May 24, 1949. J. E. AYRE 2,471,088

CERVICAL SCRAPER

Filed Oct. 1, 1947

Fig. 1

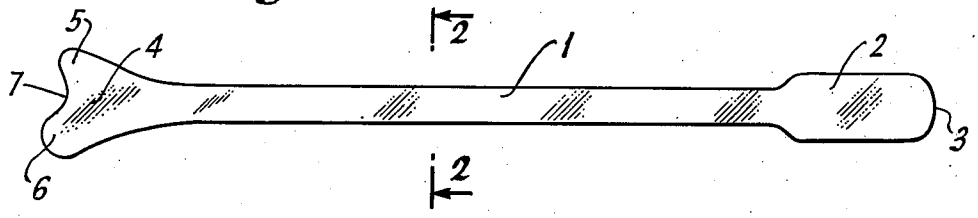


Fig. 2

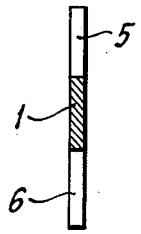


Fig. 3

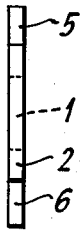


Fig. 4

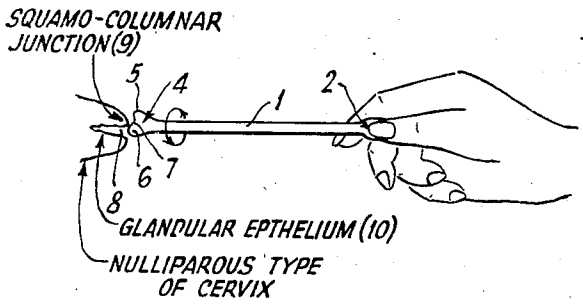
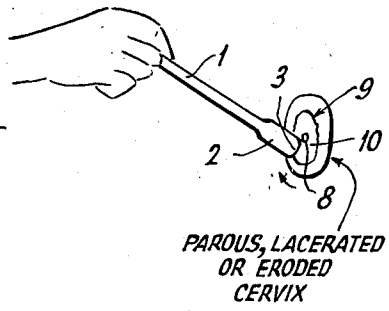


Fig. 5



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CERVICAL SCRAPER

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1 Claim. (Cl. 128—304)

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My present invention relates in general to an improved and novel scraper for use in "spatula cytology technique," and more specifically to an improved scraper for use in selective cytology employed in the diagnosis of any accessible surface cancer.

The selective cytology technique was developed in a search for a method of studying evidence of cancer growth in the cells which become earliest involved in cervical cancer. The squamous cells encircling the tiny cervical opening at the squamo-columnar junction constitute a key point of origin for cancer more frequently than any other single focus in the female body. The scraper test offers a technique providing "surface biopsy" information of these cells prior to their actual desquamation. The idea is to detect evidence of the earliest cell change in malignancy and of precancerous cell changes. It must be emphasized that the surgical biopsy is dependent for success upon the lesion being visually demonstrable. Numerous cases have been encountered where a single biopsy missed the growth while repeat sections revealed a small cancer. By study of cells in selective cytology smears, morphologic changes have been identified believed to constitute a precancer cell-complex. Through early diagnosis of cancer by routine cytology tests, death from cancer of the cervix should become highly preventable.

One of the important objects of my present invention is to provide a novel and improved scraper of particular advantage in the selective method for obtaining "surface biopsy" from the squamo-columnar junction of the cervix, and of general advantage in the diagnosis of any accessible surface cancer, e. g., tongue, lip, throat, skin and vulva.

Another important object of my invention is to provide a cervical scraper which is generally elongated in configuration and possesses a degree of flexibility, the scraper having one end thereof constructed to take a smear of a nulliparous type of cervix, while the opposite end is constructed to be adapted for a parous or eroded type of cervix.

A more specific object of my invention is to provide a thin elongated scraper, one end thereof having the form of a broad blade of uniform width, while the opposite end generally has a pair of divergent protuberances whereby one of them functions as a pivot for the other as it is rotated during gentle scraping of the entire squamo-columnar junction throughout its circumference.

Still other objects of my invention will appear

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as this description proceeds, it being emphasized that my present scraper is extremely economical in manufacture thereby to make entirely practical a simple office test for uterine cancer diagnosis.

In the drawing:

Fig. 1 is a full size front view of a scraper constructed in accordance with my invention;

Fig. 2 is a section taken along line 2—2 of Fig. 1 looking in the direction of the arrows;

Fig. 3 is an end view of the spatula viewed from the blade end;

Fig. 4 shows the manner of using the hook end of the scraper; and

Fig. 5 illustrates the use of the broad blade end of the scraper.

Referring now to the accompanying drawing, the scraper is generally of the configuration depicted in Fig. 1. The intermediate section 1 of the elongated scraper is a narrow thin strip of generally rectangular shape. One end of the strip 1 is formed into a broad blade or paddle 2 whose sides are parallel, and whose leading edge 3 is arcuate. The opposite end 4 of the strip 1 is essentially heart-shaped in that it comprises a pair of divergent protuberances or rounded peaks 5 and 6. The protuberance 6 is larger than its mate, and extends beyond it. The arcuate valley or concavity 7 between the peaks or convex sections 5 and 6 functions as a scraping edge. The concave and convex sections 7 and 6 function as a scraping edge. The entire strip is made of thin wood, but may be pressed from a plastic material, or a pulp material such as cardboard. The scraper may, also be made of metal. The scraper is disposable after use for obtaining a surface biopsy. It will be noted that the edges of the section 4 are rounded. The width of blade 2 is somewhat less than the width of section 4.

The method of taking a cervical smear for selective cytology requires first the adequate exposure of the cervix with a bivalve speculum. The mucus present at the external os is aspirated using a small glass pipette, or it may be wiped off with a cotton swab and discarded. In all cases we take both the external os smear by aspiration and the scraper smear for selectivity. In these cases the aspirated mucus is placed on a slide for the usual staining procedure, preceding the taking of the scraper test. Following the removal of excess mucus, the squamo-columnar junction is visualized. The precise method of taking the scraper test will vary according to the type of cervix, e. g., the presence of extensive lacerations or erosions will modify the procedure.

A nulliparous or healthy-appearing cervix showing the squamo-columnar junction just outside the circle of the cervical opening may readily be approached by simply placing the end 4 of the scraper gently against the cervical opening. Reference is made to Fig. 4 which shows the manner of using the section 4 for a nulliparous type of cervix. The extensive peak 6 is gently positioned, as shown, against the cervical opening 8. While held in this position a rotary movement, indicated by the circular arrow, permits light scraping of the entire squamo-columnar junction 9 throughout its circumference. By rotating the scraper the entire circumference of this cancer zone may be "surface biopsied." The cells shed from this key point show the earliest indication of incipient carcinoma before any lesion may be recognized by the naked eye. The hook end 4 is not suitable for cervices with long erosions, as the scraping might miss the squamous tissue, obtaining a "surface biopsy" of glandular tissue only.

Parous cervices more commonly exhibit a larger portion of the reddish glandular cervical epithelium, with or without an erosion, eversion or laceration. For cervices of this type the scraper test is taken by scraping along the squamo-columnar margin at the most suspicious area with the other end 2 of the scraper. This is shown in Fig. 5, which depicts the manner of using the end 2. The scraper is rotated in the direction of the arrow. Whether the secretion is derived as shown in Fig. 4 or Fig. 5 it is spread over a glass slide, and then processed to preserve in a glycerine media for 7–14 days so as to submit to any specialized cytological laboratory for experienced interpretation.

In summary, from a cytological study of over 3000 cases, by the use of cervical cytology tests in general and the scraper technique in particular, death from carcinoma of the cervix could potentially become highly preventable. It would appear that by routine cervical cytology tests with a scraper of the present type it becomes more practical and easier to take advantage of the life-saving possibilities offered by cytology.

What I claim is:

A cervical scraper consisting of an elongated strip, one end of the strip being generally triangular and having a pair of unsymmetrical convex end sections connected by a section of concave configuration, one of said convex sections being substantially longer than the other, and said longer section being adapted to enter the cervical opening and function as a pivot, the shorter section functioning as a rotatable wing relative to said pivot, said concave section being adapted to scrape cells from the squamo-columnar junction in response to rotation of the scraper about the pivot afforded by said longer section.

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REFERENCES CITED

The following references are of record in the file of this patent:

Catalog of George Pilling & Son Co. of Philadelphia, published in 1921, page 122. (Copy in Division 55.)