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TECHNICAL NOTE

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Limberg flap for pilonidal disease: the "no-protractor" approach, 3 steps to success

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Abstract We describe a simple system for marking up a patient for a Limberg flap for pilonidal disease treatment. The technique involves only the use of a ruler and produces a consistent marking for the flap. In our hands it has been used in over 120 cases with no failures of rotation or flap necrosis.

Key words Pilonidal disease • Limberg flap

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Introduction

Successful use of a Limberg flap to treat pilonidal disease is well reported in the literature with good results and low recurrence rates [1–3]. It relies on the accurate marking of a rhomboid with four equal sides and internal angles of 60 and 120 degrees (Fig. 1). The Limberg flap was popularised in head and neck surgery [4] and its use in proctology has been described for over 10 years [5]. Despite its reputation as a simple and effective skin flap, there has been resistance to its use in the treatment of pilonidal disease. This may be due to perceived difficulty in accurately marking the required rhombus on the skin of the natal cleft. We outline a simple method of marking the flap using only a ruler, based on some rudimentary trigonometry.

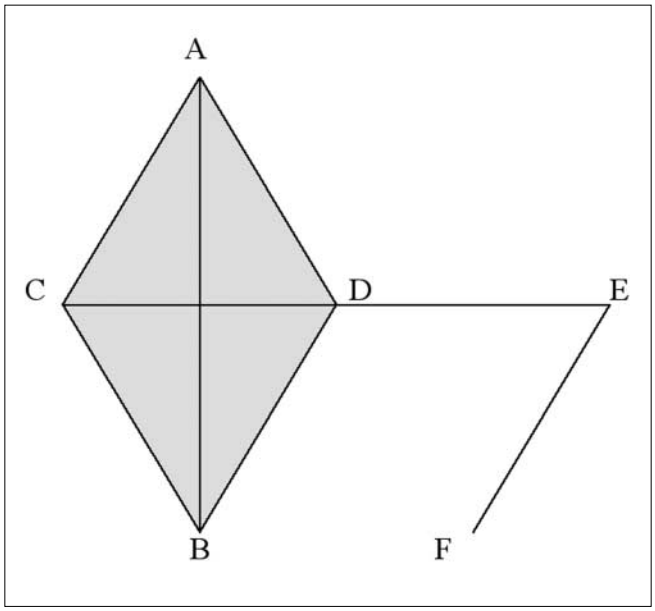

Fig. 1 Markings for Limberg flap

Methods

The rhombus (Fig. 1) is divided by lines AB (height) and CD (width) into four equal right-angled triangles with internal angles of 30, 60 and 90 degrees (Fig. 2). Therefore, the ratio of width to height of each of these triangles is the same as that of the rhombus as a whole.

In trigonometry the ratio between the opposite and adjacent sides a right angle triangle is the "tangent". For this triangle, the angle is 30 degrees and tan 30 is 0.58. Hence the width of the rhombus is linked to its height by the ratio of 0.58. For this rhombus its sides are the same length as its width, thus the length of each side of the rhombus is 60% of its known height. With this information it is possible to mark out the flap using only a ruler.

Method for marking the flap

Prior to marking, the patient should be prone on the table with strapping to help open out the natal cleft. The flap is marked in 3 steps:

- *Step 1*. Measure in the natal cleft from the cranial extent of the disease to just proximal to the post anal skin (AB), and mark the halfway point. Next calculate 60% of this distance and draw a perpendicular line of this length centred on the half way point (CD).

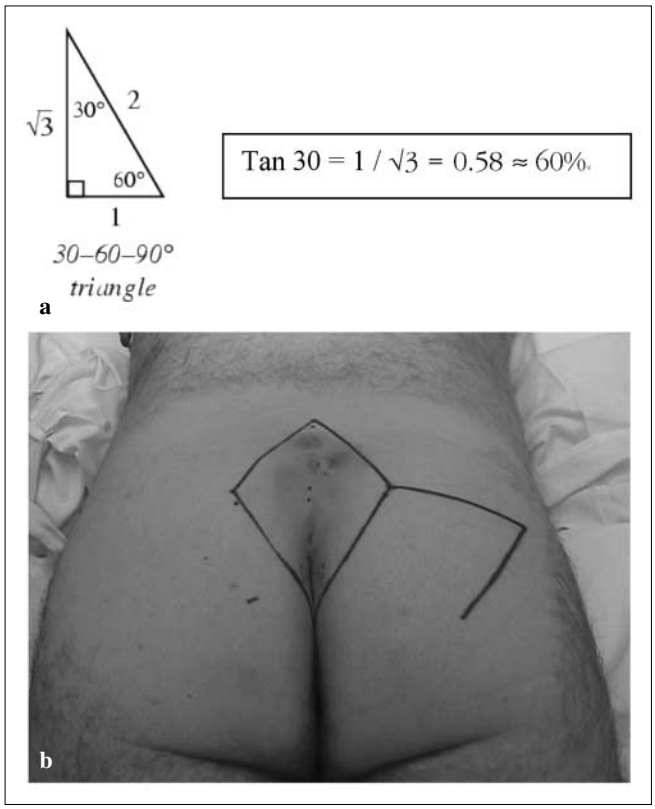

Fig. 2a, b *Right angle triangle*. **a** Trigonometric basis. **b** Application to a patient with pilonidal disease

Fig. 3 Results 5 days after surgery

- *Step 2*. Join the ends of the lines to form the rhombus to be excised (ABCD). To draw the flap that will rotate into this space, extend the midline by the same length to create line DE. Then mark point F, the same distance along a line in continuation with AD.
- *Step 3*. Join the two points E and F to complete marking the flap

The procedure

Once drawn, the surgery simply involves excising the rhombus and creating the flap. For the flap, the fat is divided down to and through the fascia covering the gluteus maximus; the flap is mobilised with this fascia layer away from the muscle. Including the fascia ensures uniformity of thickness. Finally, the flap is rotated to fill the defect and sutured in place (Fig. 3).

The procedure was carried out in 120 patients (82 men) with a median age of 29 years (range, 15–58). No patient had a major dehiscence, whereas 7 patients (6%) had minor dehiscence. No recurrence was observed at one year.

Patient satisfaction was very high but not specifically scored. There were no complaints from any patient, male or female, regarding the scar. The natal cleft recovers after 6 months or 1 year, and final cosmesis is excellent.

Discussion

Pilonidal sinus is a notoriously difficult condition to treat. Recently emphasis has been placed on achieving primary healing with a low recurrence rate. It is already known that the Limberg flap represents an excellent approach to pilonidal disease meeting both of these criteria [1–3]. No other technique has yet produced comparable results, however resistance to its use remains high. This is probably due to unfamiliarity with the use of rotation flaps, and con-

cerns about flap necrosis and failures of rotation. An accurately drawn flap conforming to the pre-requisite internal angles of 60 and 120 degrees will always rotate into the defect and will not necrose. Our formula for flap construction is derived trigonometrically and is now, as a result of this study, proven clinically. It enables the surgeon to accurately mark out the flap in the difficult contours of the natal cleft with only a ruler. Once the surgeon is happy that the flap is correctly drawn the procedure is easy to learn and perform. The results are highly reliable and reproducible, not only by an individual surgeon but also from surgeon to surgeon. The cosmetic result is acceptable to male and female patients alike.

Even for surgeons who prefer a different initial approach to primary and minor disease there is still the need for a robust technique within the surgical armamentarium for the more complex case. With this simple technique the Limberg flap and its proven benefits is now available to all surgeons who may at time need to draw upon its benefits. We hope the days of excision with packing and healing by secondary intention are now numbered.

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