

Groin pain: which protocol(s) to apply – Literature review

SUMMARY

There is much literature on this pathology, which has a complex aetiology. Many research teams have worked on the condition from its pathological description to its prevention. In addition, or as a result of this aetiology, the terminology has long been debated, making it complicated to describe the literature. In this article, we will describe groin pain, as it is currently understood, its diagnosis and its treatment from a physiotherapeutic perspective. We will not cover surgery.



Context / anatomy

Although groin pain is often cited among footballers, where it represents between 8 and 18% of injuries [1], it also occurs in other sports that involve sudden changes in support or direction. The physiopathology is difficult to determine, in particular due to the area in which the pain is located. This is because it is located at a junction where 18 muscles and 6 nerves meet in a single joint, the pubis [14].

Due to the complexity of the area, the aetiology is the subject of controversy [2]. The most extensive and accepted pathogenesis consists in an insertion tendonitis / tear of the rectus abdominis at the pubic symphysis and a weakness of the transversalis fascia or posterior inguinal wall [2] [3] (Figure 1). This weakness is created by an imbalance in the balance of power between the adductor muscles and the abdominal muscles from a central point, the pubis. This situation is particularly true of sports that involve shearing forces of the pubic symphysis [4] (football, hockey, etc.). de cisaillement de la symphyse pubienne [4]

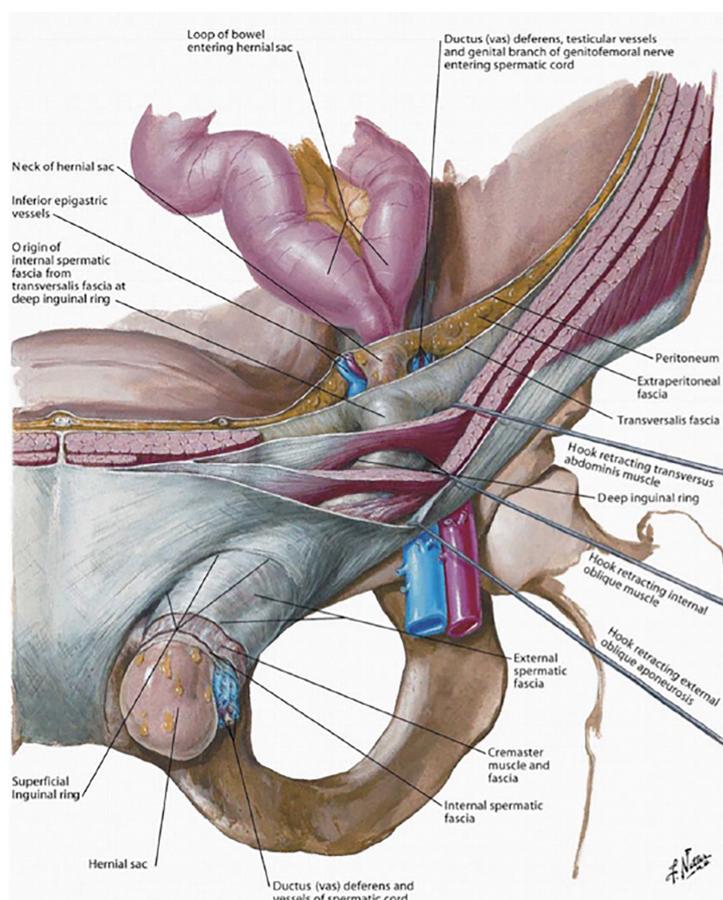


Figure 1: Anatomical layers of the groin and inguinal canal (source: [2])

(football, hockey...).

The term groin pain refers to pain in the pelvic area. It does not in itself constitute a diagnosis. It is therefore necessary to locate the origin of the pain. The literature most often refers to chronic groin pain, which has significant consequences within the sporting community. The pain occurs gradually after exercise but can occur suddenly at the start, then return after each rest period [3]. Hölmich et al. 1999 describes chronic adductor-related groin pain to be when an individual feels the pain in the proximal insertion of the adductors during or after sport for a minimum of 2 months (criteria for inclusion in their study). The acute condition refers to recent trauma and in most cases muscle injury [4], which may affect the rectus abdominis and be felt in the inguinal canal (Figure 2). This being the case, the Doha consensus [5] decided that it was a description of a pain but that it did not reflect a diagnosis, emphasising the lack of information available in the scientific literature. The treatment for groin pain, chronic or not, depends on its origin. Here we will look at the most common types, i.e., adductor-related groin pain and inguinal-related groin pain.

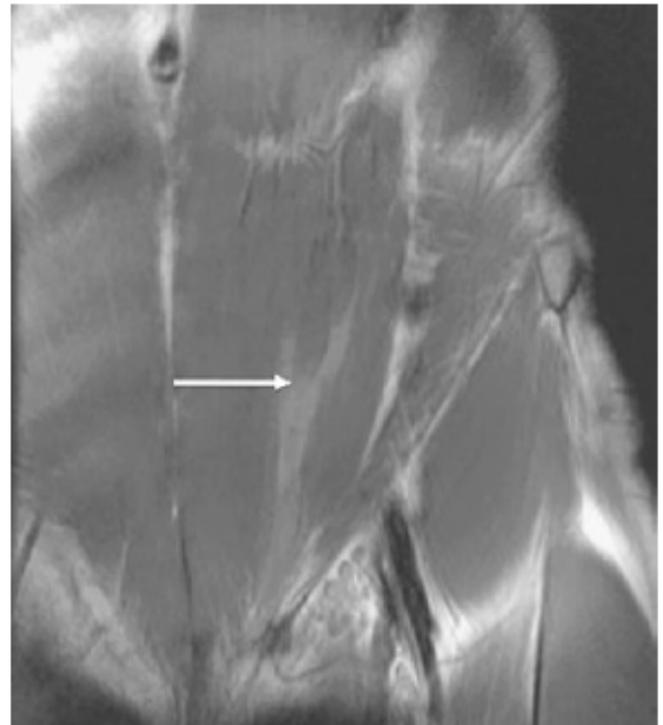


Figure 2: Rectus abdominis muscle injury under ultrasound (source: [14])

The objective of the clinical examination is therefore to use palpation and to test (with resistance) for the possible sources of the pain. The same Doha Agreements define 4 major classifications of groin pain based on the origin of the pain (Figure 3):

Definition and accompanying diagnosis

To standardise the names and consolidate the clinical results, in 2015, the scientific community concluded the Doha Agreements, to classify the various types of groin pain based on the location of the pain [5].

According to these recommendations, in practice, diagnosis is based on a clinical examination (palpation), to discover the source of the pain and identify the typology.

- *Adductor-related groin pain:* Adductors sensitive to touch or during adduction exercises with resistance.
- *Iliopsoas-related groin pain:* Iliopsoas sensitive to touch or during hip flexion with resistance and / or pain when stretching the hip flexor muscles.
- *Inguinal-related or parietal-abdominal form groin pain:* Pain in the inguinal area or inguinal canal sensitive to touch. No inguinal hernia on palpation. Pain greatest during abdominal muscle contraction or during coughing, the Valsalva manoeuvre or sneezing.

- **Pubic-related groin pain:** Pubic symphysis and adjacent bones sensitive to touch. No effective test to confirm.
- **Hip pain (not a category of groin pain):** When all other types of groin pain have been ruled out, hip joint sensitivity can be analysed.

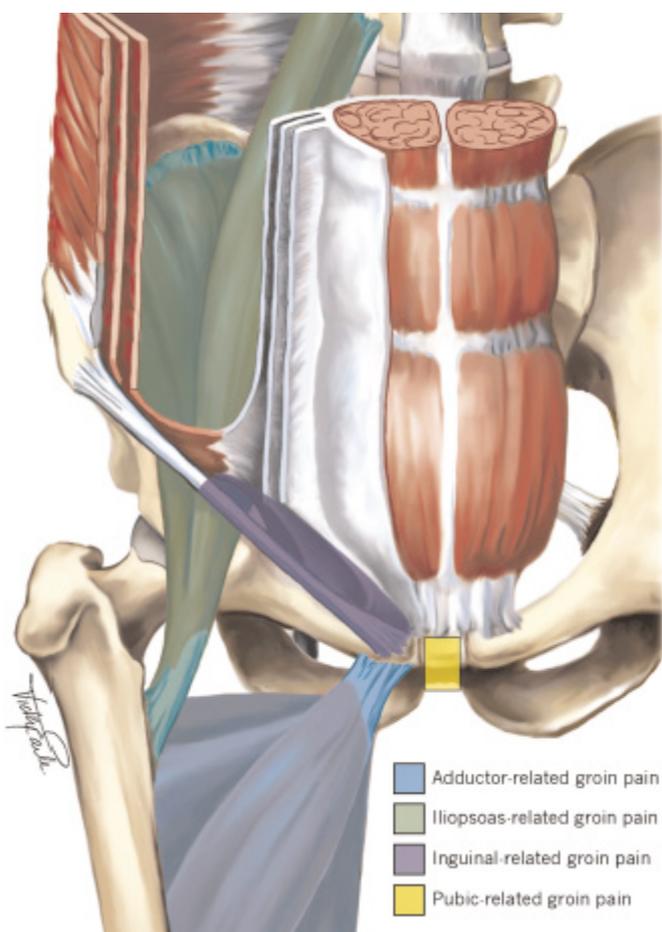


Figure 3: Diagram of the 4 categories of groin pain (source: [5])

Treatment protocols

Most of the literature sets out the treatment for adductor-related groin pain and inguinal-related groin pain, which represent the most common complaints. In a recent study based on the terminology of the Doha Agreements, out of 100 athletes experiencing groin pain from a single source (only 56% of athletes), 44% presented adductor-related groin pain, 23%

inguinal-related, 4% iliopsoas-related, and only >2% pubic-related [6] (23% multiple area and 4% hip pain).

In the case of injury, a rest period is necessary to allow healing. After this rest period, in most recent articles, surgical treatment is recommended [7]. In some cases of regular recurrence, an analgesic and steroid injection can relieve the pain for a year [4] [8]. Please also note that in the case of inguinal-related groin pain, laparoscopy has been shown to be moderately effective in reducing pain and a higher percentage return to the field in comparison to non-surgical therapeutic protocols [5].

Several non-surgical therapeutic protocols have been developed, primarily for parietal-abdominal and adductor-related groin pain. Here is a brief description of the most documented protocols:

The Hölmich Protocol, 1999: Adductor-related [10]

The Hölmich protocol, established in 1999, is one of the reference treatments for groin pain, particularly in the football community. It establishes as a starting hypothesis that the muscles stabilising the pelvis and hip adductors must be strengthened – one of the risk factors for groin pain [9] [10] – and that the key is active rehabilitation. It comprises 2 modules based on resistance exercises (e.g.: holding a ball between the knees in supine position) followed by dynamic exercises (*Figure 4*). This protocol is based primarily on the importance of motor control of the stabilising core muscles (transverse abdominis, internal / external obliques and rectus abdominis) in synergy with footballers' very powerful adductor muscles.

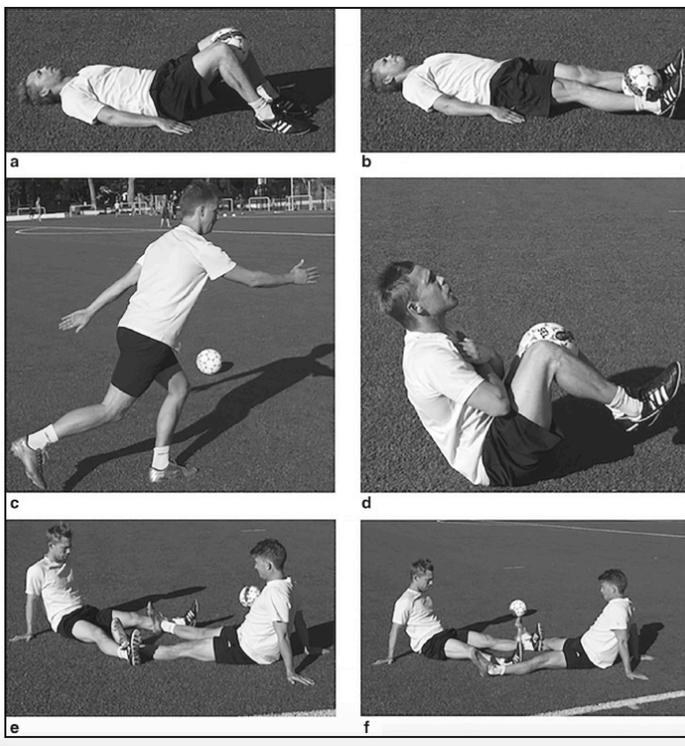


Figure 4: Exercises of the Holmich Protocol, 1999 (source: [1])

The Serner et al. Protocol, 2020: Adductor-related [11]

The recent protocol of Serner et al., involving Per Hölmich, is interesting, as it is broadly in line with the approach of the Hölmich protocol but with an emphasis on gradual build-up and patient perception, and without accessories [11] (Figure 5). It comprises a series of 9 exercises over an undefined period, since it depends on the patient (between 2 weeks and 3 months depending on the severity of the injuries). Each exercise is repeated at a low pain level defined as 2 on a scale of 1 to 10 (10 being unbearable pain and 0 being no pain). Patients repeat them as many times as possible and are invited to increase the effort if the pain level is less than 2.

The Weir et al. Protocol – 2009: Adductor-related [12]

Use of manipulative therapy for chronic groin pain. First the skin is preheated (paraffin heated to 60°C, then placed in a towel positioned on the proximal insertion of the adductors). Next, while checking the adductor muscle tension with their hand, the therapist

moves the patient’s leg from its neutral position using external rotation and abduction movements, keeping the knee extended. While performing these movements, the therapist exerts pressure on the adductors. Once this action has been repeated, there is a 5-minute running or cycling session, followed by an adductor stretch (seated or standing), with the instruction to hold each movement for 30 seconds, and finally a hot bath.

The Pau-Toronto Protocol: Adductor-related / parietal-abdominal [13]

After having mastered the positioning of their pelvis and retroversion, with the help of the physiotherapist, patients master balancing on one leg through isometric strengthening of the hip stabilisers [4] [13] (Figure 6). Here again the principal of the protocol is to steer patients towards motor control of the abdominal wall muscles, which can be referred to as pubic locking (used in the protocol of the Centre Médical Clairefontaine - First PTR) [17].



Figure 5: The 9 exercises of the Serner et al. Protocol, 2019 (source: [11])



FIG. 1. — Fléchisseurs de hanche.



FIG. 2. — Extenseurs de hanche.



FIG. 3. — Abducteurs de hanche.



FIG. 4. — Adducteurs de hanche.



FIG. 5. — Rotateurs externes de hanche, hanche et genou fléchi à 90°.



FIG. 6. — Rotateurs internes de hanche et genou fléchi à 90°.

Figure 6: Exercises taken from the Pau-Toronto protocol (source: [13])

The basic hypothesis of this protocol is that the profile of patients affected by groin pain is based on 4 weak points: hyperlordosis, abdominal weakness, limited single-leg balance and weakness of the muscles that stabilise the pelvic girdle.

Generally speaking, the protocols demonstrate the importance of starting treatment with a period of as complete rest as possible, during which rehabilitation is guided by the pain level [3] [4] [13]. This pain-guided recovery echoes the RPE (rate of perceived exertion), which is based on the notion of patient perception to avoid injuries [18]. Most of the protocols work on the patients' capacity to recover hip rotation range and correct elasticity of the adductors. The programmes involve active rehabilitation (except in the case of Weir et al., 2009 [13]) and patients are guided in their recovery towards activities more specific to their areas of interest.

Similarly, one of the main themes of the different protocols is the importance of motor control of the stabilising core muscles (transverse abdominis, internal / external obliques, rectus abdominis, etc.) in synergy with the adductors, which can be performed through dissociation exercises on an unstable support (single leg, in particular). The idea is to perform this motor control before recruiting the anterior chain muscles.



Risk factors and prevention

Whittaker et al. carried out a meta-analysis of the literature in 2015 [9], which highlighted that the risk of developing groin pain was associated with the following elements:

- Having already experienced groin pain,
- Playing at a high level,
- Presenting weakness of the hip adductor and abductor muscles,
- Low level training in the athlete's sport.

It is interesting to note that in this study, with a good level of proof (Level 2), the following elements do not present a risk factor:

- Weight or high BMI,
- Weaker hip mobility,
- Capacity of the person to perform fitness tests (squats, jumps, sprints, striking the ball or VO2 max).

In addition to these elements, Jansen et al. revealed a considerably thinner transverse abdominis muscle, among a sporting population affected by adductor-related groin pain, in comparison to athletes who had never been affected by groin pain [16]. This description was corroborated by Whittaker et al., who showed that athletes presenting groin or hip pain have an altered core muscle function, in relation to the control groups as well as a lower PRO (patient self-assessment questionnaire on quality of life / general physical perception) [15]. In light of this and to prevent this deficiency, the protocols described above recommend one part of the rehabilitation on the control of the deep abdominal muscles to rebalance the adductor / abdominal differential and reduce the risks. This treatment is greatly facilitated by actively involving patients in their rehabilitation, including this motor control, which is difficult for therapists to convey.

This integration is easier when it is relevant to the patient's discipline [16] [10].

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