

## The Hip– Scanning Protocol



## Diagnostic imaging of the Hip: Introduction

Examination of the hip will be dependent upon the specific structure and pathology suspected from a thorough clinical examination. Based on this examination it would be normal to scan one or two specific structures. In addition to static scanning dynamic imaging should be included particularly when imaging tendons and ligaments to fully assess the patency of these structures. It should be noted that examination of the hip can be problematic particularly in the muscular or obese patient given the anatomical position of the joint. The use of relatively low frequency ultrasound should be used where necessary to maximise image quality.

Imaging includes:

### Anterior - Supine:

- Hip joint including the femoral head, neck, capsule, and anterior synovial recess
- Anterior labrum
- Iliopsoas muscle, tendon and bursa
- AIIS and the tendon and muscle of rectus femoris
- ASIS and the tendons and muscles of sartorius and tensor fascia lata
- Lateral femoral cutaneous nerve and inguinal ligament

### Medial Region - Supine in Frog-leg position:

- Adductor tendons and muscles

### Lateral – Side lying:

- Gluteus maximus, Tensor fascia lata and the fascia lata
- Gluteus medius muscle and tendon
- Gluteus minimus muscle and tendon
- Greater trochanter and bursa (if pathological)

### Posterior – Prone lying:

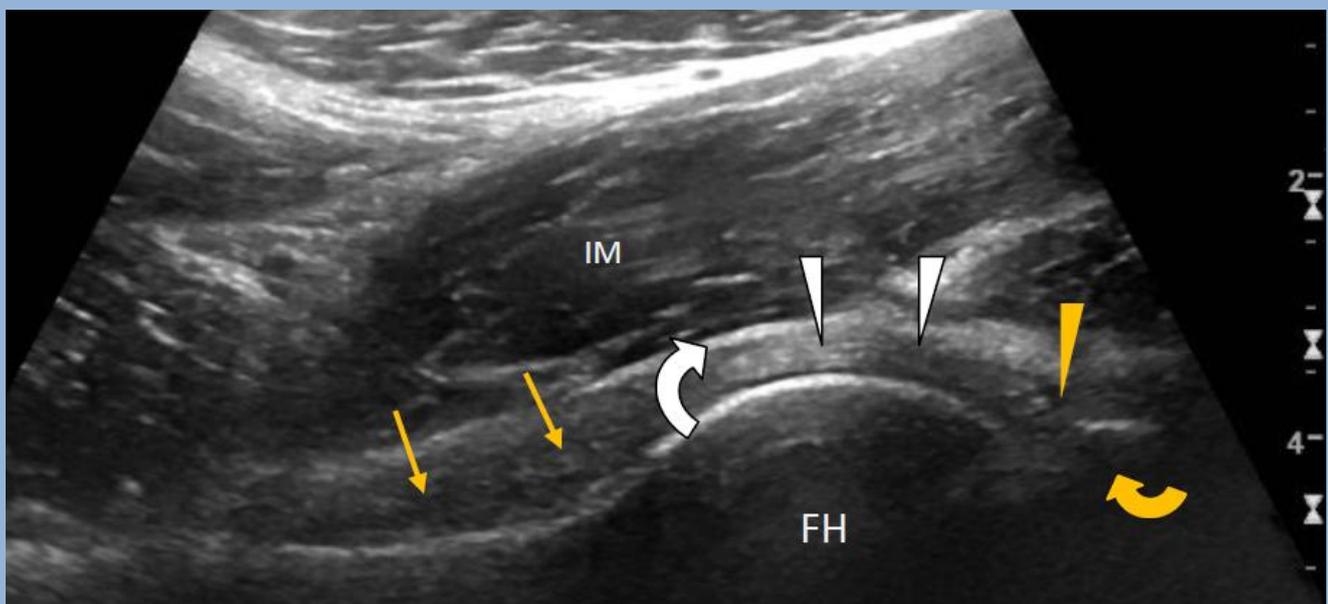
- Hamstring muscles and tendon
- Ischial tuberosity and bursa (if pathological)

# 1. Anterior

## Anterior Hip Joint: Longitudinal Scan

The hip joint may only be effectively visualised from its anterior aspect which also allows imaging of the anterior femoral recess and the iliopsoas tendon and bursa (if pathological).

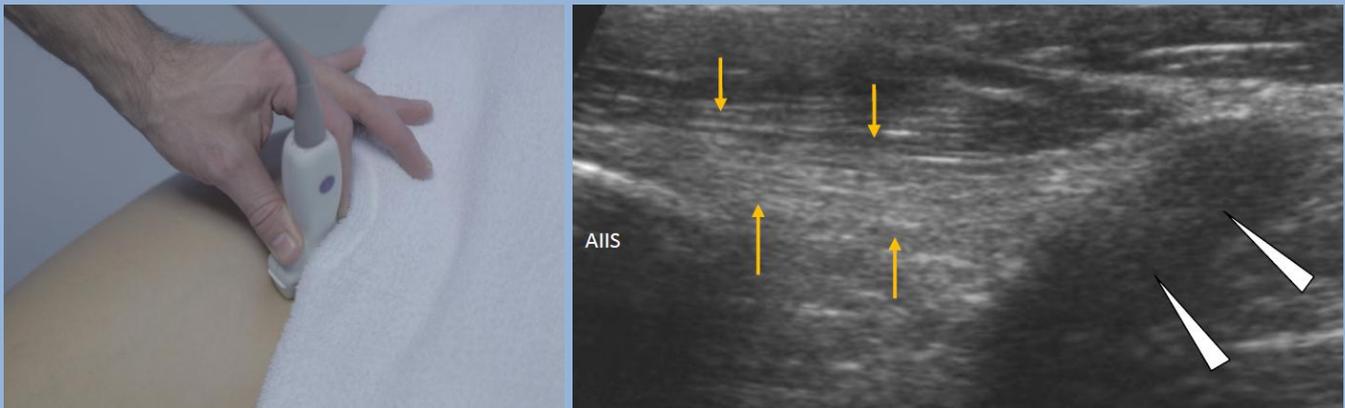
The patient is positioned in supine. A small pillow placed under the knee allows the hip to rest in a few degrees flexion which can facilitate scanning. To visualise the anterior aspect of the hip joint and the anterior femoral recess a large foot-print probe is required. In addition given the depth of the joint particularly in the larger patient a low frequency probe should be used.



**Legend:** FH-femoral head; IM iliopsoas muscle; White arrowheads- anterior capsule of hip joint and iliofemoral ligament; Curved yellow arrow- anterior margin of acetabulum; Curved white arrow- location of psoas bursa; Yellow arrowhead- anterosuperior labrum.

### Anterior Inferior Iliac Spine (AIIS): Longitudinal Scan

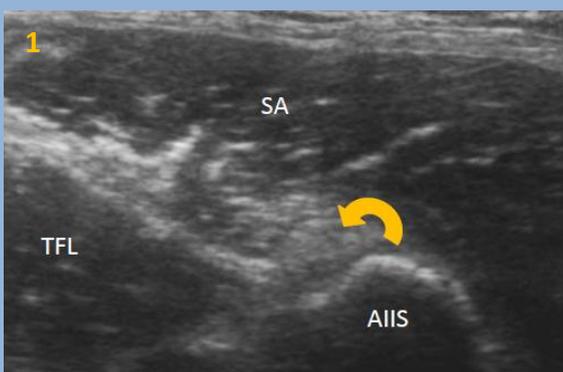
The patient is positioned in supine. A small pillow placed under the knee allows the hip to rest in a few degrees flexion which may facilitate scanning. The probe is placed over the anterior inferior iliac spine (AIIS) in the sagittal plane to image both the AIIS and the tendon of rectus femoris. The use of a large foot-print probe allows for better visualisation of this area. In the larger patient a low frequency curvilinear probe should be used.



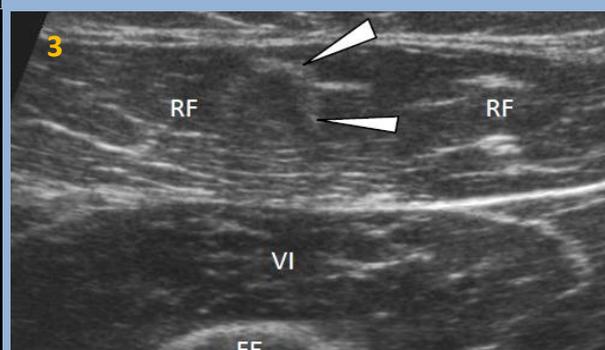
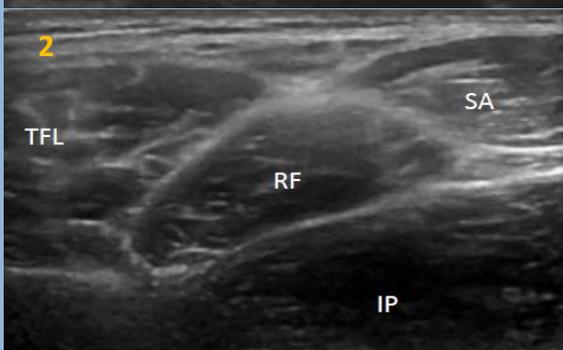
**Legend:** AIIS-anterior inferior iliac spine; Yellow arrows-rectus femoris tendon (direct tendon); White arrowheads-rectus femoris tendon (indirect tendon).

### Anterior Inferior Iliac Spine (AIIS): Transverse Scan

Turn the transducer through 90 degrees to lie in the transverse plane to image the origin of the direct tendon of rectus femoris. The transducer should then be moved in a caudal direction maintaining alignment in the transverse plane to image first the musculotendinous junction of the rectus femoris and then the muscle belly itself which can be found positioned between tensor fasciae lata, sartorius and iliopsoas. More distally the muscle of rectus femoris may be seen to overlay the vastus intermedius muscle belly (sequentially from proximal to distal 1-2-3).

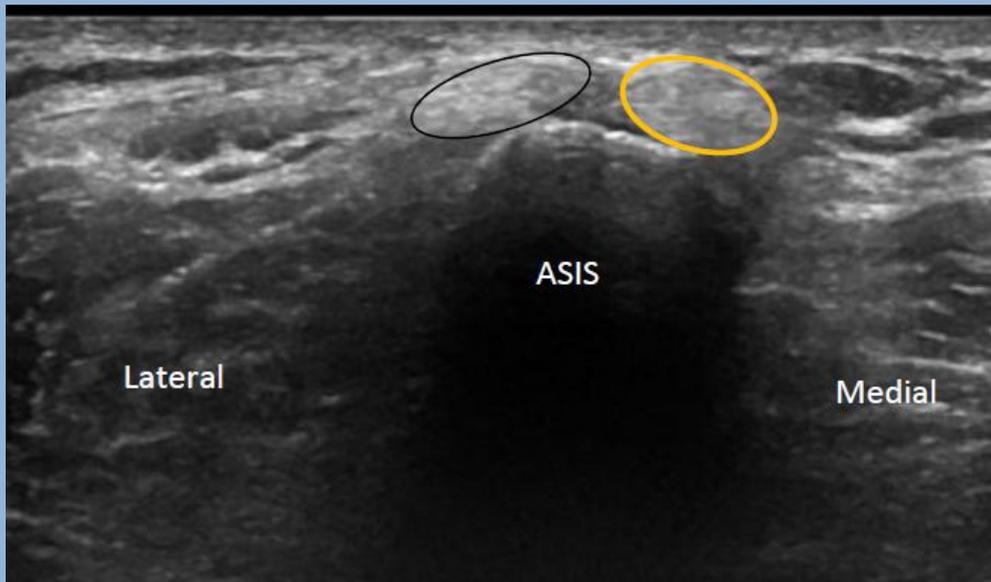


**Legend:** AIIS-anterior inferior iliac spine; SA-sartorius; TFL-tensor fasciae lata; Curved yellow arrow-rectus femoris tendon; IP-iliopsoas; VI-vastus intermedius; FE-femur; White arrowheads-central aponeurosis of rectus femoris.



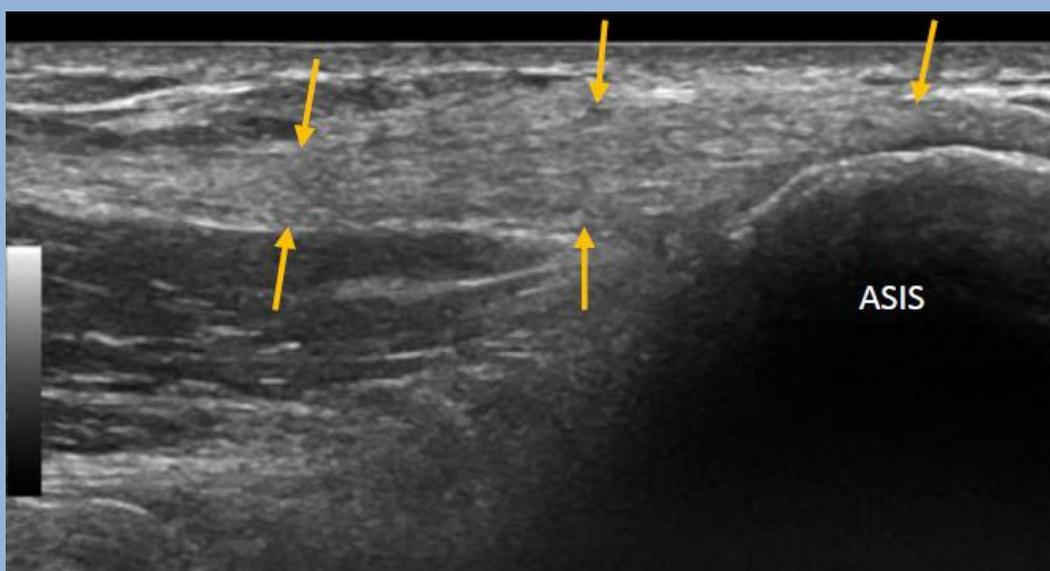
### Anterior Superior Iliac Spine (ASIS): Transverse Scan

The patient is positioned in supine and the probe is placed over the anterior superior iliac spine in the transverse plane to image the tendons of sartorius medially and tensor fasciae lata laterally. Each tendon may be followed distally to view the musculotendinous junction and more distally the muscle belly itself. The muscle of rectus femoris may be seen to lie between the muscles of sartorius and tensor fasciae lata in the upper part of the thigh.



### Anterior Superior Iliac Spine (ASIS): Longitudinal Scan

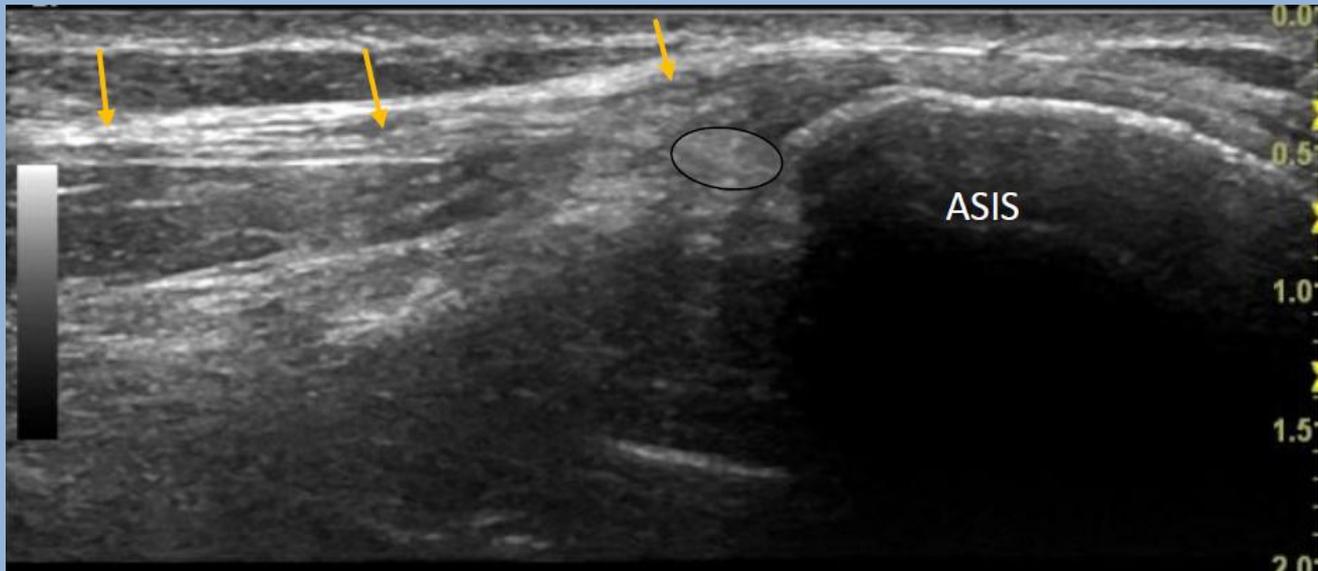
The probe is turned through 90 degrees so that it lies in the sagittal plane with its proximal edge against the ASIS. With the probe directed a few degrees medially the tendon of Sartorius can be seen and when directed laterally the tendon of tensor fascia lata can be viewed.



*Legend: ASIS-anterior superior iliac spine; Black oval-tensor fascia lata; Yellow oval-sartorius; Yellow arrows-tendon of sartorius.*

### Lateral femoral cutaneous nerve and inguinal ligament: Transverse Scan

Immediately medial to the anterior superior iliac spine in the transverse oblique plane the lateral femoral cutaneous nerve may be seen deep to the inguinal ligament as an ovoid hypoechoic foci passing through the lacuna musculorum anterior and lateral to the iliacus muscle.



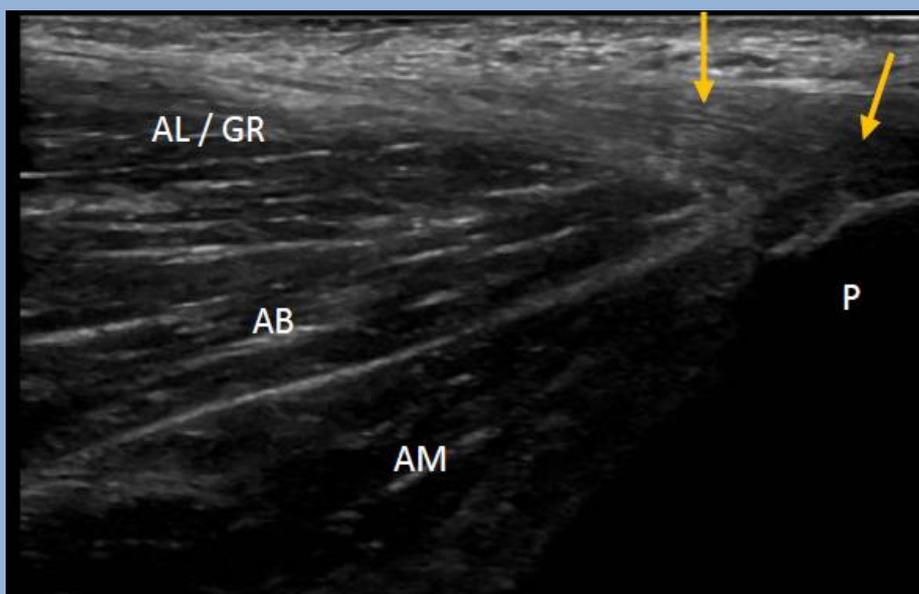
*Legend: ASIS-anterior superior iliac spine; Yellow arrows-inguinal ligament; Black oval-lateral cutaneous nerve of the thigh.*

## 2. Medial

### Medial Hip: Longitudinal Scan

The patient is positioned in supine with the leg to be examined flexed and abducted a few degrees at the hip and in some external hip rotation (frog-leg position). The knee should be in a few degrees flexion. The probe is placed in the anatomical coronal plane so that it lies longitudinally over the bulk of the adductor muscles and tendons. The proximal edge of the probe should lie against the inferior pubic rami. In this position three distinct layers should be visible with the adductor insertion being visible proximally as a triangular hypoechoic structure.

<b>Superficial</b>	<i>Adductor longus (anterior) and gracilis (posterior)</i>
<b>Intermediate</b>	<i>Adductor brevis</i>
<b>Deep</b>	<i>Adductor magnus.</i>



**Legend:** AL-adductor longus; GR-gracilis; AB-adductor brevis; AM-adductor magnus; Yellow arrow-common adductor tendon; P-pubic rami.

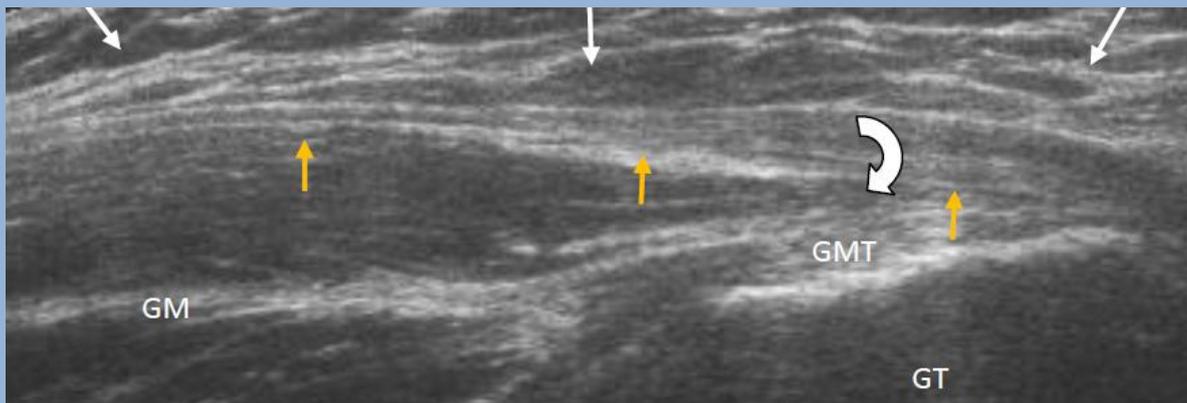
### 3. Lateral

#### Lateral Hip: Longitudinal Scan

The patient is positioned in side lying with the hips and knees in flexion. The probe is placed in the anatomical coronal plane so that it lies longitudinally over the greater trochanter. In this position it should be possible to visualise the lateral fascia of the thigh overlying the gluteus medius and minimus tendons at their insertion onto the greater trochanter. It should be noted that although a diagnosis of trochanteric bursitis is often given ultrasound more commonly demonstrates evidence of a gluteal tendinopathy.

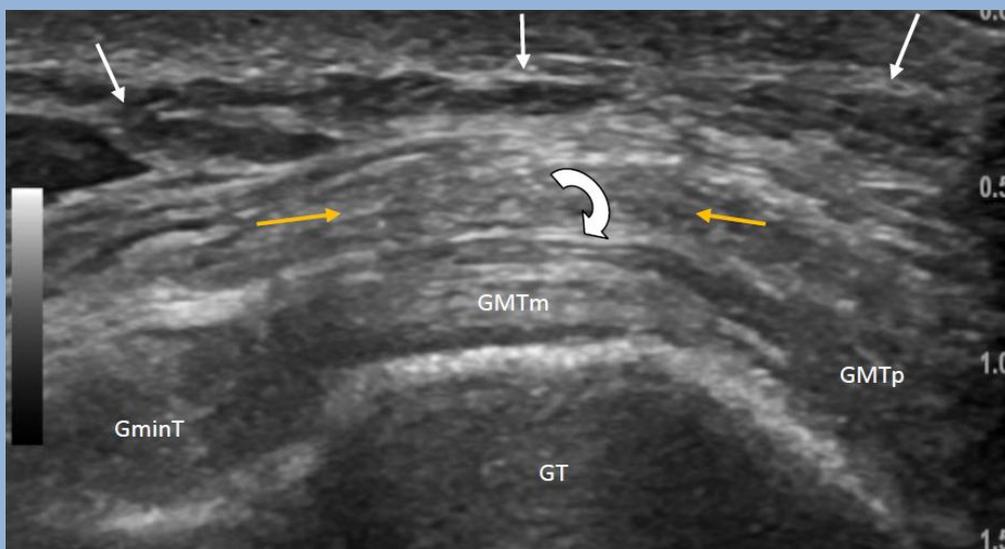


*Legend: GT-greater trochanter; GMT-gluteus medius tendon; GM-gluteus medius muscle; GminT-gluteus minimus tendon; Yellow arrows-lateral fascia of the thigh; White arrows-subcutaneous fat; Curved arrow-position of trochanteric bursa.*



#### Lateral Hip: Transverse Scan

Turn the probe through 90 degrees to lie in the anatomical transverse plane over the greater trochanter.



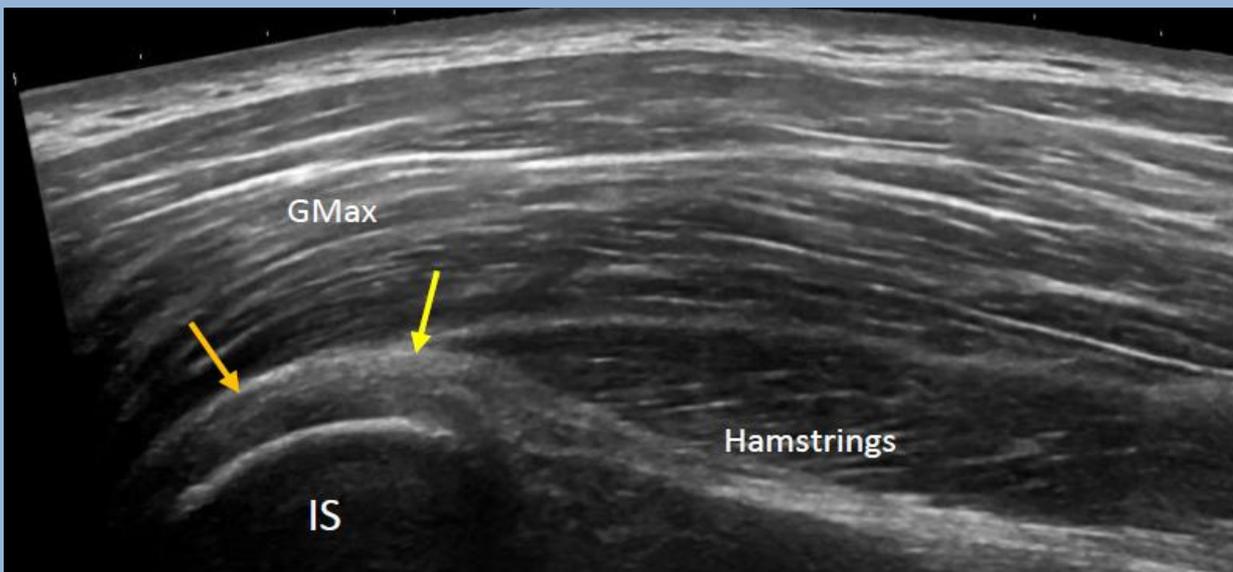
## 4. Posterior

### Posterior Hip: Longitudinal Scan

The patient is positioned in side lying with the hips and knees in flexion. This allows better visualisation of the ischium. The probe is placed in the anatomical sagittal plane so that it lies longitudinally over the ischium and common hamstring tendon.



*Legend: IS-ischium; GMax-gluteus maximus;  
Yellow arrows-common hamstring tendon*



### Posterior Hip: Transverse Scan

Turn the probe through 90 degrees to lie in the anatomical transverse plane over the ischium and common hamstring tendon

