



Plasma  
Solutions

*Accelerate GF™*

Natural Regenerative Medicine Treatments

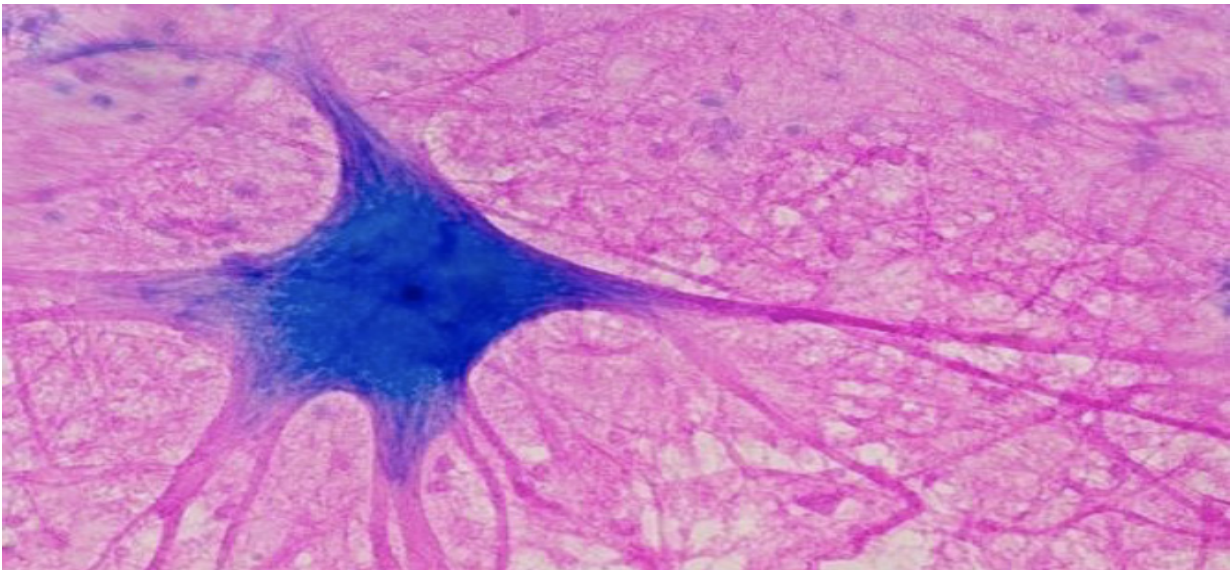
# Technical / Products Preparation

Plasma Solutions, LLC  
800.353.1507  
support@plasma.solutions

## Who is Plasma Solutions?

Plasma Solutions, LLC is a biologics company that develops, manufactures, and markets regenerative medicine products for the repair, restoration and revitalization of damaged and diseased cellular tissue for (i) musculoskeletal injuries and conditions, (ii) neuropathy, and (iii) chronic non-healing wounds.

- Plasma Solutions uses products such as ACCELERATE GF™ for treating joint and tendon pain, ankle sprains, heel pain and plantar fasciitis.
- Plasma Solutions products are also used to treat a wide range of musculoskeletal conditions in addition to peripheral neuropathies.
- We have also found that our products can be used to treat chronic non-healing wounds and help to prevent amputations in high risk populations.



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# Today's Objectives

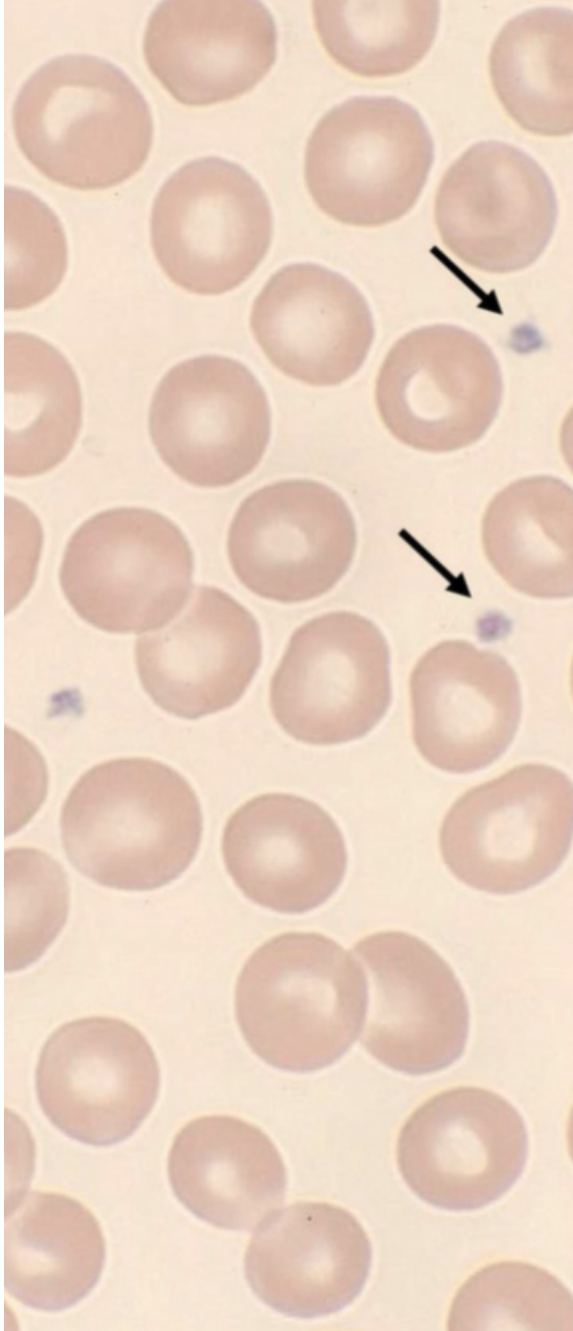
- Give you the ability to process Accelerate GF
- Explain what makes Accelerate GF different.
- Show you the Science and make you comfortable with it.
- Give you resources
- Show you how to grow your patient base.



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## What's a Platelet?



- Also called “thrombocyte”
- Small, disc shaped clear cell fragment
- Lifespan is 5-9 days
- Natural source of growth factors
- Circulate in the blood
- Lead the formation of blood clots
- Essential in healing process

## Platelets Work



## Platelets Work

Platelets are activated by damaged tissue. Primary hemostasis and initiation of the clotting cascade are just the beginning of the platelets role in healing.

Upon activation they release Natural anabolic growth factors.

- Platelet derived GF
- Transforming GF
- Basic Fibroblast GF
- Vascular Endothelial GF
- Epidermal GF
- Nerve GF

# Plasma

- The liquid portion of your blood
- Mostly water (95%)
- Proteins, Electrolytes, glucose,
- Fibrinogen
- Hormones
- The body's Protein Reserve
- Protects you from infection and blood disorders.
- Platelet Rich Plasma is simply plasma rich in platelets. This is achieved through centrifugation.
- Platelet concentration is increased from 2 to five times baseline.
- Generally considered golden.
- Platelet Poor Plasma is plasma which is poor or low in platelets. However, this plasma is rich in fibrinogen and proteins.
- A by-product of the centrifugation process.

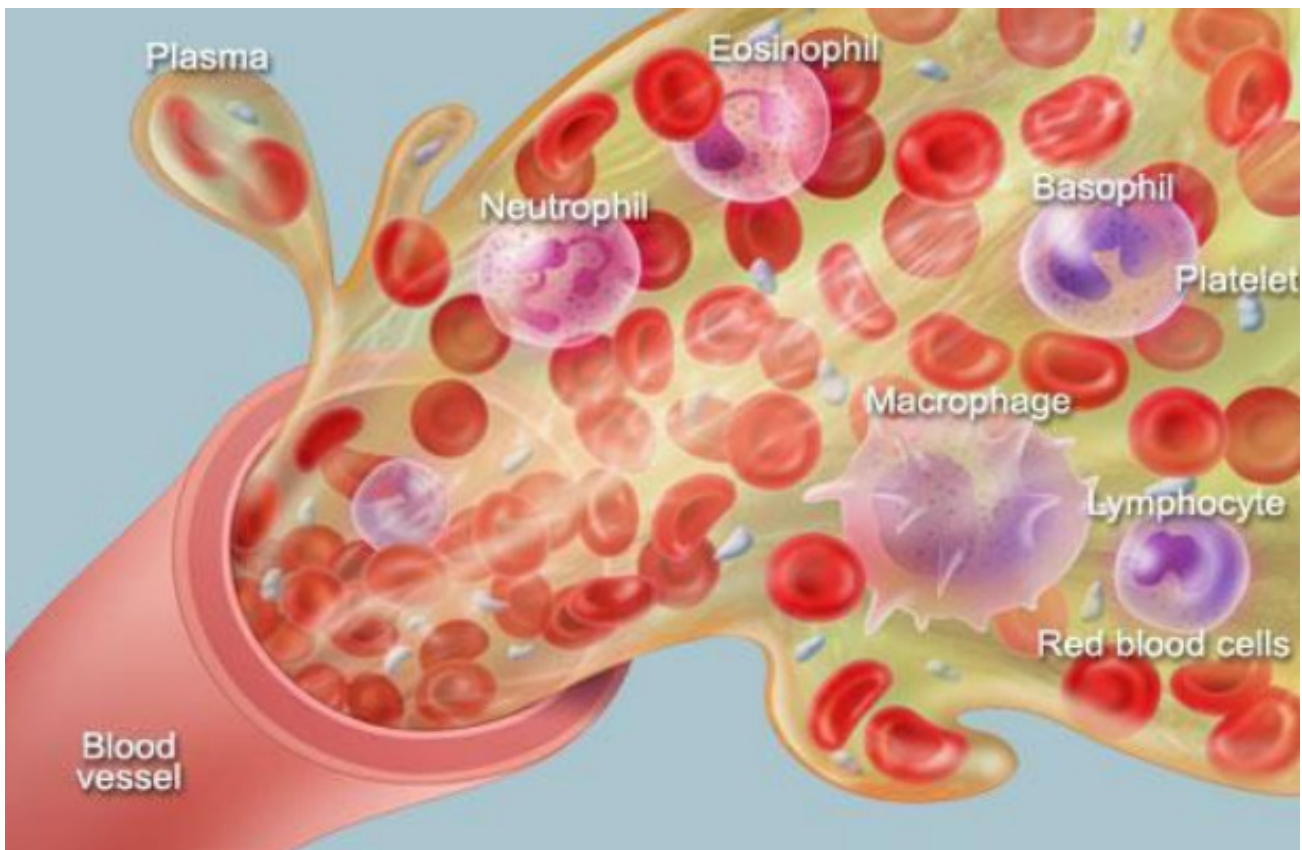


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## Plasma Solutions

- Through breakthrough science and technology, we have developed a proprietary method for activating and aggregating platelet rich and platelet poor plasma and increased levels of GF.
- This method has led to patient outcomes that are far more positive than those of competing products.
- Additionally, Plasma Solutions can provide the physician with the ability to customize treatments.



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## Procedure: Simplicity

- Draw 8.5 - 17cc of the patient's blood into the tube(s) Plasma Solutions provided vacutainertubes.
- Rotate the tubes 7 times to mix the anti-coagulant into the blood. Make certain that the patient's name has been written on the tubes.
- Place the tubes in your Centrifuge and set it to the specifications ordered by the physician. Start thecentrifugation.
- When centrifugation is complete, according to protocol, extract the Accelerate GF from the tubes with the preloaded activator/aggregator syringe.
- It's ready for injection.

## Injection

- People hate shots.
- PRP injections are usually pretty painful.
- After the first PRP injection many People don't want more.
- Most patients say the Plasma Solutions injections are "painless". Sometimes they don't know they had the injection.
- Patients don't mind coming back for More.



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## Closing Remarks

- Technician vs Technologist
- Building patient loyalty
- Being the Expert Spokesperson
- Support: WHO TO CALL

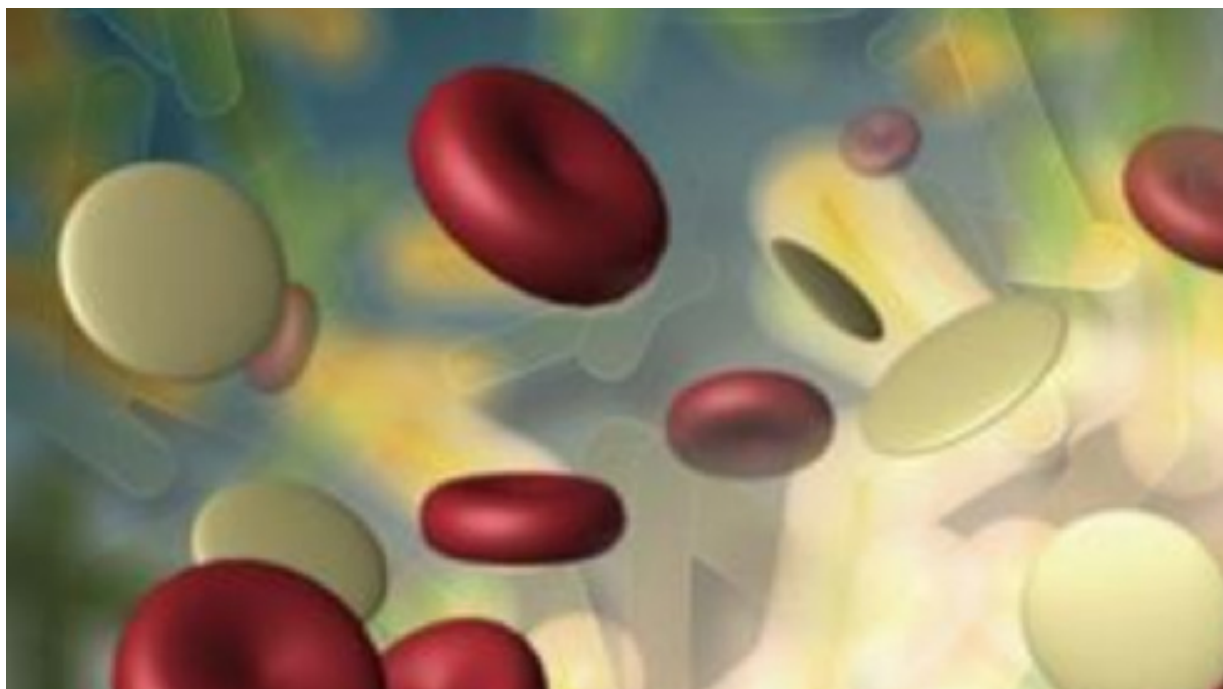


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# Table of Contents

- History of plasma-based therapy
- Pathophysiology
- Plasma product preparation
- Indications
- Contraindications
- Techniques



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# History of Plasma-Base Therapy

- M. Ferrari in 1987
- Autologous transfusion component after an open heart operation
- Avoid homologous blood product transfusion



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# History cont.

National Center for Biotechnology Information

- 5200 Entries
  - Orthopaedic
  - Sport medicine
  - Dentistry
  - Otolaryngology
  - Neurosurgery
  - Ophthalmology
  - Urology
  - Wound healing
  - Cosmetic
  - Cardiothoracic
  - Maxillofacialsurgery



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# Pathophysiology

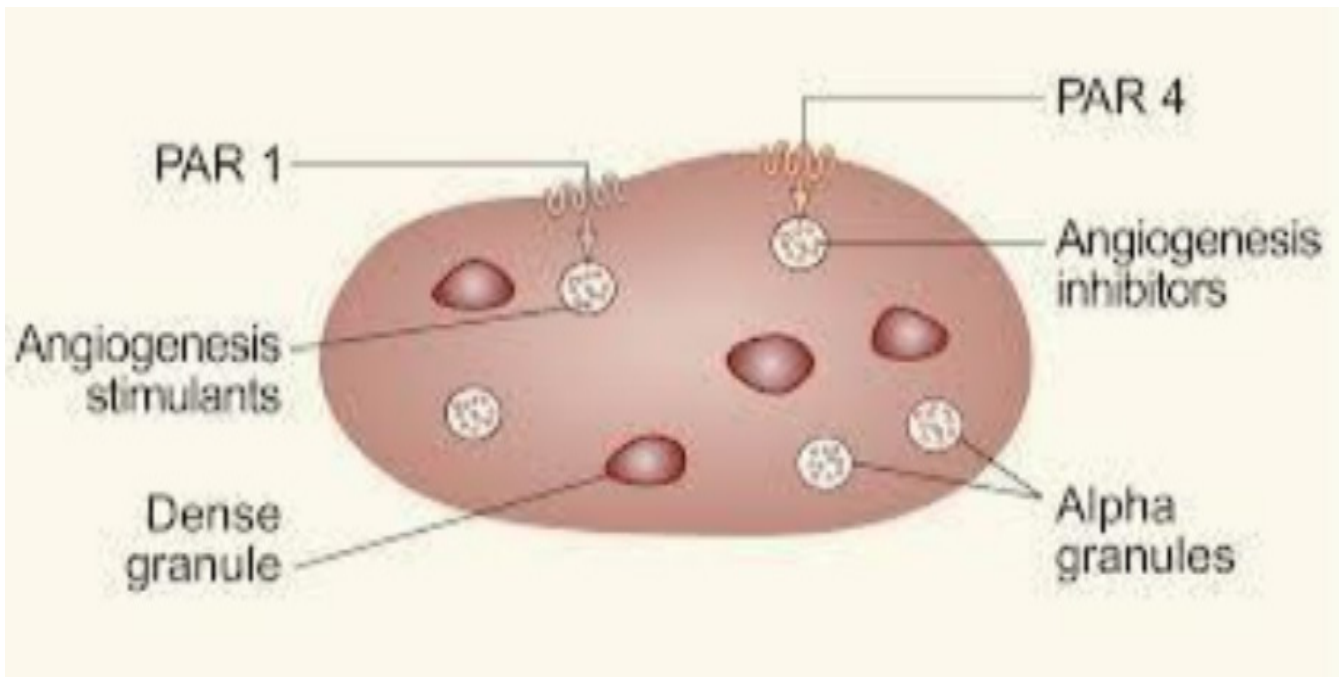
- **Platelets**

Growth factors

- Cytokines (inflammation)
- Infection
- Osteogenesis
- Wound healing
- Maxillofacialsurgery

- **Bio-Active Proteins**

- Macrophages
- Mesenchymal stem cells
- Osteoblast
- Enhance tissue regeneration/healing



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## Pathophysiology Cont.

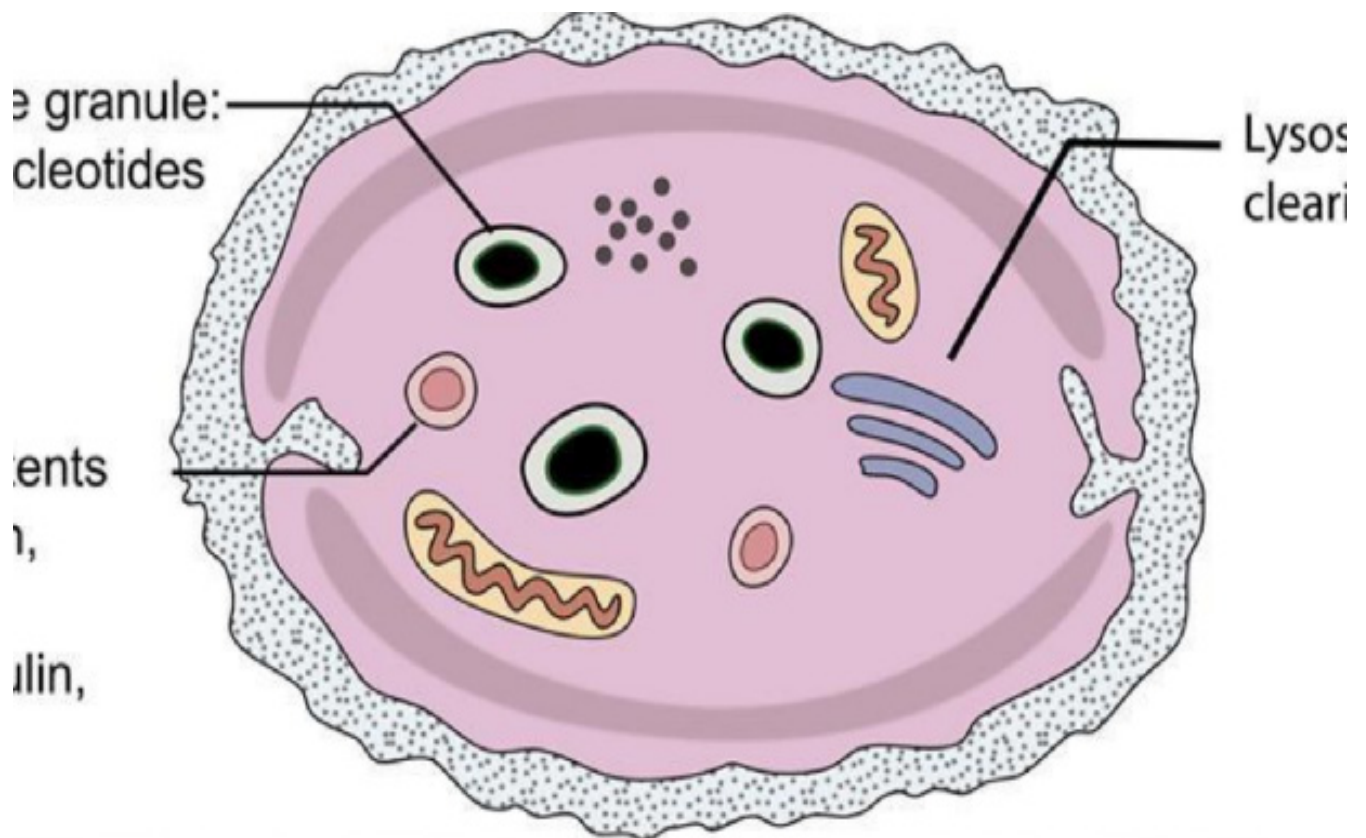
- **Platelets**

Growth factors

- Cytokines (inflammation)
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- **Bio-Active Proteins**

- Macrophages
- Mesenchymal stem cells
- Osteoblast
- Enhance tissue regeneration/healing



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## Pathophysiology Cont.

### Dense granules

Serotonin  
Histamine  
ATP  
ADP  
Calcium  
Magnesium  
Pyrophosphate

### Alpha-granules

Serotonin  
Albumin  
Fibrinogen  
Fibronectin  
Vitronectin  
Osteonectin  
Calcitonin  
Von Willebrand Factor  
Von Willebrand antigen II  
Thrombospondin  
Platelet factor 4  
IgG, IgA, IgM  
C1 inhibitor  
Plasminogen  
Plasminogen activator  
inhibitor-1  
Platelet-derived

collagenase inhibitor  
High molecular weight  
kininogen  
Angiotensinogen  
Protein S  
-Antitrypsin  
-Macroglobulin  
-Anti-plasmin  
Multimerin  
Platelet basic protein  
Thromboglobulin  
Histidine-rich  
glycoprotein  
Connective tissue activating  
protein III  
Neutrophil-activating  
protein II  
Platelet-derived  
growth factor  
Coagulation factor V  
Coagulation factor VIII  
Substance P  
Vasoactive intestinal  
peptide  
>300 other proteins  
(Maguire et al., 2002;  
Maguire and Fitzgerald,  
2003, Copinger  
et al., 2004)

### Lysosomal granules

Cathepsin D  
Cathepsin E  
Carboxypeptidase A  
Carboxypeptidase B  
Proline carboxypeptidase  
N-acetyl- $\beta$ -D-glucosaminidase  
 $\beta$ -D-glucuronidase  
 $\beta$ -D-galactosidase  
 $\alpha$ -D-mannosidase  
 $\beta$ -D-L-arabinofuranosidase  
 $\alpha$ -D-galactosidase  
 $\alpha$ -L-fucosidase  
 $\beta$ -D-fucosidase  
 $\beta$ -D-glucosidase  
 $\alpha$ -D-glucosidase  
Acid phosphatase  
Arylsulfatase



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# PRP Definition and Preparation

## • Definition

Definition

- Higher concentration than baseline
- Subjected to the individual baseline
- 2.5 -3 times baseline (low))))
- 5 - 9 times baseline (high)
- **Optimal level 2.5x**

- *Graziani et al. Clin Oral Implants Res. 2006 Apr;17(2):212-9.*

## • Preparation

- Low platelet count
  - 2 components
- High platelet count
  - 3 components



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## PRP (Buffy coat)

- **Concentration of platelet (2.5X)**

- TGF-b
- FGF
- PDGF
- EGF
- VEGF
- CTGF

- **WBC**

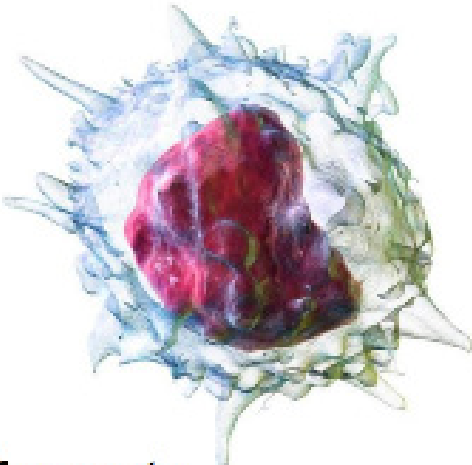
- Neutrophils
  - 40 Hydrolytic enzymes
- Lymphocytes
  - T/B cells, NK cells
- Monocytes/Macrophages



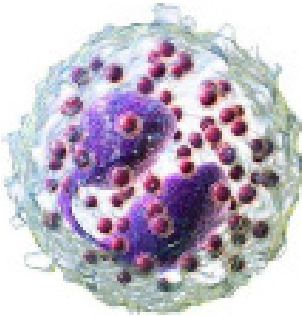
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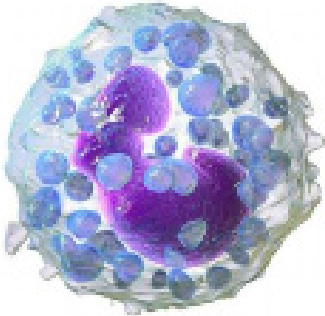
# White Blood Cells



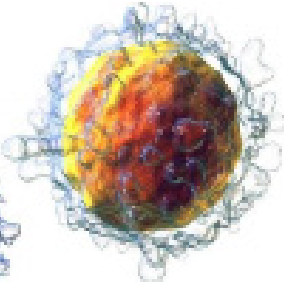
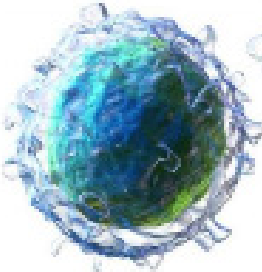
Monocyte



Eosinophil



Basophil



Lymphocytes



Neutrophil



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# Plasma-Base Product Preparation

- **Before Injection**

- Anticoagulant (ACD)
- Binds to calcium
- $\times$ PH

- **Injection**

- Buffering the PH
- Thrombin
- Calcium chloride
- Mechanical trauma



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# Plasma-Base Therapy Indications

- **Tendinopathies**
- **Ligament injuries**
- **Muscle injuries**
- **Joints conditions**
- **Intervertebral discs**
- **Nerves(irritation)**
- **Fracture Non-Union**



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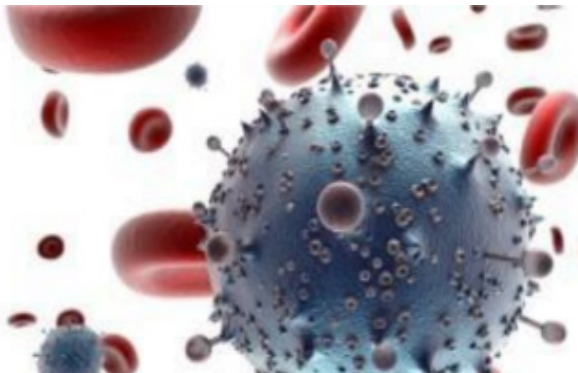
# Plasma Solutions Screening Recommendations

## • Absolute Contraindication

- Platelet dysfunction syndrome
- Critical thrombocytopenia
- Hemodynamic instability
- Septicemia
- Local infection at the site of the procedure
- Patient unwilling to accept the risks

## • Relative Contraindications

- NSAIDs within 48 hours of procedure
- Corticosteroid injection within 1 month of procedure
- Systemic use of corticosteroids with 2 weeks of procedure
- Tobacco use
- Fever or illness (recent)
- Cancer (especially hematopoietic or of bone)
- HGB < 10g/dl
- Platelet count < 105/ul

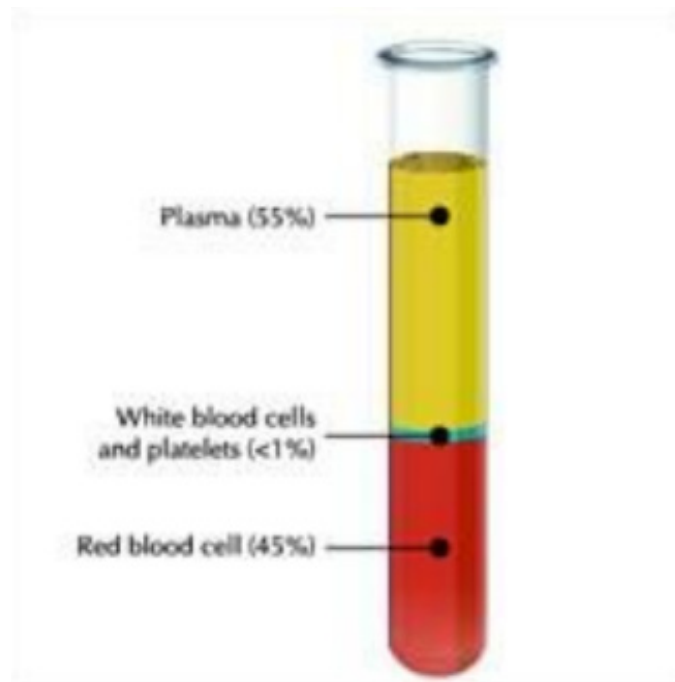


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# Plasma Solutions Treatment Approach

- Regenerative medicine on-demand
- Customary treatment modalities
- Amendable plasma-base products



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# Treatment Algorithms

- **Anatomical site**
  - Axial skeletal
- **Cervical, thoracic, lumbar, sacrum**
  
- Appendicular skeletal
- **Shoulder, elbow, wrist, hand, hip, knee, ankle, foot**
  
- **Tissue involvement**
  - Cartilage (joint), tendon, ligament, muscle, nerve
  
- **Chronicity**
  - Acute (1-4days), sub-acute (4days-3wks), chronic (3wk >)

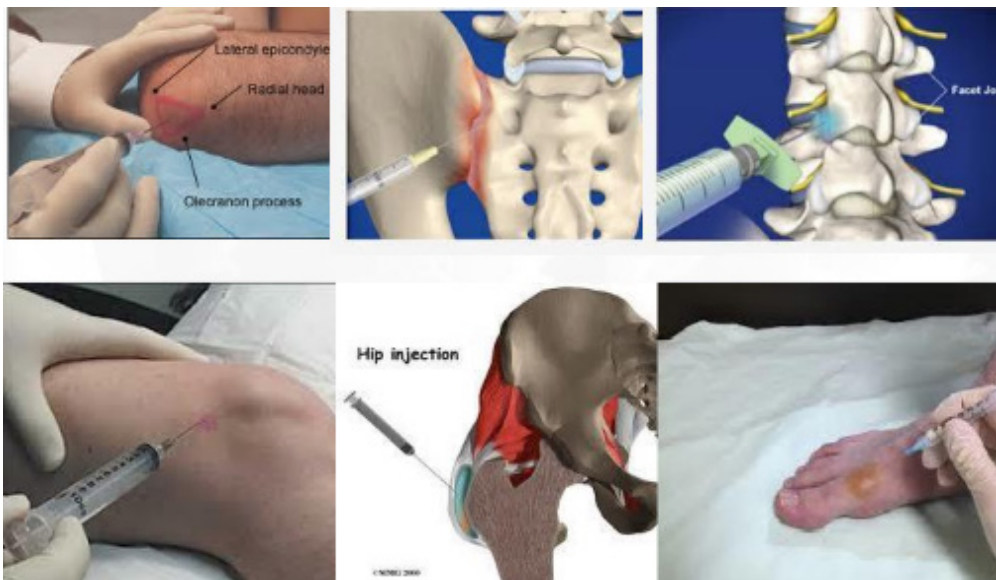


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# Anatomical Landmarks and Injection Techniques

- **Anatomical site**
  - Axial skeletal
  - Cervical, thoracic, lumbar, sacrum
- Appendicular skeletal
  - Shoulder, elbow, wrist, hand, hip, knee, ankle, foot
- **Tissue involvement**
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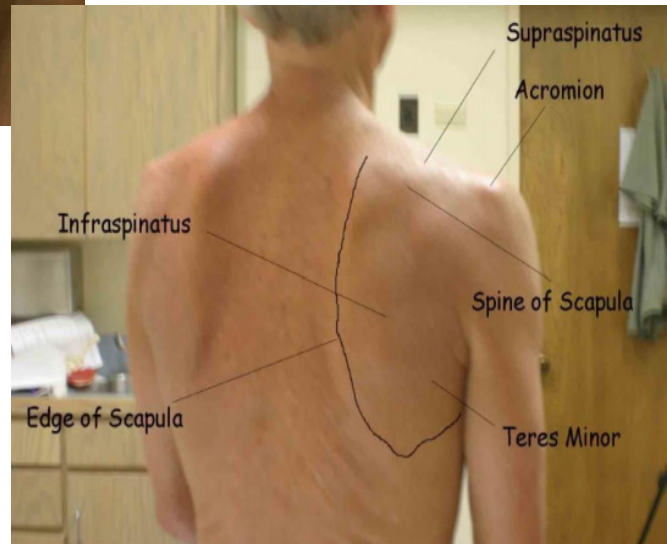
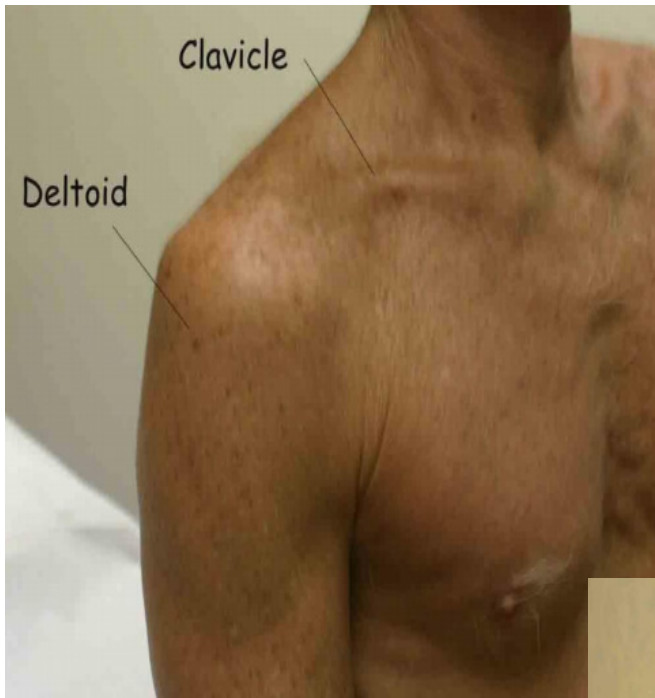
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# Injections Techniques



- **Shoulder**
- **Elbow**
- **Wrist**
- **Hip**
- **Knee**
- **Ankle**
- **Spine (C/L)**

# Normal Anatomical Structures of the Shoulder

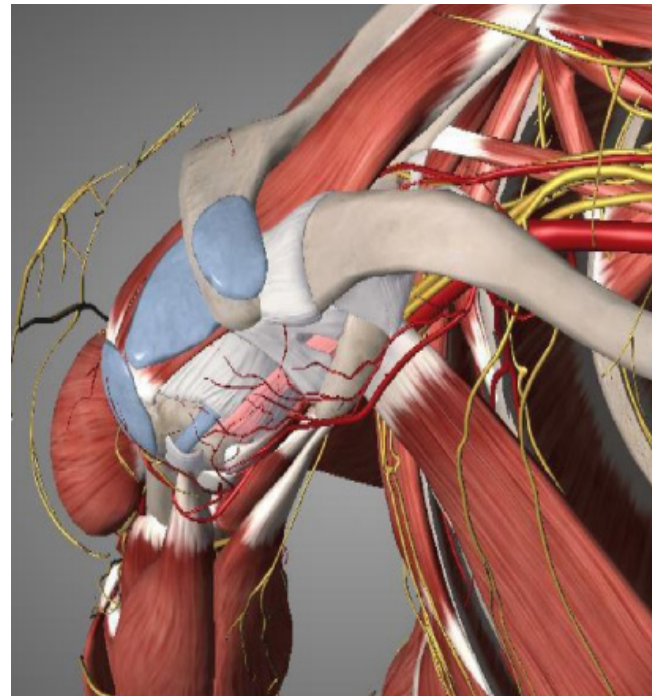
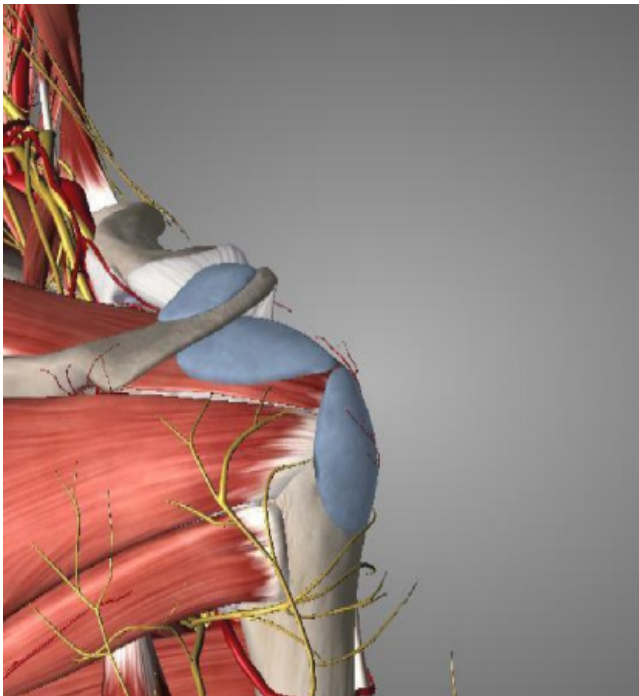


# Injection Procedure to the Shoulder

1. Gleno-humeral joint

1. Acromioclavicular joint

1. Subacromial joint

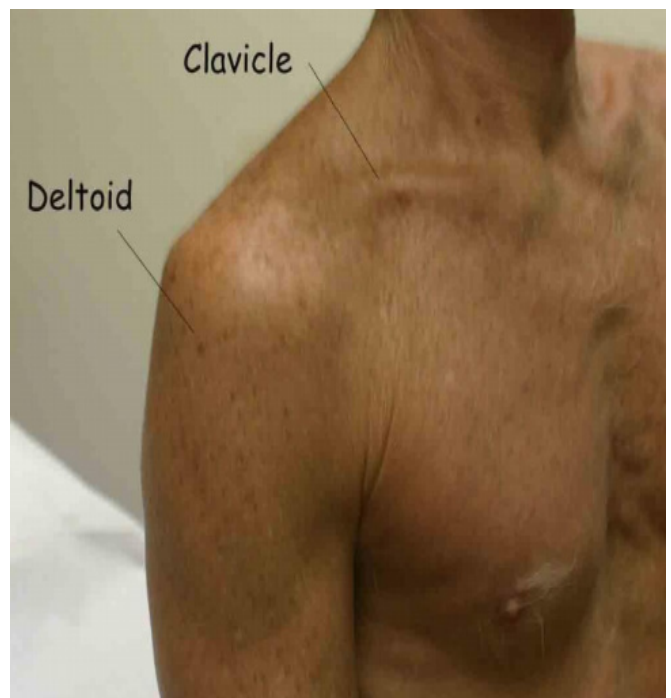


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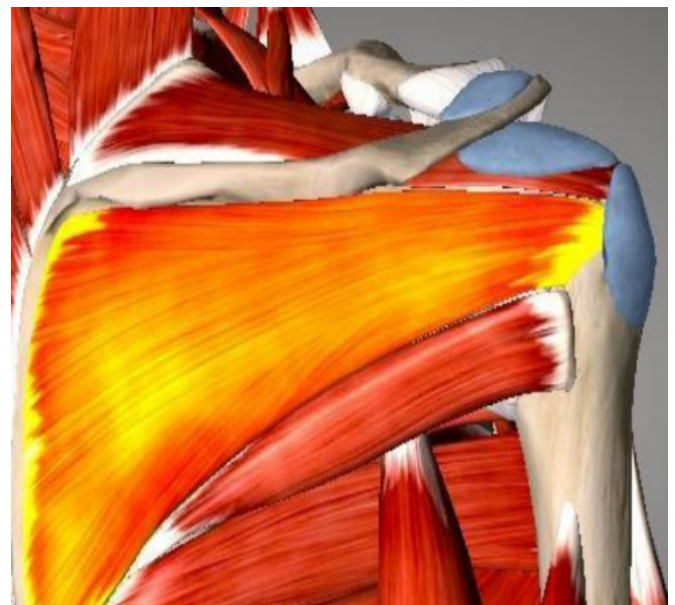
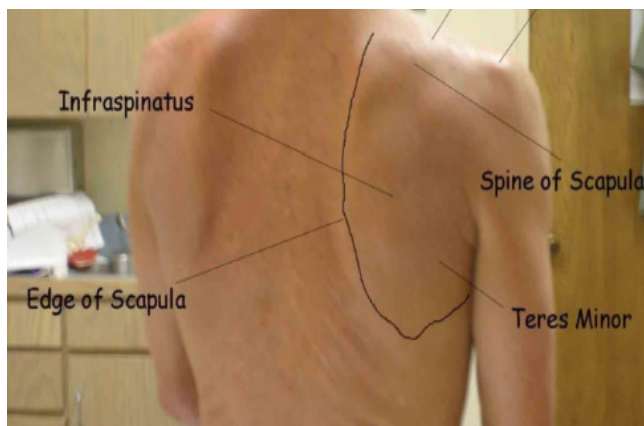
# Injection Procedures for the Shoulder Ligaments

1. Coracoacromial Ligament
2. Acromioclavicular Ligament
3. Coracohumeral Ligament
4. Articular capsule of shoulder



# Injection Procedures to the Shoulder Tendons/Bursa

1. Supraspinatus tendon
2. Infraspinatus tendon
3. Teres minor tendon
4. Sub-acromial bursa
5. Sub-deltoid bursa



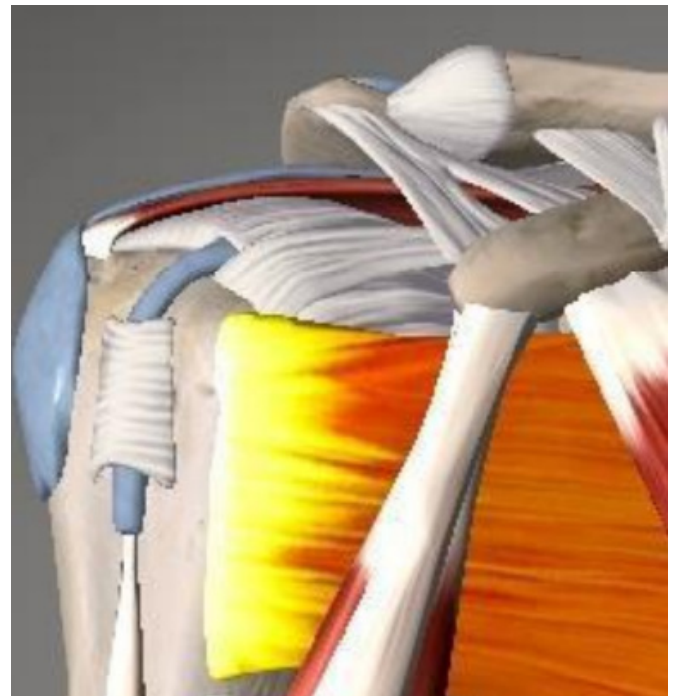
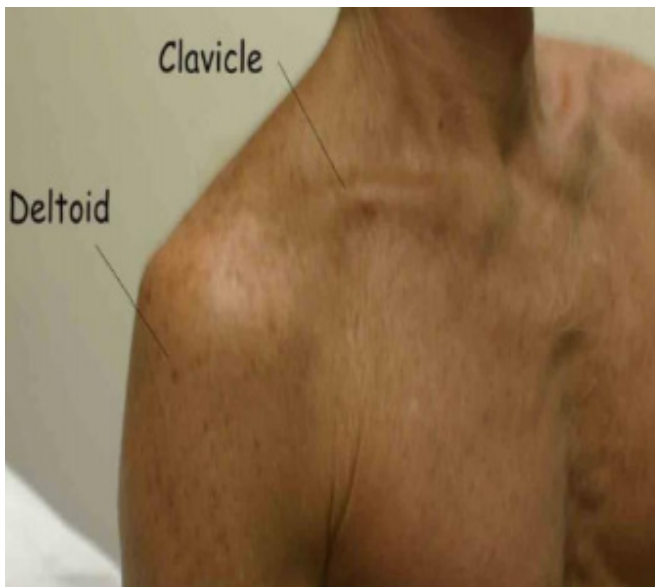
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# Injection Procedures to the Shoulder Tendons/Bursa

## 1. Subscapularis

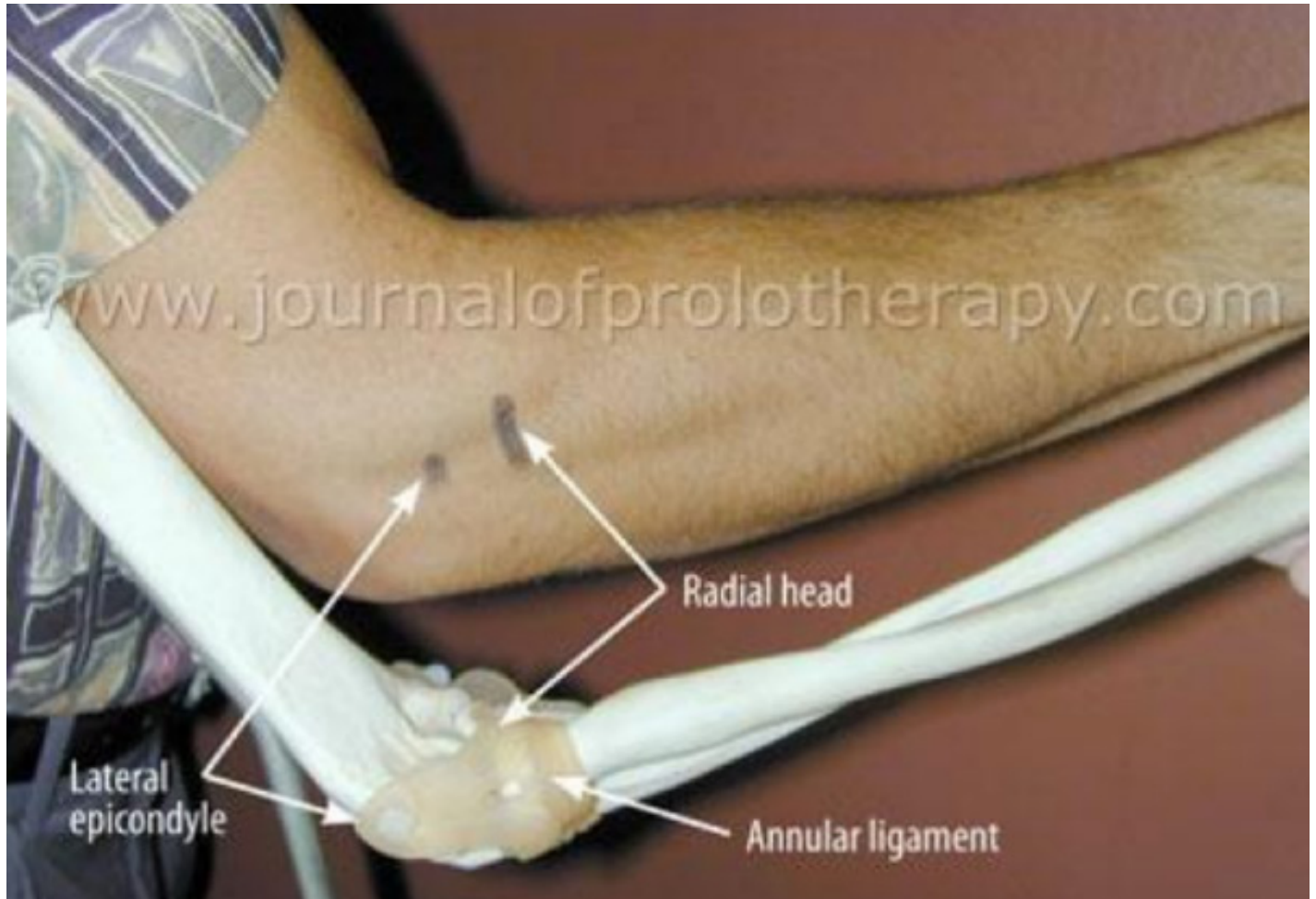
## 2. Biceps Brachii long head



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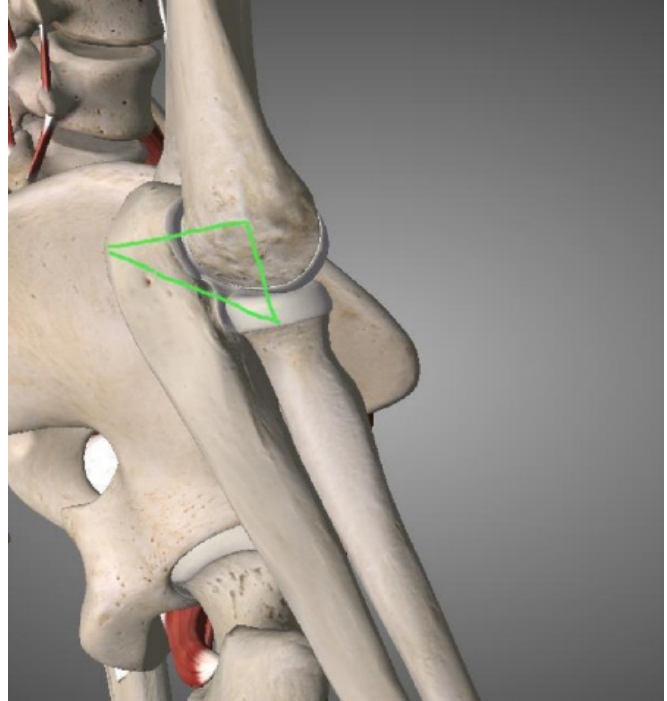
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## Normal Anatomical Structures of the Elbow



# Injection Procedures to the Elbow Joints

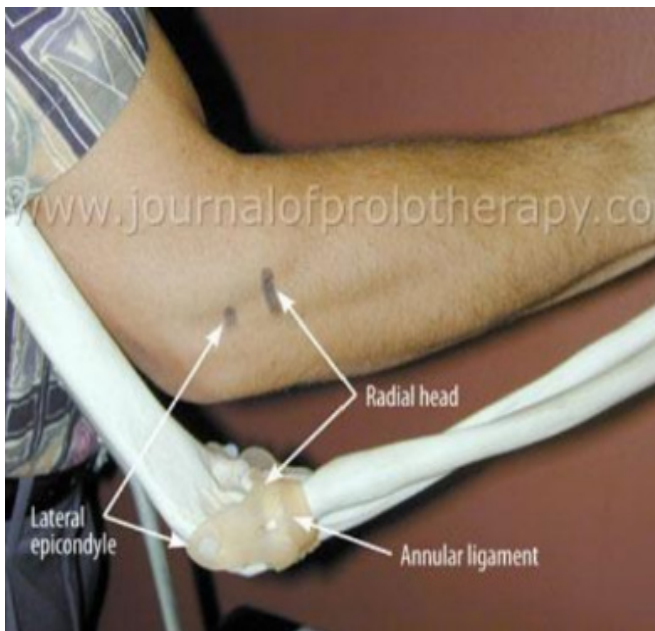
1. Radial-capitulum joint
2. Ulna-trochlear joint



# Injection Procedures to the Elbow Ligaments

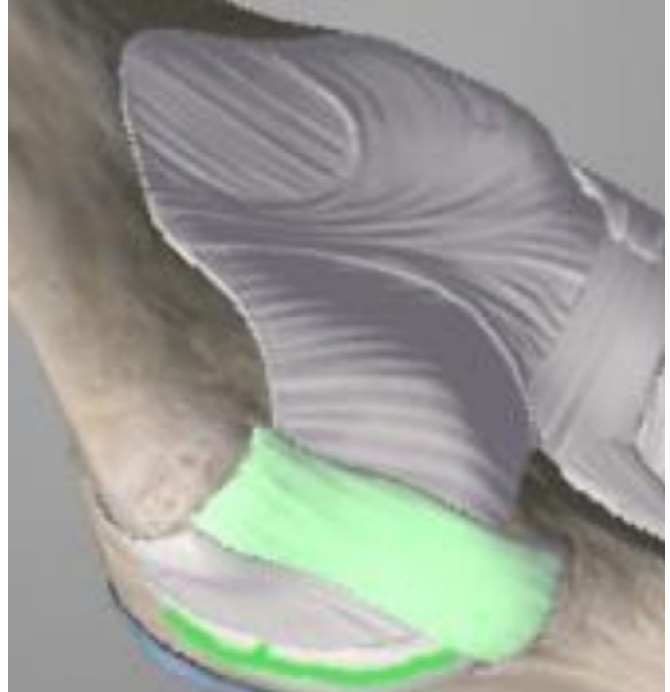
## 1. Radial collateral ligament

## 2. Ulnar collateral ligament



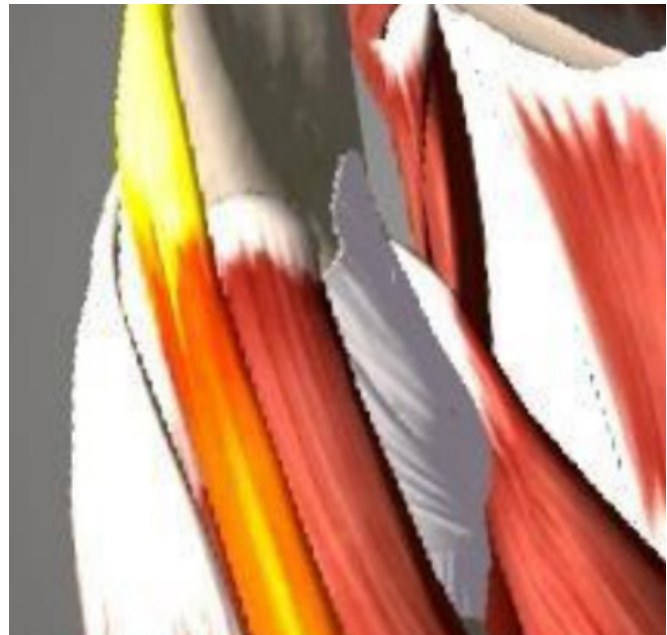
# Injection Procedures to the Elbow Ligaments

## 1. Ulnar collateral ligament



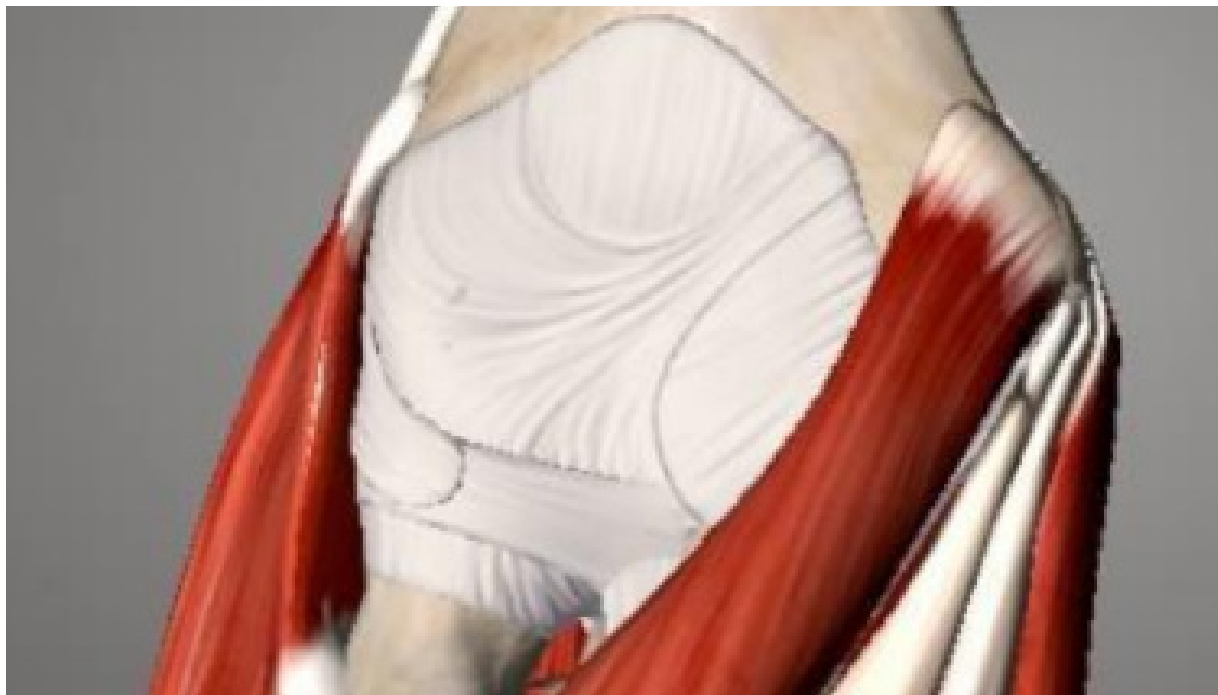
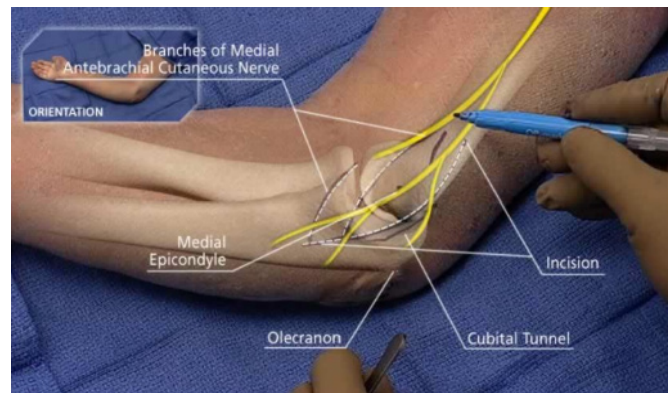
# Injection Procedures for the Elbow Tendons

## 1. Common extensor tendons



# Injection Procedures for the Elbow Tendons

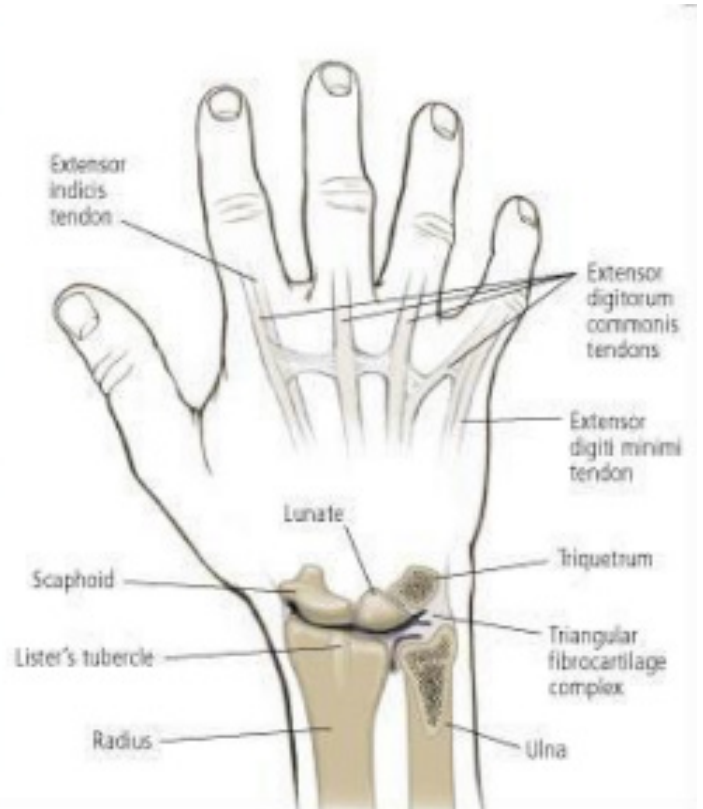
## 1. Common flexor tendons



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# Normal Anatomical Structures of the Wrist



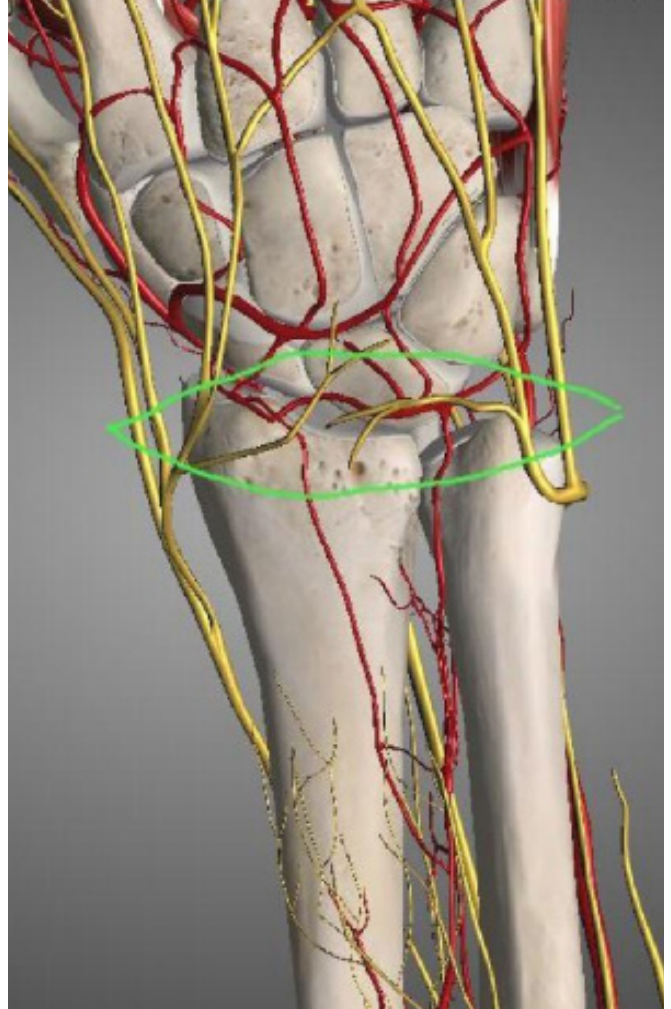
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# Injections Procedure to the Wrist Joints

1. Radial carpal joint

2. Ulnar carpal joint



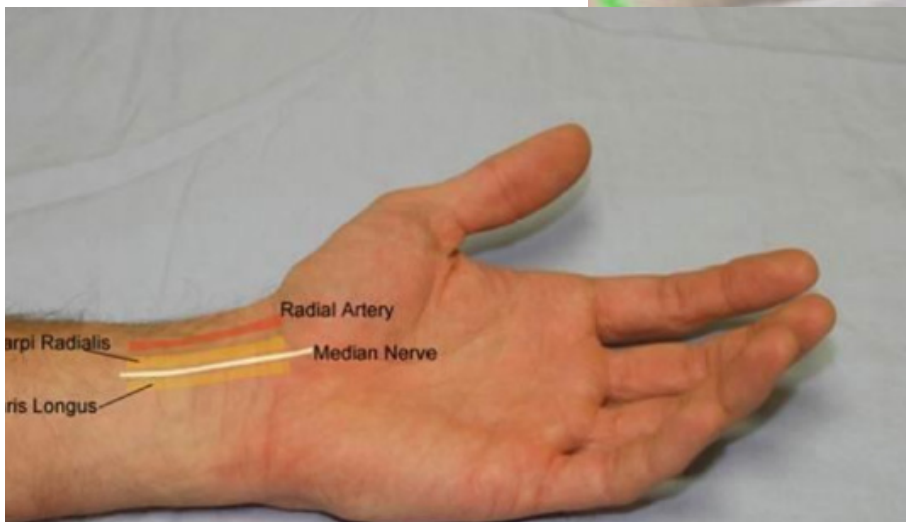
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# Injection Procedures for the Wrist Ligaments

## 1. TFCC ligaments

### a. Dorsal and palmar ulnarcarpal ligaments

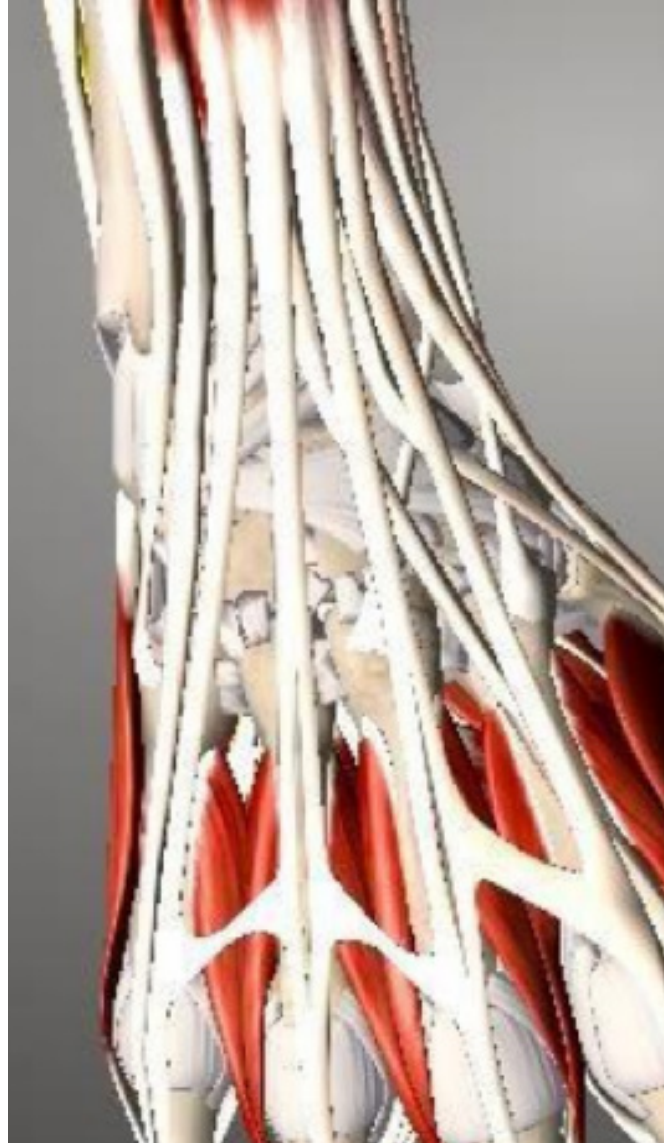


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# Injection Procedures to the Wrist Tendons

## 1. Common wrist extensor tendons

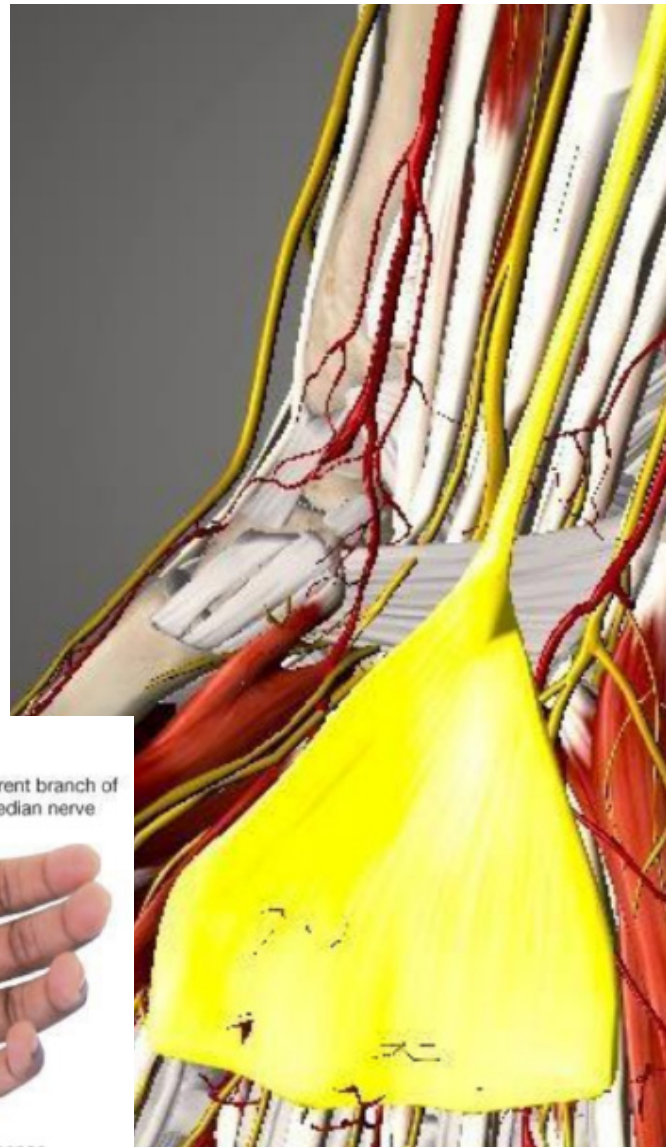


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# Injection Procedures to the Wrist Tendons

## 1. Common wrist flexor tendons

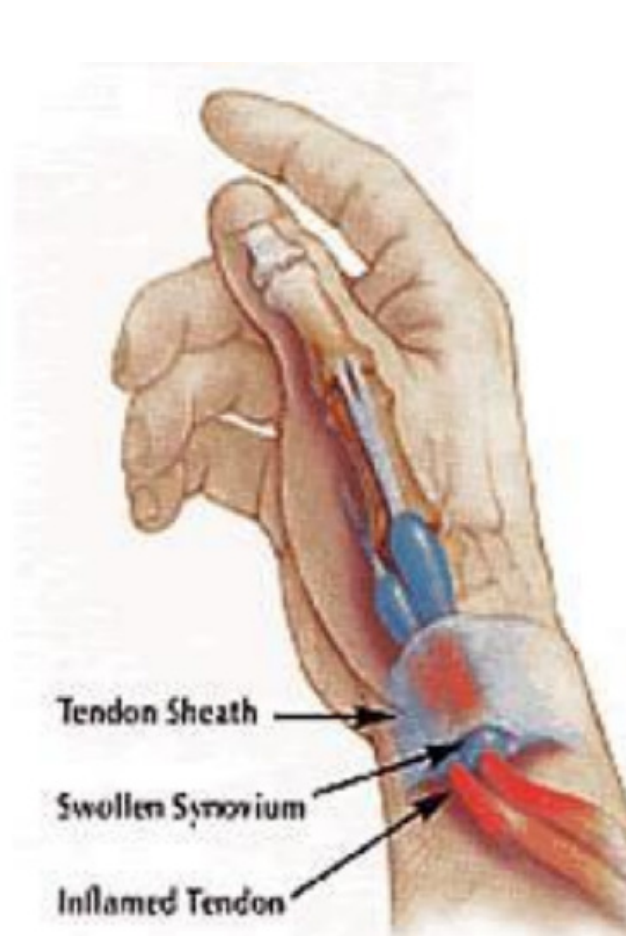


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# Injection Techniques for Dequervain's Tendonitis

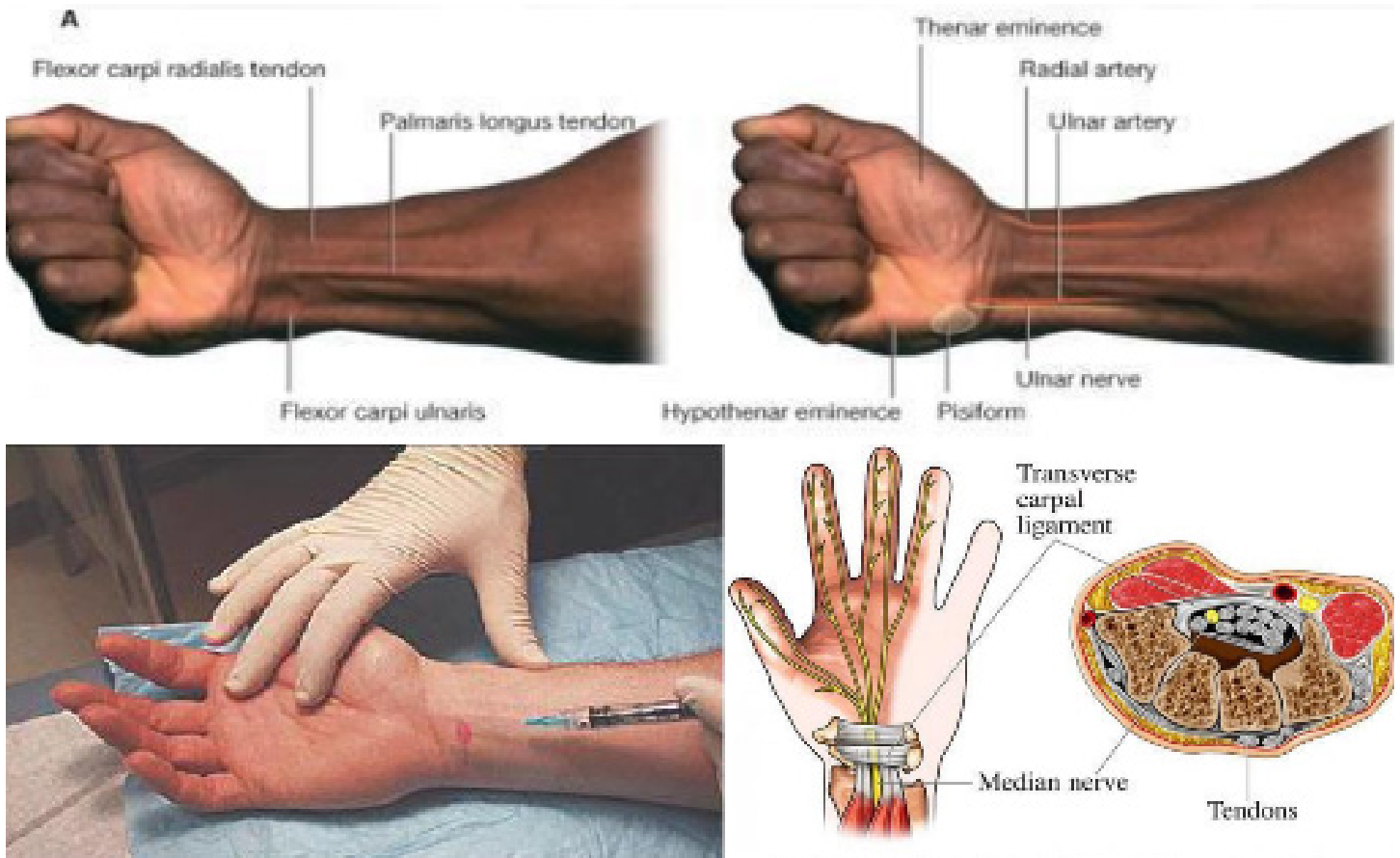
The needle is placed into the first extensor compartment, directed proximally toward the radial styloid process and sliding in parallel to the abductor and extensor tendons



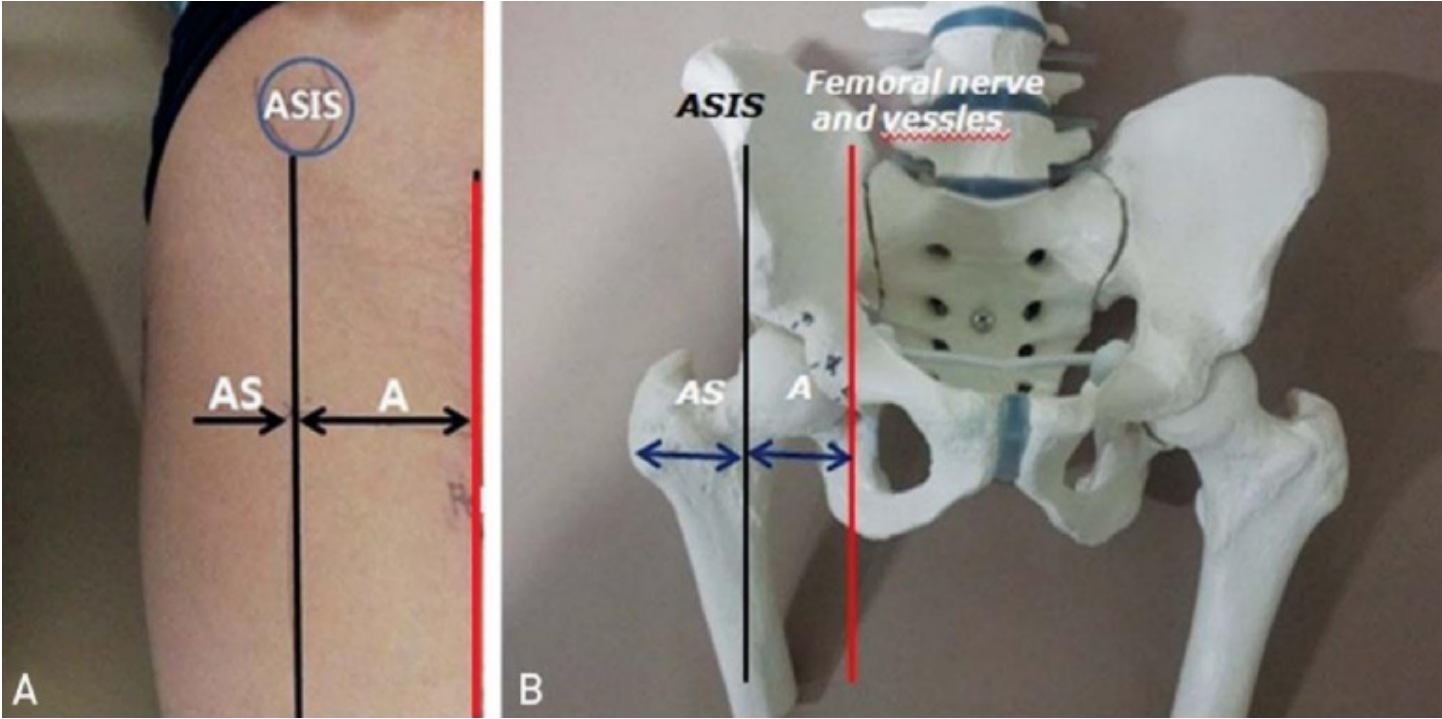
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# Entrapment Syndrome



# Normal Anatomical Structures of the Hip

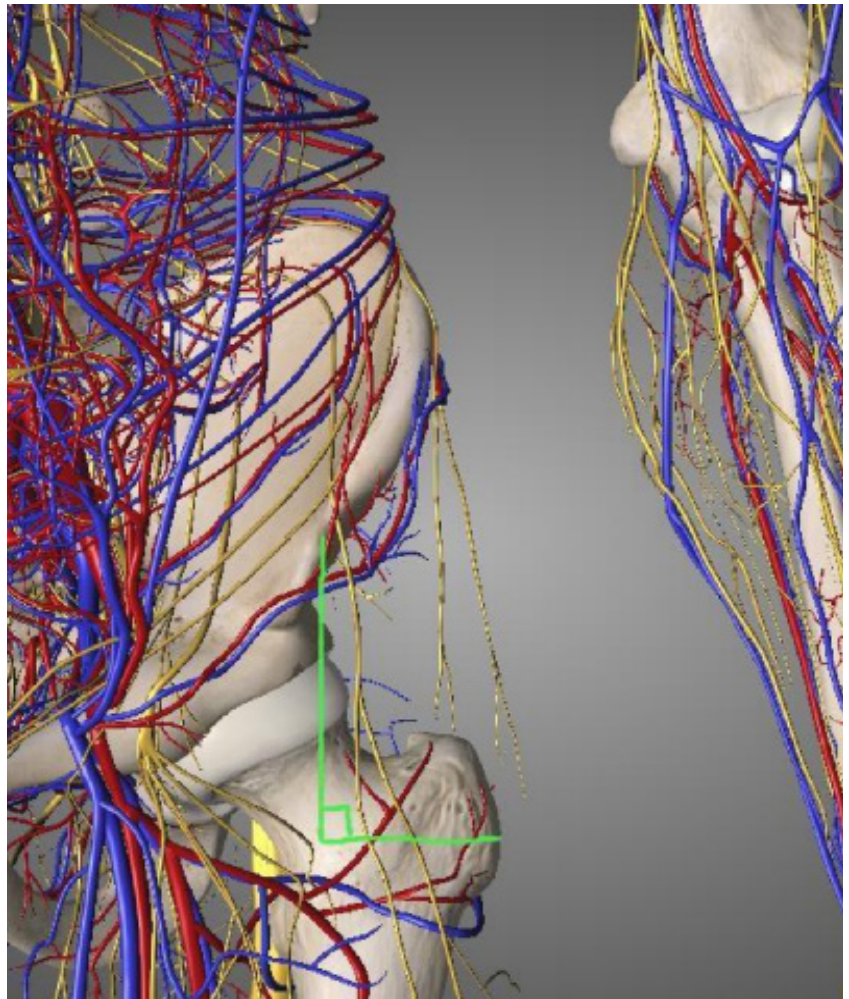


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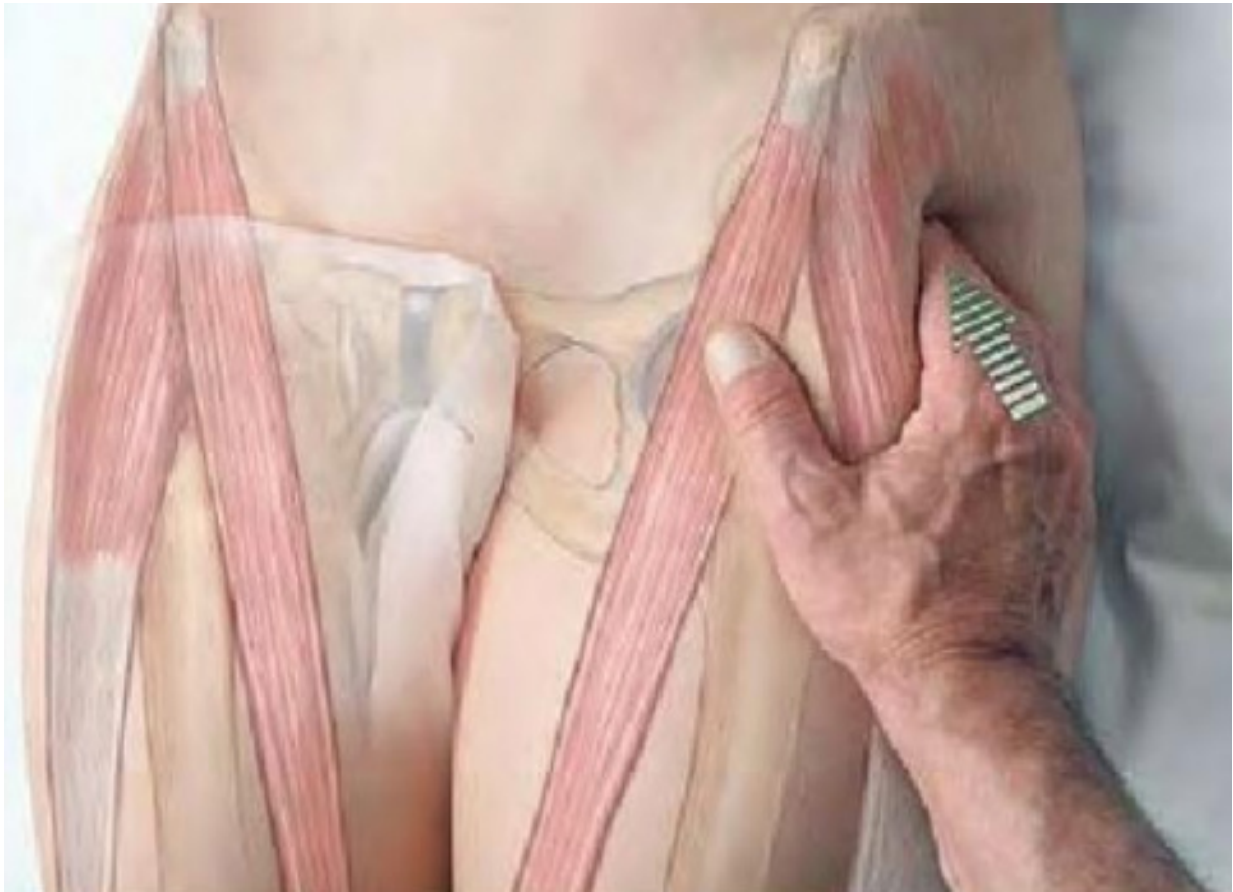
# Injections Procedure to the Hip

## 1. Femoral acetabulum joint



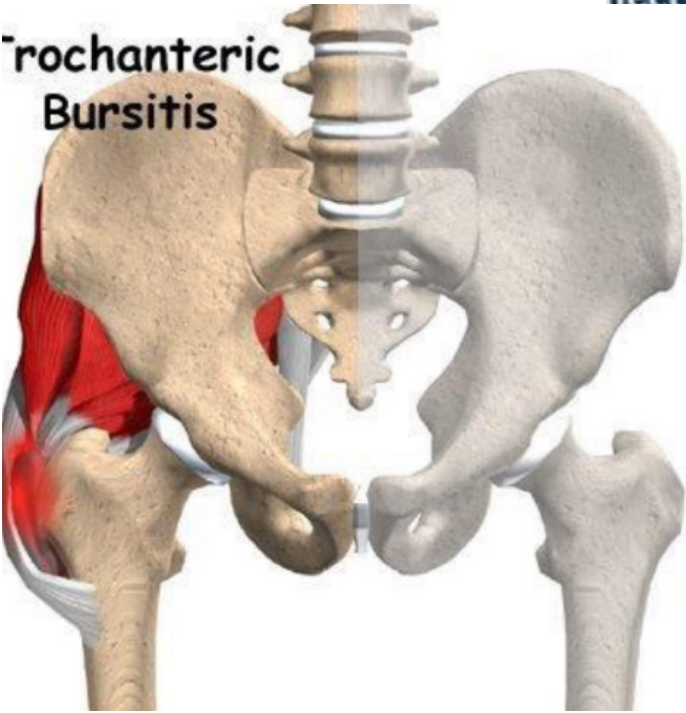
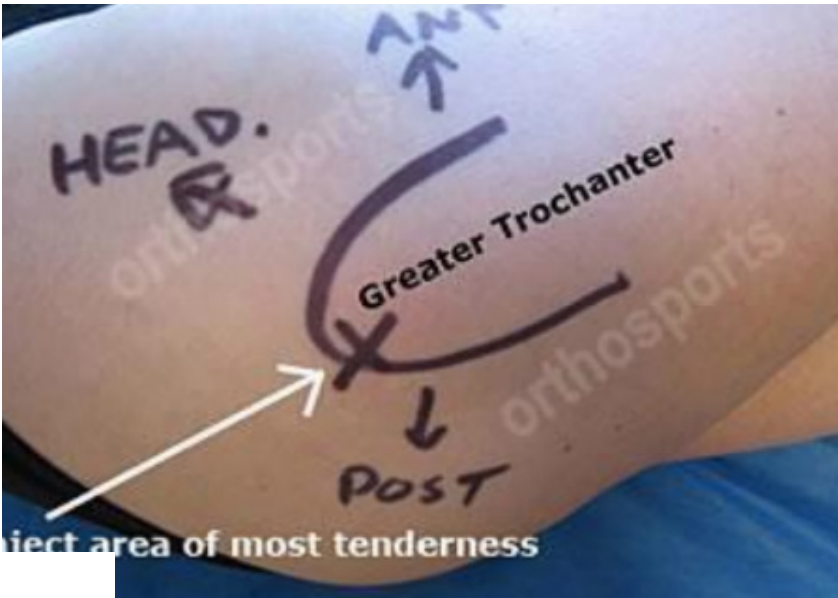
# Injections Procedures for the Hip Tendons/Bursa

## 1. Anterior hip flexors



# Injections Procedures for the Hip Tendons/Bursa

## 1. Trochanteric Bursa



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# Normal Anatomical Structures of the knee

## 1. Anterior hip flexors



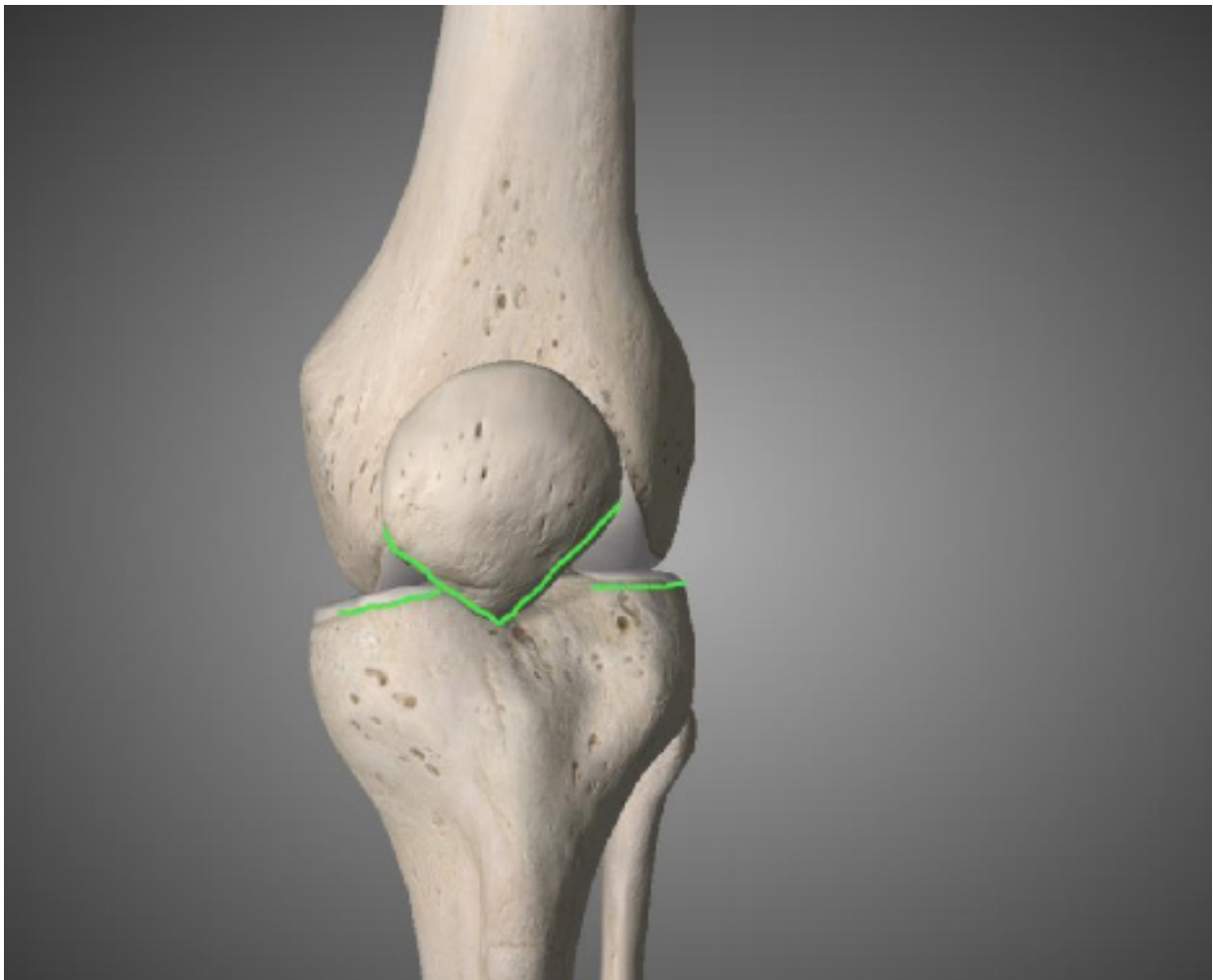
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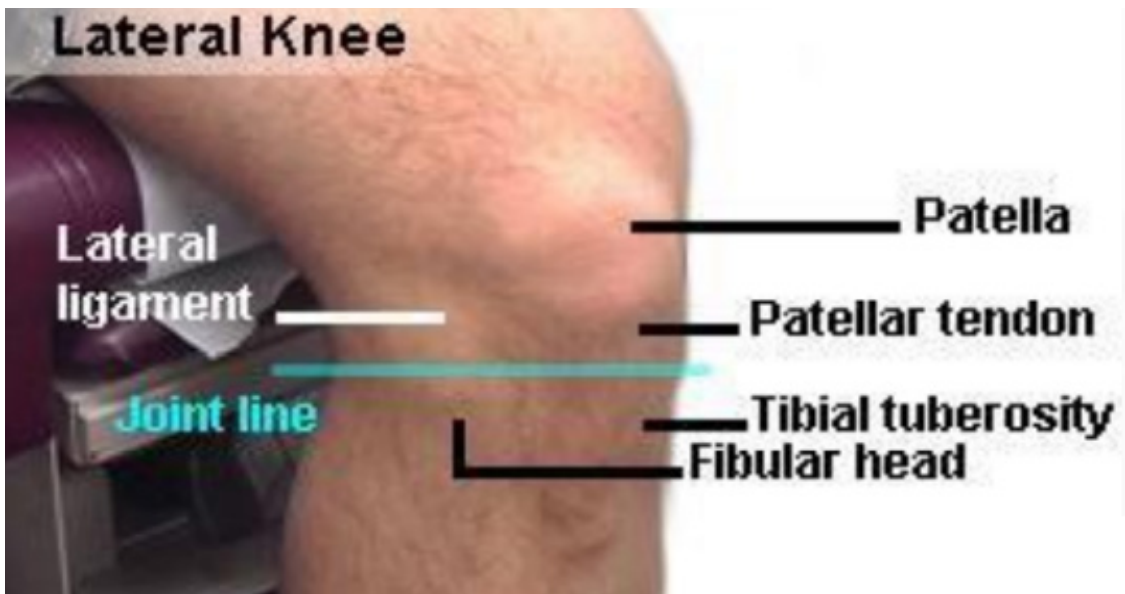
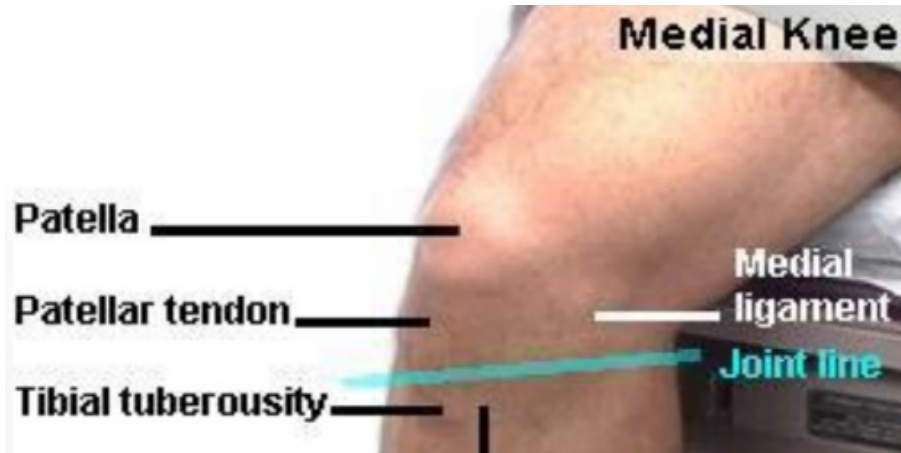
# Injection procedure to the Knee

## 1. Medical/Lateral compartments of the knee

### 1. Patella-femoral joint

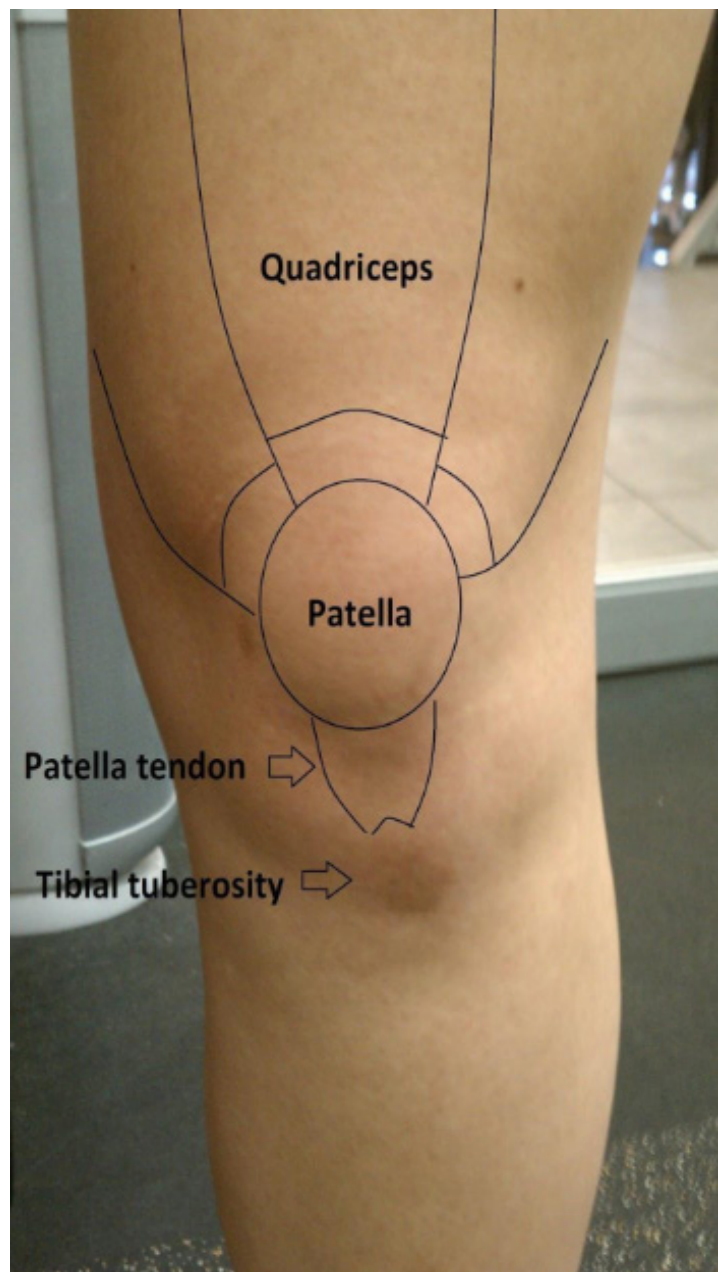


# Normal Anatomical Structures of the Knee



# Injection Procedure to the Knee Ligaments

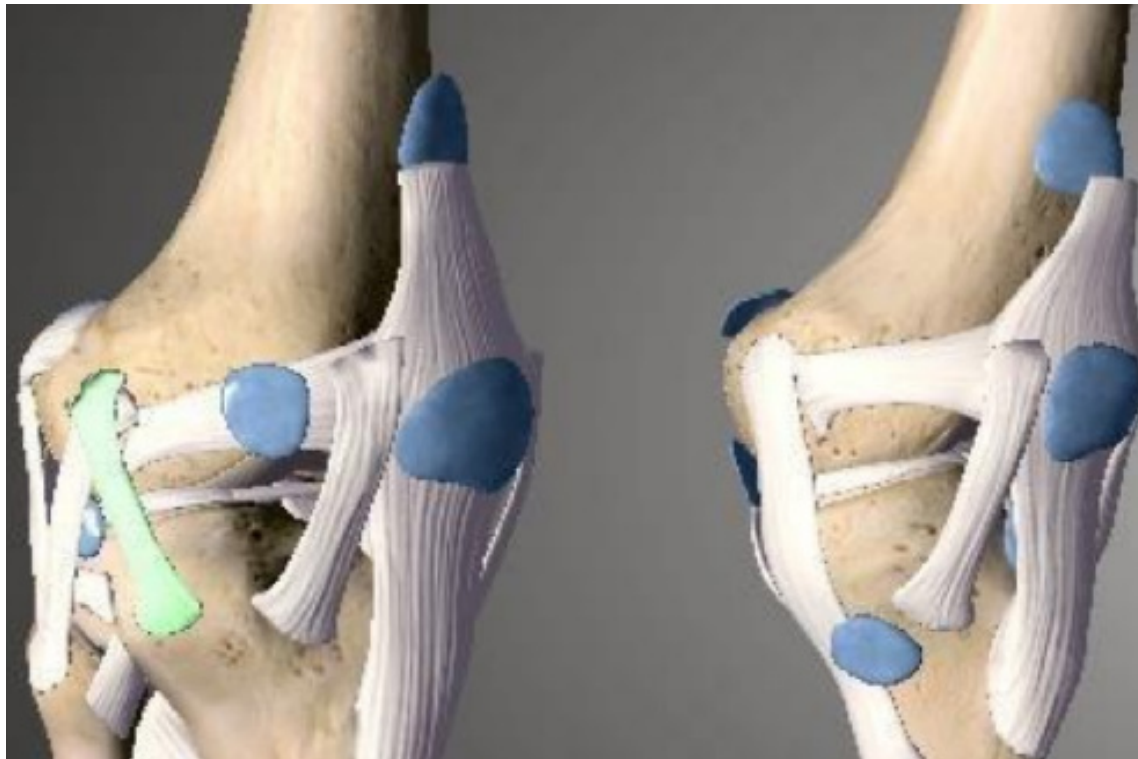
1. Medial/lateral collateral ligament
2. ACL/PCL
3. Medial/lateral meniscus
4. Patella ligament



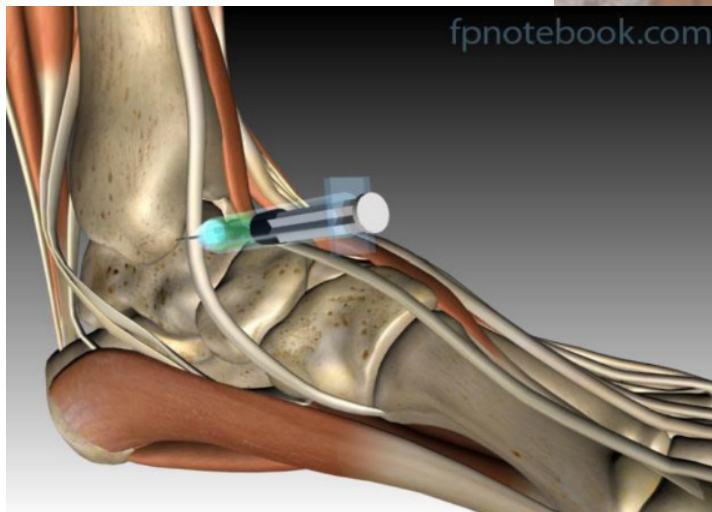
# Injections Procedure to the Knee Tendons

1. Patella tendon

2. Quadriceps tendon



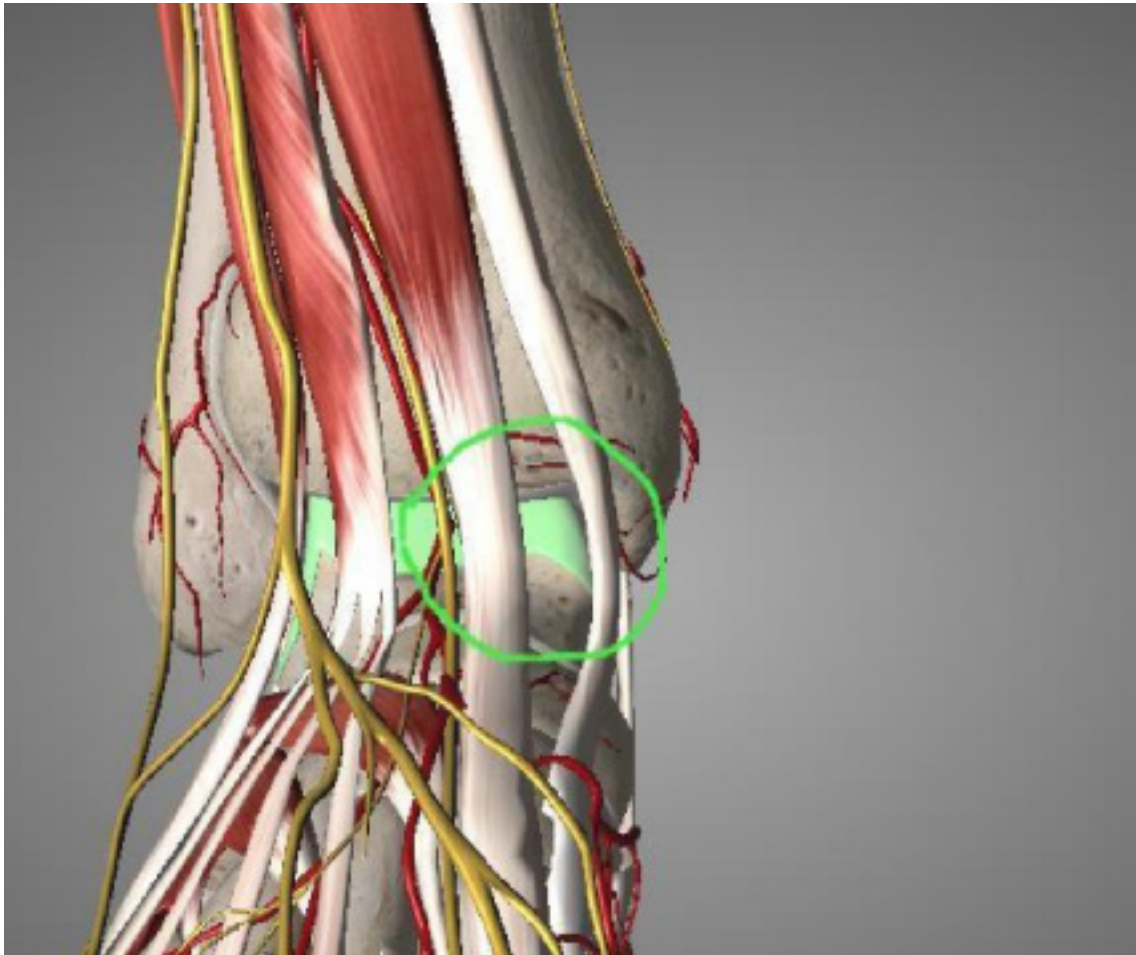
## Normal Anatomical Structures of the Ankle



# Injection Procedures to the Ankle Joints

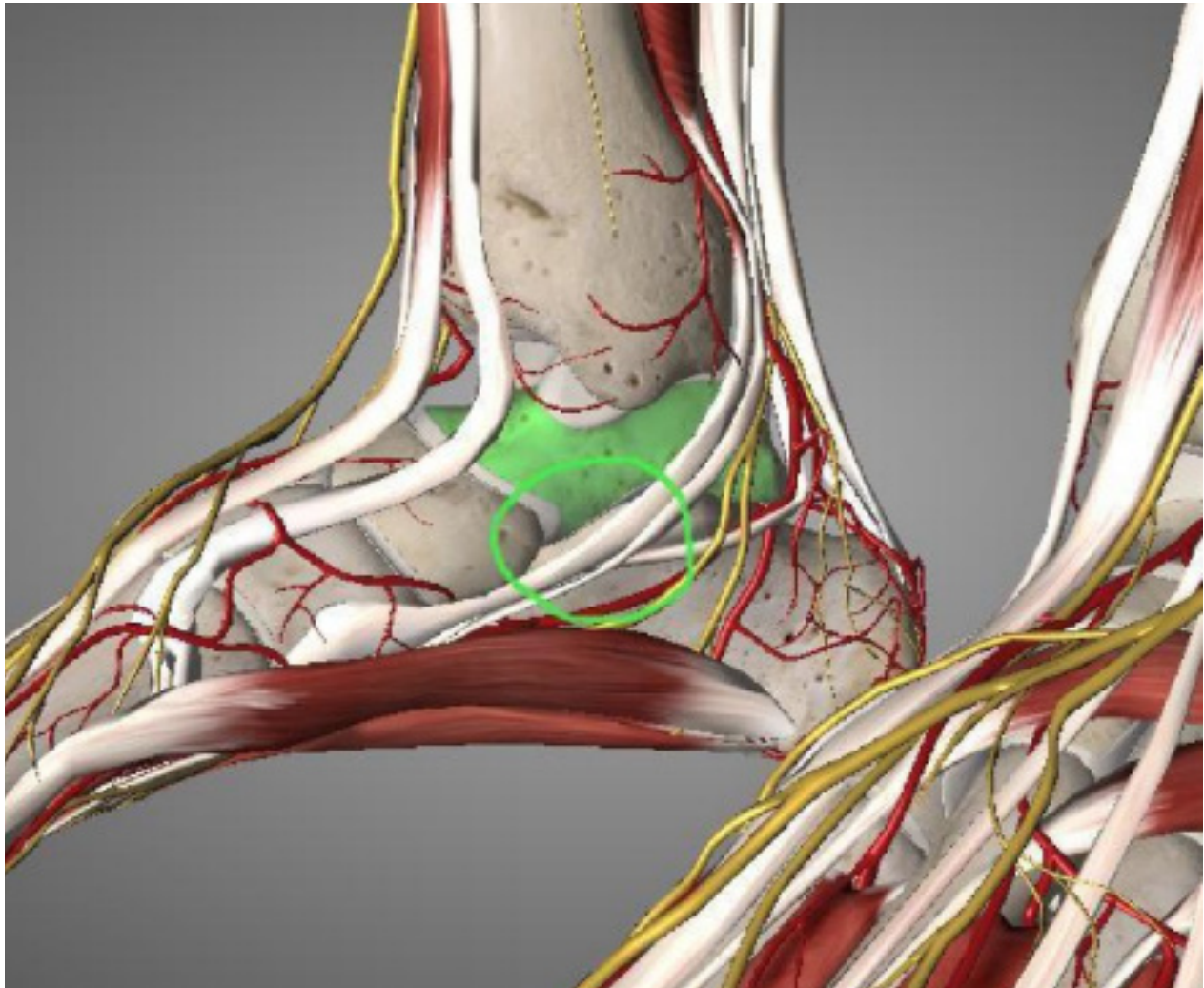
1. Tibial-talar joint

1. Sub-talar joint



# Injection Procedures to the Ankle Joints

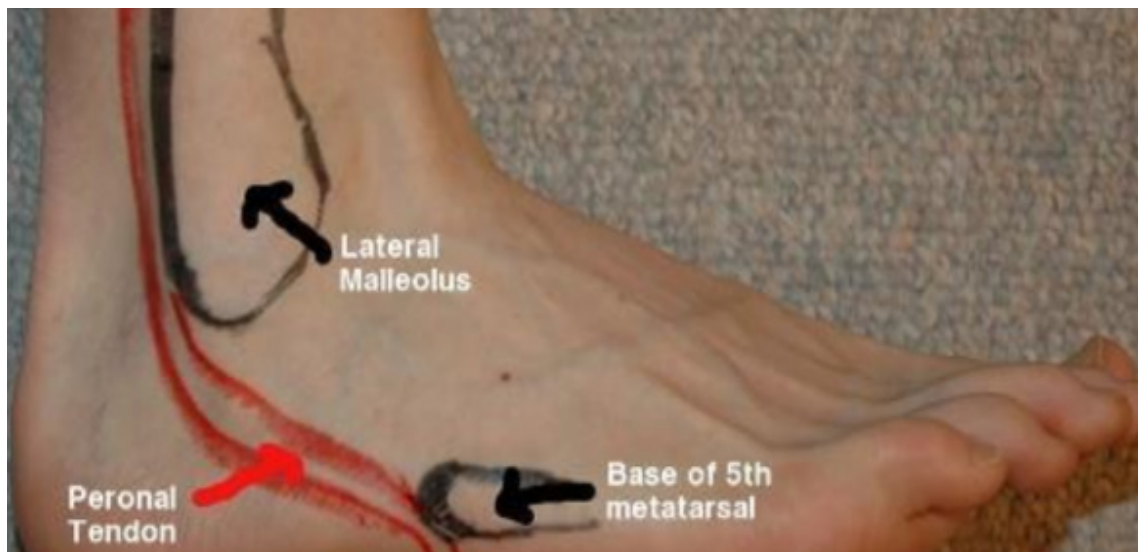
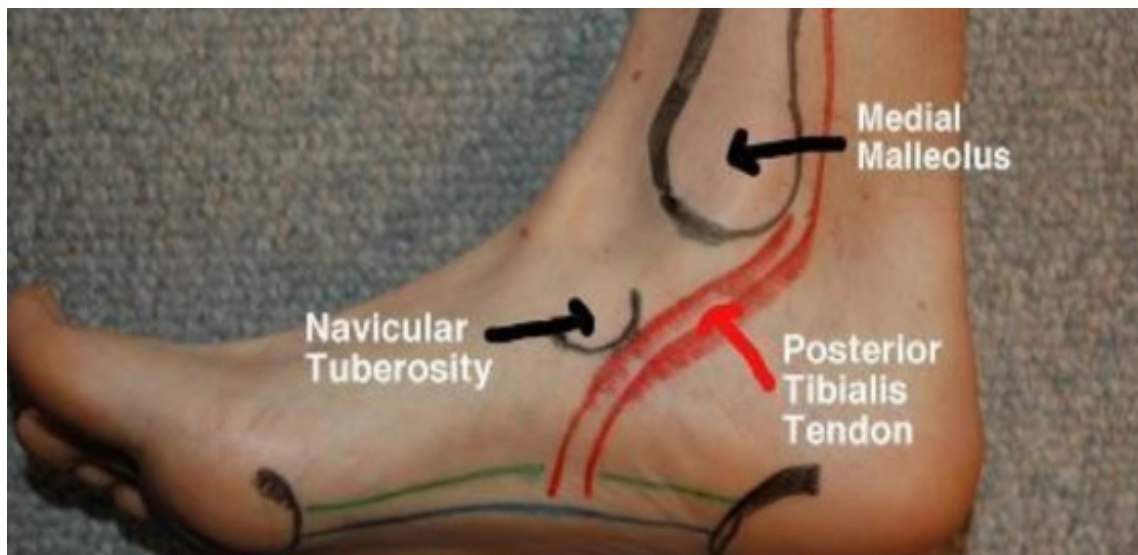
## 1. Sub-talar joint



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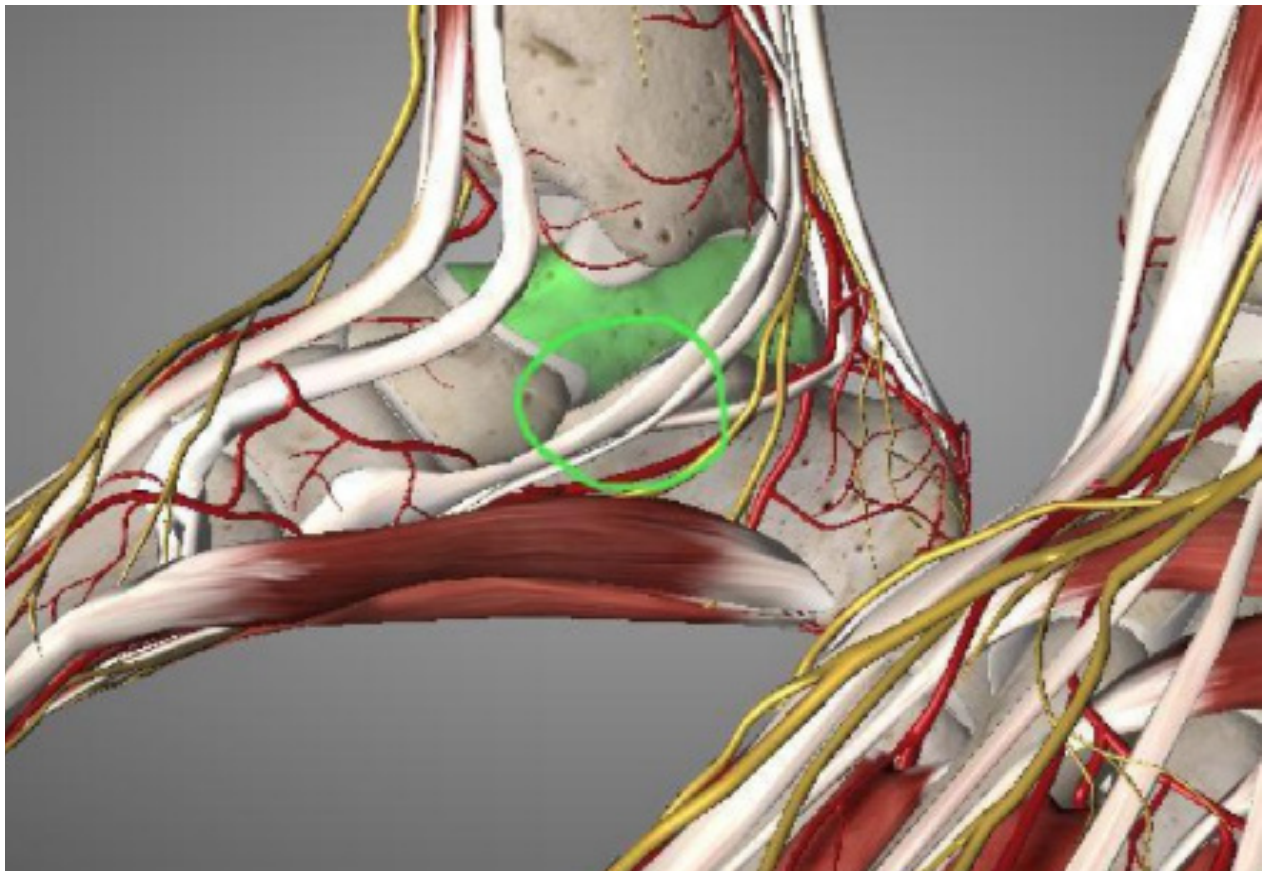
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## Normal Anatomical Structures of the Ankle

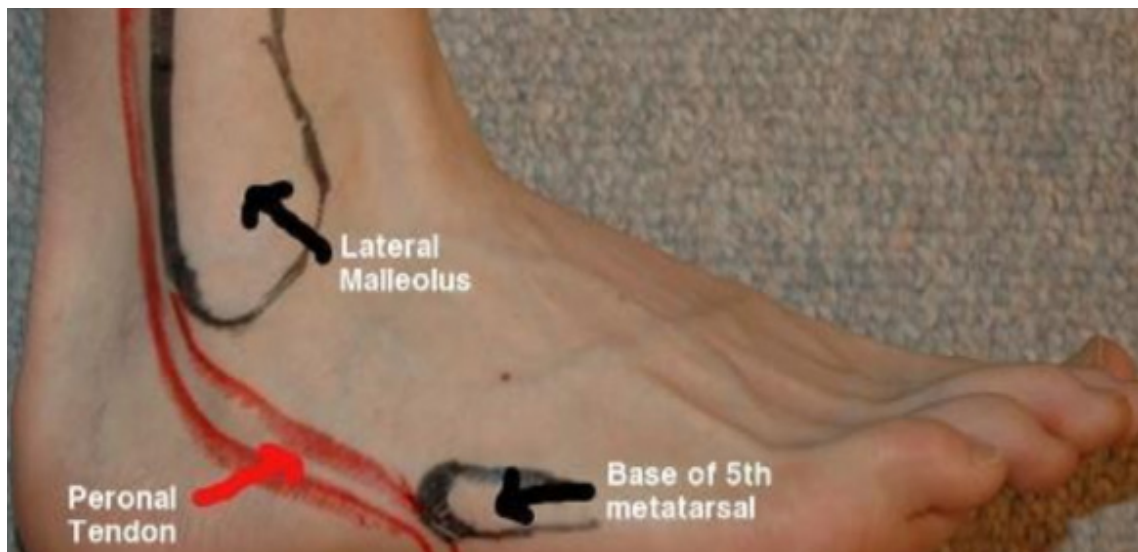
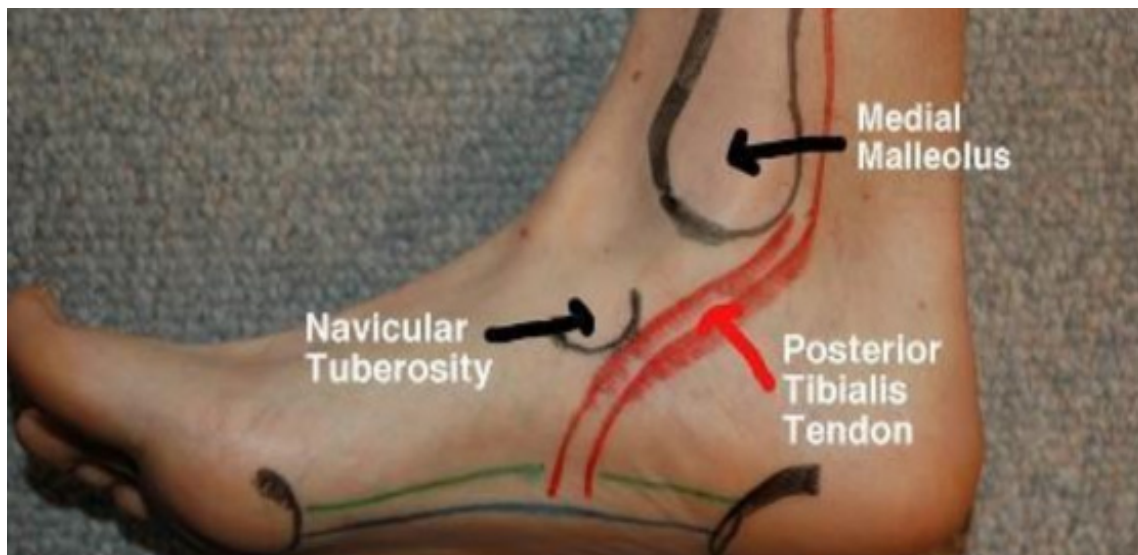


# Injection Procedures for Ankle Ligaments

1. Anterior tibiofibular ligament
2. Anterior talofibular ligament
3. Calcaneofibular ligament



## Normal Anatomical Structures of the Ankle



# Injection Procedures for Ankle Ligaments

1. Anterior tibiofibular ligament
2. Anterior talofibular ligament
3. Calcaneofibular ligament



# Injection Procedures to the Ankle Tendons

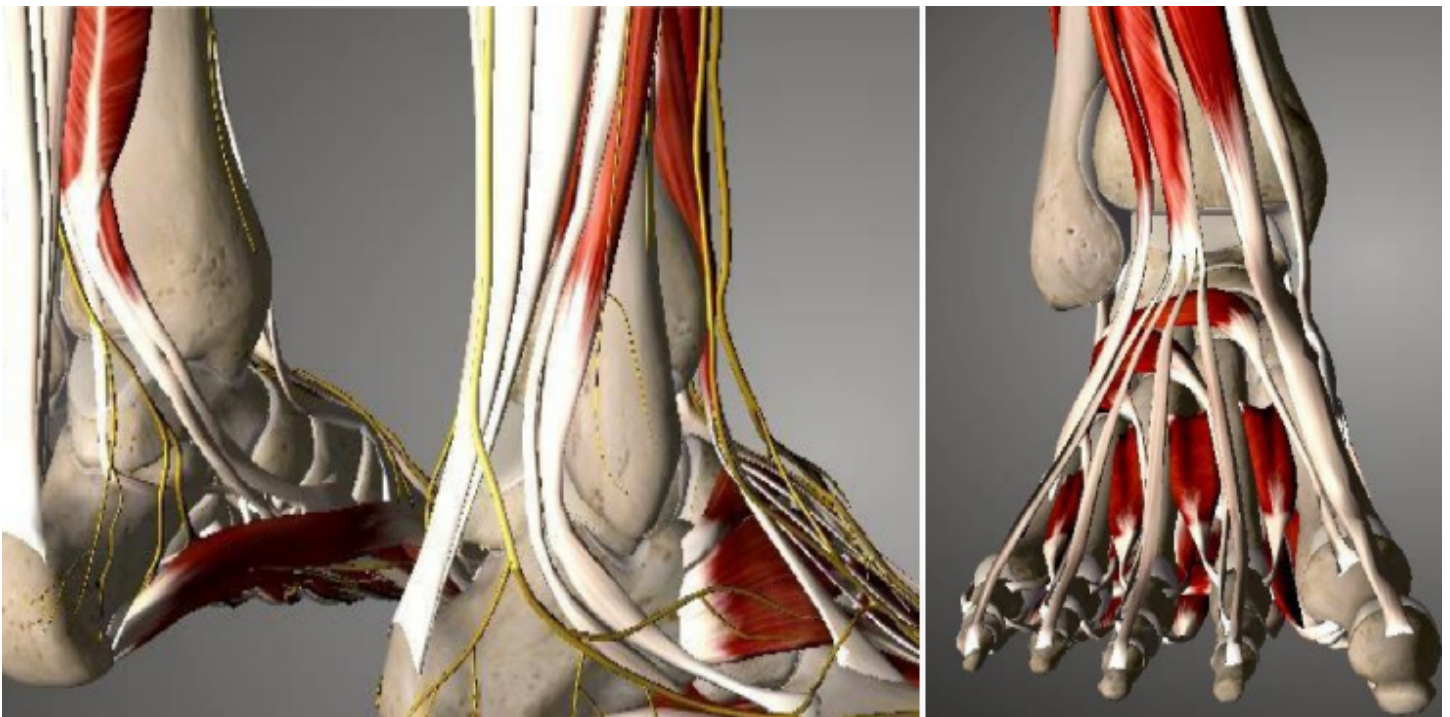
**Peroneal longus/bervis**

**Tibialis posterior**

**Flexor digitorum longus**

**Flexor hallucis longus**

**Achilles tendon**



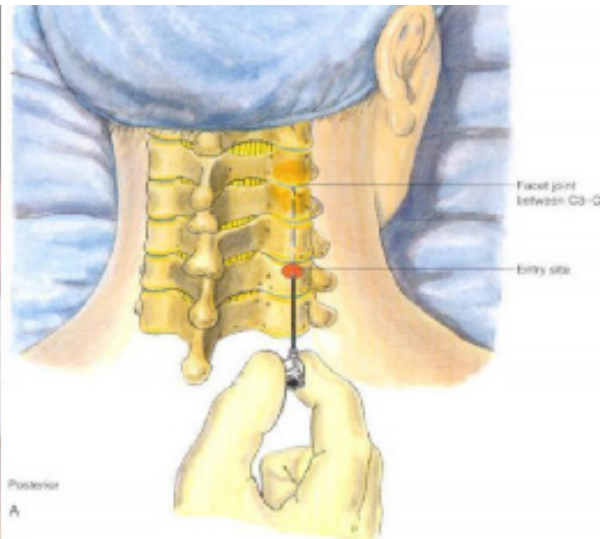
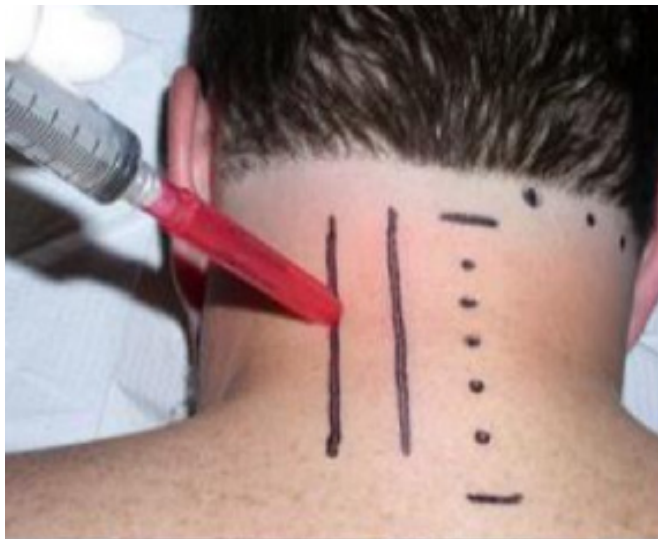
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# Cervical Facet and Ligament Injection Procedure

## Cervical facets

### 1. Cervical interspinous ligaments



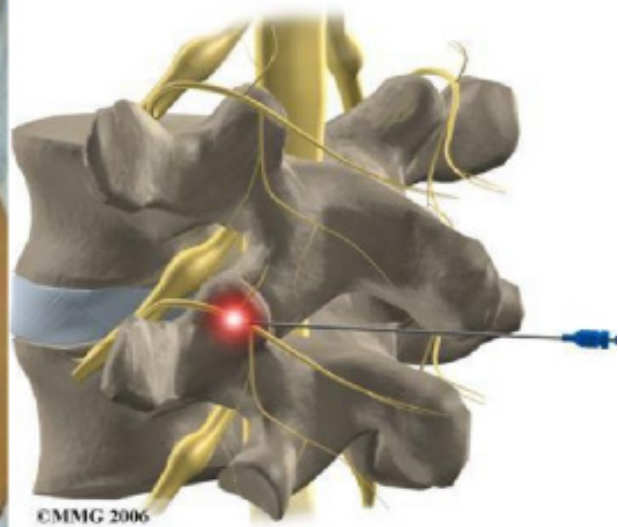
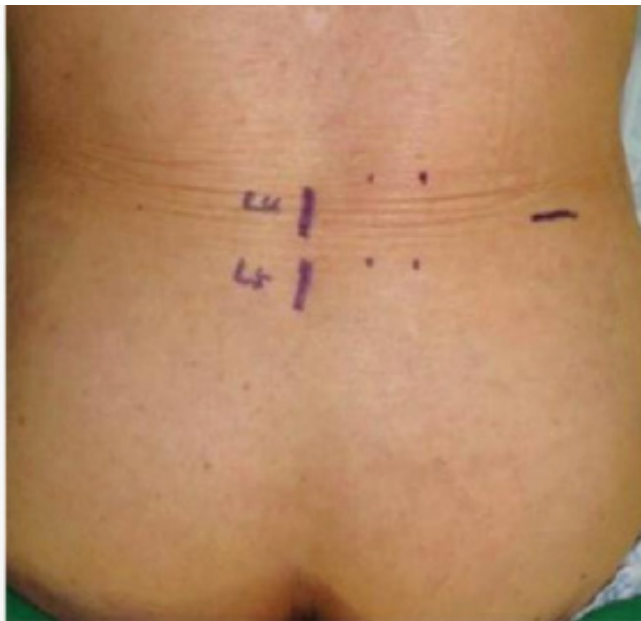
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# Lumbar Facet and Ligament Injection Procedure

Lumbar facets

## 2. Lumbar interspinous ligaments



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