

Internal Menstrual Protection with the Rubber Menstrual Cup

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IN 1959 Liswood reported on the use of a sanitary cup* during the menstrual flow instead of the internal tampon and the external pad. She listed 12 advantages of this soft rubber menstrual cup, as follows.

1. It is clean, safe, sanitary, and convenient.
2. It eliminates embarrassing odor.
3. It eliminates chafing and irritation.
4. There is no embarrassing bulge to show through the garments.
5. There is no disposal problem.
6. The wearer may dance, swim, play strenuous games, and engage in all usual activities during the menstrual period without consciousness of a pad over her vulva.
7. The cup is comfortable and does not cause cramps.
8. Blood clots cannot escape when the cup is properly placed.
9. The cup is small and convenient; it can be carried in the purse.
10. It is economical. One cup lasts a year or longer and is much cheaper than a year's supply of menstrual pads or tampons.
11. It may be used by virgins.
12. The soft pliable rubber of the menstrual cup, which adjusts itself to the changing positions and functions of the body, is preferable to the solid tampon.

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PRESENT STUDY

The Obstetrical and Gynecological Research Institute began a study of the menstrual cup in order to see if the cup was in any way injurious to the labia, vagina, or cervix, and to check the advantages mentioned by Liswood. Over 100 women have been instructed in the use of the cup, over a period of 12 months.

It is over 2 years since this author started to prescribe and to study this cup and its effects. The vagina was studied between the periods of menstrual flow with and without the use of the cup. Fifty women were used in one study. A history was taken, and physical examination, blood count, and urinalysis were done every 7-21 days. A pelvic examination was done at each visit. A more detailed gross examination of the perineum, the labia and the vagina was made for any visual changes.

Cultures were obtained from the various areas of the vaginal walls with a vaginal speculum. These were inoculated onto blood agar plates and into 30 cc. of sterile broth. Cancer smears and Gram's stains were also made. Fresh smears and stained smears were made for *Candida albicans*, *Trichomonas vaginalis*, *Hemophilus vaginalis*, and for predominance of Gram-positive or Gram-negative cocci, small rods or long-rod bacilli (*Doederlein bacilli*).

As much vaginal secretion as possible was obtained by rotating the open vaginal specu-

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lum blades and by scraping the vaginal walls with the posterior tip of the speculum. This secretion was measured in milliliters in a special 5-cc. graduate and the amount of glycogen in milligrams per cubic centimeter was determined.

Vaginal biopsies were done when it was possible to do so without upsetting other vaginal flora studies. A vaginocrit was also made of the vaginal secretion for approximating the number of cells per cubic milliliter, plus the amount of fluid present, in milliliters. This reflects the degree of vaginal infection.

pH OF THE VAGINAL WALLS

A Neltronic electronic pH recorder* was used to make continuous pH recordings of each lateral vaginal wall, from deep inside the vaginal canal to the introitus.

The pH recording is of value because the vaginal pH varies directly in relation to: (1) the amount of glycogen present within the vaginal cells; (2) the amount of glucose present within the vaginal secretion; (3) the number of *Doederlein bacilli* present, whether the vaginal flora is predominately Gram-positive, mixed, or predominantly Gram-negative; (4) the height of the vaginal epithelial cell wall; and (5) the health of the vaginal walls, or the amount of infection (mild, moderate or severe) present. By determining the vaginal pH, vaginas can be classified into 8 different types.

Electronic pH recordings were made of the "4" vaginal walls before, during, and after the menstrual flow without the cup in the vagina. Other pH recordings were made of the same vaginal walls before, during, and after the menstrual flow, with the cup in the vagina.

It has been observed in one special group of 50 women that there were no changes in the vaginal pH from deep in the vagina to the area of the menstrual cup during and after the cup was worn. Therefore, one may

assume the menstrual cup is not injurious to the vaginal walls, even though the vaginal areas where the cup was in place was more acid than before the cup was used. Fresh and stained vaginal smears from the area where the cup was in place showed more normal vaginal epithelial cells and more normal vaginal flora than that part of the vagina where the cup was not in contact with the vaginal walls. Gross examination of the vaginal walls where the cup rests showed that the vaginal walls did not visibly change. From these observations, one may conclude that the menstrual cup is not injurious.

Bacterial Aspects

To determine whether the menstrual cup is cleaner, safer, more sanitary and more convenient as compared to the internal tampon or the external pad, bacterial cultures were made from contaminated pads, tampons, and cups. These were also smeared over the sterile blood agar plates. It was observed with both the pad and the tampon that microorganisms of almost every kind and shape and even some molds were present. The amount of bacterial contamination was greatest with the pad, next with the tampon, and least with the rubber cup. It has been known that the anal region is constantly being contaminated with many kinds of pathogenic and nonpathogenic microorganisms. It is the impression of this investigator that the external pad retains the menstrual blood, shedded endometrial tissue, and serum within and on the fibers, until microorganisms can use these as a nutrient, producing irritating chemicals, odors, and gases. In this retained menstrual blood, desquamated tissues, and serum, pathogenic bacteria multiply profusely, this matter being an ideal culture medium for such organisms. The internal tampon also retains on and in its fibers the blood, endometrial tissue, and serum until pathogenic microorganisms from the vagina can utilize it as a nutrient for growth. The string on the internal tampon

* Neltronic Instrument Co., Houston, Tex.

which hangs down over the anal region is constantly being contaminated by pathogenic fecal bacteria, molds, and *Candida albicans*. The anal microorganisms spread up the string to contaminate the labia, vagina, and the menstrual blood, endometrial tissue, and serum which are within and on the fibers of the internal tampon. Every time the woman removes the internal tampon she contaminates her finger with the fecal matter on the string. The cup, which collects the menstrual blood in one mass appears to contain more antibacterial (immune) properties than the blood and serum spread thin over and in the fibers of the external pad and internal tampon. With blood and serum spread over the fiber, greater surface is exposed to the microorganisms. The cup, held snugly in place by the vaginal musculature, does not allow the menstrual secretion to escape from the vagina and, more important, does not allow the anal pathogens and nonpathogenic microorganisms to enter the vagina while the cup is in place. The rubber cup is so smoothly glazed that blood and serum do not adhere to it and so there is less chance of bacterial growth.

More important than other factors, the menstrual cup fits so completely at the vaginal orifice that it produces an anaerobic or a semi-anaerobic condition within the vagina which slows bacterial growth. The usual odor of menstrual blood, plus the decomposition of the blood, desquamated tissue, and serum by the vaginal and cervical microorganisms, which is so common with the external pad and only less so with the internal tampon, is not nearly so noticeable with the rubber cup.

Ninety-seven women were studied for types of vaginal bacteria and for *Candida albicans*. The number and kind of bacteria with the menstrual cup in the vagina were approximately the same as when the cup was not used. *C. albicans* decreased with the use of the cup. The decrease was of such a degree that now a series of *C. albicans* vaginal

infections are being treated only by the wearing of the rubber cup. The study will be reported in another paper.

Convenience and Comfort

Many women are chafed or irritated by the external pad which must be worn tight against the labia during the menstrual flow in order to keep the blood from leaking around the pad's edges. This is less common when the internal tampon is used. When the cup is used the usual chafing and irritation of the labia and/or perineum is eliminated.

There is no storage or disposal problem when the menstrual cup is used; the cup can be used over and over. The woman does not need to carry a bulky supply of pads in her purse. A small special sack stores the cup when not in use, making it convenient to carry.

The menstrual cup almost always works itself into the correct position at the vaginal entrance as the woman walks, thereby, eliminating the possibility of losing the cup within the vagina, as is sometimes the case with internal tampons.

Insertion of a sterile solution with a hypodermic into the cup as it lies within the vagina showed that fluids do not leak out, nor was it found that the menstrual blood leaked from the cup unless the flow was excessive. In women with an excessive menstrual flow, the cup is ideal in that it can be removed and reinserted as often as necessary. The cup retains the secretions so completely that menstruating women can engage in their usual activities without fear of soiling. It eliminates the usual smearing of menstrual blood over pubic hairs and perineum.

A test of whether the menstrual cup was comfortable was done on 20 clinic patients. The cup was inserted in the vagina just before the speculum was removed, without telling the patient that the cup had been inserted. When questioned, none of these women knew that the apparatus was in her vagina. Women with acute vaginitis and

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leucorrhoea complained of an irritation when using the cup but this was not produced by the cup but by the infection.

An observation of patients is that the menstrual blood does not clot as often with the rubber cup. This is not fully understood but is being studied.

The economic factor is one advantage of the cup. Because of the low annual cost, it appears that the rubber cup will replace most internal tampons and external pads.

When the cup is inserted according to directions, it leaves ample space in the vagina below the cervix for collection of fluid in addition to its own capacity of one fluid ounce. It was determined by rectal examination that there was space between the cervix and the open cup lying at the vaginal introitus. In this location, the cup does not force the menstrual flow back into the cervical canal. Thin watery solutions could not be introduced under high pressures during the menstrual flow in 6 multiparous women. One can assume that the thicker clotted blood would be much less likely to be forced back into the canal. The soft rubber cup has

elastic properties which help to prevent menstrual backflow.

To avoid the rim of the cup impinging upon the cervix, the cup must be pulled down to the vaginal entrance after it is inserted. The neck on the cup must protrude out of the vagina and about 1/12 of the dome of the cup must be visible if the cup is to be in the correct position in the vagina at the introitus.

CONCLUSION

The excellent qualities of the menstrual cup presented by Liswood have been observed in this study of its use by 150 women. The question of whether it can be worn by virgins has yet to be examined.

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