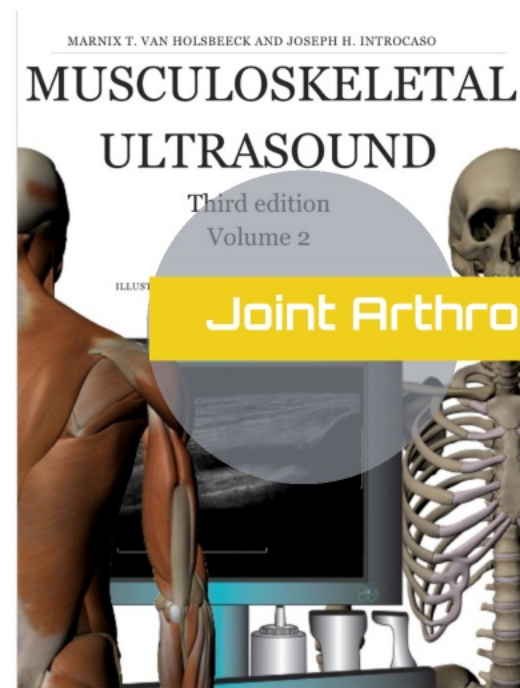
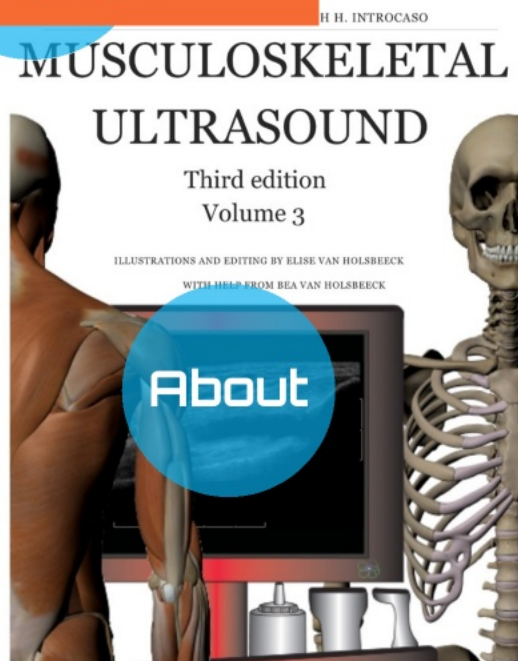


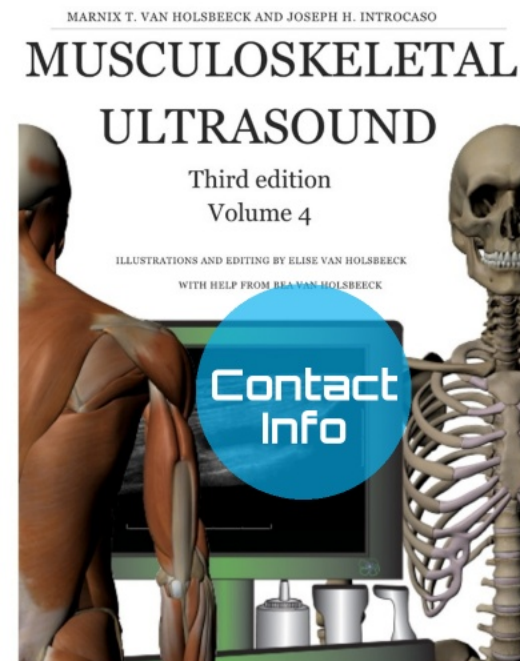
Musculoskeletal
Lexicon



Joint Arthroplasty



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Marnix van Holsbeeck, MD

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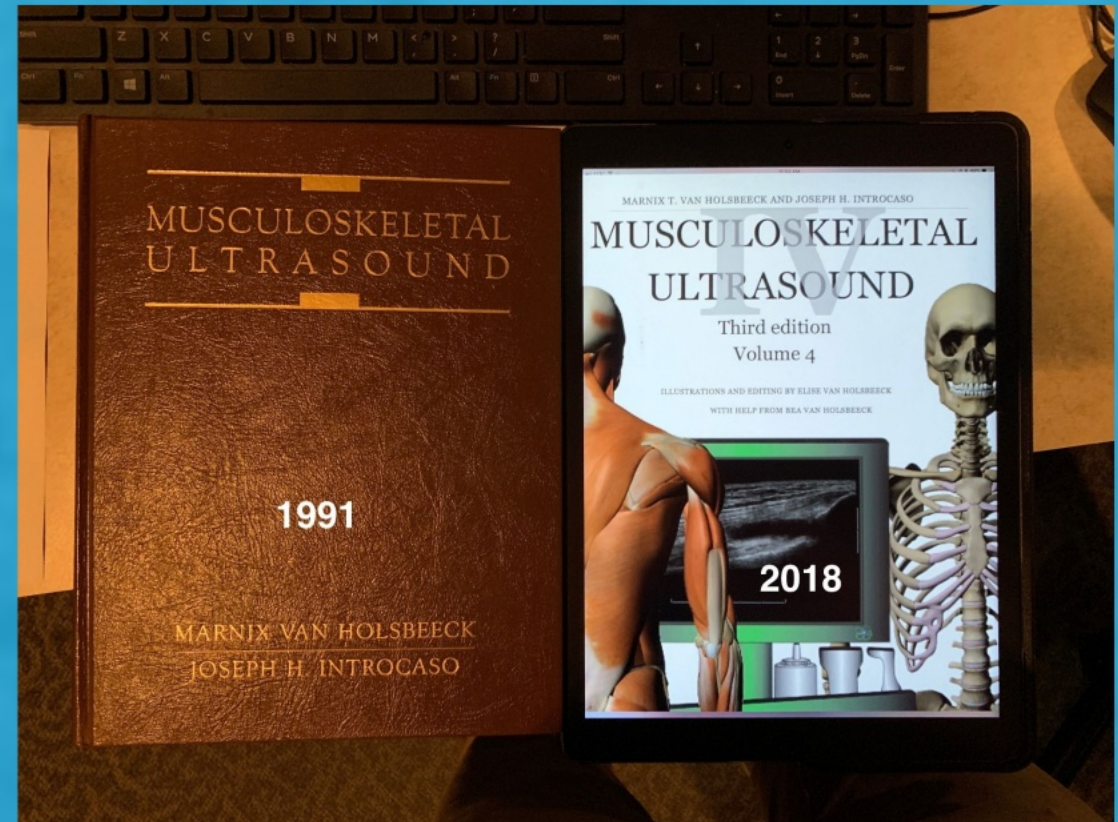
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Musculoskeletal Ultrasound

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Musculoskeletal Ultrasound

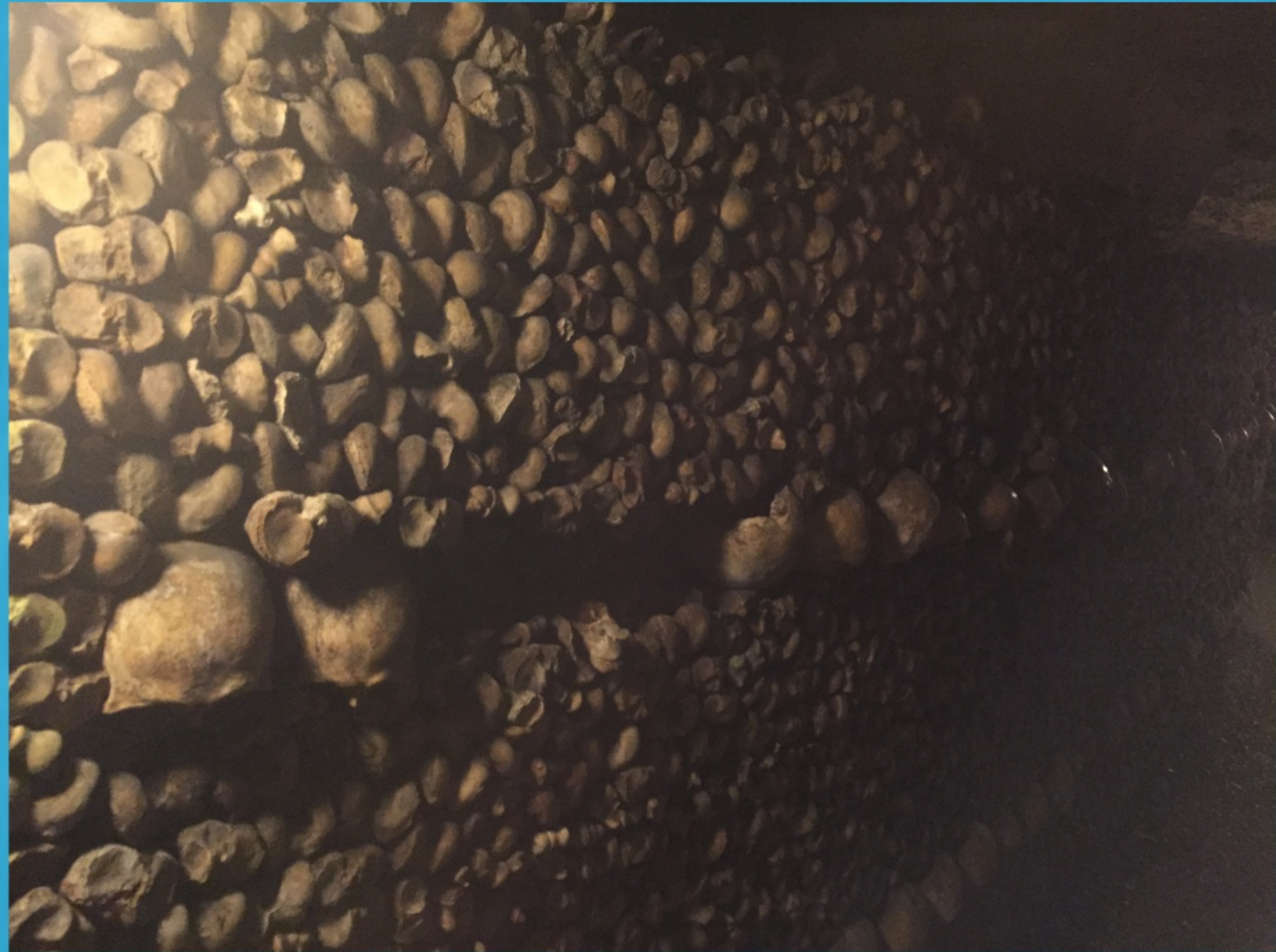


van Holsbeeck



van Wesele

van Wesele



van Wesele



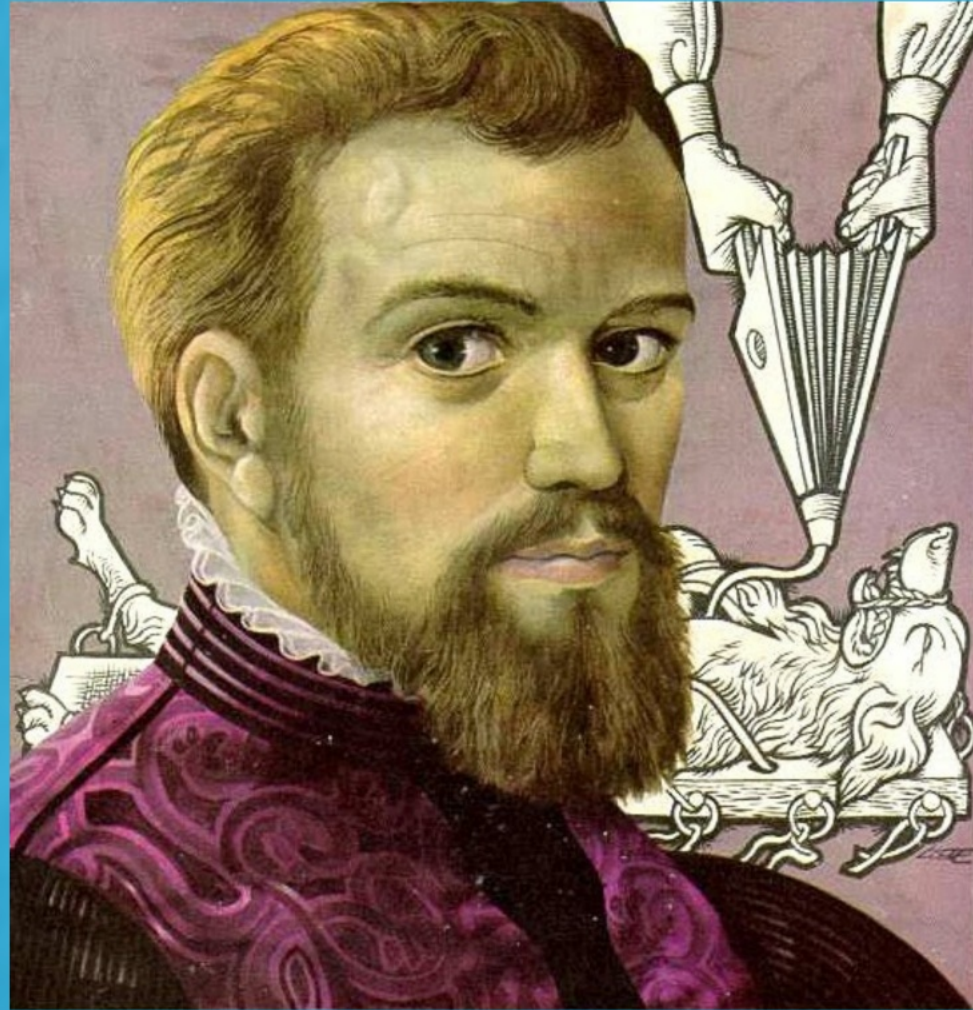


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ANDREAS VESALIUS

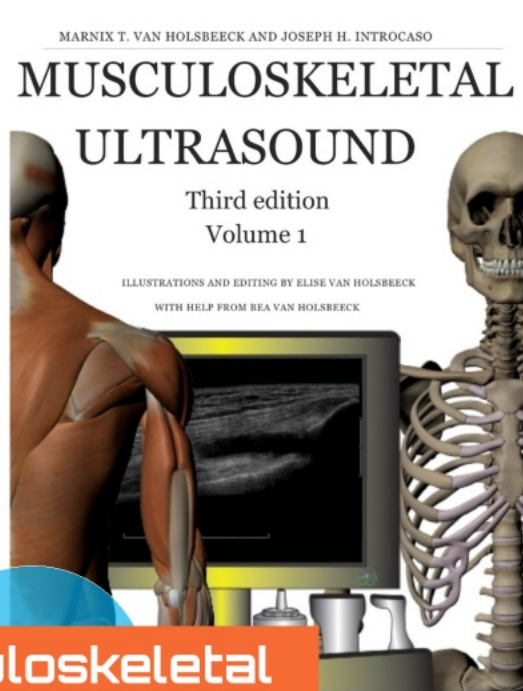


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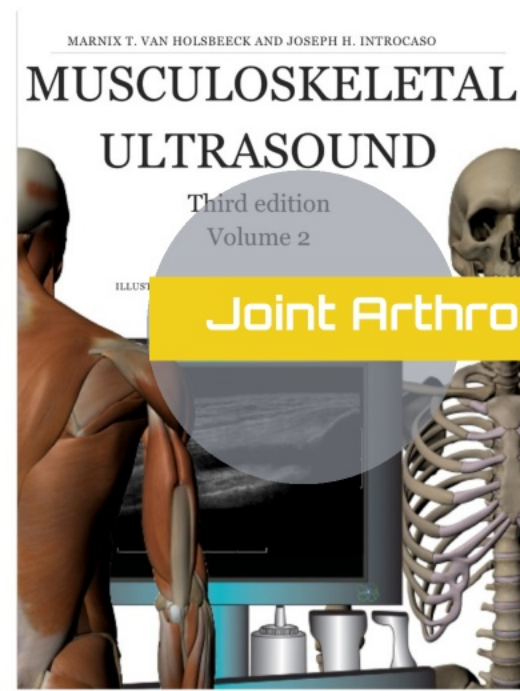


OSTEOLOGY

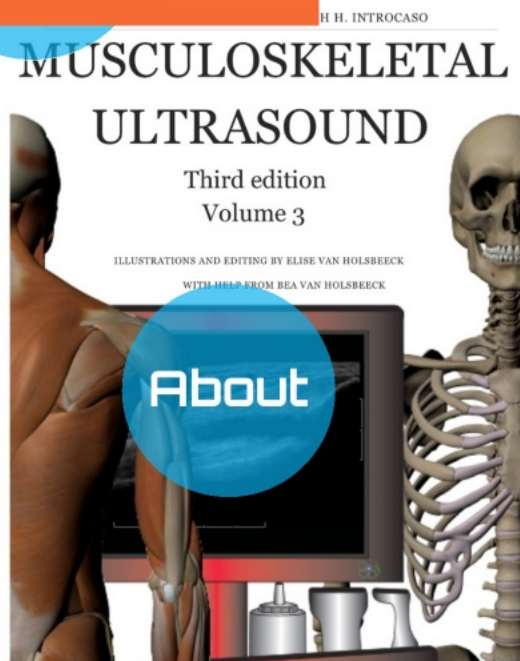
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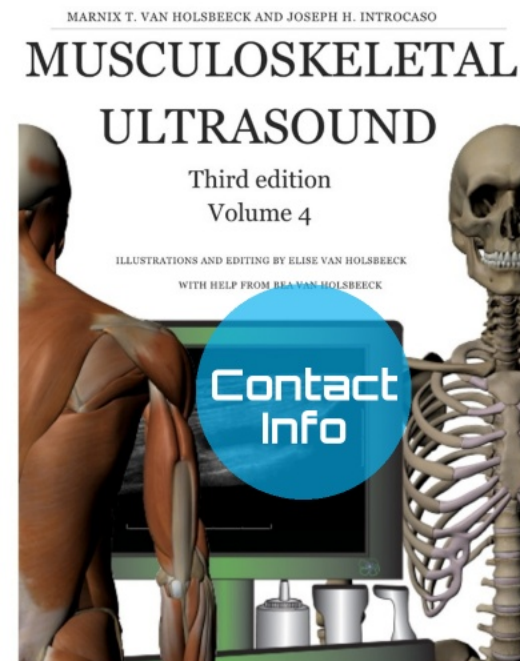
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Agree on Language

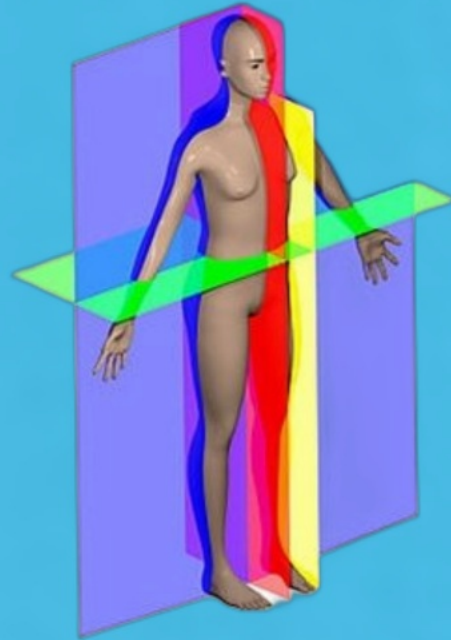
1. Imaging planes
2. Tendon Footprint
3. Groin and hip
4. Impinge

Agree on Language

1. *Imaging planes*
2. Tendon Footprint
3. Groin and hip
4. Impinge

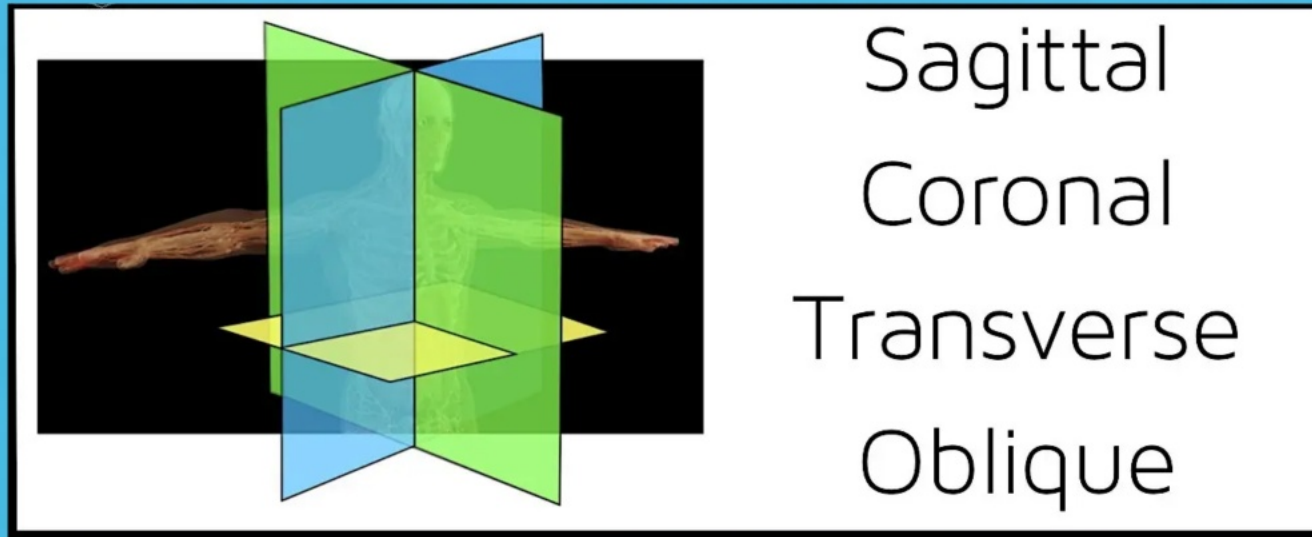
STANDARD IMAGING PLANES

CONVENTIONS IN ANATOMY

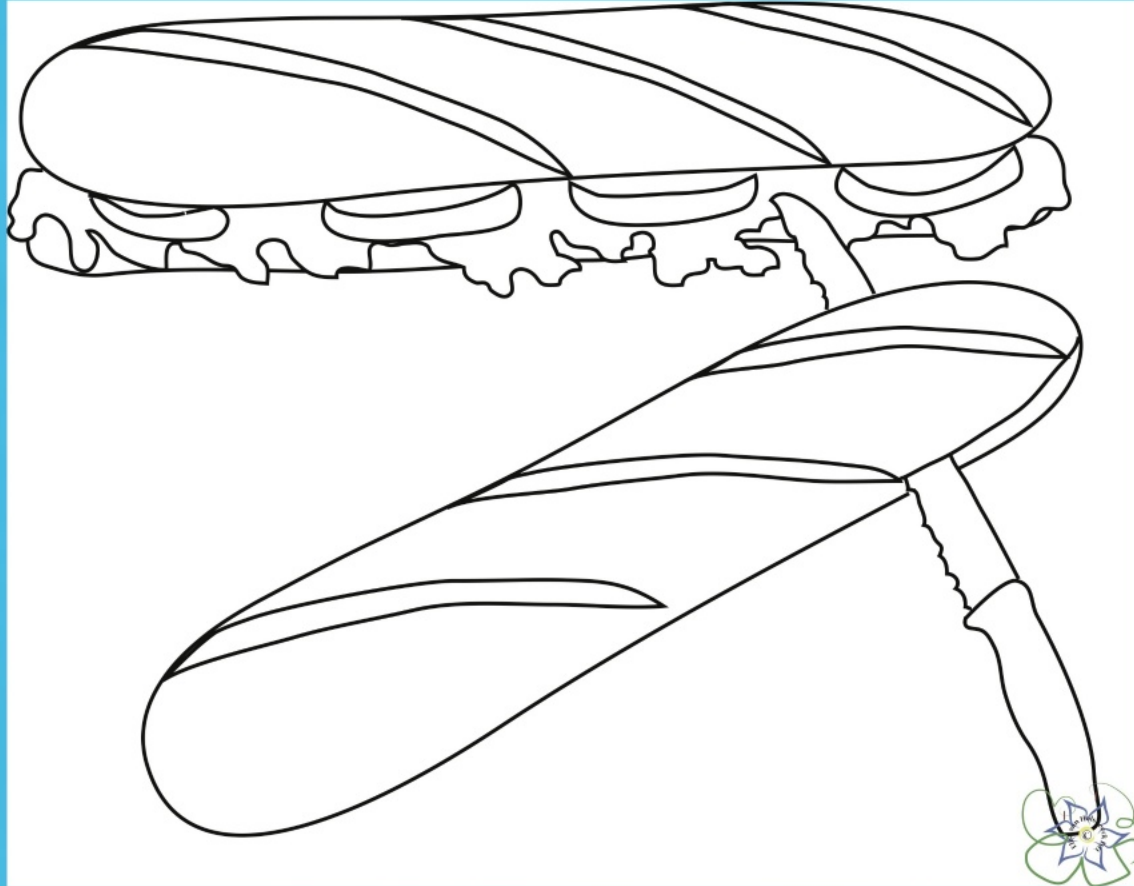


STANDARD IMAGING PLANES

CONVENTIONS IN ANATOMY

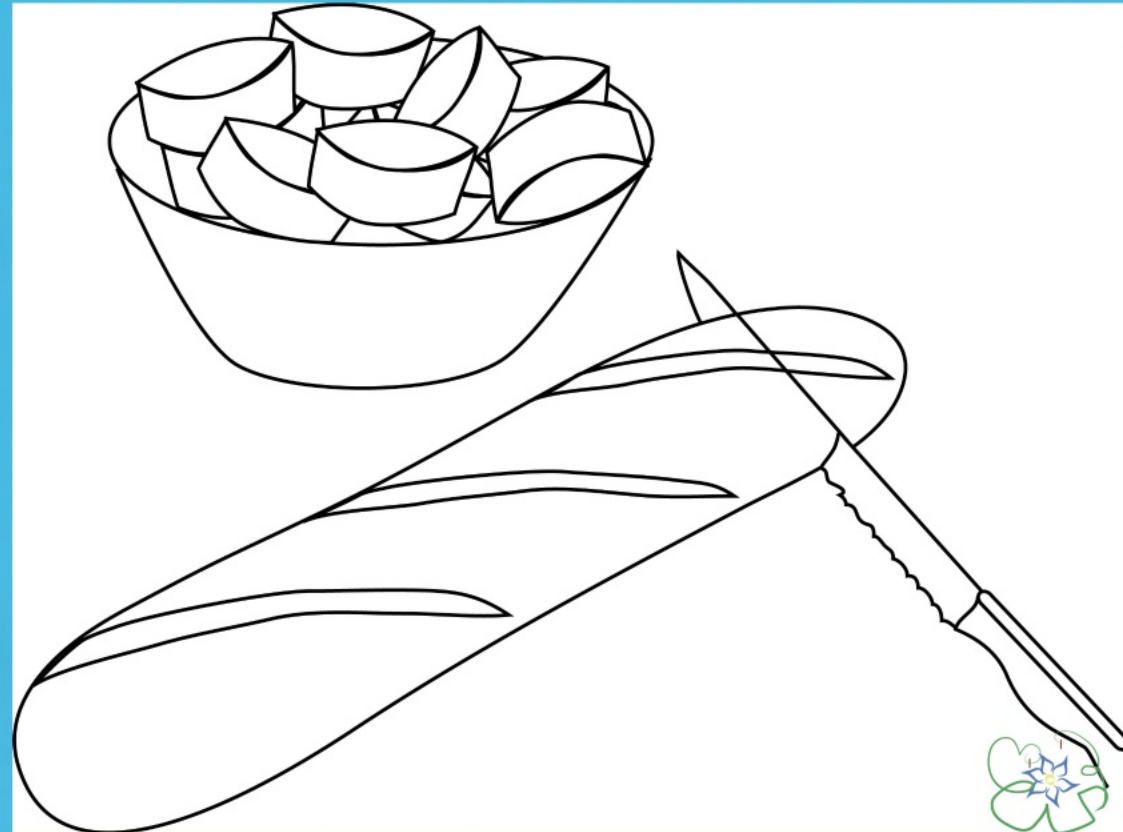


Long axis (LAX)



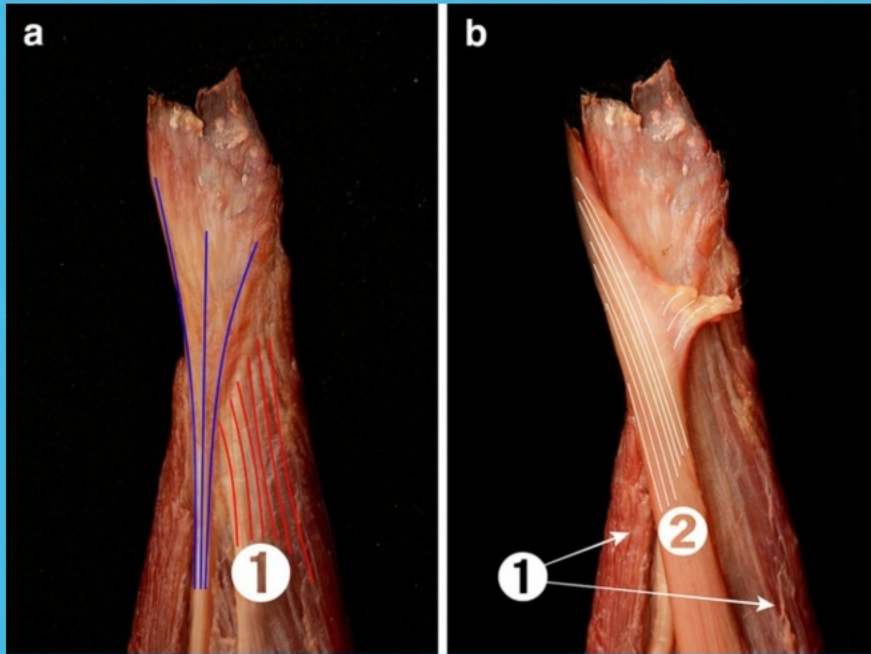
... relative to ..

Short axis (SAX)



... relative to...

Unique features of muscles and tendons

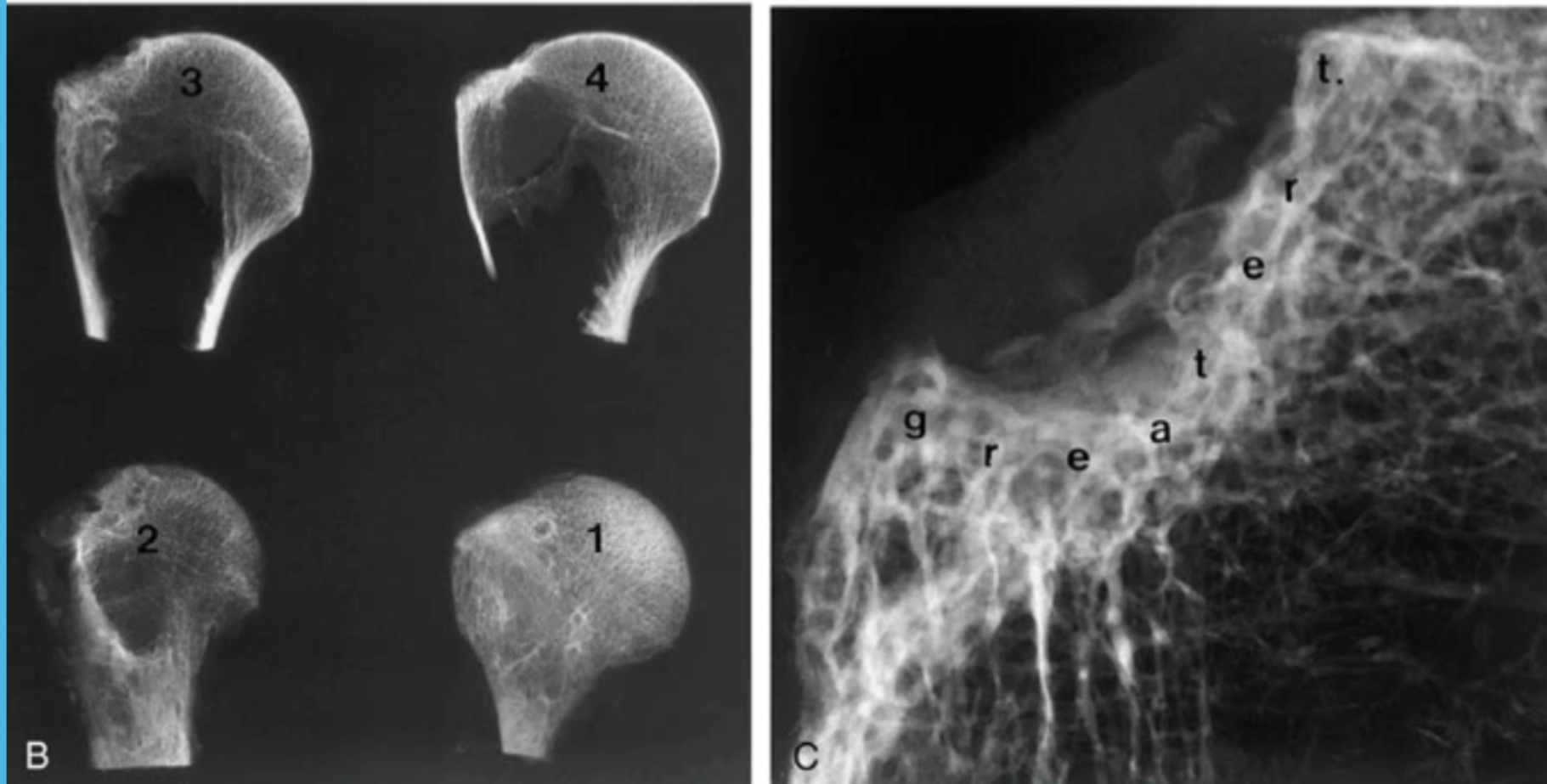


+ conjoin
+ spiral

Agree on Language

1. Imaging planes
2. *Tendon Footprint*
3. Groin and hip
4. Impinge

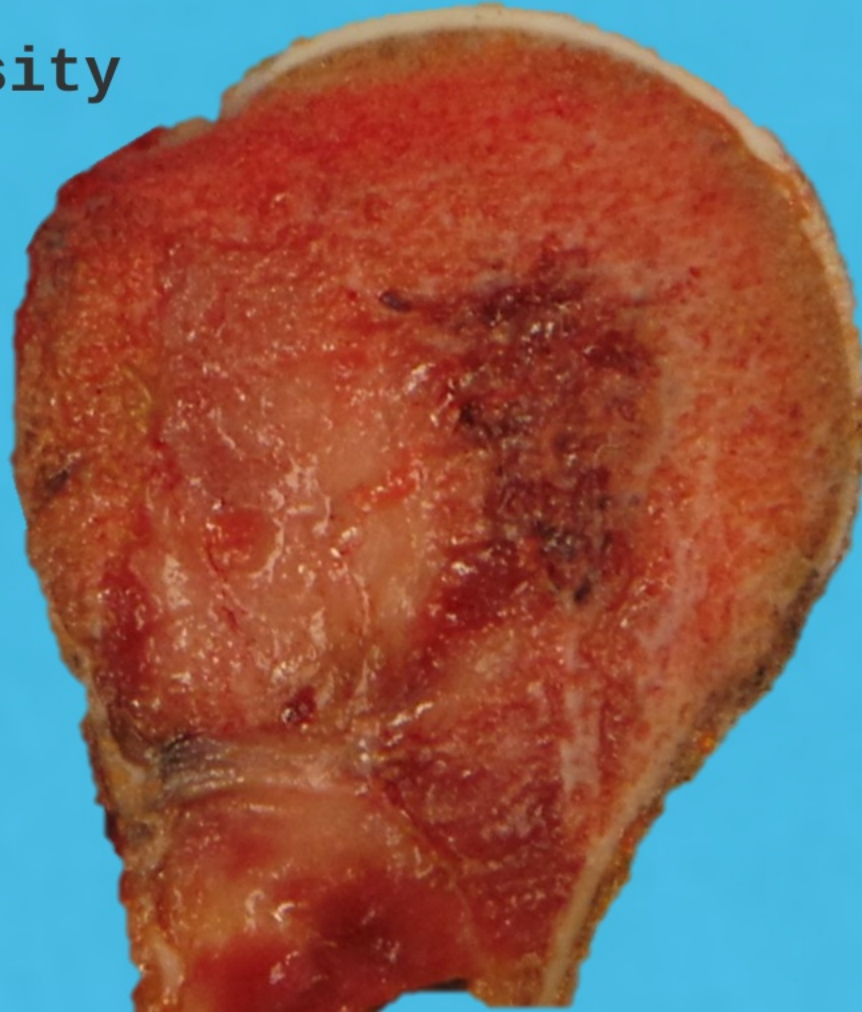
Osseous landmarks



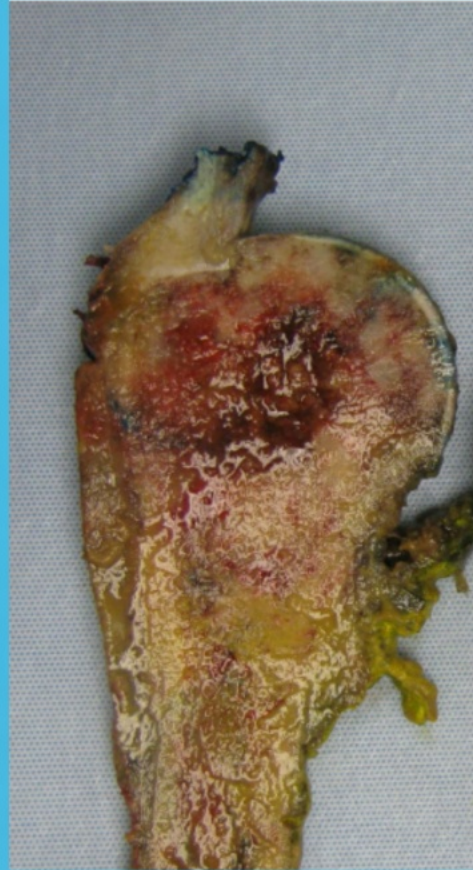
Osseous landmarks

Tuberosity

Epiphysis



Tendon footprint



Tendon footprint



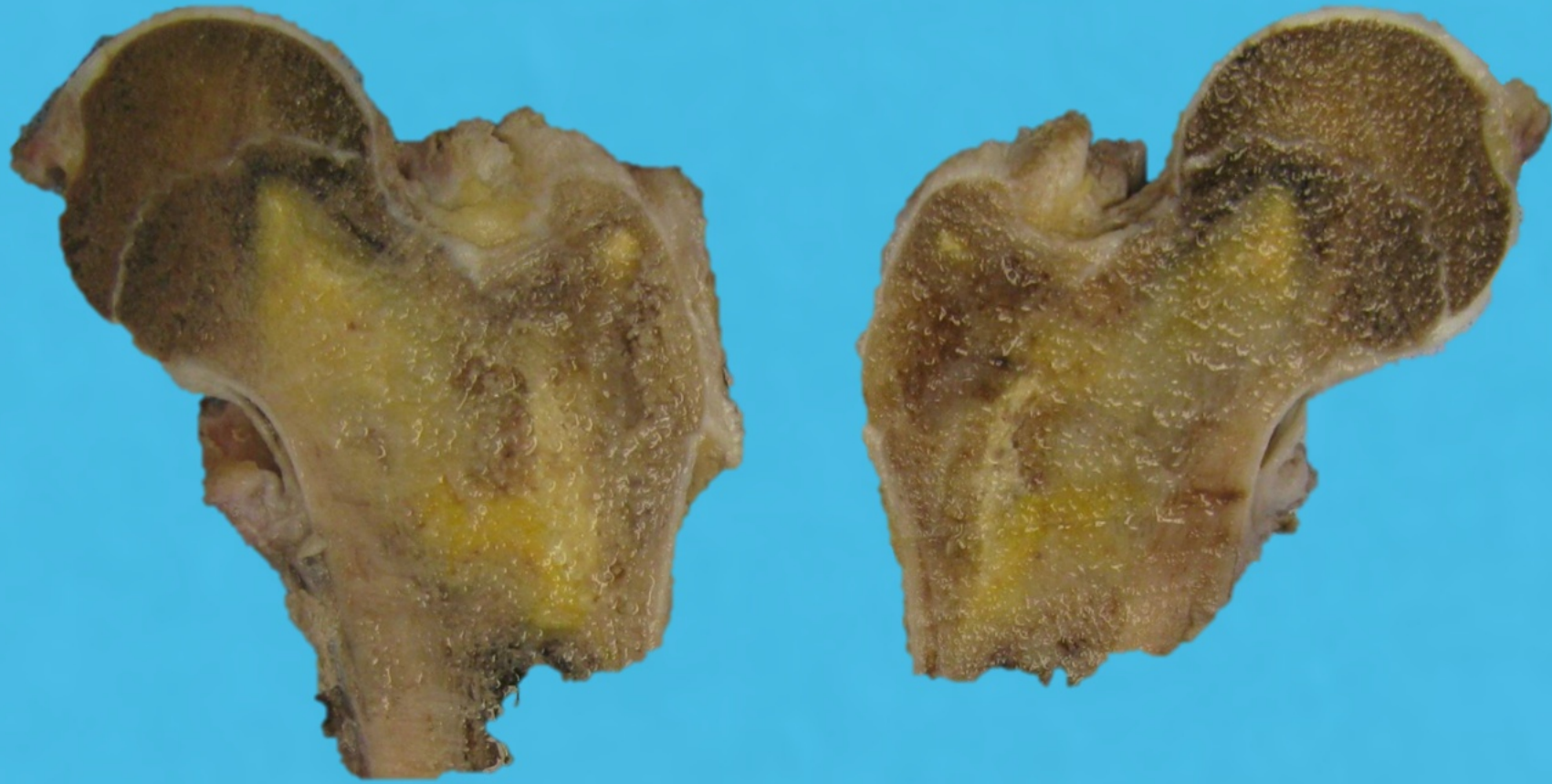
Tendon footprint



Tendon footprint

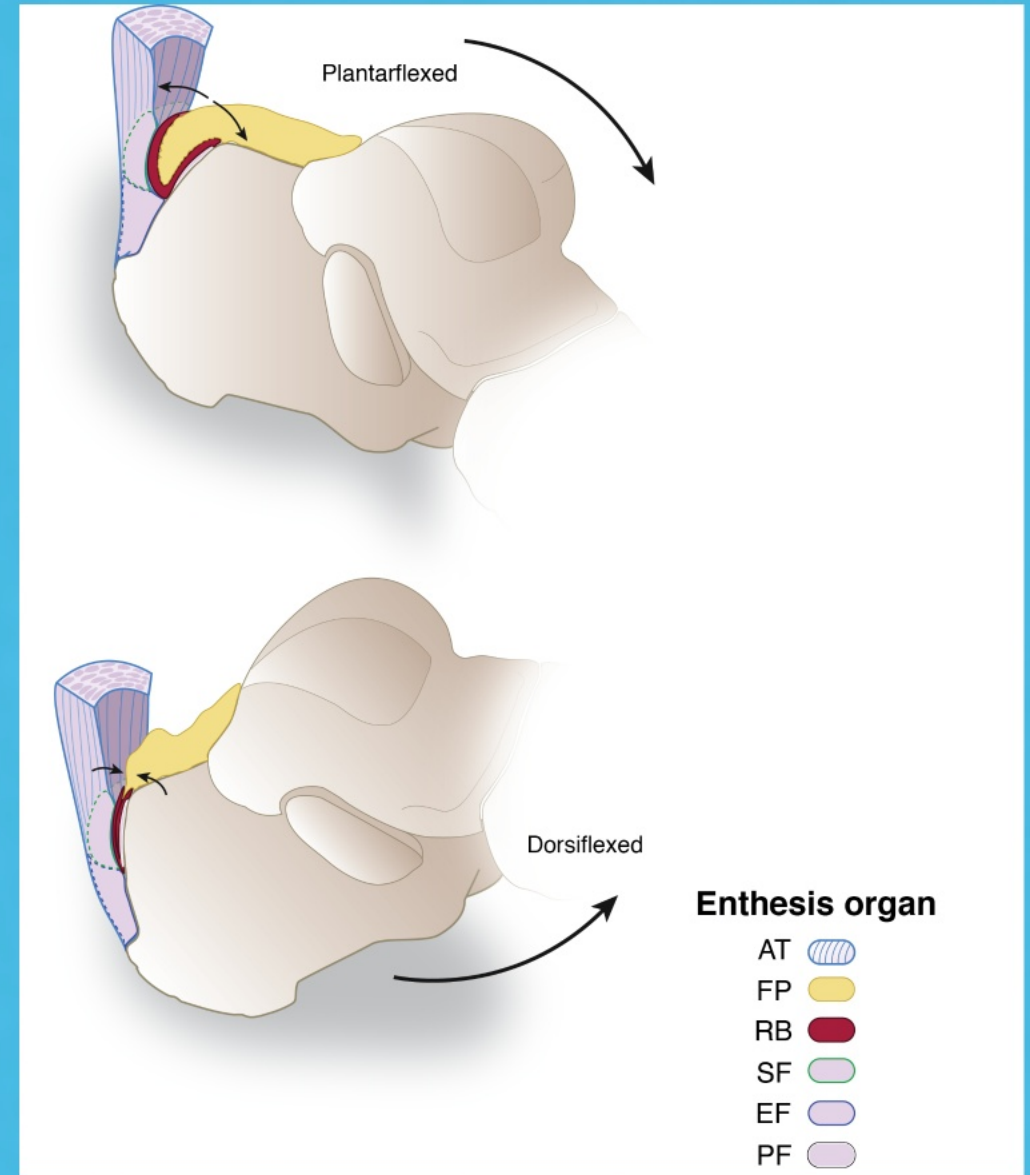


Tendon footprint

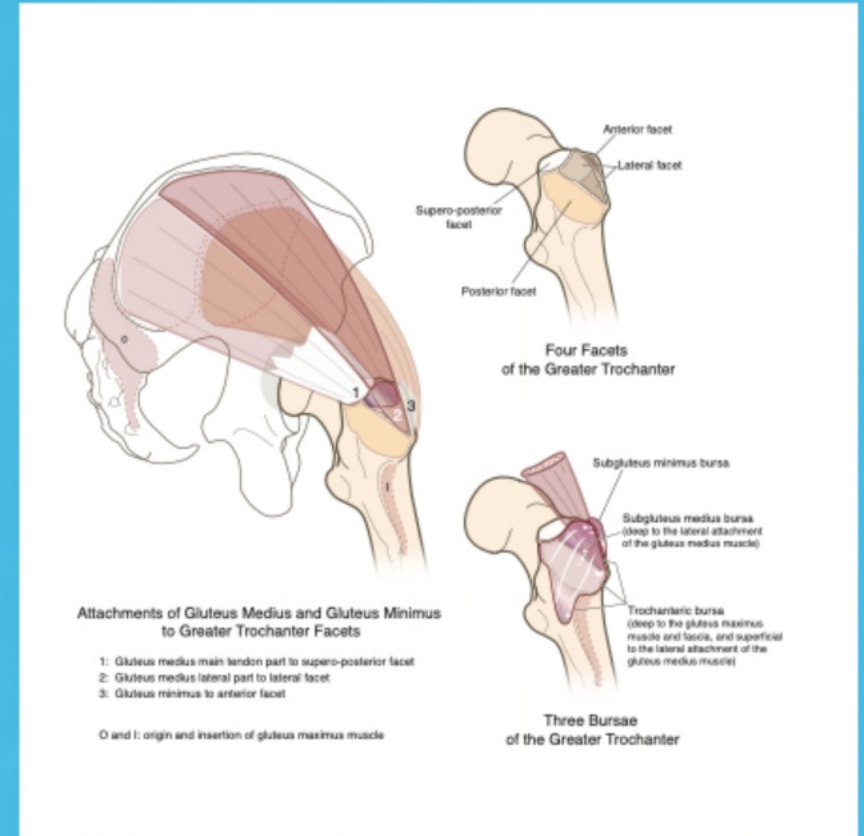
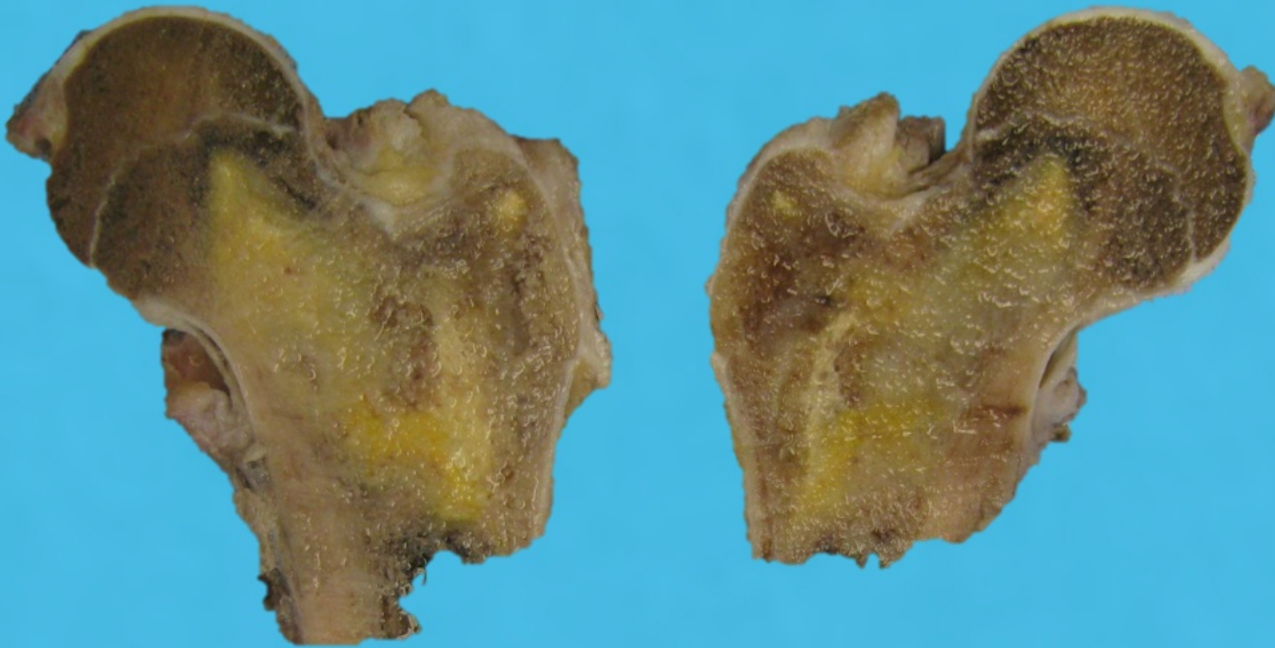


Enthesis

- Fat
- Fluid
- Synovium
- Cartilage



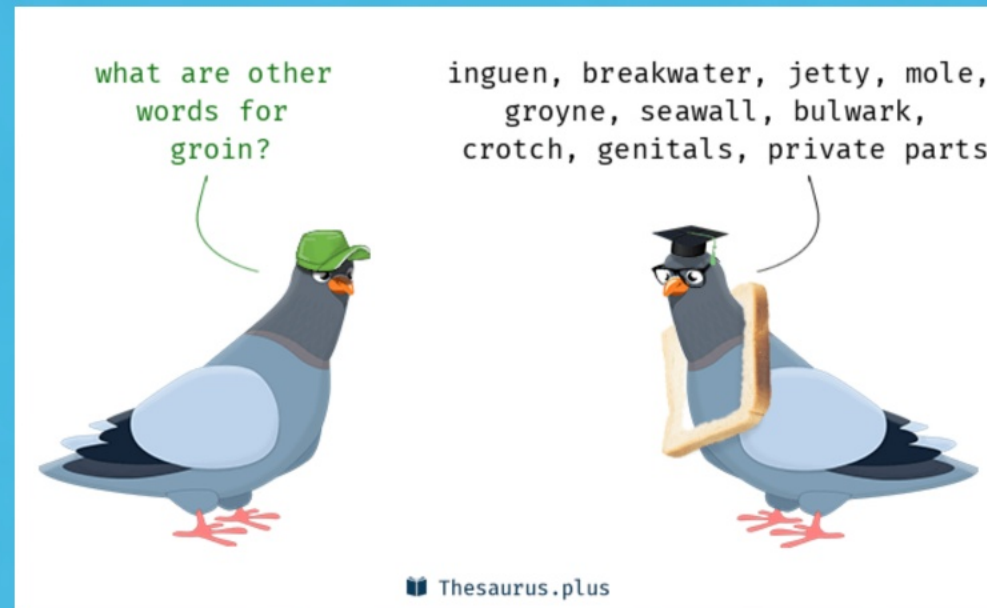
Tendon footprint



Agree on Language

1. Imaging planes
2. Tendon Footprint
3. *Groin and hip*
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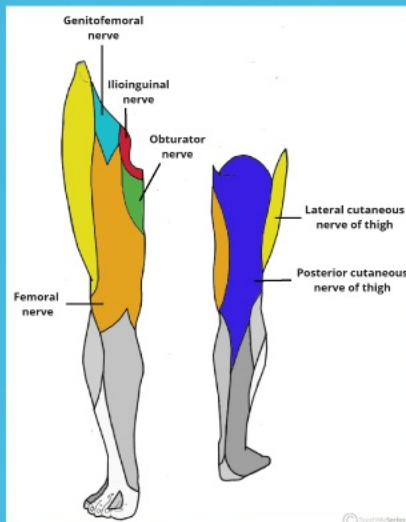
Midwestern English versus Oxford English versus Stedman English



Anatomy

GROIN:

- *formal/medical* - the area between abdomen and thigh on either side of the body
- *informal/ lay* - the area of the genitals



webster/ oxford languages

GROIN:

- *formal/medical* - the area between abdomen and thigh on either side of the body
- *informal/ lay* - the area of the genitals

HIP:

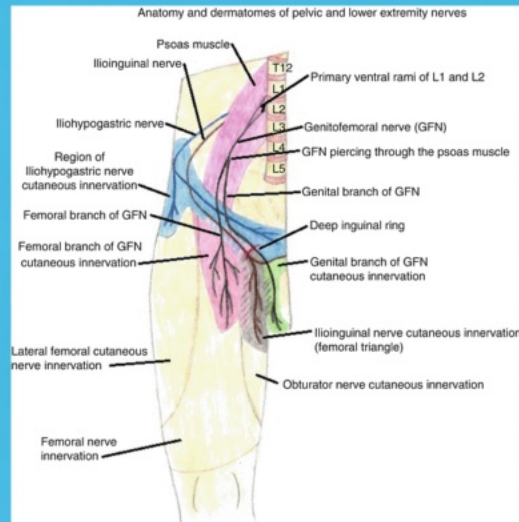
- *formal/medical* - The hip joint
- *informal/ lay* - the laterally projecting area on either side of the body below the waist, formed by the pelvis and upper thigh

Anatomy

GROIN:

- *formal/medical* - the area between abdomen and thigh on either side of the body

- *informal/ lay* - the area of the genitals



ORIGINAL COMMUNICATION

Revisiting the Genital and Femoral Branches of the Genitofemoral Nerve: Suggestion for a more Accurate Terminology

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¹Spauld Sports Foundation, Seattle, Washington
²Division of Gross and Clinical Anatomy, Department of Anatomy, Kurume University School of Medicine, Kurume, Japan
³Department of Anatomical Sciences, St. George's University, St. George's, Grenada, West Indies

The genitofemoral nerve is a branch of the lumbar plexus originating from the ventral rami of the first and second lumbar spinal nerves. During routine dissections of this nerve, we have occasionally observed that the genital branch of the genitofemoral nerve gave rise to the femoral branch, and the femoral branch of the genitofemoral nerve gave rise to the genital branch. Therefore, this study aimed to investigate the aforementioned distributions of the genitofemoral nerve in a large number of cadaveric specimens. Twenty-four sides from fourteen fresh-frozen cadavers derived from nine males and five females were used in this study. For proximal branches of the genitofemoral nerve, that is, as they first arise from the genitofemoral nerve, the terms "medial branch" and "lateral branch" were used. For the final distribution, the terms "genital branch" and "femoral branch" were used. On eight sides (33.3%) with nine branches, one or two branch(es) from either the medial or lateral branch became counted as the femoral or genital branches (five became femoral and four became genital branches). Our study revealed that the distribution of the genitofemoral nerve is more complicated than previously described. The "medial branch" and "lateral branch" that we have used in the present study for describing the proximal branches of the genitofemoral nerve are more practical terms to describe the genitofemoral nerve. *Clin. Anat.* 32:458–463, 2019. © 2019 Wiley Periodicals, Inc.

Key words: lumbar plexus; hernia; inguinal canal; inguinal ligament; nerve block; labiaplasty; pelvic neuralgia

INTRODUCTION

The genitofemoral nerve, historically also known as the cordofemoral nerve, is a branch of the lumbar plexus and originates from the ventral rami of the first and second lumbar spinal nerves. The genitofemoral nerve, formed inside the psoas major, descends obliquely within the fascia of the psoas major through the psoas fascia behind the ureter, then it splits into genital and femoral branches (Skinner, 2015). The genital branch crosses the external iliac artery to enter the inguinal canal via

the deep inguinal ring and then travels with the spermatic cord or round ligament of the uterus and usually in a distal position. The genital branch (compare back to Joe Iwanaga, Seattle to new number: 300-176-400, Janso, Tanso, Julie 083, Berlin, 06, E-mail: jiwana@spauldsportsfoundation.org). The authors have nothing to disclose. Received 16 November 2018; Accepted 22 December 2018. See also Wiley Online Library on July 16, 2019. DOI: 10.1002/ca.23327

Clinical Anatomy 32:458–463 (2019)

Check for updates

458 | Iwanaga et al.



Fig. 3. Left genitofemoral nerve (green). Arrows are branches (arrows) from the lateral branch (white) to the inguinal canal (white) terminating as a genital branch. The diagram also highlights the inguinal ligament (blue). (Color figure can be viewed at wileyonlinelibrary.com.)

RESULTS
Out of 24 sides, 18 sides (75%) had a common trunk of the genitofemoral nerve and six sides (25%) had two separate branches (medial and

lateral branches) (Fig. 2). The number of branches from the medial and lateral branches ranged from 1 to 3 (mean 1.75 ± 0.80) and 1 to 4 (mean of 1.83 ± 0.92), respectively. Both the medial and lateral branches of the genitofemoral nerve had 1–3 branches in 75% (Fig. 2). On eight sides (33.3%) with nine branches, one or two branch(es) from either the medial or lateral branch became counted as femoral or genital branches (five became femoral branches and four became genital branches) (Figs. 3 and 4). On one side, one branch from the medial branch terminated as a femoral branch and one branch from the lateral branch terminated as a genital branch (partial reversed type) (Fig. 5). On another side, the medial branch terminated as a femoral branch and the lateral branch terminated as the genital branch of the genitofemoral nerve (complete reversed type) (Fig. 6). On one side (4.2%), no genital branch was observed because the medial branch terminated as the femoral branch. On another side (4.2%), no femoral branch was detected because the lateral branch terminated as the genital branch. Interestingly, one of the branches (lateral most branch) from the medial branch joined the lateral branch and traversed the inguinal canal as a genital branch (Fig. 7). Side or sex was not predictors of the branching pattern or number of branches of the genitofemoral nerve ($P > 0.05$).

DISCUSSION

The iliohypogastric, iliohypogastric and genital branches of the genitofemoral nerve are all related to the inguinal canal (Lichtenstein et al., 1988; Watanabe et al., 2019, 2017). Anatomical studies of the genitofemoral nerve have been conducted to understand surgical anatomy for pelvic surgery, varicocelectomy, gynecomastia surgery, and hernia repair (Ratkovski et al., 2015). For example, in one study that investigated 400 genitofemoral nerves, the nerve was most commonly formed by L1 and L2

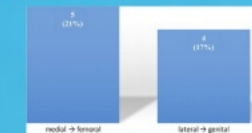


Fig. 4. Number of medial and lateral branches of the genitofemoral nerve (terms: medial and lateral branches). (Color figure can be viewed at wileyonlinelibrary.com.)

Agree on Language

1. Imaging planes
2. Tendon Footprint
3. Groin and hip
4. *Impinge*

Impinge

- *formal/medical* - means to squeeze or compress a structure, often referring to a joint, nerve, or muscle, by a surrounding bone or tissue. Essentially, it describes a situation where **one structure presses against or restricts another**, leading to pain, stiffness, or other symptoms.

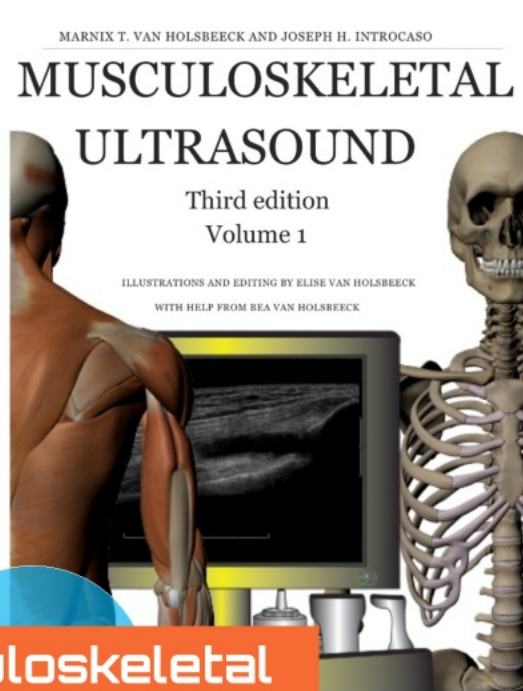
- *Webster/ Oxford languages* -

* encroach, infringe. impinge on other people's rights.

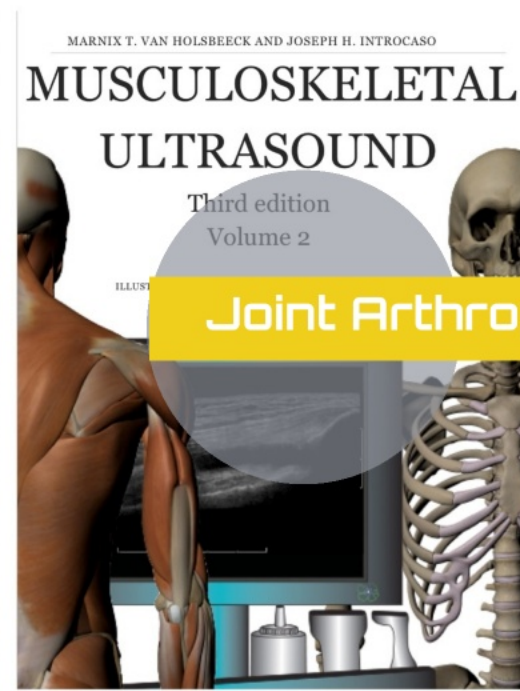
* to have an effect : make an impression.

have an effect or impact, especially a negative one.

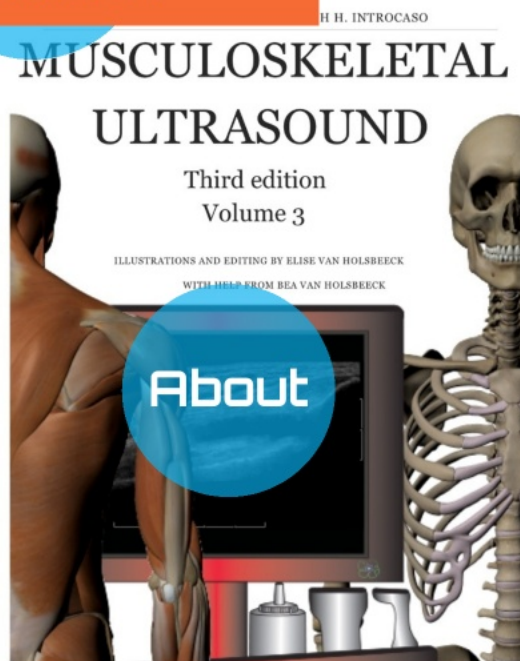
* advance over an area belonging to someone or something else.



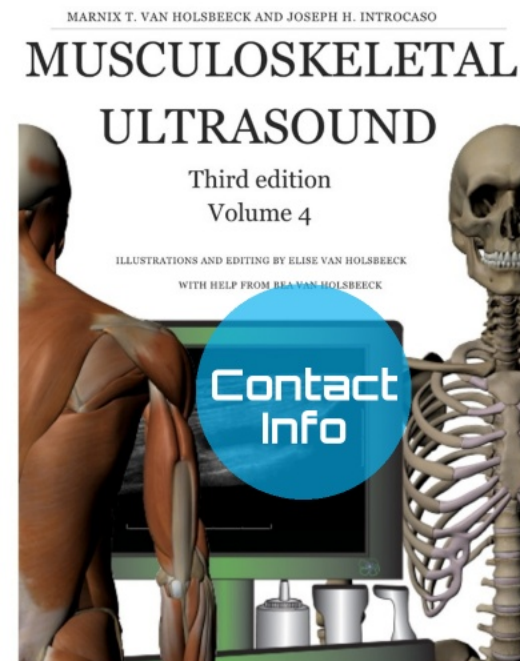
Musculoskeletal
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Joint Arthroplasty



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HIP JOINT ARTHROPLASTY -- *the synthetic anatomy*

Marnix van Holsbeeck, MD

Hip Joint Arthroplasty

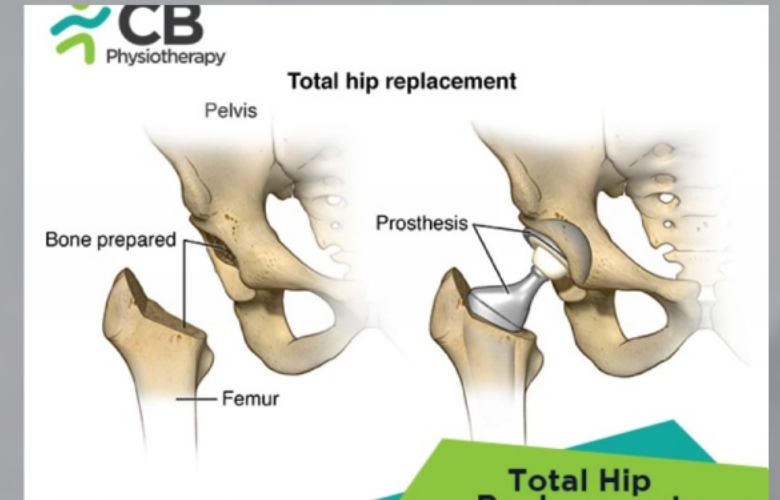
- Capsular Anatomy
- How was it placed?
- When was it placed?
- What was placed?
- Complications

Hip Joint Arthroplasty

- **Capsular Anatomy**
- How was it placed?
- When was it placed?
- What was placed?
- Complications

Hip Joint Arthroplasty

- **Capsular Anatomy**
- How was it placed?
- When was it placed?
- What was placed?
- Complications



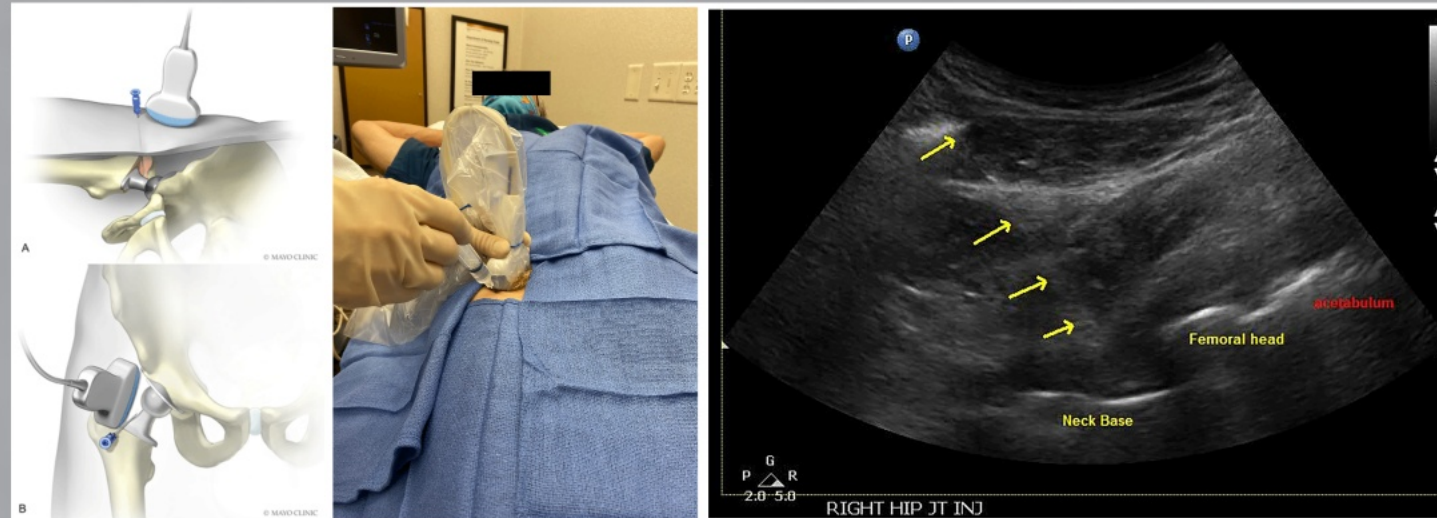
Hip Joint Arthroplasty

- **Capsular Anatomy**
- How was it placed?
- When was it placed?
- What was placed?
- Complications



Hip Joint Arthroplasty

- Pseudocapsule



Hip Joint Arthroplasty

- Pseudocapsule



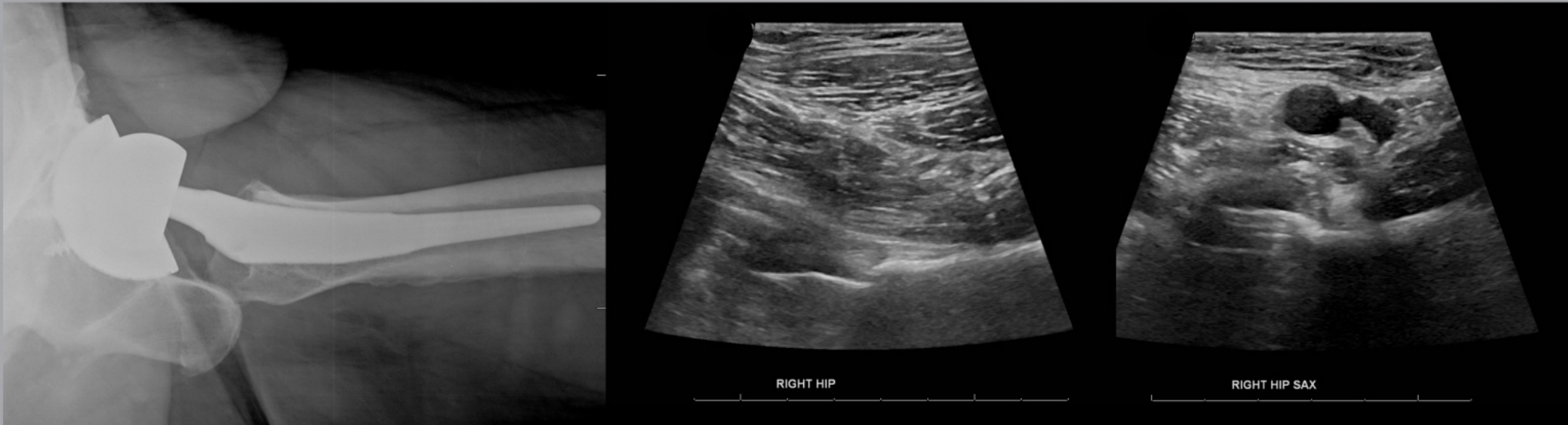
Hip Joint Arthroplasty

- **Pseudocapsule**

In the context of hip replacement surgery, a pseudocapsule is the scar tissue that forms around the artificial hip joint after the original hip capsule is removed or damaged during the procedure. It's essentially a new, fibrous "capsule" that helps stabilize the joint and prevent dislocation.

Hip Joint Arthroplasty

• Pseudocapsule



- Pseudocapsule



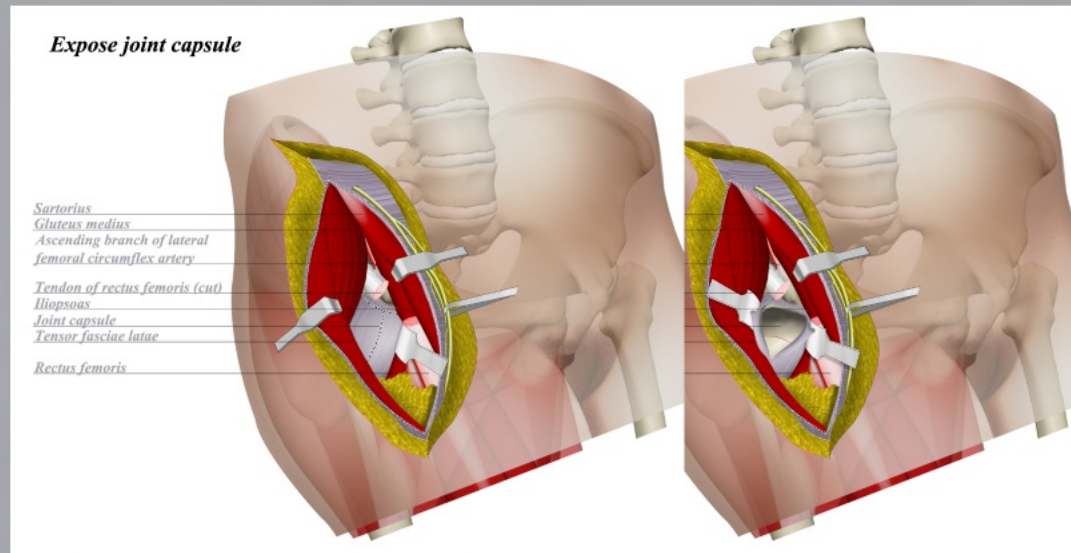
Hip Joint Arthroplasty

- **Capsular Anatomy**

Surgeons strive to preserve the iliofemoral ligament, especially its medial arm, as it contributes to hip stability with the purpose to reduce dislocation rates.

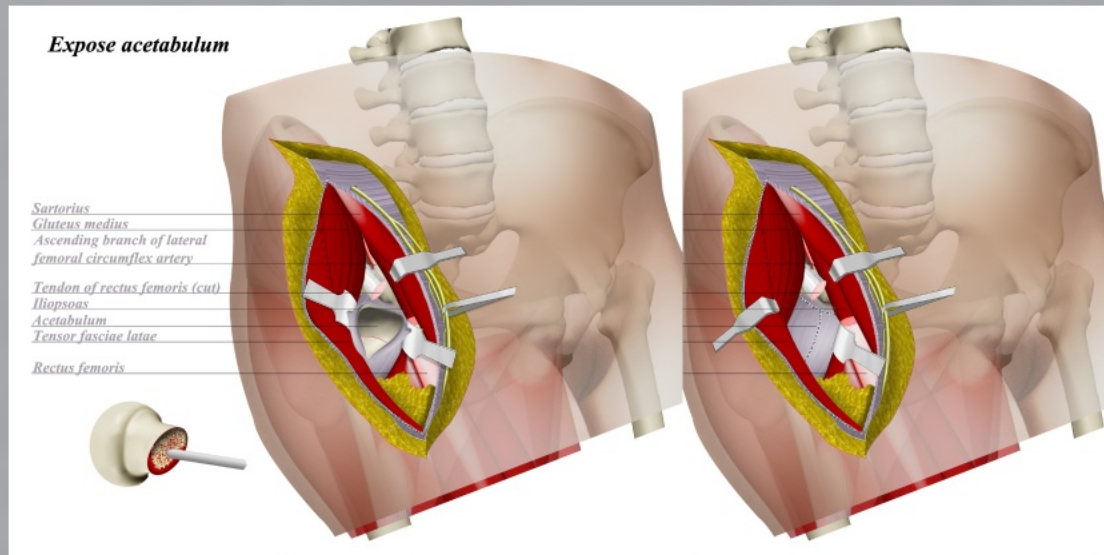
Hip Joint Arthroplasty

- Capsule incision



Hip Joint Arthroplasty

- Capsule incision closure

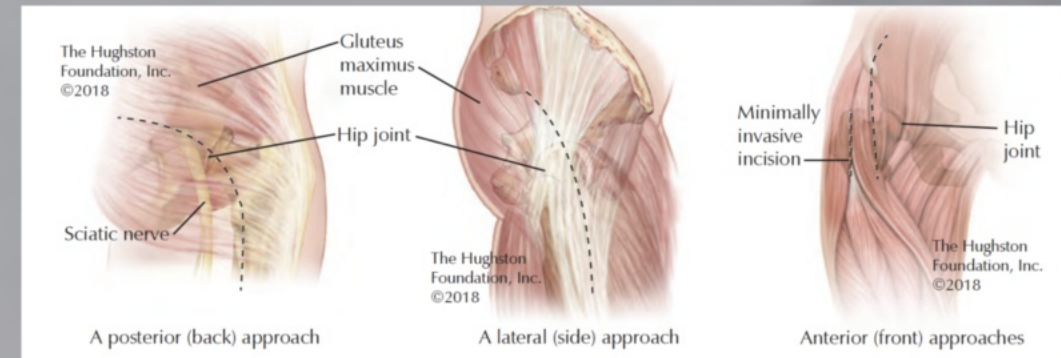


Hip Joint Arthroplasty

- Capsular Anatomy
- **How was it placed?**
- When was it placed?
- What was placed?
- Complications

Hip Joint Arthroplasty

- How was it placed?
- Anterior approach
- Lateral approach
- Posterior approach

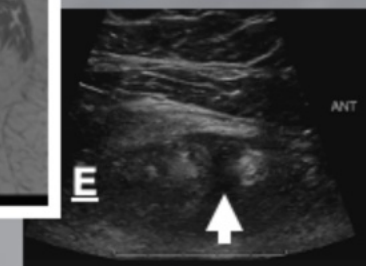
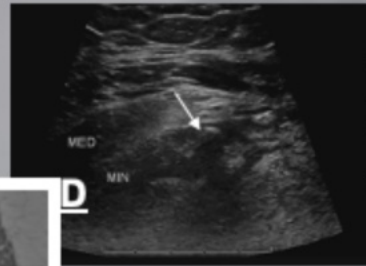
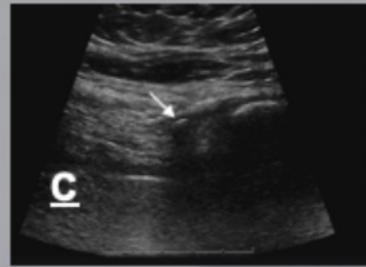
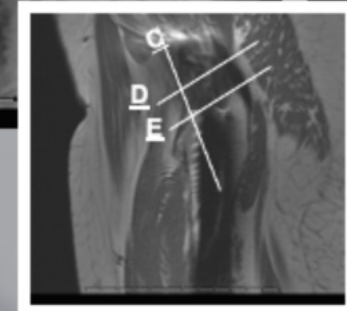
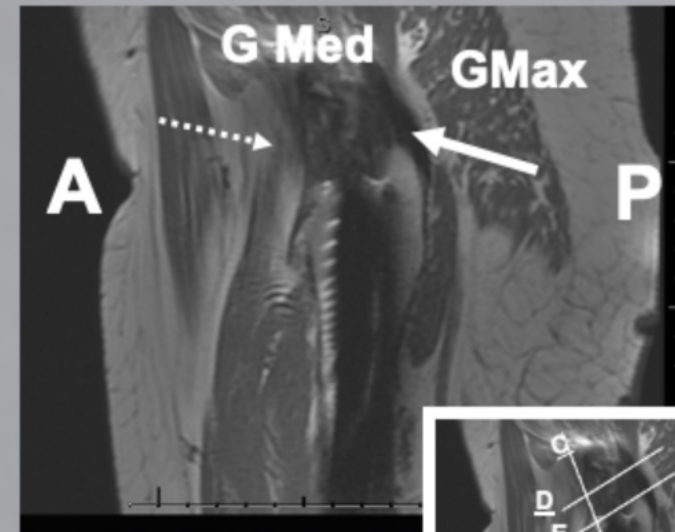


<https://hughston.com/wellness/surgical-approaches-to-knee-and-hip-replacement/>

Hip Joint Arthroplasty

- How was it placed?

- Anterior approach
- Lateral approach*
- Posterior approach



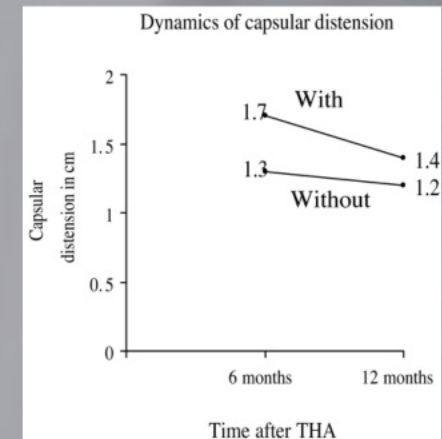
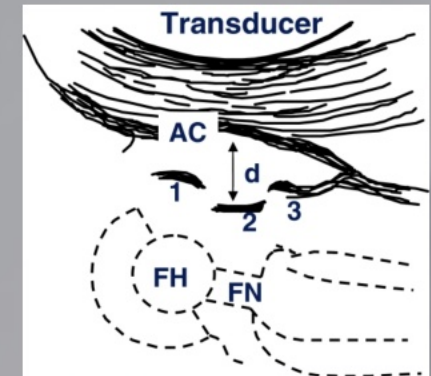
Hip Joint Arthroplasty

- Capsular Anatomy
- How was it placed?
- **When was it placed?**
- What was placed?
- Complications

Hip Joint Arthroplasty

• When was it placed?

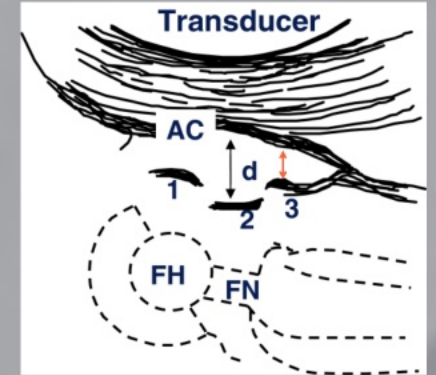
- * no capsular or extracapsular effusions (6 month after replacement)
- * *At six months* postoperatively greater capsular distension was observed in the group with posterior soft tissue repair than in the group without.
- * *After one year* the capsular distension decreased in both groups and there was no significant difference between the groups. After 12 months the volume of intraarticular fluid/synovial oedema is the same with or without posterior soft tissue repair.



Tarasevicius et al. Int Orthop, 30:233-236, 2006

Hip Joint Arthroplasty

- When was it placed?



* With biannual examinations (n=52): no effusions intra/extra-articular - The median (range) maximal anteroposterior synovial thickness was 5 (2-8) mm in the normal concave iliofemoral ligament group and 7 (4-56) mm in the abnormal straight/convex iliofemoral ligament group ($p = 0.001$)

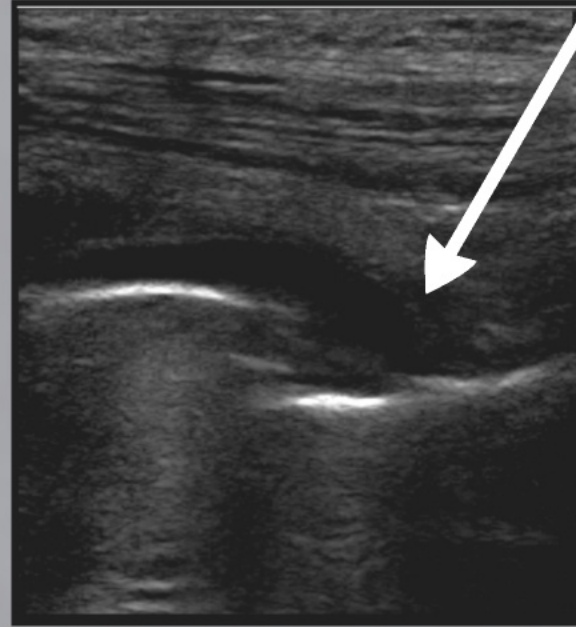
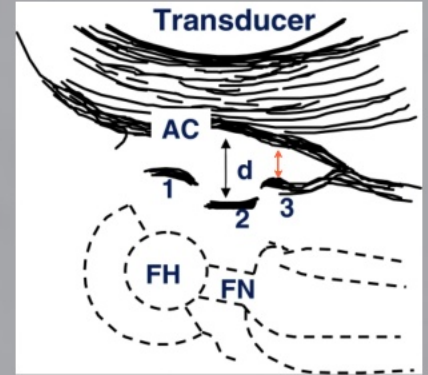
Robinson et al. *Ultrasound Med Biol*, 43, 1549- 1556, 2017

* asymptomatic patients (n=15): no effusions/ capsule-bone distance 3 (1.2 - 7 mm)

van Holsbeeck et al. *AJR*, 163, 381-384, 1994

Hip Joint Arthroplasty

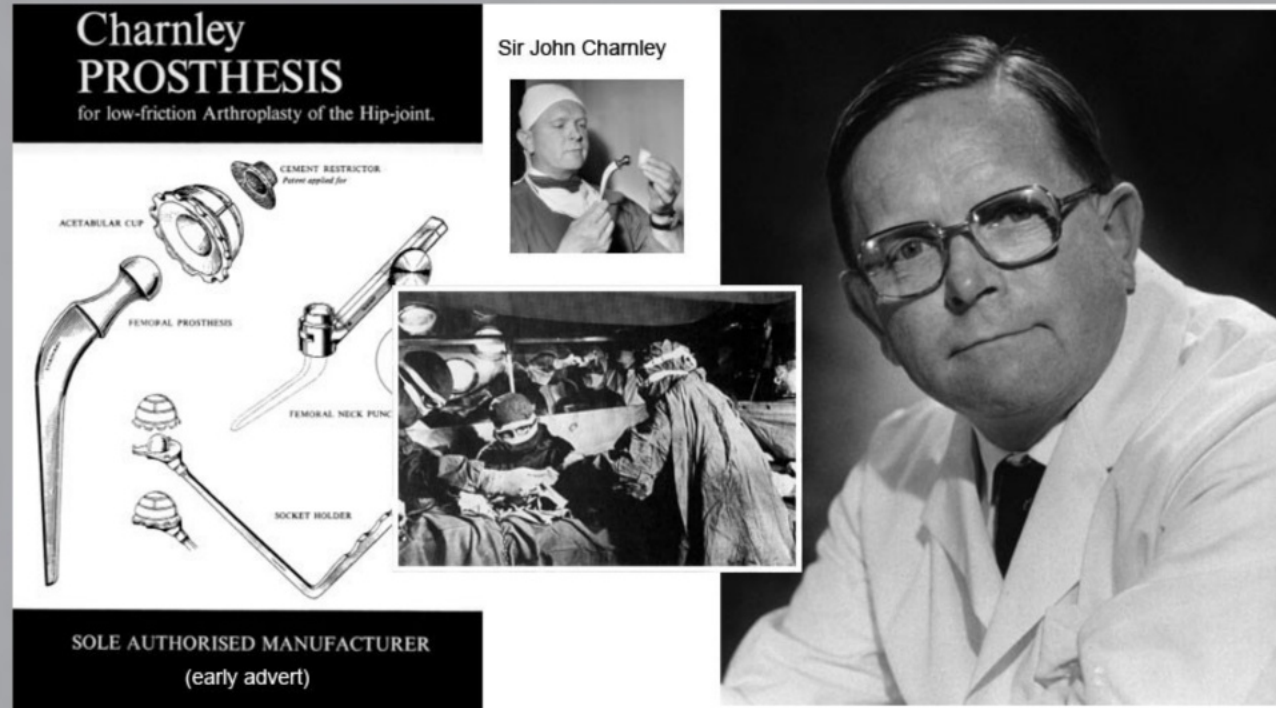
- When was it placed?



Hip Joint Arthroplasty

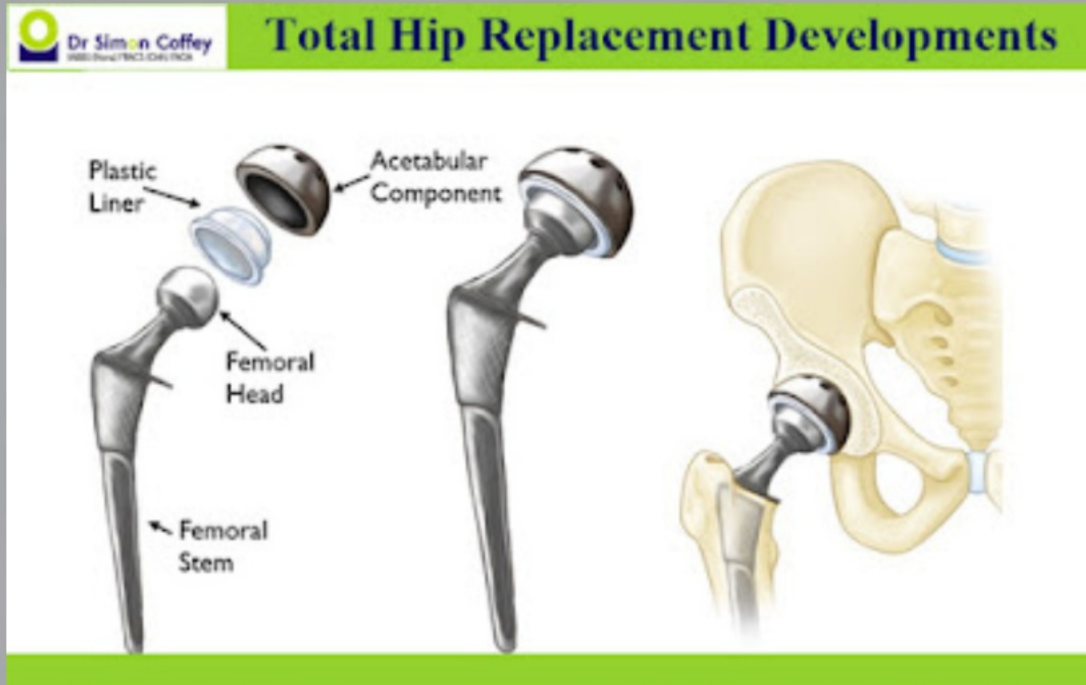
- Capsular Anatomy
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- **What was placed?**
- Complications

Hip Joint Arthroplasty



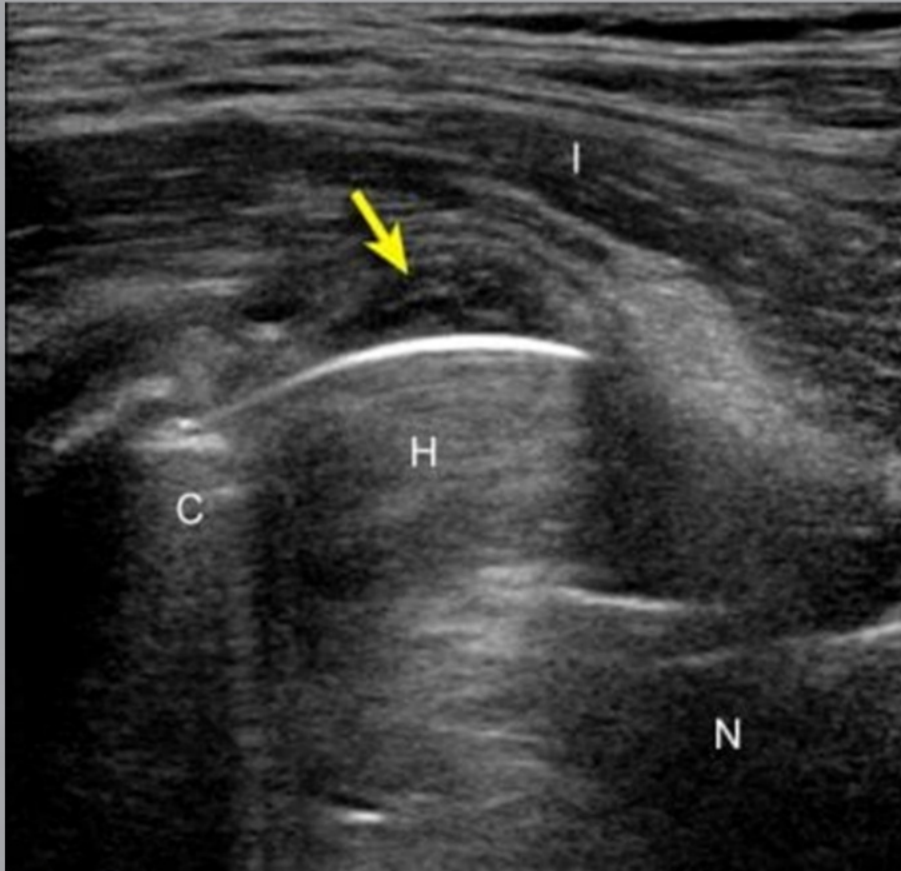
<https://www.linkedin.com/pulse/sir-john-charnley-pioneer-orthopaedic-surgery-shariatpanahi-bsc-msc-4rtbe>

Hip Joint Arthroplasty



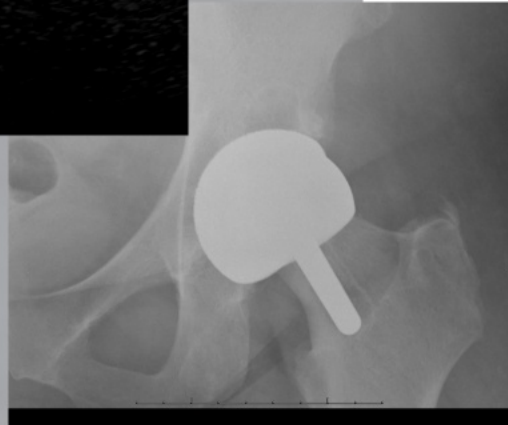
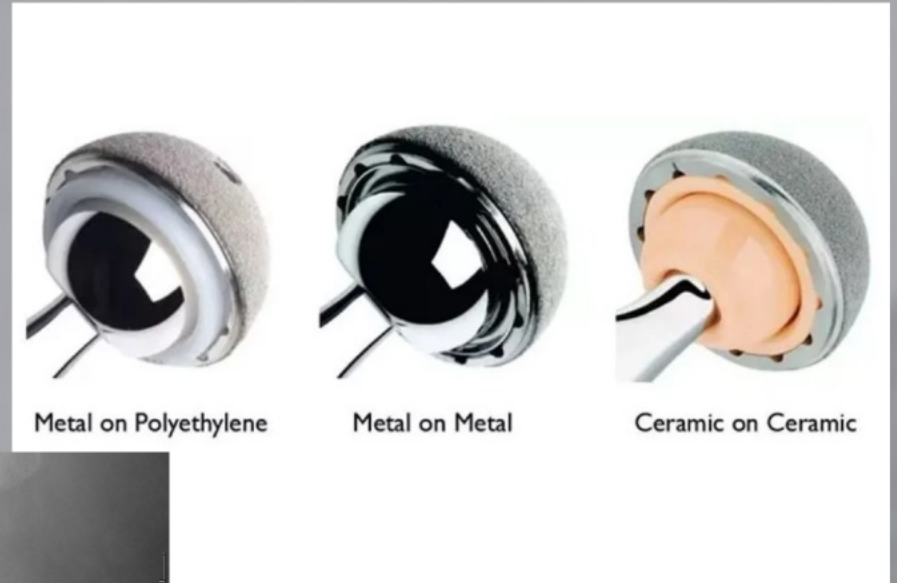
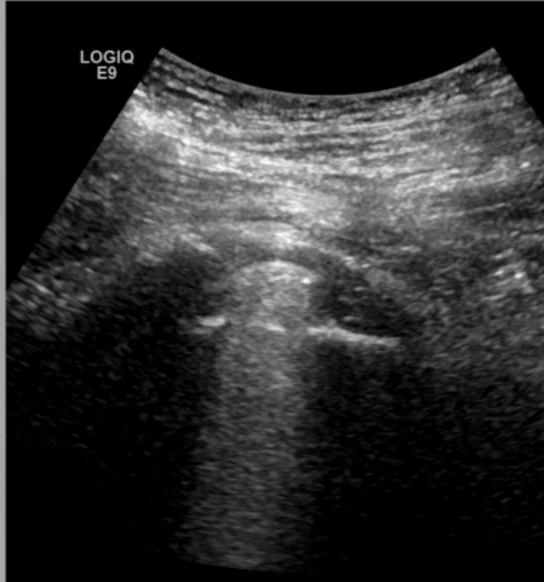
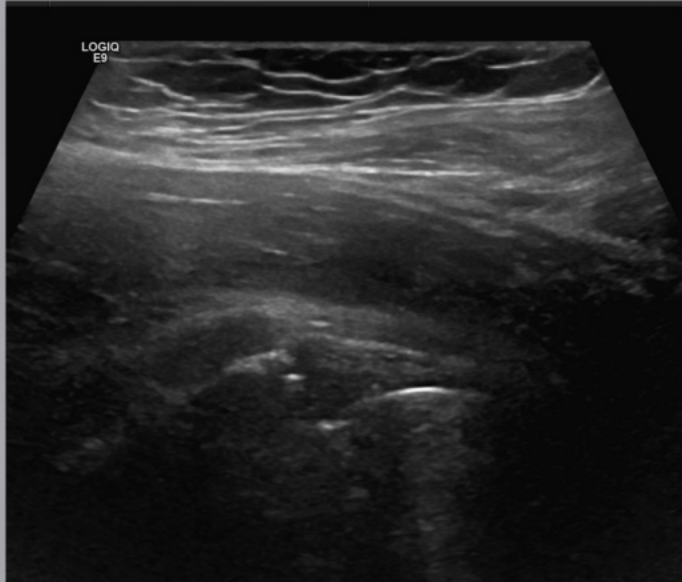
<https://bonesmart.org/hip/hip-replacement-implant-materials/>

Hip Joint Arthroplasty



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Hip Joint Arthroplasty

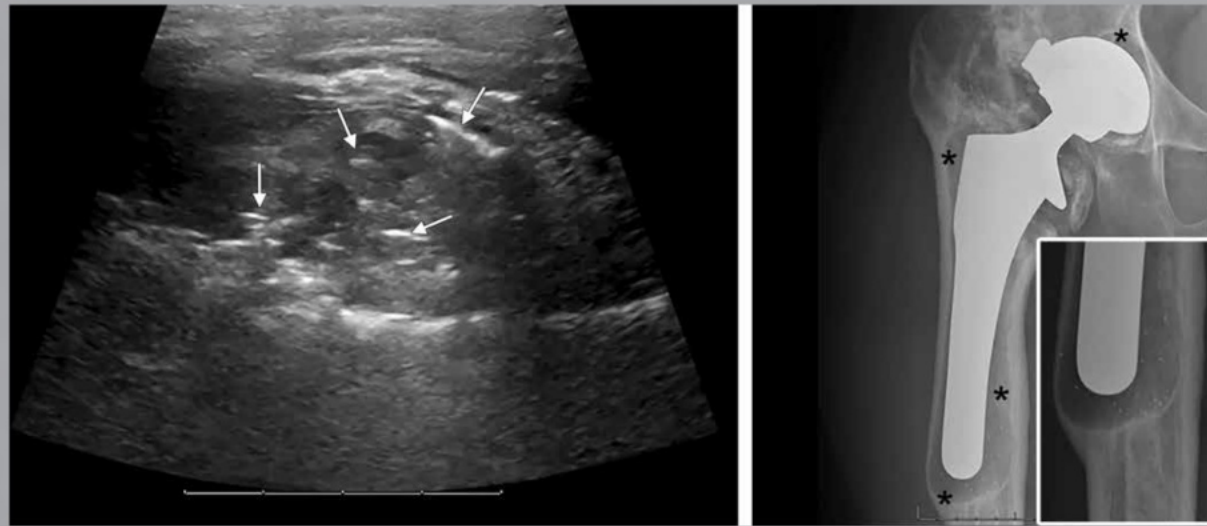


<https://bonesmart.org/hip/hip-replacement-implant-materials/>

Hip Joint Arthroplasty

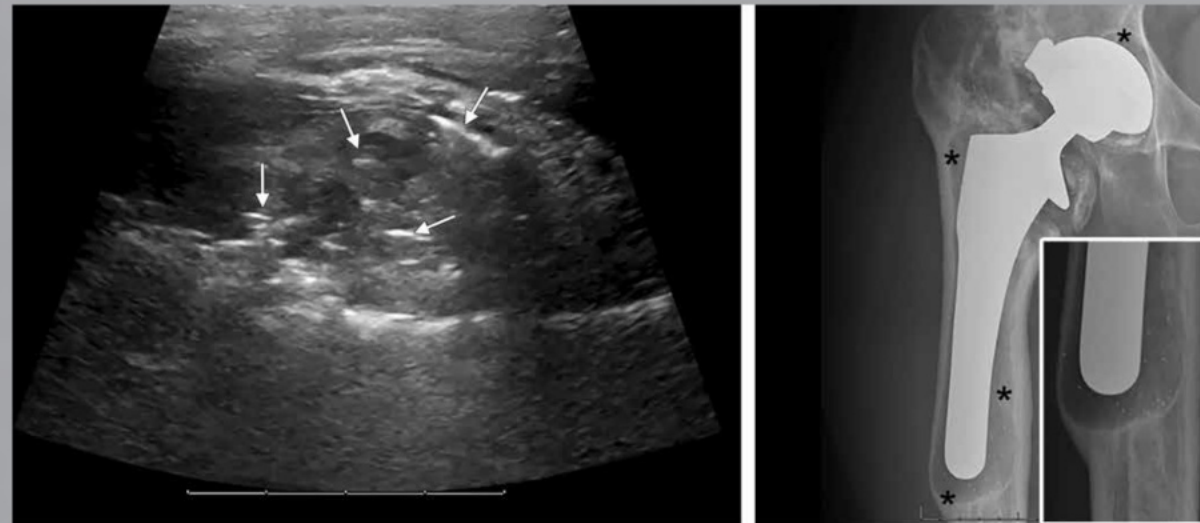
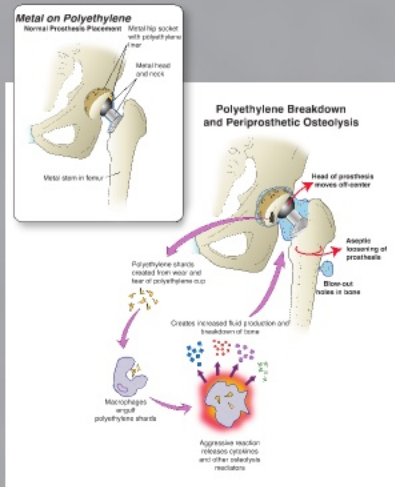
- Capsular Anatomy
- How was it placed?
- When was it placed?
- What was placed?
- **Complications**

Hip Joint Arthroplasty



Hip Joint Arthroplasty

2 materials or more
1 material



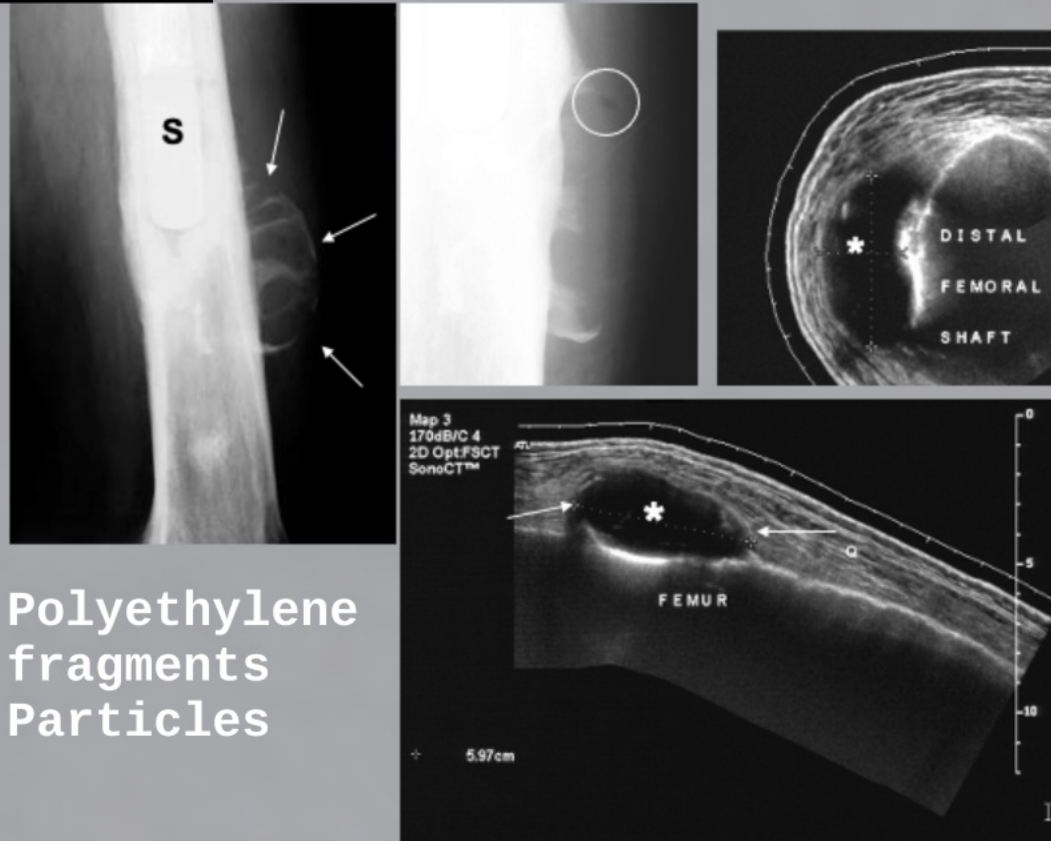
Polyethylene fragments/ Particles



Sreedhar Archik -
Mumbai

Hip Joint Arthroplasty

2 materials or more
1 material

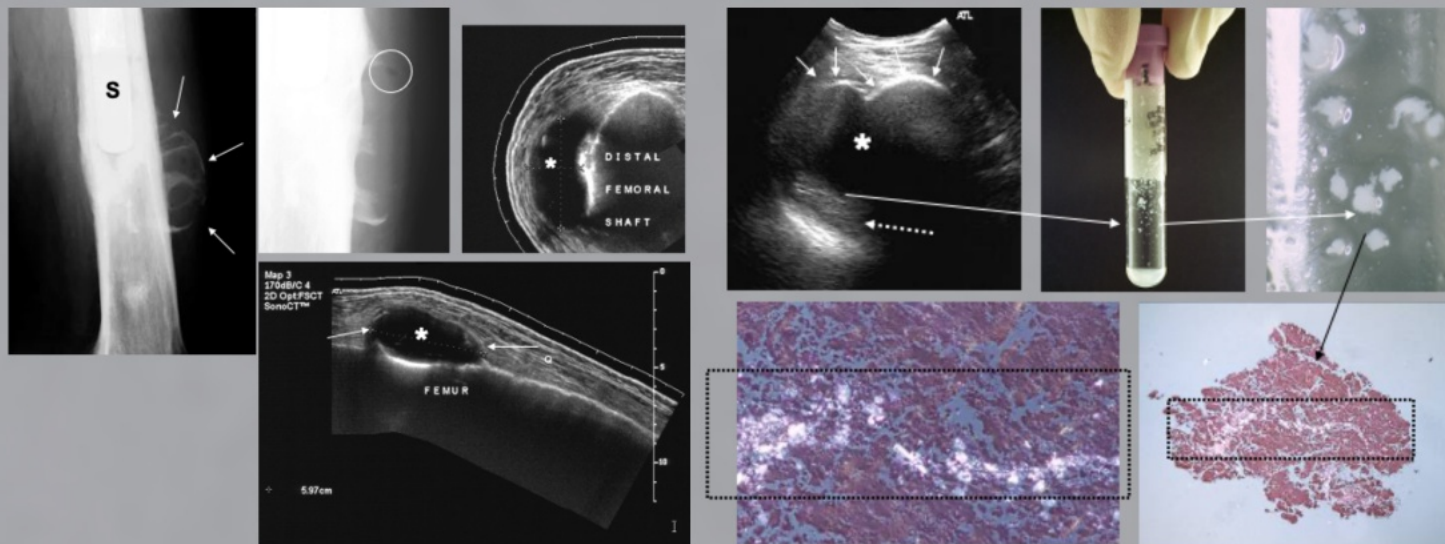


Polyethylene
fragments
Particles

Sreedhar Archik -
Mumbai

Hip Joint Arthroplasty

2 materials or more
1 material



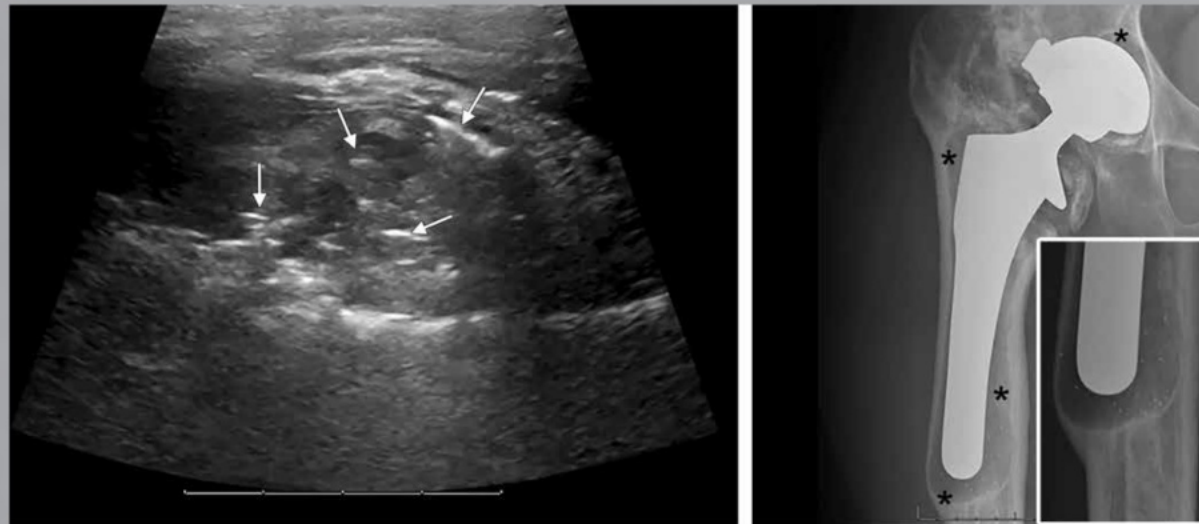
Sreedhar Archik -
Mumbai

Polyethylene fragments/ Particles

Guillin et al. J Ultrasound Med, 27:275-279, 2008

Hip Joint Arthroplasty

2 materials or more
1 material



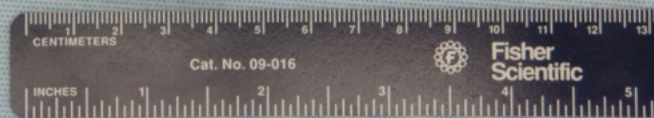
Polyethylene fragments/ Particles



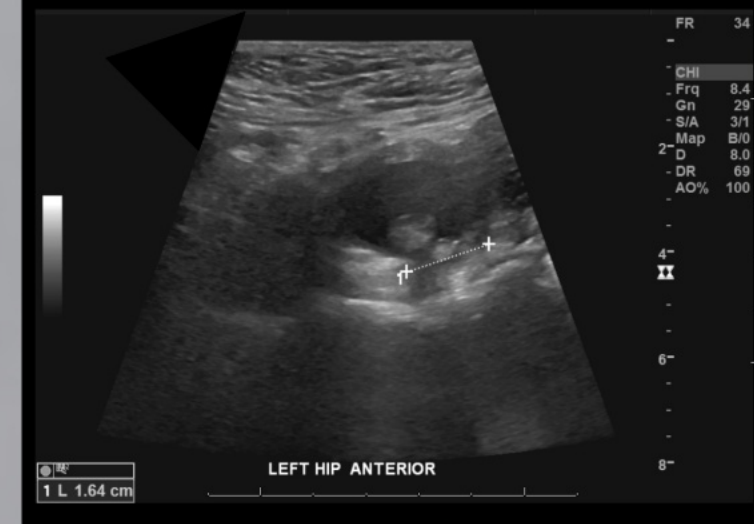
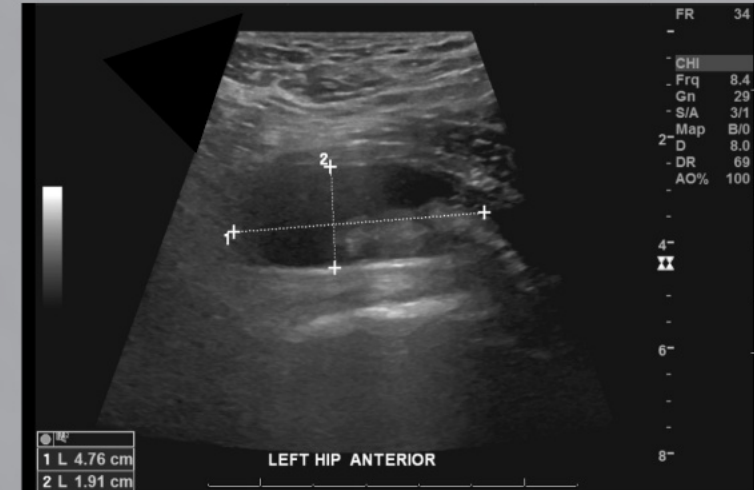
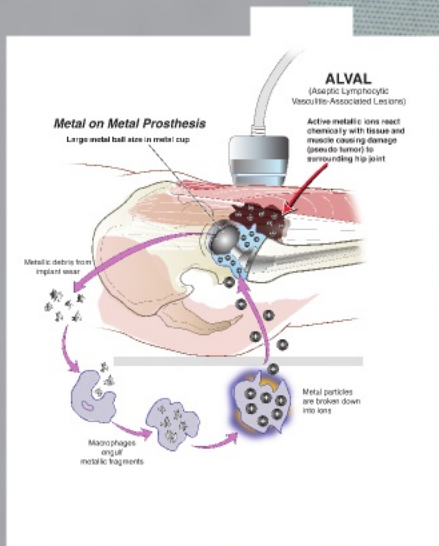
Sreedhar Archik -
Mumbai

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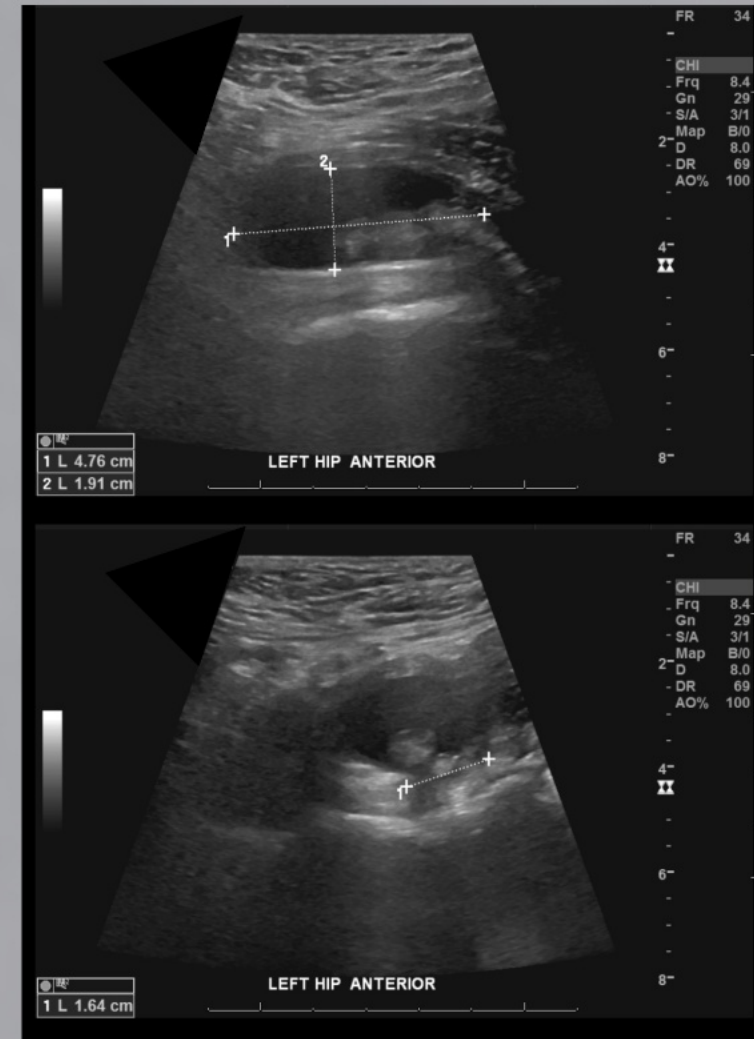


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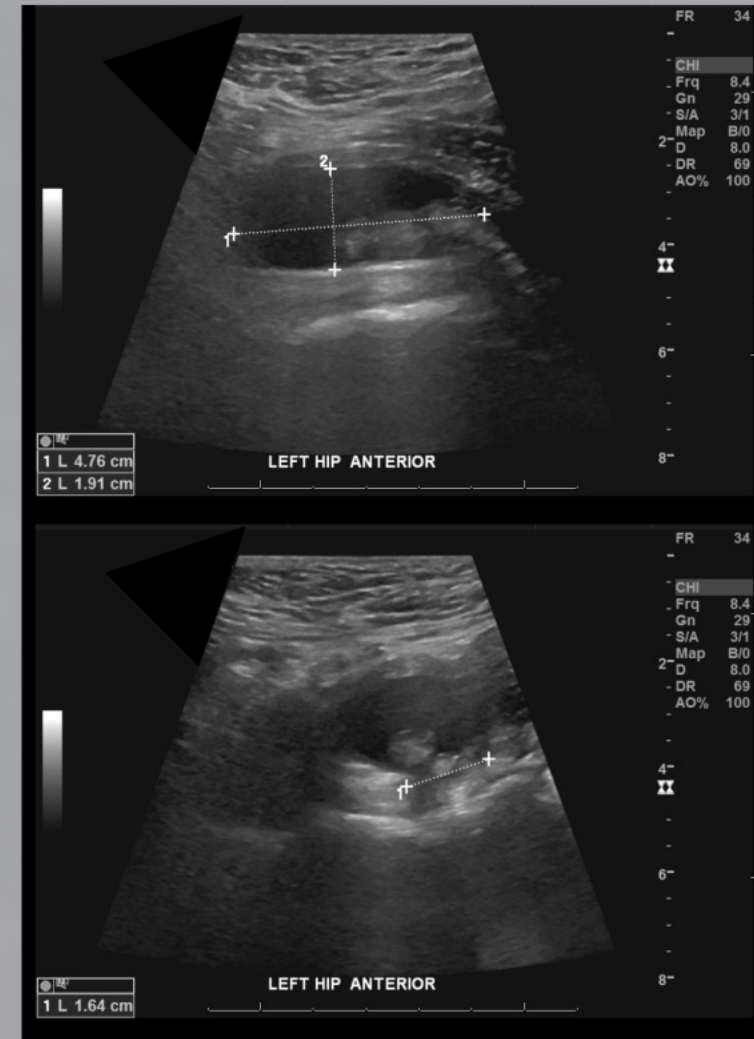
Hip Joint Arthroplasty

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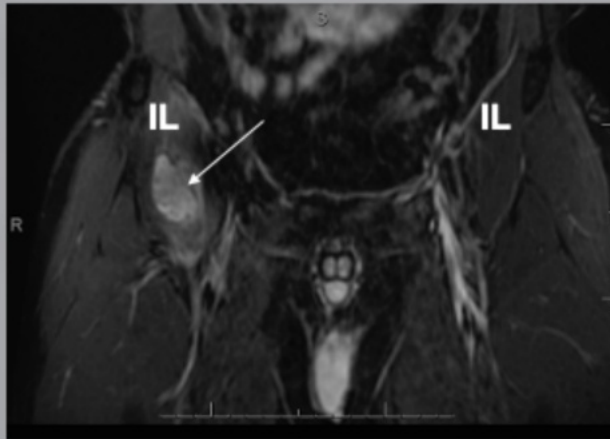
Hip Joint Arthroplasty

2 materials or more
1 material



Hip Joint Arthroplasty

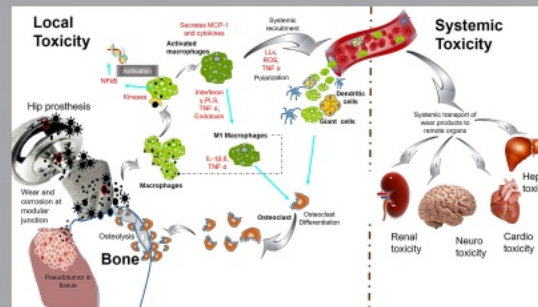
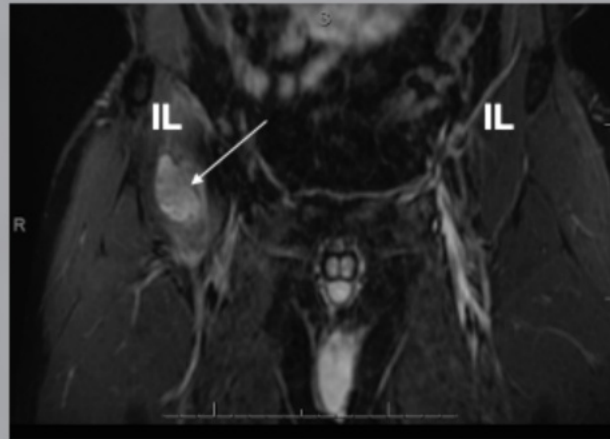
2 materials or more
1 material



Birmingham prosthesis
became unstable as
the anterior capsule
was destroyed

Hip Joint Arthroplasty

2 materials or more
1 material



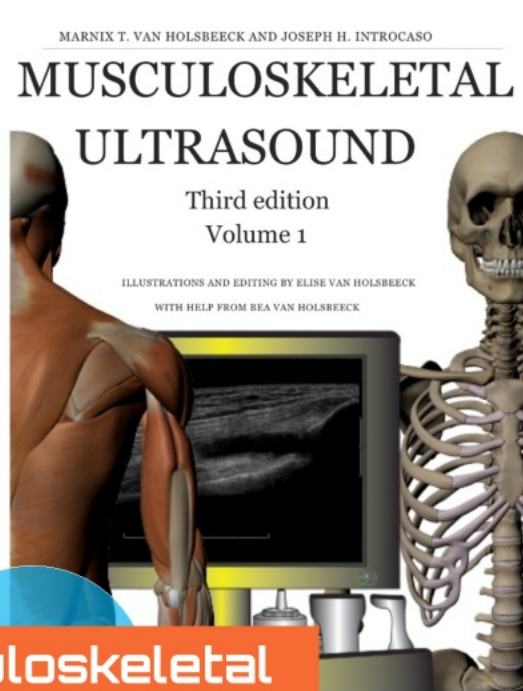
Bijukumar et al.
Nanomedicine, 14,
951-963, 2018

Hip Joint Arthroplasty

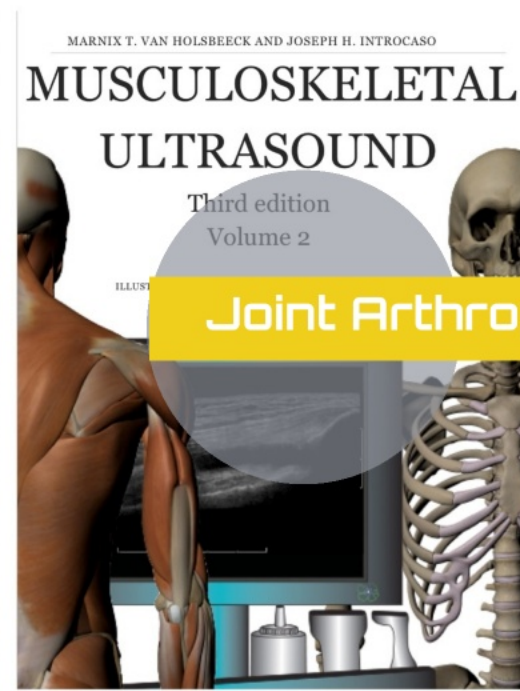
- Capsular Anatomy
- How was it placed?
- When was it placed?
- What was placed?
- Complications

HIP JOINT ARTHROPLASTY -- *the synthetic anatomy*

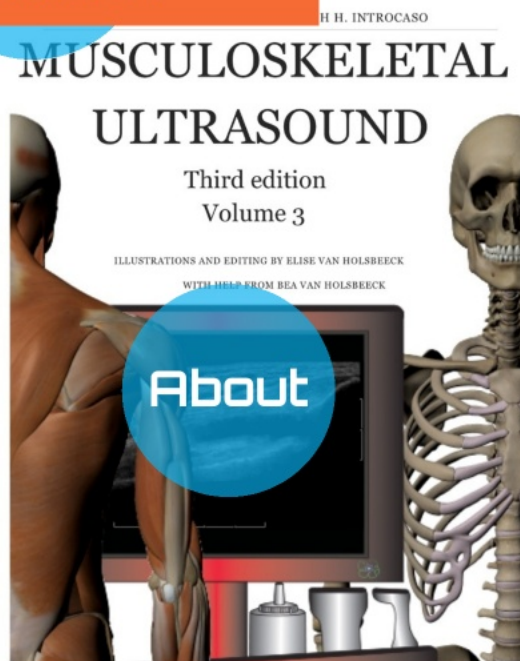
Marnix van Holsbeeck, MD



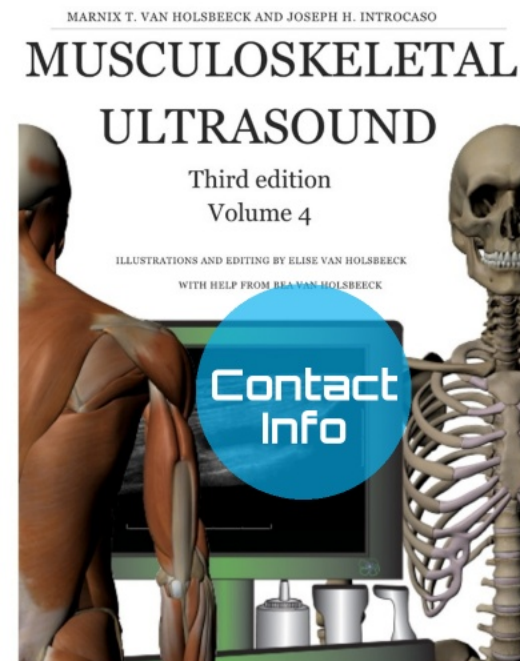
Musculoskeletal
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Joint Arthroplasty



About



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MvH?





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Marnix van Holsbeeck

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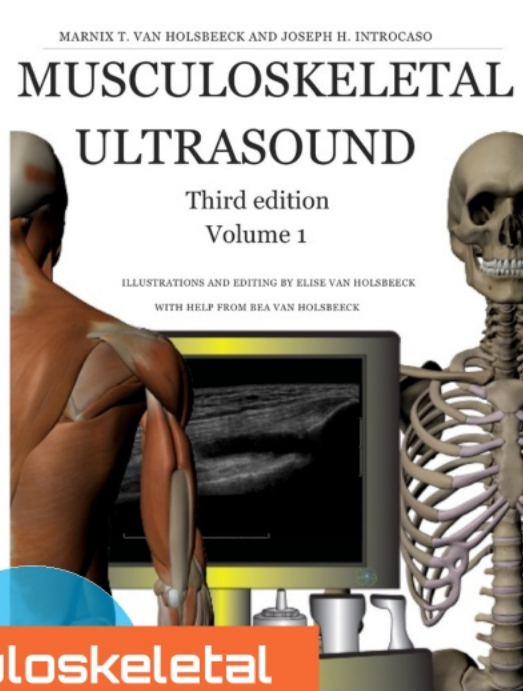


www.MuSoc.com

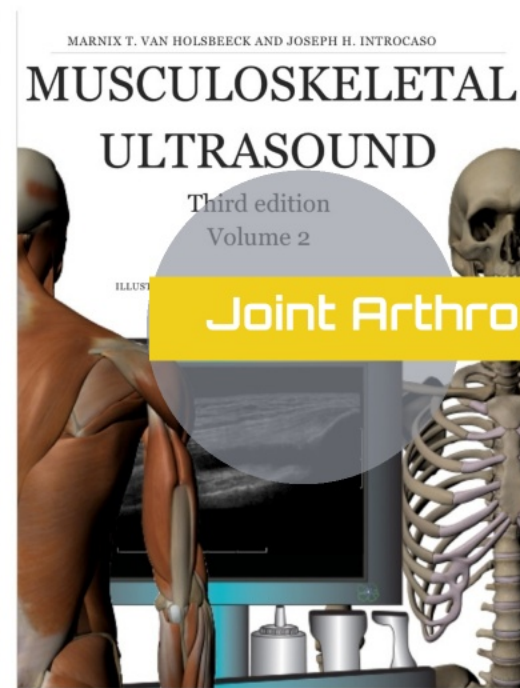
van Holsbeek

van (from)

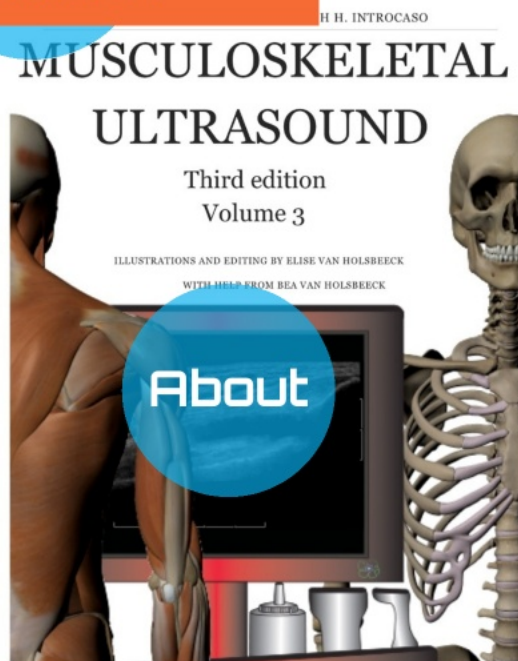




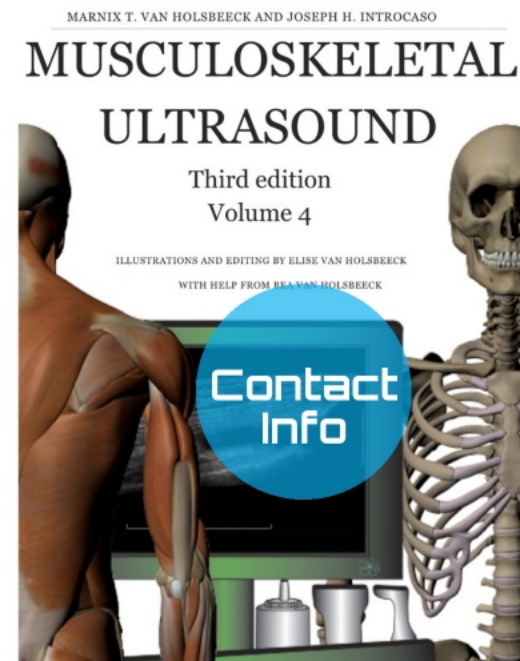
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