

Easy and Successful Treatment of Pilonidal Sinus after explanation of it's Causative Process

George E. Karydakis

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Hair insertion causes pilonidal sinus, it prevents spontaneous recovery, delays healing of any wound in the depth of the natal cleft, and is the cause of recurrence. An understanding of the hair insertion process made it possible to avoid hair insertion in 6545 cases of the condition with the use of the advancing flap operation. Results have proved this to be an easy and successful way of treating and preventing recurrence of pilonidal sinus. Furthermore, that understanding has introduced the possibility of preventing pilonidal sinus, through ways simpler than the simplest operation.

INTRODUCTION:

Pilonidal sinus is a simple condition which has a high and rising incidence in some countries, particularly in the Mediterranean. The first description of the disease was that by Herbert Mayo in 1833. After more than one and a half centuries, many surgeons are still not certain whether hair is the cause of the disease, or whether the accumulation of hair is merely an incident in the disease process. It is very important to understand the difference between these two possibilities as each requires a different principle of treatment. If the wrong view is accepted, treatment will continue to have a high failure rate.

Time has shown that the innumerable ways used to excise or to destroy some non-existent internal cause of pilonidal sinus did nothing other than facilitate the further insertion of hair, which is the real cause of the disease.

The true nature of pilonidal sinus had been revealed and widely accepted 55 years ago, but treatment continued to fail. While further details of the hair insertion process were yet to be discovered and understood, there was failure to correctly apply the basic knowledge of the hair insertion process which had been well documented. For example, although it was well known that hair inserts on its root end, and consequently only loose hair can insert, surgeons tried to stop hair insertion by removing some innocent fixed hair from the nearby skin.

However, the continued failure of treatment weakened the belief in this real cause of pilonidal sinus, so that some surgeons swung back to the

belief that there may have been an internal aetiology. This retrogression of ideas concerning aetiology is obvious lately in Eastern Europe with the tendency to use newer destructive means (laser, loop diathermy).

Fortunately, a number of surgeons remained ardent followers of the correct treatment, namely the stopping of hair insertion. A more complete understanding of the hair insertion process developed, and this allowed the successful identification of methods to interrupt the insertion process. The results of treatment have been so successful that no argument remains against the fact that hair insertion is the only cause of pilonidal sinus.

The Hair Insertion Process:

A 35 year study in an environment with thousands of cases of pilonidal sinus has left no doubt that the causative process can be defined precisely.

Three main factors play a part in the hair insertion process: the invader (H), consisting of loose hair; some force (F) which causes hair insertion; and the vulnerability of the skin (V) to the insertion of hair at the depth of the natal cleft. If these three main factors occur, then hair insertion and pilonidal sinus result.

However, it is possible to list in greater detail the many secondary factors which together make up the three main factors (Table 1.) The following equation can be used to calculate the possibility of pilonidal sinus:

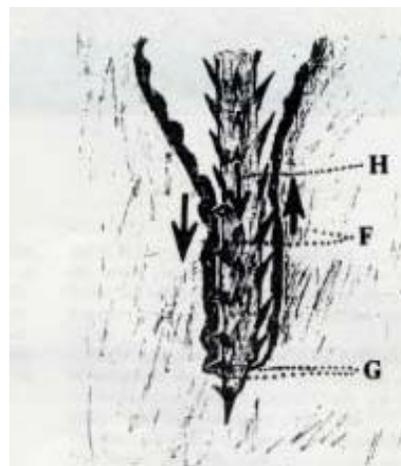
Hair (H) x Force (F) x Vulnerability (V)

H - Factors

- h1 The number of loose hairs collected in the natal cleft
- h2 The more or less acuteness of the root end of hair
- h3 The kind of hair (tough or silky)
- h4 The shape of the hair (straight hair, not curly, is the type liable to insert)
- h5 Scaliness of hair - more marked 10-22 years old

F - Factors

- f1 Depth
- f2 Narrowness of the natal cleft



f3 Friction movements between the sides of the cleft

V - Factors

v1 Softness

v2 Maceration

v3 Erosions

v4 Splits

v5 Wide pores

v6 Wounds

v7 Scars at the natal cleft

A loose hair, because of its scales, assumes a self-propelling ability by friction movements, migrates leading with the root end and collects at some point on the body surface, especially in the natal cleft. Friction forces the hair to insert, only at the depth of the natal cleft, and never at its sides.

Once one hair (usually one with an angled, chisel-like root end) inserts successfully, the other hairs can insert more easily. Foreign body tissue reaction and infection follow and the primary sinus of pilonidal disease forms. Secondary fistulae often occur due to the self-propelling ability of hair and the opening of the abscess which often forms. These are usually at a high point and on the left side due to the local tissue architecture. (figure 2).



figure 2

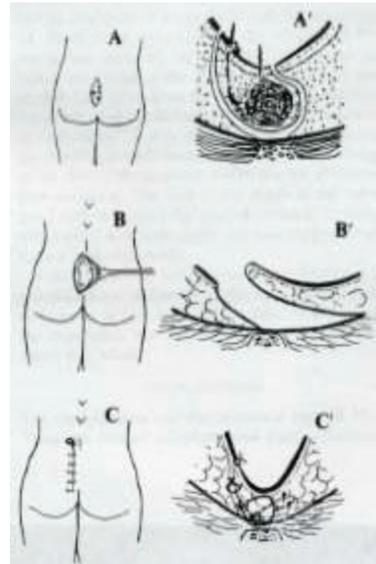


figure 3

Primary sinuses are portals of continuous entrance of hair, and secondary

fistulae are portals of continuous exit of hair. This fact is fundamental because if the entrance of new hair can be stopped, many cases of pilonidal sinus can effect a self cure by a successful foreign body reaction, assisted by the tendency of hair to self-exit.

The natural depth of the natal cleft, the raphe, being the target point of hair for mechanical reasons, is also very vulnerable to hair insertion because of a number of congenital or acquired characteristics (factors v1-v5). Many methods used for treatment of pilonidal sinus have increased this vulnerability, making the natal depth an open portal for entry of hair, for example, by leaving an open wound, defects in a sutured mid-line wound, or holes in the scar from sutures. This is the cause of the very high recurrence rate with the older methods of treatment of pilonidal sinus. We found 4670 army recruits who had been operated on for pilonidal sinus from one to nine times. 2288 of them experienced a recurrence. This is a strong criticism of the many other methods still used in the treatment of pilonidal sinus.

The contribution of each factor in the hair insertion process varies widely from one person to another according to age, sex, race, body constitution and the type of operation for pilonidal sinus performed previously. Changes in living standards have influenced most of the causative factors, with the consequence that there has been a continuing change in the incidence of pilonidal sinus in a single country. In the Greek army 4.9% of soldiers had pilonidal sinus in 1960, 25.8% in 1974, and 30-33% at present. At the same time the ratio of weight to height had increased by four units .

Hair insertion and then pilonidal sinus occur when the end result of this co-operation is equal or greater than the threshold. The most obvious contributions from an increase in weight include a tendency to increased depth of the natal cleft, increased friction, and a tendency to softness and maceration in depth.

All these factors not only explain all the known variations of the incidence of pilonidal sinus in different groups of people, and the variation of it's incidence in the same population over time, but also provide an answer to the strange presence or absence of the disease in some cases, for example, the presence of pilonidal sinus in some "hairless" individuals, and it's absence in others with hirsutism. An explanation of these variations in the incidence of pilonidal sinus in not possible by the theory of an internal aetiology.

METHODS:

Accepting that the fundamental objective in treatment and prevention of pilonidal sinus is the stopping of hair insertion, consideration must be given to methods whereby one or more of the 11 causative factors may be eliminated, thus neutralizing the causative mechanism.

Surgeons tried to remove hair from the intergluteal fold (factor h1). This method is not successful when it consists in shaving some innocent, fixed hair in the nearby skin. Numerous dangerous loose hairs from different parts of the body surface arrive and insert continuously into the natal depth, despite regional depilation and meticulous local hygiene.

Another effort to stop hair insertion was intended to flatten the natal cleft (factor F). Numerous plastic operations have such an aim, including rotation flap, rhomboid flap, Z-plasty and D excision. However, the natal cleft cannot be completely flattened and although some methods flatten the upper part of the natal cleft, its lower part remains deep. A trap for loose hair is created, especially at the lower part of the natal cleft, if these methods leave the lower part of the wound in the mid-line, together with an unexcised part of the vulnerable raphe.

Some surgeons, conscious of the difficult healing of wounds at the natal depth, used oblique or transverse incisions. Others excised only the primary sinuses and the wide pores of the cleft, believing that folliculitis was the cause of pilonidal sinus. The fact is that folliculitis, so common on the remaining surface of the body, never causes pilonidal sinus. No explanation was given for the thousands of recurrences which occurred by other methods of treatment, even though the scar in the natal depth was quite hairless and without pores.

In 1965 it was thought hair insertion could be stopped by increasing local defenses, that is by decreasing or neutralizing the vulnerability of the target point of hair (factor V). This point is the depth of the natal cleft. That view necessitates: (i) the removal (excision or displacement) of the vulnerable raphe (factors v1-v5) and (ii) the avoidance of any wound scar in the depth of the intergluteal fold (factors v6-v7).

Many ways have been tried to achieve this objective, and the simplest and most successful proved to be the advancing flap operation. It consists of an eccentric, elliptical excision, mobilization of a flap from the median side of the wound, the fixation of the base of the flap to the

sacrococcygeal fascia, and the suturing of its edge to the lateral one. A penrose drain is always put at the upper end of the wound for 2-3 days. No bowel preparation or bowel confinement is used. Patients walk and are nourished freely soon after recovery from general anesthesia, if it is used rather than local anesthesia. Antibiotics and analgesia are used in a very few cases. The mean time of hospitalization is 3 days, with many patients requiring 1 day of hospitalization or an office operation. The majority heal rapidly, with an average absence from work of 9 days.

It was found that total excision of the affected tissue of pilonidal sinus is an advantage, but not critical. With delayed healing there is increased possibility of postoperative wound infection but no increase in recurrence rate.

RESULTS:

Recurrences:

The advancing flap operation was applied in 7471 cases of pilonidal sinus during the period 1966-90. Ninety-five percent of the cases have been followed up for times ranging from 2 to 20 years. All of the 5876 operations performed since 1965 have been followed up.

In the first 6545 cases, follow-up found 55 recurrences (less than 1%) and in each case reinsertion of hair was observed. With present knowledge, it is certain that most of them could have been prevented. Many were early cases in the series, and hair reinsertion occurred because the objective of "no raphe, no wound at the depth" had not totally succeeded. One stitch from the lateral wound penetrated the depth of the mid-line, permitting hair insertion in four cases. It was observed that as young people developed adult body form, there was a change in the skin of the mid-line, following the advancing flap operation. The skin in the depth of the "new" natal cleft developed the characteristics of a vulnerable raphe, with wide pores and maceration. These form a high risk group.

Lately there has been an increased incidence of pilonidal sinus in Greece in the very young, down to 11 years of age, especially in girls. In this group, the recurrence rate of 3% is higher than for the series as a whole.

Complications:

The complication rate has remained high (8.5%). These are mainly infections and fluid collections. Other surgeons have reduced these

complications close to zero, by using precise technique antibiotics and continuous suction. We do not use such means, because we insist on a simple operation which can be applied by every surgeon. Further, these complications have no consequence other than to delay healing, because hair cannot insert into any wound located at the sides of the natal cleft, even if the wound remains open for a long time.

Many surgeons have applied this method with the same or better results. Others encountered difficulties in fixing the flap, and in obtaining an adequate level lateral displacement of the suture line and of the non-excised part of the raphe. Earlier difficulty in fixing the flap was found to be due to the little stitch cutting out of the loose fat on the side of the flap. Now we use a larger stitch and there is no problem. To obtain adequate displacement, the lateral incision must be symmetrical to the median one, even if a piece of healthy tissue has to be excised when no lateral secondary fistula exists.

Some surgeons have applied the method in ways that do not completely achieve the two aims and there are others who have totally ignored both of these objectives. They have left, partly or totally, raphe and suture lines at the natal depth, leading to failures and disappointment.

DISCUSSION:

The results of the advancing flap operation must be declared more than satisfactory and it is interesting that the reasons for failure are now known.

Furthermore, the path has been opened for prophylactic treatment of pilonidal sinus by ways simpler than the simplest operation. The high risk group have been identified by consideration of the factors known to be in the causative process and the natal depth in these persons has been covered by leucoplast, or by nobecutane spray. By such means it is believed that the very probable formation of pilonidal sinus has been prevented in high risk groups. The establishment of the disease has been interrupted in cases where the critical penetration had already taken place. A total number of 280 cases of pilonidal sinus has been successfully treated using the technique described.

In cases where secondary fistulae do not exist, the removal of hair which has already inserted is necessary. In the presence of such fistulae the self-exit of hair is quite certain, so that by preventing hair reinsertion, none of these recurrences has required operation.

Such methods are not yet practical for general use, because even if they seem effective, they require close follow-up until the patient is well past the age of 25 years, when the danger of hair insertion starts to decrease.

However, considering the continuing advance of medical and chemical sciences, it seems possible that one day a simple and practical means of preventing hair insertion may be discovered. Such possibilities might include the use of a harmless shampoo, destruction of the scales of hair, the regular use of a non-irritating silicone preparation or method of covering the natal cleft. The occurrence of such a discovery will require a continuing and deep understanding of the exact nature of the problem of pilonidal sinus.