by athletes. It is assumed in most stage models of adjustment to injury that the athlete who experiences serious injury passes through a predictable sequence of stages on the way to positive recovery (Brewer, 1994).

Different approaches to grief

Although the stage approach to grief has been utilised by a number of theorists, the works most frequently cited in the sport psychology literature are those of Kübler-Ross (1969) and Averill (1968).

The stage approach

The stage approach of Kübler-Ross (1969) postulates five stages. Her five stages begin with denial, described as a stage in which the griever fails to believe the loss. The second stage is that of rage and anger, directed at the deceased for having died, or at others for letting death occur, or at the griever for perceived past injustices to the deceased. The third stage, that of bargaining, follows and involves attempts to regain the lost object, the death of which is not being fully accepted. In the fourth stage, disorganisation, the bereaved experiences depressed affect, sleep and appetite disturbances and reduction in goal-directed behaviour. In the final stage, acceptance, the bereaved adapts to the new situation by re-establishing old behaviour patterns and developing new relationships and activities (Brasted & Callahan, 1984).

In contrast, Averill (1968) proposed three stages to the grief process. The first phase, namely that of shock and disbelief, is accompanied by physiological changes similar to those experienced in periods of acute stress. The second stage, that of despondency and depression is characterised by an awareness of the loss, an inability to concentrate, apathy, withdrawal, despair, and sometimes anger, hostility, anxiety and guilt. The third stage of recovery is achieved when these symptoms become less prevalent and new object relations are established.

Component approach

Critics of the stage approach, such as Bugen (1977), have suggested that differences between individuals may be so great that the utility of stage theories is severely diminished. Stages may not

be successive, stages may not be discernible, behaviours associated with certain stages may not occur at all for given individuals. Although there is a sequential character to the grief process, there may be so much regression to earlier stages that it would be better to use the term component approach instead. Some components would predominate earlier in the process and others later.

Phase approach

Yet others have subscribed to a phase approach to grief (Bowlby, 1991; Karl, 1987). Grief, according to them, is acknowledged as a dynamic, pervasive experience with the grieving person more actively involved in the process. However, the distinction between the component and phase approach appears to be largely one of semantics (Evans & Hardy, 1995).

Task approach

It would seem that the only approach to grief that has received little if any criticism in the clinical literature is that of the task approach. Worden (1991) proposed four tasks to the grief process. As the main proponent of the task approach, Worden (1991) differentiated the tasks he proposed primarily on the passivity that he felt is implicit within the stage, phase and component theories. The contribution of the task approach does not seem to contribute much more to the understanding of grief and will not be discussed any further. In any case, the distinction between the phase, component and task approach appears to be largely one of semantics.

Determinants of the grief response

Many researchers have attempted to identify those factors that determine the grief experience (Evans & Hardy, 1995). Engel (1964) proposed that many factors might influence and determine the eventual outcome of grief. The importance of the lost object as a source of support and the extent of ambivalent feelings toward the lost object play an important part in this. Examples of these ambivalent feelings could be anger, hostility and guilt, which if they persist may negatively influence the process of grieving. Engel (1964) also contends that the age of both the lost object and the mourner influences the capacity of an individual to resolve a loss. According to Evans and Hardy (1995) the physical and psychological health of the person at the time of the loss may be critical in determining his/her capacity to deal with the loss implying that the injured athlete can actively influence the grief process.

Worden (1991) also attempted to identify the determinants of the grief experience. He suggested a number of factors, like personality variables (age, sex, emotional stability and the individual's ability to cope with stressful situations), the relationship with the lost person/object (e.g., the

strength of the relationship), the nature of the attachment (strength of attachment), the nature of the death (e.g., was the death sudden or not), historical antecedents (e.g., did the individual have previous experiences with loss, grief, or stressful situations) and social variables (e.g., religious and cultural differences).

Within the context of sports injury, of all the factors identified as determinants of outcome from grief experiences, the severity of injury (duration of time unable to participate in chosen sport) seems to be the most significant one. More severely injured athletes experience far greater post-injury mood disturbances in tension, confusion and depression than lesser-injured athletes (Evans & Hardy, 1995).

Grief models applied to sports injury

Grief models, often called “loss of health” models, have their origins in death. According to Wiese-Bjornstal and Smith (1993) the clinical utility of using these models for understanding athletes’ reactions to injury, has yet to be established. There are, however, many sport psychologists who contend that grief response models have much to offer the study of the rehabilitation process (Gordon & Lindgren, 1990; Hardy et al., 1991; Pederson, 1986; Rotella & Heyman, 1986; Weiss & Troxel, 1986).

Pederson (1986) proposed one of the earliest models of grief response in injury. This model consisted of three phases, the first being that of shock and denial, secondly followed by preoccupation and thirdly, reorganisation. This model advanced similar response patterns to the model proposed by Kübler-Ross (1969). Weiss and Troxel (1986) on the other hand proposed a four step process: (1) the stressor (being injured), (2) cognitive appraisal of the stressor or potential stressor (including the athlete’s personal resources), (3) the emotional response and (4) the consequences of stress. Typical emotional responses they observed in injured athletes included irrational thoughts; emotions such as fear, disbelief and depression; and somatic complaints such as insomnia, muscle tension, loss of appetite, and fatigue. These observations seem to be partly consistent with grief models proposed by Averill (1968) and Karl (1987).

Based on observations in a single case study of the process of rehabilitation of an elite cricket fast bowler, Gordon and Lindgren (1990) maintained that the athlete’s attitude changes over the rehabilitation period appeared consistent with the stages of the grief response. Specifically, these responses resembled denial, followed by anger, depression and finally acceptance. Gordon et al. (1991b, 1992) examined the practical implications for physiotherapists and trainers of the

psychological aspects of the recovery process. According to them, during treatment of injured athletes, physiotherapists frequently observed symptoms of denial and bargaining, but less frequently symptoms of depression and anger. In another study by Pearson and Jones (1992) it was reported that injured athletes were significantly more tense, hostile, depressed, unsure, tired and confused than non-injured athletes were. These injured athletes also exhibited some of the emotional and behavioural characteristics of grief responses, namely depression, isolation, helplessness, anger, frustration and acceptance.

Although it would seem that there is much evidence for the use of grief response models, a word of caution was issued by Pearson and Jones (1992) when they concurred with Smith et al. (1990a) that athletes may not experience a typical grief reaction following injury. They also supported Wiese and Weiss's (1987) proposal that affective response patterns may be far more complex than suggested by stage models of grief, with athletes moving between highs and lows.

Brewer (1994) is quite critical in his comments on the validity of stage models of grief. According to him, research has not supported the major claims of stage models that there is a common sequence of discrete emotional reactions to sports injury. Affective reactions to injury appear to be far more global and varied across individuals than stage models would predict and if stages cannot be considered sequential and discrete, they have little predictive value.

STRESS PROCESS MODELS

To a large extent, according to Brewer (1994), stage models fail to account for individual differences in response to sports injury. In reaction to this, cognitive appraisal models were developed to explain such differences. Based on the work of Weiss and Troxel (1986), Wiese and Weiss (1987) provided a simplified illustration of the basic stress process model, originally proposed by Selye (1974), as a suitable model for understanding sports injury as a stressor that prompts cognitive appraisals. When these cognitive appraisals are activated, they influence emotional responses, which in turn affect behavioural responses (Wiese-Bjornstal et al., 1998).

Cognitive appraisal of psychological adjustment to sports injury

In all of the stress process models, injury is considered a stressor and responses to injury are analysed in the context of the stress process. The role of cognition is also seen as central to all of these models. This is illustrated in Figure 5. According to Brewer (1994), it is proposed that the ways in which the athlete interprets an injury determine the emotional response such as anger, depression or relief. In understanding the emotional reactions, the fact that the injury occurred is

considered less critical than is the way in which the injury is perceived. Cognitive appraisals may also be influenced by the interaction of personal (i.e., historical and/or dispositional attributes of the individual) and situational factors (i.e., injury-related characteristics and variable aspects of the social and physical environments). In turn the emotional response to injury is thought to influence behavioural outcomes (e.g., adherence to rehabilitation regimens) in the rehabilitation process.

The cognitive appraisal of injuries will now be discussed in more detail. Discussion of the emotional and behavioural responses to injury will follow under the heading “An integrated model of response to sports injury.”

Personal factors

The following personal factors are hypothesised to affect cognitive appraisals of (and presumably emotional responses to) sports injury: trait anxiety, self-esteem, self-motivation, coping skills, extraversion, neuroticism, psychological investment in sport and injury history (Grove & Gordon, 1991; Rotella, 1985; Rotella & Heyman, 1993; Weiss & Troxel, 1986; Wiese & Weiss, 1987; Wiese-Bjornstal & Smith, 1993). Few studies have directly addressed the relationship between personal factors and emotional adjustment to sports injury. However, psychological investment in sport, physical self-esteem, age, pessimistic explanatory style and hardiness have been correlated with emotional reactions to injury (Brewer, 1994).

The relationship between psychological investment in sport and adjustment to injury has been investigated in several cases. In their study among collegiate student-athletes who had experienced sports career-ending injuries, Kleiber and Brock (1992) found that individuals, who invested in playing professional sport, experienced lower post-collegiate self-esteem and life satisfaction than individuals without such an investment. Support for the findings of Kleiber and Brock come from a series of studies presented by Brewer (1993) in which a strong and exclusive identification with the athlete role was associated with depressed mood following sports injuries. Meyers et al. (1991) also reported that competitive athletes had significantly greater mood swings following orthopaedic surgery than recreational athletes and non-athletes. According to Brewer et al. (1993) it would thus seem that individuals whose self-worth is exclusively or predominantly derived from sports performance, are more likely to appraise their injury in terms of threat or loss.

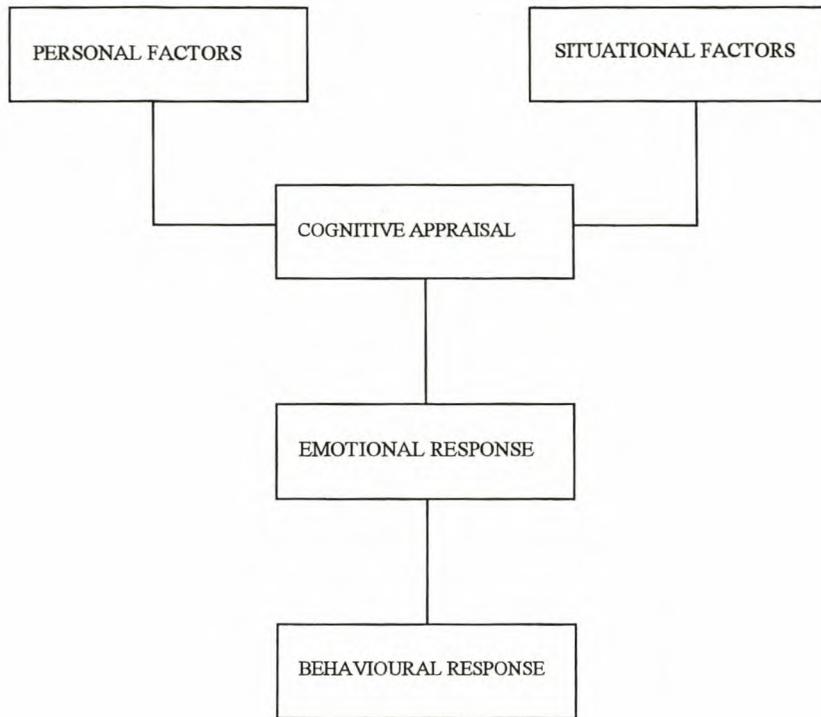


Figure 5 Cognitive appraisal model of psychological adjustment to sports injury (Brewer, 1994)

Other relationships between personality factors and sports injury have also been documented. Brewer (1993) found a negative association between physical self-esteem and two measures of post-injury depression, suggesting that high physical self-esteem could buffer the negative effects of sports injury on mood. Negative associations between age and post-injury mood disturbance have also been found by Smith et al. (1990c), suggesting that younger athletes are more likely to appraise injury as threatening than older athletes. Grove et al. (1990, October) found that pessimistic explanatory style was positively related to depression and anger for the first month of knee rehabilitation after surgery and that hardiness was negatively associated with total mood disturbance.

Situational factors

A number of situational factors have been hypothesised to influence the cognitive appraisal and emotional adjustment process in post-injury assessment (Rotella, 1985; Weiss & Troxel, 1986). Significant positive relationships between post-injury emotional adjustment and the following situational variables were found in exploratory investigations: medical prognosis (Albert et al., 1988), recovery progress (McDonald & Hardy, 1990; Smith et al., 1988), social support for

rehabilitation (Fisher et al., 1988; Brewer et al., 1995a), physician-rated current injury status and impairment of sport performance (Brewer et al., 1995b). Some situational variables were found to be inversely related to post-injury emotional adjustment. These include injury severity (Pargman & Lunt, 1989; Perna, 1992; Smith et al., 1990b; Uemukai, 1993), duration of injury (McDonald & Hardy, 1990; Smith et al., 1990a; Uemukai, 1993), impairment of daily activities (Crossman & Jamieson, 1985) and life stress (Brewer, 1993).

As with personal factors, according to Brewer (1994), situational factors have also been closely associated with adherence to sports injury rehabilitation programmes. Positive correlations were found between exercise adherence on the one hand and flexibility in rehabilitation scheduling (Fisher et al., 1988), responsiveness of the rehabilitation environment (Fisher et al., 1988), social support for rehabilitation (Duda et al., 1989) and belief in the efficacy of treatment (Duda et al., 1989) on the other hand.

Cognitive restructuring

The approach used during cognitive restructuring is based upon the cognitive therapy work of Beck (1976). Before cognitive restructuring can be discussed, one first has to look at what cognitive structures are. According to Meichenbaum (1985) the term cognitive structures refers to the tacit assumptions, beliefs, commitments and meanings that influence habitual ways of construing oneself and the world. He goes on to describe cognitive structures as follows:

Cognitive structures can be thought of as schemata that are implicit or operate at an unconscious level, are highly interdependent, and are probably hierarchically arranged. Schemata are mental organizations of experience that influence the way information is processed and the way behavior is organized. Cognitive structures may engender cognitive and affective processes and events and may in turn be developed or modified by ongoing processes and events (Meichenbaum, 1985:8).

Stressful life events can trigger such schemata. Beck (1984) viewed such schemata as specific sensitive areas or specific emotional vulnerabilities that result in individuals' predilections to overreact. Such cognitive structures act as blueprints that influence the way situations are appraised and that guide cognitive-affective processes and behaviour. In other words, these cognitive structures operate as latent perceptual readiness programmes, priming individuals to respond in certain ways. Emotional distress is typically accompanied by thoughts of distress which, according

to Heil (1993), reflect the specific circumstances of the precipitating events as well as the psychological makeup of each individual. Just as emotional distress causes distortions in thinking that reflects inaccurate interpretations of the reality, injury also gives rise to cognitive distortions. Beck and Emery (1985) identified five categories of cognitive distortion that give rise to flawed interpretations of events. In relation to sports injury these are represented as follows:

1. Catastrophising - exaggerating the severity of the injury
2. Overgeneralisation - incorrectly extending the expected impact of the injury to other areas that are not likely to be affected
3. Personalisation - taking undue personal responsibility for the injury
4. Selective abstraction - focusing on specific aspects of the injury that have little meaning in the overall context
5. Absolutistic/dichotomous thinking - reducing complex situations to simple all-or-none categories

These distortions in thinking are particularly well suited to cognitive restructuring interventions (Heil, 1993). Any change in an individual's cognitive structures is most likely to occur by discovering, through enactive experience, that old cognitive structures are questioned and unwarranted and that the adoption of new, more adaptive, structures is rewarding (Meichenbaum, 1985). The technique used during cognitive restructuring is basically as follows: (1) evoke distorted thoughts, feelings, and interpretations of events by the individual, (2) gather evidence for or against the evoked interpretations in conjunction with the individual and (3) design personal tasks (such as homework assignments) to test the validity of those interpretations and gather further information for discussion (Beck, 1976). In summary, during cognitive restructuring individuals are taught to identify stress-provoking negative self-statements and replace them with positive coping statements and behaviours (Meichenbaum et al., 1971).

In the sports injury context, a number of psychological interventions are used to enhance the psychological well-being of injured athletes, increase adherence to rehabilitation protocols and to facilitate the physical rehabilitation of injured athletes. Among these interventions are cognitive restructuring, goal setting, imagery, counselling and peer modelling (Fisher, 1990; Fisher et al., 1993; Gordon, 1986; Lynch, 1988; Rotella, 1985; Rotella & Heyman, 1993; Smith et al., 1990b; Weiss & Troxel, 1986; Wiese & Weiss, 1987; Wiese-Bjornstal & Smith, 1993). According to Lynch (1988) cognitive restructuring presents the opportunity that could help the injured athlete refocus on the positive aspects of his/her situation. Injury may allow the injured athlete time to rest

and catch up on other important aspects of life often neglected during rigorous training, as well as re-evaluating priorities and putting things into perspective. It is when the athlete changes his/her view of the crisis that the resultant emotion changes accordingly. Through this the athlete probably experiences less stress and panic, thus helping the healing process.

AN INTEGRATED MODEL OF RESPONSE TO SPORTS INJURY

According to Wiese-Bjornstal et al. (1998) cognitive appraisal and grief process models should not be seen as mutually exclusive. For example, the sense of loss prevalent in sports injury (Astle, 1986; Evans & Hardy, 1995; Hardy, 1992) can be seen as a type of cognitive appraisal that leads to emotions commonly associated with grief. Based on this assumption, a broader integrated stress process model, represented in Figure 6 was developed (Wiese-Bjornstal et al., 1998). This model posits that pre-injury and post-injury factors influence psychological response, that psychological response can and does change over time in a dynamic way and that both physical and psychosocial recovery is the process outcome.

In the core of the model we find bi-directional arrows, illustrating the dynamic nature of the recovery process. These arrows follow a predominant path of cognitive appraisals affecting emotions, in turn affecting behaviours, but it is important to realise that influences in the opposite direction are certainly also possible. The core should also be envisaged as a three-dimensional spiral, heading in the upward direction toward full recovery (if the recovery outcomes are positive), or in the downward direction away from full recovery (if the recovery outcomes are negative). The personal and situational factors listed in the model should be seen as always present in the background of the dynamic process, continuously exerting their effects throughout.

Psychological responses

For an athlete to make a full recovery from injury, full participation in rehabilitation must be elicited. For this to happen the athlete must understand the injury and its impact and must have the skills needed to deal with the situation. It is important to realise that although there are individual differences among athletes, there are common pathways by which they will perceive and respond to physical trauma. Injured athletes in general will experience cognitive, behavioural and emotional responses to the injury (Williams & Roepke, 1993).

Cognitive appraisal

Athletes appraise many things post-injury. For example, several personal factors listed in Figure 6 are appraisals, such as perceptions about the cause of the injury, recovery status and availability of

social support. Cognitive appraisal of the injury largely determines the emotional reactions as well as behaviour the athlete will exhibit. Overestimation of the seriousness or disruptive impact of the injury could lead to greater feelings of anger, apathy, loneliness and inadequacy. These feelings increase the likelihood of the athlete experiencing affective states known to impair rehabilitation. Dunn (1983) notes that in addition to the athlete's cognitive assessment of the injury, his/her attitudes and beliefs can also greatly influence the recovery process. According to Williams and Roepke (1993), the athlete's cognitive appraisal of the injury and his/her cognitive approach to rehabilitation may greatly impact on the recovery process. It therefore follows that interventions designed to facilitate productive thoughts and channel positive goal-orientated behaviour would contribute to the successful treatment of the injury.

As it has been found that athletes' cognitive appraisals were significantly correlated with their total mood disturbance, it may be necessary to examine one of the most common postinjury cognitions, namely athlete self-perception (Daly et al., 1995). Cognitions, such as self-perceptions, are important considerations because they can influence the emotional and behavioural responses of athletes to injury. Although definitions vary, self-perception is considered as the view one has of one-self. Self-perceptions can be thought of both as moderators of response and as dynamic responses in and of ourselves (Wiese-Bjornstal et al., 1998). Self-esteem, self-worth, self-confidence, and self-efficacy can be seen as components of self-perceptions.

Self-esteem and self-worth

Self-esteem involves the individual's assessment of his/her own worth (Weiss & Ebbeck, 1996). In a number of studies, both global and domain specific instruments have been used to measure post-injury self-esteem and self-worth. The use of global measures has revealed somewhat mixed results. For example, studies by Chan and Grossman (1988) and McGowan et al. (1994), showed significant decreases in global self-worth in injured athletes compared to noninjured athletes, while studies done by Smith et al. (1993), as well as Brewer and Petrie (1995) failed to show similar differences. On the other hand, when domain-specific measures were used to identify the aspects of self-esteem and self-worth most affected by injury, significantly lower scores were obtained by injured athletes compared to non-injured athletes (Brewer, 1993; Connelly, 1991; Leddy et al., 1994).

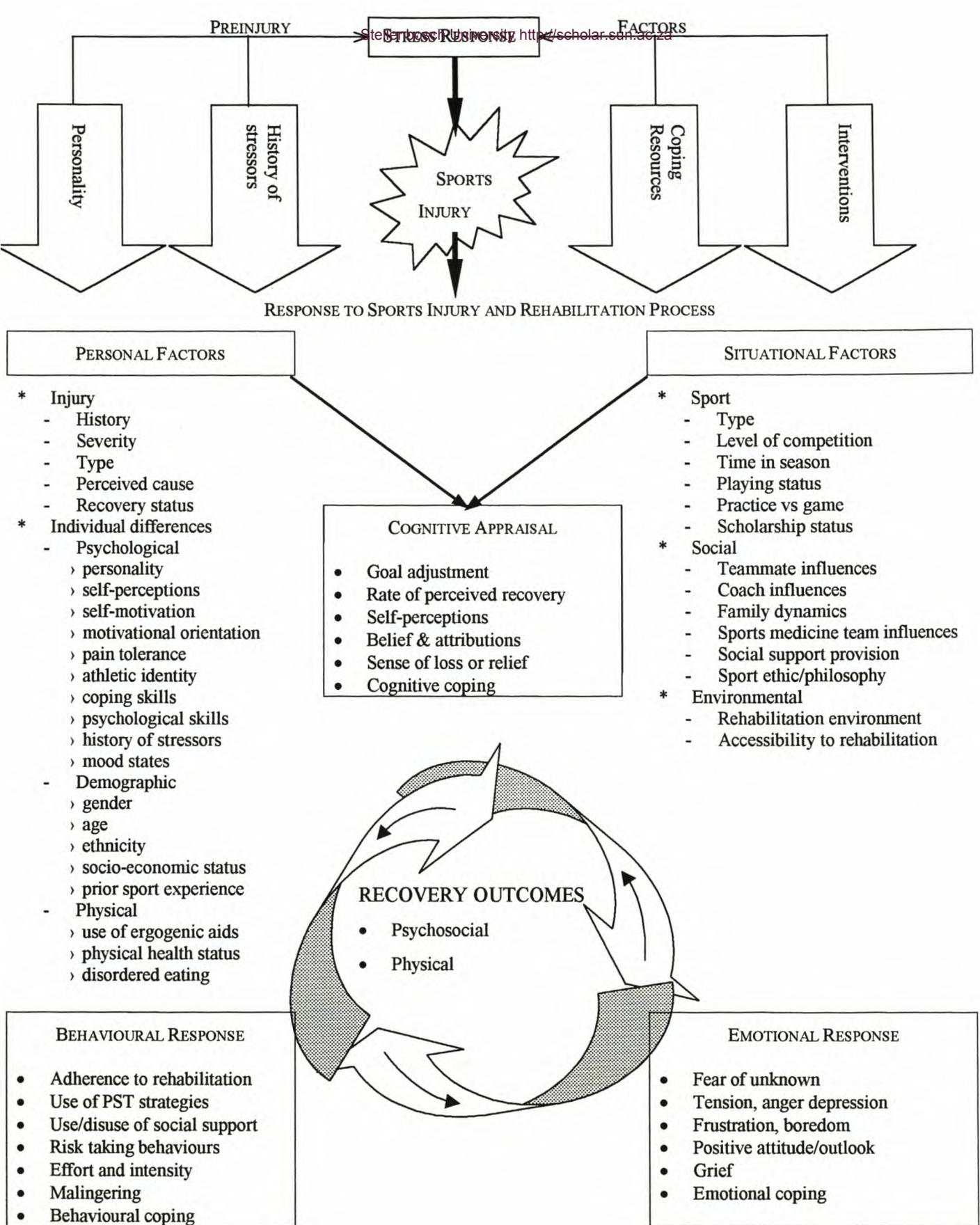


Figure 6 Integrated model of psychological response to sports injury and rehabilitation process (Wiese-Bjornstal et al., 1998)

Self-confidence and self-efficacy

Self-confidence can be described as a generalised belief in oneself, and self-efficacy as a belief in oneself as competent and effective in specific situations (Wiese-Bjornstal et al., 1998). In a study done by Flint (1991), both self-confidence and self-efficacy of injured athletes improved following a peer modelling intervention. Since self-efficacy is a situation-specific construct, the effect of injury on perceived efficacy is dependent on the situation being assessed. Connelly (1991) reported a dramatic loss of football skills efficacy as a result of injury, while Shaffer (1991) found that athletes who had previously completed rehabilitation had higher levels of self-efficacy for rehabilitation compared to those athletes not injured before.

Emotional responses

Athletes invest a great deal of time and energy in sports participation. When an athlete is injured, there is a sudden deprivation of the positive affective experiences acquired through regular exercise. When individuals who are accustomed to vigorous physical exertion are forced to refrain from taking part in such activities, numerous negative consequences may result. Treatment of injured athletes should therefore focus on the development of methods dealing with emotions, cognitions and physical sensations (Williams & Roepke, 1993).

Mood-state across time

A number of investigators have described the emotional responses of athletes to injury (Grove et al., 1990, October; LaMott, 1994; Leddy et al., 1994; McDonald & Hardy, 1990; Morrey, 1997; Smith et al., 1990a). In particular, post-injury mood-state changes across time have been documented in a number of repeated-measure investigations. No clear pattern emerged from these studies, indicating that post-injury mood-state can fluctuate across the injury time frame and can vary from athlete to athlete.

Positive profile of most injured athletes

In contrast to popular perception, a minority, rather than a majority of injured athletes have been reported to experience clinical levels of depression (Brewer et al., 1995a; Leddy et al., 1994; Smith & Milliner, 1994; Smith et al., 1993). This would seem to indicate that not all athletes would respond with depressed mood after being injured. The only factors that do seem to contribute to depressed mood are the seriousness and duration of the injury. In the Smith et al. (1990a) study, only the athletes with serious injuries, those athletes who were out of sport for more than two

weeks, experienced significant mood disturbance. However, even within this seriously injured athlete group, some athletes experienced little distress, whereas others were profoundly depressed.

Negative emotions as a facilitator

Research seems to support the possibility that the more rapid recovery experienced by competitive athletes may in part have been facilitated by negative emotions. Morrey (1997) hypothesised that competitive athletes would experience greater mood disturbances than recreational athletes and competitive athletes would recover faster than recreational athletes would. Both hypotheses were supported. It may be possible that the urgency to return to competition, initially contributing to frustration, depression and anger, also motivates the athlete during long, arduous rehabilitation. It was reported in another study by Shelbourne and Foulk (1995) that high level athletes are more impatient and thus non-compliant with traditional protocols, but many in turn experience more rapid recoveries. The untested assumption that all negative emotion is necessarily detrimental to recovery should be avoided (Wiese-Bjornstal et al., 1998).

Extreme responses

Although the majority of athletes cope well with injury, a substantial number (between 10 and 20 percent) of injured athletes experience extreme responses, particularly depression, which surpass levels usually recommended for clinical referral (Brewer et al., 1995a; Brewer et al., 1995b; Leddy et al., 1994). Among the many areas of concern for athletes exhibiting these extreme responses is that of suicidal tendencies. Athletes most at risk are young, seriously injured, competitive athletes highly invested in sport.

In another case of extreme response, injury could be used as an excuse to escape a sport situation. When injured, some athletes may actually feel relieved of externally imposed pressures from parents, coaches, team-mates and from internally imposed pressures for perfectionism and commitment.

Behavioural responses

As mentioned previously, the behaviour an athlete exhibits during recovery from injury will be greatly influenced by cognitions and emotions. To a large extent, input from these areas will determine how the athlete will respond to treatment and how the athlete will be re-acclimated into sport participation. There are two main areas where this is particularly relevant. Firstly, an athlete may be physically rehabilitated, but have problems in returning to full participation. According to Wehlage (1980) an example of this would be the fear of loss or failure that may motivate an athlete

to exhibit self-defeating behaviours. If the injured athlete fears and believes that the return to sport activity will be a negative experience, chances are that this prophecy will be fulfilled. In catastrophising, the athlete could employ negative self-talk and negative imagery, practices that, according to Woolfolk et al. (1985) have been demonstrated to impair sports performance. The negative mood states that are likely to occur during destructive internal dialogues have also been shown to have a negative effect on performance of a physical task (Kavanagh & Hausfeld, 1986).

A second unfortunate behavioural outcome involves the athlete's return to play before he/she is physically or psychologically ready. This may occur because a physician, trainer, coach or any significant other, verbally or non-verbally encouraged the athlete to prematurely return to play. Alternatively, the athlete may feel that he or she knows his/her body better than anybody else and may consequently refute sound medical advice and return to sport still unprepared. Injured athletes who are not psychologically prepared for safe and successful return to play may face a more lengthy and sometimes difficult process of regaining their prior confidence and performance levels than those who are psychologically prepared (Rotella & Campbell, 1983). Furthermore, the likelihood of injury or re-injury to another body part will increase in this state of physical or psychological unpreparedness (Williams & Roepke, 1993).

REHABILITATION ADHERENCE

Rehabilitation, according to Fisher et al. (1988) is crucial to an injured athlete's ability to return to competition. It is known that health complications may occur when injured athletes do not adhere to their rehabilitation programmes. If rehabilitation does not consistently follow most surgical procedures, there is an increased risk of scar tissue build-up and an increased risk of re-injury (Heil, 1993). An athlete's future performance in sports may even hinge on the quality of the rehabilitation programme, but in most cases the quality of the programme is not the major factor in successful rehabilitation – people are. Injured athletes often drop out of even the best-conceived programmes, resulting in a huge dilemma for the sports medicine specialist. Dishman (1981) reports that approximately 50% of the people who begin a health-related exercise programme quit within the first six months. It seems common sense that serious athletes would be highly motivated and committed to a rehabilitation programme, but the discomfort of the rehabilitation manoeuvres or the anticipation of pain might be enough to discourage adherence (Fisher et al., 1988).

What does rehabilitation adherence mean in sports therapy? In simple terms, it means sticking with the rehabilitation programme. Given the diverse array of treatments used in sports therapy, treatment adherence may involve any number of behaviours that vary depending on the nature of

the injury and rehabilitation protocol (Brewer, 1998 January). Because favourable sports injury rehabilitation outcomes are presumably dependent on successful completion of physical therapy regimens, adherence to sports injury rehabilitation programmes has recently emerged as an area of interest in the psychology of sports injury. The primary focus of empirical investigations in this area to date has been to identify predictors of sports injury rehabilitation adherence and as such a number of predictors have been identified (Brewer, 1998b). These predictors can be divided into two main categories, namely personal factors and situational factors. Although they are presented as discrete categories, these factors overlap and are not completely independent (Meichenbaum & Turk, 1987).

Personal factors associated with adherence

The personal factor most consistently linked to adherence is self-motivation (Brewer et al., 1994a; Culpepper et al., 1996; Duda et al., 1989; Fields et al., 1995; Fisher et al., 1988; Noyes et al., 1983). Self-motivation, according to Dishman and Ickes (1981) can be defined as “a behavioural tendency to persevere independent of situational reinforcements” (p. 421). In each of the cited studies, self-motivation has been positively associated with adherence to sports injury rehabilitation. Further positive associations with rehabilitation adherence have been found for high pain tolerance (Byerly et al., 1994; Fields et al., 1995; Fisher et al., 1988), high task-mastery orientation (Duda et al., 1989) and tough-mindedness (Wittig & Schurr, 1994). Inverse relationships with rehabilitation adherence have also been found for ego involvement (Lampton et al., 1993) as well as high trait anxiety (Eichenhofer et al., 1986).

Situational factors associated with adherence

Situational factors that have been shown to be related to greater adherence are belief in the efficacy of the treatment (Duda et al., 1989; Noyes et al., 1983; Taylor & May, 1996), belief in personal control over recovery (Brewer, 1998, January), responsiveness of the physical environment (Brewer, 1998, January), comfort of the clinical environment (Brewer et al., 1994b; Fields et al., 1995; Fisher et al., 1988), practitioner expectancy of adherence (Brewer, 1998, January), convenience or flexibility of rehabilitation scheduling (Fields et al., 1995; Fisher et al., 1988), perceived exertion during rehabilitation activities (Brewer et al., 1994a; Fisher et al., 1988), perceived risk of further complications in the absence of rehabilitation (Brewer, 1998, January), and social support for rehabilitation (Byerly, et al., 1994; Duda et al., 1989; Fisher et al., 1988).

Many other single situational factors have also been found. Examples of these are the following: academic class status (Culpepper et al., 1996), attribution of recovery to personally controllable factors (Laubach et al., 1996), attribution of recovery to stable factors (Laubach et al., 1996),

cognitive appraisal of the ability to cope with injury (Daly et al., 1995), importance or value of rehabilitation to the patient (Taylor & May, 1996), injury duration (Culpepper, et al., 1996), instrumental coping (Udry, 1997), emotional adjustment (Daly et al., 1995), perceived injury severity (Taylor & May, 1996), perceived susceptibility to further complications without rehabilitation (Taylor & May, 1996), rehabilitation self-efficacy (Taylor & May, 1996) and self-esteem certainty (Lampton et al., 1993).

Fisher (1990) agrees that adherence to sports injury rehabilitation is dependent on personal as well as situational factors. According to him, any attempt to view treatment adherence as a unitary construct is doomed to fail, because a complex construct demands a multidimensional outlook. Furthermore, self-confidence is the key to enhance rehabilitation adherence, and the strategies to accomplish this can be organised within a specific interactionist framework. Fisher (1990) describes his treatment adherence framework as follows: treatment adherence can best be understood in terms of the injured athlete's characteristics, conditions surrounding the rehabilitation setting, and the therapist-athlete interactions. Treatment adherence is therefore a function of the qualities which individuals possess and the conditions surrounding their rehabilitation.

Athlete characteristics

The bulk of the adherence literature, according to Friedman and Litt (1987), does not reveal that personality traits or demographic variables are useful predictors of adherence behaviour, nor can a default personality, according to Sperry (1985) be located. There does however, seem to be certain personality characteristics that are frequently observed in good rehabilitation adherers. Fisher et al. (1988) reported that, for example, adherers tolerated pain and discomfort better than nonadherers did. Adherers also seem to be more self-motivated than nonadherers are (Dishman & Gettman, 1980). Self-motivated individuals are better able to stick to their prescribed treatment regimens and overcome obstacles in the way of adherence than others not so intrinsically motivated are. Self-efficacy also appears to be a powerful predictor of treatment adherence. Self-efficacy points to the belief that an injured athlete is capable of meeting the task demands of treatment in a manner that will lead to a return to functional capacity (Dolce et al., 1986). If personality itself is not a powerful predictor of sports injury rehabilitation adherence, then it would seem that non-adherence to treatment regimens can rather be attributed to the ailing individual (Meichenbaum & Turk, 1987; Wolken, 1986).

Rehabilitation setting

It has to be remembered that the demands placed on injured athletes during their rehabilitation are taxing and unpleasant. So when rehabilitation is necessary, removing as many of the environmental obstacles as possible can enhance treatment programmes. For example, rehabilitation schedules can be fitted around the athlete's other commitments, instead of trying to fit the athlete to the treatment schedule (Dishman, 1988). Social support and external motivation also seem to enhance treatment adherence (Duda et al., 1989; Fisher et al., 1988; Friedman & Litt, 1987; Levy, 1983).

Therapist-athlete interactions

Several authors (Fisher et al., 1988; Gastorf & Galanos, 1983; Meichenbaum & Turk, 1987; Weiss & Troxel, 1986) have stressed the importance of therapist-athlete interactions in treatment regimens. The attitudes of treatment providers toward athletes' rehabilitation and the effectiveness with which they convey that attitude to the injured athletes are a crucial determinant of treatment adherence. It also becomes apparent that adherence is not the sole responsibility of the person being treated. Although there might be good reason for therapists not to personalise all their clients' problems, adherence can be facilitated or inhibited by the attitudes and actions of the therapist. The therapist's expectations may in fact be self-fulfilling. The more non-adherence is expected, the less motivated the therapist will be to alter the behaviour, because adherence is seen as the sole responsibility of the rehabilitating athlete. Reduced motivation may result in a failure to adequately explain the injury and proposed treatment, assess and request the athlete's participation in the treatment regimen, monitor progress and motivate the athlete when outside assistance seems necessary (Fisher, 1990). It may also be a good idea for sports trainers to take time and explain the injury to the athlete and to provide an explanation of the proposed rehabilitation, especially as it relates to the likelihood of pain and effort expenditure needed (Fisher et al., 1988).

Fisher (1990) advocates certain strategies to promote rehabilitation adherence. Given the adherence challenges it is not surprising that any one simple strategy will fail to have a significant impact (Haynes, 1984). A combination of strategies, or a multi-treatment approach to rehabilitation are more likely to succeed, because they simultaneously address the various challenges injured athletes face. Fisher (1990) believes that self-confidence is the key to rehabilitation adherence and outlines a variety of strategies that complement self-confidence. According to him, self-confidence is comprised of (1) competence – a feeling that a particular task can be completed in a successful manner; (2) control – the ability to take charge of a particular situation; and (3) commitment – a

willingness or capacity to stick to a task. A strategy that promotes any of these three components will increase the likelihood of treatment adherence. These will now be discussed in more detail.

Competence strategies

In spite of the negative emotions they are likely to experience, injured athletes need to feel that they can achieve their treatment goals. This can be obtained through education, efficacy of treatment, tailoring and relapse prevention training.

Education

Injured athletes need to understand at least the general details of their injuries as well as the plans and chances for full recovery. According to Brewer (1998b) sports therapists should clearly describe the athlete's condition and the details of the programme, providing a rationale for the course of action being recommended and reinforcing key issues over time. There is not necessarily a direct relationship between what athletes believe about themselves and the plans of action they pursue, but increasing their knowledge about their injuries seems to be a necessary first step to treatment adherence (Fisher, 1990). Brewer (1998, January) contends that education is vital. The reason many rehabilitation behaviours are not adhered to is because they were never learned in the first place. If they are unclear about how to perform rehabilitation exercises, athletes may omit prescribed exercises from their home regimens.

Treatment efficacy

To achieve treatment adherence, it is crucial that the rehabilitating athlete believes that the treatment will achieve its desired goals. Injured athletes therefore need reassurance that the treatment will work (Duda et al., 1989).

Tailoring

The rehabilitation regimen should be matched to the characteristics of the injured athlete (Friedman & Litt, 1987). Therapists should not have an "ideal" programme and have athletes try to meet its requirements, but preferably set up a manageable programme (even if it is less than ideal) and have the athlete meet the lesser demands and gradually return to functional capacity (Fisher, 1990). Brewer (1998, January) points out that it is important to identify potential roadblocks to goal attainment as well as strategies to overcome those roadblocks. If an athlete's employment precludes completion of daily home exercises, the therapist should consider alternate means of achieving gains in strength and flexibility.

Relapse prevention training

Treatment adherence does not mean that rehabilitating athletes are always optimally motivated to adhere to their treatment regimens. Almost everyone experience lapses in their motivation, and athletes should be reassured that normal ebbs and flows are acceptable. Athletes should, however, be encouraged to keep appointments, but in missing one, should not expect total failure. Treatment adherence must be seen as continuous, not dichotomous (Fisher, 1990).

Control strategies

Rehabilitating athletes should exercise control over their rehabilitation and the thoughts, feelings and actions associated with it. Many times athletes doubt that their goals can be reached and sometimes the anticipation or actual presence of pain makes adherence to rehabilitation difficult. If defeatist thoughts or avoidance feelings are not controlled, the probable outcome is reduced adherence. Control, whether actual or perceived, is a prerequisite to developing a sense of self-efficacy (Dolce et al., 1986). Behavioural outcomes (e.g., physical recovery) that have implications for self-esteem elicit self-enhancing attributions. These self-enhancing attributions enable athletes to take credit for success and deny responsibility for failure, thus bolstering their self-esteem. Athletes who perceive themselves as recovering rapidly tend to attribute their recovery more to stable, personally controllable and externally controllable factors than athletes who perceive themselves as recovering slowly (Laubach et al., 1996).

Dissociation

Because soreness, pain and fatigue associated with rehabilitation can be difficult to endure, it might be useful to minimise the sensory impact by distraction techniques. Instead of focusing on bodily sensations, rehabilitating athletes might concentrate on more pleasurable activities. Any strategy that alters athletes' focus from internal to external has the potential to assist rehabilitating athletes to work through the inevitable discomfort (Pennebaker & Lightner, 1982).

Self-monitoring

Success tends to breed success, and the more overt rehabilitating athletes can be with the accomplishment of their goals, the more likely they are to endure with treatment regimens. Exercisers can record relevant information on a daily basis, or they can graph daily progress (e.g., distance run, sessions attended) (Martin & Dubbert, 1984).

Decision balance sheet

The decision balance sheet can be a useful device, because adherence to rehabilitation is a personal behavioural decision made by every injured athlete on the basis of costs and benefits. Categories addressed in the balance sheet could include: (1) perceived costs of rehabilitation (e.g., takes time) compared with perceived outcomes (e.g., return to competition); (2) perceived costs and benefits to others (e.g., team-mates); (3) self-approval or disapproval; and (4) approval or disapproval of peers (Fisher, 1990).

Deconditioning of pain

Fisher and his co-workers (1988) reported that better adhering athletes in their study tolerated pain better than the lesser adhering athletes. Because some pain is endemic to most rehabilitation programmes, treatment providers should understand that the anticipation of pain often limits participation in treatment regimens (Dolce et al., 1986). Injured athletes could be taught pain control techniques, or with the application of systemic reinforcement, pain and soreness can even come to function as a conditioned positive reinforcer (Lees & Dygdon, 1988).

Commitment strategies

Motivational or commitment strategies are essential if rehabilitation adherence is the goal. Individualised or behavioural approaches to the promotion of adherence, according to Martin and Dubbert (1984), have been shown to be among the best strategies injury treatment providers might consider.

Shaping

Demanding too much too early in rehabilitation may well lead to discontinuance of treatment. Athletes should be encouraged to set limited (and attainable) goals as they initiate their rehabilitation (Kanfer & Schefft, 1988). Essentially, rehabilitating athletes should be hooked on the successful accomplishment of progressive goals, thus increasing their chances of shaping their treatment behaviour.

Contracting

Rehabilitating athletes can be anchored to their treatment regimens by making a formal commitment, usually in writing, in which rewards and punishments are clearly related to particular behaviours. This strategy is aimed at bringing social pressure to bear on the decision-maker and also failure to comply carries a certain amount of self-disapproval (Fisher, 1990).

Threats

The use of threats should be considered very carefully, because of the potential negative impact on the treatment provider-athlete relationship.

Goal setting and attainment

It is important that rehabilitating athletes see progress with their treatment. The rehabilitation process should be broken up into stages, and goals set for each stage. Short-term goals (e.g., attending the rehabilitation session, giving maximum effort on the prescribed exercises, completing homework assignments) are superior to long-term goals (e.g., return to competition). Progress towards goals is so rewarding that rehabilitation adherence is doubled for those athletes who achieve their goals (Ice, 1985). According to Brewer (1998, January) rehabilitation goals should be: (1) short-termed and, to a lesser extent, long-term; (2) specific (e.g., to complete 3 sets of 15 lunges), instead of general (e.g., to get better); (3) measurable, so it can be determined whether the goals have been attained; (4) challenging, yet realistically achievable; (5) process-orientated rather than outcome-orientated, so that control over goal attainment rests with the athlete; (6) phrased in positive terms; and 7) flexible and modifiable when required.

Social support

Research evidence points to a positive relationship between social support and adherence (Caplan et al., 1976). Therapists are in a good position to orchestrate a very powerful system of social support. They can remind coaches of athletes' rehabilitation appointments, affording them the opportunity to become personally involved. Team-mates can also be asked to visit injured athletes, creating the opportunity to show their concern about treatment progress. Dishman (1988) suggested that people are more likely to keep a commitment to another person than they are to themselves. Injured athletes, who receive support from others around them, including their trainers, are more likely to adhere to their rehabilitation programme than athletes who receive less support.

MALINGERING ATHLETES

According to Heil (1993) a sports medicine provider will face no more difficult and potentially disruptive situation than the prospect of a malingering athlete. Malingering has been discussed in sport psychology literature since the 1960s, but it is still not completely understood. In fact, it is very difficult to know with certainty that a given situation is in fact malingering and not a misdiagnosis (Rogers, 1990). Misdiagnosis may easily occur when problems such as myofascial pain syndrome or sympathetically maintained pain (SMP) syndromes occur secondary to injury.

Great care must be taken to not falsely accuse an athlete of malingering, because it is such a compelling condemnation. The treatment relationship may also be undermined or irreparably damaged through this action. On the other hand, if malingering is in fact occurring and it is not addressed, a significant behaviour problem is allowed to continue.

Definition of malingering

Malingering is defined in the *Pocket Handbook of Clinical Psychiatry* (Kaplan & Sadock, 1990) as the “voluntary production of physical or psychological symptoms in order to accomplish a specific goal, e.g., insurance payments, avoid jail term or punishment” (p. 115). The term malingering is often erroneously used to describe any illness that appears to have a significant psychological component. It is also sometimes mistakenly used to refer to a fictitious disorder for which symptoms are intentionally produced, but in the absence of external incentives and without a clear understanding on the part of the individual as to the motivation for the behaviour. Yet another incorrect use of malingering is in reference to the broad category of somatoform disorders, in which there is a significant interplay between somatic and psychological symptoms, but in which intentional symptom production and motivation for gain are absent (Heil, 1993).

Recognition should be given to the broad role psychological factors may play in contributing to problems in injury rehabilitation. The term malingering explicitly suggests that there is no physical problem and that the athlete is not motivated to rehabilitate or return to competition. It is used by athletes who have learned from experience that they can use complaints of pain and injury to their advantage (Heil, 1993).

Understanding malingering

Malingering, according to the *American Psychiatric Association* (1987), under limited circumstances is appropriate and could actually demonstrate adaptive behaviour. For example, a young athlete may see no other way out from adult-imposed standards of mental and physical toughness. Malingering may be undesirable as a problem-solving strategy, but there could simply be no other alternative for a young person who is truly unable to choose whether to participate or not. The real focus should, however, be with athletes who have a serious, recurring problem with malingering.

From the start it must be emphasised that malingering is not restricted to the world of sport. For instance, in industrial medicine it has proven to be an extremely costly psychological and behavioural problem (Brink, 1989; Labbate & Miller, 1990; Lees-Haley, 1986). Within the sports

world malingerers are those who intentionally lie about an injury in order to avoid practice or competition (Kane, 1984; Ogilvie & Tutko, 1966). According to Swanson (1984) the presence of a clearly definable goal differentiates malingerers from persons with other forms of fictitious illness. Labbate and Miller (1990) contend that it would be safe to describe malingering behaviour as an adaptive response to adverse circumstances requiring the presence of an external incentive for being injured. The problem of malingering may present a considerable challenge to treatment providers, since there is no foolproof way to confirm that a person is consciously faking symptoms of discomfort or physical distress. This is especially true when such athletes seem to cling to their symptoms or disability in the absence of physiological support for such behaviour. Athletes who fail to respond to treatment or a physician's assurance as to their state of physical recovery may be driven by unconscious as well as conscious motives. Treatment for malingering is also almost always confounded by the issue of secondary gain. For the typical malingering athlete the greatest need is attention and the greatest fear is getting caught (Rotella et al., 1993).

Origins of malingering

Athletes learn to malingering from personal experiences, observation of models such as parents, coaches, or other older athletes. Malingering techniques may also be taught directly by older athletes. Irrespective of how it occurs, malingering is a behaviour that has been learned, adopted as acceptable, rewarded, and then done wilfully and intentionally or habitually (Ogilvie & Tutko, 1966). Often malingering athletes were spoiled in their early years, by being allowed to lie and deceive. From this the malingerer gathers the notion that lying is acceptable and justifiable in order to get one's way. It is also likely that the malingerer's own devious behaviour was at some point directly reinforced or learned indirectly by observing parents, teachers, coaches, or older athletes being reinforced for dishonest behaviour. Typically malingerers learn from an early age that they will not be punished for improper behaviour or that family members will rescue them from trouble. Talented athletes from such backgrounds tend to enjoy knowing that a team's success might depend on them. This affords them the potential of exercising control, receiving attention, and becoming aware of the potential disturbance they might cause to their team.

Malingering can typically be seen as a manifestation of complex motives. The social and family influences that undermine the maturity of malingerers can vary considerably, but these influences seem to produce individuals with a shallow conscience. This, in turn, tends to result in the shirking of responsibility to others. Avoidance reactions then become the standard response when such persons are confronted with the demands of reality. Malingering is a consequence of deceit, faking, or selfish manipulation that is related in some way to underlying forms of inadequacy. It is often

very difficult to provide help to malingerers, because they are fearful of being exposed as such and are therefore always on guard. Malingerers also tend to cling to their strategies of dishonesty at all cost, causing avoidance reactions to become the standard response when confronted with the demands of reality (Rotella et al., 1993).

Reasons for malingering

The reasons for malingering can be summed up as follows (Rotella et al., 1993:87).

- Using an insignificant injury to rationalise loss of starting status, reduction in playing time and poor competitive performance.
- Using injury-related disability to prevent loss of athletic scholarship.
- Using injury to account for apparent decrease or change in motivation for participation.
- Using injury to offset the personal realisation of insufficient ability (talent) to compete successfully.
- Using injury to attract needed or desired attention from others that has not been forthcoming elsewhere.
- Using injury to demonstrate personal courage by “playing hurt”.
- Using injury to offset expectations of coaches, team-mates and parents.
- Using injury as a reason to desist from performing thereby not contributing skill, talent and ability to the team’s effort, and thus expressing hostility or anger towards coaches, team-mates or parents.
- Using injury to avoid the rigors of practise but still be able to compete since the coach may need the athlete’s services on game day.
- Using minor injury as a reason not to play in order to save the body for intercollegiate or professional competition where the material rewards are greater than those at the present level.
- Using injury as a way of disengaging from a dimension of life that hereto has proven to be undesirable, but also unavoidable (e.g., all males in the family traditionally play football).

Helping malingering athletes

When helping malingerers, the first step should always be to attempt to understand the individual athlete’s problems and the underlying reason for malingering. To achieve this a trusting athlete-treatment provider relationship is of the utmost importance. This, however, can be difficult to establish with an athlete who initially may be disliked, respected, or admired. Listening, showing care, concern and interest are necessary first steps, but athletes should not be allowed to use the discussion or counselling sessions as another opportunity to lie and manipulate. When the

malingering athlete does try these strategies, the treatment providers should not take it personally, because they are simply well-learned habits. Listening must be combined with straightforward feedback to the malingering athlete (Rotella et al., 1993).

Although it is difficult to establish whether an athlete is indeed faking, it is important to confront the issue honestly and directly. There is always the possibility of an undetected injury. The treatment team therefore should not attack or accuse the athlete of lying and should be sure to display the necessary empathy. It should be made clear that the best interests of the athlete and the team are the only concern. Care should be taken not to show sympathy (which breeds weakness, stagnation, and self-pity), but empathy and understanding should rather be displayed, promoting growth and positive development. The treatment team should attempt to determine the reason for the malingering. Malingering is practised only if it produces gain for the athlete and will not occur in the absence of perceived gain. Does the athlete malingering due to fear of playing, is he or she in need of help to manage stress or fear, is there a need to reduce internally or externally imposed pressure, or is it practised to receive attention? (Rotella et al., 1993)

The athlete should be advised that the treatment team and its members care about him/her, but it troubles them that he/she seems to defy getting well and that their patience is running thin. It should be made clear that nobody is assigning blame, but that the goal is to solve the problem. Athletes should be asked for suggestions as to how the problem should be addressed. At some point malingering athletes should also be given strictly defined boundaries for behaviour and detailed consequences of stepping outside those boundaries. With the athlete's agreement, specific rehabilitation goals should be established and recorded and athletes should be encouraged to talk to other athletes who have successfully recovered from similar injuries. Rewards should be provided for desired behaviour or withdrawn for further malingering (Rotella et al., 1993).

It is important to remember that it is best to avoid using a word like "malingerer" when speaking to the athlete, as it will most likely serve only to raise defences and further complicate honest communication (Rotella et al., 1993).

Preventing malingering

There are some basic steps that can be taken in reducing or preventing malingering. For instance, practise sessions should include as many "fun" activities as possible, while still being challenging and stimulating. Participation through minor pain, soreness and discomfort should be privately and publicly reinforced, without encouraging athletes to risk additional or serious injury. Equal attention

should be given to starters and non-starters. Coaches should be alert to signs of high levels of tiredness and, if necessary, reduce assigned workloads. Emphasis should be placed on the fact that game and practise rules are intended to benefit and protect athletes. After an athlete has been injured, short- and long-term goals for rehabilitation should be established and where possible, reinforce progress toward achieving goals. Coaches and treatment providers should be tolerant of short-lived malingering attributable to fatigue or family problems and be supportive, understanding and sensitive to the feelings of athletes after they sustained a competitive loss or are experiencing a streak of bad losses (Rotella et al., 1993).

PEER MODELLING

Teachers and coaches have made extensive use of modelling within sport as an instructional tool for the learning of motor skills and social behaviour. Modelling, according to Bandura (1986), is acknowledged as one of the most powerful means of transmitting values, attitudes, and patterns of thoughts and behaviours. Although coping models have been used fairly extensively within clinical or therapeutic settings (Kulik & Mahler, 1987; Thelan et al., 1979), the idea of employing coping modelling in sports rehabilitation settings has received only limited attention (Flint, 1993; Weiss & Troxal, 1986; Wiese & Weiss, 1987). Because athletes are familiar with observing models for the purpose of motor skill learning or the transmission of psychological information, it seemed logical to extend this technique into the realm of sports injury rehabilitation. For an athlete who has never experienced a major injury, successful recovery (among other things) involves learning how to cope with the process of rehabilitation and return to play. Being able to observe another athlete, who has already effected a complete recovery from injury, can facilitate an injured athlete's belief in recovery.

What is peer modelling?

Modelling or observational learning is one of the primary modes used by individuals to gain socialisation information and cognitive skills. Behaviours, attitudes and skills can be learned through modelling by means of behavioural and verbal cues provided by a model (Bandura, 1986). As the observer views the model, verbal coding or symbolic representation takes place, and these cues are placed in the memory. As the observer gains information through another's experiences, judgement criteria are established and new behavioural patterns can be learned. Often the capabilities of the observer are compared to those of the model and therefore, seeing someone similar to oneself perform a novel task or particular behaviour, can enhance the perception about the observer's capacity to recreate the action (Bandura, 1986).

A number of significant factors, such as physical characteristics (e.g., physique, age, gender), model type (e.g., mastery vs coping) and the number of models help to determine how effective the modelling experience would be and whether the observer will have the incentive to copy the modelled behaviour. Bandura (1977) as well as McCullagh et al. (1989) emphasised the importance of model/observer characteristics. They proposed that the observer will form a bond with the model through the identification of similarities, and by doing this, the observer will be motivated to pay attention to the message the model is conveying. The selection of specific characteristics of the model in creating “similar others” is therefore critical for effecting behavioural change in observers.

The level of expertise displayed by the model is another important aspect of the model/observer relationship. For example, mastery or exemplary models demonstrate errorless task execution and show tasks as they are to be performed perfectly (Schunk et al., 1987). Coping models, on the other hand, initially demonstrate negative cognitions and affects and an imperfect performance. Gradually the coping model demonstrates positive thoughts, high self-efficacy, and strategies needed to overcome problems and improve performance. Within the sports injury rehabilitation setting the use of coping models is particularly relevant, because the injured observer can relate to stages of recovery demonstrated by the model who is overcoming an injury (Flint, 1993).

Formal and informal modelling

Both formal and informal modelling techniques have been used to bolster the observer’s sense that recovery from a serious health problem is possible. Informal modelling usually takes place naturally within rehabilitation settings when the therapist points out another person with a similar injury and who is progressing well with the rehabilitation process. This is mainly used as a motivational boost for the injured athlete, because very little data on psychological strategies or ways of overcoming obstacles to recovery is conveyed (Flint, 1993). However, the modelling process should be formalised to ensure that pertinent, useful information and strategies for complete rehabilitation is displayed by the model. In formal modelling, the situation is structured in such a way that the observer gains maximum benefit from the exposure. This would mean that a situation is created whereby one or more models present specific verbal or visual cues that expose the observer to their experiences, verbal persuasions and emotional urgings.

Information provided through modelling

Very concrete guidelines concerning patient information comes from Heil (in Samples, 1987). He stated that information given should include the exact nature of the injury, the procedures and rationale for rehabilitation, the potential obstacles that can occur and ways to overcome them and

the feelings that the athlete may experience through the recovery period. The main aim of providing any information or applying psychological interventions, is to help the injured athlete gain more confidence that he/she is capable of performing activities that may benefit overall recovery. According to Flint (1993) athletes who sustain injury for the first time have no experience on which to base their expectations of a full recovery. Fear of the unknown may cause dysfunctional attitudes on the part of the injured athlete and may seriously hamper the process of recovery (Rotella & Heyman, 1986). Making use of vicarious learning from a similar other who can provide an accurate account of the road ahead, is an effective strategy for dealing with challenging or threatening situations.

SOCIAL SUPPORT

Although athletes face many challenges within the competitive sport environment, one of the most common and most stressful is dealing with injury. Injury can act as a threat to the athlete's self-concept, belief system, social and occupational functioning, values, commitments, and emotional equilibrium (Danish, 1986). When confronted with the stress of injury, athletes will attempt to minimise net resource losses. In the absence of effective personal resources, athletes will try to extend their resource pool by seeking the support of others to help them cope with the injury (Hobfoll & Stokes, 1988). Stressful events cause people to turn to those closest to themselves as a source of comfort and strength. Hobfoll and Stephens (1990: p. 459) describe social support in the following way:

It is those closest to us who carry our burdens when we are incapable; who offer a shoulder on which to cry, shelter from adversity, and solace from grief. Significant others share their resources to help those for whom they care through these most difficult periods of life.

Definitions of social support

There are many definitions of social support. In its broadest sense, social support is the essence of being social. Eckenrode and Gore (1981) view social support as the number of friendships, relatives nearby and organisational involvements of an individual. Wilcox (1981) defines social support as having a confidant or spouse. Kaplan et al. (1977) saw social support as the "metness" or gratification of basic social needs, approval, esteem, succor and belonging. Moss (1973) on the other hand, defined social support as "the subjective feeling of belonging, of being accepted or being loved, of being needed all for oneself and for what one can do" (p. 237).

Yet more definitions of social support come from Caplan (1974) and Cobb (1976). Caplan defines social support as assistance from significant others in completing tasks, in providing instrumental aid (e.g., money, tools, advice) to deal with particular situations and in mobilising psychological resources to deal with emotional problems. Cobb views social support as informational aid belonging to one or more of three categories. Firstly, information leading individuals to believe that they are cared for or loved. Secondly, information leading individuals to believe that they are esteemed and valued. Thirdly, information leading individuals to believe that they belong to a network of communication and mutual obligation in which others can be counted on in time of need.

A last definition according to Specht (1988) is that social support can be seen as the process of mutual nurturing and caring among two or more individuals, involving an exchange of resources between at least two of these individuals and perceived by the recipient or the provider to be intended to enhance the well-being of the recipient.

Elements of social support in sports environments

Social support is a form of interpersonal connectedness, and according to Heil (1993) it encourages the constructive expression of feelings, provides reassurance in times of doubt and leads to an improvement in communication and understanding. Ogilvie and Taylor (1993) contend that due to the total psychological and social immersion in sports activities, athletes' primary social support system will often be derived from their sports involvement. Other authors agree with this. According to Svoboda and Vanek (1982) as well as Botterill (1990) the social activities of athletes revolve primarily around their sports life, because the vast majority of their friends, acquaintances and other associations are found in the sports environment.

Hardy and Crace (1993) suggest that during the social support process, the transaction between the provider of the support and the recipient thereof, allows for an exchange of resources to take place. The recipient transmits a need for a specific type of support to potential support providers who, in turn, have to recognise the request for help and be willing and capable of offering the type of support requested (Albrecht & Adelman, 1984). The recipient must also perceive the behaviours of providers to be helpful in meeting expressed needs (Sarason et al., 1990). The aim of this would be the enhancement of the recipient's physical and psychological well-being.

Hardy et al. (1991) identified a number of factors that would enhance social support. These include listening, technical appreciation, technical challenge, emotional support, emotional challenge and shared social reality.

Listening

Listening support is behaviour that indicates that people listen to the concerns and feelings of the injured athlete without giving advice or being judgmental. This also includes the empathic sharing of joys and sorrows.

Technical appreciation

These are behaviours that acknowledge good effort and performance of the injured athlete, expresses appreciation for the work that he/she does, while based on technical understanding of the tasks in question.

Technical challenge

These are behaviours that challenge athletes' way of thinking about their work in order to stretch, motivate and lead them to greater creativity, excitement and involvement in their work.

Emotional support

This points to behaviours that comfort athletes and indicate that people care for them. This means active support of the athlete through emotionally demanding circumstances without necessarily taking his/her side.

Emotional challenge

Emotional challenge means behaviours that challenge athletes to evaluate their attitudes, values and feelings. Encouragement is shown to meet and overcome obstacles that are emotionally demanding.

Shared social reality

These are behaviours that indicate to athletes that people are similar to them and generally see things the way they do. This helps them to confirm their perceptions and perspectives of the world and help keep things in focus. Sharing similar experiences, values and views provide a basis for self-evaluation through social comparison.

Although not part of the original set of factors, two other factors, namely material assistance (behaviours that provide financial assistance, products and gifts), and personal assistance

(behaviours that indicate a giving of time, skills, knowledge and/or expertise to help accomplish tasks) can also be added (Hardy & Crace, 1993).

Functions and mechanisms of social support

According to Hardy et al. (1991) the overall function of social support is to enhance the recipient's well-being. Research has shown that social support is critical to handling life stress, crises, mental and physical illness, unemployment, job stress, bereavement, childbirth, mortality risk and other stressors. Results indicate that individuals who receive social support are generally more mentally and physically healthy than unsupported individuals. This is perhaps due to the health-sustaining and stress-reducing functions of the support (Shumaker & Brownell, 1984). The more effective the social support an individual receives, the better his or her mental and physical health. On the other hand, ineffective or low quantities of social support reduce mental and physical well-being (Hardy & Crace, 1993).

The stress-reducing functions of social support could best be described by the buffering hypothesis, which suggests that social support moderates or buffers the impact of stress on the individual and thus indirectly affects well-being. At low levels of social support the relationship between stress and psychological well-being should be strong and direct, and as social support increases, the relationship should weaken. Under conditions of maximal support, the relationship between stress and well-being should be non-existent. The precise mechanisms of these two functions have yet to be established; however, it has been suggested that effective social support networks alter the individual's cognitions, affect, immune system function and/or behaviour (Hardy & Crace, 1993).

Social support may have unique dimensions, but those dimensions share some common variance. According to Sarason et al. (1990) the active ingredient of social support is an individual's belief that others value and care about him/her and that others are willing to assist if the individual needs support. When individuals perceive the world as supportive, they feel that the resources necessary for the attainment of their goals are available to them, either from within themselves or from their support network.

Social support can, however, have negative effects on both the provider and the recipient. For the recipient, social support may lead to increases in pressure to perform, causing some people to behave in unhealthy ways. Recipients may also feel smothered and controlled by, and indebted to support providers (Shumaker & Brownell, 1984). Providing support can drain the provider's resource pool (e.g., emotions, time, finances), alter his/her attitude toward the recipient and increase

the provider's sense of personal vulnerability (Hobfoll & Stephens, 1990; Shumaker & Brownell, 1984).

A framework for social support-based interventions with injured athletes

Hobfoll and Stephens (1990) suggested that the following factors be considered when setting up a framework for, or designing social support-based interventions.

Evaluation of loss

The first step in setting up the framework is to determine the nature of the stress. Cutrona and Russell (1990) contend that injury can be categorised as a negative, uncontrollable event that involves the loss of or a threat to physical assets, relationships, achievement and social roles. Once the nature of the stress has been established the next step is to determine the most effective type of social support to counter the stress of injury. It is important to keep in mind that specific types of social support facilitate coping with particular types of life stress. Social support, therefore, will only have a beneficial effect to the extent that the support actually received is appropriately matched to the specific needs activated by the stressor (Sarason et al., 1990). Emotional support is essential because emotion-focused coping is important in reducing the intensity of emotions as a result of the injury (Cutrona & Russell, 1990; Hobfoll & Stephens, 1990). Because injury can adversely affect many life roles, a broad range of support will most likely need to be provided for effective healing to occur. The longer the effects of the injury last, the more emotional support will be required, while for some injuries even the provision of tangible support to compensate for the assets lost during the injury will be needed.

Intensity of support-based interventions

In setting up the framework for social support-based interventions, another factor to consider is the intensity of the support that is available. Hardy and Crace (1993) believe that the most effective support is intensive and provided by the closest loved ones. The source of support also appears to be an important factor for determining intensity of support-based interventions, with Sarason et al. (1990) suggesting that when the recipient perceives that the support provider is interested, empathic and committed, the intended support provisions will be helpful and used.

Evaluation of other resources

Resources other than social support also need to be considered when setting up a framework for social support-based interventions. It is important to include other resources, such as personal

characteristics and injury characteristics that might interact with social support (Hardy & Crace, 1993).

Timing

The stress of injury and the effectiveness of social support are dynamic processes, making the timing of support behaviour an additional important consideration. Normally, initial support efforts would focus on emotional support, but the type of support needed would change as a function of the stress sequence experienced (Hardy & Crace, 1993).

Drain of resources

The use of resources is not entirely without costs. As the rehabilitation process continues, support recipients may find it increasingly difficult to ask for the type of support needed, and providers may feel increasingly more strained when asked for assistance. One way of controlling the drain in resources is to have a professional supervise the support process, ensuring that the support system does not become overtaxed. The main task of such a professional would be to make psychological and medical expertise easily accessible to the providers, and to develop a multiplex network of support providers (Hobfoll & Stephens, 1990).

Environmental vs individual intervention

The final consideration would be to try and alter the environment in ways to facilitate the provision of effective social support. This would, for example, involve changing the athlete's living arrangements (moving back from college hostel to parents house) to be near people that can care for him/her. The context of social support can be a critical factor because the stress of injury involves the loss of many tangible resources (Hobfoll & Stephens, 1990).

Creating and maintaining an effective social support system

Although the ongoing support of significant others is essential, ultimately individuals have to assume the responsibility of creating and maintaining the support they themselves need (Danish & D'Augelli, 1983). This entails assessing the structure and efficacy of their existing social support systems by identifying the types of support they feel they need, the nature of their current network, and the level of satisfaction they experience with their network in having their needs met. It is also beneficial to determine the type-provider match. Athletes usually have two type-provider match systems, namely those that require expertise on the part of the provider and those not requiring such expertise (Hardy & Crace, 1993).

The next step in creating an effective social support system is to actually locate and determine the availability of potential support providers. The following guidelines for identifying such providers are offered by Danish and D'Augelli (1983). Firstly, providers must be people with whom the athlete has frequent contact, someone who is available when needed. Secondly, they must understand the athlete's potential as well as his or her limitations. Thirdly, they must be individuals on whom the athlete can rely. Lastly, they should be persons to whom the athlete can give something in return.

Athletes should be discouraged from assuming that people in supporting roles are able to provide all necessary support. For example, a coach or member of the sports medicine team may be able to provide tangible and informational support, but no emotional support. Parents or family members on the other hand, may be able to provide emotional support, but no task challenge support needed to recover successfully from injury (Hardy & Crace, 1993).

The following people can be seen as natural helpers in the social support system.

Coaches

Coaches can be helpful by providing emotional and informational support during rehabilitation from injury. They can continue to keep athletes involved in team activities and meetings. Injured athletes can act as assistant coaches, or help with collecting game statistics. However, the most important contribution by coaches would be to continually reinforce the notion that the most important team function injured athletes can perform, is to commit to an effective rehabilitation training programme, thus facilitating a timely return to the team (Hardy & Crace, 1993).

Team-mates

Every effort should be made to keep injured athletes involved with the team. Team-mates can be helpful by providing emotional, informational and tangible support during rehabilitation. According to Silva and Hardy (1991) when injured athletes are continually involved in team activities, feelings of letting the team down are minimised, important "family" ties are maintained, and fears of being replaced and forgotten are decreased.

Sports trainers, biokineticists and physical therapists

Trainers, biokineticists and physical therapists can be helpful by providing emotional, informational, and tangible support throughout the process of recovery from injury. Because these therapists are often aware of athletes with similar injuries, they can serve an important function by

networking and co-ordinating peer modelling. By acting as the go-between, these therapists can facilitate selecting the most appropriate peer model, prevent the model from being swamped with requests from injured athletes. Trainers, biokineticists and physical therapists can also be helpful in establishing support groups, providing a sense of universality, a realisation that the individual members are not alone in having experienced injury or the psychological reaction to the event (Hardy & Crace, 1993).

Parents

Parents are especially helpful by providing emotional support during rough times of recovery from injury. Parents can use this opportunity to gradually emphasise other important roles that form an individual's identity, and to indicate how positive aspects of one's life can still occur during setbacks in other areas of life (Hardy & Crace, 1993).

In conclusion, in order to maintain an athlete's social support system, it is advised that they remain in regular contact with the members of their network. It is important, however, that athletes realise that the goal of support interventions is to overcome the need to depend too much on environmental support by developing them as a support system (Hanson & Lubin, 1986).

Chapter Five

A SERVICE PROVIDER MODEL FOR SPORTS INJURY REHABILITATION

INTRODUCTION

Historically, sports medicine practitioners have concerned themselves mainly with the physical aspects of injury rehabilitation. Rehabilitation, according to the *Oxford Dictionary of Sports Science and Medicine* (Kent, 1996) is defined as:

The restoration of an injured person to the level of physical fitness he or she had before the injury. In the past, rehabilitation often followed the treatment of the injury, but now it more commonly begins at the same time as treatment. The aim of rehabilitation in sport is to facilitate the return of the athlete to training and competition at as high a standard and in as short a time as the specific priorities of each athlete determines. (p. 370)

Previously athletes who had attained a prescribed level of physical rehabilitation were assumed to be fully prepared for a safe and successful return to competition. It gradually became clear however, that this assumption was not valid for all athletes. Some athletes quite readily adapt psychologically to injury, but others, despite physical readiness, are not psychologically ready to return to competition (Rotella & Heyman, 1986).

To date most approaches for the rehabilitation of sports injuries seem to have been driven from a medical-model perspective (see Figure 7) with little consideration for the psychological factors that could accompany those injuries (Heil, 1999). It was therefore the purpose of this study to develop and implement a rehabilitation model that would not only encourage and facilitate physical rehabilitation (based on medical grounds) but also take into consideration the psychological rehabilitation that is so important in full recovery from injury. (See Figure 8).

From personal observation it would also seem that of all the treatment providers within the medical model, it is the physical therapists that spend most time with the injured athlete. Sometimes very special bonds develop between injured athletes and physical therapists. As a result of this special treatment provider–client relationship, athletes may begin to feel comfortable enough to confide in their therapists any psychological problems experienced as a result of their injury. According to Diesel (1997), physical therapists are often ill equipped to deal with such psychological problems, thus preventing successful rehabilitation. The main purpose of this proposed “service provider model” (SPM) will therefore be to provide physical therapists with an “instrument” to help them identify, refer or treat athletes who need psychological help in their rehabilitation process. This SPM will not deviate much from the medical model, but will incorporate psychological principles (see Figure 8).

WAYS OF ASSESSING PSYCHOLOGICAL REHABILITATION

It is relatively easy to assess whether an athlete is making progress with his/her physical rehabilitation. Strength can be measured with weight lifting, or speed with a stopwatch, but psychological contributors to rehabilitation cannot be readily determined. Psychological assessment however, is critically important because it identifies essential information that can either facilitate or interfere with the many aspects of rehabilitation (Taylor & Taylor, 1997). Assessment increases understanding of the areas that need to be addressed to optimise rehabilitation. It helps organise a comprehensive rehabilitation programme to address these areas and it offers a simplified means of charting both physical and psychological progress during the course of rehabilitation (Taylor & Taylor, 1997).

As previously stated, in the life of an athlete, injury is perhaps the ultimate stressor (Heil, 1993). If it is assumed that all injuries carry some degree of psychological cost to the athlete, it follows that a psychological diagnostic assessment should go beyond the objective evaluation of the injury. It should identify the personal meaning and subjective cost of injury to the athlete, as well as the extent of his or her coping resources. There are a number of factors to be considered when injuries occur, including emotional distress, the site of injury, the immediate experience of pain, as well as the timeliness, culpability and unexpectedness of injury (Heil, 1993).

For the purpose of the SPM, special attention was paid to the experience of emotional distress and pain. The more extreme the emotional response relative to the injury and the more limited the athlete’s coping resources, the greater the likelihood of treatment complications.

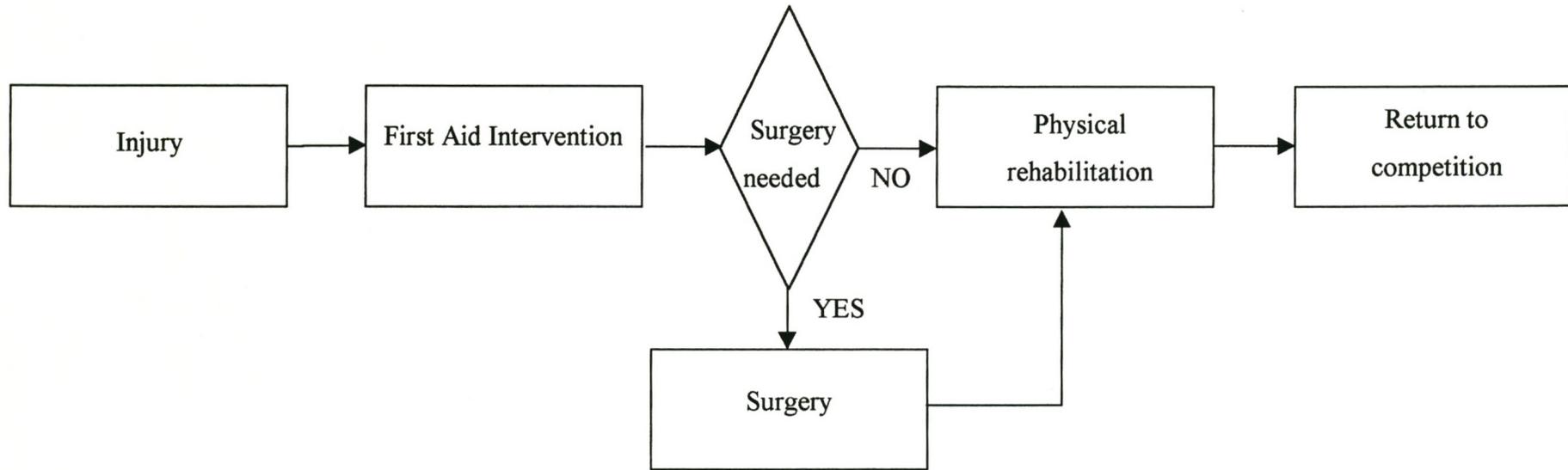


Figure 7 Medical model of injury rehabilitation

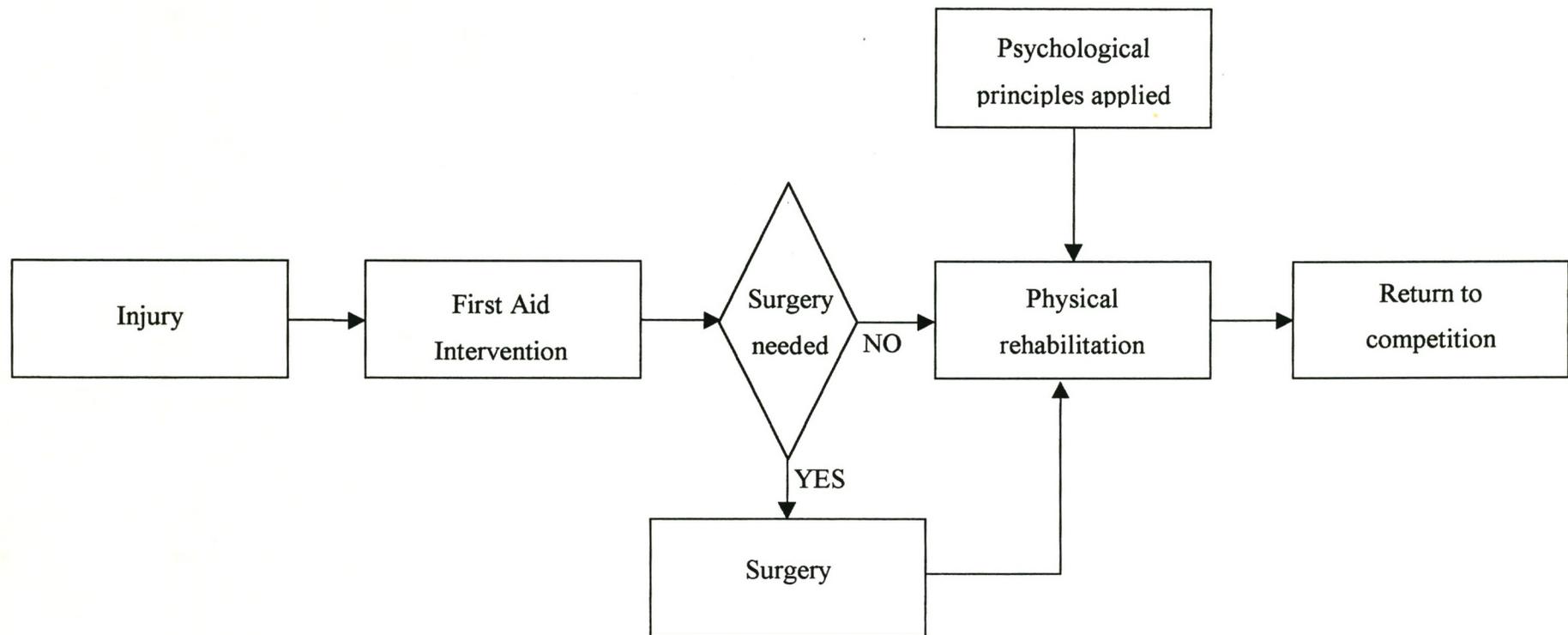


Figure 8 Service provider model of injury rehabilitation

Pain, as an immediate response to injury on the other hand, reflects not only the severity of tissue damage, but also anxiety and expectations regarding the impact of injury on performance. Pain that appears to be out of proportion to the magnitude of the injury, may signify a breakdown of coping mechanisms (Heil, 1993).

Assessing emotional distress

One of the best ways to assess emotional distress is through the use of psychological tests. The purpose of psychological testing in injury is to help gather information about the athlete's personality style and coping skills. It also helps to determine how these personality styles and skills have been affected by injury or other circumstances. Psychological testing provides a relatively concise, time efficient and objective measure of athlete functioning (Heil, 1993). For the purpose of this study, the *Incredibly Short POMS (ISP)* was chosen. The *ISP* was derived from the *Profile of Mood States (POMS)*, originally developed by McNair et al. (1971).

Profile of mood states (POMS)

Understanding the psychology of emotion, according to McNair et al. (1971), requires not only the inclusion of psychological and behavioural data but also the subjective data of feeling, affect and mood. The *Profile of Mood States (POMS)* was developed to meet the need in the clinical psychology field for a rapid, economical method of identifying and assessing transient, fluctuating affective states.

The present version of the POMS consists of 65 adjectives rated along a 5-point intensity scale from 0 ("not at all") to 4 ("extremely") to reveal six mood dimensions: tension-anxiety, depression-dejection, confusion-bewilderment, anger-hostility, vigor-activity and fatigue-inertia. To complete the *POMS* requires 5-10 minutes. Although originally developed as a clinical instrument, it has been used widely with athletes. It appears to be not only a sensitive measure of change in athletes' emotional responses to injury over time, but has also proved itself useful in predicting emotional distress. The advantages of the POMS include its speed and ease of administration, as well as its face validity (Eichman, 1978).

Seven areas of research in particular, have provided evidence of the predictive and construct validity of the *POMS*. These areas are: (1) brief psychotherapy studies, (2) controlled outpatient drug trials, (3) cancer research, (4) drug abuse and addiction research, (5) studies of response to emotion-inducing conditions, (6) studies of concurrent validity coefficients and other POMS correlates and (7) research on sports and athletes (McNair, Lorr & Droppleman, 1992).

Short-term psychotherapy studies

Several studies by Lorr et al., (1961), Lorr et al. (1964) as well as Haskell et al. (1969), proved one or more of the POMS factor scores to be sensitive to change with psychotherapy. For the purposes of this study, however, this area need not be discussed any further.

Controlled outpatient drug trials

Results of a controlled clinical drug trial-study by Lorr et al. (1964) suggest that the POMS factors are sensitive to short-term changes associated with mild tranquilisers. It was found that, compared with the placebo groups, patients treated with chlordiazepoxide (Librium) showed significantly greater reductions in "Tension-Anxiety" and significantly greater increases in "Vigor" after only one week of treatment. There were no significant differences on the other four mood factors. After four weeks of treatment, patients who received chlordiazepoxide or placebo showed significantly more improvement on "Tension-Anxiety" and "Depression-Dejection" than patients who received no medication. The active drug vs placebo differences were not apparent after the first week.

Several other studies, such as those done by Bass (1956), McNair et al. (1970), as well as the one done by McNair, Fisher, Kahn and Droppleman (1970b) support the fact that the POMS factors are sensitive in measuring drug-personality interactions in the treatment of psychiatric outpatients.

Cancer patients

Cancer is often associated with a great deal of pain, psychological distress and significant mood disturbance. This greatly affects the quality of life of cancer patients. There have been numerous studies using the POMS to measure mood disturbance caused by the physical and psychological effects of cancer (McNair et al., 1992). For example, the POMS was used to help measure illness and treatment related factors in the psychological adjustment to breast cancer (Taylor et al., 1985). The authors concluded that there are psychosocial consequences associated with a mastectomy and other illness- and treatment-related factors that contribute to psychosocial adjustment problems.

In another study by Holland et al. (1986) the POMS was used to test the hypothesis that patients with advanced pancreatic cancer experience greater psychological disturbance than patients with other types of advanced abdominal neoplasm. The data obtained from this study support the hypothesis.

Drug abuse and addiction

There have been numerous studies where the POMS was used to measure the subjective effects of drugs on humans. In a study by Orzack et al. (1982) the POMS was used to assess the subjective effects of prazepam by comparing this drug with diazepam and placebo. Similarly, in studies by Cole et al. (1978) and Fischman et al. (1983) the POMS was used to assess the subjective effects of d-amphetamine, nefapam, caffeine and a placebo, and cocaine and lidocaine respectively.

The effects of lithium carbonate on the mood and personality of normal subjects under double-blind and placebo controlled conditions have been studied by Judd et al. (1977). Affect, mood and personality attributes were compared after two weeks of administration of lithium and two weeks of placebo administration. The POMS, among other measures, was used to measure affects and mood changes. The results proved significant.

The POMS has been used effectively to measure the subjective effects of drug use by casual users and to measure the effects of withdrawal by addicted users. In clinical settings, the POMS has also proven to be an effective measure of the effects of drugs used as medication on mood (McNair et al., 1992).

Studies of response to emotion-inducing conditions

Several studies using the POMS to assess tension and fatigue in subjects after watching anxiety-inducing films, have been conducted. Pillard and Fisher (1967) obtained POMS scores at several points before and after subjects viewed an anxiety-inducing autopsy film, as well as a neutral film. For all the groups involved, "Tension" scores decreased significantly from baseline following the neutral film, but increased significantly following the autopsy film. "Fatigue" scores increased between baseline and prior to the autopsy film. Following the autopsy film, all the groups registered decreased "Fatigue" scores.

Studies of concurrent validity coefficients

In order to examine the concurrent validity of the POMS it has been correlated to similar types of instruments. That finding of a relationship between the POMS to conceptually similar tests lends further support to the validity of this test (McNair et al., 1992). In a comparison between the POMS and a modified version of the *Hopkins Symptom Distress Scales* (Parloff et al., 1954), nearly all the POMS factors were moderately-to-highly correlated with the three symptom measures of "Somatisation", "Anxiety" and "Depression".

The correlation of .80 between the usual POMS version factors of “Tension-Anxiety” and the Taylor (1953) *Manifest Anxiety Scale* (MAS) is about as high as the test-retest reliability of the MAS.

In a study assessing the effects of organic solvents on exposed workers the POMS was correlated with the *MMPI-2* and the *Beck Depression Scale* (Bowler et al., 1991). The Hypochondriasis scale (Hs) of the *MMPI-2* correlates significantly with the “Tension”, “Anger”, “Fatigue” and “Confusion” scores of the POMS.

Research on sports and athletes

The use of the POMS has become very popular in sports research. According to McNair et al. (1992), the POMS has been cited in at least 56 published papers since its widespread use in sports research begun in 1975. The popularity of the POMS in sports research is due in a large part to the studies of athletes conducted by Morgan (1980a).

The POMS has been found to be an effective measure of mood state in athletes. Morgan (1980a) presented a typical athlete profile, the so-called “Iceberg Profile”, in a study of USA Olympic wrestlers. In this study forty candidates for the 1972 Olympic Wrestling Team were tested the evening before the final wrestle-off. Similarly, the sixteen finalists for the 1976 Olympic Team were also evaluated with the POMS. Morgan (1980a) found that the two teams were remarkably similar on each variable. Almost all these elite athletes scored below the 50th T Score on “Tension”, “Depression”, “Fatigue” and “Confusion”, and above the 50th T Score on “Vigor” in comparison with published norms for individuals of comparable age and educational background. This led him to refer to this typical POMS profile as the “Iceberg Profile”. Morgan, in his work with the POMS, found that athletes differ from nonathletes on a variety of psychological states. Athletes’ profiles tend to follow the Iceberg Profile in that they tend to have lower scores on “Tension”, “Depression”, “Fatigue” and “Confusion” and higher scores on “Vigor” than nonathletes (McNair et al., 1992).

Studies using the POMS in sport have ranged from those done with individuals involved with fitness activity such as aerobics to Olympic athletes. These include studies that examined the effect of regular exercise on stress levels (Wilfley & Kuncze, 1986), assessing army personnel prior to the beginning of basic training (Kowal et al., 1978), examining the effectiveness of training procedures and predicting success with professional and elite amateur athletes (Morgan et al., 1987) and the use

of psychological testing as an “auxiliary means” of selecting college and professional football players (Daus et al., 1986).

Two studies examining the nature and cause of “addiction” to exercise have been done. Farrel et al. (1982) studied experienced distance runners to determine whether changes in mood states were related to changes in BN-EP/BN-LP immuno-reactivity. In a second study, Thaxton (1982) examined the psychological effects of short-term exercise addiction on habitual runners. These results indicated that the POMS can detect shifts in mood and that even a slight change in routine may have a negative effect on mood in habitual runners.

In yet another study with elite athletes, Mastro et al. (1987) compared the psychological characteristics of visually impaired athletes with sighted athletes. The POMS was administered to visually impaired athletes who competed in the 1984 *International Games for the Disabled* and they showed the Iceberg Profile characteristic of elite sighted athletes. In a similar study by Henschen, Horvat and French (1984) wheelchair athletes also showed the Iceberg Profile. As a matter of fact, the wheelchair athletes came closer to the “ideal” Iceberg Profile than elite athletes.

According to LeUnes et al. (1988) participants in 19 different sports have served as subjects in studies using the POMS. Some of these include runners, exercise and fitness participants, football players, divers and swimmers, wrestlers, body builders, cyclists, visually impaired athletes, wheelchair athletes, basketball players, gymnasts, karate competitors, netballers, oarsmen, rodeo athletes, soccer players, speed skaters, triathletes and volleyball players. To date the POMS has been used successfully to show differences in mood states between elite athletes and nonathletes, to predict success, to measure the effectiveness of certain types of training, to show how exercise can attenuate stress and depression and to show how habitual exercise may lead to “exercise addiction”.

Incredibly Short POMS (ISP)

According to the POMS manual, this measure was developed as a “rapid, economical method of identifying and assessing transient, fluctuating affective states” (McNair et al., 1992, p.1). Although a 5-10 min administration time for the POMS may be efficient for most research projects, a 5-min mood assessment prohibits the examination of a variety of research questions (Dean et al., 1990). Sometimes it would be interesting to examine affective changes in players, coaches, or spectators when the “momentum” of a game or competition suddenly shifts. Or, similarly, it could be interesting to assess the immediate effectiveness of a coping strategy when athletes are faced with disappointment. In such situations, the utility of an even briefer assessment of mood becomes

apparent. For this reason a brief alternative to the POMS (that could be administered in less than 1 minute), was devised and was very aptly called the *Incredibly Short POMS* (ISP) (Dean et al., 1990). Further research is being done on this instrument and it is now called the *Brief Assessment of Mood* (BAM). Nothing in this regard has as yet been published (Meyers, 1999).

The ISP consists of the following six questions:

1. How anxious do you feel right now?
2. How sad or depressed do you feel right now?
3. How confused do you feel right now?
4. How angry do you feel right now?
5. How energetic do you feel right now?
6. How fatigued do you feel right now?

In answering these questions, the subject has a choice of any of the following alternatives: Not at all; A little; Moderately; Quite a bit; and Extremely. It has been found that the ISP accurately gauges anxiety, depression, confusion, anger, energy and fatigue levels and that the validity does not differ much from that of the full POMS version (Meyers, 1999).

Assessing the experience of pain

It must be stated that the tolerance of pain, in one form or another, is a routine aspect of sport performance for most athletes. However, even for athletes who show a remarkably good tolerance for performance pain, the pain of injury can be quite distressing (Heil, 1993). Before one can look at assessing the experience of pain, the concept of pain itself will have to be discussed briefly.

Pain

Pain and suffering, according to Jensen and Karoly (1992), are private, internal events that cannot be directly observed by clinicians or assessed via bioassays. Assessment of the pain experience is, therefore, frequently built upon the use of patient self-report. In their *Pain Context Model*, Jensen and Karoly (1992) consider pain to be a construct, similar to other constructs such as depression, anxiety or intelligence, in that it is not directly observable, but rather inferred from varied observations. Cleeland (1986) contends that even the best measures, or indicants, of a construct are not always closely related to one another. The different observations or components that make up a construct, do not always co-occur in time or in the same configuration in all people. So, even though the pain construct consists of such dimensions as pain behaviour and self-reported pain, one person may display nonverbal behaviours without complaining of pain. Another may complain

bitterly of pain and yet display no nonverbal pain activities. A third person may display pain behaviours as well as reporting intense pain and suffering. This leads to an important conclusion: because of the multidimensionality of pain, no single measure can adequately assess the construct.

The multiple context of pain measurement

Pain is a dynamic, developmental process – not a single event or simple countable product. Pain can therefore not be depicted as a static, all-or-none, unidimensional, body-centered occurrence that somehow exists independent of time, place, the patient's cognition, or the observer's presuppositions (Jensen & Karoly, 1992). For the purpose of assessing pain, researchers have been forced to decontextualise the pain experience by separately addressing an individual's awareness of pain (e.g., "my arm hurts"), emotional reactivity (e.g., "the pain in my arm is killing me") and behavioural responses (e.g., the tendency to use the right arm when the left one is hurt). It should, however, be kept in mind that thought, action and emotion are inextricably bound in the sentient organism. They are only separable for the sake of convenience (Jensen & Karoly, 1992).

Many other factors, for example gender role expectations (Levine & De Simone, 1991), modelling of pain tolerance (Craig & Weiss, 1971), changes in environment (Dworkin & Chen, 1982) and time of day the pain assessment is made (Folkard et al., 1976) also impact on the measurement of pain.

There are two important implications of the above findings for the assessment and interpretation of self-report pain data. Firstly, self-reports of pain do not stand in a one-to-one relationship to the activation of sensory transduction in nerves (so-called nociception), that convey information about tissue damage. Although it is likely that in most situations, people attempt to report their subjective pain experience honestly, there are no guarantees that what they tell about the pain experience, accurately reflects that experience (Jensen & Karoly, 1992). Secondly, researchers and clinicians should take the factors known to influence self-report into account when assessing pain. The conditions under which the self-report of pain are made, should be as similar as possible between comparison groups, or between assessment periods (Jensen & Karoly, 1992).

Dimensions of pain

A considerable amount of work has gone into defining the dimensions of subjective pain. Although more work has to be done in this area, at least three distinct dimensions of the pain experience can be assessed in nearly all pain patient populations, namely, pain location, pain intensity and pain affect (Jensen & Karoly, 1992).

Pain location

Pain location can be defined as the perceived location(s) of pain that patients experience on or in their bodies. The number of locations indicated and the way patients describe the location(s) of their pain, all appear to be related to physical and psychosocial functioning (Jensen & Karoly, 1992).

Assessing pain location

The instrument most commonly used to assess pain location is that of pain drawing. Pain drawing is a relatively simple diagnostic tool that allows pain sufferers to give a graphic representation of their pain. It provides information not readily evident in other forms of self-report and is especially useful for its clear portrayal of pain distribution through the body (Heil, 1993).

This procedure usually involves a line drawing of the front and back of the human body. Sometimes line drawings of the face, head and neck are also presented for patients experiencing localised pain. Patients are asked to indicate the location of their pain on the surface of the drawings (Jensen & Karoly, 1992).

According to Jensen and Karoly (1992), it is possible to vary the instructions regarding the indication of pain by patients to suit the purposes of the investigator. Patients may be asked to distinguish between various sensations of their pain experience and to indicate the location of these sensations by means of different symbols. For example, “—” has been used for numbness, “oo” for pins and needles, “xx” for burning and “//” for stabbing pain (Ransford et al., 1976). Similarly, Melzack (1975b) used the letters “E” for external (surface) and “I” for internal (deep somatic) pain respectively.

Toomey et al. (1983) used line drawings of the human body divided into 32 regions, and gave patients a score equal to the number of regions they have shaded. This score was found to be related to a number of important pain-related constructs such as (1) dimensions of the *McGill Pain Questionnaire* (MPQ) (i.e. Number of words chosen, MPQ-Sensory and MPQ-Total Subscale scores), (2) self-report of time spent reclining, (3) interference of pain with basic activities such as walking, working, socialising and recreation, (4) number of health-care professionals consulted and (5) medication used. It was, however, unrelated to pain intensity, pain affect and duration of the pain problem.

Some clinicians have suggested that exaggerated pain drawing may reflect a tendency toward somatic pre-occupation. Although there seem to be a positive relationship between abnormal pain drawing and psychopathology, it is not recommended that pain drawings be relied upon as a proxy measure of psychopathology. According to Jensen and Karoly (1992), caution should be taken not to over-interpret pain-drawing data. Pain drawings should be used to assess what they measure best – the patient’s report of the sensory distribution of pain.

Pain intensity

Pain intensity may be defined as a quantitative estimate of the severity of felt pain, or put in different terms, how much does a person hurt. Findings suggest that pain intensity is a fairly homogeneous dimension and one that is relatively easy for people to identify and gauge (Jensen et al., 1986; Jensen et al., 1989).

Assessing pain intensity

The three most commonly used methods to assess pain intensity are the *Verbal Rating Scale* (VRS), the *Numerical Rating Scale* (NRS) and the *Visual Analogue Scale* (VAS). Other lesser used instruments are the *Behavior Rating Scale* (BRS), the *Picture Scale*, the *Box Scale* and the *Descriptor Differential Scale* (DDS) (Jensen & Karoly, 1992).

Verbal rating scales (VRS) consist of lists of adjectives describing different levels of pain intensity. An adequate VRS of pain intensity should include adjectives that reflect the extremes of this dimension (e.g., from *no pain* to *extremely intense pain*) with sufficient adjectives to capture the graduations of pain intensity that may be experienced. Patients read over the list of adjectives and select the words or phrases that best describe their level of pain (Jensen & Karoly, 1992).

A numerical rating scale (NRS) involves asking patients to rate their pain from 0 to 10 (11-point scale) or 0 to 100 (101-point scale). The understanding is that the 0 represents one end of the pain intensity continuum (i.e., *no pain*) and the 10 or 100 represent the other extreme of pain intensity (e.g., *pain as bad as it could be*). The number that the patient states, represents his or her pain intensity score (Jensen & Karoly, 1992).

A *Visual Analogue Scale* (VAS) on the other hand, consists of a line, usually 10 cm long, whose ends are labeled as the extremes of pain (e.g., *no pain* to *pain as bad as it could be*). Patients are asked to indicate which point along the line best represents their pain intensity. The measured

distance from the *no pain* end to the mark made by the patient, is that patient's pain intensity score (Jensen & Karoly, 1992).

Pain affect

Pain affect appears to be more complex than both pain location and pain intensity. Pain affect can be defined as the degree of activation, or changes in action readiness, caused by the sensory experience of pain (Jensen & Karoly, 1992). This arousal is often felt as distressing or frightening and can lead to interference in daily activities and habitual modes of response. Measures of pain affect do not appear to be as homogeneous as measures of pain intensity. They are less likely than measures of pain intensity to be strongly related to one another, suggesting that the affective component of pain may consist of a variety of emotive reactions (Morley, 1989).

Assessing pain affect

There is evidence, according to Gracely et al. (1979), for an affective component of pain that is conceptually and empirically distinct from pain intensity. Other researchers such as Jensen et al. (1989), Jensen et al. (1991), Melzack and Wall (1983) and Tursky (1976) support this view. Where pain intensity may be defined as how much a person hurts, pain affect may be defined as the emotional arousal and disruption engendered by the pain experience (Jensen & Karoly, 1992). The complex nature of pain affect suggests that single-item measures may be less comprehensive and less reliable than multiple-item measures. Similar to the assessment of pain intensity, verbal rating scales, visual analogue scales and descriptor differential scales were developed to rate patients' experience of pain affect. A *Pain Discomfort Scale* (PDS) can also be used to assess negative affect that patients attribute to their pain and pain problems. However, the most widely used measure of pain affect by far, is the Affective sub-scale of the *McGill Pain Questionnaire* (MPQ) developed by Melzack (1975a, 1975b).

The *McGill Pain Questionnaire* recognises that pain consists of different dimensions. Responses to this questionnaire indicate both the sensory and emotional aspects of pain, which vary in different people at different times. Pain sufferers use words that show how much emotional distress is associated with their problem. In describing their pain, people can use words such as "it's horrible", or "it's wearing, depressing, or frustrating". This would give an insight as to how much pain has started to dominate the patient's life in terms of psychological distress.

Generally, when patients are coping well with their pain, they are aware of its physical sensation, but do not feel that it is controlling their lives. Also, when describing their pain, it is in terms of

what it feels like physically. On the other hand, when patients are not coping, the pain is overwhelming and they feel worn down. It depresses them and they tend to use emotional words to describe it. When using the questionnaire, this has specific relevance. The further down the groups of words the patient goes to describe his or her pain, the worse the psychological distress is for that person. For example, using the terms near the bottom of each list describes the psychological effects of pain, rather than the pain itself (Wells & Nown, 1993).

PROPOSED DIAGNOSTIC TOOL FOR THE SERVICE PROVIDER

The proposed diagnostic tool for the service provider, is a computer-based program that monitors whether an injured athlete has made any progress in his/her rehabilitation. No new individual instruments were developed for the purpose of this study. Rather, existing instruments were adapted, combined and used, in a computer program to form a completely new instrument. One of the objects of this computer program was ease of use and it was therefore written in such a way that most data could be entered by selecting from certain choices presented on screen.

Why computer based?

Data can be gathered in a number of different ways. Pencil and paper tests are the most common form of gathering such information, but in this case it was felt that exciting computer technology exists and should be utilised. It was felt that much time could be saved if data could be entered into, and almost simultaneously processed by a computer.

Construction of the program

The aim of the program is twofold. Firstly, it creates a database for keeping a record of patients' biographical data. Secondly, it processes patient data from the different psychological tests in order to give a profile of the mood states and pain experiences of those patients. This can then be used to assess whether an injured athlete has made any progress from one therapy session to the next.

Use of the program

When starting the program, an introductory screen is displayed (see Appendix 2, Screen 1). After 5 seconds this screen automatically defaults to the next "SIM Main Menu" screen (see Appendix 2, Screen 2). The therapists administering the program then has the option of either selecting to enter new patient data or retrieving existing patient data. When the option "New Patient" is selected, the program allows the therapist to create a new file for that patient (see Appendix 2, Screen 3).

New patients

The patient's first name, surname and initials can be entered into the database (see Appendix 2, Screen 4). The program uses this information to create a file for that specific patient. Additional information that can be entered, include current address, date of birth, height, weight and home and business telephone numbers.

Psychological profile

A psychological profile is drawn up through the use of the following instruments: the *Emotional Responses of Athlete's to Injury Questionnaire* (ERAIQ) (see Appendix 2, Screens 5-9), the *Incredibly Short POMS* (ISP) (see Appendix 2, Screen 9), a Pain Drawing instrument (see Appendix 2, Screen 10), a Visual Analogue Scale (VAS) (see Appendix 2, Screen 11) and the Affective subscale of the *McGill Pain Questionnaire* (MPQ) (see Appendix 2, Screen 12).

Emotional Responses of Athletes to Injury Questionnaire (ERAIQ)

This *Emotional Responses of Athletes to Injury Questionnaire* (Smith et al., 1990b) forms the basis of the first twenty questions of the computer program, although the original questionnaire has been adapted for the purposes of this program. Questions one and two of this instrument offer an opportunity for the therapist to gain insight into the athlete's values and priorities. The athlete can share sports-related, as well as academic or non-sport career goals. Athletes who are tired, burned out, or alternatively burning with ambition, can often be identified through these two questions already.

Question three permits the therapist a glimpse into the athlete's motivation for sport or exercise and heightens the therapist's appreciation of what is lost to the athlete when injury occurs. The questions on perceived goals, athleticism, patients perception of the nature of the injury, pressures to be in sport and to perform to the expectations of others, stress and social support are mostly self-explanatory (Wiese-Bjornstal & Smith, 1993).

It is important to note that sometimes information omitted from the athlete's responses can be significant. For example, an athlete suffering from an eating disorder or exercise addiction will frequently rank weight and stress management lowest on their list of motivators, perhaps in a conscious or unconscious effort to draw the attention away from some major concerns and areas of discomfort (Wiese-Bjornstal & Smith, 1993).

Pain assessment

For the purpose of assessing pain location, the scoring template for pain drawing developed by Margolis et al. (1986) was used. The instrument was adapted for use on the computer by allowing the patient to use the mouse and click on the areas affected. This will give an indication of where on or in the body the patient experiences pain.

Being very easy to administer with a computer program, a *Visual Analogue Scale* (VAS) was chosen to give an indication of pain intensity. Unlike a number on a scale that would be easy to remember, using the VAS would make it very difficult for a patient to remember the exact position on the line where he/she previously indicated his/her pain. This would contribute to obtaining an honest rating of the pain experienced, eliminating trying to please the therapist.

The Affective subscale of the *McGill Pain Questionnaire* was adapted for use in the program. Patients can give an indication of their emotional pain experience by selecting certain adjectives from lists of words.

Existing Patients

As previously stated, the program allows for data of new patients, as well as existing patients to be entered. This choice can be made on the "SIM Main Menu" input screen (see Appendix 2, Screen 2). As soon as the "Existing Patient" option has been selected on this particular screen, the "Existing Patient Menu" screen is opened (see Appendix 2, Screen 13). By executing the "Load Patient Data" option on that screen, the therapist can select the file of any previous patient (see Appendix 2, Screen 14) for further therapy sessions. If any of the selected patient's biographical data have changed, the option "Change/View Patient Biographical Data" can be selected and the data altered (see Appendix 2, Screens 13, 15). If no alterations need to be made, the therapist can proceed directly to the "Next Test" option on that screen (see Appendix 2, Screen 13). The test data from previous sessions for that particular patient will be displayed in the same screens as in Screens 5–12 (see Appendix 2) and any of this data can be changed at this point. After the completion of each therapy session, the therapist can either display the patient's psychological profile on the computer monitor, or print out the profile (see Appendix 2, Screen 16 for part of the profile).

Scripts

Provision was made for scripts, or handouts, that can be given to the patient after each treatment session. These scripts can vary from general information on the role of the sport psychologist in the management of injuries, to more specific information on mental imagery, goal setting, rehabilitation adherence, keeping of a homework log, or any information relevant to the rehabilitation of the specific athlete. Examples of these scripts can be found in Appendix 1. After the completion of each session, the therapist can either select a particular script thought appropriate for the patient at that time, or scripts can be generated by default. This is done on the “Scripts” screen of the program (see Appendix 2, Screen 17).

Chapter Six

EVALUATION OF SPORTS INJURY MANAGEMENT PROGRAM

QUESTIONNAIRES

The aim of rehabilitation, according to Kent (1996) is to facilitate the return of the injured athlete to training and competition at as high a standard and in as short a time as possible. To be able to determine whether the Sports Injury Management program was a useful instrument in accomplishing this objective it had to be evaluated in some way.

Injured athletes may choose to rehabilitate on their own, but usually within the rehabilitation setting there are at least two parties involved, namely the party receiving treatment and the party giving the treatment. Although the aim of rehabilitation is complete recovery, it would probably be safe to say that the perspectives of the two parties involved in reaching that objective may differ slightly. To make provisions for these differences in perspectives, the effectiveness of the program was evaluated firstly from the therapists' and secondly from the injured athletes' points of view. For this purpose two very simple questionnaires were developed. (See Appendix 3 for examples of the Patient and Therapist questionnaires.)

Patient feedback

It is important to get feedback from patients using the SIM program, because the success of the program largely depends on whether patients perceive it as helpful in their rehabilitation, or whether they perceive it as a hindrance. Depending to what extent they perceive it as helpful, will determine how quickly it is accepted as an integral part of their rehabilitation process. With regards to the first question the following feedback was received.

	How easy/difficult was the SIM computer program to use?						
Scale	Very easy 1	2	3	4	5	6	Very difficult 7
Number of patients		11	4	1	1		

The following feedback on the second question was received.

How useful was the SIM computer program in helping you rehabilitate from injury?							
Scale	Not at all useful 1	2	3	4	5	6	Very useful 7
Number of patients			4	6	3	4	

The following feedback on the third question was received.

Would you recommend the use of the SIM computer program to other athletes?							
Scale	Definitely not 1	2	3	4	5	6	Definitely yes 7
Number of patients				5	5	6	1

On the fourth question “What aspects of the SIM computer program did you like?” the following feedback was received.

- Patient 1: I liked the fact that one test was compared to the next.
- Patient 2: I became more aware of what I was feeling, specifically towards the effects of the physiotherapy I was receiving.
- Patient 3: It made me think about my injury.
- Patient 4: The program encouraged me to analyse my emotional responses to the injury. It also encouraged me to monitor my progress in a more measurable way, i.e. there are greater awareness of gains.
- Patient 5: It made me more aware of the improvements I was making, not only the physical ones, but the emotional responses too.
- Patient 6: The feedback I received, increased my motivation for recovery.
- Patient 7: It put me in touch with my lack of pain and helped me realise that I wasn't far from complete recovery.
- Patient 8: It was good to see improvements on a scale and pain descriptions changing or lessening.
- Patient 9: It helped me to keep positive when looking back at the type of pain I used to have. It showed the improvements I made.
- Patient 10: That the ratings were not numbered so you won't remember what your previous score was.

- Patient 11: Stipulating on a diagram exactly where the injury is, is helpful as it is often hard to describe the area exactly. Background information (reasons for participating).
- Patient 12: Includes emotions that are often involved with injuries.
- Patient 13: Easy to use. Compresses a lot of information.
- Patient 14: Where they had to explain about pain.
- Patients 15 - 17: No comment.

On the fifth question “What aspects of the SIM computer program did you dislike?” the following feedback was received.

- Patient 1: No comment.
- Patient 2: The questions were too personal.
- Patient 3: No comment.
- Patient 4: The repetition of questions is confusing. There is some doubt as to which questions needed to be answered on subsequent visits/treatments.
- Patients 5 - 10: No comment.
- Patient 11: It is not possible to deal with more than one injury at a time.
- Patient 12: No comment.
- Patient 13: No comment.
- Patient 14: The fact that it just stopped, did not save any information. Are you not allowed to skip a question?
- Patient 15: Clarity of the questions.
- Patient 16: No comment.
- Patient 17: No comment.

Patients also had the opportunity to make any other comments and suggestions and the following feedback on that question was received.

- Patient 1: No comments or suggestions.
- Patient 2: No comments or suggestions.
- Patient 3: The therapist should be more involved with the entering of the data.
- Patients 4 - 7: No comments or suggestions.
- Patient 8: The program should be divided into two parts, i.e. the first part where the data stays fairly static and the second part where new test data has to be entered after

each consecutive treatment session. The mouse as input device could be used less and the “Enter” button more.

Patient 9: The program should have a “rehabilitation-test” part to speed up the process.

Patients 10 to 17: No comments

Therapist feedback

As with feedback from patients, it is equally (if not even more) important to receive feedback from the therapists using the program. The program was developed with physiotherapists in mind, so it stands to reason that if the feedback received was largely negative, the goal of the program has not been achieved. On the first question the following feedback was received.

	How easy/difficult was the SIM computer program to use?						
Scale	Very easy 1	2	3	4	5	6	Very difficult 7
Number of therapists	2	6			1		

On the second question the following feedback was received.

	How useful was the SIM computer program in helping your patient rehabilitate from injury?						
Scale	Not at all useful 1	2	3	4	5	6	Very useful 7
Number of therapists			1	5	1	2	

On the third question the following feedback was received.

	Would you recommend the use of the SIM computer program to other therapists?						
Scale	Definitely not 1	2	3	4	5	6	Definitely yes 7
Number of therapists				1	1	7	

On the fourth question “What aspects of the SIM computer program did you like?” the following feedback was received.

- Therapist 1: The patient may think that he/she does not make any progress, but the program may guide the patient to start thinking about his/her injury and may realise that he/she is actually a little better after each treatment session. You get a positive reinforcement effect.
- Therapist 2: I liked the graphic representation of how the patient was feeling at the time of treatment. I also liked the fact that present sessions were compared to previous sessions.
- Therapist 3: Therapists in general make a subjective assessment of how well their patients are recovering from their injuries. This program provides the therapist with an instrument to correlate the subjective and objective assessments of patients' emotional responses. Experienced therapists may be able to do this without such an instrument, but less experienced therapists may find it very useful to have such a program.
- Therapist 4: It is good to give patients a regular update on their pain levels, how they experience their pain and their description of their pain.
- Therapist 5: Easy to use.
- Therapist 6: Background information.
- Therapist 7: Structure of interview questions.
- Therapist 8: Good recordkeeping.
- Therapist 9: No comment.

On the fifth question "What aspects of the SIM computer program did you dislike?" the following feedback was received.

- Therapist 1: No comments.
- Therapist 2: No comments.
- Therapist 3: Therapy sessions usually range from 30 to 40 minutes. It is sometimes difficult to find the time to explain or set-up the initial questionnaire and still do physical therapy during that session.
- Therapist 4: More time was needed per normal consultation for the patient to be able to complete the questionnaire. This is not necessarily a problem with the program, but it may take more of an organisational effort at the practice.
- Therapist 5: None.
- Therapist 6: Not possible to attend to more than one injury.
- Therapists 7-9: No comments.

The therapists also had the opportunity to make any other comments and suggestions and the following feedback on that question was received.

Therapist 1: No comments or suggestions.

Therapist 2: No comments or suggestions.

Therapist 3: The program should be further condensed so that administration time could be shortened. Alternative ways of obtaining the data, for example making use of pen and paper tests to be returned after each session, should be considered.

Therapist 4: No comments or suggestions.

Therapist 5: Injuries in many areas. Mechanics of injuries.

Therapist 6: Phases of rehabilitation. Date of report of printout.

Therapists 7-9: No comments or suggestions.

INDEPENDENT CRITIQUE

In addition to feedback on the ease of use and the usefulness of the program, critique on the construction of the program was also received from an independent authority in the field of sports injury rehabilitation. This critique is summed up in the following table.

1. The program has an automatic default function option to whatever rating appears in the response field. This means that if no response is given on a given question, the program accepts the default option. There should be a way to identify no response as missing data, that is, to differentiate no response from the default response.
2. Consider adding a “pain free” response to the McGill words in Question 24.
3. At the moment the program has a “Help” button, but it is not active and no help is provided when clicked. Perhaps a manual would be a good idea too.
4. On the pain intensity rating (Question 23) it would be a good idea to include separate bar graphs instead of combining two ratings on one graph.
5. As much as I like the simultaneous presentation of current data and summary data, I feel the program would be even more interesting if the immediately preceding response was included as well, thereby providing information regarding whether the respondent has improved or has had difficulties since the last treatment.
6. It is unclear how the results from Question 24 is calculated.

7. The program would be greatly improved by revising the social support component (Questions 10-12) of the SIM program. I believe that an indication of the support type should be available for each of the “significant others” individually. In addition, it makes sense to broaden the number of support categories. It would also be very useful to know if both positive and negative support are coming from the same person, which is often the case. Where there is mixed support, intervention is usually needed. This type of intervention is one that can often be made effectively by the physiotherapist, especially in the context of a sports team. Where this effort is not fruitful, referral is indicated to a sport psychologist.

Critique on the SIM program (Heil, 1999)

CONCLUSIONS AND RECOMMENDATIONS

Criticism that can be levelled against most of the models for the psychological rehabilitation of sports injuries discussed in this thesis would be that they are mostly theoretical models. Very few, if any, of these models seem to be able to give a physical therapist interested in using psychological principles in injury rehabilitation a ready-made instrument for that purpose. An attempt was therefore made in this study to rectify that situation by developing a practical instrument that can be used after very little training. Judging from the feedback received, it would seem that attempts in doing that was largely successful.

COMPUTER TECHNOLOGY

The use of computer technology seemed to have generated mixed feelings. Although some patients and therapists seemed to like the idea of using computer technology, some seemed reluctant to do so, at least in part. Some therapists seemed to favour the idea of combining the use of computer technology with pen and paper methods of obtaining data. This might be more of a practical suggestion than anything else might. Many of the physiotherapists did not have a laptop computer of their own readily available. This fact might have moved them to revert back to more familiar instruments such as pen and paper methods. Their consultation times also did not necessarily allow for the gathering of data as well as physical treatment, as would have been necessary when using a laptop computer. They might therefore have felt that patients should rather have completed the tests on paper and handed them back afterwards for a clerk or receptionist to enter into the computer, rather than entering the data themselves directly into the computer.

PSYCHOMETRIC INSTRUMENTS USED

No new psychometric instruments were developed for use in the SIM program. Although the results obtained from this study seems positive in general, more suitable instruments might be developed in future. Other existing instruments may be added to the program, or parts of them adapted for use in the program.

VALIDATION

The program in its present form is yet to be validated. In many respects the aim of this program was not to validate the existing program, but just to introduce a new line of thinking on the subject of injury rehabilitation. If the program was found to have high face validity, it was thought that in follow-up studies it could be validated or even be made available to other researchers to help with validation.

CHANGES TO PROGRAM

The aim of the SIM program was to provide therapists with an instrument that will assist them in helping athletes recover from injury. The program had to be as user-friendly as possible and the information provided by the program had to be as clear as can be to avoid any misunderstandings. The program in its current format complies with those requirements to a large extent, but as can be seen from the feedback of patients and therapists, there is some room for improvement. It was never intended for the program to be written and left at that, but rather the development of the program was seen as a continuous process, with improvements and changes made if and when necessary.

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APPENDIX 1: SCRIPTS

Script 1

Sport psychology and injury rehabilitation

Researchers have reported that the use of psychological techniques during rehabilitation of injured athletes has considerable potential to facilitate the recovery process. Interventions such as goal setting, imagery, positive self-talk, relaxation training, biofeedback, counseling, and cognitive restructuring are specifically recommended for use with injured athletes. The purpose of these techniques is to provide motivation and feedback, counteract negative thoughts, increase rehabilitation adherence, and to assist athletes with pain control. Athletic trainers and physiotherapists have also affirmed the use of psychological strategies with injured athletes, as have sports medicine physicians who, in addition, have expressed support for the use of sport psychologists as part of the rehabilitation team.

In 1991 Ievleva and Orlick conducted a study to determine the relationship between various psychological factors and recovery time from injury. Their study involved 32 former patients who had sustained knee or ankle injuries. Participants completed a survey designed to measure positive attitude, outlook, stress and stress control, social support, goal setting, positive self-talk, and mental imagery. The results indicated that individuals who had healed more rapidly scored higher on all variables than slow healers. The main variables associated with speed of recovery were goal setting, positive self-talk, and imagery. Self-talk of “fast healers” was highly positive (e.g., “I can do anything,” “I do not hurt”), and “slow healers” demonstrated negative and unforgiving self-talk (e.g., “Why me?” “What a stupid thing to do”). Fast healers also used goal setting more and their daily goals were related to recovery time rather than to long-term or return-to-sport goals. Of the questions related to imagery, the use of healing imagery showed the greatest relationship to recovery time. The researchers concluded that psychological skills could play an important role in promoting healing, because goal setting, positive self-talk, and imagery are within the control of the injured athlete.

Potter (1995) investigated the impact of a psychological intervention with injured athletes in a physiotherapy setting. Four matched pairs of athletes with moderately severe ankle injuries were assigned to treatment and control conditions. Control participants received standard physiotherapy, whereas treatment participants were taught goal setting, relaxation, imagery, and positive self-talk, and received standard physiotherapy concurrently. Mood states, cognitions, and the physical recovery of each athlete were monitored from initial presentation for physiotherapy until return to competition. Participants were interviewed post-recovery as well. Findings indicated that goal setting was the most beneficial of the four psychological skills. In addition, individual expectations about the potential benefits of psychological skills appeared to exert an influence on the effectiveness of the intervention. Researchers have stressed that psychological techniques are not a panacea for all athletes during rehabilitation, but these techniques may be a useful adjunct to existing rehabilitation procedures.

Finally, Ross and Berger (1996) recently reported positive benefits from stress inoculation training with injured athletes during rehabilitation. Sixty male athletes who underwent arthroscopic knee surgery were randomly assigned to treatment or control groups. The control group received physiotherapy only, whereas the treatment group received physiotherapy, information on likely responses to surgery, and instruction on relaxation, imagery, and positive self-talk. Findings showed that injured athletes in the treatment group reported less post-operative pain and anxiety during rehabilitation, and returned to criterion levels of physical functioning more rapidly than athletes in the control group.

The results of these intervention studies provide some empirical support for the benefits of psychological techniques in sports injury rehabilitation. However, despite the support both physiotherapists and athletic trainers have reported for the use of goal setting, mental imagery, open communication, monitoring self-talk, relaxation training, and counseling, there are concerns about whether they can effectively implement these skills without more in-depth training. Competency in teaching such skills is required before athletes are likely to perceive the benefits from such strategies.

[Adapted from: Gordon, S., Potter, M., Ford, I.W. (1998). Toward a psycho-educational curriculum for training sport-injury rehabilitation personnel. *Journal of Applied Sport Psychology*, 10 (1), 140-156.]

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Script 2

The role of the sport psychologist in the rehabilitation of sports injuries

Historically sports medicine specialists have primarily concerned themselves with the physical aspects of injury rehabilitation. As a result, athletes who attained a prescribed level of physical rehabilitation were assumed to be fully prepared for a safe and successful return to competition. Gradually it has become clear that this assumption is not valid for all athletes. Certainly, some athletes adapt psychologically to injury quite readily. If these athletes are provided with physical rehabilitation combined with support, encouragement, and the assurance that it is safe to return to competition, they are ready for a confident return.

Other athletes are, despite physical readiness, not psychologically ready to return to competition. To them even the suggestion of returning is a questionable challenge. Doubts, fears, and anxieties surface. Despite assurances from trainers, physicians, and coaches, these athletes do not feel ready. Fears begin to mount concerning the possible risk of returning too quickly. The mind and body become overloaded with thoughts and images of further injury. Sleep is interrupted by recurring dreams of a disastrous return to the playing field, or by vivid recall of the experience of the original injury.

It appears that the frequency with which these apprehensive responses occur has increased as (1) surgical techniques have reduced the time period required for physical rehabilitation, thereby reducing the time period required for psychological adjustment, and (2) athletes have become more aware of the importance of taking care of their bodies. In future injury rehabilitation may therefore include both physical and psychological components. It will no longer suffice to argue that athletes who appear to be physically ready, but who do not feel psychologically prepared to return are malingerers, mentally weak, or lacking in toughness. The old-school approaches of challenging desire and commitment to the team, inducing guilt for letting the team down, or using scare tactics to foster fear, shame and embarrassment, will have to change. These strategies cause more problems than they cure.

For example, upon an athlete's initial return to competition, anxiety and tension can lead to one or more of the following:

1. re-injury
2. injury to another body part
3. lowered confidence resulting in a *temporary* performance decrement
4. lowered confidence resulting in a *permanent* performance decrement
5. general depression and fear of further injury, which can sap motivation and the desire to return to competition

Today's athletes are well educated. They usually see through coercive strategies and will distrust individuals who use such approaches. Athletes may respond by simply refusing to return to competition, confidently claiming that they are not ready or, by finding other indirect ways to undermine their performance and/or physical rehabilitation. As a result, everyone suffers – the athletes, the team, the coach, and the sport psychologist.

Old approaches to rehabilitation will have to be replaced by sound educational approaches. Coaches and sport psychologists will have to teach athletes how to respond psychologically to injury. This should be done in a positive and growth-orientated manner, rather than in a negative and self-defeating one. It must be realised that it is unnatural to be psychologically ready to return to competition after physical rehabilitation is complete, unless that rehabilitation takes place in a natural manner. In a world that uses special equipment to shorten the time needed for physical recovery, special techniques need to be found to facilitate an equally rapid psychological adjustment.

[Extract taken from: Rotella, R.J., & Heyman, S.R. (1986). Stress, injury, and the psychological rehabilitation of athletes . In J. M. Williams (Ed.), *Applied sport psychology. Personal growth to peak performance* (pp. 343-344). Mountain View, CA. Mayfield.

Script 3

Fostering treatment adherence in athletic therapy

“Edgar would get better a whole lot faster if only he would remember to ice his shoulder after practice.”

“I’m sure Micheala would have healed by now if she didn’t keep testing her leg.”

It is not uncommon to hear athletic therapists muttering statements like these to sympathetic colleagues. They can become exasperated when athletes fail to follow their treatment recommendations. The pertinent issue for both Edgar and Micheala is treatment adherence, or more specifically, the lack of it. For many athletes with injuries, adhering to the prescribed rehabilitation regimen can mean the difference between a rapid recovery and a long period of frustration.

What is treatment adherence in athletic therapy?

In simple terms, treatment adherence means sticking with the rehabilitation program. Given the diverse array of treatments used in athletic therapy, treatment adherence may involve any number of behaviours that vary depending on the nature of the injury and rehabilitation protocol. Some of the more common adherence behaviours are appropriate restriction of physical activity, completion of home rehabilitation exercises, completion of home cryotherapy, compliance with medication prescriptions, and participation in clinic-based exercises and therapy. Due to the multifaceted nature of treatment in athletic therapy, it can be challenging for athletic therapists to monitor the adherence of athletes whose rehabilitation they oversee.

Treatment adherence is most easily evaluated for components of the rehabilitation program that are carried out in a clinic or athletic training room setting, where assessment of adherence is likely to involve seeing whether athletes show up for their scheduled appointments and how they behave during the sessions they attend.

In observing the behaviour of athletes during rehabilitation sessions, athletic therapists can judge the degree to which athletes put forth effort, follow instructions, and respond favorably to changes in the program.

By contrast, it may be difficult to determine how well athletes adhere to home-based components of rehabilitation protocols. Because they are not able to observe athletes away from the clinic or the athletic training room, athletic therapists must often rely on the athletes' self-reports of rehabilitation behaviour to ascertain whether they are adhering to treatment in these situations.

Athletes' reports can be biased, distorted, or inaccurate. It may be useful to have the injured athletes record their home-based rehabilitation behaviours in a log. Although still vulnerable to deception, such an approach can at least encourage adherence. For some home-based rehabilitation activities, objective measurement of treatment adherence is possible. For example, many biofeedback units allow for electronic recording of the time, date, and duration of each use.

It is clear that healing rate should not be used as an index of treatment adherence in athletic therapy. Some athletes with injuries may heal rapidly despite the fact they completely disregard their prescribed rehabilitation regimen, whereas others may stick doggedly to the recommended protocol and still heal slowly. Other factors outside of the athletes' control can contribute to their rate of recovery.

How well do athletes adhere to treatment in athletic therapy?

A recent review of the literature indicated that, depending on how adherence is measured, adherence rates range from 40 to 91%. What is not known, however, is the level of treatment adherence necessary for optimal healing to occur. It is often assumed that better adherence leads to better treatment outcomes.

Sometimes less than 100% adherence is adequate for achieving desired outcomes for certain injuries. The minimal level of adherence likely varies as a function of the athlete, the injury, and the rehabilitation program. It may be that some injury rehabilitation protocols require higher levels of treatment adherence than others to attain rapid and complete recovery.

What factors contribute to treatment adherence in athletic therapy?

Current theory considers treatment adherence in athletic therapy as being influenced by the athlete's cognitive and emotional responses to injury. How athletes think and feel after sustaining an injury are affected by characteristics of the athletes themselves and the rehabilitation context.

One very consistent finding in the research literature tend to adhere to treatment better than those who are not self-motivated. Other personal factors related to treatment adherence in athletic therapy are:

- High self-motivation
- High pain tolerance
- Toughmindedness
- High task-mastery orientation
- Low trait anxiety

Although these factors cannot be modified by athletic therapists, it is nevertheless important to understand the characteristics of athletes most likely and those least likely to adhere to treatment. Athletic therapists, however, can influence directly how athletes with injuries perceive the rehabilitation context. Situational factors that have been linked to treatment adherence in athletic therapy are as follows:

- Social support
- Belief in efficacy of treatment
- Responsiveness of the physical environment
- Scheduling flexibility
- Practitioner expectancy of adherence
- Belief in personal control over recovery
- Perceived risk of further complications in the absence of rehabilitation

For example, athletic therapists can be a significant source of social support for athletes with injuries. They can create a rehabilitation environment that is responsive to athletes' needs; they can give athletes as much scheduling flexibility as possible within the constraints of the rehabilitation facility; and they can communicate their belief in the efficacy of the treatment. After all, if the athletic therapists don't believe in the treatment, why should the athletes?

Moreover, athletic therapists can convey that adherence is expected, not optional, and that the athletes are ultimately responsible for their rehabilitation, although the athletic therapists are there to help them.

By accurately describing to athletes what can happen if they do not adhere to their rehabilitation program, athletic therapists can help the athletes to see how susceptible they might be to further complications related to the injury. However, it should be noted that threats and scare tactics have *not* proven effective in encouraging adherence to treatment (Fisher & Hoisington, 1993; Fisher, Mullins, & Frye, 1993).

What can athletic therapists do to enhance treatment adherence?

Knowingly or unknowingly, most athletic therapists already engage in behaviour that facilitates adherence by the athletes they are treating. Three key strategies for enhancing adherence to sport injury rehabilitation programs are education, communication, and goal setting. (For elaboration on these and other strategies, see Fisher & Bitting, 1996.)

1. *Education*: It is essential that athletic therapists educate athletes about their injuries and the rehabilitation program. Athletic therapists should clearly describe the athlete's condition and the details of the program, providing a rationale for the course of action being recommended and reinforcing key points over time. They should not overload athletes with too much information at once.

Education is vital. The reason many rehabilitation behaviours are not adhered to is because they were never learned in the first place. For example, athletes may omit a prescribed strengthening exercise from their home regimen if they are unclear about how to perform the exercise correctly.

2. *Communication*: Athletic therapists should establish a rapport with athletes to create an alliance for success in rehabilitation. In building this rapport, it is crucial that athletic therapists (a) be warm and empathic; (b) convey competence, confidence, optimism, and knowledge of the treatment; and (c) listen to what athletes say about their injuries, anxieties, and impressions of the rehabilitation program.

Athletic therapists should remember that communication is a two-way street and that they can learn a great deal from what athletes tell them about their treatment. Also, since athletes may receive treatment from more than one athletic therapist in the same facility over time, it is important that they get consistent messages about their rehabilitation program from members of the athletic therapy staff.

Clear and frequent communication among members of the treatment team is vital to presenting a unified front to athletes with injuries. Along these lines, athletes should be encouraged to keep their coaches informed about their injuries and progress in rehabilitation.

3. *Goal setting*: With goal setting in their arsenal of treatment techniques, athletic therapists can help prevent non-adherence. Soliciting the input of athletes in setting rehabilitation goals can help motivate the athletes to pursue those goals. Ideally, rehabilitation goals should be:

- Short-term, and to a lesser extent, long-term
- Specific (e.g., “to complete 3 sets of 15 reverse lunges”), not general (“to get better”)
- Measurable, so it can be determined whether the goals have been reached
- Challenging, yet realistically achievable
- Process-orientated rather than outcome-orientated, so that control over goal attainment rests with the athletes
- Phrased in positive terms
- Flexible, and modified as necessary

It is useful to identify potential roadblocks to goal attainment as well as strategies to overcome those roadblocks. For example, if an athlete’s employment precludes completion of daily home exercises, the athletic therapist should consider alternate means of achieving gains in strength and flexibility.

Finally, progress toward rehabilitation goals should be monitored. In addition to making notes on athletes’ medical charts, there should be written records accessible to athletes so they can gain confidence from their accomplishments and focus their efforts on further rehabilitation goals.

Conclusion

Treatment adherence is a critical issue in athletic therapy. Even the most advanced rehabilitation protocols will be ineffective if athletes fail to adhere to treatment. By understanding what treatment adherence is, how it can be assessed, what factors contribute to it, and what can be done to enhance it, athletic therapists can create an environment that enables them to maximize their skills and better meet the needs of athletes with injuries.

[Adapted from the article by: Brewer, B.W. (1998). Fostering treatment adherence in athletic therapy. *Athletic Therapy Today*, 30-32.]

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Script 4

Mental imagery

Positive images of healing, as well as images of being fully recovered, are useful in enhancing one's belief and mobilising one's own healing powers both inside and outside sport. The value of imagery in healing has a long history in Eastern philosophies and is currently gaining increasing acceptance in the West.

There are many clinical reports of therapeutic benefits that result from imagery. Although most are anecdotal, there is increasing documentation of cases to support the benefits of engaging in healing imagery. Positive findings have been reported as a result of implementing a relaxation and imagery programme with patients diagnosed as having medically incurable cancer. Forty-one percent showed improvement, of which 22,2% demonstrated total remission and 19,1% tumor regression. It was contended that the practice of relaxation and imagery enhanced the immune system (Simonton et al., 1978).

In a study by Ievleva and Orlick (1991) it was found that athletes used three types of imagery. These included healing imagery in which athletes tried to see and feel the body parts healing; imagery during physiotherapy in which they imagined the treatment promoting recovery; and total recovery imagery in which they imagined being totally recovered, returning to sport, and performing well again. Athletes felt that all three types of imagery were helpful. The healing imagery however, evidenced the greatest relationship to recovery time. Case studies have been reported in which negative images (e.g., of the injury as it occurred, inflamed, torn) have interfered with positive imagery of healing and recovery, and hence impeded recovery.

It is generally considered more effective to use healing imagery after first eliciting some form of "relaxation response" to quiet and enhance the receptivity of the mind. According to Jaffe and Bresler (1984), "attaining a state of bodily relaxation is a prerequisite for all work with therapeutic guided imagery, for it provides inhibition of somatic muscle activity and verbal thoughts and allows mental images to become dominant" (p. 61). The usual procedure is to engage in some form of progressive muscle relaxation or meditation before beginning the healing imagery. Other methods involve hypnosis, and some methods have taken advantage of a patient's being under anesthesia. It was originally thought that while anesthetized, patients were totally oblivious to all events around

them, including casual conversation. It has since been discovered that patients, when later hypnotised, can recall all that was said during/or following surgery. Apparently, what is said can significantly influence the patient's recovery in either a positive or negative way, depending on what was said. Pearson (1961) demonstrated that patients receiving positive suggestions about a quick recovery while "unconscious" (i.e., under anesthesia) had an average hospitalisation stay of 2,4 days less than the control group.

Green and Green (1977) have reported the results of a doctor who used post-surgical suggestions:

After testing reflexes to make certain that the patient was coming to consciousness, he would begin talking in a very low voice, telling the patient how well the operation had gone, how nicely the body had responded, how well the repairs were made. He planted the idea that there would be little pain, and possibly none at all; the tissues would recover very quickly; there would be no infection; the patient would be walking in a very short time. Nurses in intensive care soon noticed that his patients recovered more rapidly than others and asked him to work with other patients too (p. 327).

The preceding evidence supports the programmability of the unconscious mind for promoting the healing process. Although anesthesia and hypnosis may be efficient in accessing the unconscious in certain cases, a much more practical method, offering similarly effective results, involves self-directed relaxation and imagery.

Daily practise is recommended for best results. What precisely is to be imagined, is determined individually. An image that works for one person may not be as effective for someone else. For example, among the cancer patients studied by Simonton, Mathews-Simonton and Creighton (1978) one patient saw her white cells as "killer sharks" attacking the cancer cells, whereas another saw the white cells as white knights. The important feature is that one see one's own bodily resources as being powerful and effectual. This can also be applied to the physiotherapy setting, for example, seeing/feeling the treatment minimizing scar tissue, increasing blood flow, and strengthening the muscle or tissue. Athletes should be well informed about what the treatment is designed to do, in order to imagine those effects taking place. Some practitioners feel that it is important that the athlete be educated about the physiological process of healing. Once the healing process is understood, the athlete is instructed to imagine it taking place during therapy and throughout the day. If an infection is being fought, the body's phagocytes can be imagined as "Pac Men" gobbling up infectious material.

Because injured athletes are unable to practise physically, mental practise becomes that more important if they are to maintain a certain skill level. Imagery can also be a powerful tool in this regard. Not only does it provide a medium by which to rehearse sport skills, but it also helps preparation for situations that are infrequently encountered in physical practise or competition. Imagery practice can be effective in preparing injured athletes for any number of competitive or practice situations. It can thus help them retain confidence in their ability and dissipate any lingering fears they may have of re-injury.

Timing is an important consideration concerning the athlete's readiness to practise forms of imagery. For example, it may be advisable to focus solely on relaxation and pain management immediately following knee reconstruction surgery. It may not be feasible to practise performance imagery until enough healing has taken place for the athlete to feel ready to contemplate being active and performing again. In some cases, the injury may have been so dramatic or traumatic that it would be unreasonable to expect the athlete to have sufficiently recovered psychologically, let alone physically, to immediately apply the mental energy required to implement self-directed healing.

[Adapted from: Ievleva, L. & Orlick, T. (1993). Mental paths to enhanced recovery from a sports injury. In D. Pargman (Ed.), *Psychological bases of injuries* (pp. 232-236). Morgantown, WV: Fitness Information Technology.

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Script 5

Goal setting

Perhaps the most advocated technique to enhance motivation is goal setting. Individuals on both sides of the rehabilitation process, namely injured athletes and rehabilitation professionals, have indicated the value of setting rehabilitation goals to promote motivation and adherence to injured athletes' rehabilitation programmes.

Setting a variety of goals related to rehabilitation, offers injured athletes numerous advantages that positively influence their physical and psychological recoveries. Since goal setting is a regular part of most athletes' sports programmes, it will give them a greater sense that rehabilitation is, in fact, just another type of training to which their competitive skills are successfully transferred. Goal setting increases patients' commitment and motivation to their rehabilitation programmes by providing a clear direction and means for achieving their ultimate goal, namely, complete return to sport. It also enhances injured athletes' feelings of familiarity, predictability, and control over their injuries, because they know exactly what they need to accomplish to recover fully. These feelings have the corollary benefits of improving patients' confidence and reducing their anxiety about their rehabilitations.

Goal setting, being future-directed and positive, helps patients focus on the constructive aspects of rehabilitations and directs their attention away from interfering aspects of the injury. It provides deliberate and progressive steps toward full recovery that dissuade injured athletes from attempting to take short-cuts and encourages them to take all of the necessary time to fulfil their entire rehabilitation prescription. Finally, goal setting is the most effective means of utilising motivation. Motivation alone is not sufficient for a successful rehabilitation. Motivation without goals is like wanting to drive somewhere without knowing how to get there. Goals act as the road map to the desired destination, in this case, a full recovery and return to sport.

The most effective means of using goals is to develop a structured rehabilitation goal setting programme that incorporates all areas for which goals should be set. Various levels of goals that will lead injured athletes to the successful conclusion of their goal setting programmes should be identified. This will provide them with clearly identified objectives at which to aim, as well as the specific means for achieving those objectives.

The effectiveness of a rehabilitation goal-setting programme depends largely on injured athletes' understanding of what kinds of goals to set and how to use them to enhance motivation. A goal-setting programme will only be beneficial if patients have the proper perspective of what goals can do for them and how to set goals that will encourage their rehabilitation.

There are six guidelines that will enable athletes to develop an effective goal-setting program. They are the following:

1. *Goals should be challenging, but realistic and attainable.* Injured athletes should set goals that can be reached, but only with time and effort. If goals are too easily reached, motivation will decrease. If goals are too difficult, injured athletes will perceive that they cannot achieve the goals no matter how hard they try, which leads to a decline in motivation.
2. *Goals should be specific and concrete.* Goals should have tangible criteria to be met and a target date for their accomplishment, for example, "I want to improve my quadriceps strength by 10 percent during the next eight weeks."
3. *Patients should focus on the degree of attainment rather than on the absolute attainment of goals.* An inevitable part of goal setting is that not all goals can be achieved, because it is not possible to accurately judge what is realistic for all goals. Injured athletes should be more concerned with how much of their goal they achieve, rather than whether or not they reached absolute attainment of it. Injured athletes should understand that the effort and intensity involved in striving for the goal are often as beneficial to their overall rehabilitation as reaching it.

4. *Goal setting is a dynamic and fluid process.* Goal setting is a process that never ends, much like sports participation. When one goal is accomplished, another is set higher or in a different direction to continually allow injured athletes to improve and develop. Goals should be reviewed regularly, compared to actual progress, and adjusted as needed.
5. *Prepare a written contract.* Goal setting is most effective when it is prepared as a written contract comprised of explicit statements of the athlete's goals, the specific means of achieving them and with whom they are to be shared.
6. *Provide regular feedback.* Injured athletes should receive regular feedback about how they are doing in pursuing their goals. Consistent goal feedback offers several benefits. It fortifies motivation by demonstrating a clear relationship between effort and tangible progress. Feedback also bolsters confidence in the effectiveness of the rehabilitation programme and patients' ability to adhere to it.

[Adapted from: Taylor, J., & Taylor, S. (1997). *Psychological approaches to sports injury rehabilitation* (pp. 125-133). Gaithersburg, Maryland: Aspen Publishers.

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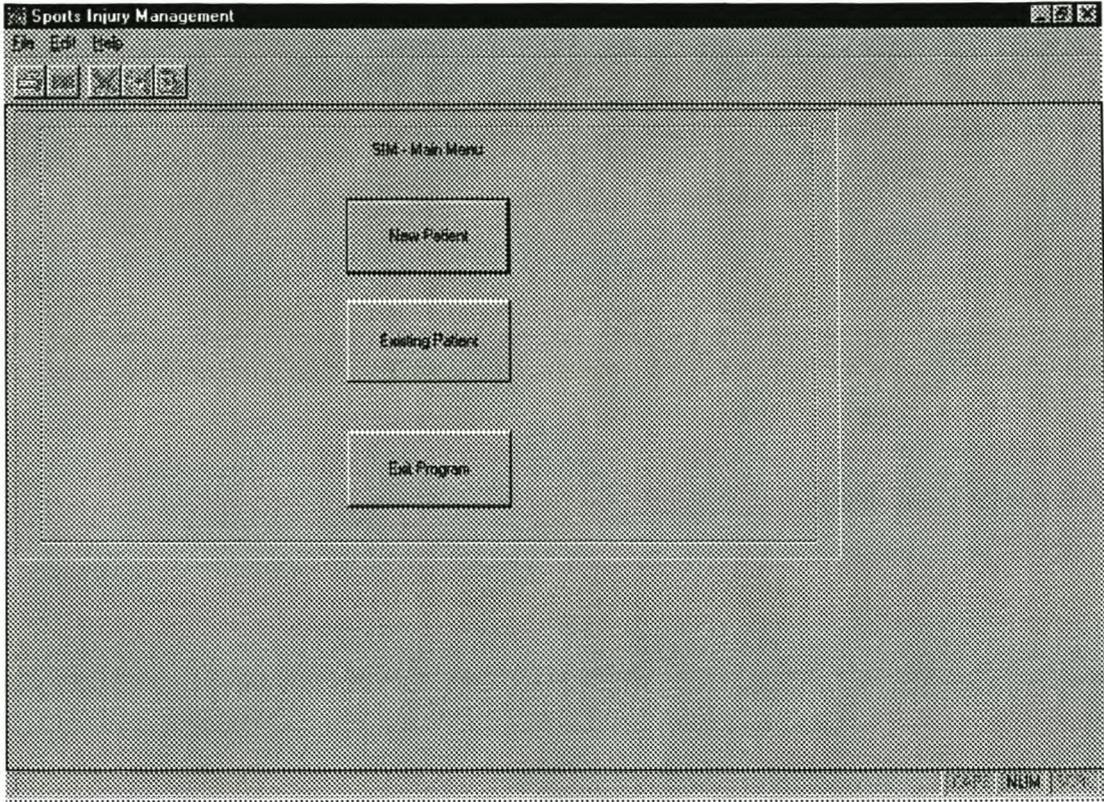
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APPENDIX 2: SPORTS MANAGEMENT PROGRAM (SCREENS 1 – 17)

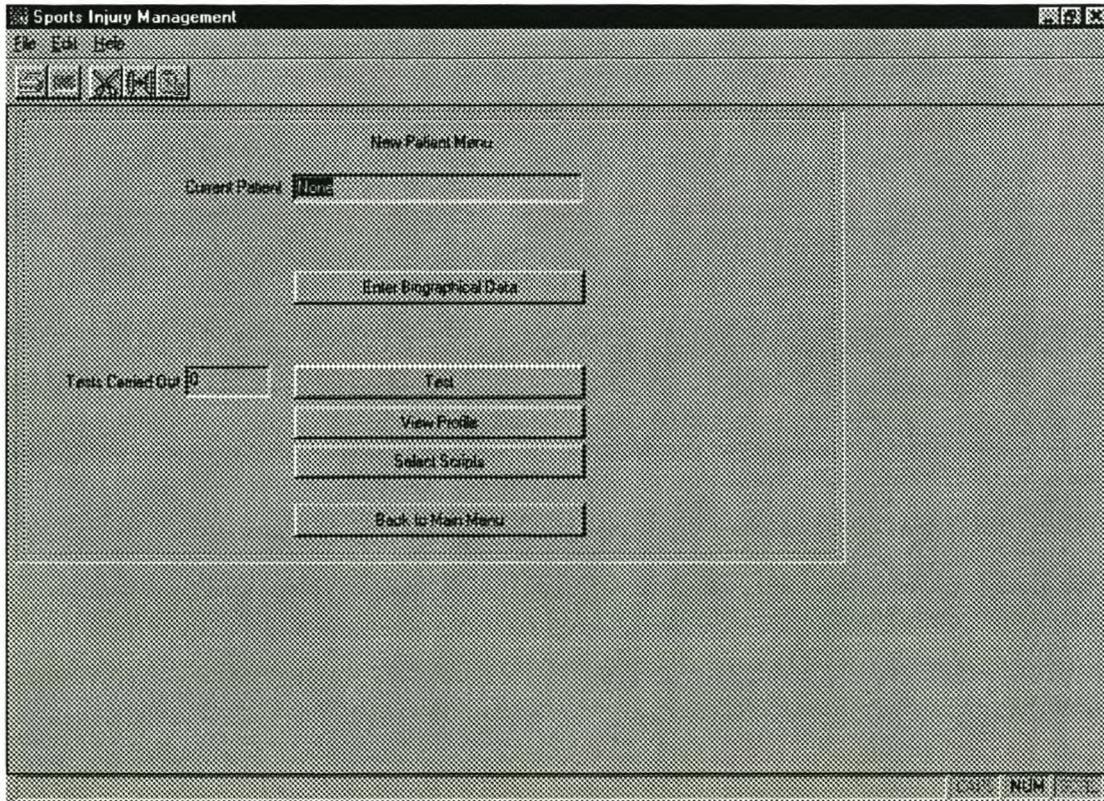
Screen 1



Screen 2



Screen 3



Screen 4

Sports Injury Management

File Edit Help

Name (First/Surname) First & Middle initials

Address

Suburb

City

Date of Birth: 1 January 1999 Age

Height 0.00 m

Weight 0.0 kg

Tel. No (Home)

Tel. No (Bus)

Back

Case NUM 1000

Screen 5

Sports Injury Management

File Edit Help

1. If you could be anything in life, what would that be?

2. List in order of preference the sports and activities that you participate in:
a) b) c)
d) e) f)

3. What are your reasons for participating in sport?

Dress Management	No Importance	Fun	No Importance
Competition	No Importance	Self-discipline	No Importance
Socialisation	No Importance	Diets of Aggression	No Importance
Pleasure of Excellence	No Importance	Weight Management	No Importance
Fitness	No Importance	Other (e.g. well-being)	No Importance
Personal Involvement	No Importance		

Cancel Next

Case NUM 1000

Screen 8

Sports Injury Management

File Edit Help

14. Have you recently been under stress (e.g. any significant changes)?

Yes No

15. What percentage of recovery have you made to your pre-injury status?

0% 50% 100%

16. When do you expect to return to play? (give date) 1 January 2000

17. Do you have any fears about returning to sport?

Yes No

18. Do you plan to return to the same sport in which you were injured?

Yes No

Prev Next

1042 NJM 10/20

Screen 9

Sports Injury Management

File Edit Help

19. Are you a motivated person in general?

Not at all Extremely motivated

20. Do you have a strong family support system or close friends who know the extent of your injury?

Yes No

21.

How anxious do you feel right now? Not at all

How sad or depressed do you feel right now? Not at all

How confused do you feel right now? Not at all

How angry do you feel right now? Not at all

How energetic do you feel right now? Not at all

How fatigued do you feel right now? Not at all

Prev Next

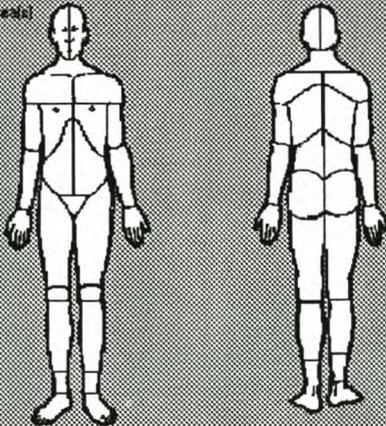
1042 NJM 10/20

Screen 10

Sports Injury Management

File Edit Help

22. Give an indication of the area(s) where you experience pain:



Prev Next

LEAPS NEM

Screen 11

Sports Injury Management

File Edit Help

23. Give an indication of the intensity of the pain you are experiencing right now. Make a mark on the line at a point that best represents your pain intensity.



Absolutely no pain Pain as bad as it could be

Prev Next

LEAPS NEM

Screen 12

24. There are many words to describe pain. Some of them are grouped below. Check any words that describe the pain that you have right now. (You do not have to check words in every group)

Flickering Quivering Pulsing Throbbing Beating Pounding	Jumping Flashing Shooting	Picking Boring Drilling Stabbing	Sharp Cutting Lacerating	Pinching Pressing Gnawing Cramping Crushing	Tugging Pulling Wrenching	Hot Burning Scalding Searing	Tingling Itchy Smarting Stinging
Dull Sore Aching Heavy	Tender Taut Rasping Splitting	Tiring Exhausting	Sickening Suffocating	Fearful Frightful Terrifying	Punishing Gruelling Cruel Viscious Killing	Wretching Blinding	Annoying Troublesome Miserable Intense Unbearable
Spreading Radiating Penetrating Piercing	Tight Numb Drawing Squeezing Tearing	Cool Cold Freezing	Nagging Nauseating Agonising Dreadful Torturing	Clear Selections			

Flex Save

NUM

Screen 13

Existing Patient Menu

Current Patient: John Citizen

Load Patient Data

Change/View Patient Biographical Data

Tests Carried Out: 1

Next Test

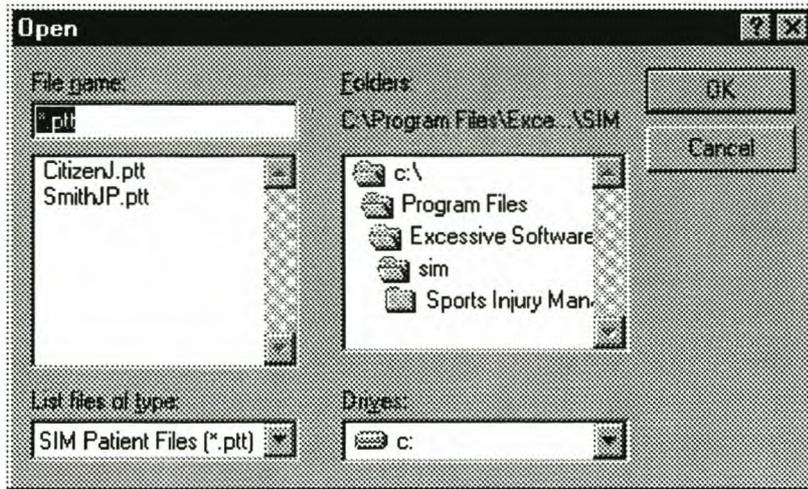
View Profile

Select Scripts

Back to Main Menu

NUM

Screen 14



Screen 15

The screenshot shows the 'Sports Injury Management' application window. The title bar reads 'Sports Injury Management'. The menu bar contains 'File', 'Edit', and 'Help'. Below the menu bar are several icons. The main form area contains the following fields:

- Name (First/Surname): John Citizen
- First & Middle initials: P
- Address: PO Box 123
- Suburb: Suburb
- City: City
- Date of Birth: 27 March 1960
- Age: 40
- Height: 1.6 m
- Weight: 75 kg
- Tel. No (Home): 12345678
- Tel. No (Bus): 1236543

At the bottom of the form are 'Back' and 'Save' buttons. The system tray at the bottom right shows 'CAPS', 'NUM', and 'SCRL' indicators.

Screen 16

Sports Injury Management

File Edit Help

Icons: [Print] [Back] [Home] [Refresh] [Close]

Patient Name: _____ Date of Birth: 1/1/1999 (0 years)
Address: _____ Height: 0.00 m
Home Phone: _____ Weight: 0.0 kg
Bus Phone: _____

1. Ambition:
2. Sports Preferences:

3. Reasons for Participating In Sport:

Stress Management	
Competition	
Socialisation	
Pursuit of Excellence	
Fitness	
Personal Involvement	
Fun	
Self-discipline	
Outlet of Agression	
Weight Management	
Other	

Importance: None Moderate Significant Greatest

4. Athletic Rating (1-5): 3
5. Injury Occurred: Pre-season
6. Sport Injured In:
7. Nature of Injury:

Buttons: [Back] [Print]

System: [CAPS] [NUM] [SCRL]

Screen 17

Sports Injury Management

File Edit Help

Icons: [Print] [Back] [Home] [Refresh] [Close]

Scripts

Set 1
 Set 2
 Set 3
 Set 4
 Set 5
 Choose Scripts

[View Scripts]

"SCRIPT 1.doc"
"SCRIPT 2.doc"
"SCRIPT 3.doc"

[Back]

System: [CAPS] [NUM] [SCRL]

APPENDIX 3: EVALUATION QUESTIONNAIRES

SPORT INJURY MANAGEMENT PROGRAM

(SIM)

PATIENT QUESTIONNAIRE

1. How easy/difficult was the SIM computer program to use?

Very easy 1 2 3 4 5 6 7 Very difficult

2. How useful was the SIM computer program in helping you rehabilitate from injury?

Not at all useful 1 2 3 4 5 6 7 Very useful

3. Would you recommend the use of the SIM computer program to other athletes?

Definitely not 1 2 3 4 5 6 7 Definitely yes

4. What aspects of the SIM computer program did you like?

5. What aspects of the SIM computer program did you dislike?

Any other comments or suggestions?

Thank you.

**SPORT INJURY MANAGEMENT PROGRAM
(SIM)
THERAPIST QUESTIONNAIRE**

1. How easy/difficult was the SIM computer program to use?

Very easy 1 2 3 4 5 6 7 Very difficult

2. How useful was the SIM computer program in helping your patient rehabilitate from injury?

Not at all useful 1 2 3 4 5 6 7 Very useful

3. Would you recommend use of the SIM computer program to other therapists?

Definitely not 1 2 3 4 5 6 7 Definitely yes

4. What aspects of the SIM computer program did you like?

5. What aspects of the SIM computer program did you dislike?

Any other comments or suggestions?

Thank you.