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BJU INTERNATIONAL, Volume 83, Suppl. 1: Pages 109-113,
January 1999.

Surgical methods of restoring the prepuce: a critical review

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Introduction

Uncircumcision, the restoration of the prepuce, has been performed since antiquity, perhaps since shortly after the first circumcision. In history, restoration of the prepuce has been particularly important in societies where most men were uncircumcised, while a minority group practised ritual circumcision and thus were not accepted in communal settings of nudity.

Uncircumcision in antiquity

Many of the first references to uncircumcision are found in the Judeo-Christian religious writings of the Old and New Testament. In the era of the Roman Empire, the Greek practice of public nudity was adopted at the bath houses and gymnasia, for all exercises and sports activities. To have a glans penis without a preputial covering was considered socially unacceptable and ugly. The circumcised penis was considered deformed and disfigured, whether through congenital absence or surgery. It was also considered unacceptable if the uncircumcised foreskin was allowed to retract in public. In fact, to prevent the foreskin from retracting and exposing the glans penis, it was common practice to undergo infibulation, the placement of a circular safety-pin-like instrument (known as a fibula) across the distal edge of the prepuce [1].

In ancient times, uncircumcisions were practised for *decoris causa* 'the sake of appearance,' rather than for health reasons. Furthermore many Roman Jews led a secular life and attempted to conceal their 'badge' of Jewishness, and thus their 'outsider' identity, by undergoing uncircumcision [2]. In the Book of Maccabees (1:14-15), during the reign of Antiochus Epiphanes (~167 BCE) and in the Talmud (132-135 CE), during the reign of Hadrian, as well as in Corinthians 7:18 (mid-first century AD) there are references to the practice of uncircumcision [1]. Egyptians had also once practised ritual circumcision, but by Roman times circumcision was performed

only on Egyptian priests [3].

Judeum Pondum

One of the simpler methods for uncircumcision used during Roman times was the instrument known as the 'judeum pondum' [2], a funnel-shaped copper tube that was placed around the penile shaft (fig. 1). The heavy copper then pulled and stretched the shaft skin forward, to cover the glans. The hope was that the stretched skin would eventually stay in place and create a new prepuce. It is difficult to see how this technique could have produced any durable success [2]. **[CIRP Note: This is a curious statement. Today, in contemporary society, many men are successfully using modern versions of the *judeum pondum* to restore their foreskins. The weight works by tissue expansion principles. Skin maintained under traction for an extended period forms additional skin cells and expands. Skin expansion is frequently used by plastic surgeons to create additional tissue for restorative or reconstructive surgery. The increase in size is permanent and is used to restore lengthen the penile shaft skin into a semblance of a foreskin.]**

Celsus' operations

One of the first detailed descriptions of the operative techniques of uncircumcision was by Celsus [1]. In his treatise, *De Medicina*, written between 14 and 37 CE, he described two such operations. As Celsus wrote, 'and if the glans is bare, and the man wishes for the look of it to have it covered, that can be done'. Celsus called one of his operations 'decircumcision' (or restoration of the prepuce) for those who were circumcised, and the other 'reconstruction' of the prepuce for those with congenitally deficient foreskins. The ideal surgical candidate for best cosmetic results was felt to be a child or young adult with a small glans penis, with loose penile shaft skin, and where the prepuce was congenitally absent or underdeveloped, rather than previously removed by circumcision [1].

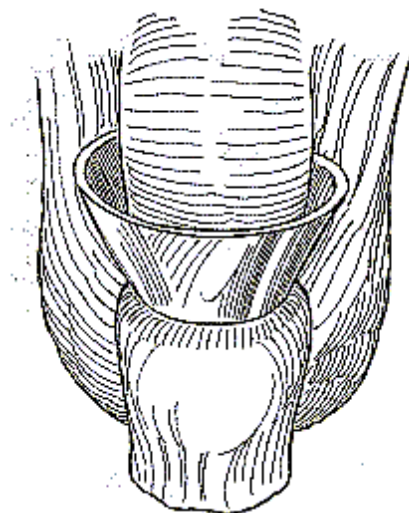


Fig. 1. The Judeum Pondum: a funnel shaped copper weight used during the Roman era, in an attempt to create a prepuce, by pulling the penile shaft skin to cover the glans penis.

Decircumcision

For those who were previously circumcised, Celsus performed a circumferential

subcoronal superficial skin incision (deep to the dartos fascia), to be in an avascular plane. The penis was degloved and the shaft skin advanced distally to cover the glans. A plaster dressing containing lead oxide (an ancient version of mercury ointment) was placed between the glans and the new prepuce, to prevent the skin from adhering to the glans [1,2] (fig.2). Postoperatively, erections were discouraged to prevent the penile skin from retracting. Therefore, the patient was not allowed to eat any solid food for days, because it was thought that by keeping the patient hungry and weak he would not have erections [1]. When the penile oedema resolved the penile shaft was tightly bandaged from the base to the subcorona. Again, it is difficult to see how this technique had any success at producing a cosmetic and functional prepuce.

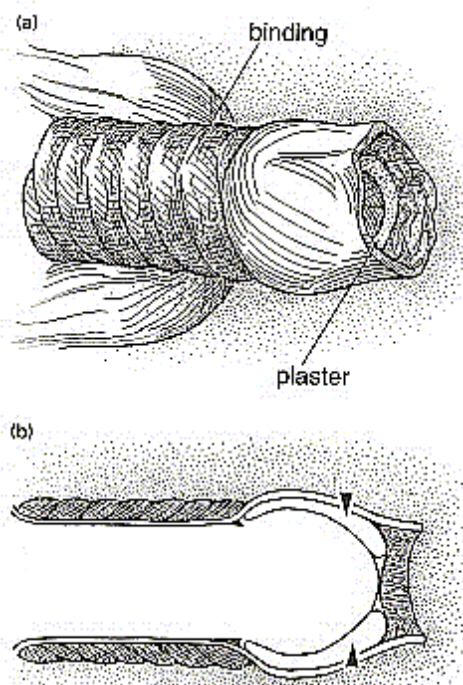


Fig. 2. Celsus's operation of decircumcision. (a) A subcoronal degloving incision is made to pull the shaft skin over the glans. Note the binding that is placed to hold the penile shaft binding and the plaster cast (arrows) placed between the neo-prepuce and the glans penis (to prevent skin adherence).

Reconstruction of the prepuce

For the congenitally absent or underdeveloped prepuce, Celsus advocated making a superficial skin incision at the penile base superficial to the penile blood vessels and the urethra (e.g. superficial to Buck's fascia) (Fig. 3). The penile shaft skin was then slid distally until the skin folded onto itself and covered the glans. A tie was then placed through the distal skin so that it could not retract proximally. The suture was tied loosely to allow for voiding via the urethra. The partially degloved penis leaves an open wound, that was then covered with flax dressings and allowed to granulate. Overall, favourable cosmetic or functional results seem doubtful with this technique.

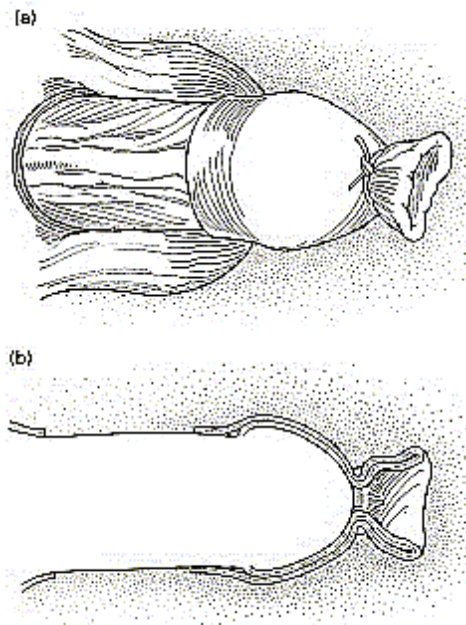


Fig. 3. Celsus's operation of reconstruction of the prepuce. (a) Penis degloved via a circumferential base incision, to cover the glans penis. Note the exposed proximal penile shaft and the distal suture to prevent the skin from retracting. (b) Cross-sectional view showing the degloved penis with the shaft skin and dartos pulled forward and sutured distally in place.

Modifications of the original Celsus technique were described centuries later. The first such modification was detailed by Penn [4]. Penn first degloved the penis in the same manner as Celsus's reconstruction of the prepuce. In addition, he placed a unmeshed split-thickness skin graft to the denuded area of the proximal penile shaft. (Fig 4a). In so doing he noted more favourable cosmetic results [4]. In our extensive experience with skin grafting the penis, we would suggest that the skin graft be sutured in place to the penile shaft while under stretch to allow for erections after grafting. To immobilize the graft we commonly place long silk sutures at the margins and tie them together over a non-adherent dressing (e.g. Xeroform) followed by a bolster of mineral oil-soaked cotton batting (Fig. 4b). To further immobilize the penis in the vertical position we place a plastic housing unit (e.g. a one litre plastic saline bottle with the top cut off) around the bolster (Fig. 4c). Another modification of Celsus's was later detailed by Goodwin [5]. As per Celsus, a circumferential incision was made in the penile base skin to deglove the penis and to move the skin distally until the entire glans penis was covered. Additionally, Goodwin made multiple small transverse incisions at the most distal aspect of the neoprepuce, and then sutured them closed longitudinally so as to narrow the distal aspect of the new prepuce. To keep the skin drawn over the glans, traction sutures were then placed at the margins of the neo-prepuce. Instead of leaving the denuded proximal shaft to granulate in, the penis was buried in a shallow tunnel of the scrotal skin. After 2-3 months the scrotal skin was tubularized around the penis and the scrotum closed primarily. Unfortunately, as the scrotal skin is hair-bearing, this method usually creates a hairy penile shaft which is distinctly not cosmetic.

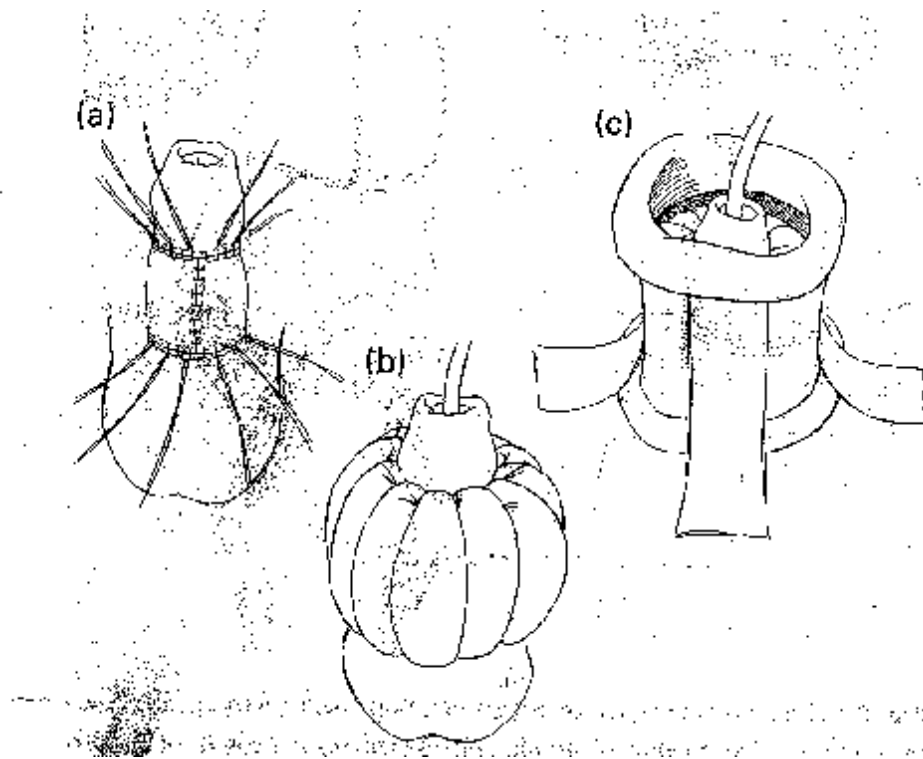


Fig. 4. Modified reconstruction of the prepuce (after Penn [4]). (a) Split-thickness skin graft to the penile shaft. (b) Long silk sutures tied over a bolster of cotton wadding. (c) Plastic housing unit to keep the penis and skin graft immobile.

To convert the Goodwin modification of Celsus's reconstruction of the prepuce into a one-stage procedure, Lynch and Pryor [6] described covering the denuded proximal penile shaft with a pedicled island scrotal flap. Their scrotal skin flap was developed from the mid-scrotum and based on a vascularized pedicle of dartos. The longitudinal fasciocutaneous flap was then rotated 90° on its blood supply to cover the proximal penis. The edges of the scrotal defect are then sutured closed. As the anterior, midline aspect of the scrotum is often hair-bearing, the scrotal flap will probably create a hairy proximal penis. To avoid this, we suggest that the anterior scrotum be carefully depilated and re-evaluated weeks before such anticipated neo-preputial surgery.

Prepuce restoration during the Nazi era

The practice of uncircumcision had a resurgence during the Second World War [7]. Because circumcision was rarely practised amongst any European ethnic group except for Jews, being circumcised was a physical characteristic that could expose and identify a Jew. In Nazi-occupied Poland, there are reports of several Warsaw doctors who had busy practices by performing surgery to restore the prepuce. The types of operations that were being performed, as well as the outcomes and success of such operations are unclear. Unfortunately, we can assume that these desperate people were merely exploited and probably disfigured. The wartime memoir of Solomon Perel [8], subsequently the subject of an award-winning film, details Perel's experiences during World War II as an orphaned Polish Jew who passed himself off as an ethnic German. At a Hitler Youth military school he ironically was often praised as a model Aryan. However, as he was circumcised, he constantly feared being discovered as a Jew; he was careful not to be naked in front of others. At one point he attempted to create a foreskin by sewing his penile shaft skin around the glans penis. As expected his attempt at prepuce restoration was unsuccessful. Like Perel, many other Jews also attempted

preputial restoration; it is doubtful that many, if any, were successful.

Other methods for preputial restoration

Aside from the *judeum pondum*, there are other anecdotal reports of patients using long-term traction to stretch the penile shaft skin to cover the glans. Goodwin [5] suggests the use of a tissue expander to obtain extra penile shaft skin. Such a tissue expander would need to be ring-shaped, have a rigid inner layer and a tissue-expanding outer layer. A rigid inner layer is needed so that the penis does not become compressed during insufflation of the expander. The ring diameter would need to be tailored to each patient's penile girth. The ring-shaped tissue expander could be easily placed around the penis and under the shaft skin through a subcoronal degloving incision. Over the following weeks the penile shaft skin could be stretched to sufficient redundancy that a relatively normal-appearing prepuce could be achieved.

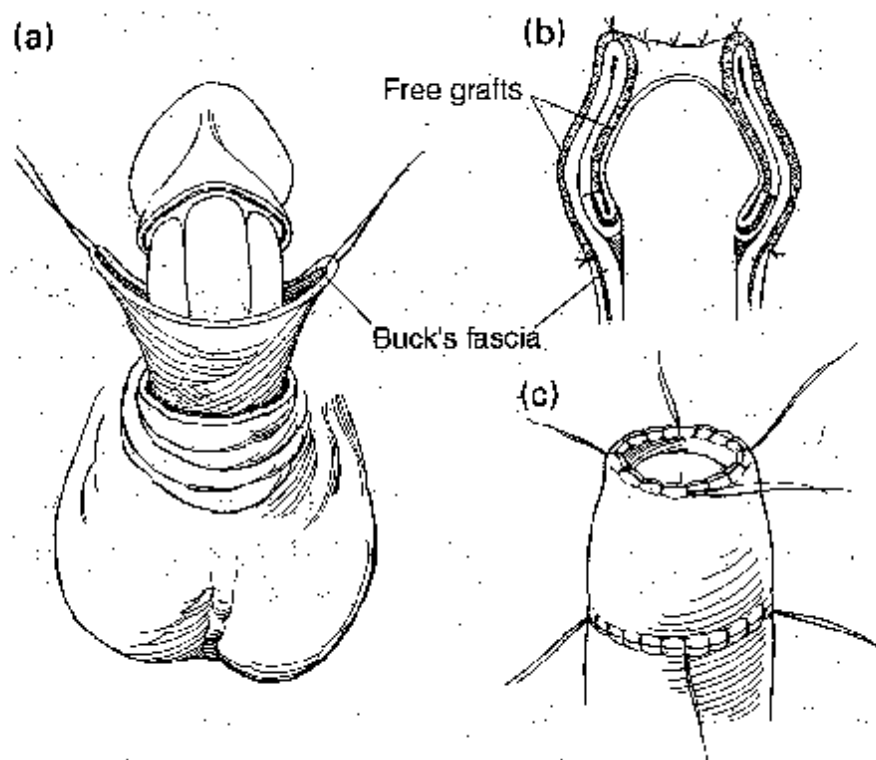


Fig. 5. Circular fascial flap and skin graft neo-prepuce. (a) Mobilization of the pedicle of Buck's fascia folded on itself and then covered with an unmeshed skin graft on both surfaces. (b) Cross-sectional view of Buck's fascia folded on itself and then covered with an unmeshed skin graft on both surfaces. (c) Skin graft sutured into place. Note the long silk sutures placed at the corners to tie over a cotton bolster.

Other potential methods for prepuce reconstruction could use either a fascial or a fasciocutaneous circular penile flap. Both flaps are from the distal penis and based on the highly vascular pedicle of Buck's fascia. Fascial flap and neo-prepuce development are shown in Fig. 5. An incision is made at the previous circumcision line completely around the penis, extending through the dartos and Buck's fascia back to the base of the penis. The developed pedicle of Buck's fascia is then folded inward and onto itself at its distal aspect. The double layer of fascia is made as wide as the glans penis. The pedicle is then advanced distally to cover the entire glans and sutured in place. A split-thickness skin

graft is then harvested from the inner aspect of the thigh in the usual way. The skin graft is not meshed, placed on the inner and outer aspect of the bed of folded Buck's fascia, and then sutured in place with absorbable sutures. Non-adhering bolster dressings of Xeroform, followed by mineral oil-soaked cotton batting are placed on the outer and inner aspect of the neo-prepuce and secured in place with previously placed silk stay sutures at the edges (Fig 5c). The skin graft is kept immobilized for 5 days and then the dressings are removed. The patient is then instructed to shower twice daily and air-dry the skin graft.

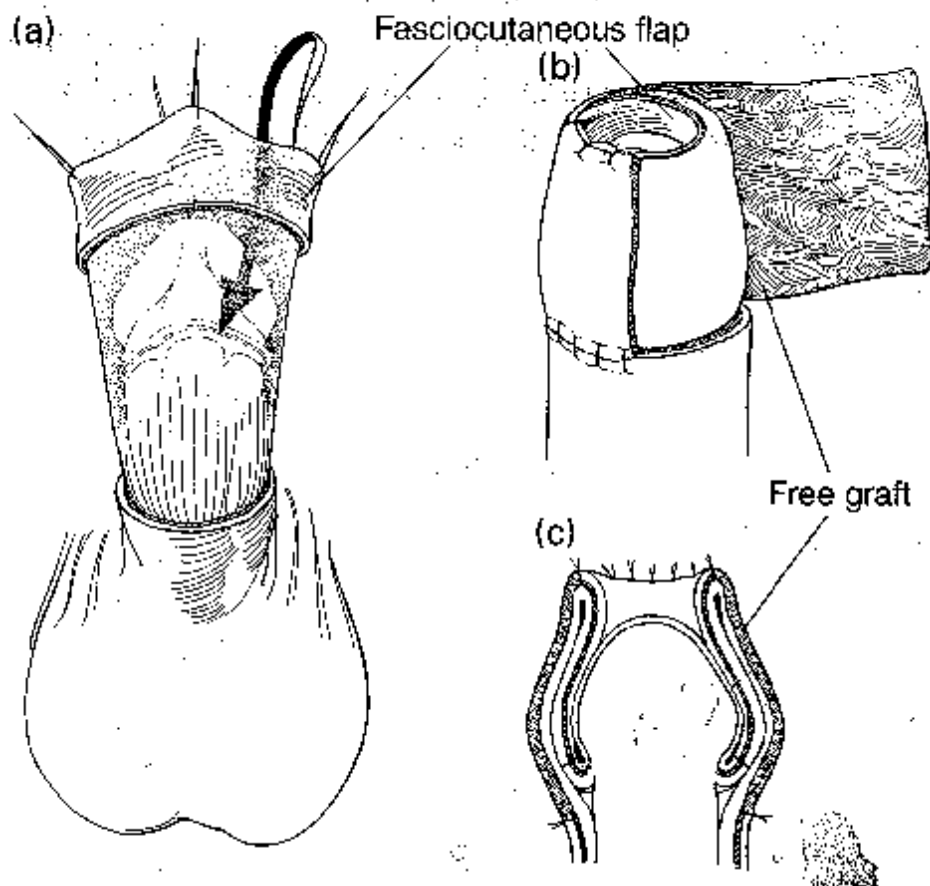


Fig. 6. The circular fasciocutaneous flap and skin graft neo-prepuce. (a) Island flap of penile skin based on a pedicle of Buck's fascia. (b) Free skin graft to the exposed surface of the Buck's fascia pedicle. (c) Cross-sectional view of the skin island flap on the inside and the free skin graft on the outside surfaces of the neo-prepuce.

To develop a neo-prepuce with a circular fasciocutaneous penile flap, we initially develop the flap as described by McAninch [9]. The methods for such preputial restoration are illustrated in Fig. 6. The skin flap is made wide enough [to] correspond to the length of the glans penis. The flap is not divided in the ventral midline. Instead, it is kept circular, folded inward and onto itself, and then sutured in place at the subcorona with absorbable sutures. A split-thickness skin graft is then harvested from the inner aspect of the thigh as usual. The unmeshed free graft is then placed on the outer aspect of the exposed Buck's fascia and sutured in place. Bolster dressings are placed and the graft managed as described above. The above two methods should be able [to] create a hairless, functionally successful and cosmetically acceptable neo-prepuce.

It is also important to realize that as a cosmetic operation, preputial restoration has numerous associated psychological problems. Most of the men have had a life-long preoccupation with circumcision, many being homosexual and with prudish views of sexuality [10]. Before undertaking preputial restoration surgery, it is essential to carefully counsel the patient about the potential complications, cosmetic results and unusual nature of the surgery. Furthermore, it is essential that patients with underlying psychiatric conditions are unrealistic expectations, particularly for changes in their interpersonal relationships or psyche, be referred for psychiatric consultation [10]. Overall, surgical methods for restoration of the prepuce are not standard, and reports in the literature are primarily anecdotal, with poorly documented follow-up.

[CIRP Note: 1) The above comment on psychological problems is based on a 1981 report with four subjects. The view is outdated. Today, there are numerous heterosexual males who are seeking wholeness through foreskin restoration (primarily non-surgical). Today, circumcision is considered to cause psychological problems. 2) Serious complications have been reported from surgical foreskin restoration. On the other hand, no serious complications have been reported from non-surgical restoration.]

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Citation:

- Brandes SB, McAninch JW. Surgical methods of restoring the prepuce: a critical review. *BJU Int* 1999; 83 Suppl 1:109-113.

(File revised 11 September 2004)

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