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The Surgical Reconstruction of Severe Varus and Flexion Deformity of the Proximal Femur

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Severe varus and flexion deformity of the proximal femur may be secondary to various etiologies but, regardless of the cause, the patient walks with a dramatic Trendelenburg limp. Surgical correction is challenging and requires a complete understanding of all components of the deformity. A utilitarian approach (SuperHip procedure) has been described by Dror Paley and addresses every element of this complex deformity and provides excellent correction in young children. This article illustrates the application of this technique in a case of congenital femoral deficiency.

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Severe varus and flexion deformity of the hip in a young child is rare and very challenging to treat. This condition is most commonly seen in children with congenital femoral deficiency (CFD), also known as proximal focal femoral deficiency. However, the deformity may also be present as a consequence of fracture malunion or nonunion of a proximal femoral osteotomy. There are a few reports in the literature on surgical treatment of severe proximal femoral varus and flexion in children with CFD.¹⁻³ These reports mention the use of a valgus osteotomy, with or without extension, but do not describe any consideration of potential soft tissue contractures. Nevertheless in CFD, abduction contracture is very common, and after a corrective osteotomy, this contracture can prevent the hip from returning to a neutral position. As noted by Paley and Shawn⁴ “in cases of CFD the deformity in the proximal femur is often not only coxa vara but ... a combination of bone deformities in the frontal, sagittal and axial planes combined with soft tissue contractures... .” In more severe cases the obvious coxa vara is associated with an abduction contracture of the hip. If coxa vara is corrected, the abduction contracture would be uncovered and would prevent the hip from returning to a neutral position relative to the pelvis. For these reasons Paley et al⁵ described a surgical technique to address the flexion-abduction and external rotation deformity at the hip

with extensive soft tissue releases and a corrective femoral osteotomy (the SuperHip Procedure).

Indications

The indications for this extensive soft tissue and osseous reconstruction include coxa vara with flexion along with an external rotation contracture of the hip. Aitken proximal focal femoral deficiency types A and B and Paley CFD types 1b and 2a are amenable for this surgical reconstruction. A child with growth remaining at the proximal femur would have the potential to remodel the new femoral head-acetabular relationship to maintain concentricity. Additional indications are acquired flexion deformity and coxa vara after a nonunion or malunion of a proximal femoral osteotomy.

Surgical Technique

The SuperHip Procedure⁴ to address the flexion and varus deformity of the hip is described using a case example with congenital femoral deficiency (Fig. 1). The patient is positioned supine on the operating table with a bump under the ipsilateral hip. The entire leg must be draped free in a manner similar to the positioning of a combined pelvic-femoral osteotomy. The patient's ipsilateral arm must be placed across their patient's chest so as not to hinder the surgeon during the procedure. A long lateral curvilinear incision is made with a slight posterior apex and is extended from the anterior-superior iliac wing down to the lateral aspect of the distal femur (Fig. 2). After subcutaneous tissues are incised and retracted, the first goal is to identify the fascia lata. The interval between the tensor fascia

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Figure 1 Anteroposterior radiograph showing the right-sided congenital femoral deficiency.

lata muscle and sartorius muscles is identified at the proximal part of the incision (Fig. 3). This interval is then developed longitudinally starting anterior to the tensor fascia lata muscle extending distally to the level of the distal femur (Fig. 4). Posteriorly, the interval between gluteus maximus and fascia lata is identified and the posterior edge of the fascia lata is longitudinally exposed down to the distal femur (Fig. 5). The distal extent of the fascia lata is then cut transversely, and the fascia lata with the attached tensor fascia lata muscle is reflected proximally (Fig. 6). The adhesions between tensor fascia lata and gluteus medius must be released with care so as not to injure the superior gluteal neurovascular pedicle which supplies the tensor fascia lata muscle. Next step is the release of the hip flexion contracture.

Flexor Release

Hip flexors are exposed at the level of anterior inferior iliac spine lateral to sartorius. Both heads of rectus femoris

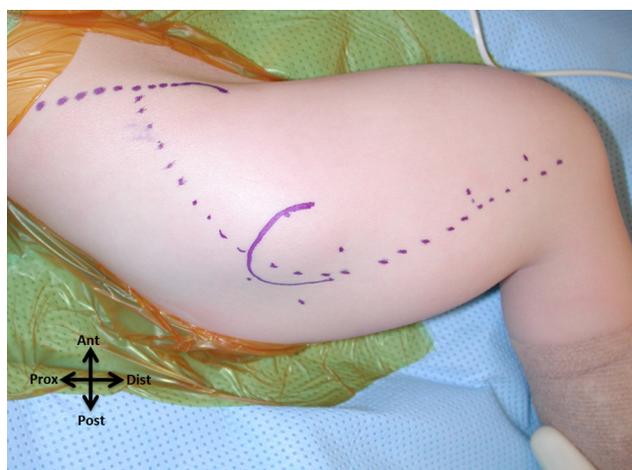


Figure 2 Incision is centered on the greater trochanter and extends from anterior-superior iliac spine to the lateral of the knee joint as needed. (Color version of the figure is available online.)

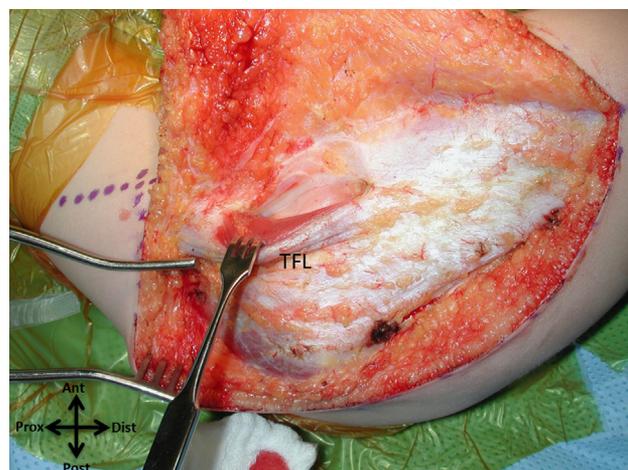


Figure 3 The interval between the tensor fascia lata (TFL) and sartorius is developed anterior to the TFL. (Color version of the figure is available online.)

are exposed and transected. The psoas muscle is found just medial to the rectus insertion, and on its undersurface, the iliopsoas tendon is identified and transected (Fig. 7). These releases provide correction of the hip flexion (Fig. 8). The femoral nerve lies on the anterior surface of iliopsoas muscle and must be protected. Any additional tightness in the anterior thigh fascia and sartorius fascia can also be released. Gluteus medius and minimus may contribute to the hip flexion contracture, but they are addressed during the next step of the procedure.

Abduction and External Rotation Release

The greater trochanter is identified with the gluteus medius and minimus muscles proximally and the vastus

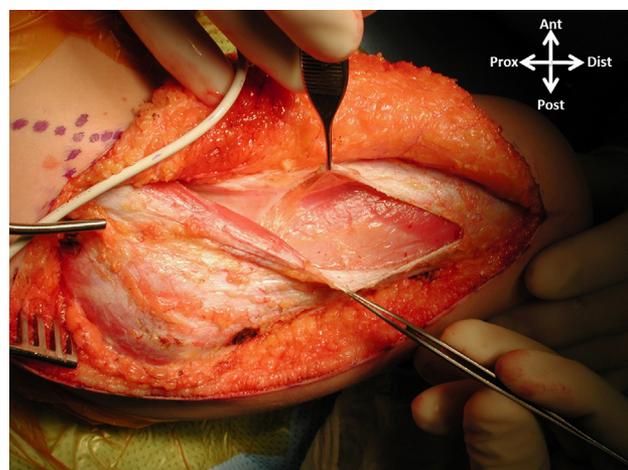


Figure 4 The fascia lata is divided longitudinally anterior to the TFL and extending down to the knee joint. (Color version of the figure is available online.)

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