Proximal Rectus Femoris Lengthening

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There are two main problems with muscle tendon lengthening: thinness created by the technical procedure weakens the tendon, and in short tendons, lengthening may not provide enough length for the amount of joint motion required. In proximal rectus femoris lengthening, the distal ends of the reflected and straight heads are sutured together. Using this technique, the tendon will not be thinned, and a later second lengthening is possible.

Muscle tendon lengthening is a common surgical procedure for cerebral palsy treatment. It is performed with the underlying assumption that these changes will lead to functional gain. There are several techniques for tendon lengthening, all of which are followed by manual stretching until the desired joint motion is achieved. Muscle tendon lengthening techniques have, however, two main problems. First, because of the thinning of the tendon created by the procedure, weakness of the lengthened part of the tendon may result, and second, the tendon lengthening may not be long enough to provide the amount of lengthening required for the desired joint movement. This is common in short-tendon muscles such as the proximal rectus femoris, either during a combined procedure on the lower limb or an isolated procedure for improving gait.

This article describes a technical modification for lengthening the proximal rectus femoris tendon.

SURGICAL TECHNIQUE

The rectus femoris muscle arises from the ilium by two tendons. The direct head arises from the anterior inferior iliac spine and the reflected head from a shallow groove above the acetabulum (Figure 1). By dividing the common tendon approximately 30 mm below its origin at the anterior inferior iliac spine and detaching the reflected head from the most posterior part of its origin (Figure 2), the distal ends of the reflected and direct head can be sutured together (Figure 3), thereby lengthening and strengthening the reconstruction.

DISCUSSION

Our technical modification of rectus femoris lengthening allows ≤30 mm of lengthening. The common tendon will not be thinned, and therefore, a second classical z-lengthening is always possible. An overall amount of 70 mm of
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lengthening can be achieved if necessary.

We have used this technique on 17 patients with cerebral palsy for combined correction of hip and knee flexion deformities. Mean patient age was 8 years (range: 5-12 years). The goal was to provide full hip and knee extension to achieve stance or gait.

Patients with >30° of hip flexion deformity, measured by the Staheli and Ely’s tests, require intrapelvic iliopsoas tendon lengthening and rectus femoris lengthening. Full hip extension is not possible with the use of the classical z-lengthening technique because the proximal rectus femoris tendon is not long enough to achieve the required length in cases with >30° of hip flexion deformity. In cases with <30° of hip flexion deformity, rectus femoris lengthening must be performed by dividing not only the tendon but also its own muscle. However, in many cases full hip extension with flexion of the knee (Ely’s test) is not possible.

Using our technical modification in all cases, full hip extension was achieved. Rectus femoris lengthening using the reflected head is simple and easily reproducible. Localization and detachment of the reflected head must be performed carefully as it can be either injured or fully torn off. Therefore, until experience with this technique is achieved, we recommend dissecting the reflected head before lengthening. This way if complications occur, classical z-lengthening is possible and preparation of the common and direct head can be performed properly.

REFERENCES

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Figure 1: Normal anatomy of the origin of rectus femoris with direct and reflected tendons. Figure 2: The common tendon is divided. Care is taken not to thin the proximal isthmus between direct and reflected tendons. Figure 3: The reflected tendon is dissected from the iliac bone and sutured to the distal end of the direct tendon.