YUGATO

ISSN: 0387-5695, eISSN: 0387-5695
Vol. 76 No. 1 (2024)

Received: November 29, 2023 / Revised: December 23, 2023 / Accepted: January 18, 2024 / Published: February 17, 2024

PHYSICAL THERAPY INTERVENTION IN ADDUCTOR MUSCLE INJURY

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*Patient agreed to participate in this physical therapy case report and signed an informed consent, allowing medical information to be used.

Abstract

Background and purpose

An adductor injury can cause pain in the groin area. This is a common complaint among athletes as they have to use the adductor muscle constantly, which can lead to muscle fatigue and damage to the muscle fibers in this area. The aim of this case report is to highlight the importance of physiotherapy in sport and to raise awareness of physiotherapy among individuals and athletes who may be experiencing mild but chronic pain.

Introduction

One of the five muscles may contribute to an adducer sprain by injury “pectineus, adductor and adductor longus, gracilis and adductor magnus”. Adductor muscle injury is one of the highest reoccurring lower limb injuries in most sports and can lead to groin pain. An adductor injury can not only cause pain, but also limit the range of motion of the muscle. In a significant percentage of athletes, the cause of discomfort is usually multifactorial. Pain being precursor to acute or chronic injury can lead to difficulties similar to those found in chronic pain syndromes.

Case description

The case report concerns a 32-year-old dentist and soccer player who recently experienced pain in his left groin, mainly due to an adductor muscle injury during stretching. He had a torn medial meniscus a month earlier, for which he underwent physical therapy. He felt pain, with a score of 5 out of 10 on the digital pain scale, and had minor mobility limitations, mainly due to pain. The patient also developed muscle soreness and could not play football because of this.

Outcomes

Systematic treatment was applied with great success, achieving a reduction in pain from (5/10 with activity, 2/10 at rest) to (2/10 with activity, 0/10 at rest) on the numerical pain scale, along with an improvement in range of motion and significant improvement in muscle tenderness.

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Discussion

This case describes a physical therapy intervention in a patient with left groin pain due to an adductor muscle injury. The patient complained that, he could not be playing football and wanted pain relief because the playing was restricting his muscle movements. The planned procedure was not only quick but also attractive to the patient, and resulted in a good overall postoperative examination. The case describes the importance of physical therapy in sport and how it can affect an athlete's career. It also discusses the importance of developing interventions for individual patients to maximise their interest in treatment.

Body of Manuscript

A common complaint among athletes is groin pain. Many athletes present to the clinic with groin pain, which may be acute or chronic and may be the result of a single injury or repeated micro-trauma to the area. In contrast, people with persistent groin pain may have multiple conditions and are therefore difficult to diagnose and treat. Groin pain can be caused by a variety of factors. Torsion of the lumbar spine, sacroiliac joint, pubic symphysis, rupture of the rectus abdominis muscle, sports hernia, sacroiliac joint pathology or adductor injury are possible causes of groin pain. (13)

Chronic groin pain, hip stiffness and pain with active leg extension are common in athletes. Entrapment disease is common because the vastus medialis and gracilis muscles are located with the epicondyle. The vastus medialis and vastus lateralis are usually located posteriorly and are rarely affected by a permanent groin condition. There is often muscle strain at the tendon junction. These injuries are usually caused by the impact of a single weight. On the other hand, tendinopathy-type injuries do not occur as a result of a single injury. They represent an insidious onset of groin problems that are usually caused by overuse, progression and increased movement. Groin pain, localised pain, weakness and unilateral maladjustment raise the suspicion of enthesopathy. (3) The patient may experience pain in the groin, medial leg or lower abdomen during violent activities such as cutting, twisting and sliding. In order to alleviate the clinical symptoms and double the groin pain, the patient is observed to engage in vigorous physical activity around the tendon and tendon attachments. Resistance to passive extension of the hip inversion and adduction muscles can also cause pain, as in this case.

The local distribution of nerve fibers within the groin is another important anatomical concept in groin pain. The inguinal nerve, the iliac tibialis muscle and the genital branches are the main sensory nerves and play the most important role in non-acute pain caused by groin injury. In sport, this type of movement requires a strong eccentric contraction of the adductor muscles.

Groin pain in athletes caused by adductor pain can manifest in a variety of ways. Muscle strains, tendinopathies, tendinitis, paratendinitis, tendinopathy, or a combination of these conditions can cause groin pain associated with the adductor muscle. Symptoms of this type of groin injury due to various causes can range from acute, mild, intractable symptoms to persistent, sometimes life-threatening conditions. One or more musculoskeletal structures may cause local or systemic symptoms. (13) Driver musculoskeletal strength is associated with the occurrence of multiple dislocations. Careful wound care and rehabilitation programmes are essential to reduce loss of playing time and avoid surgical intervention. Muscle sprains can cause significant lost time for multi-sport athletes. Sprains are particularly common in winter and on the football field.

Taylor *et al*. (2001) showed that strengthening the adductor muscle group can prevent adductor sprains in professional hockey players (17). Given the findings of Lorenzon *et al*. that 10% of all hockey injuries were

related to adductor sprains, preventative measures may be beneficial. Despite the identification of risk factors and improved sports management, adductor sprains still occur in most activities (16). Thus, the high recurrence rate may be related to inadequate rehabilitation or recovery time (17). According to Homlich *et al*. (1999), 8-12 weeks of active interventions, including isometric and adductor training, abdominal strengthening, balance training, and gliding exercises with a gliding belt, are more effective than passive physical therapy (e.g., massage, stretching, and other techniques) in alleviating chronic sprains (6).Tyler *et al*. (2002) also created a treatment plan for muscle injuries that should be followed during the recovery period (15). Conventional physical therapy for chronic conditions can take up to 6 months to achieve optimal results. According to a well-known clinical study in this field (10), active muscle training is more beneficial than passive physiotherapy for motor rehabilitation in patients with chronic groin. The local distribution of nerve fibers in the groin is another important anatomical concept in groin pain. The femoral nerve, as well as the branches of the iliac nerve and the glossopharyngeal nerve, are the main sensory nerves and play the most important role in non-acute pain caused by groin injury. In exercises of this type, the movement requires a strong eccentric contraction of the adductor muscles (17). The strength of the adductor muscle has been linked to the development of various dislocations. Injury and rehabilitation programmes must be carefully managed to minimize loss of playing time while avoiding surgical intervention (11). Athletes playing a variety of sports can lose a significant amount of time due to an adductor sprain. Winter sports and football are the most common causes of adductor sprains (3, 5). Lynch *et al* (1999) proposed a useful classification system for prognosis and treatment (Table 3) (14). The same logic applies to third-degree dislocations, which are accompanied by complete disruption of the musculotendinous apparatus and complete loss of function (16). Overall, it should be noted that various passive physical therapy methods (e.g. massage and stretching) have not shown any effect in the treatment of chronic groin strains (16). For the treatment of recurrent hamstring sprains, Brukner *et al*. (2013) recommend a seven-point protocol that includes "rest, ice, compression and elevation" (RICE), as well as soft tissue massage, stretching, core muscle strengthening, progressive flexibility, neuromuscular control exercises, a progressive walking protocol, and an isolated cervical tendon strengthening protocol that emphasises eccentric exercises (8). In general, rehabilitation for the treatment of this type of injury should focus on reducing muscle imbalances in the lower limbs and protecting these structures during the energy transfer phase of activity. Thus, by implementing an evidence-based rehabilitation programme (18), the injured person can return to daily physical activity and avoid future difficulties.

Table 3. Classification of Groin Sprains Prognosis Based on Muscle Tears (49).

Grading	Specifications
Grade 1	A minor tear with fiber damage of less than 10%
Grade 2	A moderate tear of fibers in the range of 10 to 90%
Grade 3	The most serious, either partial or full ruptures

Case Description

This case concerns a 32-year-old dentist athlete who complains of pain in his left groin, which started while performing stretching exercises. Since then, he has had difficulty football playing. The patient presented to the

centre with left groin pain that started while performing stretching exercises during warm-up. According to the patient, he had torn his medial meniscus a month earlier and went through physical therapy as a result. The pain subsided and he eventually returned to his exercises.

There was “no history of diabetes, asthma, hypertension, gynaecological abnormalities, visceral pain or hernias”. He was also reported to be a “non-smoker, alcoholic and vegetarian. At the time his employment history was recorded, he was a college level athlete with four years of experience”. He played soccer for approximately 3 days/week. He warmed up and warmed down during his workouts.

Clinical impression I

The first clinical sign was left groin pain, initially acute, persisting for 2 days, accompanied by a dull ache, localised to the left groin. There was no radiating pain. Stretching the hip adductors during warm-up and warm-down, and kicking the leg exacerbated the pain. Rest and ice helped to reduce the pain. Sleep disturbances due to discomfort were not observed. The radiology report did not show any fractures in the area that could cause groin pain and only the adductor muscle was involved in this patient, which could be a good topic for a case report as this would broaden the understanding of the importance of the adductor muscle and the role of physical therapy in treating such injuries to improve the patient's condition and reduce pain. This case could also be used to demonstrate the role of physiotherapy in overcoming neglect and lack of awareness of physiotherapy requirements.

Radiology test

A digital X-ray and ultrasound were also taken of the patient to find any case of fracture leading to the cause of pain, which revealed no signs of stress fracture which further proved that the pain is due to a muscular injury primarily in the adductor.

Examination

The patient underwent a 'full examination' which included a general examination and numerical pain scale, as well as skin integrity, range of motion, manual muscle testing and palpation.

On general examination of the groin where the patient reported pain, detailed examination revealed ectodermal structure. The anterior view showed normal alignment without significant abnormalities; the lateral view showed normal alignment without significant abnormalities; the posterior view showed normal alignment without significant abnormalities. Gait analysis showed no significant abnormalities.

Pain was assessed using a numerical pain scale, where pain started at 0 and ended at 10. On this scale, 0 indicates no pain and 10 indicates maximum pain (6). Once pain was identified on this scale, the patient reported pain using a visual analogue scale. 5 during activity and 2 at rest.

On visual inspection, there was no swelling, scarring or lesions on local examination. There were no corrected insoles or wear on the shoes assessed.

Range of motion was measured using a retractor as described by Norkin and White (5), and range of motion and telangiectasia were within normal limits.

Chiropractic Neuromuscular Test (CMT) performance validation showed that the Chiropractic Neuromuscular Test (CMT) performed using the Oxford grading system was rated as above average. (4)

The Thomas test showed normal iliopsoas muscle length bilaterally, the Ali test showed normal straight thigh muscle length bilaterally, the Ober test showed normal latissimus muscle length bilaterally, and the gastrocnemius test showed normal gastrocnemius muscle length bilaterally. The left hamstring was stretched, which was evident in the active knee extension test.

A compression test was used to check adductor muscle involvement and the results were positive. The results of the isometric left adductor strength test were also favorable.

Anatomically, there was no difference in leg length due to previous dislocation or trauma, which led the doctor to believe that the adductor muscle was the main cause of the pain. Furthermore, there was no evidence that the femoral nerve was the cause of the pain.

On palpation, there was local grade 1 pain, or muscle tension with very mild swelling and little restriction of movement, which was not related to muscle injury but was due to pain on full extension of the adductor muscle.

After all these tests and examinations, it was finally determined that the patient's left groin pain was due to an adductor muscle injury, which was confirmed by a stretching test that was positive for an adductor muscle injury.

Clinical impression II

On the bases of the initial examination it was diagnosed that the patient is experiencing pain which is numerically rated as 5 on the numerical rating pain scale with no difference in the range of motion, according to the diagnosis the problem is persisting to an injury of the left adductor muscles leading to pain in the left groin region, the patient has a history of working in combat sports and wishes to return to his full potential soon which was taken in consideration when establishing the plan of care.

The planned intervention for this patient suffering from pain in the left groin region primarily due to an injury of adductor muscle was short term goals exercises including, balancing exercises, strength exercises and stretching to relief the tenderness of muscle and eventually relief from the pain.

Interventions:

Reducing discomfort and pain, maintaining cardiovascular fitness, developing strength, improving proprioception and balance and returning to activity are short-term goals. Long-term goals include maintaining proprioception and balance, strengthening, improving motor skills and restoring mobility.

Rest and ice massage three to four times a day for ten minutes, beginning with vigorous, painless exercises such as hip flexion and extension in various positions. Isometric internal stretching is recommended. To gradually improve strength, use bands to perform strenuous inversion exercises, flexion and extension exercises, wall squats, single leg squats and muscle strengthening techniques.

To maintain mobility in the hip, knee and lower back joints, we performed hamstring stretching, hip flexor stretching, adductor stretching and tibial orthopaedic ligament stretching. Functional strengthening included static cycling, jogging, abdominal stabilisation exercises, squats and eccentric adductor strengthening exercises 3-4 times a week. For proprioceptive training, sand walking, single leg walking, tandem walking and swinging exercises were used and performed 3-4 times on different days of the week. (13) By practicing specific motor skills such as walking in a straight line, walking in a figure eight and hitting a ball with a heavy object.

A home fitness programme should also include icing, exercise and stretching, adequate rest and warm-up and cool-down time. It is recommended to avoid exercising on hard surfaces, use appropriate protective equipment where necessary, eat a balanced diet and drink plenty of water.
To be certain in description the interventions used were,

Interventions on First visit.

- Shock wave 1500 at injured site
- Leg swing front to back
- Leg swing side to side
- Hip circles
- Resisted hip adduction by wall pulley
- Resisted hip flexion by wall pulley
- Resisted trunk rotation both sides by wall pulley

And the patient was further advised to walk 10 minutes daily.
Interventions on second visit

- Shock wave 1500 at injured site
- Leg swing front to back
- Leg swing side to side
- Hip circles
- Resisted hip adduction by wall pulley
- Resisted hip flexion by wall pulley
- Resisted trunk rotation both sides by wall pulley
- Single leg coordination
- Ice packs at injured site

Walking for 30 minutes as advised in previous visit.
Similar interventions were further used with addition of crunches, tension arc with ball, abduction adduction with weights and overall use of higher weights as the program proceeds for strength, along with these interventions walking and cycling was also added to the patient's program in further visits, balancing exercises were also part of the interventions to improve patients balance and overall performance of muscles, these interventions were continued for 12 more visits till the final assessment was done on the patient which showed a great improvement in the results of the patient condition and pain.

Outcome

The patient was treated according to a systematic approach developed specifically for sports medicine physicians, so she was happy to return to training, especially because of her experience in martial arts. On post-operative examination, pain was rated 1/10 at rest on a visual analogue scale and 3/10 at activity on a digital pain scale. range of motion improved, pain in this area decreased, allowing him to move his muscles freely, and muscle strength eventually improved as the pain subsided. A significant reduction in muscle sensitivity was noted. At the

end of the intervention, there was positive feedback on the exercises and training, including the short-term goals and short exercises that were part of it.

Summary

Internal adductor strains are the most common cause of groin problems in sports such as climbing, acceleration/braking and rapid changes of direction such as football. (13) These injuries are usually overlooked. Therefore, early diagnosis is essential as it does not interfere with the athlete's sports performance or lead to a career-threatening injury. It is important to develop a strengthening programme that covers all weak and tight muscles. In general, the pelvic and core muscles should be strengthened. Allow a longer period of time after each workout to complete it. This prevents joint stiffness and allows the muscles and nerves to work optimally. In this way, the athlete can eventually achieve pain relief without losing muscle strength. This case report discusses various aspects of physiotherapy interventions for adductor injuries and discusses the importance of physiotherapy in sport and for athletes.

Discussion

Internal adductor sprain is the most common cause of groin problems in athletes, especially in sports such as football that require kicks, rapid acceleration and deceleration, and rapid changes in direction of movement. Most often these injuries go unnoticed. Therefore, early, definitive assessment is necessary to ensure that an athlete's sporting performance is not impaired and that the injury does not develop into a career-ending injury. (1)

This case involved a 32-year-old dentist and soccer player who complained of left groin pain that began during a stretching session, after which she had difficulty completing a sparring session. On a numerical pain scale, the pain was experienced during activity at a level of 5 out of 10, and at rest at a level of 3 out of 10. However, after diagnosis and several tests, including ultrasound, X-rays, they were determined that the patient did not have a fracture or neuromuscular problem, but rather an injury to the muscle that was causing the pain. The injury occurred in the adductor muscle and was diagnosed with a pinch test, while the patient's history revealed that he had suffered a medial meniscus tear a month earlier, for which he underwent physical therapy. In order to treat the martial arts patient, it was necessary to develop an intervention plan that included a rapid recovery, maintaining the patient's interest in training and maximising pain relief. In addition to these aspects, when planning an intervention planIt's critical to construct a strengthening programme that takes into account what muscles are weak and what are tense. This should entail strengthening the pelvic muscles as well as the core muscles. This should be combined with stretching exercises, which should be done after each workout. This prevents joint stiffness and allows for optimal muscle and nerve movement. (2) A detailed plan is therefore similarly drawn up to achieve the best possible intervention.

Regular physiotherapy treatments for chronic conditions can take up to six months to achieve optimal results. According to known clinical studies in this field, active muscle training is more beneficial than passive physiotherapy in restoring mobility in patients with chronic groin inflammation (14).

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