

# In search of more representative cervical cytology

## A preliminary prospective study

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### Summary

Non-representative cervical smears represented 26,5% of the 105 165 smears screened by the cytology laboratory at Tygerberg Hospital during the period 1986 - 1987. This figure varied from 21% to 41% depending on the skill of the performer. In an effort to secure more representative smears a preliminary prospective study was conducted to ascertain the value of a variety of devices (Ayre wooden spatula, saline-soaked cotton-wool swab, Cytobrush). Initially these devices were employed by one specific clinician and subsequently by a variety of medical personnel. This study proved that in the hands of all the personnel endocervical cells were present in all smears taken by the Cytobrush technique, obviating the need for repeat smears. The combination of an ectocervical scrape by an Ayre wooden spatula with an endocervical Cytobrush smear applied to one slide should result in more representative smears at screening. The resultant higher cost should be offset by minimising repeat smears.

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The quality of cytological smears from the uterine cervix has been the subject of many reports and controversies.<sup>1</sup> In the combination of factors responsible for reliable cervical cytology the most important one is a representative smear.<sup>1-5</sup> Proper sampling is therefore essential.<sup>3</sup> The presence of endocervical cells in an ectocervical smear means that there is a significant rise in the number of moderately and severely atypical epithelial changes.<sup>1,2</sup> A significantly higher number of abnormal epithelial changes was found on second screening of smears from women whose first screening smears did not contain endocervical columnar cells.<sup>1</sup> The presence of endocervical cells should therefore be considered a very important indicator not only of the fact that the smear was taken from the transformation zone but also of its quality.<sup>1</sup>

When endocervical columnar cells are absent, the quality of the smear should be considered unreliable and a repeat smear should be taken.<sup>1</sup> It has been proved that the routine combination of ecto- and endocervical smears results in the most representative material.<sup>4,5</sup> However, the dexterity of the staff also influences the reliability of any method or combination of methods.<sup>6</sup> Simplicity of method should therefore be one of the prerequisites in any screening programme. It is therefore essential that a method should be developed that can be reliably executed by the majority of medical personnel.

With the above in mind, the cytology laboratory of the Department of Obstetrics and Gynaecology at Tygerberg Hospital calculated the percentage of non-representative smears received from various sources within the hospital and from National Cancer Association and district clinics during 1986 (Tables I and II). As a result of this calculation a prospective study was conducted in order to compare various cytological sampling techniques in the hands of different personnel. Concurrently, the 1987 smears were also analysed for sufficiency (Tables I and II).

TABLE I. TOTAL NUMBER OF VAGINAL SMEARS SCREENED AT TYGERBERG HOSPITAL CYTOLOGY LABORATORY, 1986 - 1987

Source	1986		1987	
	No.	%	No.	%
Tygerberg Hospital (clinics and wards)	29 664	57,8	27 549	52,2
District clinics	17 280	33,7	19 360	36,6
National Cancer Association clinics	4 384	8,5	5 928	11,2
<b>Total</b>	<b>51 328</b>	<b>100,0</b>	<b>52 837</b>	<b>100,0</b>

### Materials and methods

This prospective study was done in two phases on non-pregnant patients attending the gynaecology outpatient department at Tygerberg Hospital for the first time. Each smear was applied to a glass slide with the patient's name and number on it and within 15 seconds immersed into the fixative (50:50 solution of ether and 95% alcohol). The smears were sent to the cytology laboratory fully immersed in the fixative.

Phase 1 involved 100 patients from each of whom three different smears were taken at the first visit. These were taken in a specific sequence by one person (A. L. B). On insertion of the Cusco vaginal speculum and visualisation of the cervix an ectocervical scrape was done with an Ayre wooden spatula (Fig. 1). This was immediately followed by the taking of an endocervical smear using a cotton-wool swab soaked in normal saline (Fig. 2). Finally, an endocervical smear was taken using a Cytobrush (Medscand AB, Malmö, Sweden) (Fig. 3).

In phase 2, which involved 25 patients, the smears were taken by a variety of members of the staff of the Department of Gynaecology (nurses, interns, medical officers and registrars). In this phase, the first smear was an ectocervical scrape taken with an Ayre wooden spatula followed immediately by an endocervical smear taken with a Cytobrush.

These slides were screened in the cytology laboratory in the ordinary manner by the cytotechnicians and cytologists. Care was taken not to give them preferential treatment and the laboratory staff was not aware of the sequence in which the smears were taken or which device was used.

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**TABLE II. CELLULAR COMPOSITION OF VAGINAL SMEARS SCREENED AT TYGERBERG HOSPITAL CYTOLOGY LABORATORY**

Source	Endocervical cells				No endocervical cells			
	1986		1987		1986		1987	
	No.	%	No.	%	No.	%	No.	%
Tygerberg Hospital (clinics and wards)	22 545	76,0	21 764	79,0	7 119	24,0	5 785	21,0
District clinics	11 924	69,0	14 133	73,0	5 356	31,0	5 227	27,0
National Cancer Association clinics	2 587	59,0	3 616	61,0	1 797	41,0	2 312	39,0
<b>Total</b>	<b>37 056</b>	<b>72,2</b>	<b>39 513</b>	<b>74,8</b>	<b>14 272</b>	<b>27,8</b>	<b>13 324</b>	<b>25,2</b>

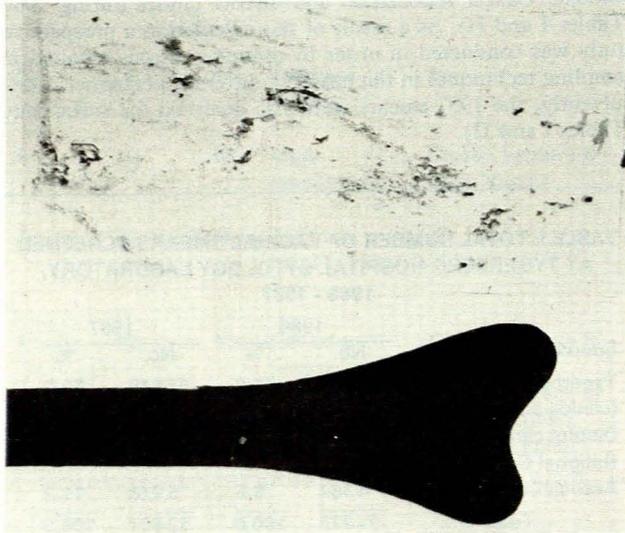


Fig. 1. Ectocervical scrape with an Ayre wooden spatula: uniform distribution of ectocervical cells.

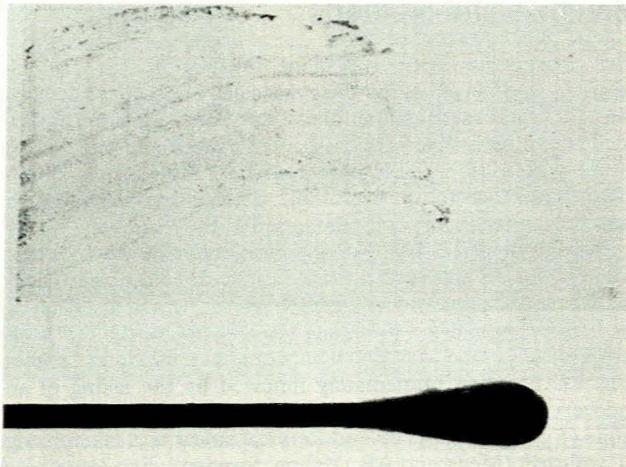


Fig. 2. Endocervical smear with a soaked cotton-wool swab: scanty distribution of endocervical cells.

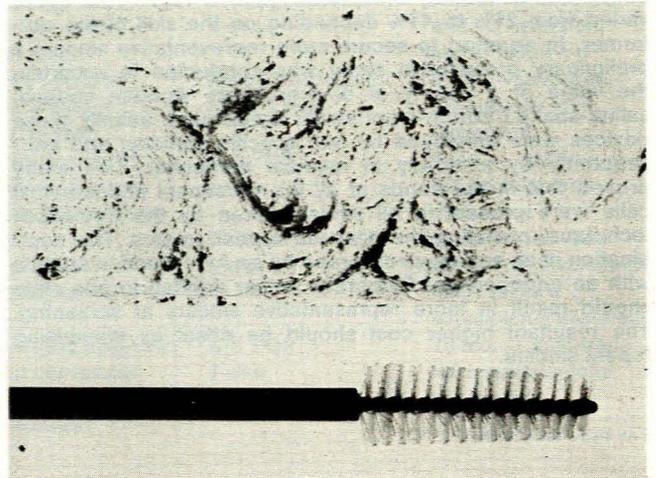


Fig. 3. Cytobrush endocervical smear: excellent distribution of endocervical cells of good quality.

from 21% to 24%, while the figures for National Cancer Association clinics varied from 39% to 41%. The results for the smears received from the district clinics lay somewhere between these two extremes.

In phases 1 and 2 of the prospective study the Cytobrush technique produced the most representative smears (Table III). These results were obtained despite the fact that in phase 1 the Cytobrush technique was the third in the sequence executed by one particular person while in phase 2 it was second in the sequence followed by various people.

**TABLE III. PRESENCE OF ENDOCERVICAL CELLS IN CERVICAL CYTOLOGY SMEARS TAKEN IN TWO PHASES BY DIFFERENT TECHNIQUES AND PERSONNEL**

Device	Phase 1 (N = 100)		Phase 2 (N = 25)	
	No.	%	No.	%
Ayre spatula	94	94	18	72
Cotton-wool swab	94	94		
Cytobrush	100	100	25	100

**Results**

As shown in Table II endocervical cells were not present in 14 272 (27,8%) of smears taken during 1986. The corresponding figure for 1987 was 13 324 (25,2%). The figures for smears received from Tygerberg Hospital clinics and wards varied

In phase 1 the first two techniques showed that only 6% of the smears did not have endocervical cells. However, with a variety of personnel using the Ayre spatula technique in phase 2 this figure rose to 28% (Table III).

An added advantage of the Cytobrush technique was the better quality of the smears. The laboratory reported that

there were more groups of endocervical cells present on these smears and that the cells were of better quality and much easier to interpret (Figs 1, 2 and 3).

## Discussion

If it is accepted that the presence of endocervical cells on a slide is an indicator of a representative smear it becomes clear that the percentage of non-representative smears received by the cytology laboratory at Tygerberg Hospital is very high (Table II). The corresponding figures for non-representative smears in published reports varies from 6,9% to 13,5%.<sup>1,2,5</sup> Four major factors may be responsible for this discrepancy: (i) the standard of the personnel taking the smears; (ii) the fact that as a routine only one scrape with an Ayre wooden spatula is taken; (iii) the inclusion in the 1986 and 1987 statistics of a large number of smears from pregnant patients; and (iv) the inclusion of a much smaller number of vaginal vault smears. Despite these factors the percentage of non-representative smears is too high and will necessitate a well-controlled educational programme on smear-taking.<sup>7</sup>

The role of the personnel taking the smear is well illustrated by the difference in the number of non-representative smears received from the three different sources (Table II). The smears from Tygerberg Hospital clinics and wards are taken by consultants, registrars, medical officers, interns and specially trained nursing staff whereas those received from district clinics and the National Cancer Association clinics were almost entirely taken by nursing personnel, some of whom have no special training.

Non-representative smears lead to false-negative results and should therefore be repeated.<sup>1</sup> During the 2-year period surveyed an average of 26,5% of the smears at this laboratory should have been repeated at additional cost and inconvenience to the patients.

The only technique that produced adequate endocervical cells when used by a wide variety of people was the Cytobrush endocervical smear. It reduces the need for repeat smears to an absolute minimum (Table III). Conversely, the presence of endocervical cells does not necessarily mean that a smear will give the highest accuracy for detecting abnormalities. For the best results a combination of an ecto- and endocervical smears is necessary.<sup>4,5</sup> The aim should therefore be to find the ideal combination of techniques producing adequate endo- and ectocervical cells.

## Conclusions

The results of this preliminary study clearly indicate that for providing adequate endocervical cells the Cytobrush technique should at present form part of any screening procedure in non-pregnant patients. In an effort to provide adequate ectocervical cells the Cytobrush endocervical smear should be preceded by an ectocervical scrape with an Ayre spatula.

The cost of Cytobrush is approximately 15 times higher than that of the Ayre wooden spatula. At a combined price of  $\pm 40c$  (Cytobrush and Ayre spatula) and an average laboratory cost of R10 per smear the cost for 100 smears should amount to R1 040 compared with R1 002,50 for the Ayre spatula alone. At present, however,  $\pm 26,5\%$  of our smears should be repeated at an extra cost of  $\pm R272$ . This more than adequately compensates for the extra cost of the material.

In the non-pregnant patient a combination of an ectocervical scrape with an Ayre wooden spatula and an endocervical smear by Cytobrush both applied to one slide is therefore strongly recommended. The importance of education in correct smear-taking is also stressed.

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## REFERENCES

1. Vooijs PG, Elias A, Van der Graaf Y, Veling S. Relationship between the diagnosis of epithelial abnormalities and the composition of cervical smears. *Acta Cytol* 1985; **29**: 323-328.
2. Elias A, Linthorst G, Bekker B, Vooijs PG. The significance of endocervical cells in the diagnosis of cervical epithelial changes. *Acta Cytol* 1983; **27**: 225-229.
3. Garite TJ, Feldman MJ. An evaluation of cytologic sampling techniques. *Acta Cytol* 1978; **22**: 83-85.
4. Sedlis A, Walters AT, Balin H, Hontz A, Sciuto LL. Evaluation of two simultaneously obtained cervical cytologic smears. *Acta Cytol* 1974; **18**: 291-296.
5. Shingleton HM, Gore H, Straughn JM, Austin JM, Littleton HJ. The contribution of endocervical smears to cervical cancer detection. *Acta Cytol* 1975; **19**: 261-264.
6. Shen J-T, Nalick RH, Schlaerth JB, Morrow CP. Efficacy of cotton-tipped applicators for obtaining cells from the uterine cervix for Papanicolaou smears. *Acta Cytol* 1984; **28**: 541-545.
7. Du Toit JP. The role of the nurse in the early detection of cervical carcinoma in a developing country. *Cancer Nurs* 1985; **8**: 121-127.