



Original article

Circumcision: a refined technique and 5 year review

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The vast majority of circumcisions currently performed in the UK are for phimosis or balanitis and the patients are not looking for the denuded glans appearance of a ritual circumcision. We present a refinement of the sleeve technique of circumcision, which involves Horton's test to define the proximal incision margin, and bipolar electrodissection. A review of all patients undergoing circumcision at the Wordsley Plastic Surgery Unit, in a 5-year period, has shown this technique to be safe with a haematoma rate of only 1.4%, and an overall complication rate of 3%.

Key words: Circumcision – Method – Horton's test – Electrodissection

A review of the experience of basic surgical trainees in our unit revealed that the surgical approach to circumcision is extremely varied. This view is supported by a national survey of urologists,¹ which concluded that there is a need to increase the use of up-to-date techniques in the current practice of circumcision.

We present our method of circumcision, which is a refined version of the sleeve technique. We also review our experience with this technique.

Surgical technique

Circumcision can readily be carried out under local anaesthetic using a 1:1 mixture of 1% lignocaine and

0.5% marcaine. A dorsal nerve block is performed, with additional circumferential infiltration to block branches of the genitofemoral nerve. We recommend that local anaesthesia be combined with intravenous sedation to decrease the tendency to penile retraction that occurs if the patient is anxious. When penile retraction is present, it may lead to an excessive excision of foreskin, if an erection test is omitted.

Glandular adhesions are released and Horton's test² is performed in order to define accurately the proximal resection margin. This is done by applying a tourniquet around the proximal shaft of the penis, inserting a butterfly needle (23 gauge in an adult and 25 gauge in a child) obliquely into the corpora cavernosa from one side of the penile base. It is important to insert the

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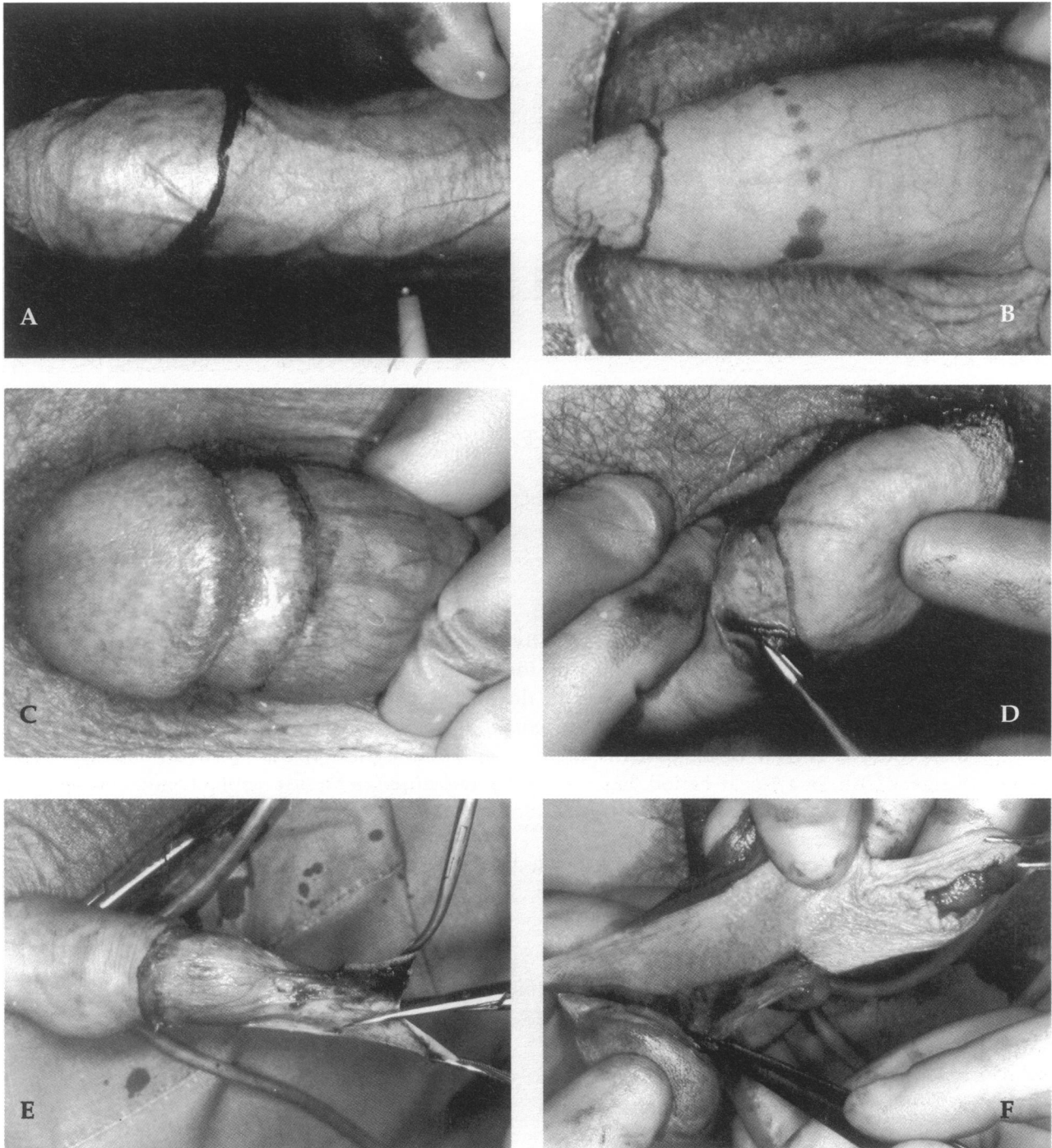


Figure 1 Photographs demonstrating the operative technique of circumcision. (A) Horton's test is used to produce an erect penis. The safe proximal limit of excision is then marked at the level of the coronal sulcus. (B) With the penis flaccid again, the coronal sulcus level (indicated by a dotted line) is apparently more proximal. Omission of the erection test could easily lead to excessive penile skin excision. (C) With the foreskin fully retracted, the distal limit of excision is marked 5 mm proximal to the coronal sulcus. (D) The two circumferential incisions are then made with a scalpel and bipolar electrodissection is used to divide the subcutaneous tissues of the proximal circumferential incision down to Buck's fascia. (E) Two haemostats are then placed either side of the dorsal midline at the proximal circumferential incision and, using scissors, the two circumferential incisions are joined by a longitudinal dorsal incision. (F) The foreskin is finally dissected off the penis, by completing the distal circumferential incision using the same bipolar electrodissection technique. (G,H) The end result following mucocutaneous suture.



Figure 1 (G,H) The end result following mucocutaneous suture.

needle through the skin 1–2 cm distal to the insertion point into the tunica and also to angle the needle proximally. This way the needle will straighten as the penis becomes erect, without becoming displaced from the corpora and causing extravasation of saline. Isotonic saline is then used to inflate the penis. Care must be taken in order not to inadvertently inflate with water, which may induce dangerous osmotic shifts and result in penile necrosis. With the penis fully erect and the foreskin reduced, an incision is marked circumferentially at a level which is appropriate to the pathology present. For example: (i) just proximal to a simple phimotic stricture for a foreskin preserving circumcision; or (ii) over the coronal sulcus (Fig. 1A) resulting in a full denuding of the glans for BXO. With the safe proximal resection margin determined, the tourniquet is removed and only then should the needle be withdrawn. It can be seen from Figure 1B that making this incision with the penis in a flaccid state would result in far more skin being excised than is desirable. This would lead to pain on erection postoperatively until the skin is stretched by the tissue expansion effect of subsequent erections. With the foreskin fully retracted, another circumferential incision is marked 5 mm proximal to the coronal sulcus (Fig. 1C). The tourniquet is re-applied to provide a relatively bloodless surgical field. The skin incisions are made with a knife along the lines as marked. Starting at the proximal incision, the subcutaneous tissue is divided circumferentially using electrodissection with the bipolar diathermy. This is done by firm retraction of the skin to put the subcutaneous tissues under tension so that the areolar tissue can be grasped with the bipolar forceps, simultaneously applying current and pulling at the tissue to coagulate and divide it (Fig. 1D). This dissection

should stop at Buck's fascia to prevent injury to the dorsal nerve branches.

Two haemostats are then applied to the free edge of the foreskin dorsally and a longitudinal incision is made which joins the proximal and distal circumferential incisions. The foreskin is then dissected away from the penis using the same electrodissection technique, working from proximal to distal in the plane developed earlier at the proximal incision (Fig. 1F). Care must be taken on encountering the frenular artery and any large veins, which may need to be ligated with 5.0 vicryl® (Ethicon, Edinburgh, UK). If the frenulum is tight this can also be released. The tourniquet is now removed from the penis and bipolar diathermy used for meticulous haemostasis. Skin closure is with 5.0 or 6.0 vicryl rapide® for adults and 6.0 or 7.0 for children. In a full circumcision the addition of a few vicryl® interrupted sutures to the deep tissues aids closure (Fig. 1G,H). A simple jelonet dressing is applied overnight.

Patients are instructed on postoperative hygiene and advised to take daily baths from 24 h. Sexual activity can recommence at 4 weeks after the operation.

Review

Between 1992–1997, there were 307 circumcisions carried out at Wordsley Hospital using this technique, which was developed by the senior author (AB). Of these, 70 were carried out simultaneously with other procedures, and 18 were revision procedures referred from other units, leaving 219 cases of primary circumcision alone. Patients were identified using a prospectively collected computerised database and case notes were retrieved and reviewed. Notes were

Table 1 The indications for circumcision for all patients undergoing primary circumcision at Wordsley Hospital between 1992 and 1997

Indication	Number	%
Phimosis	125	61
BXO with or without phimosis	75	37
Paraphimosis	2	
Viral warts	1	
Congenital naevus	1	

available for 204 (93%) of these cases. The indications for circumcision are shown in Table 1. The senior author carried out 69% of the operations; the rest were done by experienced registrars.

All patients were reviewed at 6 weeks after discharge, 13 (6%) failed to attend. There were 2 cases of bleeding, 1 returned to theatre for re-exploration and haemostasis with bipolar diathermy, the other underwent ligation of the frenular artery under local anaesthetic. Haematomas occurred in 2 cases and both were surgically evacuated. One further patient was re-admitted 5 days after discharge and underwent evacuation of an infected haematoma. All of these patients were noted to have settled satisfactorily by the time of their 6-week appointment. One patient was noted at follow-up to have had a minor infection that the GP treated and which had completely settled, and another had a minor excess of skin which was trimmed as a local anaesthetic procedure. This gives a total complication rate of 3% (7 cases) which is comparable with previous rates reported in the literature.³ The haematoma rate in particular was 1.4% and there were no complications related to the use of Horton's test.

Discussion

Circumcision is a very common, usually straightforward procedure which has traditionally been taught to trainees on a 'see one, do one, teach one' basis. There are, however, several aspects of the described technique that are not commonly considered when performing circumcision.

When carrying out a circumcision under local anaesthetic, the patient is often in a heightened state of anxiety. This can produce a variable degree of penile retraction, which can lead the unwary operator to overestimate the amount of prepuce that can safely be removed. Excessive excision of foreskin at circumcision is common and leads to a spectrum of problems ranging from pain at the suture line on erection to the 'concealed penis syndrome' (Fig. 2). A simple way to reduce this anxiety and minimise this retraction effect is the addition

of intravenous sedation with fentanyl and midazolam. This has the added benefits of inducing operative amnesia and reducing the discomfort of the local anaesthetic injections.

The dimensions and proportions observed in the non-erect penis can be misleading when trying to judge the amount of preputial skin that needs to be excised as the relative changes between circumferential and longitudinal dimensions are not constant in different individuals. The use of Horton's test in this context enables the surgeon to tailor the amount of foreskin excised precisely to the requirements of the individual patient and thus avoid the complications of excessive excision altogether. Horton's test is familiar to urologists and the addition of it to circumcision operations leads to a cosmetically superior result. We have not seen any complications related to its use and it obviates the need for clamps, and their complications.

There is a growing trend towards patients seeking a foreskin preserving circumcision in contrast to the denuded glans appearance of a ritual circumcision, and it seems reasonable to accommodate this request if the foreskin is essentially healthy but tight. Foreskin preservation is most effective in a penis of even or tapering girth, otherwise the conserved skin may remain on the shaft rather than roll onto the glans, particularly, if the coronal ridge is unduly prominent.

In the presence of overt disease, in particular BXO, too conservative a foreskin reduction is inappropriate, as exposure of the glans and removal of moist skin folds is necessary for the disease to regress. However, even when a full circumcision is necessary, there is no need, or justification, for leaving a penile skin envelope that is immobile and 'tight as a drum' on erection, as is all too often the case with traditional techniques.



Figure 2 The appearance of the penis when an excessive amount of foreskin has been excised.

The use of diathermy in the penis is controversial. Although there are several published series of circumcisions using cutting diathermy,^{4,5} there are also several alarming cases in the literature of total penile ablation following the use of diathermy in children,^{6,7} most of whom had to be managed with gender re-assignment surgery. However, in all the problem cases reported, the type of diathermy used was monopolar which of its nature transmits a current down the shaft of the penis. We only recommend the use of bipolar diathermy in our technique, which produces a much lower current that flows only between the tips of the diathermy forceps. Bipolar electrodissection is not a new concept.⁸ It permits the simultaneous division and haemostasis of tissue, produces a virtually dry operating field with a low rate of postoperative haematoma, and carries no risk of necrosis of the penile shaft. The choice of suture material and method can influence the final outcome. The use of a fine 5.0–7.0 vicryl rapide® interrupted suture results in excellent mucocutaneous opposition, with rapid suture absorption before suture marks develop. The preputial skin is very thin and does not lend itself well to subcuticular suturing. Fine non-absorbable sutures would require an unpleasant episode of suture removal for the patient. Absorbable catgut sutures do not dissolve with such predictable certainty as vicryl rapide® and may last long enough to permit epithelial in-growth down the suture tracks resulting in suture sinuses which compromise the aesthetic and hygienic results of the operation.

Recently, there have been descriptions in the literature of foreskin preserving procedures as alternatives to circumcision such as the V–Y-plasty described by Hoffman *et al.*⁹ and novel techniques,^{10–12} including the use of lasers.^{13,14} However, these do not appear to be widely employed by urologists as only 6% of respondents to a national survey¹ ever used such methods. Such techniques are not familiar to most surgical trainees and also cannot be applied to all indications for circumcision. On the other hand, the sleeve technique of circumcision is widely used and surgeons at all levels of training can easily apply our refinements of this technique.

Summary

Non-religious circumcision does not need to be a mutilating procedure. Evidence of the unique sensory characteristics of the prepuce and changing attitudes among our patients has led to the development of a refined circumcision technique. The use of Horton's test allows the excision of preputial skin to be tailored to individual patients and ensures that it is never excessive. Electrodissection minimises bleeding during and after the operation. This technique is simple, safe, and it results in a very satisfactory, cosmetic and functional outcome.

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