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Local flap coverage following posteromedial release in clubfoot surgery in older children

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Abstract We present our experience of avoiding skin problems in older children with severe clubfoot deformity. We used a local transpositional flap coverage during wound closure following posteromedial release. We present our experience in five cases.

Résumé Nous présentons une façon de régler les problèmes cutanés dans la chirurgie du pied bot sévère chez les grands enfants. Nous utilisons un lambeau local de couverture lors de la fermeture cutanée après la libération posteromédiale. Nous présentons notre expérience dans cinq cas.

Introduction

Posteromedial release [4] is an accepted and time-tested method of correcting clubfoot deformity in children. Skin dehiscence, necrosis, sloughing, fibrosis, scarring and recurrence of deformity are well-known complications, even in the hands of the best of surgeons, following this simple surgery. Methods such as immobilising the foot in under-corrected position and leaving the wound partially or completely open for secondary healing are really not only compromising but may lead to a suboptimal final outcome. Some of the other methods of solving this problem using tissue expanders and external fixators are not only multi-staged, noncompliant and expensive but also need a higher degree of surgical expertise. Local fasciocutaneous transposition flaps are quite versatile in covering small defects of

traumatic origin in the distal third of the leg. The defect that needs to be addressed during closure of posteromedial release procedure is small and generally does not exceed 1.5–2 cm, and such small areas can easily be covered using local, medially based, fasciocutaneous transposition flap by introducing a back cut proximally in a V–Y fashion.

Materials and methods

Between July 1999 and July 2002, 46 clubfeet in 32 children were treated at our hospital using the standard posteromedial release. The age of the children ranged from 6 to 38 months. Out of 32 children, five were considered in this study where it was decided intraoperatively that a simple closure of the wound was not possible without compromising the adequate correction. The details of these five children are given in Table 1.

All five children underwent a standard Turco's release [4] along with release of the posterior calcaneo-fibular ligament using a single posteromedial incision. After the adequate surgical release and obtaining good correction of the deformity, it was found that skin closure was impossible without compromising the correction obtained. The defect needed to be covered was generally between 1.5 and 2 cm (on average 1.8 cm). The skin closure was facilitated by combination of advancement and rotation of the medial flap of the posteromedial incision after a proximal releasing incision (back cut). The length of the defect to be addressed corresponded to the vertical height of the triangular area that was left uncovered following the full correction. The extent of advancement of the flap was matched with the size of the defect in each case. The angle of back cut should be around 45° to the incision, and the length of back cut should be adequate enough for the medial flap to close the defect without tension. We have been able to achieve this objective by using a back-cut length between 2.5 and 4 cm, on average. The proximal part of the incision could be closed primarily in all cases without tension in a V–Y fashion. The tourniquet was

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Table 1 Details of the five children considered in the study

Case number	Age in months/gender	Type	Nature	Size of defect (cm)	Mode of healing
1	38/M	Rigid-unilateral	Neglected	1.5	Marginal necrosis
2	20/F	Rigid-unilateral	Neglected	1.8	Primary healing
3	30/M	Rigid-unilateral	Neglected	2	Primary healing
4	36/M	Rigid-unilateral	Neglected	1.8	Primary healing
5	27/F	Rigid-unilateral	Neglected	2	Primary healing

released in all cases before wound closure to assess the vascularity of the flap (Fig. 1).

Results

We report a small series of five children with rigid clubfoot deformity who needed local fascio-cutaneous coverage during closure following posteromedial release. Good correction was achieved on table and maintained in all five cases. The only complication encountered was in the first case, a boy of 3 years 2 months, when this procedure was contemplated for primary neglected clubfoot; minor complications in the form of marginal necrosis of the tip of the incision occurred, which did not require any secondary procedure. Retrospectively, we realise that this complication could have been avoided by limiting our dissection just to the anterior border of the tendon of the tibialis posterior during Z lengthening.

Discussion

Late presentation of neglected and recurrent idiopathic clubfoot deformity is still a major problem in developing

countries. Management of these difficult problems is always a challenge to orthopaedic surgeons. Correction of the deformity, though technically difficult, is possible, but the wound closure in any approach has been the crux of the problem. Some of the commonly used methods to avoid problems with primary wound closure in posteromedial release incision are to use two incisions with varying width of intact skin between them over the posteromedial aspect of the ankle; closing the wound, immobilising the foot in under-corrected position; closing the wound partially and immobilising the foot in fully corrected position allowing the wound to heal by secondary intention; use of tissue expanders; and use of gradual differential fractional distraction using an external fixator.

All these above-mentioned methods have their own advantages and disadvantages, indicating the need for a better method for dealing with this problem. With the advent of various local fasciocutaneous flaps in the distal third of the leg and ankle, skin and soft-tissue defects following trauma are being managed in a better way these days. The usage of various plastic procedures for skin closure following posteromedial release is not new. Sharrard [3] has used rotation flaps during difficult wound closure in posteromedial release for clubfoot but failed to provide the technical details. Recently, D'Souza and Yagnic [1] have

Fig. 1 **A** Intraoperative photo showing the defect to be covered without compromising the correction. **B** Photo showing the angle of back cut. **C** Transposition of the flap after back cut showing adequate coverage of the defect, without tension. **D** Closure of the proximal back cut in V-Y fashion.

used rotation-flap coverage during posteromedial release but recommended split-skin grafting for closure of proximal secondary defect in the calf. They also recommended immobilising the foot in under-corrected position following closing the defect. Walker [5] and Mittal [2] suggested extensive dorsal rotation flap cover from the foot to overcome the skin problem during posteromedial release, which necessitated split-skin grafting over the dorsolateral aspect of the foot for the secondary defect created following rotation.

The procedure that has been described here is simple, safe and practical. The decision to do, and the extent of, the procedure are planned intraoperatively on the table. The secondary defect that is created proximally in the middle third of the calf has always been closed primarily without significant functional or cosmetic deformity or disability. Since the raw area created is primarily closed without any split-thickness skin graft, this procedure does not preclude any subsequent procedure. Though this series is very small, our early results have been encouraging, and we are extrapolating the same technique for other clubfoot-like deformities secondary to meningo-myelocele, multiple

congenital contractures and post-polio residual palsy. The oldest child in this series was 3 years and 2 months. However, we have used a similar procedure for secondary equinovarus deformity due to post-polio residual palsy in children up to 5 years of age.

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