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Proximal Hamstring Tendinopathy—Overview of the Problem With Emphasis on the Surgical Treatment

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Proximal hamstring tendinopathy is a remarkable clinical problem that expresses itself by lower gluteal pain, especially during running at a faster pace or sprinting, causing impaired athletic performance. This chronic disorder affects athletes and recreational exercisers of various sports activities, but it has been especially seen in sprinters and middle- and long-distance runners. However, it can also affect inactive people. It is known to be difficult to treat, often requiring long rehabilitation times. If conservative treatment is not successful, then surgery relieves pain in most cases. This article overviews the problem of proximal hamstring tendinopathy focusing on the surgical treatment and surgical technique.
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Tendinopathy is the preferred term used to describe different tendon pathologies, including paratendinopathy and tendinosis in the absence of biopsy-proven histopathologic evidence.[1] Furthermore, tendinopathy is a clinical condition characterized by activity-related pain and impaired performance, focal tendon tenderness and swelling, and intratendinous imaging changes.[1,2] It represents a common and remarkable clinical problem, with a prevalence of 14% in elite athletes and requiring a recovery time of 3-6 months with first-line conservative treatment.[2,3]

In the lower extremity, tendinopathies typically involve the patellar and Achilles tendons. The chronic and often frustrating problems related to these 2 common tendinopathies are under active research but only limited information exists on proximal hamstring tendon disorders.[4-7]

In the literature proximal hamstring tendinopathy was first described as "hamstring syndrome" by Puranen and Orava in 1988.[4] After that this chronic disorder has also been reported under the name of "high hamstring tendinopathy,"[6] "ischiatic intersection syndrome,"[8] "hamstring enthesopathy,"[9] and "hamstring origin tendinopathy."[10] This article overviews the basic concepts of proximal hamstring tendinopathy, emphasizing the role of surgery in cases that fail to respond to conservative treatment.

Clinical Presentation

Proximal hamstring tendinopathy has been seen in athletes of various sports activities, but especially in sprinters and middle- and long-distance runners. However, it can also affect inactive individuals. The main symptom of proximal hamstring tendinopathy is pain in the lower gluteal region, sometimes radiating along the hamstring muscles to the posterior thigh, during sports activities and especially during running at a faster pace.[6,7,11] Often the pain is so intense that the athlete is not able to sprint at all. Most of the patients suffer also from pain while sitting for a prolonged time (ie, while driving a car).[4-7] Typically, the pain appears without any acute trauma and gradually becomes worse.[4,7] In general, continued exercises and stretching of the posterior thigh aggravate the situation.[5,7]

On clinical examination, there is sometimes tenderness over the ischial tuberosity. Active stretch tests of the posterior thigh recreate the pain at the site of the ischial tuberosity. Typically, peripheral neurological tests and electroneuromyographic studies are normal and no strength deficiencies are noted in knee flexion or in hip extension.[4-7]

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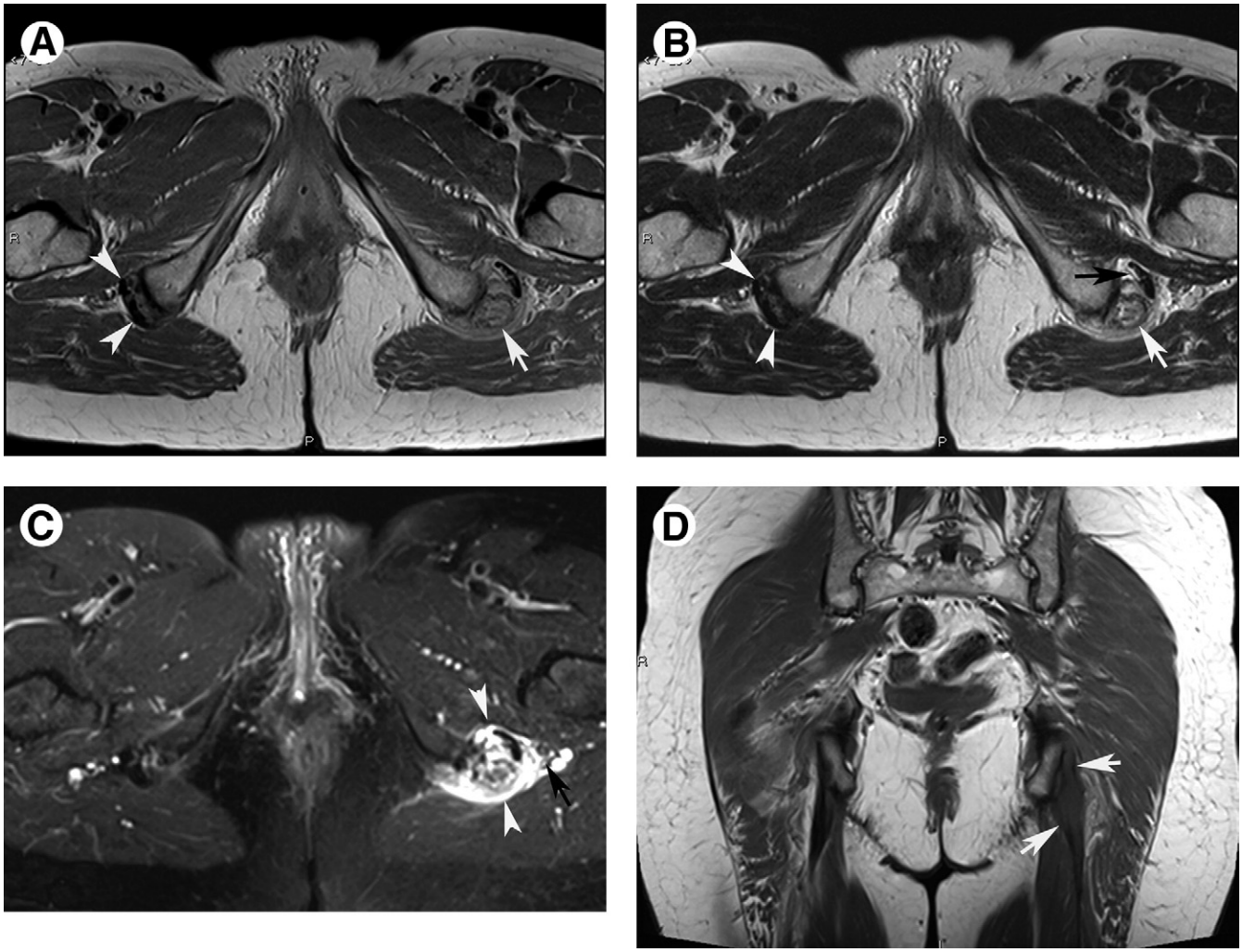

Figure 1 MRIs of a female recreational runner with a long history of left gluteal pain. The right hamstring insertion is normal (A and B; white arrowheads), while there is marked edema on fat-saturated proton-density images (C; white arrowheads) surrounding the left hamstring insertion. At insertion level the origin of the biceps femoris and semitendinosus tendons appear thickened and signal intensity is increased on proton-density images (A; white arrow), but the structural integrity is preserved and no fluidlike defect indicating a tear was detected on T2-weighted axial images (B; white arrow). The semimembranosus tendon is slightly laterally dislocated (B; black arrow). Edema surrounds the whole hamstring insertion, and even the clearly thickened sciatic nerve alongside the hamstring insertion (C; black arrow). The continuity of thickened tendons is preserved, as demonstrated on a T1-weighted coronal image (D; white arrows).

Diagnostic Imaging and Differential Diagnostics

Because chronic pain in the gluteal region and in the posterior thigh is often a diagnostic challenge, magnetic resonance imaging (MRI) is typically used to confirm the diagnosis of hamstring tendinopathy and to exclude other sources of pain.[6] MRI provides extensive information on the internal morphology of tendon and the surrounding structures, and is useful in evaluating chronic tendon degeneration.[12,13] Also, the sciatic nerve's close position alongside the proximal hamstring tendons is clearly seen on MRIs.

Typical MRI findings of proximal hamstring tendinopathy include increased tendon girth, intrasubstance signal heterogeneity and asymmetric involvement of hamstring tendons in unilateral cases (Fig. 1).[7,8,12,13] Thickened tendons with increased signal intensity on T1-weighted and proton-density images with no focal fluid-signal on T2-weighted water-sensitive images have been regarded as a diagnostic finding for tendinopathy.[7] The tendons on the affected side must be carefully compared with those on the contralateral side. Asymmetric involvement of hamstring tendons is a common finding in unilateral cases. However, one must keep in mind that bilateral hamstring tendon involvement is not rare.

MRI has an invaluable role also when contemplating the main differential diagnoses of proximal hamstring tendinopathy. Lumbar radicular pain, stress fractures, apophysitis, avulsion fractures, proximal hamstring tears, bursitis, piriformis syndrome, quadratus femoris muscle tears, and bone and soft-tissue tumors should be considered.

Treatment

Various modalities have been recommended as appropriate treatment options for common tendinopathies, but the scientific evidence for most of the conservative and surgical treatments remains sparse.[14] In the initial phase treatment should be directed toward relieving symptoms using relative rest, ice, and physical modalities and reducing possible risk factors.[10] In general, the treatment of common tendinopathies is primarily conservative, but if it is not successful, then surgery is often a noteworthy option in most cases.[10,14-16]

In the case of proximal hamstring tendinopathy, to our knowledge, no results of conservative treatment have been published except for 1 case report presented in a review study by Fredericson et al.[6] In their study, mainly based on their 12-year experience of treating hamstring tendinopathy patients, Fredericson et al recommended an aggressive rehabilitation program, including soft-tissue mobilization, frequent stretching, and progressive eccentric hamstring and core-stabilization strengthening exercises. They also concluded that in some cases corticosteroid injections can be helpful and also occasionally surgery may be necessary.

According to our experience stretching of the hamstrings only worsens the pain in proximal hamstring tendinopathy.[7] Also our opinion considering the role of local corticosteroid injections is more pessimistic than Fredericson et al. In proximal hamstring tendinopathy peritendinous corticosteroid injections seem to give good short-term results in pain relief in many cases, but often the symptoms recur even more severe later.[7]

Treatment of proximal hamstring tendinopathy offers an exceptional challenge. It seems that the basic pathology in proximal hamstring tendinopathy is tendinosis of the proximal hamstring tendons, especially of the semimembranosus tendon.[7] However, the close relationship of the sciatic nerve to the proximal hamstring tendons should be considered, especially in differential diagnostics and also when making decision between different treatment alternatives.[4,5,10,17] Surgical and MRI findings have shown that adhesions between the sciatic nerve and proximal hamstring tendons may occasionally be present and, in rare cases, thickened and swollen proximal hamstring tendons can even cause direct compression to the sciatic nerve.[4,5,7,8] The sciatic nerve may be maximally tautened and impinged during the forward swing phase of running because of swollen tendons and adhesions.[5] This irritation of sciatic nerve may aggravate the pain caused by hamstring tendinosis alone.[4,7,18]

Our experience is that in chronic phase, proximal hamstring tendinopathy seems to be quite resistant to conservative treatment.[7] However, response to surgical treatment in proximal hamstring tendinopathy seems to be mainly good with a low complication rate.[4,5,7] In a series of 90 athletes with proximal hamstring tendinopathy, 80 were able to return to the same level of sporting activity as before the onset of the symptoms after surgery.[7] This took an average of 5 months (range, 2-12). In this series all patients were treated conservatively before surgery, with insufficient results. The indications for surgical treatment were chronic and disturbing symptoms and typical clinical and MRI findings of proximal hamstring tendinopathy. The average time from the onset of symptoms to surgery was 21 months (range, 4 months to 10 years).

Operative Procedure and Postoperative Rehabilitation

In surgery, the patient is placed in a prone position. The ischial tuberosity is exposed either via a transverse gluteal crease incision or via a longitudinal posterior incision by retracting superiorly the inferior border of the gluteus maximus muscle. The proximal attachment sites of the hamstring muscles are identified and a transverse tenotomy is done to the thickened semimembranosus tendon 3-4 cm distal to the origin. The biceps femoris and semitendinosus muscles are left intact. The tenotomized semimembranosus tendon is then sutured to the biceps femoris tendon to prevent excessive retraction. After tenotomy the sciatic nerve is explored and freed from adhesions if necessary. The procedure is presented in schematic drawings of the right proximal hamstring muscle insertion (Figs. 2 and 3).

After surgery the patients are allowed to begin full weight-bearing gradually during the first 2 postoperative weeks. Swimming and water training are allowed 2-3 weeks after surgery. Bicycling with gradually increasing time and intensity is begun after 4 weeks. Running and heavier weight training are typically allowed 2 months after the operation.

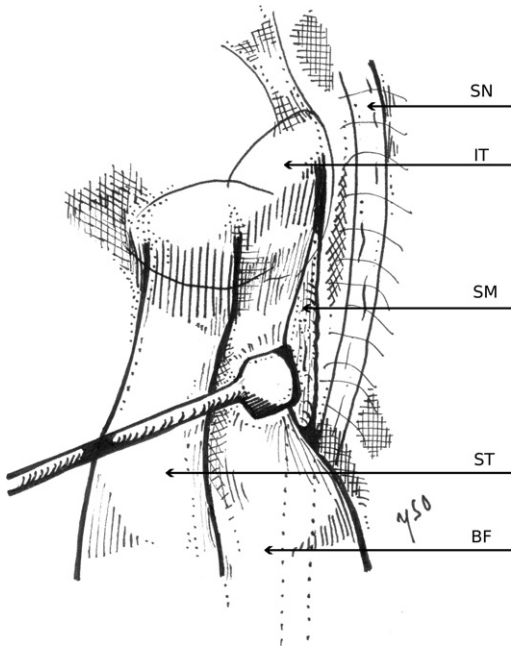

Figure 2 Preoperative view of the right hamstring muscle insertion. The lateral edge of the biceps femoris muscle (BF) is pulled medially to expose the thickened semimembranosus (SM) tendon. ST, semitendinosus; IT, ischial tuberosity; SN, sciatic nerve.

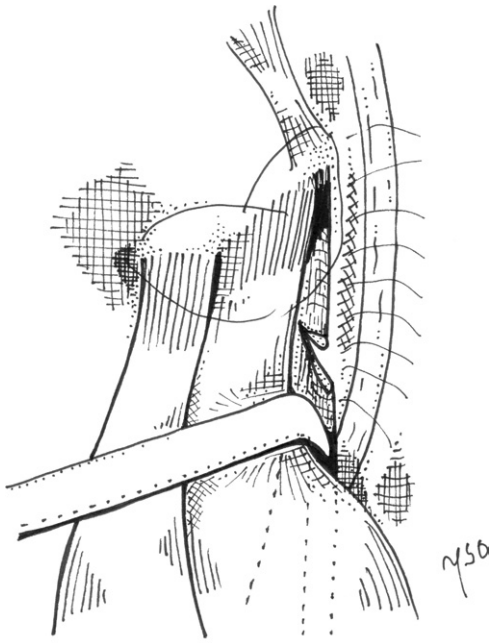

Figure 3 Tenotomy is done to the proximal tendon part of the semimembranosus muscle. The sciatic nerve is explored and freed from adhesions.

Conclusions

Proximal hamstring tendinopathy is not a life-threatening condition, but for an athlete it can be a career-ending disorder at its worst. Various modalities have been recommended as appropriate treatment options for other common tendinopathies but the scientific evidence for conservative treatment of proximal hamstring tendinopathy is mainly lacking. If conservative treatment is chosen, the possibility of surgical treatment should be kept in mind, particularly if the symptoms are prolonged. Given the good functional outcome and low complication rate, the authors advocate surgical treatment in proximal hamstring tendinopathy if conservative treatment fails. However, further studies are required to evaluate who should be treated surgically and at which point surgery should be considered.

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