

GROIN PAIN

Clinical Examination

Aspetar Sports Groin Pain Centre

Willem Heijboer
Zarko Vuckovic
Adam Weir
Hans Tol
Per Hölmich
Andreas Serner



- This protocol is a description of the clinical examination tests included in our research study on the diagnosis of groin pain in athletes. All clinical examination tests include bilateral comparison
- Palpation pain provocation tests are only scored positive when the athlete recognizes his specific injury pain.
- Stretch and resistance pain provocation tests are only scored positive when the athlete reports recognizable injury pain in the tested region (for example: the adductor stretch test has to reproduce the athlete's recognizable injury pain in the adductor region).
- When dealing with athletes with acute groin pain, there may be other relevant tests to perform.

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PAIN PROVOCATION TESTS

ADDUCTOR PALPATION

Adductor palpation

The patient lies supine on the examination bed with the tested leg placed in a relaxed position with the knee on the examiners thigh. The hip of the tested leg is flexed, slightly abducted and externally rotated.

Adductor Longus

The examiner palpates the adductor longus insertion on the pubic bone just inferior to the pubic tubercle and follows the adductor longus tendon and muscle distally. *Score: pain (yes/no)*

Gracilis

The examiner palpates the gracilis muscle a few cm. distal to the pubic insertion, just posterior of the adductor longus insertion, to distinguish the gracilis from the adductor longus. The gracilis is then palpated proximally to the insertion. *Score: pain (yes/no)*

Adductor Magnus

The examiner palpates the adductor magnus insertion on the ischiopubic ramus, just posterior of the gracilis insertion, and then continuous more posterior to the ischial tuberosity. *Score: pain (yes/no)*

Pectineus

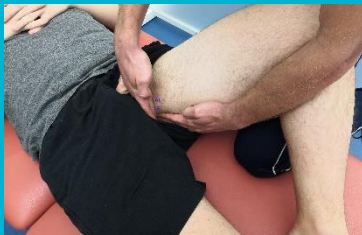
The examiner palpates the pubic tubercle and follows the superior pubic ramus a few cm. laterally. Palpation is then performed a few cm. distal from this point within the femoral triangle, lateral to the adductor longus, and medial to the femoral vein, artery and nerve. While the examiner palpates the pectineus with a firm pressure with one hand, the patient is asked to push against the examiner's other arm which is placed medially on the knee of the tested leg. The examiner should then be able to feel a contraction of the pectineus. *Score: pain (yes/no)*



Adductor longus palpation



Gracilis palpation



Adductor magnus palpation



Pectineus palpation

RF=rectus femoris, S=sartorius, IL=iliopsoas,
P=pectineus, AL=adductor longus, G=gracilis

PAIN PROVOCATION TESTS

ADDUCTOR STRETCH & RESISTANCE

Adductor stretch

The patient lies supine on the examination bed.

Hip abduction

The examiner abducts the tested leg, holding it with one hand to ensure the foot points straight up. With the other hand, the contralateral leg is supported to stabilize the testing position. The tested leg is then moved into maximal abduction. *Score: pain (yes/no)*

Adductor resistance

The patient lies supine on the examination bed.

Adduction in maximal abduction

The patient-examiner position for this test is similar to the hip abduction test: the tested leg is maximally abducted and in this position the patient is asked to push the leg towards the examiners body. *Score: pain (yes/no)*

Mid-range adduction – cross-over sign

The examiner places the tested leg outside of the examination bed (the thigh is on the bed, and the lower leg is “hanging” next to the bed). The other leg is positioned in approximately 45° hip abduction. The patient is asked to give a maximal isometric adduction. This test is positive, if the patients reports the recognizable injury pain at the proximal adductor region of the contralateral leg (the “hanging” leg). *Score: pain (yes/no)*



Hip abduction



Outer-range adduction



Outer-range adduction
Cross-over sign

PAIN PROVOCATION TESTS

ADDUCTOR RESISTANCE

Squeeze 0°

The patient lies supine on the examination bed with the hips and knees in neutral position. The examiner stands at the end of the examination bed holding the lower legs of the patient (arms crossed) just above the medial malleoli. The patient is asked to perform a maximum hip adduction. *Score: pain (yes/no)*

Squeeze 45°

The patient lies supine on the examination bed. One leg is flexed until the medial malleolus is positioned at the level of the contralateral medial knee joint line. The other leg is then flexed similarly, so both medial malleoli are next to each other and the feet flat on the bed. The hips will then be approximately 45 degrees flexed and the knees approximately 90 degrees flexed. The examiner then positions a clenched fist between the patient's knees, and the patient is asked to press the knees together with maximal force. *Score: pain (yes/no)*

Squeeze 90°

The patient lies supine on the examination bed. Both hips and knees are flexed in 90 degrees. The legs are not supported by the examiner. The patient is allowed to hold the sides of the examination table. The examiner then positions a clenched fist between the patient's knees, and the patient is asked to press the knees together with maximal force. *Score: pain (yes/no)*



Squeeze 0°



Squeeze 45°



Squeeze 90°

PAIN PROVOCATION TESTS

ABDOMINAL WALL & PUBIC PALPATION

Abdominal wall palpation

The patient lies supine on the examination bed.

Rectus abdominis

The rectus abdominis muscle is palpated slightly lateral to the umbilicus and followed distally to the pubic insertion. *Score: pain (yes/no)*

Pubic palpation

The patient lies supine on the examination bed.

Pubic symphysis

The examiner palpates the pubic symphysis on the proximal side with one finger. *Score: pain (yes/no)*

Adjacent bone

Remaining with one finger on the symphysis, the adjacent bone is palpated on the lateral borders. (The adjacent bone is comparable with the knuckles of the hand, where the pubic symphysis is the "gap" in between). *Score: pain (yes/no)*



Rectus abdominis palpation



Pubic symphysis joint palpation
& Adjacent bone palpation

PAIN PROVOCATION TESTS

INGUINAL PALPATION (without invagination)

Inguinal palpation (without invagination)

The patient lies supine on the examination bed.

Pubic tubercle

The examiner palpates the lateral/craniolateral border of the pubic tubercle at the insertions of the inguinal ligament and conjoint tendon. *Score: pain (yes/no)*

Inguinal ligament

The inguinal ligament is a firm structure between the pubic tubercle and the spina iliaca anterior superior (SIAS). The examiner palpates the medial 0.5-3cm of the inguinal ligament. *Score: pain (yes/no)*

External ring (medial border)

The examiner palpates the medial border of the external ring at the lateral border of the rectus abdominis (superolateral of the pubic tubercle). The examiner palpates an area of 0.5-3cm. *Score: pain (yes/no)*



Pubic tubercle



Inguinal ligament



External ring (medial border)

PAIN PROVOCATION TESTS

Scrotal INVAGINATION

Inguinal invagination

The patient lies supine on the examination bed.

External ring

The examiner inverts the scrotum with the index finger and the external inguinal ring can be palpated approximately 1 cm craniolateral to the pubic tubercle. The examiner then gently attempts to move the tip of the finger through the external inguinal ring into the inguinal canal. *Score: pain (yes/no), size of the “entrance” of the inguinal canal (S: no entry, M: fingertip, L: >fingertip)*

Conjoint tendon

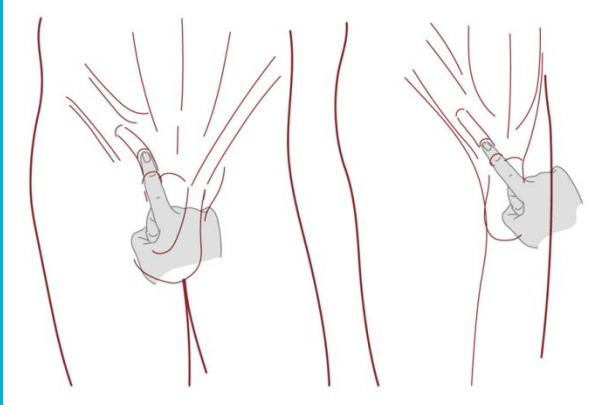
The examiner palpates the conjoint tendon during invagination of the inguinal canal, directly medial after passing the external inguinal ring. *Score: pain (yes/no)*

Posterior wall

The examiner palpates the posterior wall of the inguinal canal during invagination and follows the inguinal canal proximolateral. *Score: structure (soft/firm)*

Bulging/Valsalva

Examiner palpates the posterior wall and asks the patient to perform a Valsalva maneuver by inhaling deeply first and then to exhale forcefully against the backside of his hand (without letting the air escape). *Score: pain (yes/no), bulging is defined as the subjective feeling of “ballooning” of the posterior wall during Valsalva (yes/no)*



Invagination of the inguinal canal

PAIN PROVOCATION TESTS

ABDOMINAL RESISTANCE

Abdominal resistance tests

The patient lies supine on the examination bed.

Straight sit-up 0° hip flexion

The patient lies in supine on the examination bed with knees and hips extended (0° hip flexion). The patient crosses his arms in front of the chest. The patient then performs a sit-up movement, lifting head and scapulae from the couch, while the examiner resists the movement (isometric test) by holding one arm on the patient's knees and the other arm on the patient's chest. *Score: pain (yes/no)*

"Cross test" 0° hip flexion

The patient lies in supine on the examination bed with knees and hips extended (0°). The patient crosses his arms in front of the chest. The patient then performs an oblique sit up where the opposite hip is simultaneously flexed with an extended knee. The examiner resists the movement by fixating the right shoulder and the left leg just above the knee cap. This isometric test is also performed on the opposite site. *Score: pain (yes/no)*



Straight sit-up 0° hip flexion



Cross-test 0° hip flexion

PAIN PROVOCATION TESTS

ABDOMINAL RESISTANCE

Straight sit-up 45° hip flexion

The patient lies in supine on the examination bed with the hips in approximately 45° flexion and the knees in 90° flexion. The patient crosses his arms in front of the chest. The patient then performs a sit-up movement, lifting head and scapulae from the couch, while the examiner resists the movement by holding one arm on the patient's knees and the other arm on the patient's chest (isometric test). *Score: pain (yes/no)*

Oblique sit-up 45° hip flexion

The patient lies in supine on the examination bed with the hips in approximately 45° flexion and the knees in 90° flexion. The patient then performs an oblique sit up (right shoulder to left knee), while the examiner resists the movement by fixating the right shoulder and the left knee just above the knee cap. This isometric test is also performed on the opposite site. *Score: pain (yes/no)*



Straight sit-up 45° hip flexion



Oblique sit-up 45° hip flexion

PAIN PROVOCATION TESTS

HIP FLEXOR PALPATION

Psoas palpation (supra-inguinal)

The patient lies supine on the examination bed. The examiner locates the lateral edge of the rectus abdominis muscle at the level of the anterior superior iliac spine.

Palpation is performed laterally to this. The fingers are gently pressed posteromedial while pushing the intra-abdominal structures away to reach the psoas muscle. The patient must be relaxed (let the patient exhale). When the hands are as “deep” as possible, the patient is told to elevate the foot slightly on the side being tested. The psoas muscle is now palpated firmly over an area as large as possible. *Score: pain (yes/no)*

Iliopsoas palpation (infra-inguinal)

The patient lies supine on the examination bed with the tested leg placed in a flexed, slightly abducted and externally rotated position. The patient is asked to push against the examiners hand which is placed on the medial malleolus of the tested leg. This will make the sartorius appear clearly, and the examiner can locate the distal iliopsoas in the femoral triangle just medial to the sartorius below the inguinal ligament. If the examiner cannot clearly distinguish the iliopsoas a resisted hip flexion can be performed while the examiner palpates. *Score: pain (yes/no)*

Proximal sartorius palpation

The patient lies supine on the examination bed with the tested leg placed in a relaxed position with the knee on the examiners thigh, which is supported by the examination bed. The hip of the tested leg is flexed, slightly abducted and externally rotated. The patient is asked to push against the examiners hand which is placed on the medial malleolus of the tested leg. This will make the sartorius appear clearly, and the muscle can be differentiated from the surrounding muscles proximally near the insertion on the Anterior Superior Iliac Spine. *Score: pain (yes/no)*

Proximal rectus femoris palpation

The patient lies supine on the examination bed. The rectus femoris is localized by asking the patient to push against the examiners hand, which is placed anteriorly on the distal tibia. The leg is then relaxed again and the knee is slightly flexed by the examiner. The rectus femoris is then palpated proximally towards the insertion on the anterior inferior iliac spine in the small triangle between the sartorius medially and the tensor fascia latae laterally. *Score: pain (yes/no)*



Psoas palpation



Iliopsoas palpation



Sartorius palpation



Rectus femoris palpation

PAIN PROVOCATION TESTS

HIP FLEXOR RESISTANCE

Hip flexion 0°

The patient lies supine on the examination bed. The patient is asked to flex the hip keeping the leg straight, while the examiner applies resistance slightly proximal to the ankle of the tested leg (isometric test). *Score: pain (yes/no)*

Hip flexion 90°/90°

The patient lies supine on the examination bed. Both hip and knee are flexed approximately 90 degrees. The examiner tries to extend the flexed hip by pulling it with one arm wrapped around the thigh just proximal to the knee (isometric test). *Score: pain (yes/no)*



Hip flexion 0°



Hip flexion 90°

PAIN PROVOCATION TESTS

HIP FLEXOR RESISTANCE & STRETCH

Modified Thomas test

(A) Hip extension stretch and **(B)** Hip flexion resistance (isometric) and **(C)** Hip flexion-adduction resistance (isometric)

(A) The examiner places one hand on the thigh of the hanging leg just above the knee, and presses the leg down applying a hip extension stretch. **(B)** The patient is then asked to push the knee against the examiner's hand, while the examiner resists the hip flexion movement. **(C)** Similar to test B, but now the patient is asked to perform a combined hip flexion and adduction movement ("try to move the knee in the direction of the contralateral shoulder").



Modified Thomas Test

PAIN PROVOCATION TESTS

HIP TESTS

Hip tests

The patient lies supine on the examination bed.

FADIR

The examiner moves the tested hip to maximal flexion, adduction and internal rotation (FADIR), with compression on the hip joint. This test is scored positive when the patient feels recognizable injury pain. *Score: pain (yes/no)*

FABER

The hip and knee of the tested leg is flexed, abducted and externally rotated, as the foot of the tested leg is placed on the contralateral thigh just proximal to the knee. While stabilizing the pelvis on the contralateral side, a gentle pressure is applied downwards on the knee of the tested leg. This test is scored positive when the patient feels recognizable injury pain. *Score: pain (yes/no)*

Internal rotation 90°/90°

The examiner moves the tested leg to 90 degrees flexion of both hip and knee, and then internal rotates the hip. This test is scored positive when the patient feels recognizable injury pain. *Score: pain (yes/no)*

External rotation 90°/90°

The examiner moves the tested leg to 90 degrees flexion of both hip and knee, and then external rotates the hip. This test is scored positive when the patient feels recognizable injury pain. *Score: pain (yes/no)*



FADIR



FABER



Internal rotation 90°/90°



External rotation 90°/90°

OPTIONAL TESTS

HIP TESTS

Optional tests

The following tests are optional and can be used when there is when there is clinical suspicion on a certain pathology: e.g. when a femoral stress fracture is in the examiner's differential diagnosis, the fulcrum test should be performed.

Prone internal rotation

The examiner lies prone on the examination bed. The examiner flexes the knee to approximately 90 degrees and then internal rotates the hip. The test is positive when the athlete reports recognizable injury pain (yes/no).

Internal snapping hip

The patient lies supine on the examination bed. The examiner flexes and external rotates the hip to the end range. The patient is then asked to extend and internal rotate the hip. If a recognizable "click/clunk" is heard/felt by the patient, this test is positive for an internal snapping hip. Pain (yes/no) is also recorded.

Fulcrum test

The patient sits on the examination bed, with both thighs fully supported on the bed. The examiner places his arm under the tested thigh and puts his hand on the other thigh. The examiner then gives a firm pressure downwards with his other hand on the knee of the tested leg. If the patient reports recognizable injury pain, this can be suggestive for a femoral stress fracture.

Posterior hip impingement

The examiner lies prone on the side of the examination bed. The examiner then places the hip in extension, abduction and external rotation on the side of the examination bed. The test is positive when the athlete reports recognizable injury pain (yes/no).

Prone knee flexion

The patient lies prone on the examination bed. The examiner then flexes the knee. The test is positive when the athlete reports recognizable injury pain (yes/no).



Internal snapping hip



Posterior hip impingement



Prone internal rotation







Fulcrum test



Prone knee flexion



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