

## Surgical Prevention of Cancer of the Uterine Cervix

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Papanicolaou screening followed by biopsy and definitive therapy have resulted in significant lowering of the worldwide death rate from cancer of the uterine cervix; because of this success, a more universal extension of this activity is energetically advocated. However, the final conquest of this disease awaits the discovery of its cause. Yet, if an effective means of preventing cancer were available and used, its early recognition, cause, and cure would be of academic interest only.

The purpose of this paper is to present a theory of prophylaxis of cancer of the cervix based upon long-accepted facts and newer evidence published in recent literature. We will first state the theory and the fact that suggested it, then consider the evidence that supports it. We will finally offer two hypotheses for further research.

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This research was supported in part by Brigham Young University Research Division, Grant 115-77-266

Three related articles appeared in *Clinical Medicine*, September, 1971, and January and March, 1975. The present article was received in November, 1976.

### Theory of Cancer of the Cervix Prophylaxis — The Clinically Normal Cervix

The nontraumatized virgin cervix is resistant to cancer. In our theory, based upon this fact, we define a clinically "normal" virgin cervix as one in which the vaginal portion of squamous epithelium extends to the small external os, behind which is held a crystal-clear mucus plug formed by healthy columnar cells entirely within the canal. By this definition, so-called "erosions" in virgins are not clinically normal. Biopsies of such tissue have invariably been reported as "chronic cervicitis."

According to our theory, any persistent variation from the clinically normal, as we have defined it, is cancer susceptible; and, conversely, the prevention of cancer would consist simply of eliminating the variations by surgically constructing a virgin-like, clinically normal cervix.

### The Nonvirgin Cervix and Cancer — The "Normal" Multiparous Cervix

There has always been strong evidence of a close association between healing and regenerative processes and the onset of cancer.

No organ in the human body is more trauma-

tized, mistreated, or neglected than the functionally important uterine cervix. Each month it undergoes profound and complex changes in its cells, secretions, blood supply, size, and shape. It is continually immersed in a septic environment in which streptococci, staphylococci, gonococci, Trichomonas, Monilia, and a large variety of other organisms and viruses and their products sometime thrive. It must repeatedly adjust to chemical and physical agents (e.g., antiseptics, antibiotics, douches, bath water often scented or medicated, hormones, creams, smegma, tampons, IUD's, or pessaries). It is severely tested with every pregnancy when it is hypertrophied, ironed out, pounded, stretched, and torn. It is physically assaulted in sexual intercourse and by many forms of masturbation, and by physicians who palpate, probe, sound, dilate or scrape it; apply caustics or coagulants to it; biopsy, cone, or amputate it; sear, burn, or freeze it. Thus the cervix is continually undergoing reparative or protective reactions so that the abnormally inflamed cervix of

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eversion, laceration, erosion of hypertrophy is so common it is often pronounced "normal" by the physician who sees it, and accepted as such by the patient who does not, and so is neglected by both. If their roles could be reversed — the patient to see her cervix and the physician experience the annoying signs and symptoms — neither would then be so indifferent to the cancer warning signs of a persistent abnormal discharge and a non-healing wound. It is easy to allow the patient to see her cervix; we do it regularly. All that is needed is a good spotlight, a speculum, and a small hand mirror; but we know of no way for the male physician to experience the symptoms except by sympathetic understanding and empathy.

So it is that every class of known carcinogen, (e.g., chemical, physical, living, or viral) is present in and about the cancer-susceptible cervix, not only one at a time and repetitiously, but also in clusters and continually. This is important, for

although one or more carcinogens may be operating for a time, the introduction of just one more may trigger the onset of invasive cancer.

As physicians we, of course, cannot eliminate all of the possible factors involved in the genesis of cervical cancer, but we must be above reproach and avoid any new trauma that may be construed as possibly adding to them. This is mandatory, because the diminishing death rate from cervical cancer, for which we accept the credit, is not matched by its increasing incidence at an earlier age, for which we do not.<sup>1</sup> What is more, this is happening at a time when more women, made cancer-conscious by physicians and the American Cancer Society, are seeing physicians more regularly in the belief that in doing so they will be protected. The statistics mentioned give graphic evidence that they are not.

### **Epithelial Cancer — The Uterine Cervix and Cauterization**

The most cancer-susceptible tissue in the body is epithelial. Except for the skin, the most common epithelial cancer is that of the uterine cervix. A well-known carcinogen for the skin is a burn.

Since the Roman physician August Celsus (c. 14-37 A.D.) recorded the development of cancer in burn scars, physicians have been aware that years later a skin burn may become the site of cancer (e.g., Marjolin ulcer). But even though that fact is common knowledge today, a usual treatment of benign lesions in the same kind of tissue around the cervix is cauterization by heat, chemicals, or cryotherapy.

Theoretic considerations based upon extensive colposcopy studies suggest another, more specific cancer danger in cauterization of the uterine cervix. In 90 percent of patients, early carcinoma begins in columnar cells, or former columnar cells that have been overgrown by squamous epithelium.<sup>2</sup> It is conceivable that after the junctional zone is lightly cauterized, as is done regularly, in the epithelization of the secondary healing that follows, squamous epithelium may overgrow the columnar cells that have survived the trauma.<sup>3</sup>

According to this theory, therefore, thermal modalities of treatment should be discontinued, or

used with utmost caution. In no way can such methods contribute to a clinically normal cervix, for their action destroys the columnar cells that produce the multiprotective mucus which is an essential part of a clinically normal cervix.

### The Protective Functions of the Cervix Mucus

As demonstrated *in vitro* and *in vivo*, cervical mucus can inhibit bacterial growth, even of such virulent organisms as hemolytic streptococci and staphylococci. Its chemical and physical nature is altered at optimal times by pH, osmolarity, nutrients, hormones, and minerals, for that purpose, as well as for the attraction, nourishment, protection, and upward movement of spermatozoa.<sup>4</sup> Fibrillar strands, which are a part of the complex mucus structure, form a tangled barrier to ascending infection, similar to a cotton pledget protecting the inoculated or sterile media of the bacteriologist. At ovulation time the fibrils line up parallel, like railroad tracks, to permit an unobstructed guided passage upward of spermatozoa, single file, to the recently released ovum. To further facilitate their passage, the liquid mucus thins and increases, and is followed by a normal mucorrhea downward, assisted by ciliated columnar cells.<sup>5-8</sup>

Many sperm do not directly enter the uterus but are diverted into pools of mucus in folded columnar cell crypts (there are no glands as is mistakenly thought), harbors of refuge and rest from which they emerge at a constant rate to continue their journey upward.<sup>9</sup> Meanwhile dead, sick, or nonmotile spermatozoa are washed away with other debris in the mucorrhea.

With desquamation at catamenia and dislodgment of the mucus plug, the sterile lavage of blood that follows protects the upper passages until cervical and uterine cells are regenerated and the tenacious fibrillar plug is re-established. The plug in the luteal phase of a regular cycle is always more dense than in the follicular phase. In the event of pregnancy, under the influence of the luteal hormone, the mucus becomes thicker yet, even rubbery, for the duration of pregnancy to protect the developing fetus. This plug is dislodged with labor, and the sterile bloody flow after delivery once again protects the upper passages until involution is complete and the follicular phase is established once more.

Complementary to the mucus are the protective functions of the virginal caliber of the external os.

### Protective Functions of the Virgin Caliber External Os

The clinically normal (virgin) external os is round and small in caliber; the multiparous os is larger in caliber and slitlike because it is always torn by the first birth. This fact is accepted as evidence in courts of law.

Much has been written about the incompetent internal os, yet incompetence of the external os is infinitely more important because it retains the cervical mucus. If this opening is too large, the predominantly alkaline mucus escapes, leaving endocervical cells exposed to the predominantly acid vagina. Inflammation, infection, menstrual irregularities, infertility, and spontaneous abortions follow. This was known centuries before the time of Christ, according to LisFranc, who quoted Hippocrates (c. 460-377 B.C.) as saying that, except in the catamenia and/or pregnancy, if the neck of the uterus admits the examining finger it is "either already, or on the point of being attacked by a grave affection."<sup>10</sup> In other words, with this firstline barrier weakened, a woman is already in, or in danger of entering, a high-risk cancer category.

There is yet another reason why a virgin caliber external os is cancer resistant. It is an accepted fact that cancer of the cervix usually begins at the transitional zone between the columnar and the squamous cells. This zone, according to our definition, marks the external os in the clinically normal cervix in which the columnar cells are entirely within the cervical canal. It is also the line that marks the true external os in eversive cervicitis of the multipara and in the misplaced border of the eroded virginal cervix (Figure 1). What appears to be the external os in these cervixes is actually only a cross-section of the cervical canal — the hole of a washer of inflamed, misplaced columnar cells, the outer edge of which is the squamocolumnar line. Thus, the clinically normal cervix with its virginal caliber external os and short squamocolumnar line is proportionately less prone to the development of cancer than the variant cervix of exposed columnar cells, where the line is irregularly scalloped and longer.

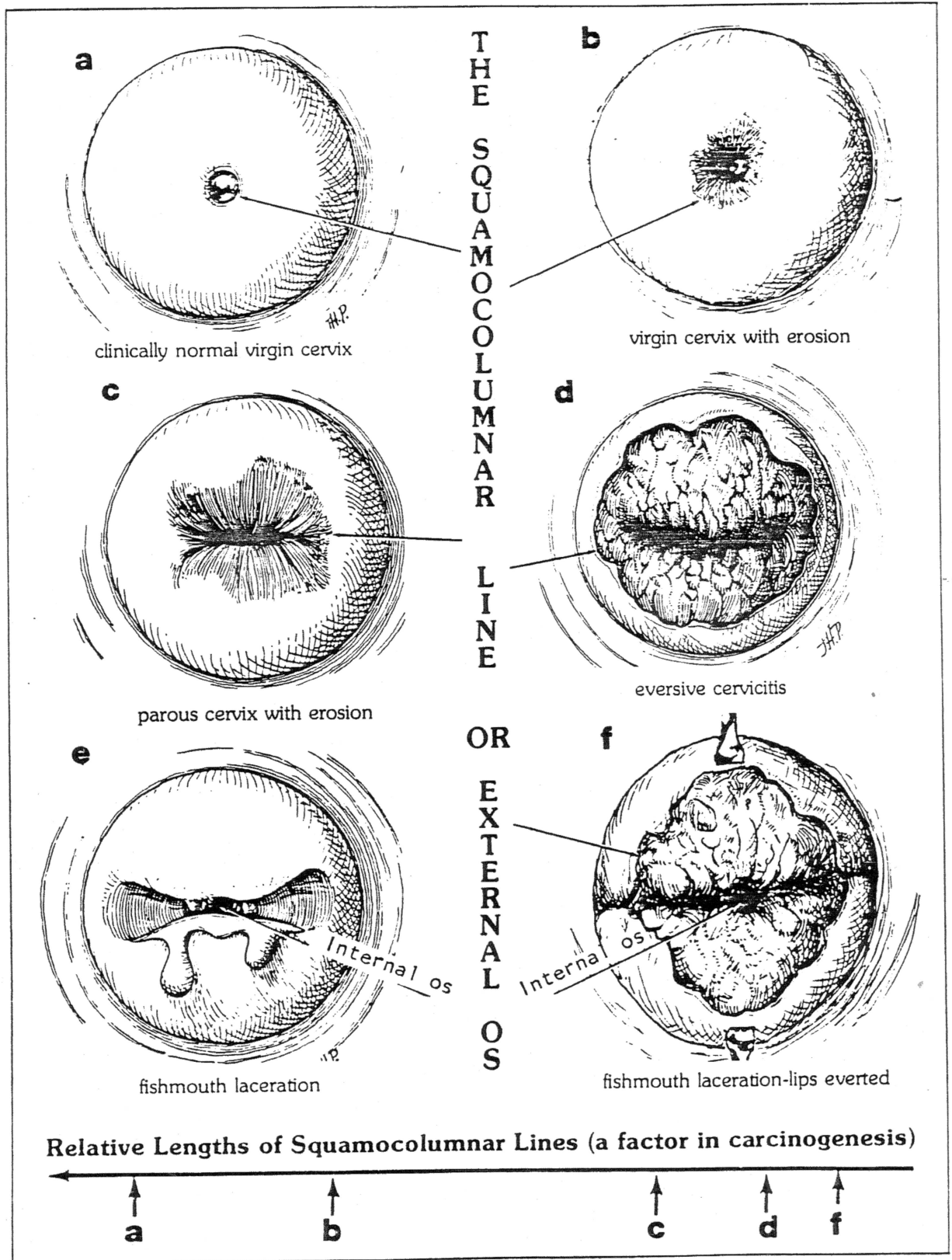


Figure 1

The squamocolumnar line or external os in various conditions.



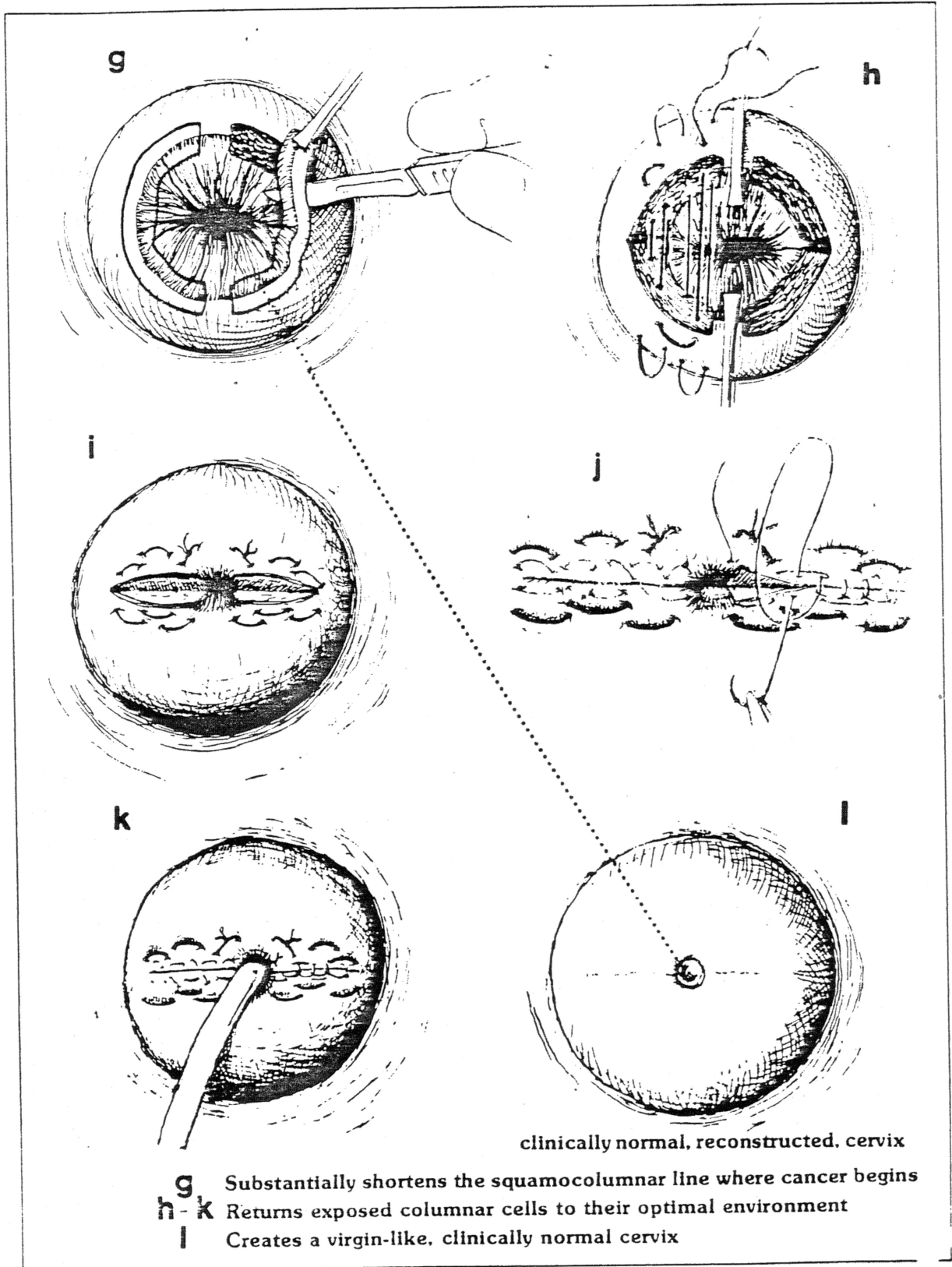


Figure 2

Semilunar biopsy repair for cancer prevention.

### Surgical Prevention of Cancer of the Uterine Cervix

Thus surgical prevention of cervical cancer, according to our theory, would consist simply of carefully preserving the exposed columnar cells and inverting them back into their proper place within the cervical canal, where they and their secreted mucus would be retained by a newly created, sufficiently small, virginal caliber external os. Situated in their normal environment, they would rapidly regain their health (Figure 2).

#### Experimental Support

In 1938, five years before the Papanicolaou smear was accepted, we performed the first operation based upon this theory of prophylaxis. Since that time we have operated on over 1300 patients with no modification of our theory, except for some changes in surgical technique. Polyglycolic acid suture,\* which became available in 1971, has replaced chromic catgut.

In earlier series, patients were told to expect a profuse, foul-smelling discharge following surgery. They were also told that in two weeks this discharge would "shut off like a faucet," and that the discharge for which they were operated on would also stop permanently. On occasion, the wound would partially fall apart and the end results would be less than desired. Occasionally hemorrhage occurred and resuturing was necessary. In one patient in whom this happened, there was such an improvement in her symptoms after final healing that she requested another operation to obtain a perfect result. This time she insisted on remaining in the hospital until healing was complete. On the fifth day, she hemorrhaged. Inspection revealed that the 21-day catgut had lasted only five days because it was bacterially absorbed. Triple sulfa cream† was immediately inserted into the vagina and used daily thereafter until healing was complete. The hemorrhage stopped spontaneously; nothing else was done. Encouraged by the additional improvement in objective and subjective symptoms, the patient requested a third operation. This time the cream was used from the day of surgery, resulting in prompt healing, un-

accompanied by any unpleasant symptoms. The symptoms and signs for which she was operated on had also vanished: 30 years later she still has a healthy uterus.

Since that experience, triple sulfa or some other antiseptic cream has been used routinely from the day of surgery. Convalescence is smooth and complications are minor and infrequent.

We are now performing the operation frequently on outpatients. If the effectiveness of the procedure were reported statistically in a scientific paper, the claimed results probably would not be believed. Details of the operation, semilunar biopsy-repair (SBR), and its statistical analysis as a cancer preventative have been presented in three previous papers.<sup>11-13\*</sup>

#### Discussion

An untested concept is a hypothesis; a theory must be supported by experimental, reproducible evidence. Furthermore, to be useful it must direct our attention to new ideas for fruitful investigation.

So, too, must our theory be tested. Our experimental confirmation of it is a matter of record. The names of all patients operated on are available, the times of their surgery noted, and the statistics thoroughly validated.<sup>13</sup> We will, of course, continue our study; but alone, we cannot add much to what has already been written. The theory must be tested by others; the more investigators, the more certain the conclusions.

But a word of warning: If not properly performed, the operation, though simple in concept, will be no more successful than the Emmet repair. If a poor result is obtained, the operation has not been properly performed. If it is not properly performed, it cannot serve as a test of our theory.

There are two hypotheses, suggested by the theory, that offer new directions in research:

1. Thermal modalities of treatment of the uterine cervix significantly contribute to the onset of carcinoma by adding to the clustering of carcinogens that form the natural environment of the uterine cervix. Data should be obtained correlating the number of cauterized and noncauterized women in whom cancer of the cervix develops. This must be a long-range, worldwide study covering several decades, similar to the study correlating

\*Dexon® Synthetic, Absorbable Suture, Davis & Geck.

†Sultrin®, triple sulfa cream, Ortho Pharmaceutical Corp., Rantan, NJ.

\* Reprints are available upon request.

cancer of the lungs with smoking. However, unlike the lung cancer study, in which only one carcinogen was suspected, cauterization is to be considered as possibly one of many, or a co-carcinogen.

2. The pH difference between cervical and vaginal environments contributes to the onset of cancer. Columnar cells, displaced from their normal predominantly alkaline environment within the cervical canal and exposed constantly to the hostile, predominantly acid secretions of the vagina, undergo metamorphic changes that eventually lead to cancer. This acid-base differential may vary racially, thereby explaining ethnic group differences in cancer susceptibility. Differences in pH due to heredity or lifestyles may similarly explain the onset of cancer on an individual basis. For example, the common use of a vinegar douche could be suspect.

### Summary and Conclusions

A theory of prevention of cervical cancer by surgical reconstruction of a clinically normal cervix, based upon the known cancer-resistant virgin model, has been presented. Most important to the creation of a clinically normal cervix is preservation of the columnar cells and creation of a competent external os to retain them and the multiprotective cervical mucus they produce. Attention is called to semilunar biopsy-repair (SBR), an operation which accomplishes these objectives. The external os is precisely delineated by the squamocolumnar line where cancer usually begins. Because this line is longer in the parous woman than in the virgin, the former is proportionately more

likely to sustain cervical cancer. SBR significantly shortens this line.

Since a burn is known to be carcinogenic in epithelial tissue, cauterization as a modality of treatment of cervical lesions should be discontinued or used with extreme caution. Cauterization adds to the clustering of the many carcinogens that are constantly and uniquely a part of the environment of the cancer-susceptible uterine cervix.

Two hypotheses useful in initiating new directions in research are mentioned.

Prophylactic surgery should be done as soon as practical, i.e., when involution is complete, to prevent the metamorphosis of columnar cells to the irreversible stages of dysplasia or carcinoma *in situ*. ◀

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