Iliopsoas

8

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8.1 Anatomy Key Points

The iliopsoas muscle complex is composed of two muscles with different areas of origin and same distal insertion: psoas major muscle and iliacus muscle (Fig. 8.1).

Psoas major originates proximally from the lower spine, in particular from the lateral aspect of the vertebral bodies and transverse processes of T12–L5 and the intervening intervertebral discs. The iliacus is a broad muscle of the lateral pelvis which has a wide origin from the iliac crest, the iliac fossa, the ala of the sacrum and the sacroiliac and iliolumbar ligaments; then it runs downward in the iliac fossa and, just cranially to the inguinal ligament, joins with the psoas major fibres forming the iliopsoas muscle. It passes below the inguinal ligament (together with the femoral nerve on its anteromedial aspect) into the so-called lacuna musculorum, which represent the lateral compartment of the femoral triangle; then it passes around the iliopubic ramus and courses anteromedial to the hip joint to insert distally onto the lesser trochanter of the femur through its conjoint tendon. Common femoral artery and vein pass just medially to the fibres of the iliopsoas muscle in the so-called lacuna vasorum space (which constitute the medial compartment of the femoral triangle). Further, sited medial to the iliopsoas and deep to the femoral vessels is the pectineus muscle, which constitute the floor of the femoral triangle.

The iliopsoas bursa is located anteriorly between the joint capsule and the posterior surface of the iliopsoas muscle. This is the largest synovial bursa of the human body, which communicates with the joint space in 15 % of cases.

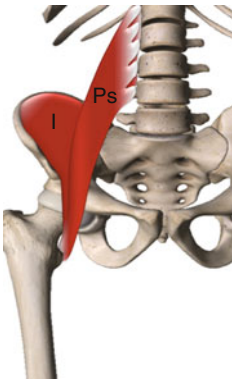

Fig. 8.1 Anatomical scheme of the ilipsoas muscle: *I* iliac muscle, *Ps* psoas major muscle

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Focus On

The *femoral triangle* (or Scarpa's triangle) is a connective tissue space located anteriorly in the proximal thigh. Its boundaries are the inguinal ligament, the medial border of the sartorius muscle, and the superior-lateral border of the adductor longus muscle (respectively superior, lateral and medial margins). Pectineus and adductor longus muscles compose the floor of this space, and the fascia lata (and the cribriform fascia at the saphenous opening) composes the roof of the triangle (Fig. 8.2). The femoral triangle could be divided into two compartments: a lateral compartment, the 'lacuna musculorum', which contains the iliopsoas muscle and the femoral nerve and a medial compartment, and the 'lacuna vasorum', which houses the common femoral artery and, lateral to it, the femoral vein.

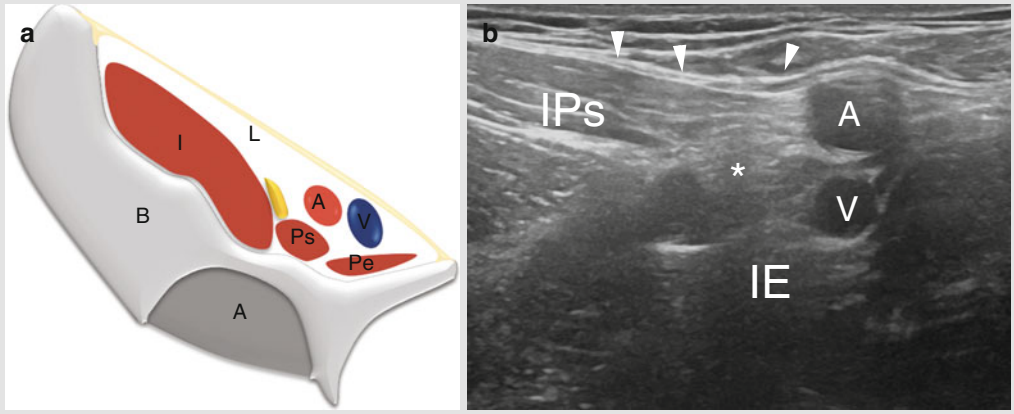

Fig. 8.2 (**a**) Anatomical scheme illustrating the femoral triangle. (**b**) US axial scan of the femoral triangle. *IE* ileopectineal eminence, *A* common femoral artery, *V* common femoral vein, * femoral nerve, *IP* Iliopsoas, *arrowheads* inguinal ligament

8.2 Ultrasound Examination Technique

The iliopsoas muscle is evaluated with the patient lying supine on the table with the leg extended and the hip slightly extrarotated (Fig. 8.3).

Palpate the anteroinferior iliac spine and position the probe just medially to it in a transverse plane. At this level, the US image shows, from lateral to medial, the hyperechoic cortex of the iliac bone with the attachment of the rectus femoris tendon, the fibres of the iliac muscle, the fibres of the psoas major muscle and finally the femoral neurovascular bundle (Fig. 8.4).

Maintaining a transverse orientation, it is possible to follow the iliopsoas muscle moving the transducer from cranial to caudal positions: on the US image, the myotendinous junction of the iliopsoas muscle can be progressively seen forming by the two distinct muscular bellies until the hyperechoic fibrillar oval structure of the tendon appears in a postero-medial eccentric position (Fig. 8.5).

At this level, turn the probe by 90° and follow the tendon along its long axis until its insertion on the lesser trochanter. Due to the curvilinear course of the iliopsoas tendon before the enthesis, anisotropy may significantly affect the visualization of tendon attachment over the lesser trochanter. Anisotropy can be reduced by positioning the patient in flexion, abduction and maximal external rotation of the thigh and by

pressing on the distal edge of the probe in order to correctly visualize also the distal portion of the tendon (Fig. 8.6).

The longitudinal US scan shows the cortex of the femoral head covered by the articular cartilage and the anterior joint capsule (normally the anterior joint recess is a virtual space); the acetabulum is located proximally, covered by the iliopsoas tendon and the rectus femoris muscle fibres. At this level, it is important to evaluate the presence of the iliopsoas bursa, which intervenes between the tendon and the anterior capsule on the medial hip and could be seen when distended by fluid (Fig. 8.7).

Further, dynamic scans may be useful to assess internal snapping hip. The patient is asked to move the hip in the frog leg position and then to return it to the normal supine position: oblique transverse US images obtained over the tendon can demonstrate the impingement between the iliopectineal eminence and the tendon which moves abruptly in a medial direction causing the snap.

Fig. 8.3 Lower limb position to evaluate the iliopsoas muscle

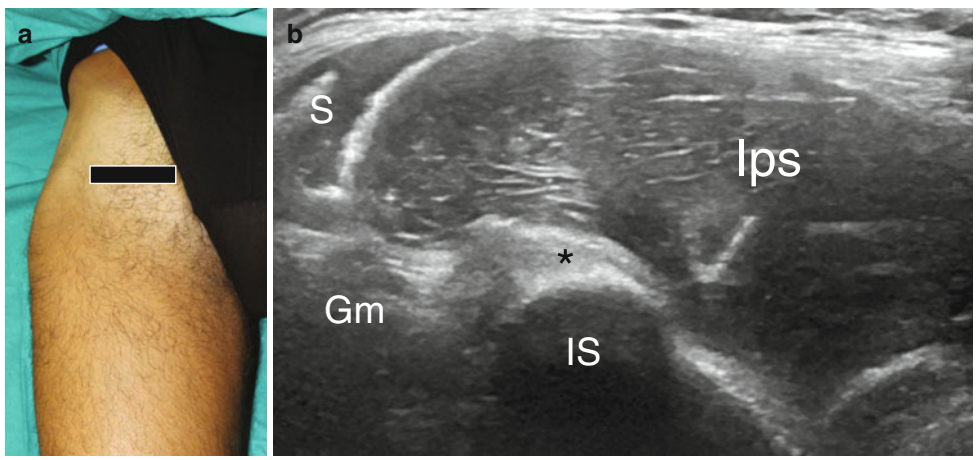

Fig. 8.4 (**a**) Probe position over the anterior hip for the evaluation of the iliopsoas muscle. (**b**) Corresponding US axial scan: this image shows the relationship between the anterior-inferior iliac spine (*IS*) and the iliopsoas muscle (*Ips*); on the left, the muscular fibres of the sartorius (*S*) and gluteus medius muscle (*Gm*) can be seen

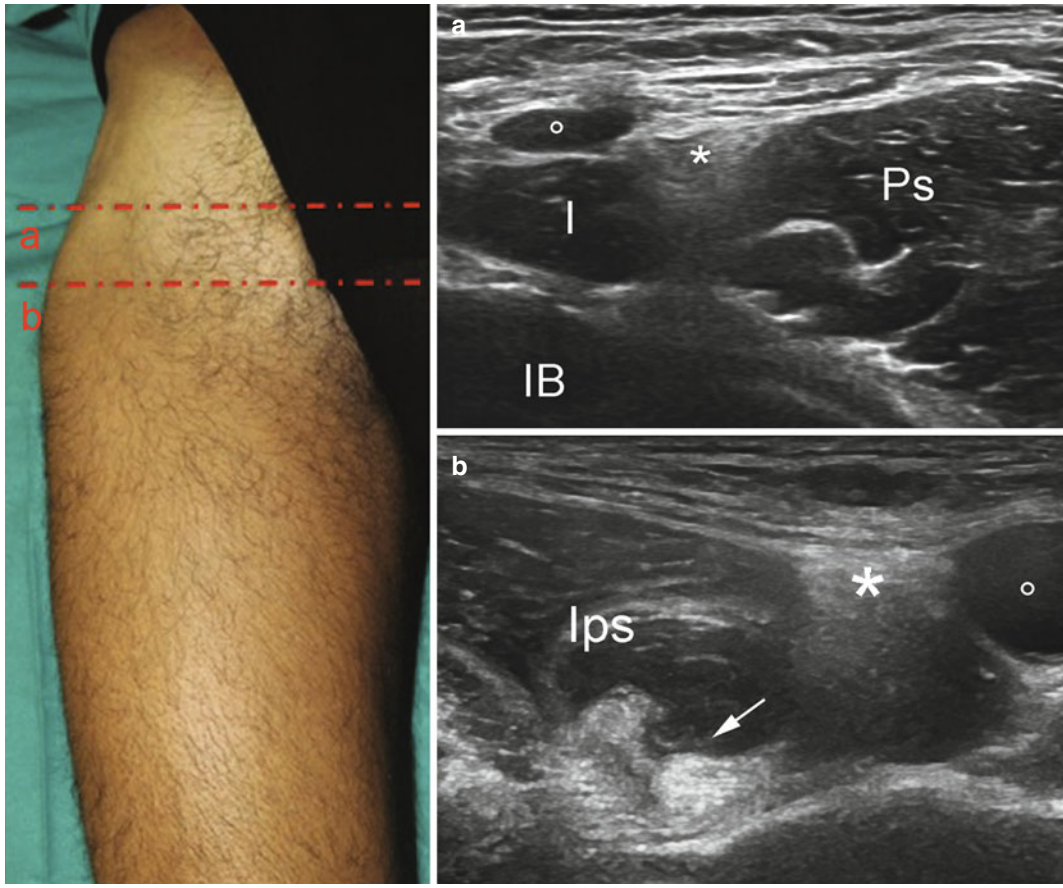

Fig. 8.5 Probe position over the anterior hip at different transverse planes for the evaluation of the iliopsoas muscle. (**a**) Cranial US axial scan showing the distinct muscle bellies of the iliac (*I*) and psoas major (*Ps*) muscles, respectively, on the left and on the right of the image, coursing in the lateral pelvis over the iiac bone (*IB*); at this level, the femoral neurovascular bundle with the femoral artery (*circle*) and nerve (*asterisk*) can be seen between the two converging muscular bellies. (**b**) Caudal US axial scan which shows the iliopsoas muscle belly (*Ips*) with its tendon in the typical eccentric position (*arrow*); at this level, the femoral neurovascular bundle can be seen on the medial aspect of the iliopsoas muscle, entering the femoral triangle

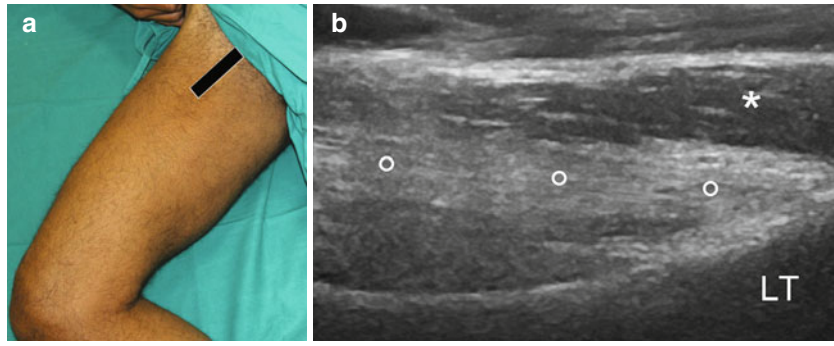

Fig. 8.6 (**a**) Patient position in flexion, abduction and maximal external rotation (**b**) US longitudinal scan showing the distal iliopsoas tendon (*circles*) inserting on the lesser trochanter (*LT*) and some fibres of the adductor longus muscle passing close to it. Press the probe over the skin and position along the tendon course to obtain a proper US scan

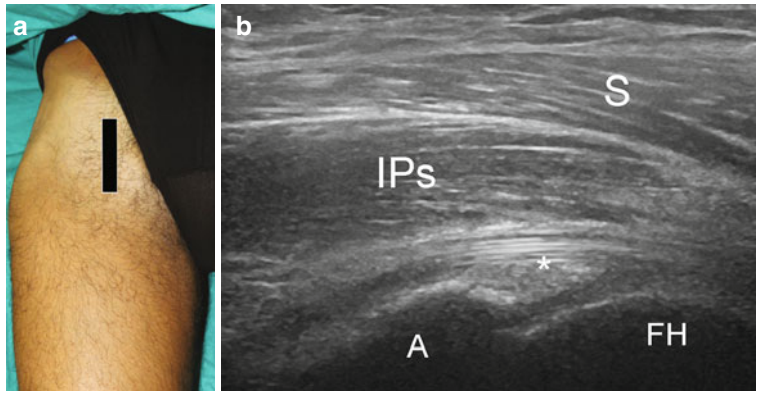

Fig. 8.7 (**a**) Probe position in a longitudinal scan, over the anterior aspect of the hip joint for the evaluation of the iliopsoas muscle. (**b**) Corresponding US longitudinal scan: this image shows the relationship between the iliopsoas muscle fibres (*IPs*), seen in a longitudinal plane, and the underlying joint capsule (*asterisk*), acetabulum (*A*) and femoral head (*FH*); sartorius muscular fibres (*S*) can be seen in a superficial position, passing over the iliopsoas muscle at this level

8.3 Summary Table

Muscle	Origin	Insertion	Innervation	Action
Psoas major	Lateral aspect of the vertebral bodies and transverse processes from T12 to L5	Lesser trochanter of the femur (conjoint tendon with iliacus)	Lumbar plexus: L2 and L3	Strongest flexor of the thigh and a flexor of the trunk when the thigh is flexed; also rotates the thigh laterally and stabilizes the pelvis
Iliacus	Iliac crest, iliac fossa, ala of the sacrum and sacroiliac and iliolumbar ligaments	Lesser trochanter of the femur (conjoint tendon with psoas major)	Femoral nerve (L2, L3, L4)	

Suggested Reading

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