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Treatment and Abnormalities Deemed to Cause of Anterior Knee Pain

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Abstract

Anterior knee pain onset is generally insidious and without trauma, which reflects an overuse condition or an underlying mal alignment. Overuse can be brought on by a new activity or an increase in frequency or intensity of a customary activity. History should be geared towards determining which supra-physiological loading activity is of importance in the origin of Anterior knee pain.

Keywords: Successful treatment; Neuropathic pain; Functional taping; Evaluate proprioception; Knee graph; Condition progressing

Introduction

The identification and careful management of the activities associated with the onset and endurance of Anterior knee pain are key elements for successful treatment. Symptoms in both knees are common and may move from one knee to the other over time. Anterior knee pain is often described as dull with intermittent episodes of sharp acute pain [1]. In obtaining the history, it is important to quantify the pain. Pain is sometimes disproportionate due to existing hyperalgesia or allodynia. These patients belong to the Anterior knee pain subset of neuropathic pain. Finally, in cases preceded by realignment surgery in which pain and disability are much worse than the preoperative symptoms that prompted surgery, there should be suspicion of iatrogenic medial patellar instability. In addition to pain, it is also important to quantify the disability. Patients with Anterior knee pain very often experience anxiety, depression, kinesiophobia and catastrophizing [2]. These psychological factors play an important role as pain modulators. Even if the structural findings are clear, psychological factors influence and modify pain sensation as well as subsequent impairment and can serve as barriers to recovery. Therefore, it is essential to recognise and quantify the existence of these psychological issues to have a holistic view of a particular patient and plan the best treatment.

Methodology

The first objective of physical examination is to pinpoint the painful area, and to replicate the symptoms. The location of the pain is crucial because it is able to indicate the injured structure, which is really helpful in diagnosing and planning treatment. Tenderness over the lateral retinaculum is a frequent finding. Therefore, we must evaluate lateral retinaculum tightness using the patellar glide test. In order to exclude the possibility that Anterior knee pain originates in the patellofemoral articular surfaces, the axial patellar compression test is used. Moreover, the sustained knee flexion test allows one to rule out pain brought on by an increase in intraosseous patellar pressure as shown in (Figure 1). Palpation of the inferior pole of the patella must be performed in all cases because pain is very frequently located in that area [3]. Moreover, Hoffa's fat pad should not be overlooked as a cause of pain; it should always be examined while performing Hoffa's test because it can be a source of disabling pain. Existing scars should be palpated and Tinel's sign carried out to detect neuromas. Improvement in the patient's pain after selective injection with local anaesthetics or with unloading functional taping leads us to think that specific knee soft tissue may be the origin of pain. When a neuropathic origin of pain is suspected, pressure algometry, which provides a measurement of pressure pain threshold by applying progressive pressure to a given body point using an algometer, is helpful. Female adolescents with Anterior knee pain have been demonstrated to have a lower pressure pain threshold in comparison with a control group [4]. Most patients with Anterior knee pain will develop a quadriceps avoidance gait pattern to decrease the PFJ reaction force and thereby the pain. Notably, a knee extension strength deficit appears to be a predictor of Anterior knee pain. Hence, it is mandatory to evaluate quadriceps atrophy and isometric strength of the quadriceps, which can be done with a manual dynamometer. Moreover, it is necessary to evaluate the flexibility in the quadriceps, hamstring, gastrocnemius muscles, the iliotibial band and anterior hip structures, given that Anterior knee pain is frequently associated with a reduced flexibility of these structures. Baker showed abnormal knee joint proprioception in those with Anterior knee pain [5]. Although they could not determine if the abnormality preceded Anterior knee pain or was secondary to it, their results support the inclusion of specific proprioceptive training in treatment.

Discussion

The active or passive joint position reproduction can be used to

Figure 1: Pain brought on by an increase in intraosseous patellar pressure.

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evaluate proprioception [6]. Normally, when a patient with anterior knee pain is seen in a clinic, the focus is on the knee and only that structure is studied. This focus is a mistake, because other important aetiological factors distant from the knee can be responsible for the pain as shown in (Figure 2). Strong evidence currently exists that patients with anterior knee pain have deficits in hip abduction, hip extension and external rotation strength. Therefore, it is mandatory in the clinical examination to evaluate hip abduction strength, hip extension strength and hip external rotation isometric strength, which can be done with a manual dynamometer [7]. Knee pain inhibits quadriceps contraction, decreasing the loading ability of the knee, whereas fear of pain only decreases vastus medialis oblique activity. In middle-aged individuals with decreased quadriceps strength, there are reports of increased knee pain, but MRI scans have also demonstrated increased patellofemoral cartilage loss and tibiofemoral joint space narrowing. Wang found that optimising the vastus medialis size was critical to reducing osteoarthritic progression and decreasing the need for a total knee replacement [8]. Recent evidence of the long-term outcome of treatment for adolescents with Anterior Knee Pain, who are supposedly compliant with a multimodal exercise programme, is fairly poor, although the same authors found that the majority of adolescents did not perform the home exercises correctly few weeks after their initial instruction [9]. It is hypothesised that the adolescents whose symptoms fail to improve will develop PFOA. Therefore, it is imperative for clinicians to ensure from the beginning that they get buy in with the treatment to ensure compliance, so the clinician must educate the patient about why they have symptoms, explaining where the pain is coming from, what has contributed to the pain and in the first visit significantly reduce the symptoms. A useful tool for clinicians to give a patient is a modified version of Dye's homeostasis of the knee graph, so the patient understands the issues of load intensity and load frequency contributing to Anterior knee pain symptoms. The clinician needs to inform the patient about the effect of ADL on knee joint loading, so the patient understands about keeping inside their envelope of function to ensure that they are not aggravating their symptoms further [10]. After the patient has been educated about the effect of load through the knee, the clinician needs to show the patient in front of a mirror his/her lower limb alignment, so the impact of the internally rotated femurs and/or pronated feet can be readily seen. A valuable and easy demonstration to reinforce how proximal and distal factors affect the knee is for the clinician to ask the patient to squeeze their gluteals together, causing external rotation of the femurs and hence a straightening of the knees. The final piece of vital information to improve treatment compliance is for the patient to palpate their size of the fat pad on the symptomatic and asymptomatic sides, as well as to feel the direction their patella moves with a quadriceps contraction [11]. Appropriate education and understanding helps allay the fear of pain, which lessens the likelihood of the condition progressing to complex regional pain syndrome. Moreover, a patient with anterior knee pain may have core muscle weakness, so it is also important to evaluate the core muscle endurance. Both core and hip weaknesses lead to dynamic malalignment of the lower extremity that influences patellar tracking [12]. Tibial and femoral rotation should also be evaluated because of their influence on the patellofemoral contact area and pressure. Although lower extremity rotational deformities might increase the risk of Anterior knee pain, these deformities alone are not enough to provoke Anterior knee pain, they are only predisposing factors. AKP is correlated with lateralisation of the tibial tubercle. Currently, evaluation of the PFJ tends to be done under conditions that simulate realistic functional demands using specific functional tasks rather than specific tests of the patella. Our preferred activity to evaluate patients with Anterior knee pain is descending the stairs because it is the most demanding of all the activities of daily living with regard to the knees since it requires substantial control in the quadriceps contraction eccentric phase [13]. Therefore, we perform the step-down task. The patient steps down slowly from a step. In this task, the limb going down only brushes the floor with the heel and then goes back to full knee extension. Moreover, we perform the one-legged squat task and the landing from a drop task. During these tasks, many patients with Anterior knee pain have an excessive functional knee valgus. Feet examination is crucial because pronated feet have an important role in the genesis of Anterior knee pain. Lastly, functional hallux limitus cannot be forgotten as a potential predisposing factor for Anterior knee pain [14]. It can be demonstrated by a loss of dorsal flexion of the first metatarsophalangeal joint with the ankle in dorsal flexion. Finally, if an IMPI is suspected, the Fulkerson relocation test is useful. To perform this test, the patella is held medially in extension and then released on abrupt knee flexion. It is a pro vocative test, and therefore reproduction of symptomatology with this manoeuvre strongly suggests medial patellar instability. Anterior knee pain is basically a clinical diagnosis, with imaging only assisting to complete the diagnosis. Imaging studies are aimed at quantifying the pathology and checking for other pathologies that could simulate femoropatellar pathology [15]. The standing anteroposterior view, a true lateral view, and axial X-rays should be obtained for all patients with anterior knee pain. These X-rays are the first steps for imaging. In cases refractory to conservative treatment, CT and MRI should be considered. In selected cases, such as revision surgery or workers' compensation patients, technetium-99m-methylene diphosphonate scintigraphy may be helpful. It shows the metabolic and geographic characteristics of bone homeostasis. A relationship has been demonstrated between an abnormally increased technetium bone scan of the PFJ and Anterior knee pain. Additionally, an association between restoration to normality of the bone scan and the resolution of anterior knee pain after conservative treatment has also been documented. Näslund found that nearly 50% of patients with Anterior knee pain show a diffuse uptake in the scintigraphy in one or more of the bony compartments of the knee joint..

Figure 2: Active/passive joint position reproduction to evaluate proprioception.

Conclusion

Finally, in those cases in which an IMPI is suspected, stress radiography or stress axial CT scans will be helpful. They allow one to objectively document and quantify medial patellar instability. The difference between the displacements of both sides carries more importance than the absolute amount of displacement. Since Anterior

knee pain is a multifactorial problem, non-operative management depends on the examination findings. The clinician needs to decrease the strain of excessively loaded and painful soft tissues around the PFJ, improving the seating of the patella in the trochlea, as well as to optimise the lower limb mechanics, which should decrease the patient's symptoms and, if maintained, will minimise any recurrences of symptoms. A multi modal physiotherapy programme is effective in reducing anterior knee pain symptoms.

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Conflict of Interest

None

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