Joint Examination and Injection Course

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Objectives

Indications for aspiration/injection

Choice of steroid preparation

Doses/Volumes for injection

Adverse effects

Safety/Medicolegal aspects

Injections can speed recovery but one needs……

- The right medicine’
- ‘In the right quantity’
- ‘given in the right spot’
- ‘at the right time’

Diagnosis

Careful history, consider possible trauma/overuse

Xrays often add little information

Investigations tend to support clinical diagnoses

Indications for aspiration/injection

DIAGNOSIS:

Monoarthritis (sepsis, crystal arthropathy,haemarthrosis)

THERAPY:

Remove tense effusion to ease pain

Remove blood or pus

Intra-articular injection (steriods, hyaluronic acid)

Tendonitis

SOFT TISSUE

- Tendonitis
- Bursitis
- Trigger finger
- Ganglions
- Neuromas
- Entrapment syndromes
- Fascitis
- Trigger points
- Nerve blocks

JOINT CONDITIONS

- Effusions
- Inflammatory arthropathies
- RA
- Crystal arthropathies
- Sero-negative arthropathies
- Others
- Osteoarthritis eg. Knee, 1st CMC, ACJ

JOINT ASPIRATION

Type	Normal	Inflammatory	Septic	
Viscosity	High	Low	Low	
Colour	Clear	Straw	Yellow/Opaque	
White Cells/mm3	<200	>2000-50000	>50000	
Culture	-	-	+	

GP Injections

1. Tennis elbow
2. Knee joint
3. Frozen shoulder
4. Supraspinatus tendinopathy
5. Carpal Tunnel Syndrome
6. Plantar fascitis
7. AC Joint
8. Golfer's elbow
9. Trochanteric bursitis
10 .Trigger finger

Evidence Base

Limited-esp for soft tissue injections

Systematic reviews- ‘steriods injections give short term relief (2-3months). Few High Quality Trials.

Anecdotal evidence-

90% benefit

50% improve “a lot”

10% worse pain than before

70% would have further injection

Ruben et al. Assessing injection pain. Audit Gen Practice 1995.17-19

GENERAL GUIDELINES

- Explain procedure to patient
- Check for allergies
- Obtain verbal consent
- Explain possible side effects/risks
- Support limb/part, so well exposed and patient relaxed
- Identify landmarks of structure and mark if necessary
- DOCUMENT PROCESS

EQUIPMENT

- Needles (Green 21G & Orange 25G) and syringes
- Sterets/ alcohol wipes to clean skin
- Cotton wool balls, plasters
- Injectable steriods and lidocaine
- Sharps bin
- Cryo-spray- optional

Needle sizes and hub colours

Size	Hub Colour	
25G	Orange	Hand
23G	Blue	Elbow
21G	Green	Shoulder
19G	White	

SKIN PREPARATION

- No Touch Technique
- Clean skin with Steret/alcohol (chloroprep wipe)
- Do not touch cleaned area again

CORTICOSTERIODS

- Triamcinolone acetonide
- Methylprednisolone (Depo-medrone)
- Depo-medrone with Lidocaine
- Hydrocortisone (rarely used, least effective)

What to inject

STERIODS	Prep	Effect	Solubility
Hydrocortisone	25mg/ml	+	high
Methylprednisolone (Depomedrone)	40mg/ml	+++++	Intermediate
Triamcinolone (Kenalog)	40mg/ml	+++++	Intermediate

What to inject

LOCAL ANAESTHETIC

Benefits:

Pain relief immediately post-injection

Confirms correct needle placement

Disperses steriod

1% Lignocaine lasts 1-2hrs

0.5% Marcain lasts 4-6hrs

LOCAL ANAESTHETICS

- Lidocaine hydrochloride
- mixed with steriod
- to differentiate local from referred pain
- to confirm diagnosis eg shoulder impinge
- to provide volume
- for comfort

- Bupivicaine 0.5% for nerve blocks

Upper Limb Joint Injection

JOINT	STERIOD DOSE	VOLUME	NEEDLE	
Shoulder	40mg	5-10ml	Green	
AC Joint	20-40mg	2ml	Orange	
Elbow	40mg	2-5ml	Blue	
Thumb	20-40mg	2ml	Orange	

Lower Limb Joint Injection

JOINT	STERIOD DOSE	VOLUME	NEEDLE	
Hip	40mg	5-10ml	Spinal	
Knee	40mg	5-10ml	Green	
Ankle	40mg	2ml	Blue	
Subtalar	40mg	2ml	Blue	

Soft Tissue Injection

JOINT	STERIOD DOSE	VOLUME	NEEDLE	
Trochanteric Bursitis	40mg	5-10ml	Green/Spinal	
De Quervains Tenosynovitis	40mg	2-5ml	Green	
Tennis/ Golfers Elbow	40mg	2-5ml	Blue	
Plantar fascia	40mg	2ml	Blue	

Adverse reactions

LOCAL SIDE EFFECTS

1. Post Injection flare- 5% <48hours
2. Infection < 1:10000
3. Bleeding
4. Skin Damage < 1% - atrophy, depigmentation
5. Tendon Rupture <1%
6. Cartilage damage- theoretical risk, < 3 year
7. Soft tissue calcification

Adverse reactions

SYSTEMIC SIDE EFFECTS

1. Skin flushing-common> 40mg steroid-transient
2. Fainting
3. Loss of diabetic control
4. Allergy- usually immediate

   Flushing, itching, urticaria, wheeze, collapse

   Ensure oxygen, adrenaline 1ml 1:1000im, Piriton 10mg +/- hydrocortisone 200mg iv
5. Mood Changes
6. Menstrual Irregularity

Contraindications

ABSOLUTE

1. Sepsis
2. Allergy
3. Tendinopathy (achilles,patellar)
4. Joint Prosthesis

RELATIVE

1. Coagulation disorder
2. Anticoagulants
3. Poorly controlled diabetes

Safety

Informed Consent:

- Indication, benefit, side effects

Documentation:

- Examination, diagnosis,consent,
- Aspetic technique, dose volume and location

Aftercare:

Relative rest 48hrs +/- splint

Post injection flare

Infection signs

Rules

- Use only pre-packed sterilised disposable needles and syringes
- Draw up steriod and lidocaine with one needle, dispose of needle. Use new needle to inject.
- Use single dose ampoules for both steriod and local anaesthetic
- Do not open any sterilised needle or syringe pack until moment of use.

More rules

- Wash and dry hands
- Do not guide the needle with your finger
- Mark the point to be injected with indentation mark which will not disappear when the skin is cleansed
- Always dispose of needles immediately into sharps box, do not put on preparation tray
- Consider dressing pack and sterile gloves for aspirations

FOCUS FOR TODAY

Shoulder
Elbow
Wrist
Hip
Knee
Foot and Ankle

DIAGNOSING AND MANAGING UPPER LIMB CONDITIONS

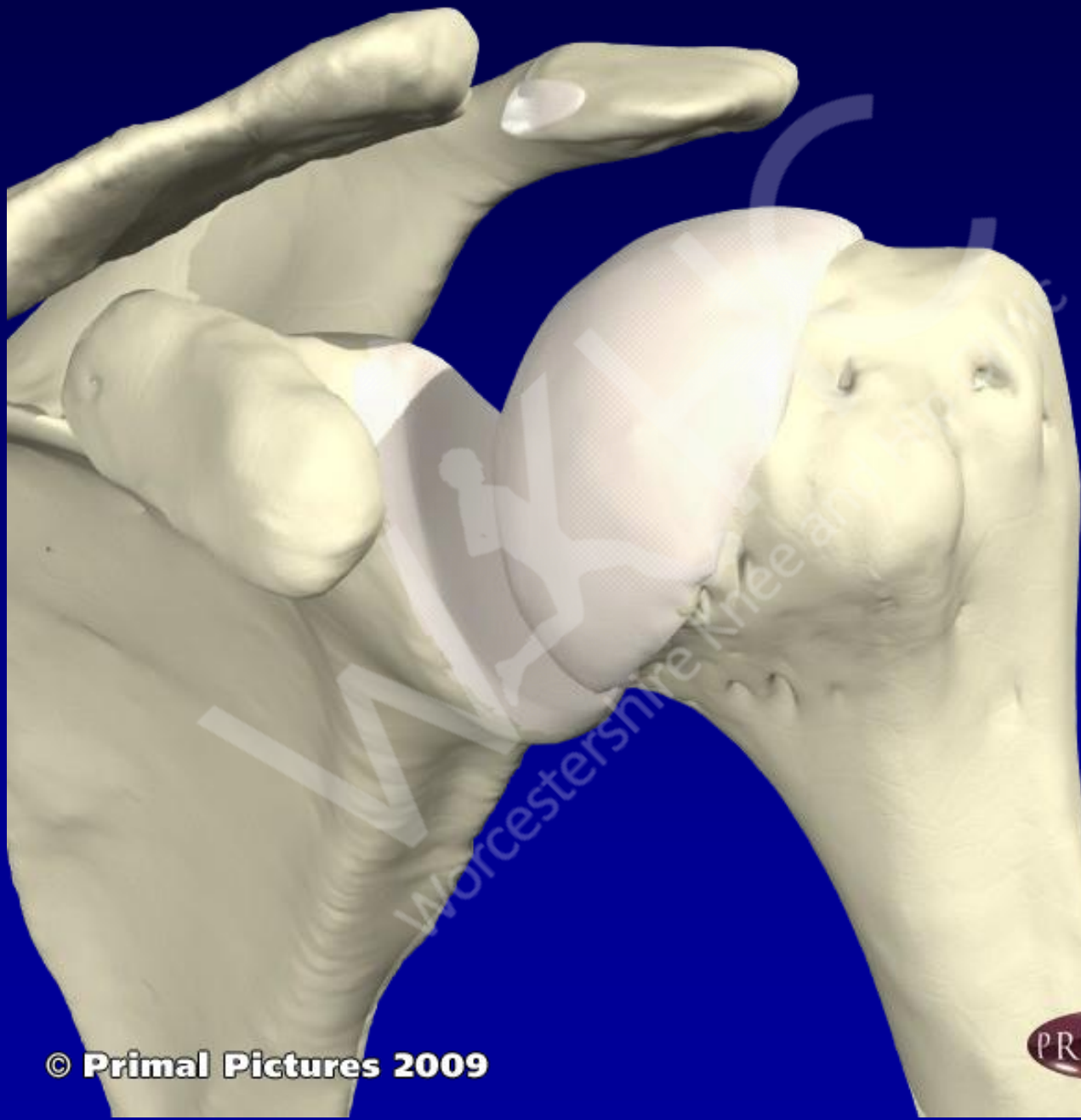
- Shoulder
- Elbow
- Wrist
- Hand

SHOULDER AREA

- Acromioclavicular joint
- Adhesive capsulitis
- Rotator cuff (SITS)
- Supraspinatus
- Infraspinatus
- Teres minor
- Subscapularis

SHOULDER AREA

- Biceps tendonitis
- OA
- Pyrophosphate disease
- RA
- Other inflammatory arthropathies

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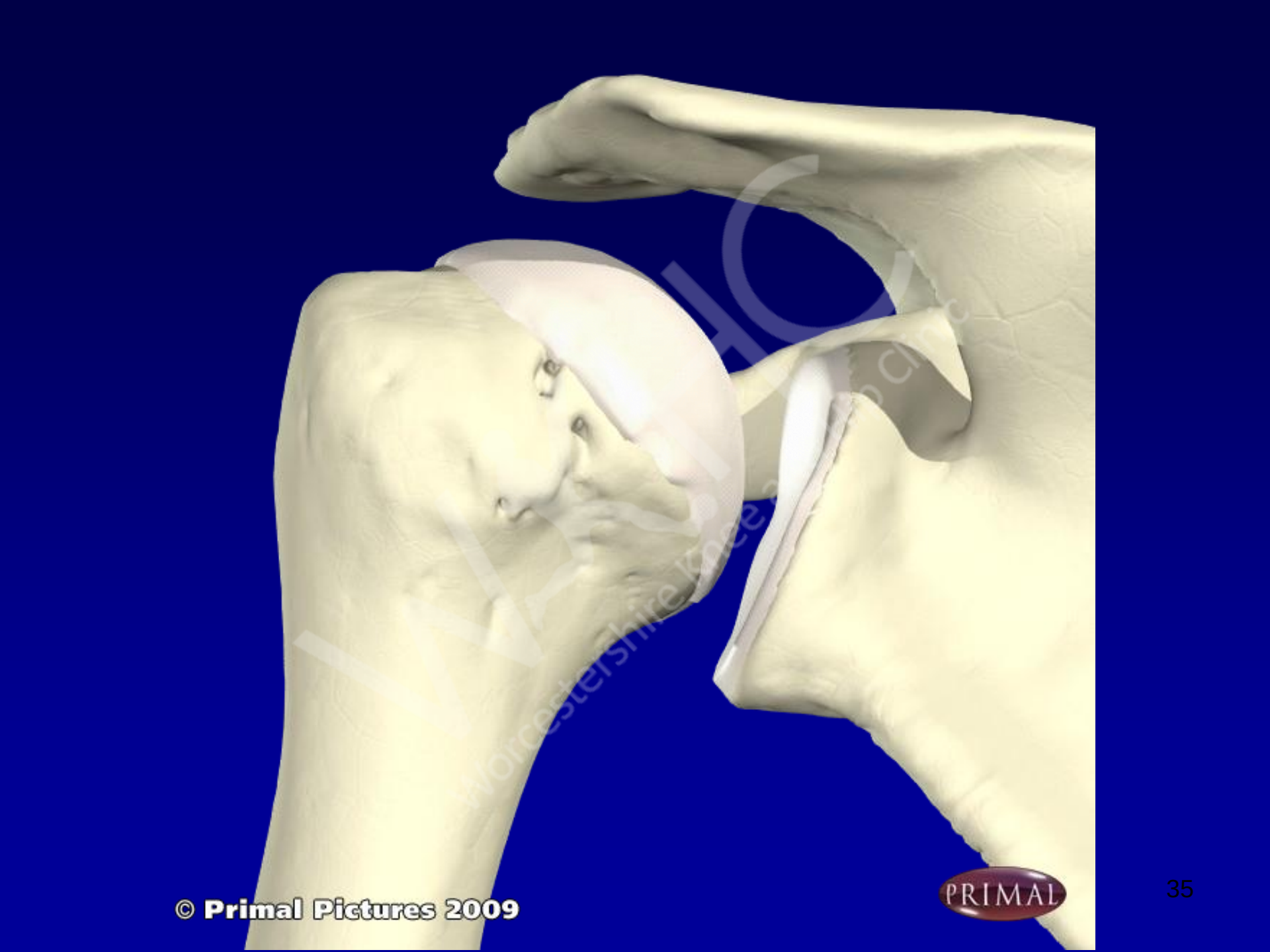
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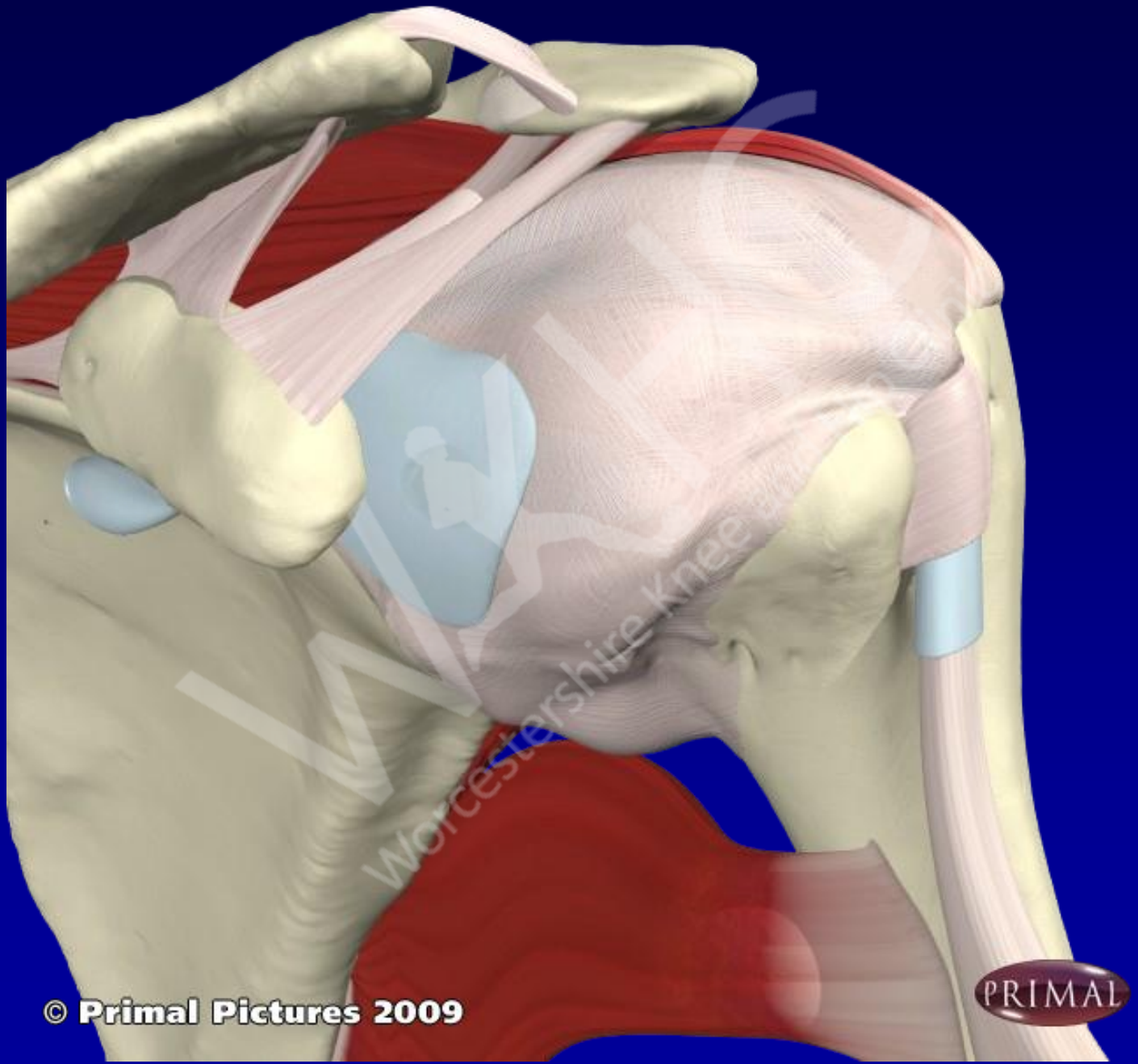
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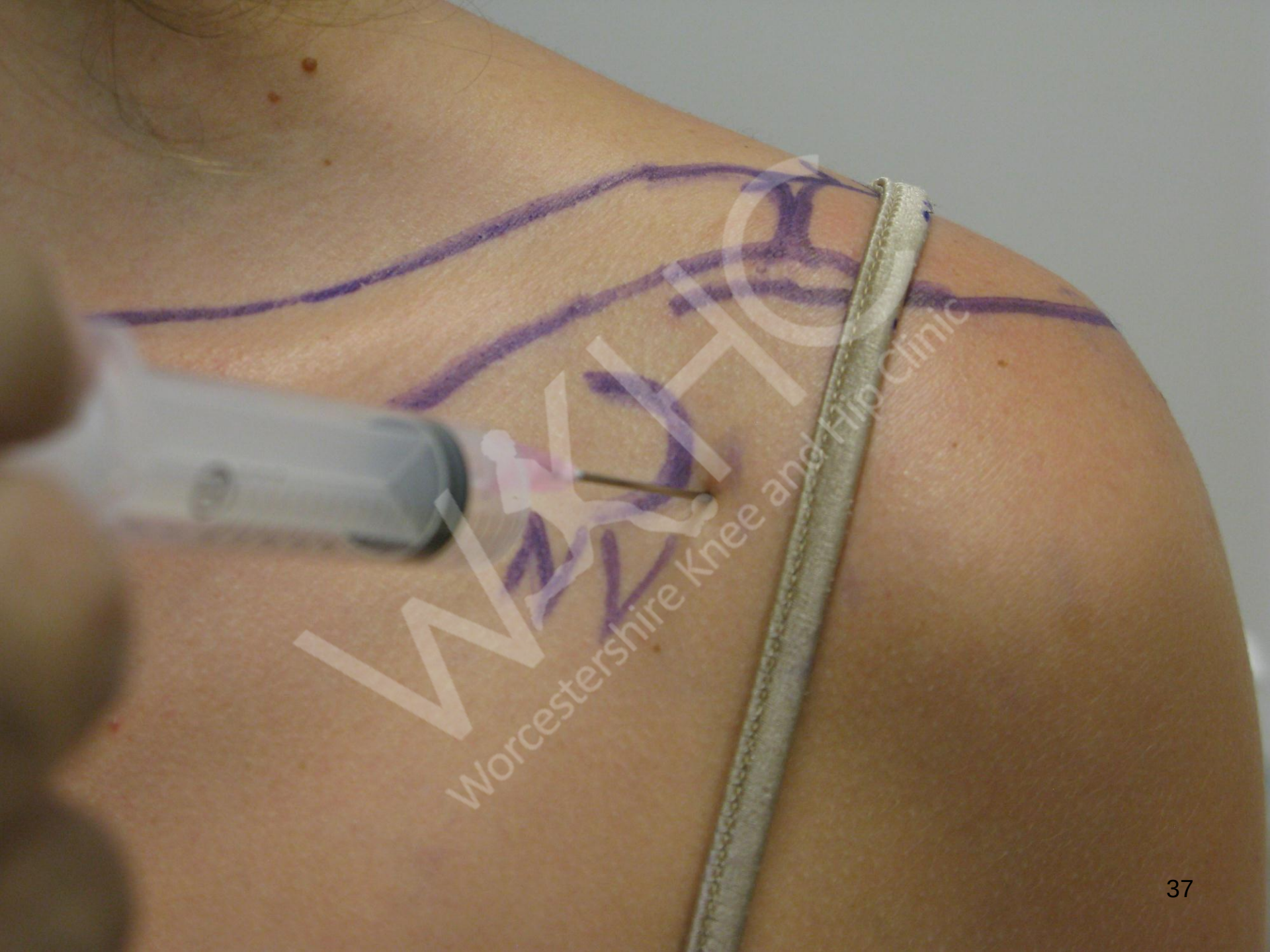
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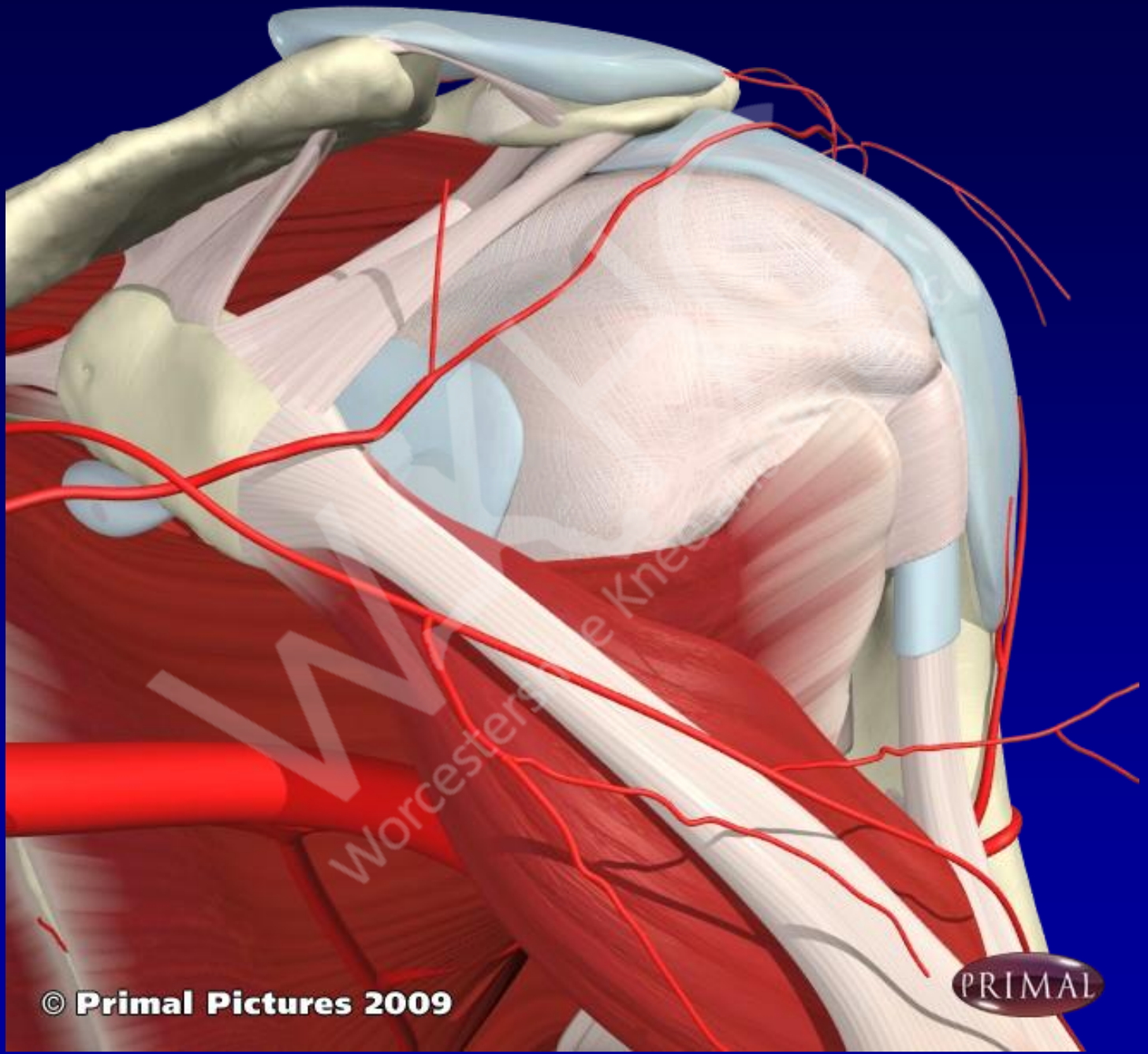
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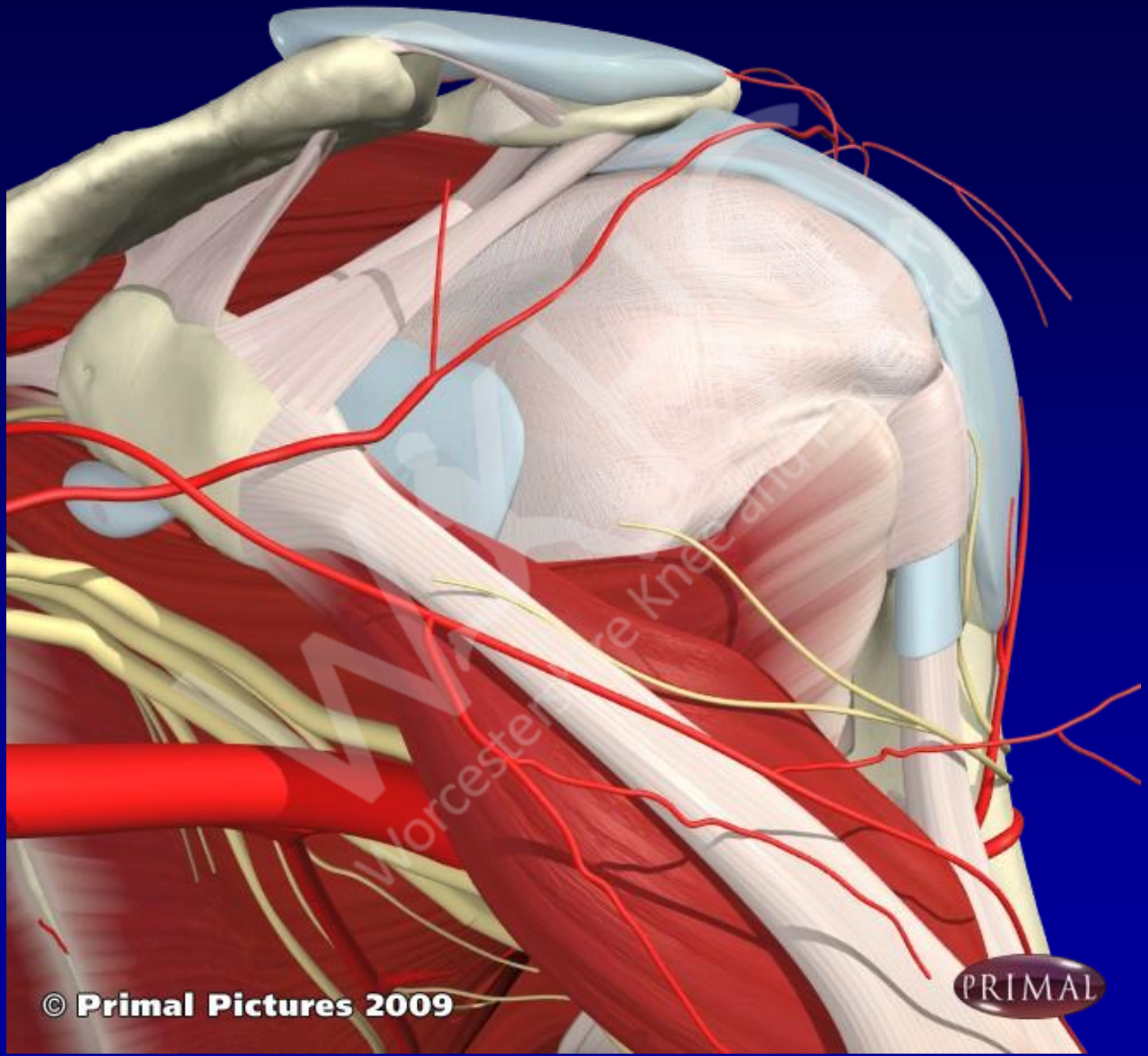
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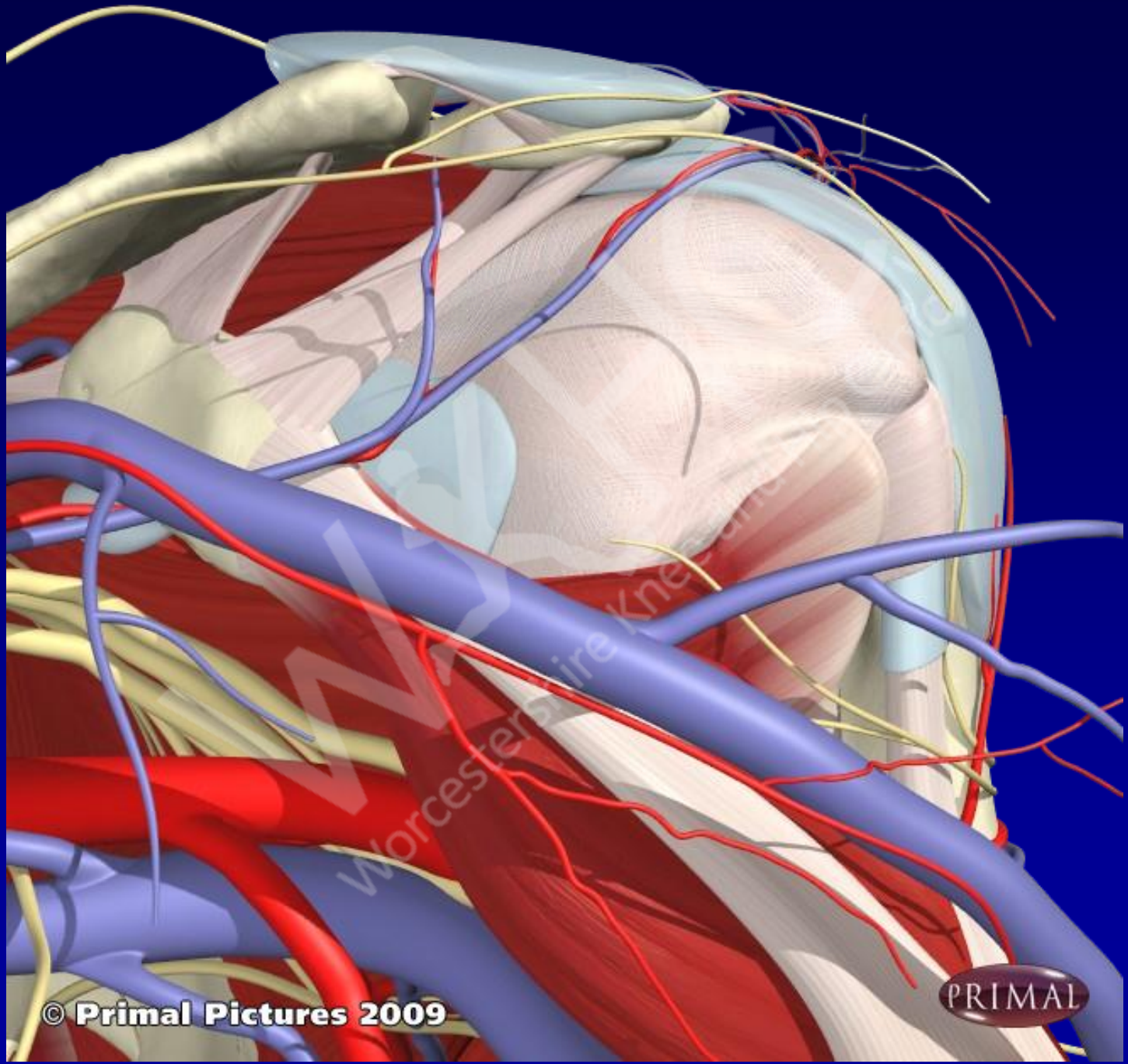
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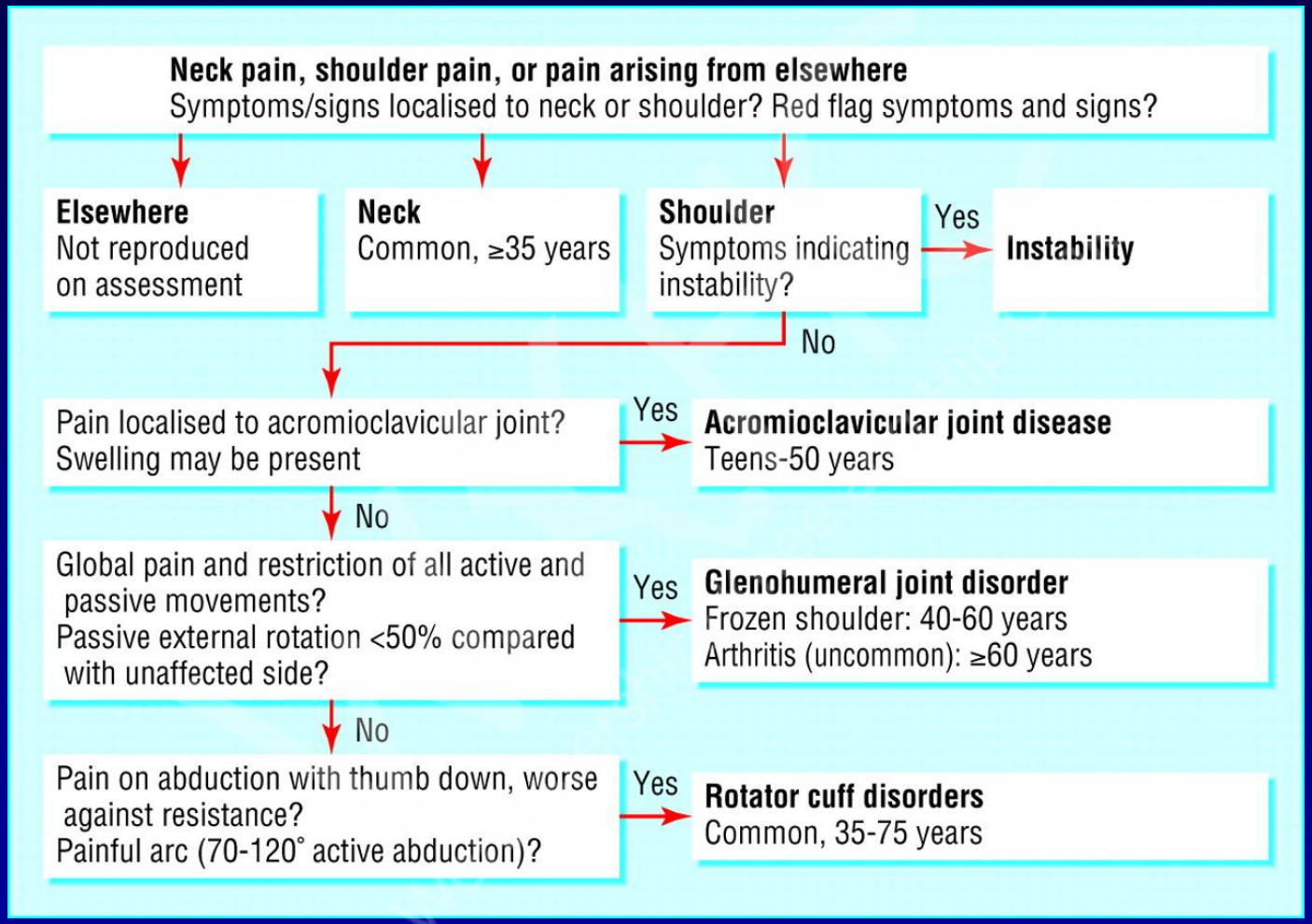
Diagnosis of shoulder problems. Adapted with permission from shoulder pain algorithm: www.oxfordshoulderandelbowclinic.org.uk



Mitchell, C. et al. BMJ 2005;331:1124-1128

SHOULDER EXAM

- LOOK at skin, contour,compare both sides,muscle atrophy

- FEEL for heat, tenderness

- MOVE

Active movement

Passive movement

Simple ‘rules’ for soft tissue problems

- Pain on active movement between 40-80 deg in flexion or abduction will involve cuff

- Pain on active movement, mainly with abduction 40-80 deg likely to be supraspinatus tendonitis

- All of above will have almost normal passive movement
- Pain and loss of movement, active and passive in all planes of movement indicates adhesive capsulitis

Subacromial Impingement

Pain caused by impingement

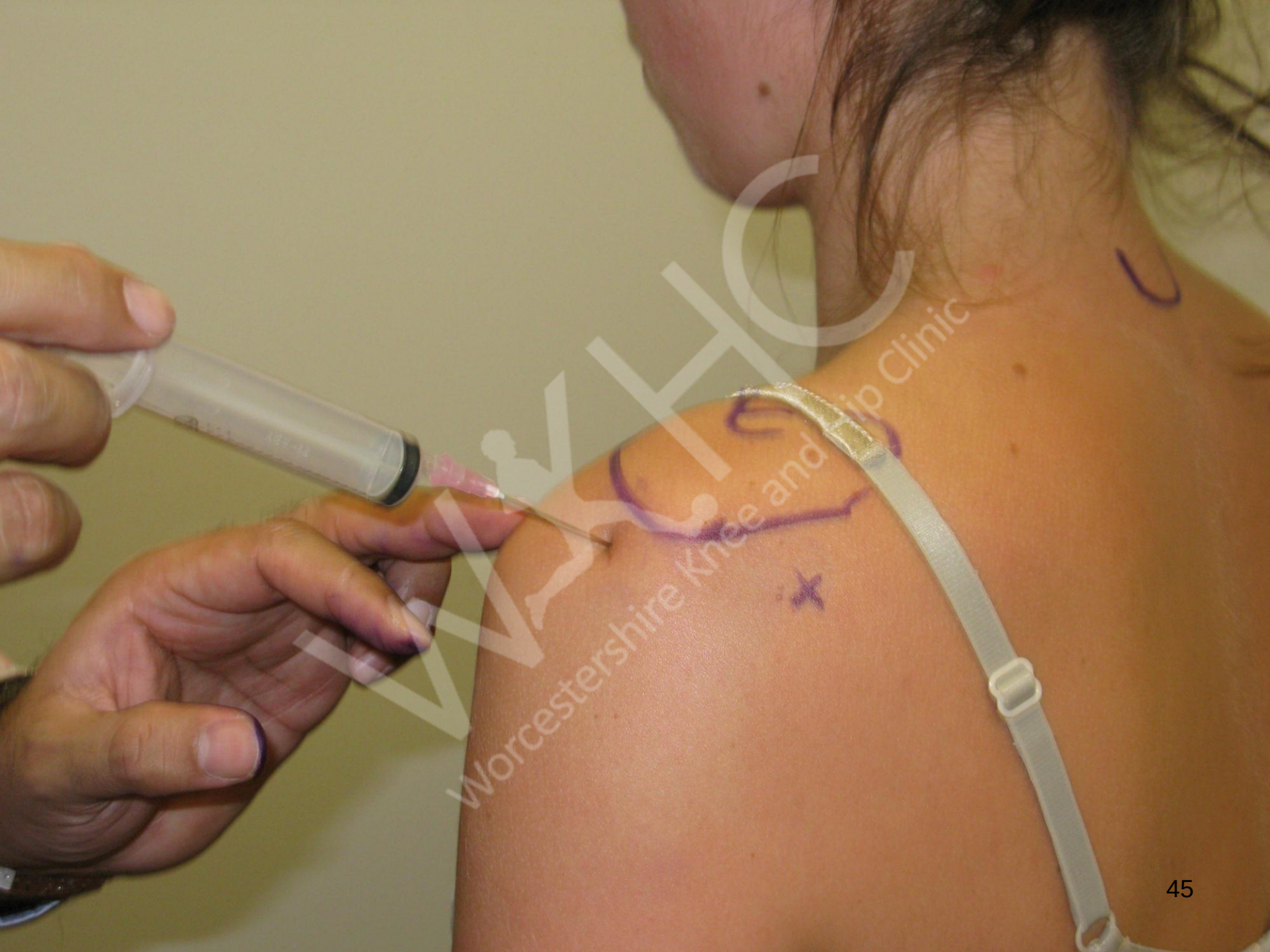
Supraspinatus tendinitis

Painful arc of movement

Positive Impingement Test

Hawkins

Inject under the acromion process with 40mg Depomedrone and Lidocaine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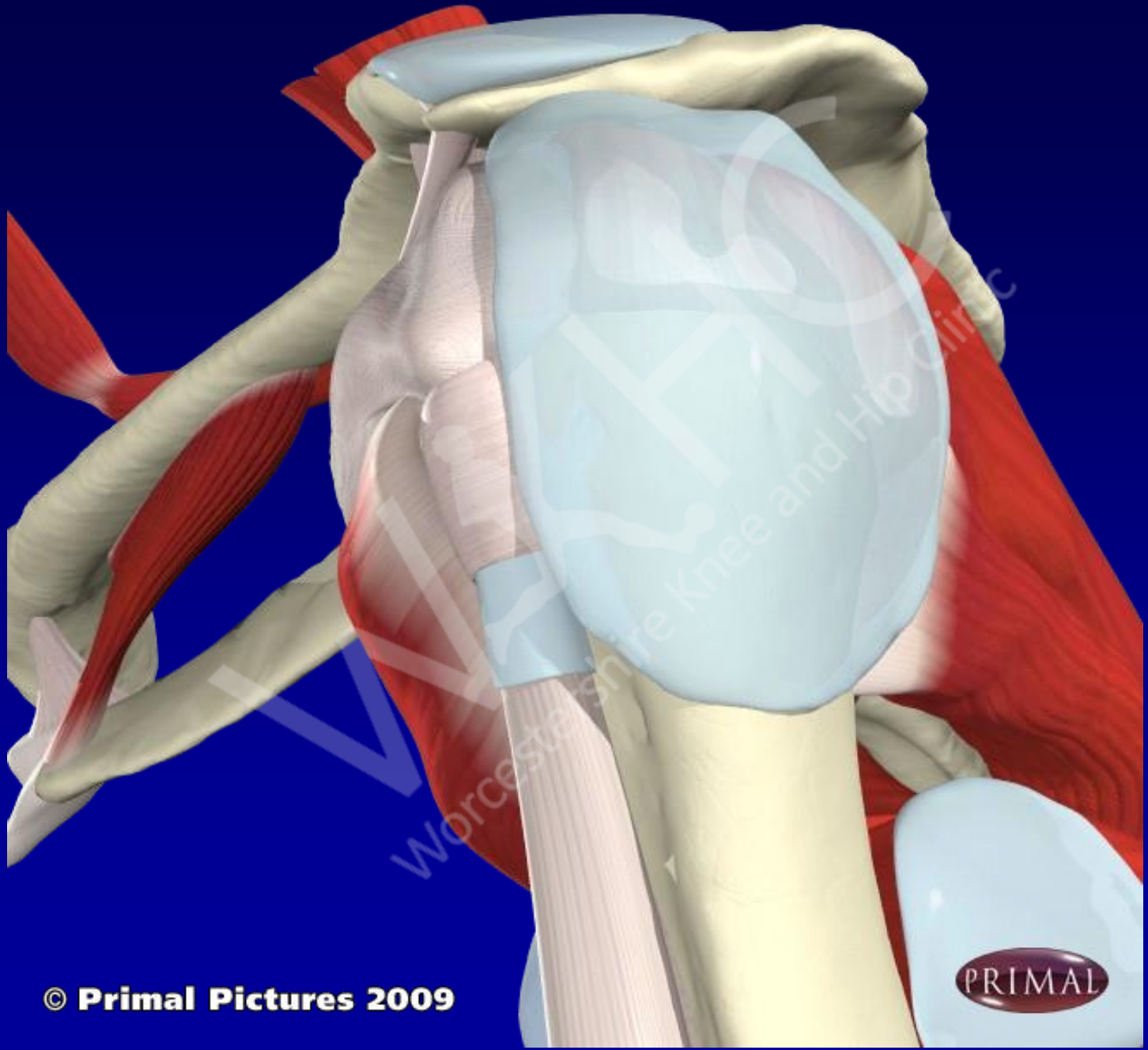
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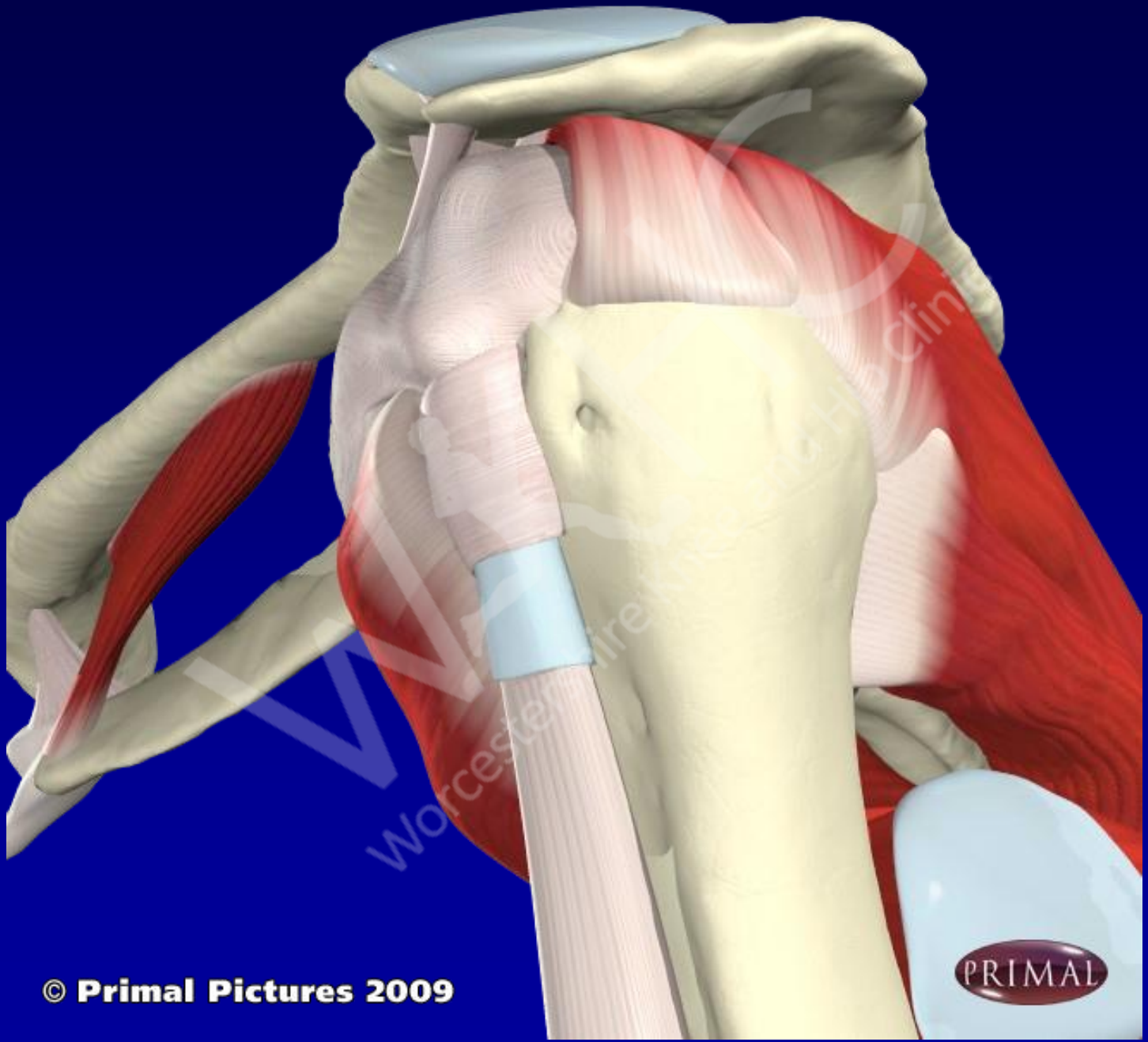
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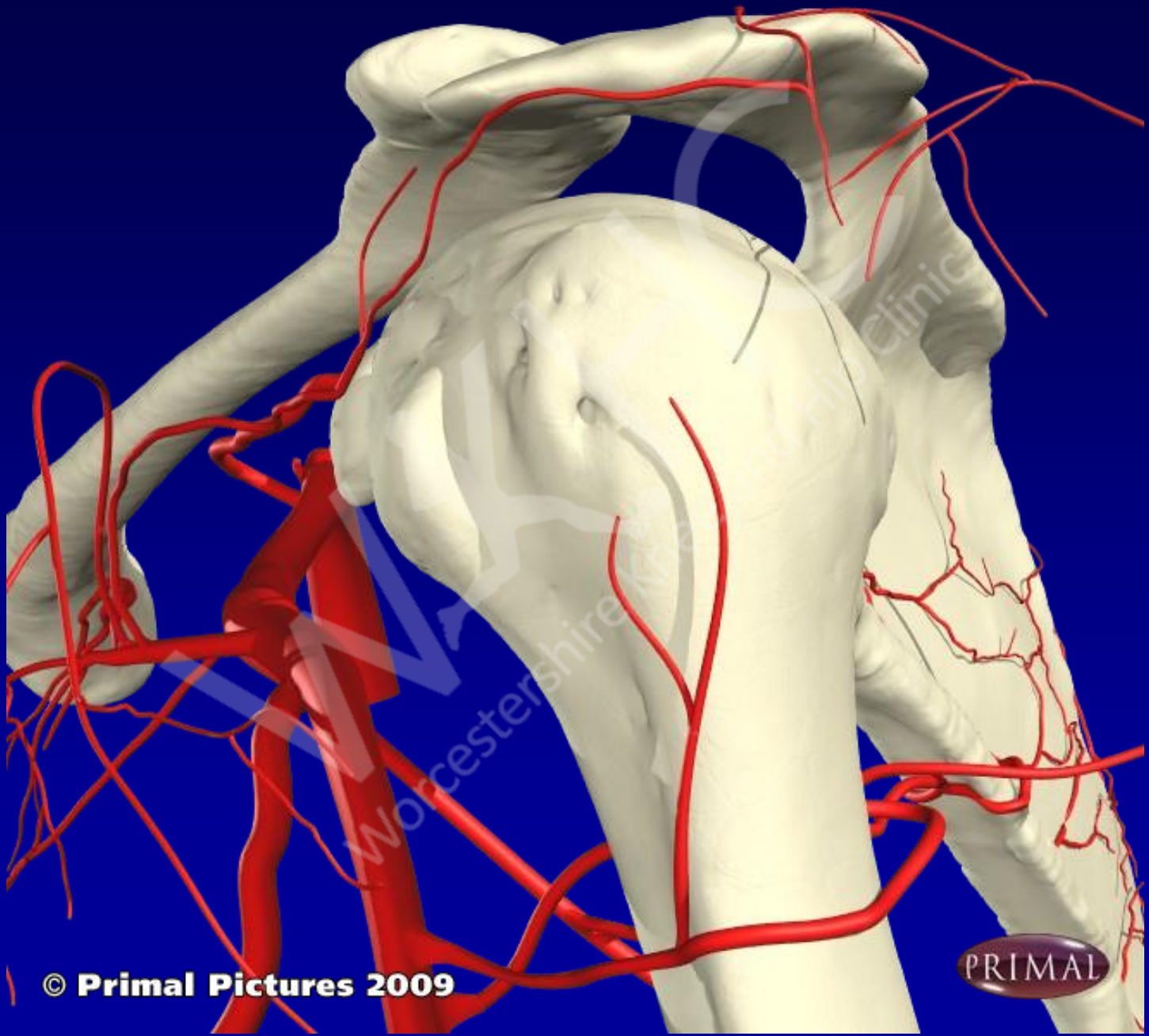
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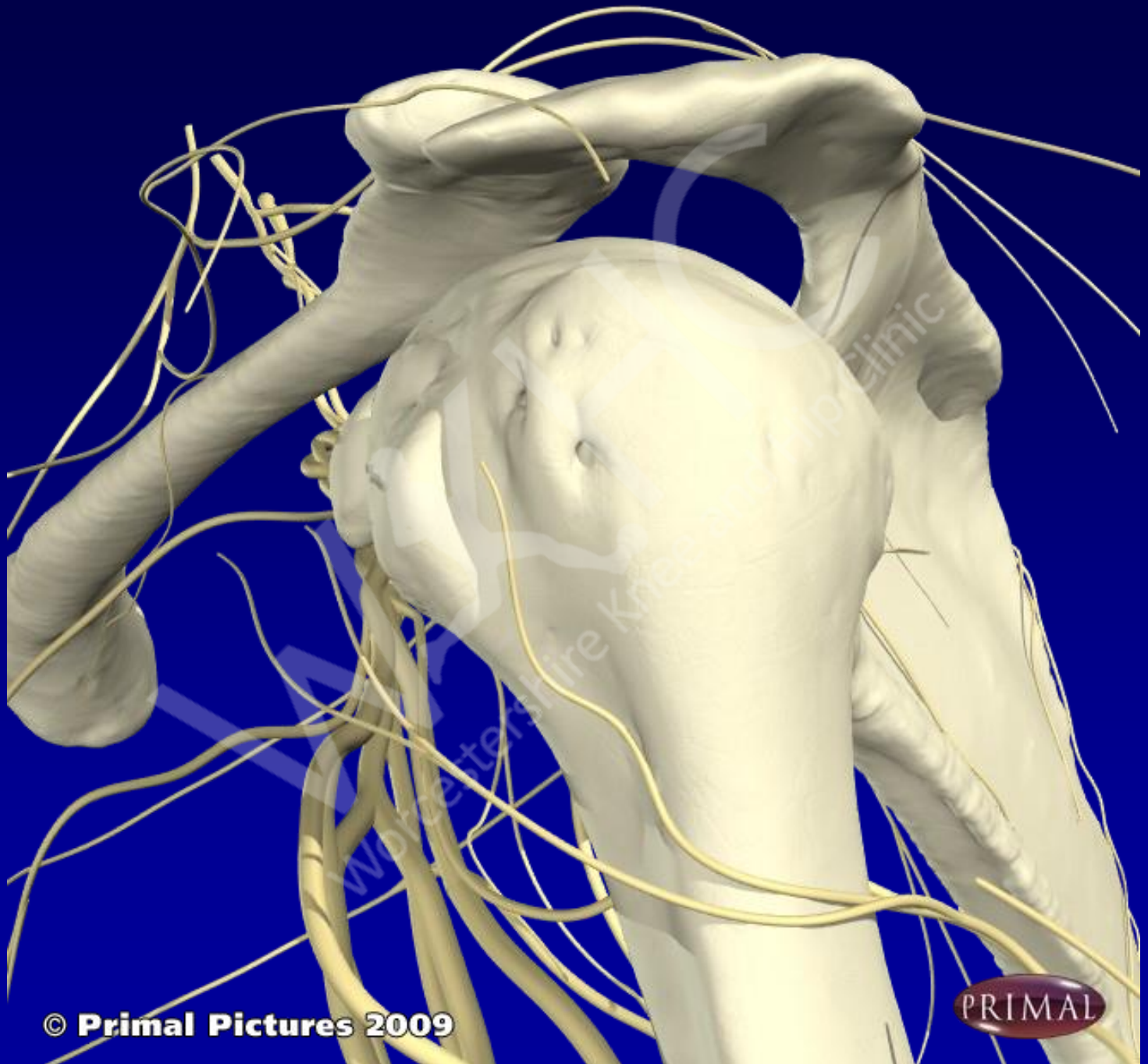
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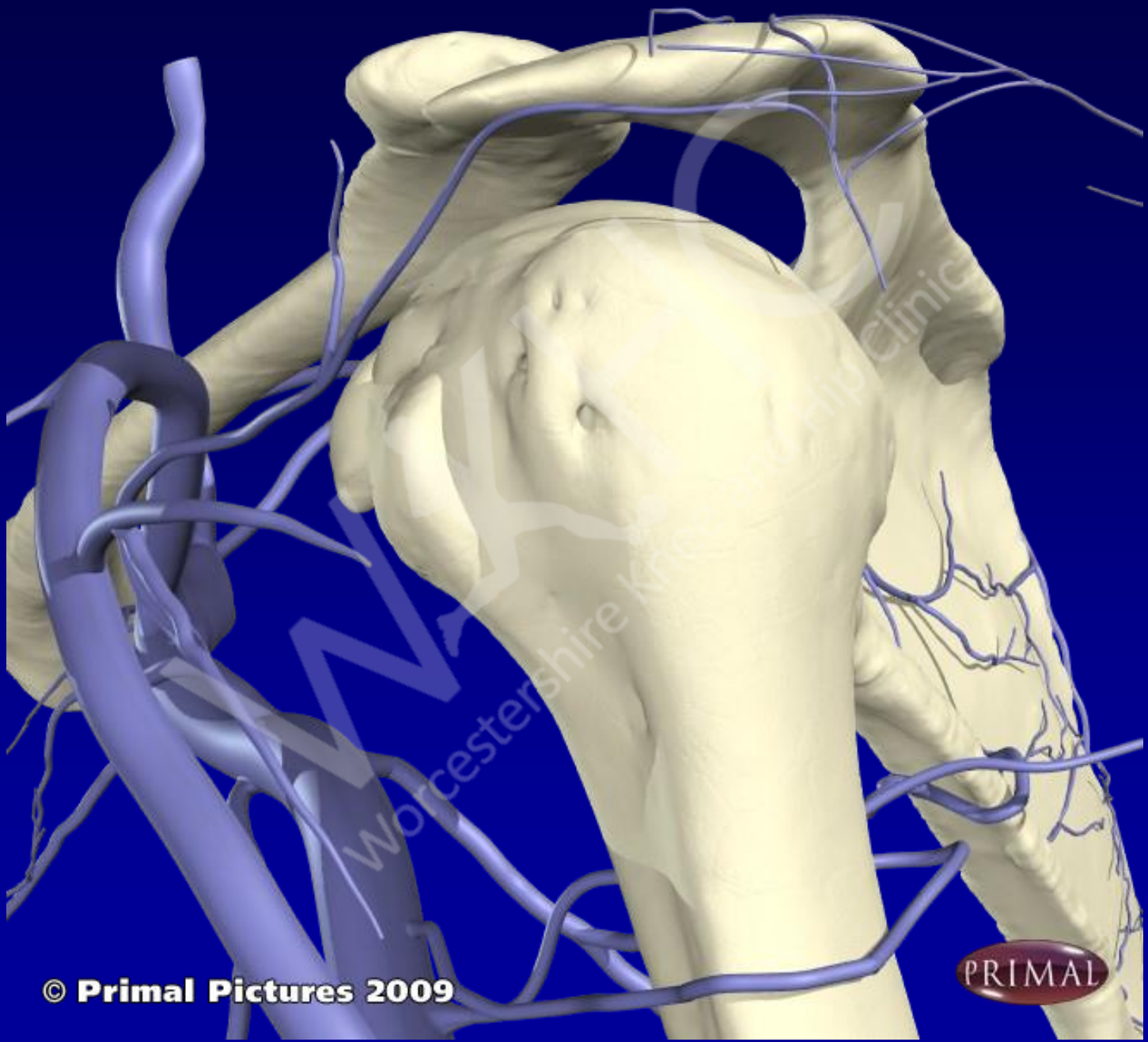
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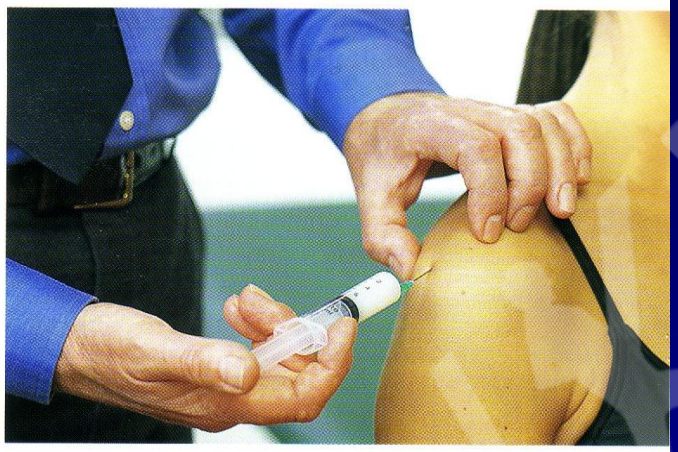
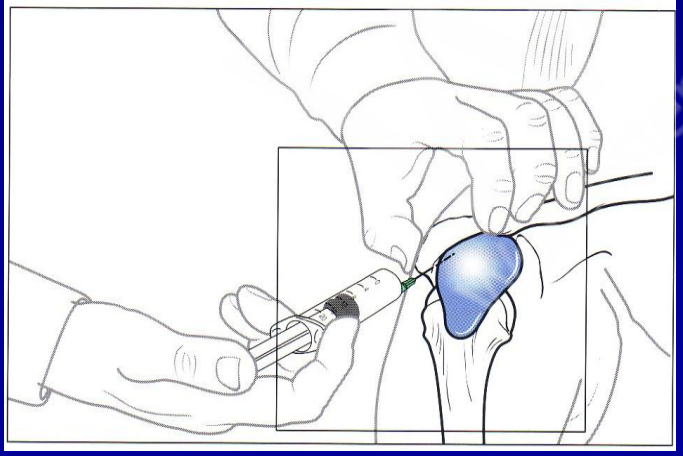
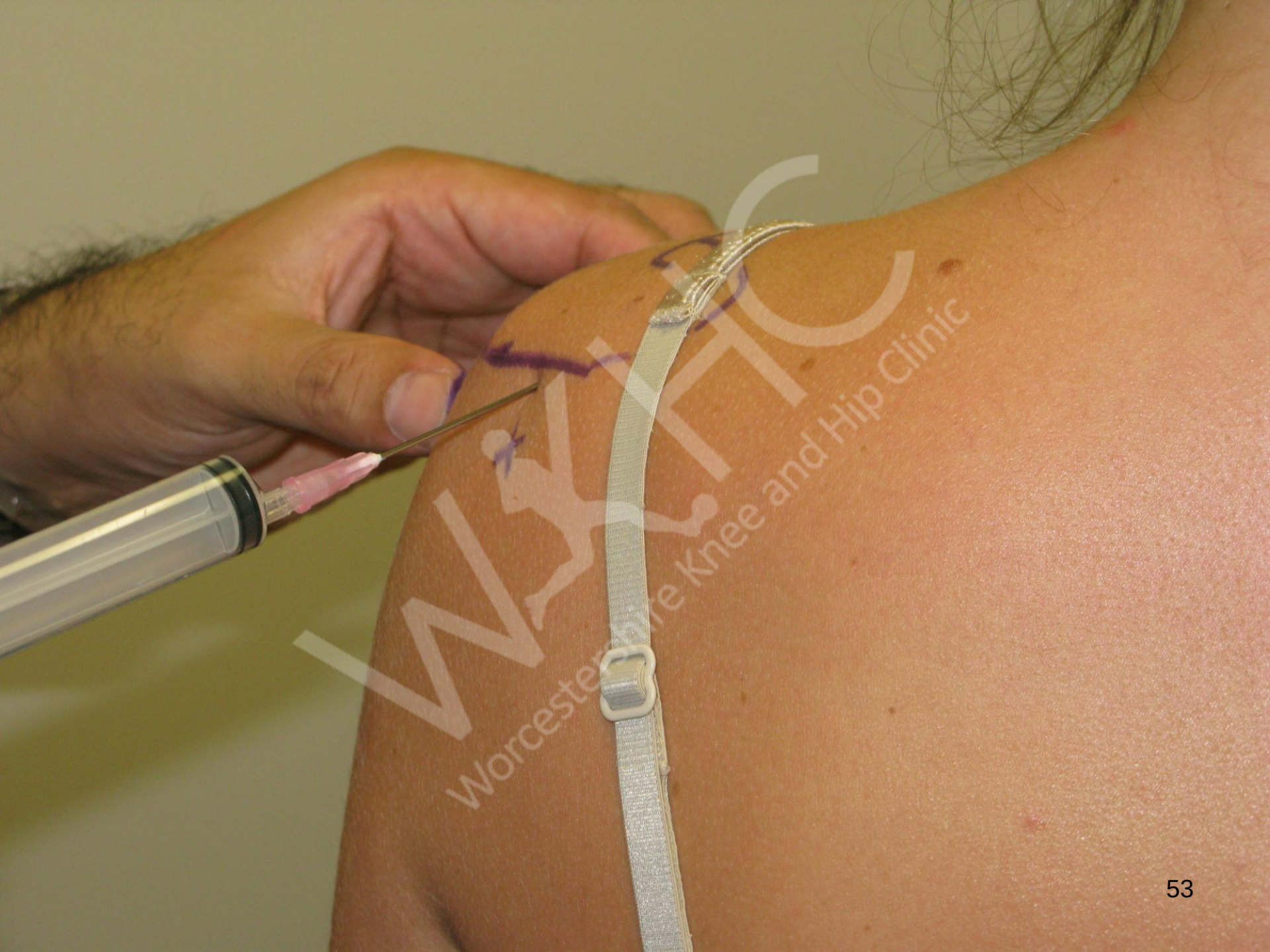
Subacromial bursa - posterolateral approach





- Landmarks: Posterolateral border acromion; aim upwards and slightly medially
- Position: Arm hanging by side to distract humerus from acromion
- Needle : green
- Steroid : 40mg
- LA: 5-10 mls total volume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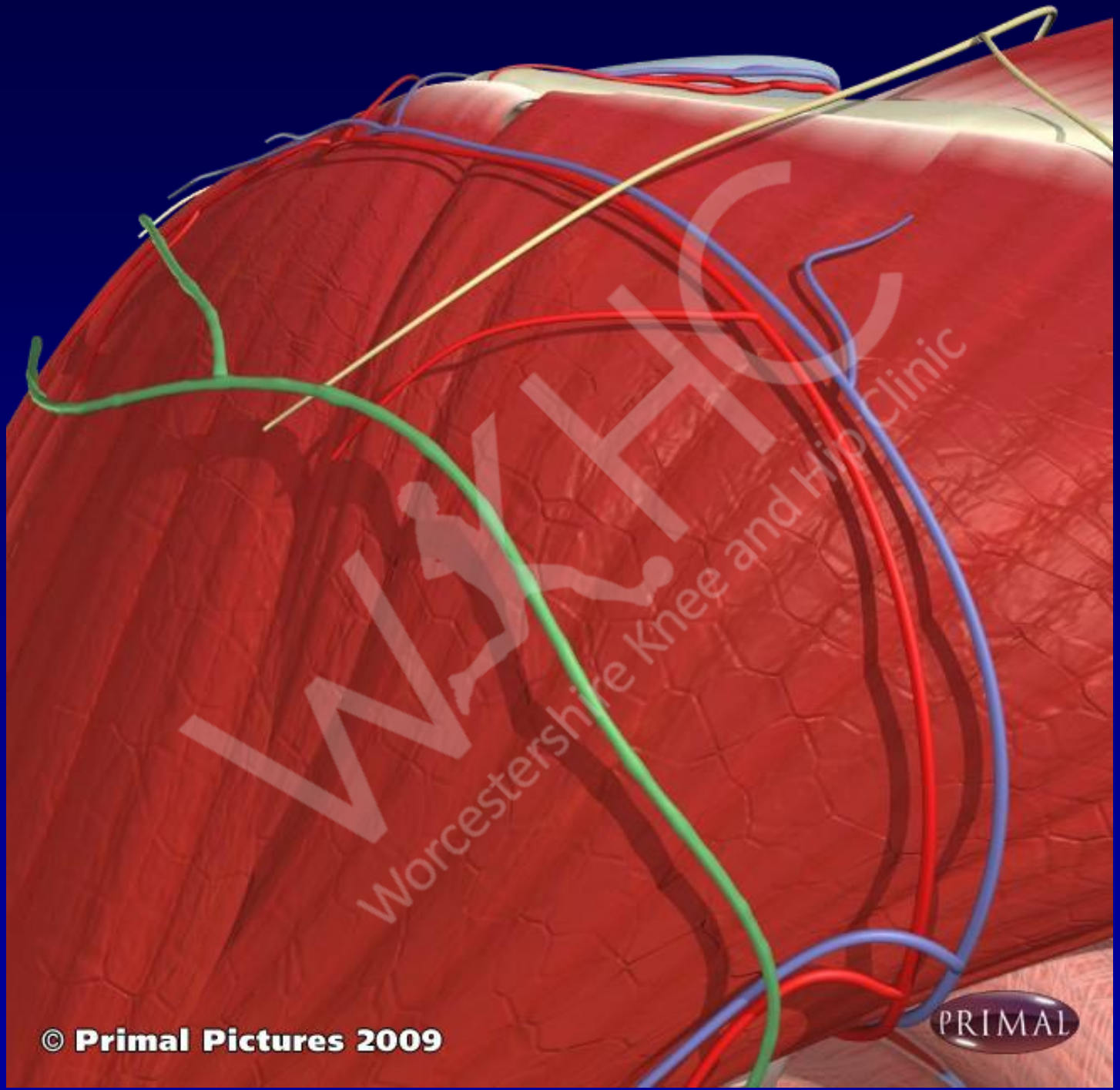

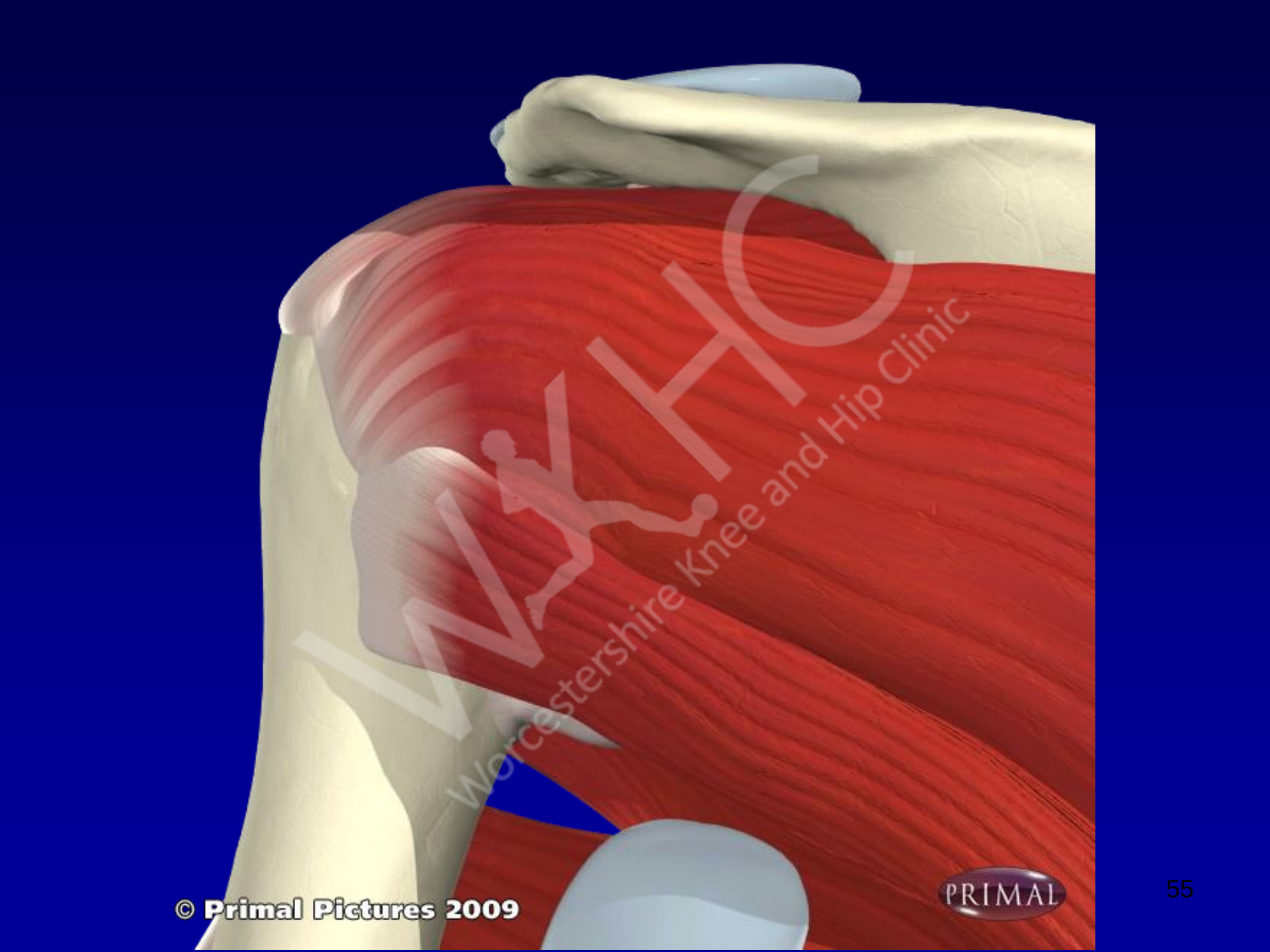
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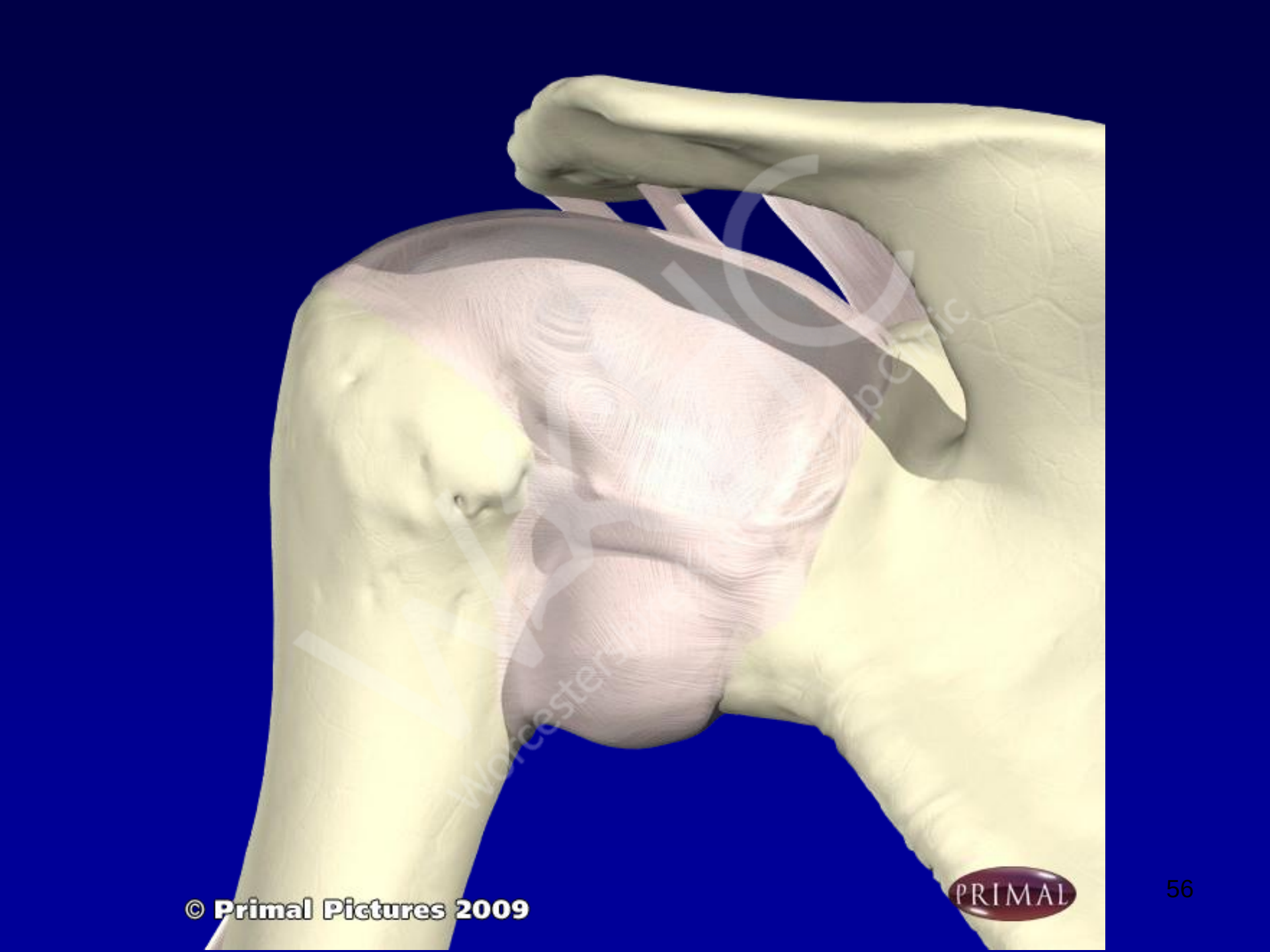
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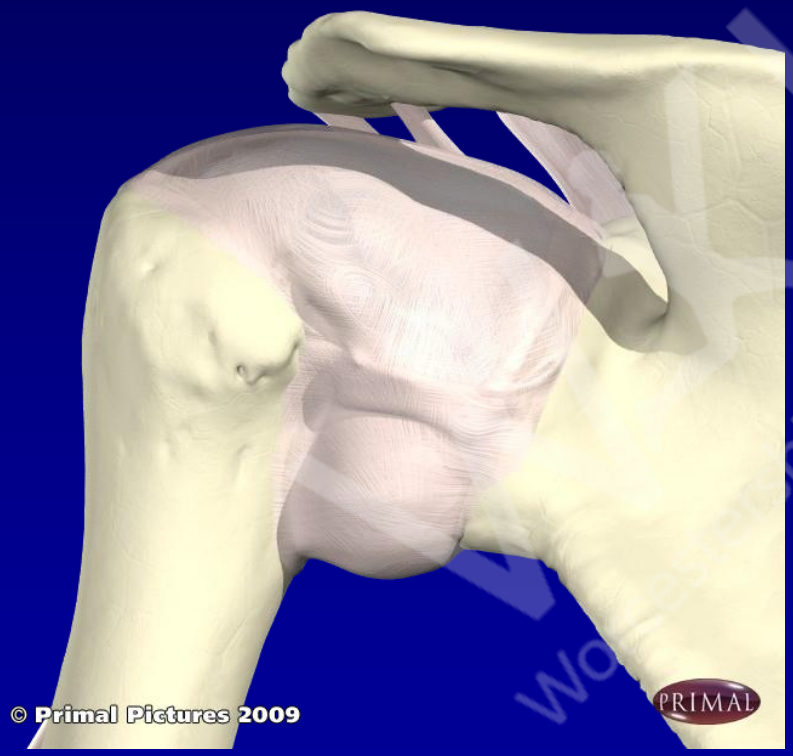
Subacromial bursa - posterolateral approach



- Landmarks: Posterolateral border acromion; aim upwards and slightly medially
- Position: Arm hanging by side to distract humerus from acromion
- Needle : green
- Steroid : 40mg
- LA: 5-10 mls total volume

Shoulder pain unresponsive to injection

Exclude other causes:

Breast carcinoma

Pancoast tumour upper lobe lung

Referred from cervical spine

Thoracic outlet syndrome

Referred from viscera:- MI, Pleurisy, Gall bladder, pericarditis

If pathology excluded can help relieve pain with supra scapular nerve block.

Adhesive capsulitis (Frozen shoulder)

- Capsular thickening and restriction, with low grade inflammation
- Loss or range of movement in all planes both active and passive, particularly rotation
- Pain felt over lateral aspect of arm (C5) often worse at night
- Common in middle aged and elderly and diabetics

Adhesive capsulitis

Course of three injections 6 weeks apart, started as soon as possible after onset of symptoms

No physio til night time pain stops

3 phases: Painful

Adhesive

Recovery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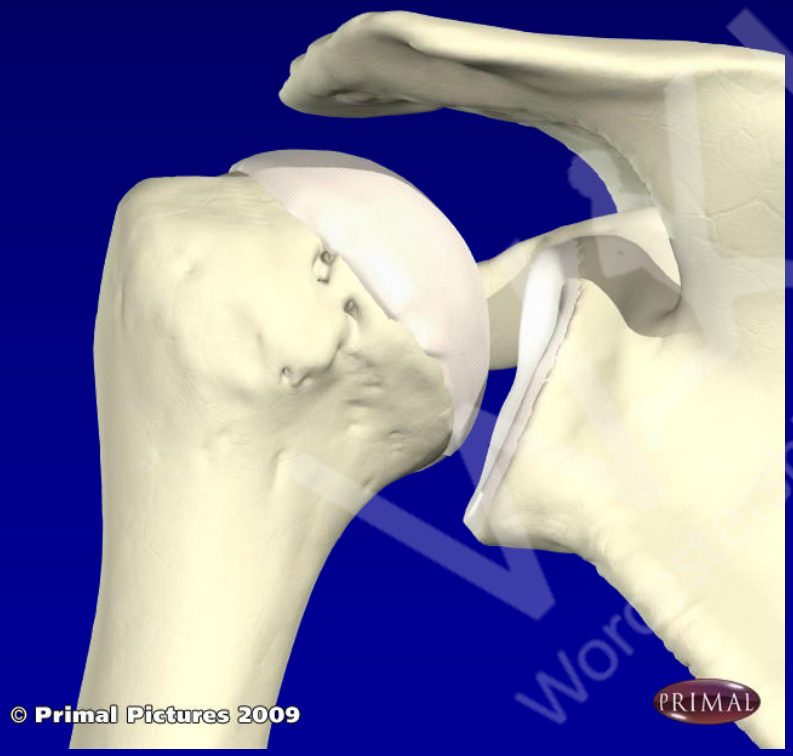
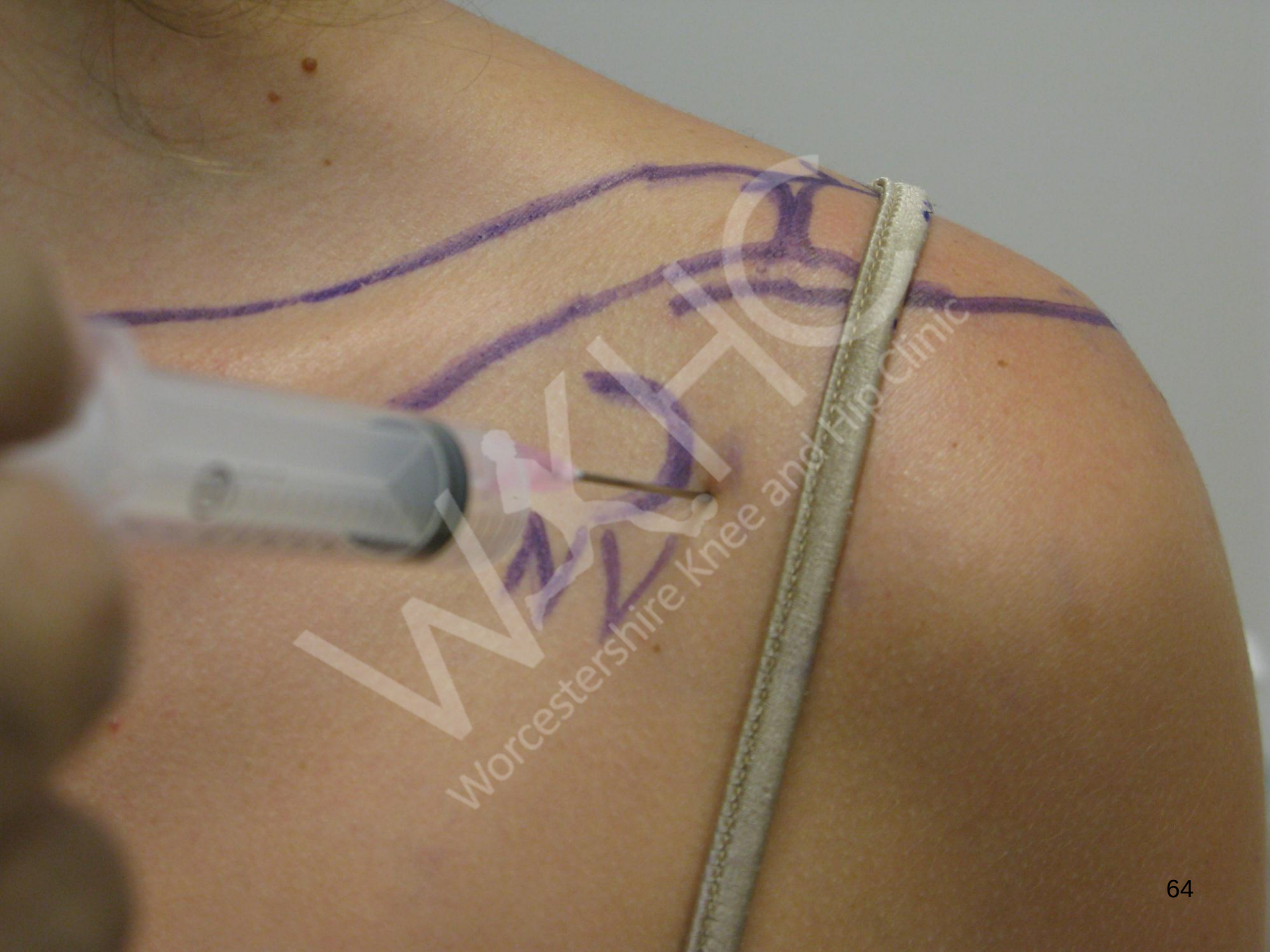
Glenohumeral joint - posterior approach



- Landmarks: Posterior angle acromion, inject below acromion, obliquely toward coracoid process
- Position: Arm on lap, medially rotated
- Needle: Green
- Steroid: 40mg
- LA: 8-10mls
- Uses: Capsulitis

Glenohumeral joint - anterior approach

- Landmarks: Lateral to coracoid process, medial to humeral head; joint line. Aim posterior
- Position: Arm by side, externally rotated
- Needle: Green
- Steroid : 40mg
- LA: 8-10mls 0.5%
- Uses: Capsulitis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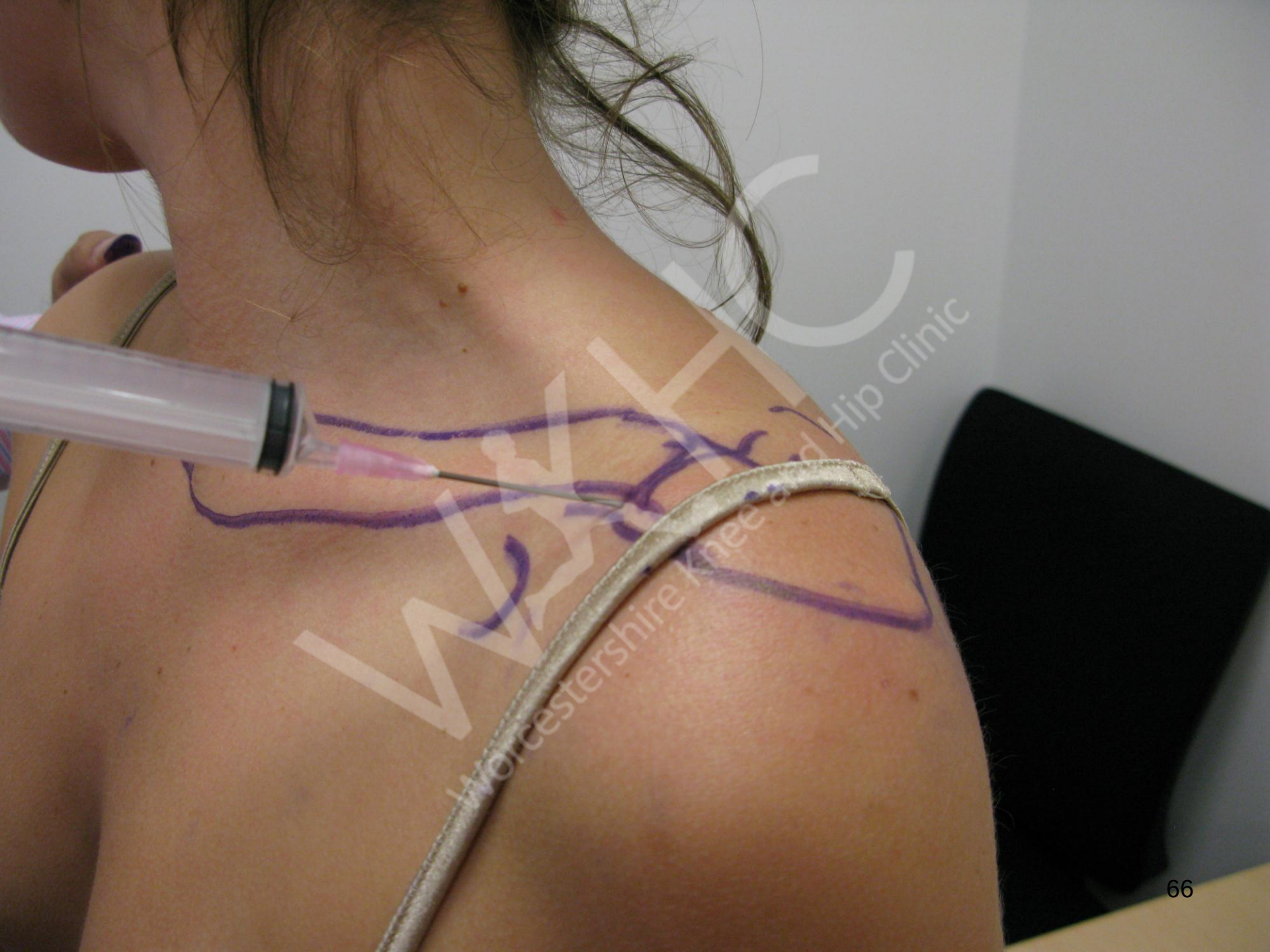
Acromioclavicular joint

- Commonly affected in OA
- More common in manual workers, sports players eg. Rugby players
- Pain over point of shoulder, crepitations on movement
- Pain from approx 80 deg Abd/Flex to end of range
- Pain if touching opposite shoulder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Acromio-clavicular joint

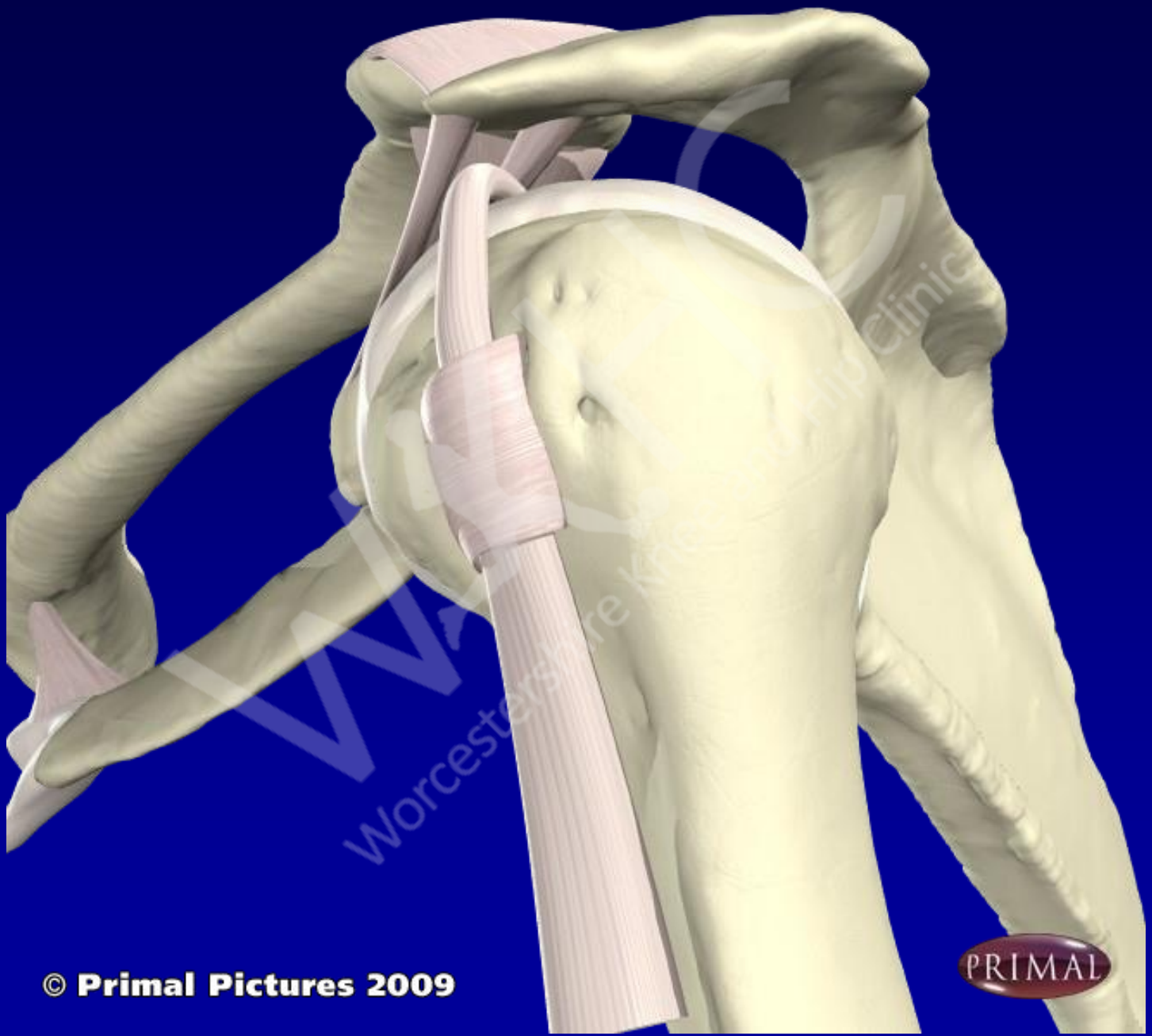
- Landmarks: Follow clavicle laterally to A-C joint. Superior or anterosuperior approach, perpendicular to joint line, angle medially.
- Position: Arm hanging by side
- Needle : Orange
- Steroid : 10mg
- LA: 1ml or none

Bicipital tendonitis

Pain and tenderness in bicipital groove on front of shoulder

Pain in cubital fossa with

Resisted supination and flexion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ELBOW

ELBOW PROBLEMS

Lateral epicondylitis (Tennis elbow)

Medial epicondylitis (Golfers elbow)

OA,RA,Gout etc

Olecranon bursitis

Other causes

REFERRED PAIN TO ELBOW

From proximal site:

Cervical root

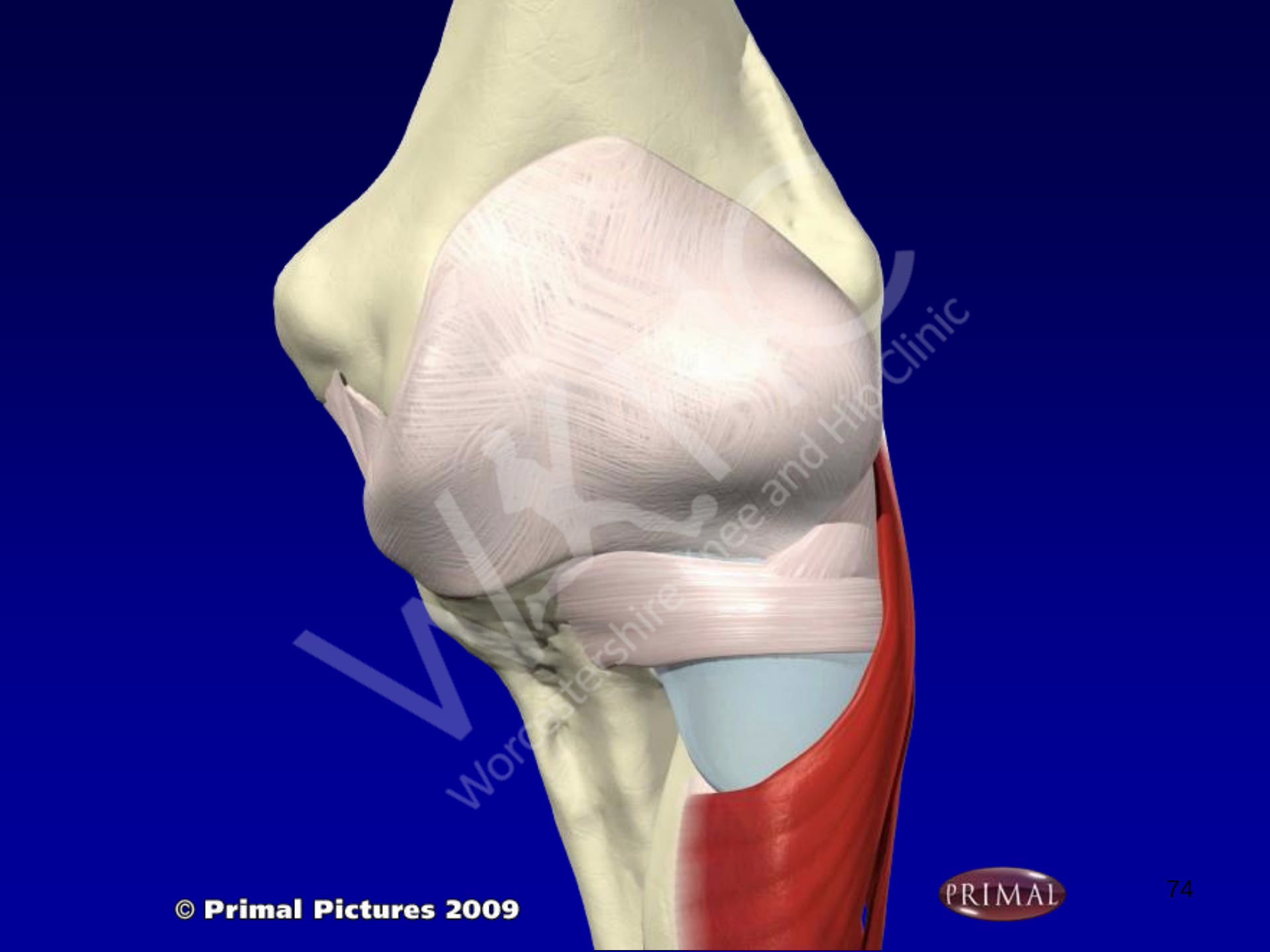
Thoracic outlet syndrome

Supraspinatus tendonitis and SAB

From distal sites:

Carpal tunnel syndrome

Ulnar nerve entrapment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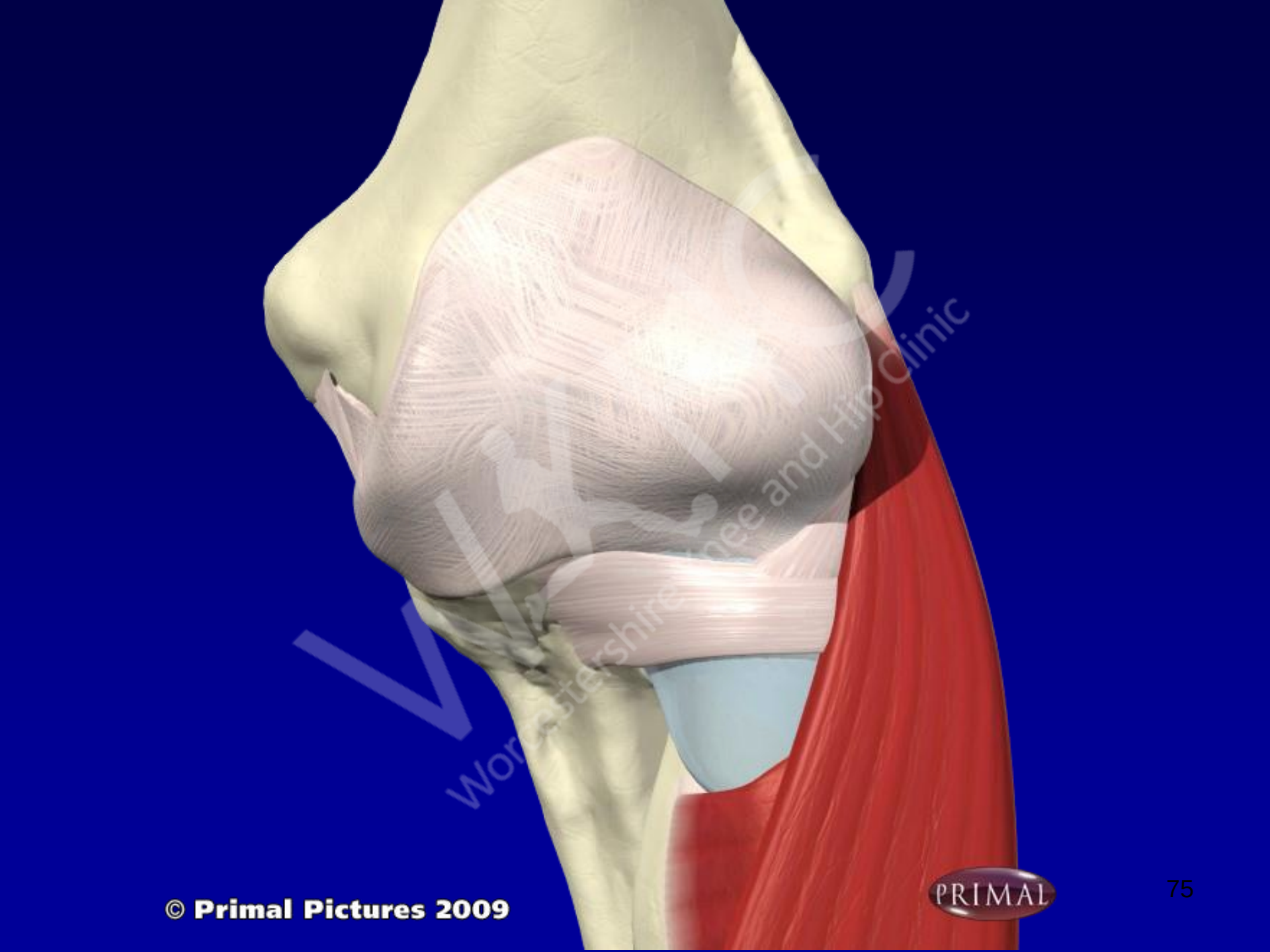
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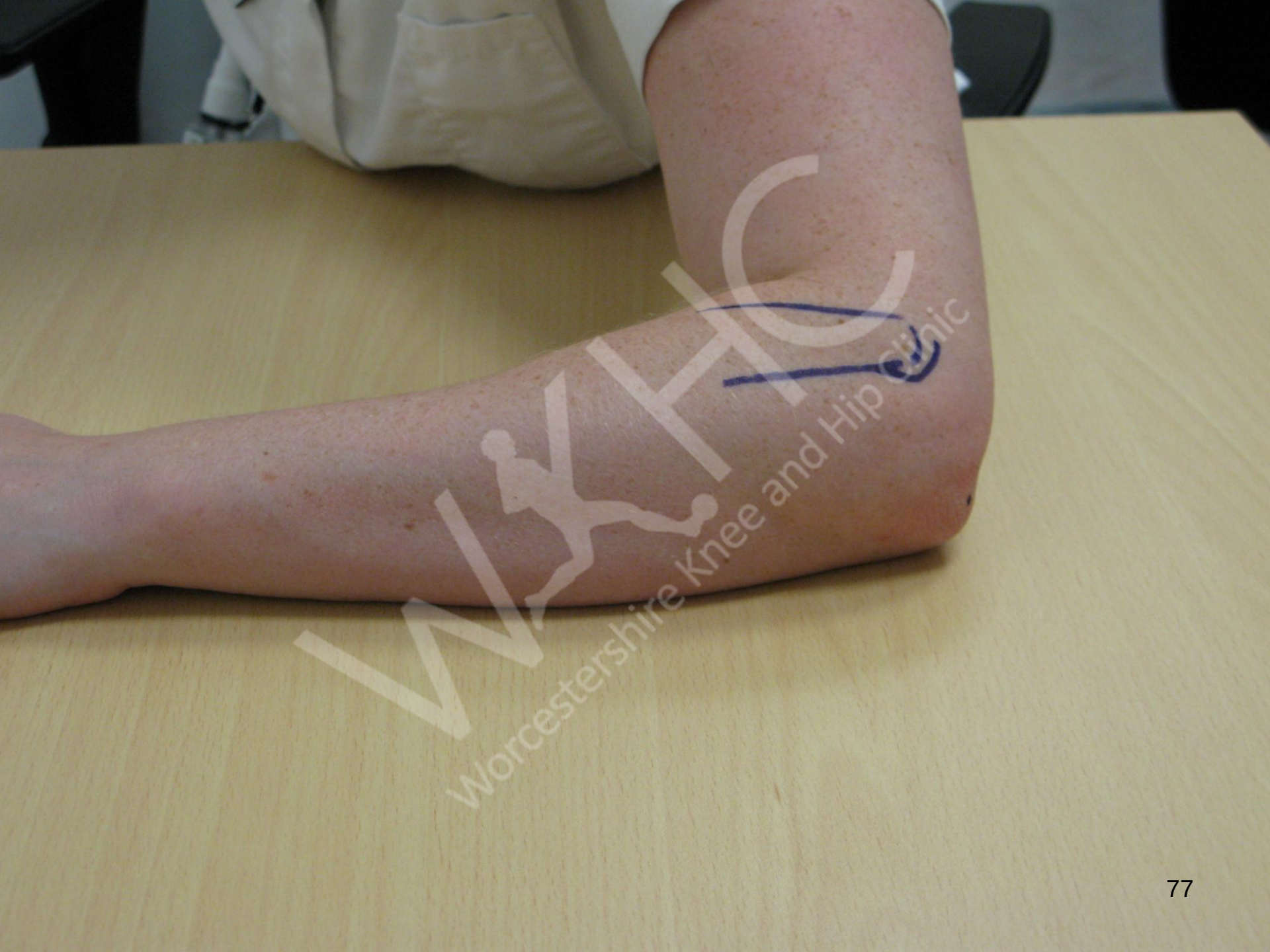
TENNIS ELBOW

Diffuse pain in lateral side of elbow often radiating into upper arm and into forearm and dorsum of hand

There is tenderness localised to the lateral epicondyle

Pain is aggravated by dorsiflexing the wrist against resistance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TENNIS ELBOW

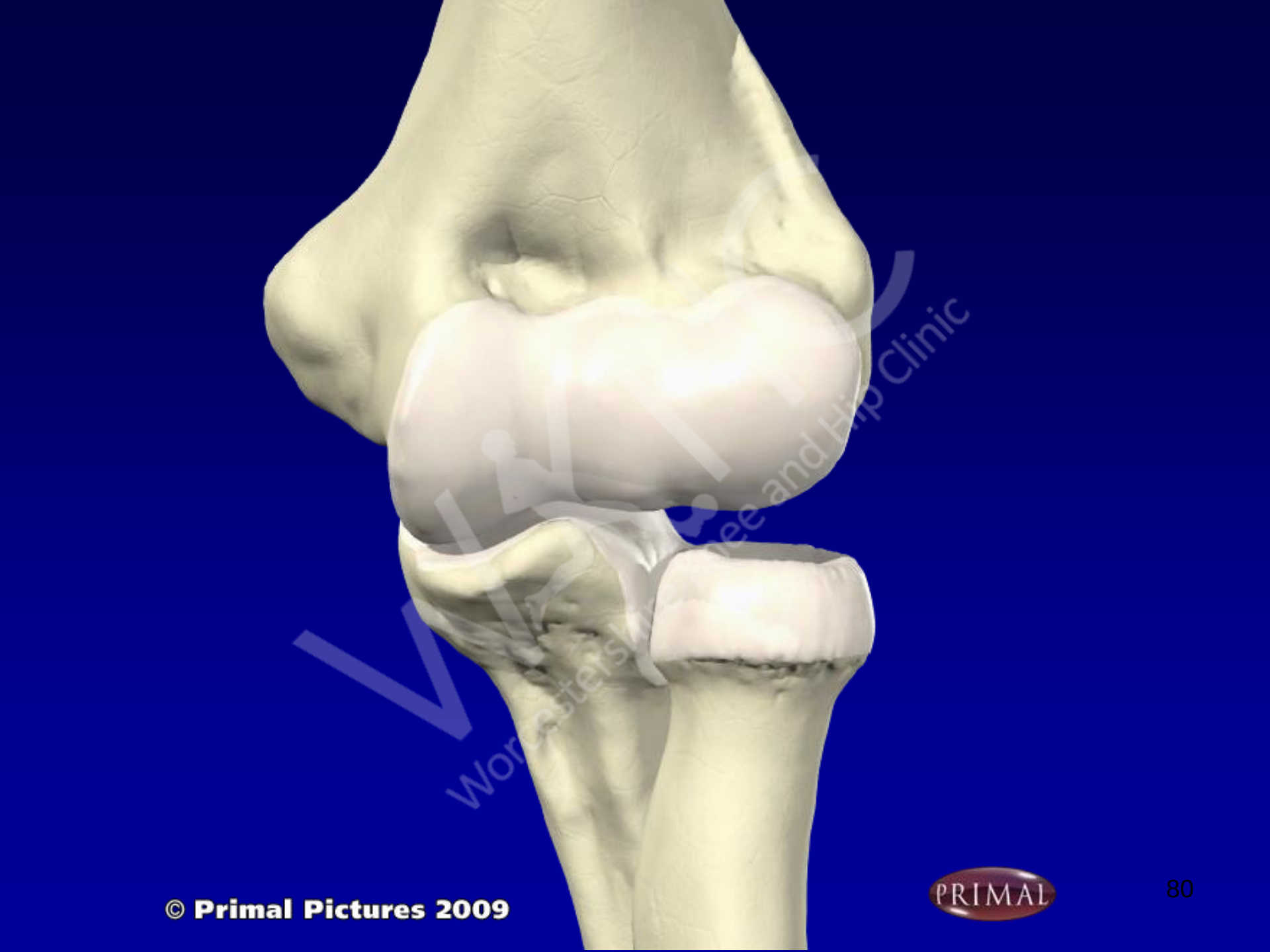
Infiltrate insertion of common extensor tendon, into tender area with 40mg Depomedrone with 3-5mls 1% Lidocaine

With orange/blue needle (25G)

Rest for 24 hours

Warn post injection pain common

Kesson et al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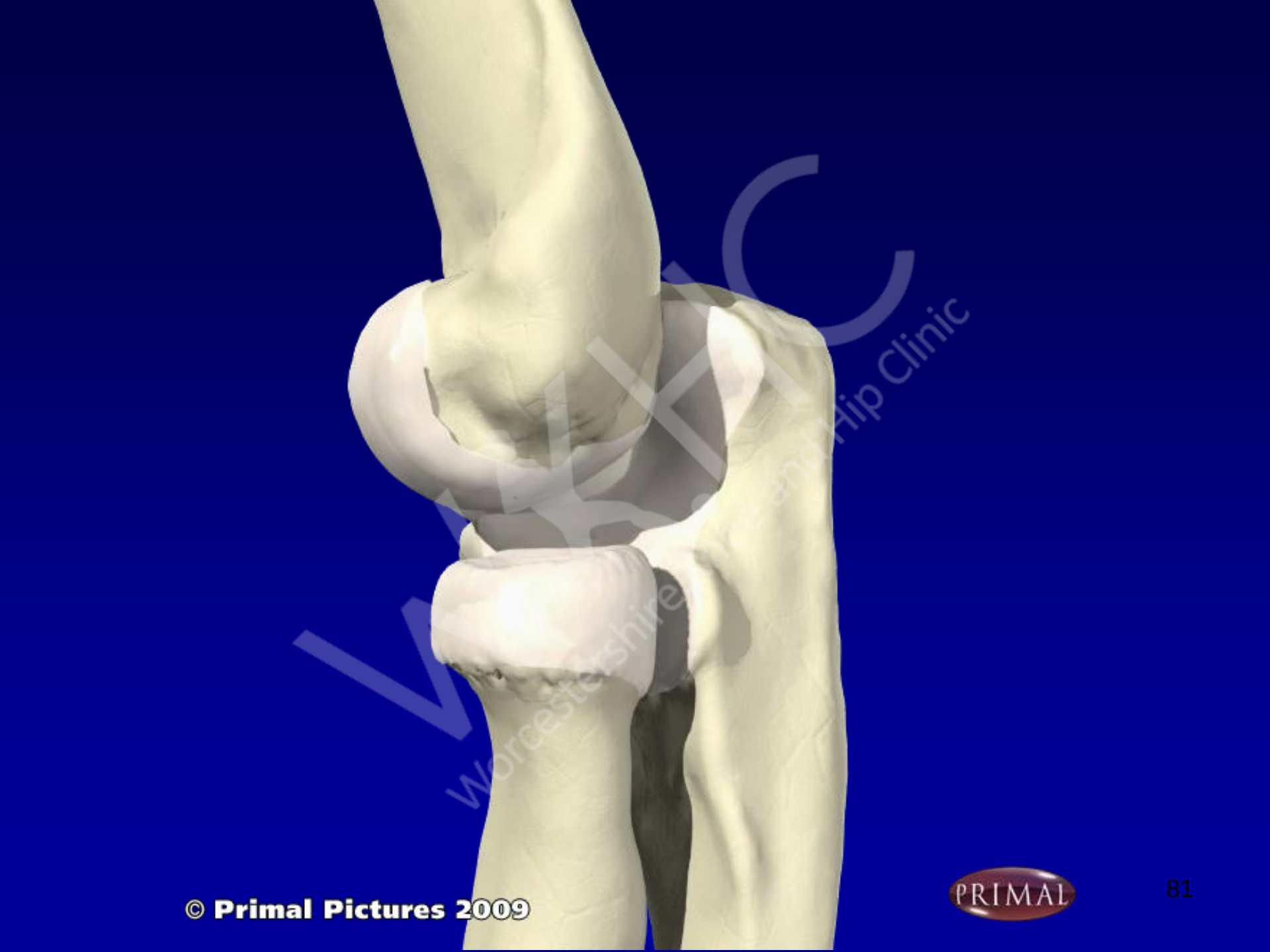
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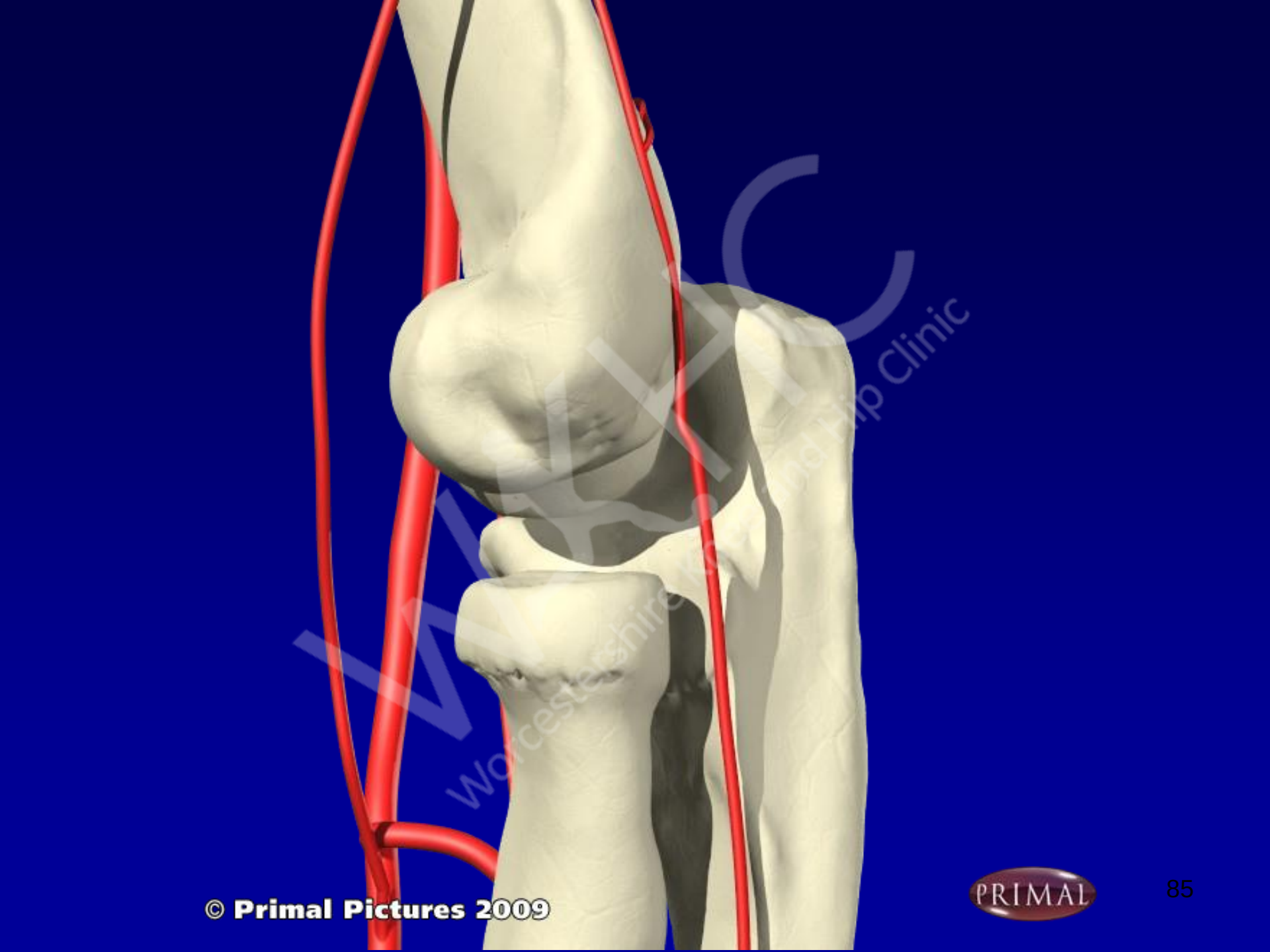
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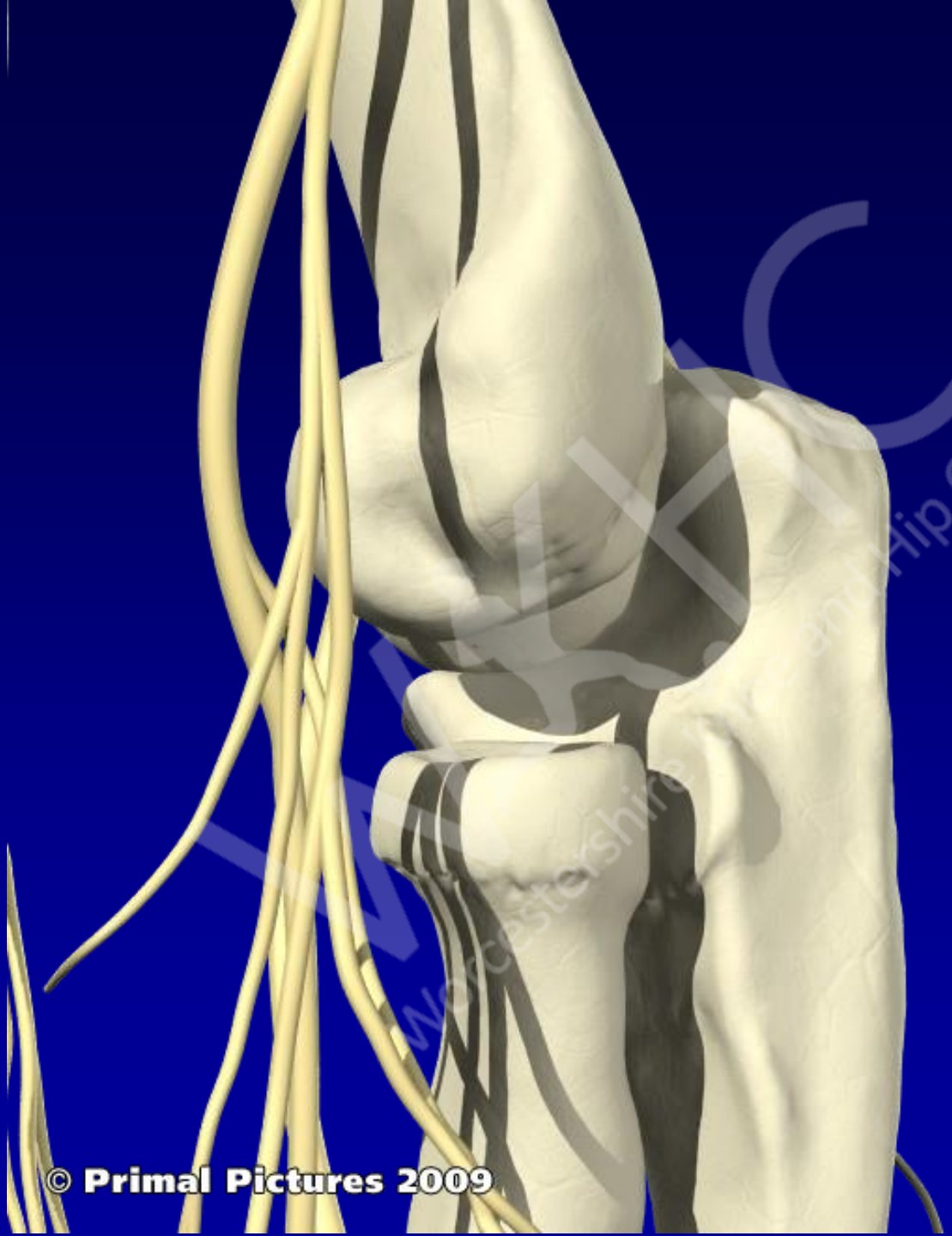
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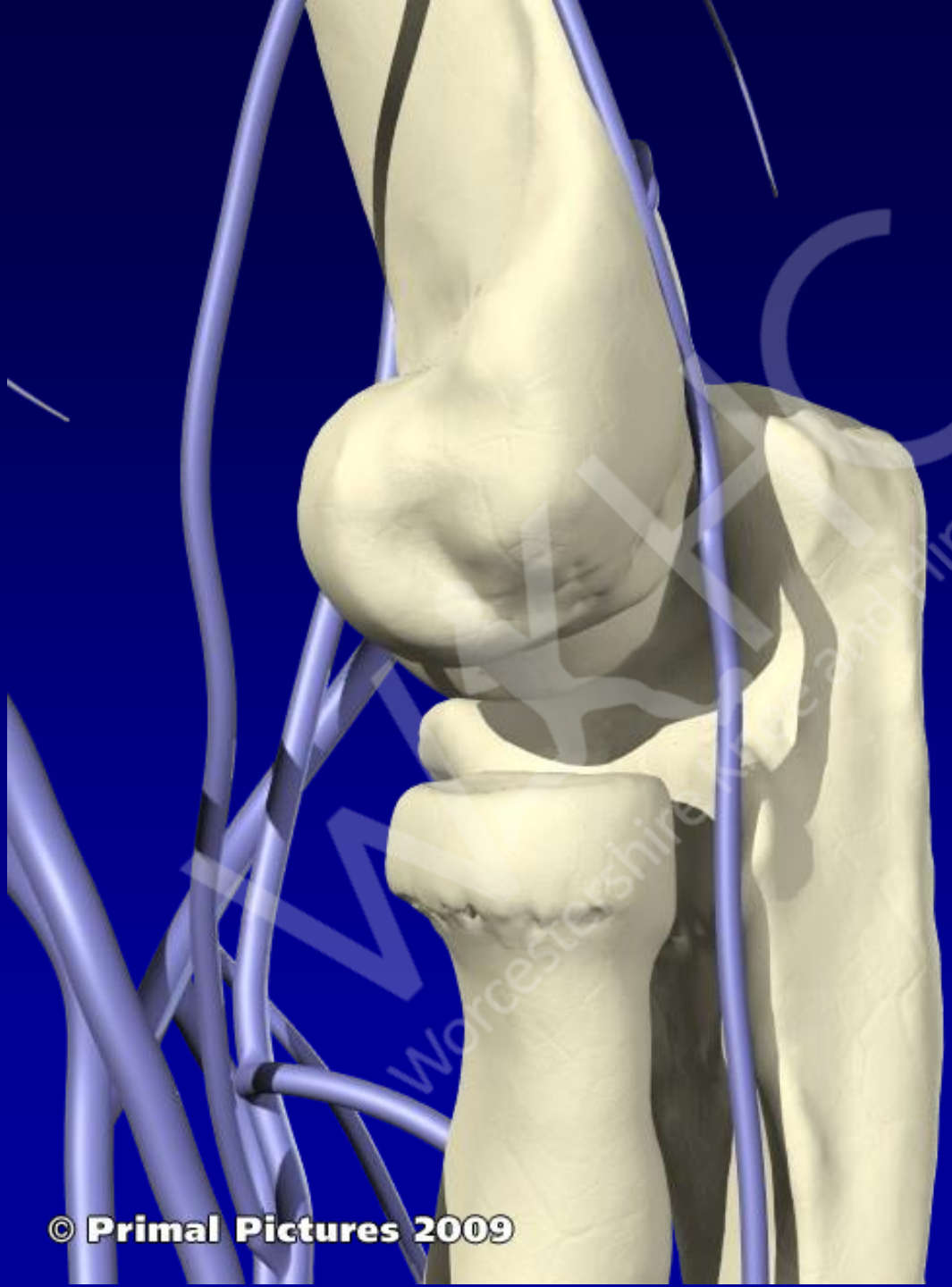
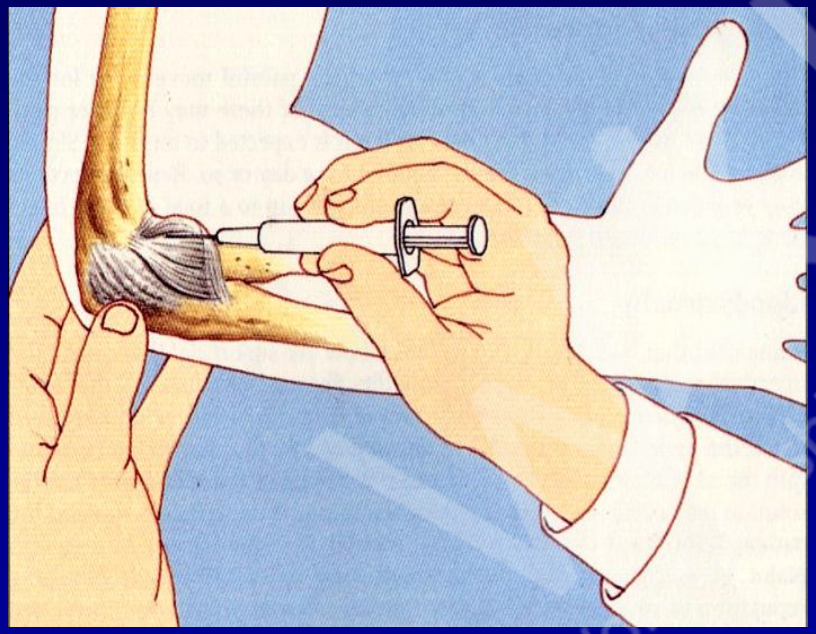


Tennis elbow



- Landmarks: Point of maximal tenderness; anterior facet lateral epidondyle
- Position: Elbow flexed to 90 degrees and supported, forearm fully supinated
- Needle: Blue
- Steroid: 40mg
- Technique: Pepper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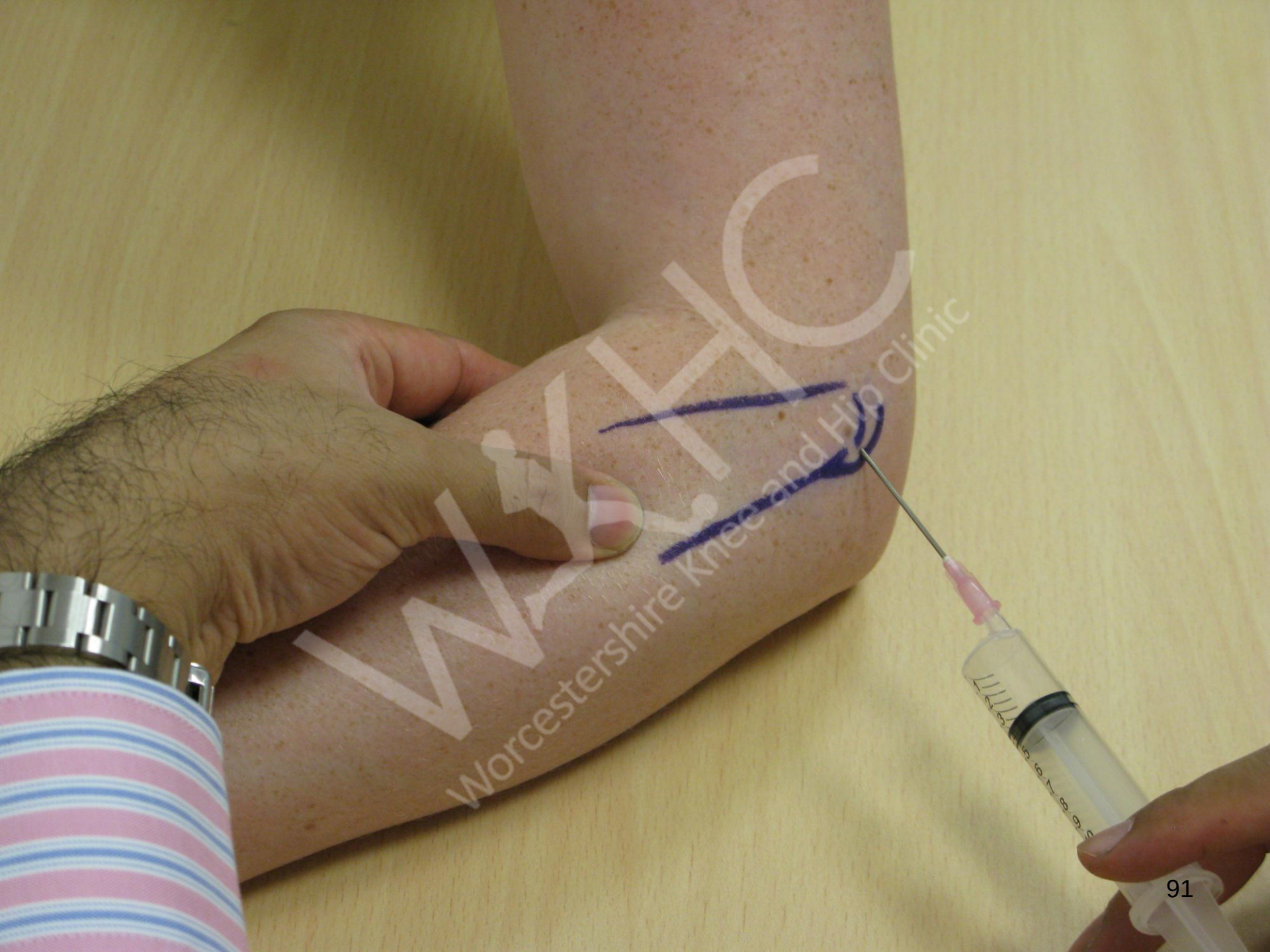
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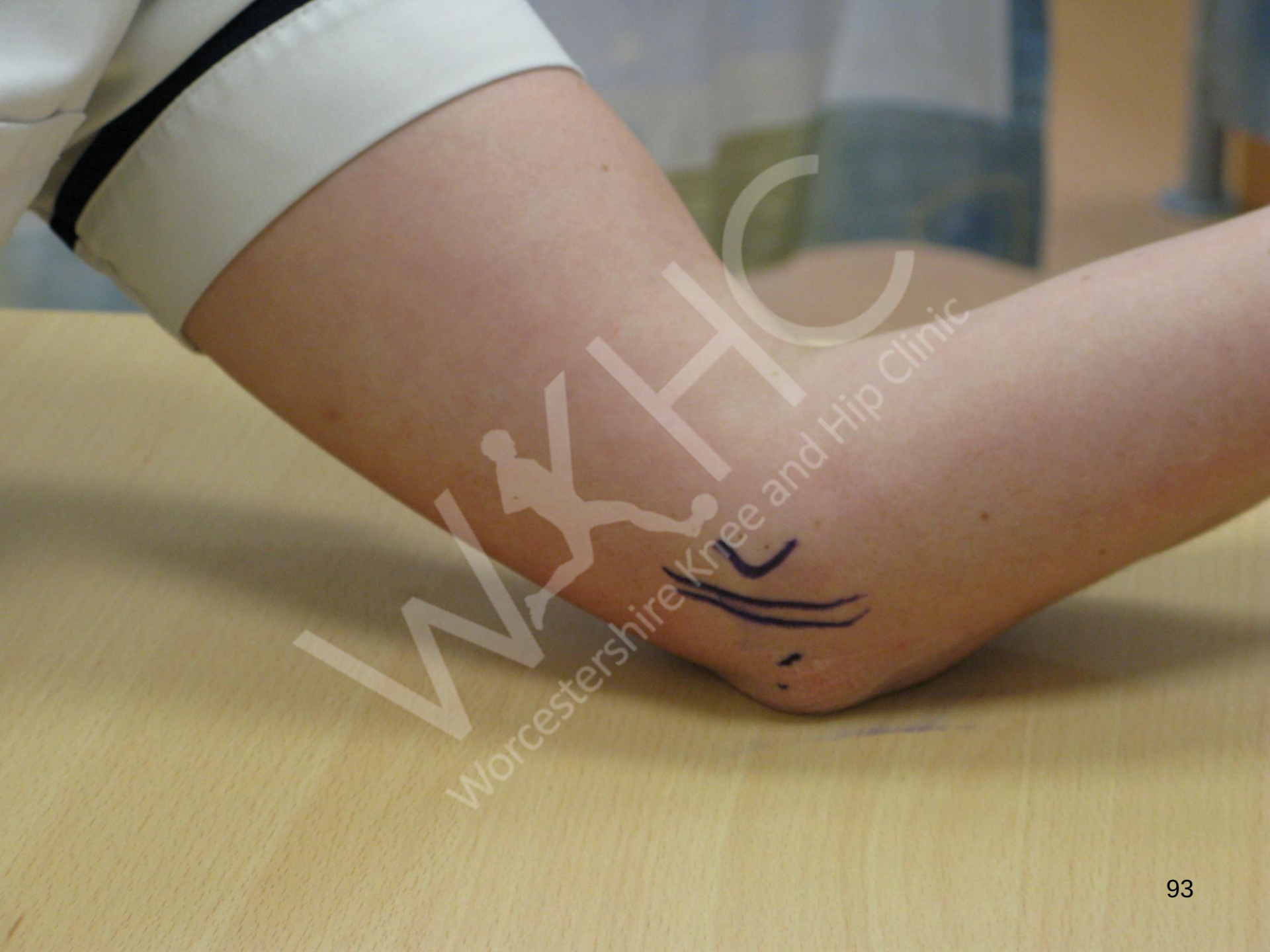
GOLFERS ELBOW

Diffuse pain on medial side of elbow often radiating to upper and lower arm, accompanied by tenderness over medial epicondyle

Pain aggravated by active flexion of the wrist and reisted pronation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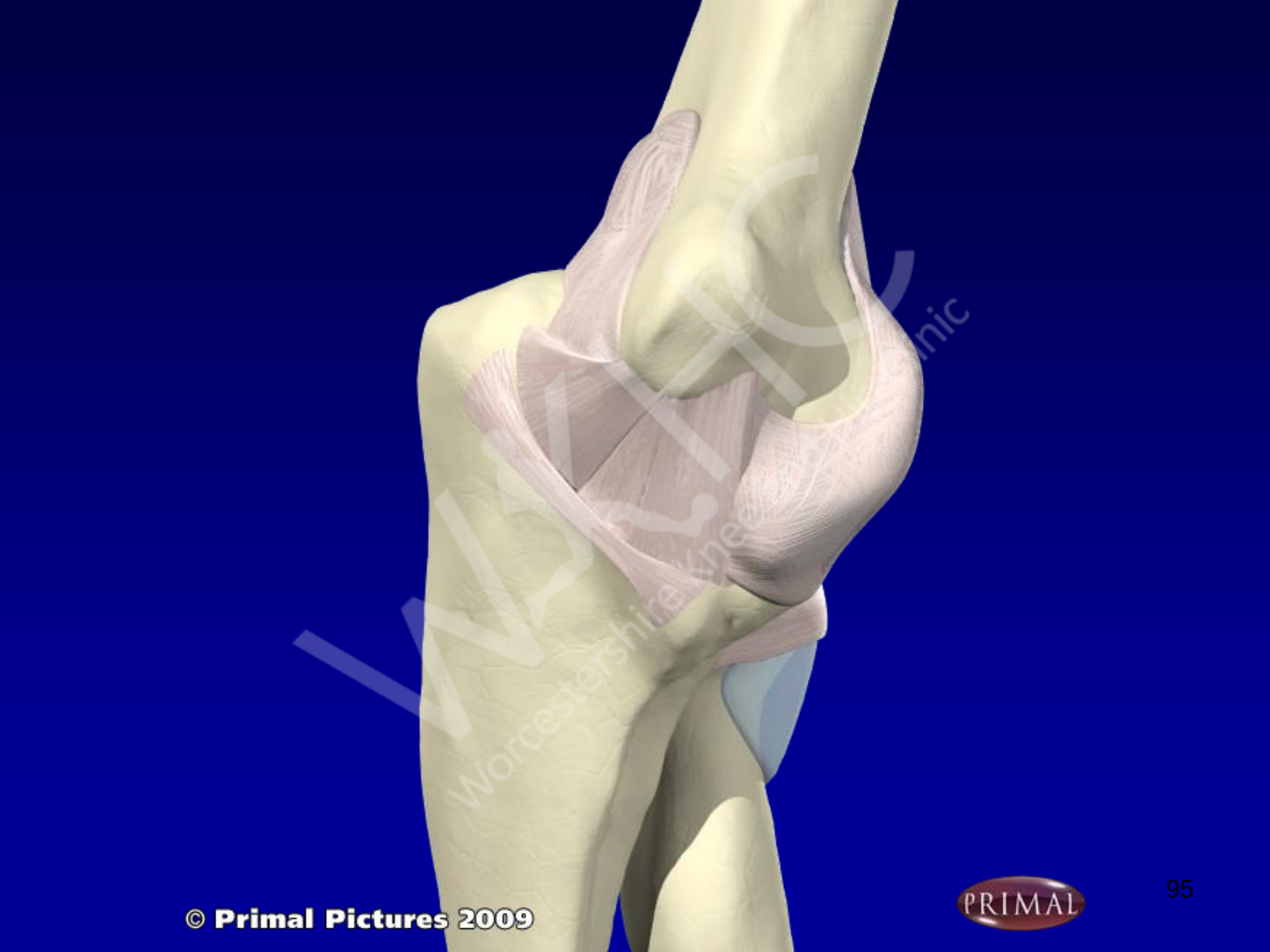

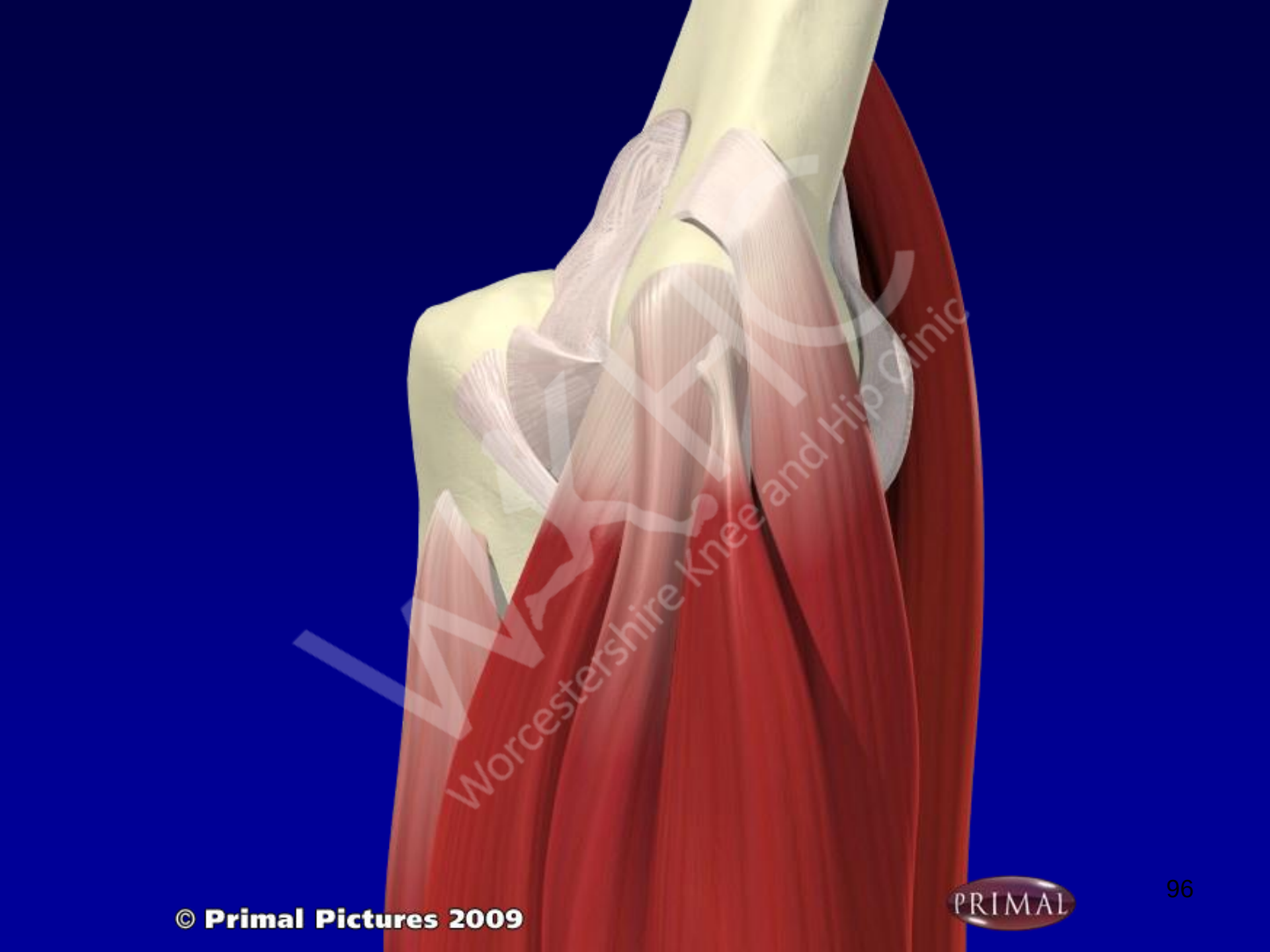
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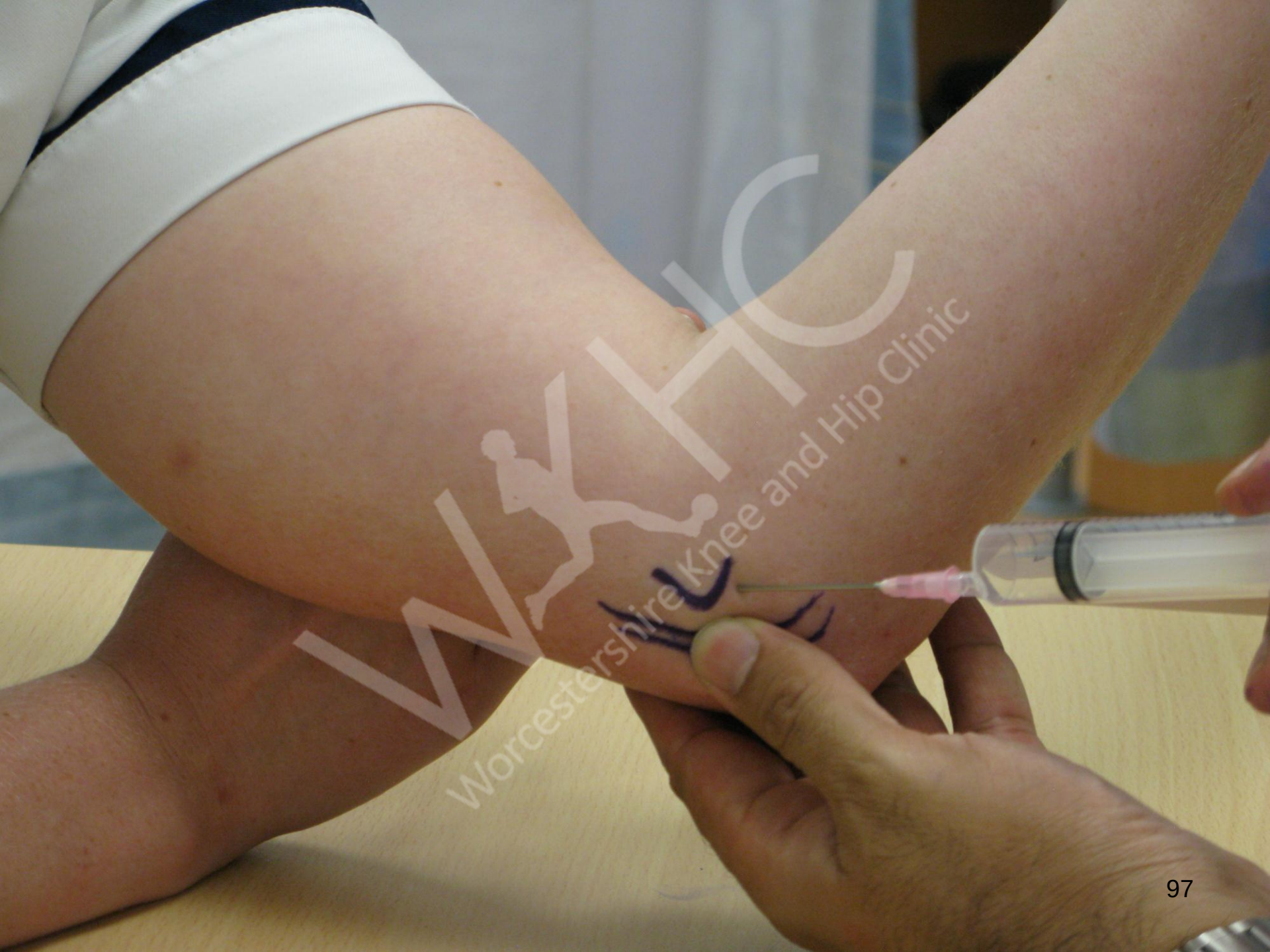
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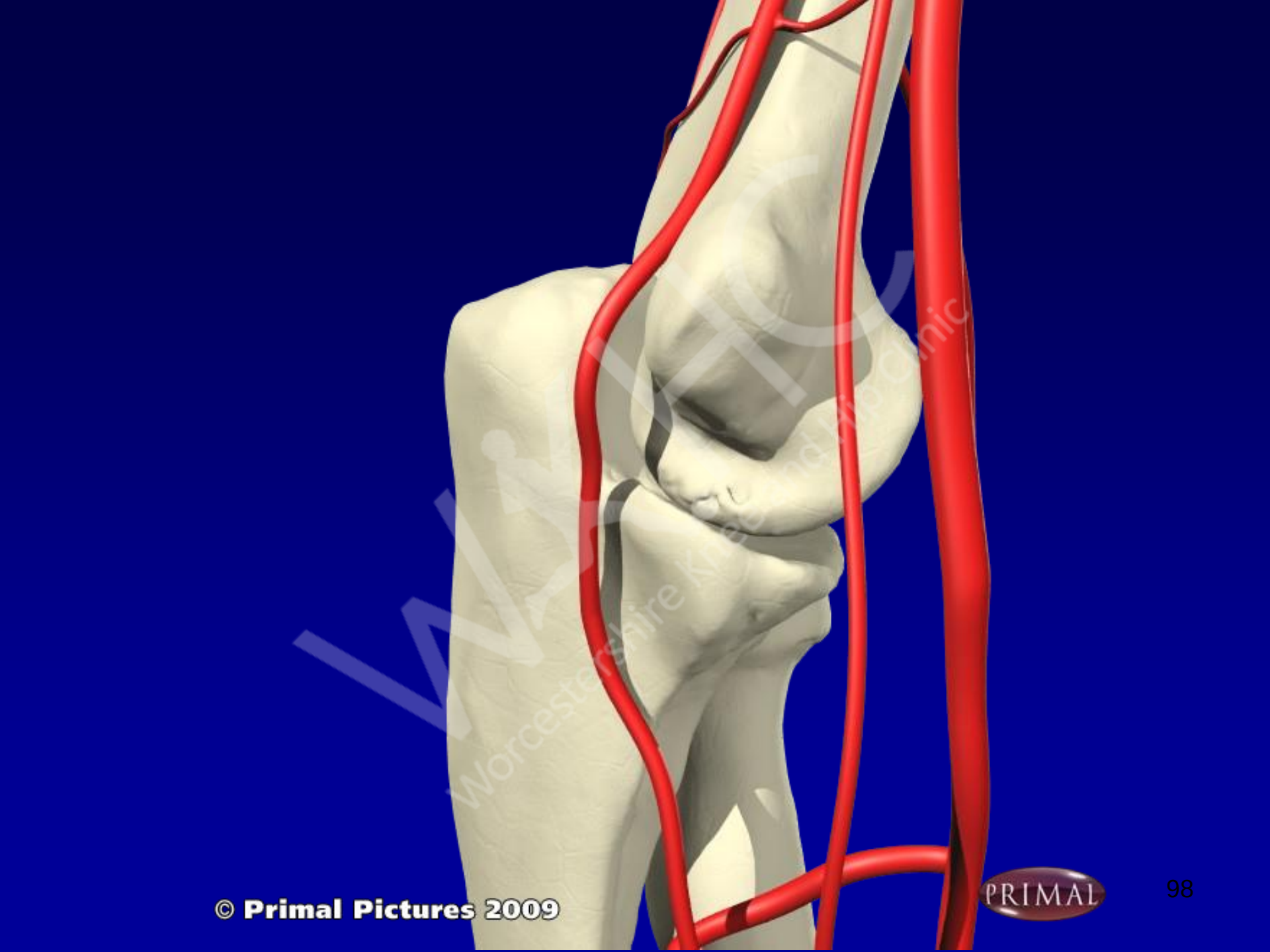
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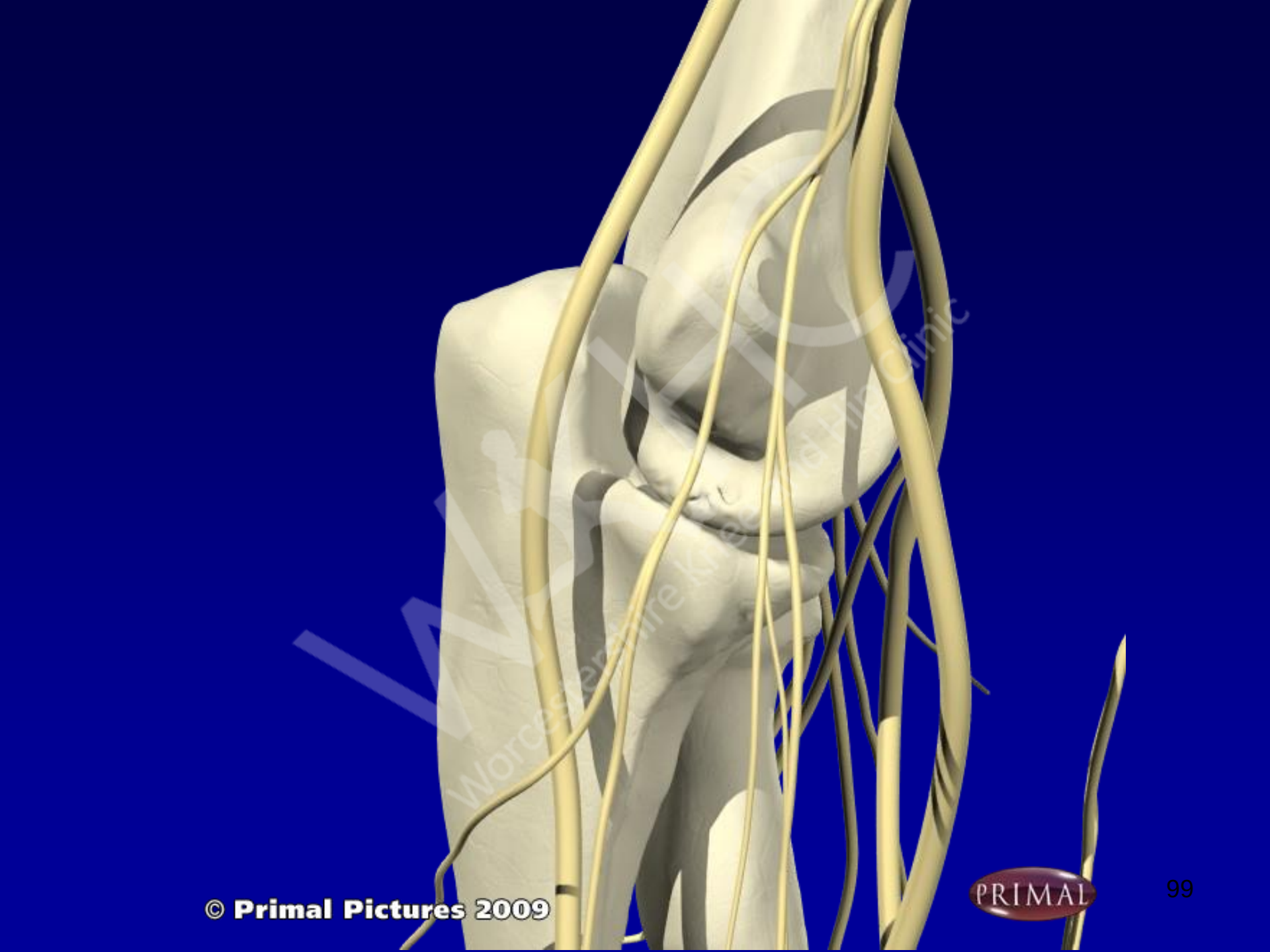
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Elbow pain caused by ‘arthritis’

Loss of range of movement with characteristic fixed flexion deformity. (never seen with golfers or tennis elbow)

Hot with palpable swelling especially over head of radius

Tender joint margin

Reduced supination and pronation

Elbow pain caused by ‘arthritis’

Inject down into groove along medial side of olecranon process towards the elbow joint

Olecranon bursitis

Common in:

Trauma

Infection

Inflammatory arthritis

Gout

Aspirate and send aspirate for MCS and crystal analysis (cytology)

Painless swelling requires no intervention unless large and therefore inconvenient


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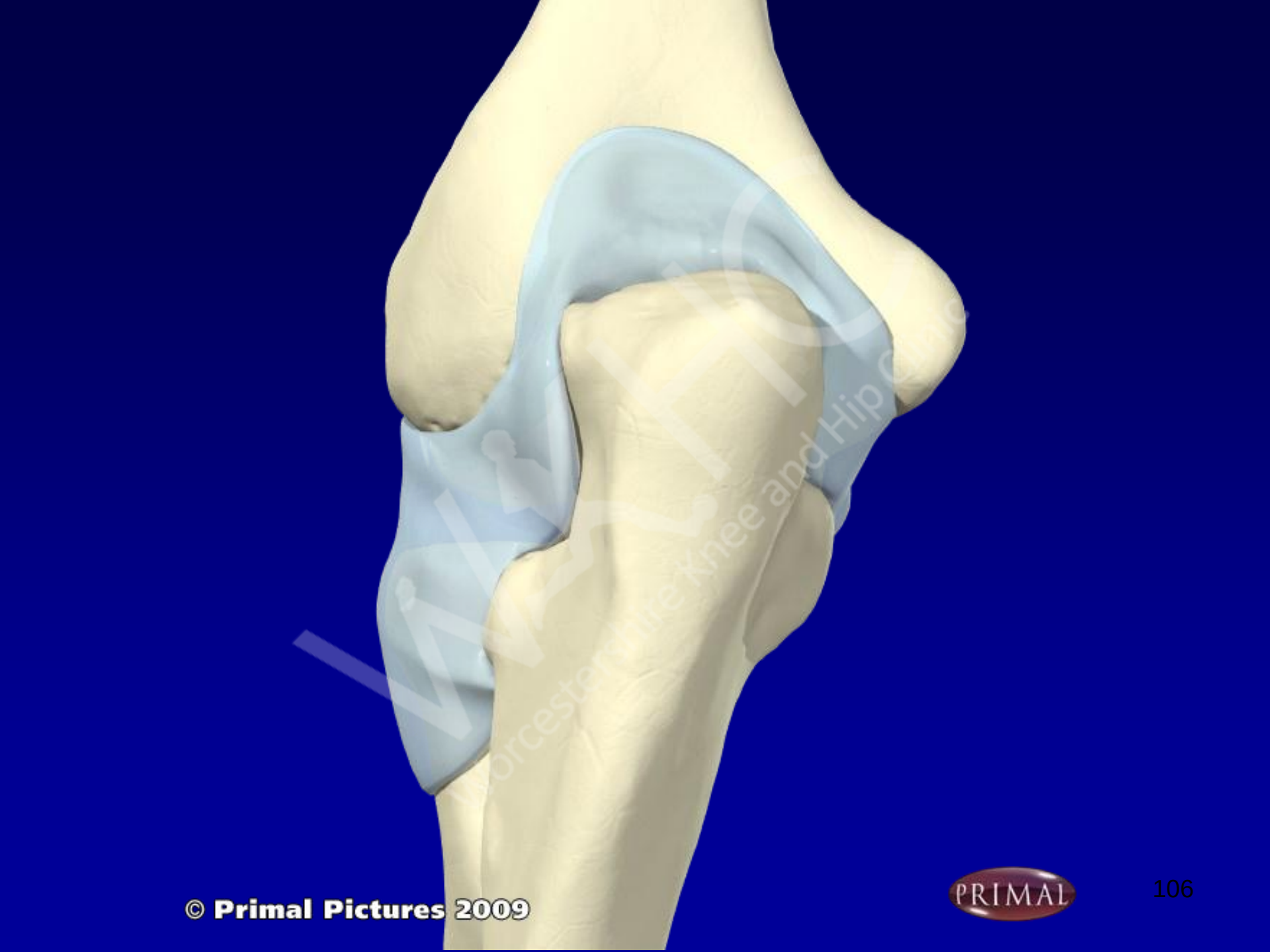

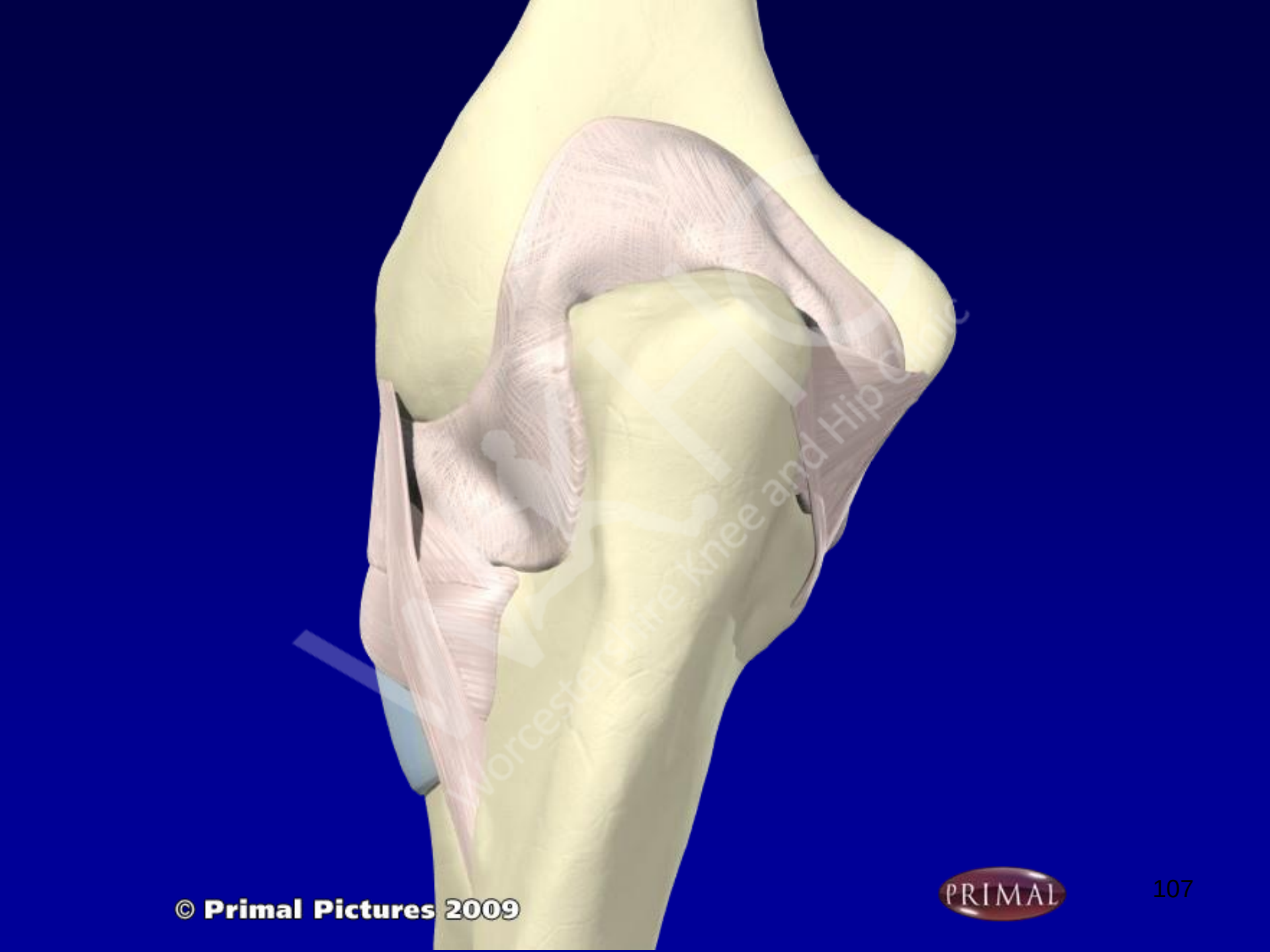
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HAND

Trigger Finger

- Nodular thickening of flexor tendons causing catching at fibrous stenosis at the level of MCP joint
- Common in adults of all ages
- Often caused by overuse
- Common in RA


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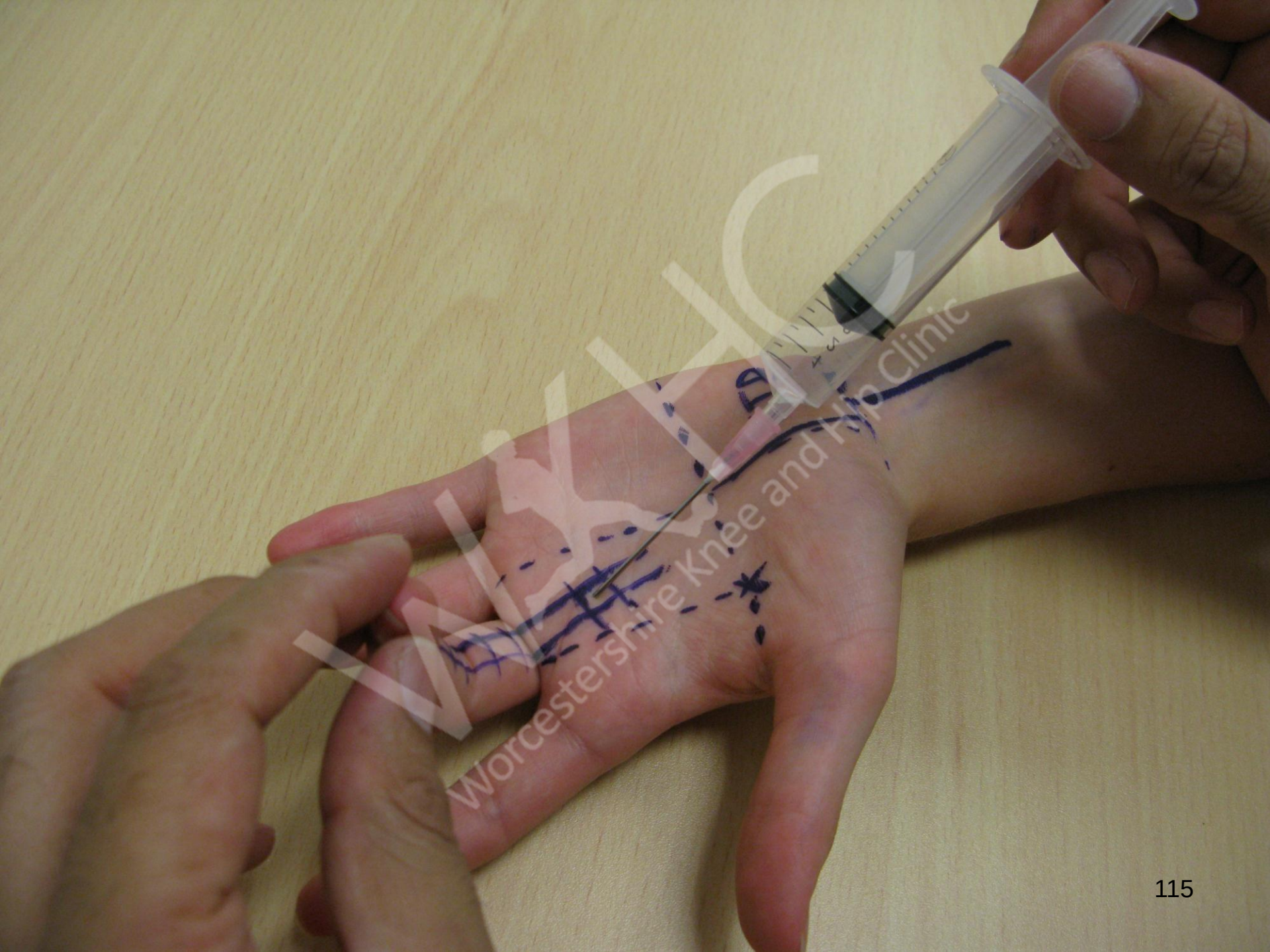
Injection Of Trigger Finger

- 40 mg depomedrone with lidocaine into tendon sheath
- If 2 injections fail approx. 6-8 weeks apart and if significant disability, refer to hand surgeon
- Direction of needle towards nodule. Angle approx. 20 deg (Feel for nodule with your left hand, inject along side of nodule)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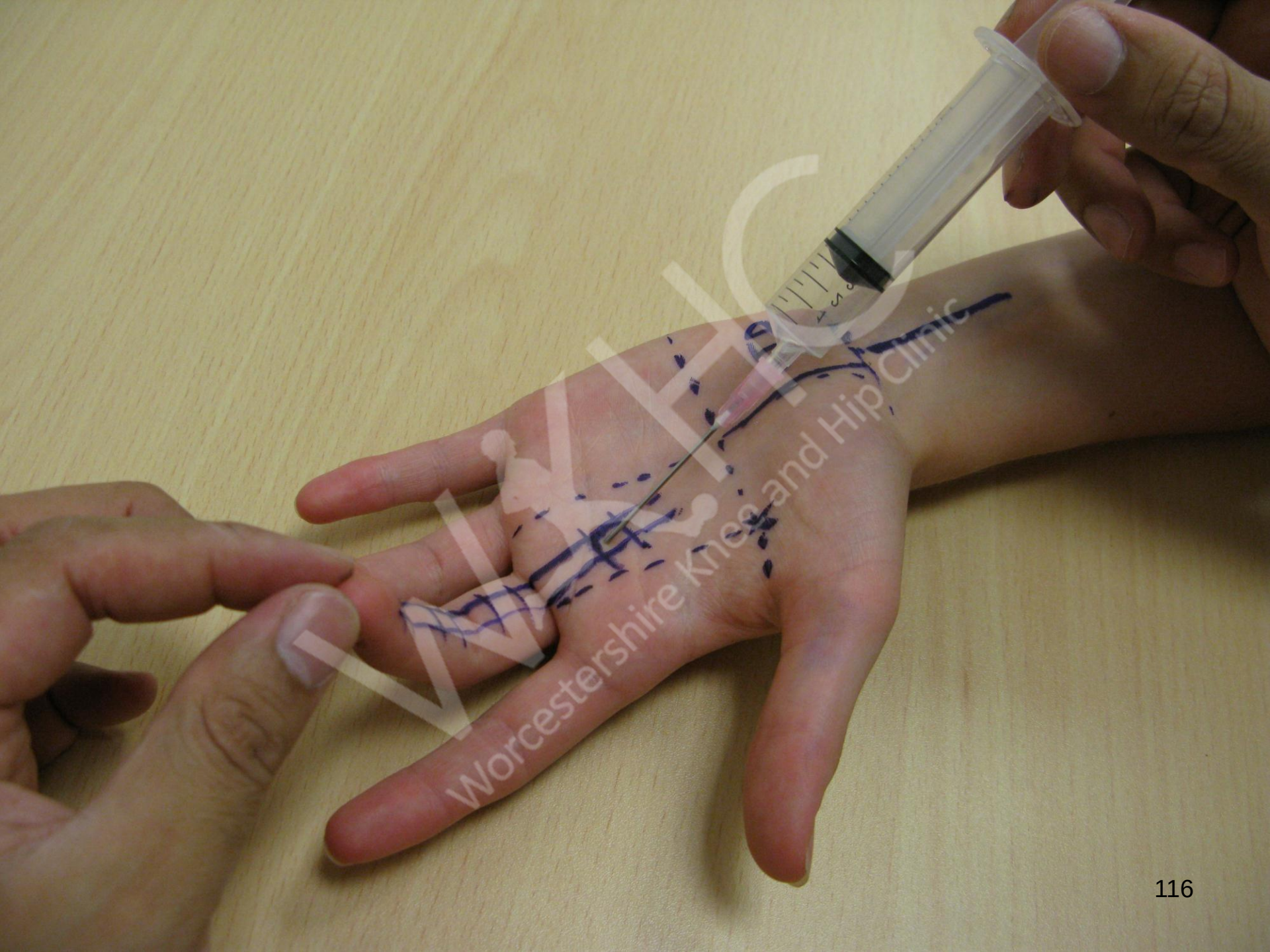
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1ST CARPOMETACARPAL JOINT

- Affected by osteoarthritis
- Pain over base of thumb
- Worse with ‘opening jars’
- Tendancy to drop things due to propioceptive dysfunction and pain

1ST CARPOMETACARPAL JOINT

- 40mg depomedrone with lidocaine
- Orange needle (25g)
- Pain from periarticular structures therefore intra-articular access not essential, inject close to capsule
- Lateral approach or palmar over tenderest point


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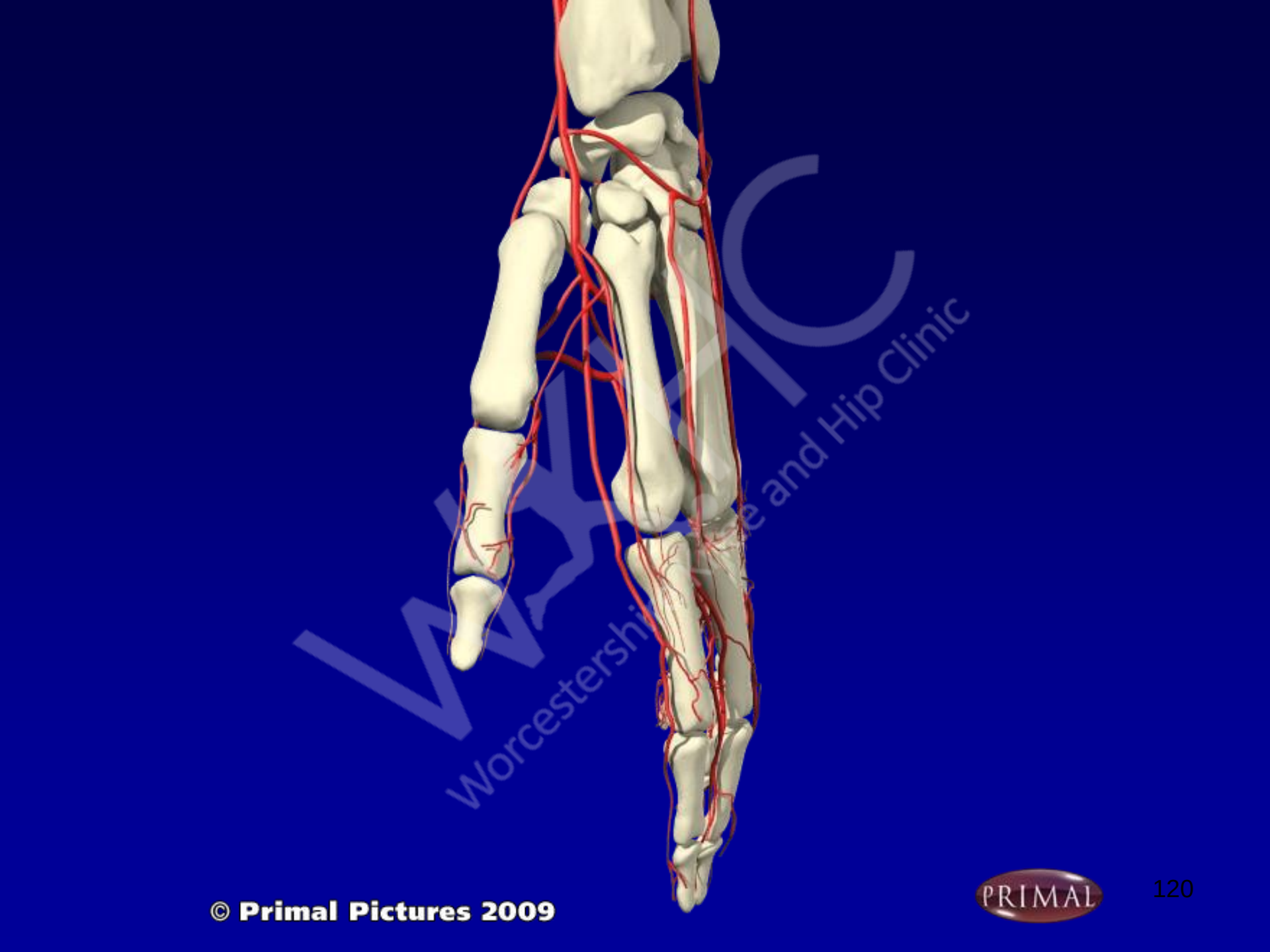

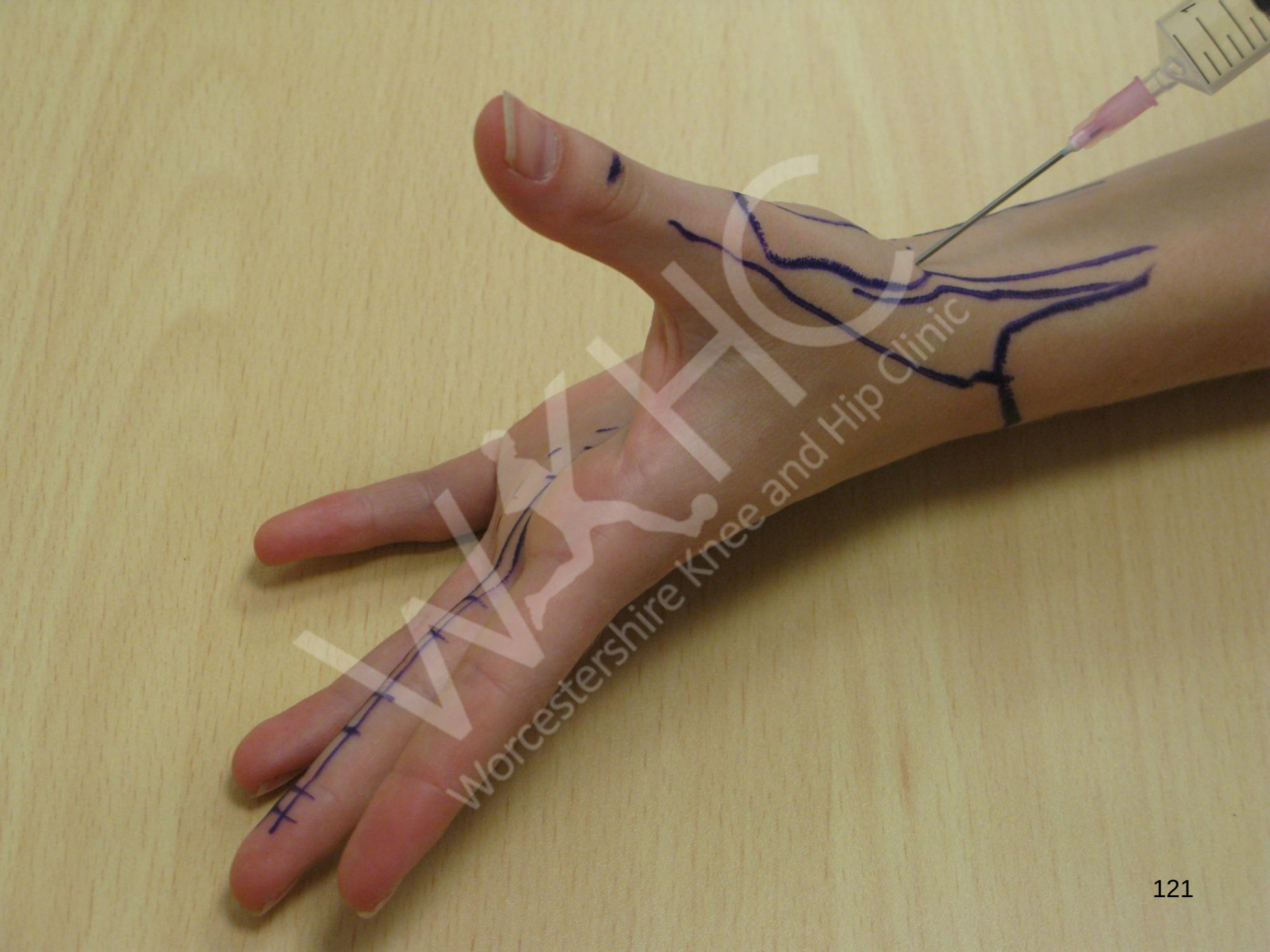
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DE QUERVAINS

- Inflammation of tendon sheath of extensor pollicis brevis and abductor pollicis longus as they pass over the radial styloid in the first extensor compartment
- Painful swelling at wrist , exacerbated by resisted thumb abduction of forced thumb flexion (Finkelsteins test)
- Often due to over use
- Common in young adults


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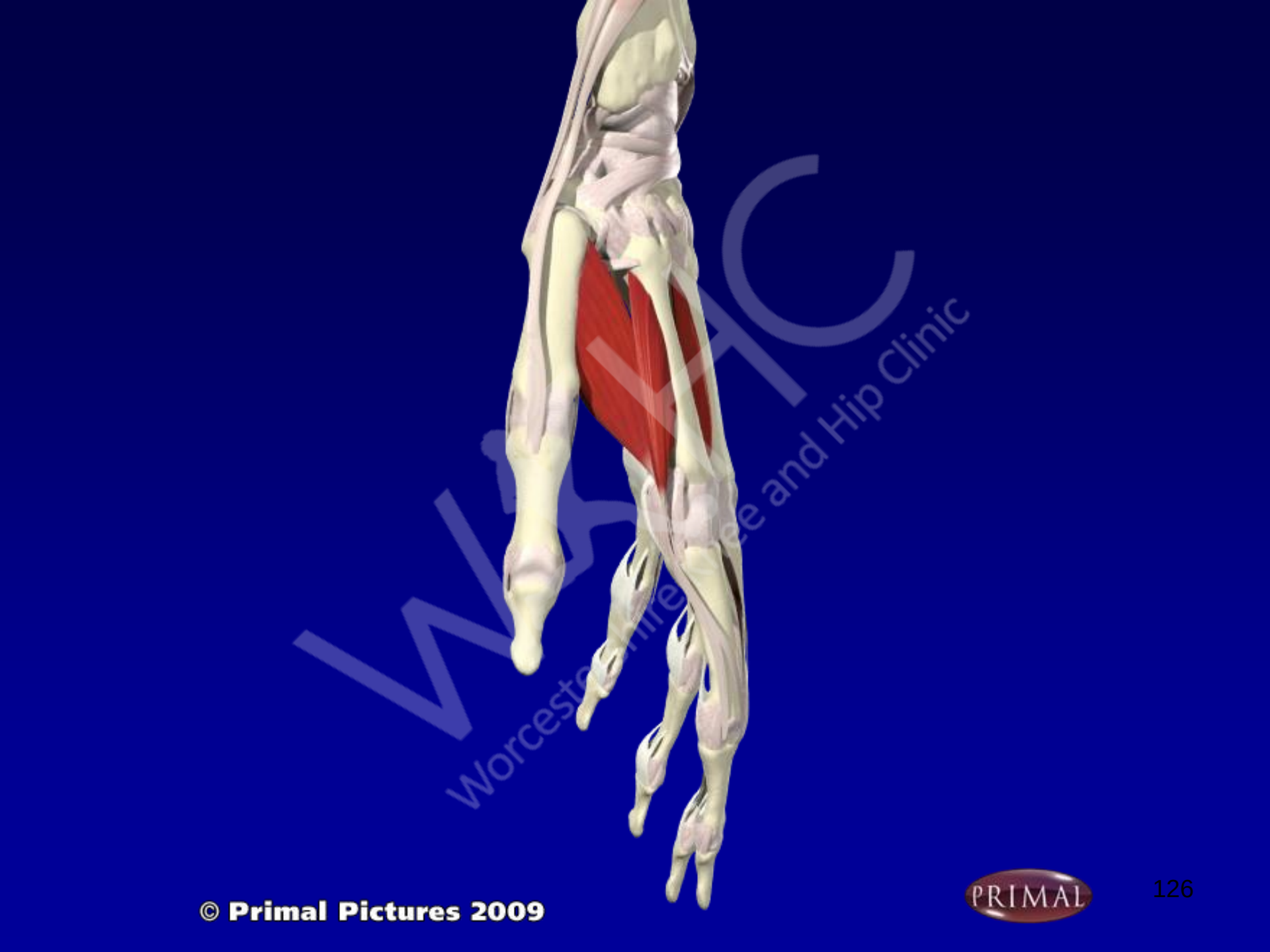

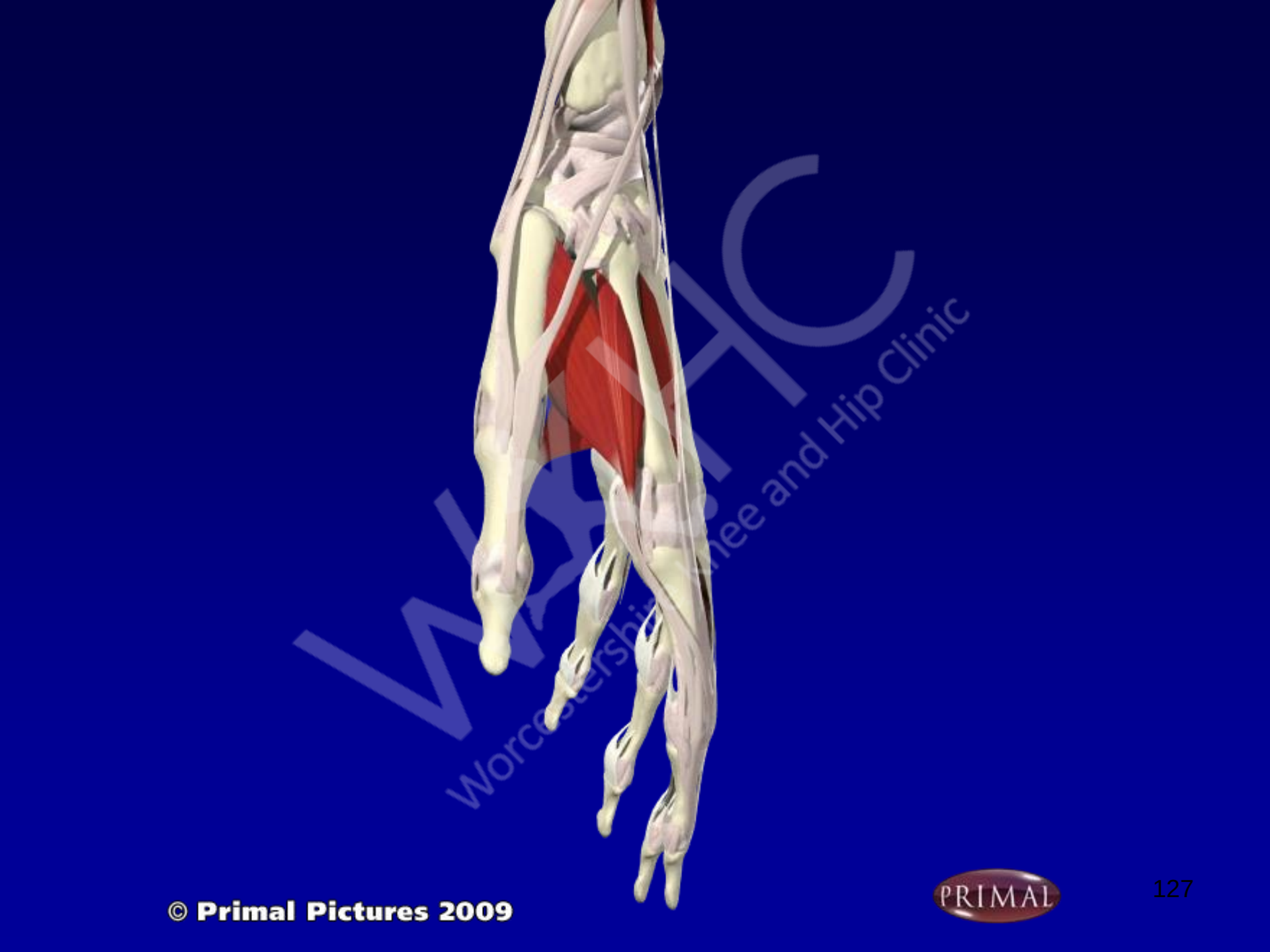

Finkelsteins test

- move wrist into ulnar deviation
- positive test=pain


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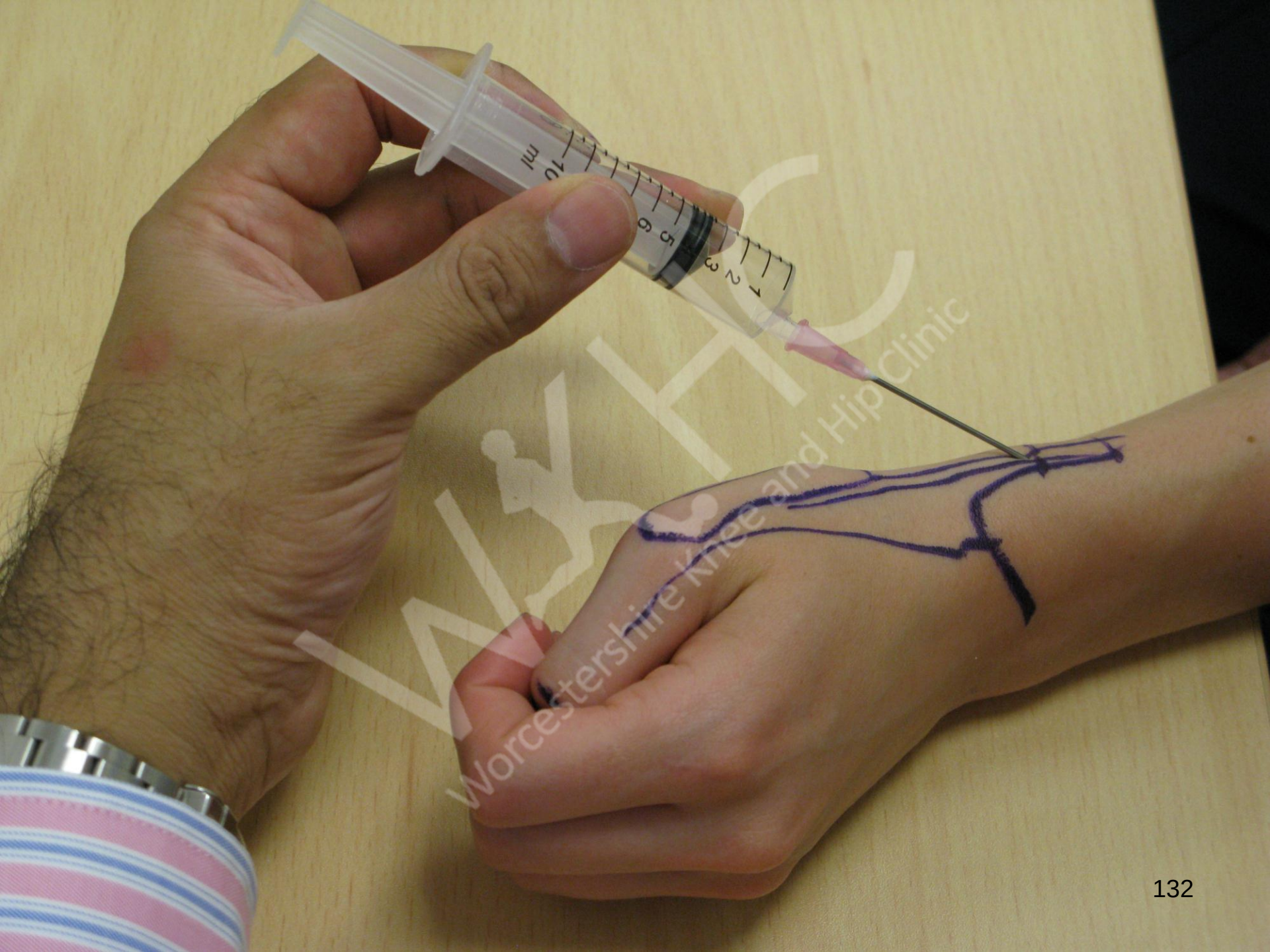
DE QUERVAINS

- Inject tendon sheath with 40mg depomedrone and lignocaine
- Orange needle
- Rest 24hours
- Address cause
- Reduce repetitive action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Carpal Tunnel Syndrome

- Idiopathic
- RA
- Other arthropathies
- Colles fracture
- Myxoedema
- Acromegaly
- Pregnancy
- Obesity
- Amyloidosis

Symptoms and Signs of CTS

- Parasthesiae median nerve distribution

- Inject with Depomedrone 40mg and Lidocaine. If helps but symptoms return, refer for surgery.

Phalens and Tinels test

- Both reproduce symptoms.


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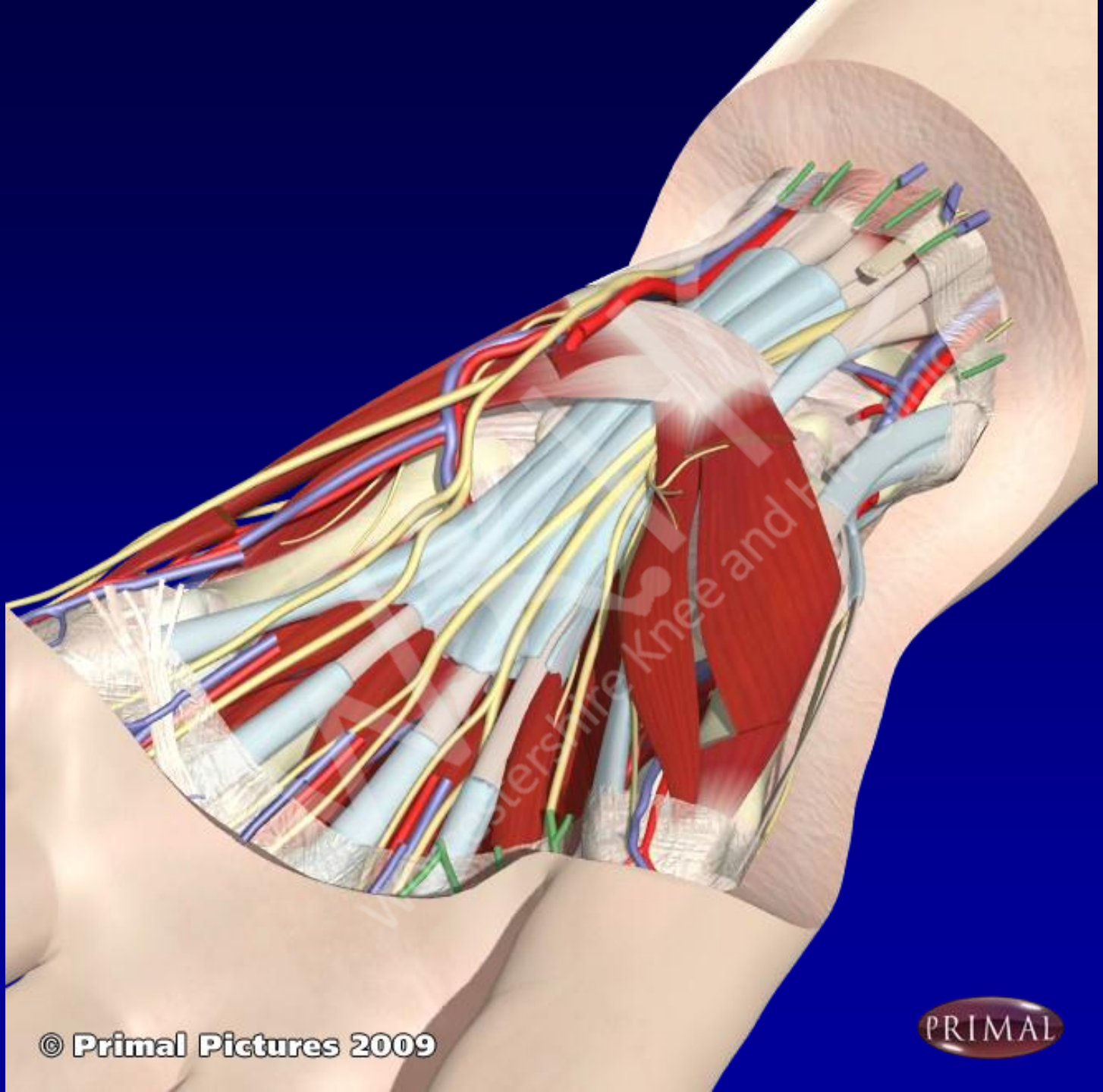
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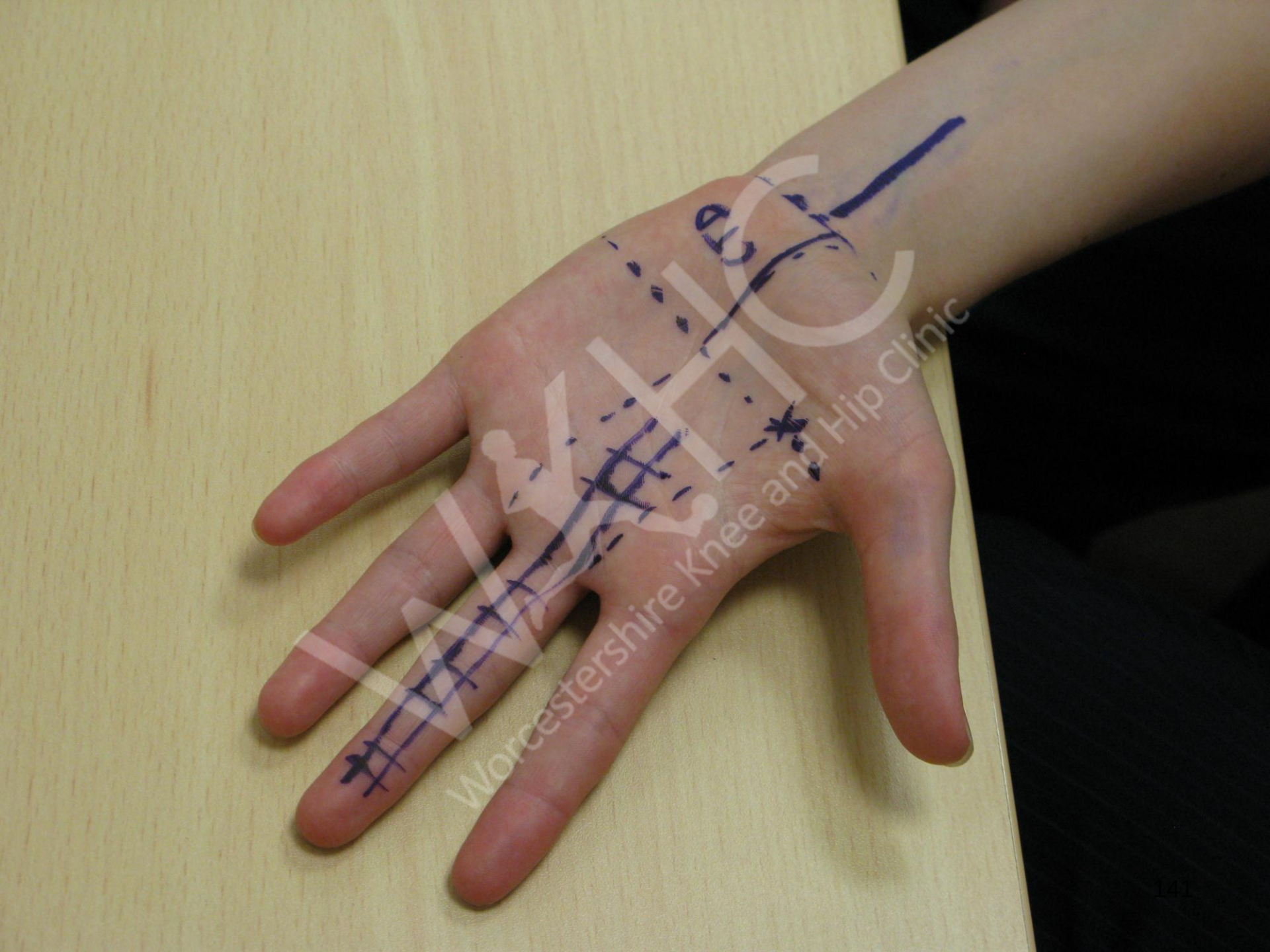
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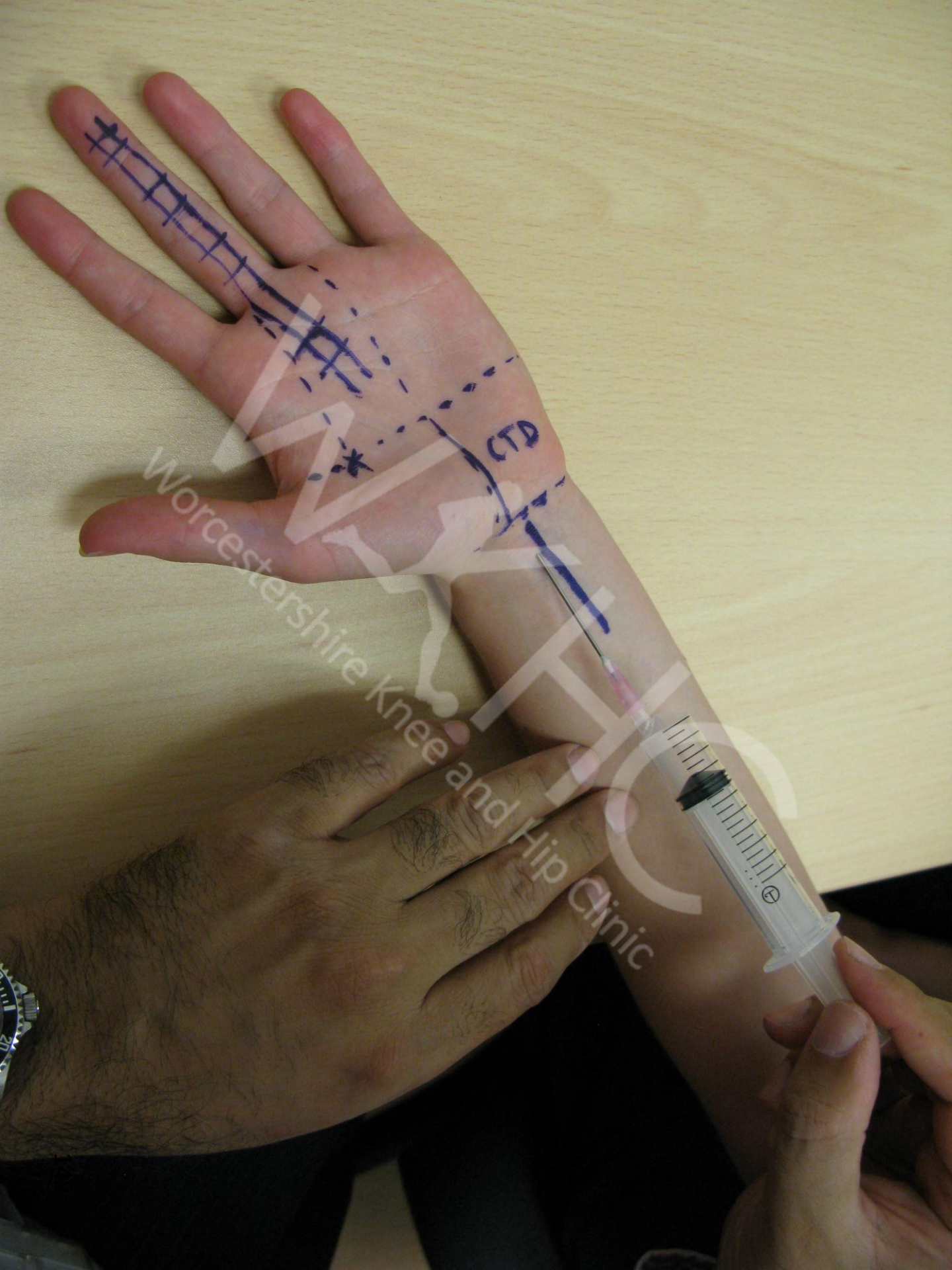
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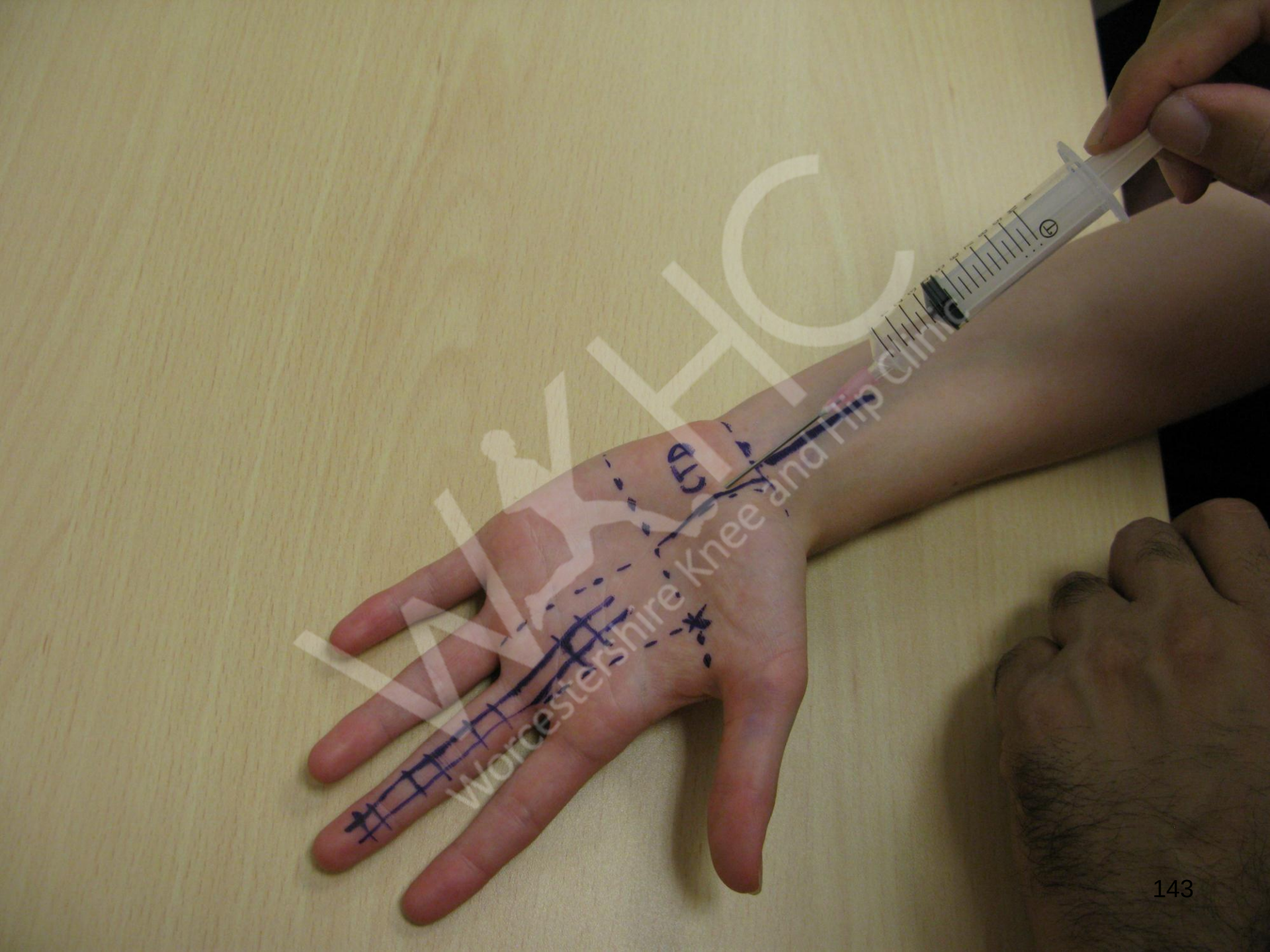
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THE END

Joint Examination and Injection Course

Mr Nadim Aslam
Consultant Orthopaedic Surgeon
Worcestershire Royal Hospital

DIAGNOSING AND MANAGING LOWER LIMB CONDITIONS

Hip

Knee

Ankle

Foot

WHAT IS THIS CLINICAL SIGN?

Greater Trochanteric Pain Syndrome (Bursitis)

- Pain over GT especially with weight bearing
- Unable to lie on affected side
- Usually over-weight
- May have short leg causing pelvic tilt (needs correction with shoe raise)
- Pain on resisted abduction

Injection of Greater Trochanteric Bursitis

- Infiltrate tender point with 40-80mg Depomedrone with 10mls 1% lidocaine
- Spinal or green needle inserted until bone felt.

Hip


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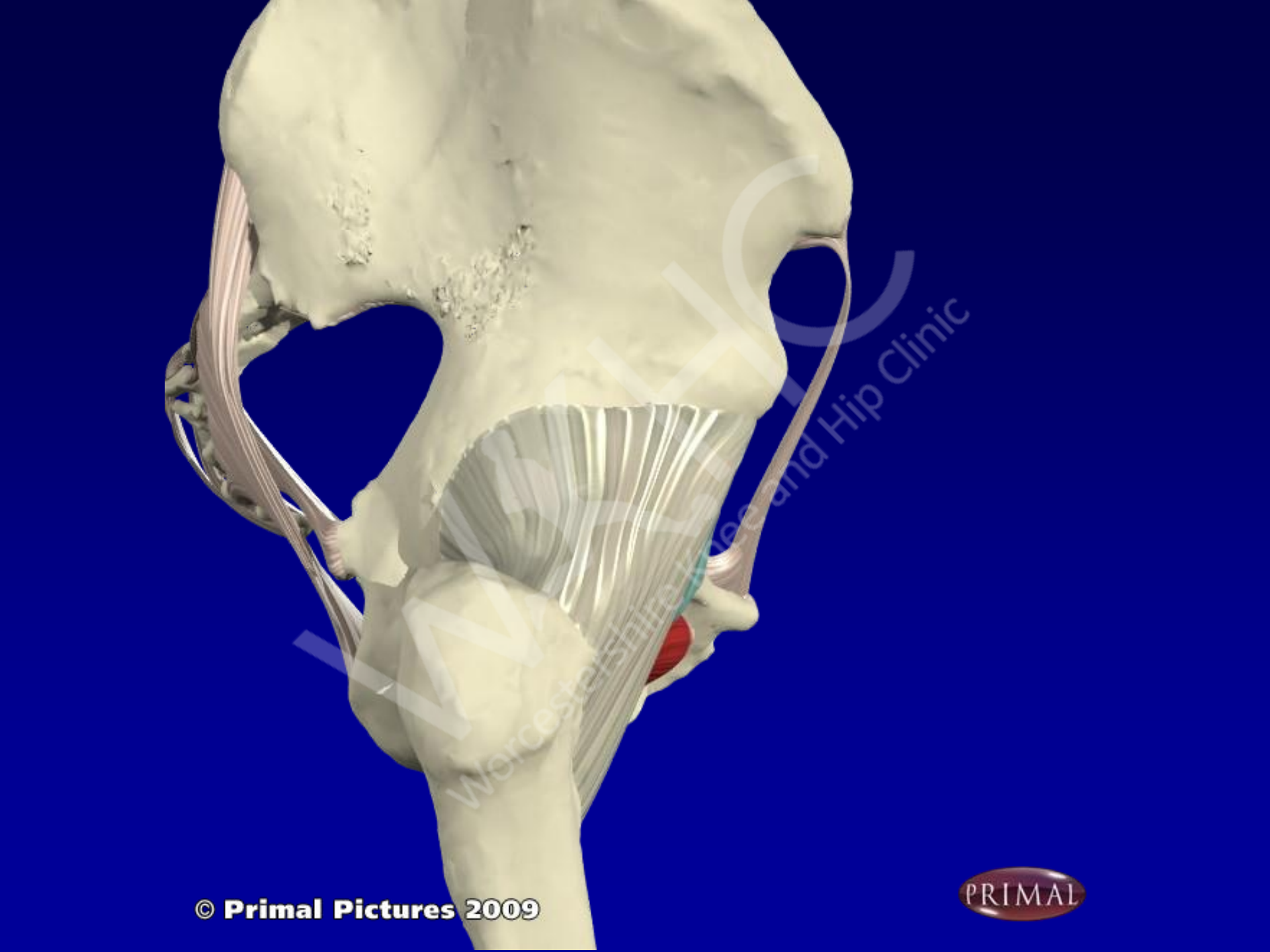
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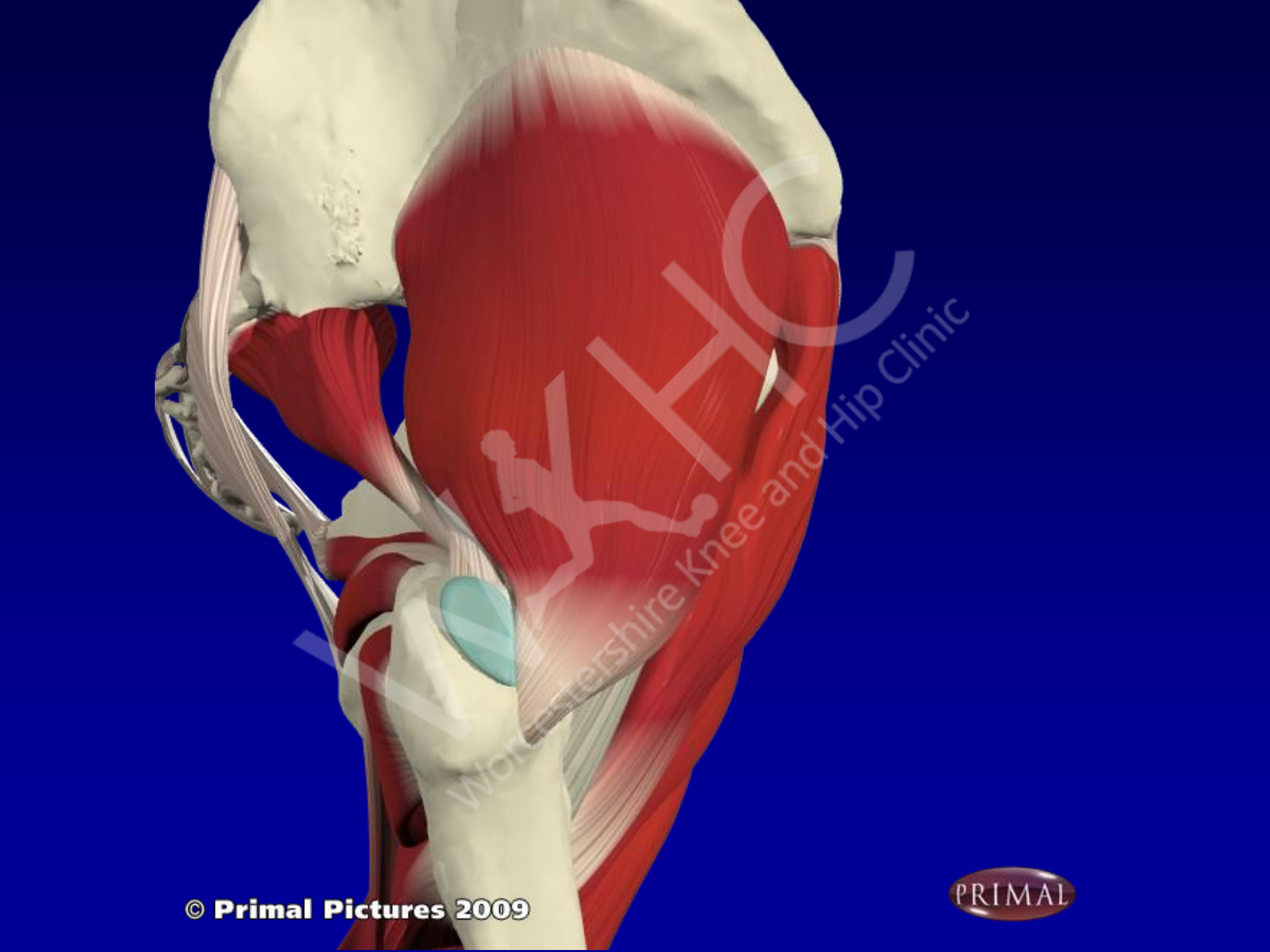
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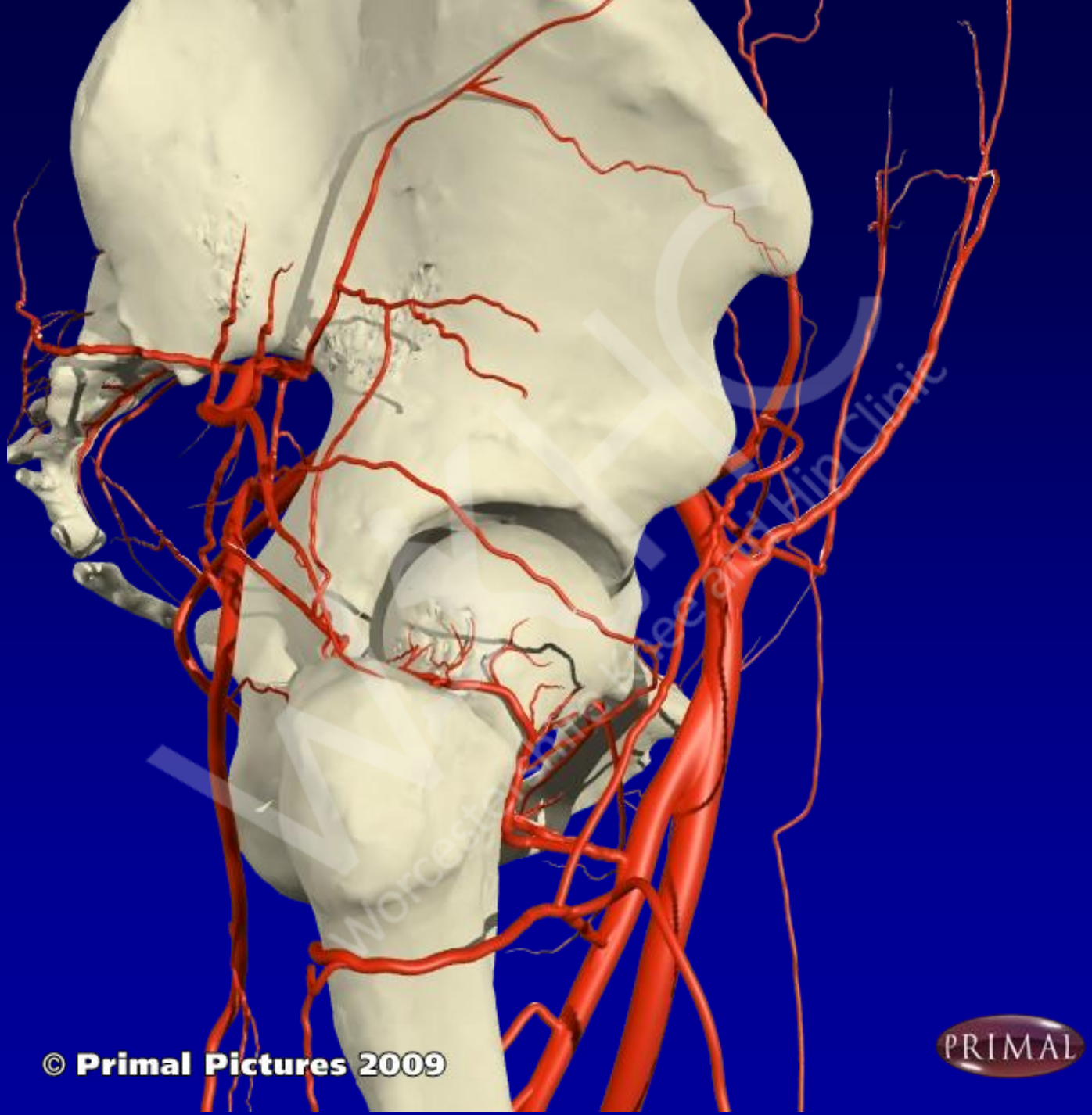
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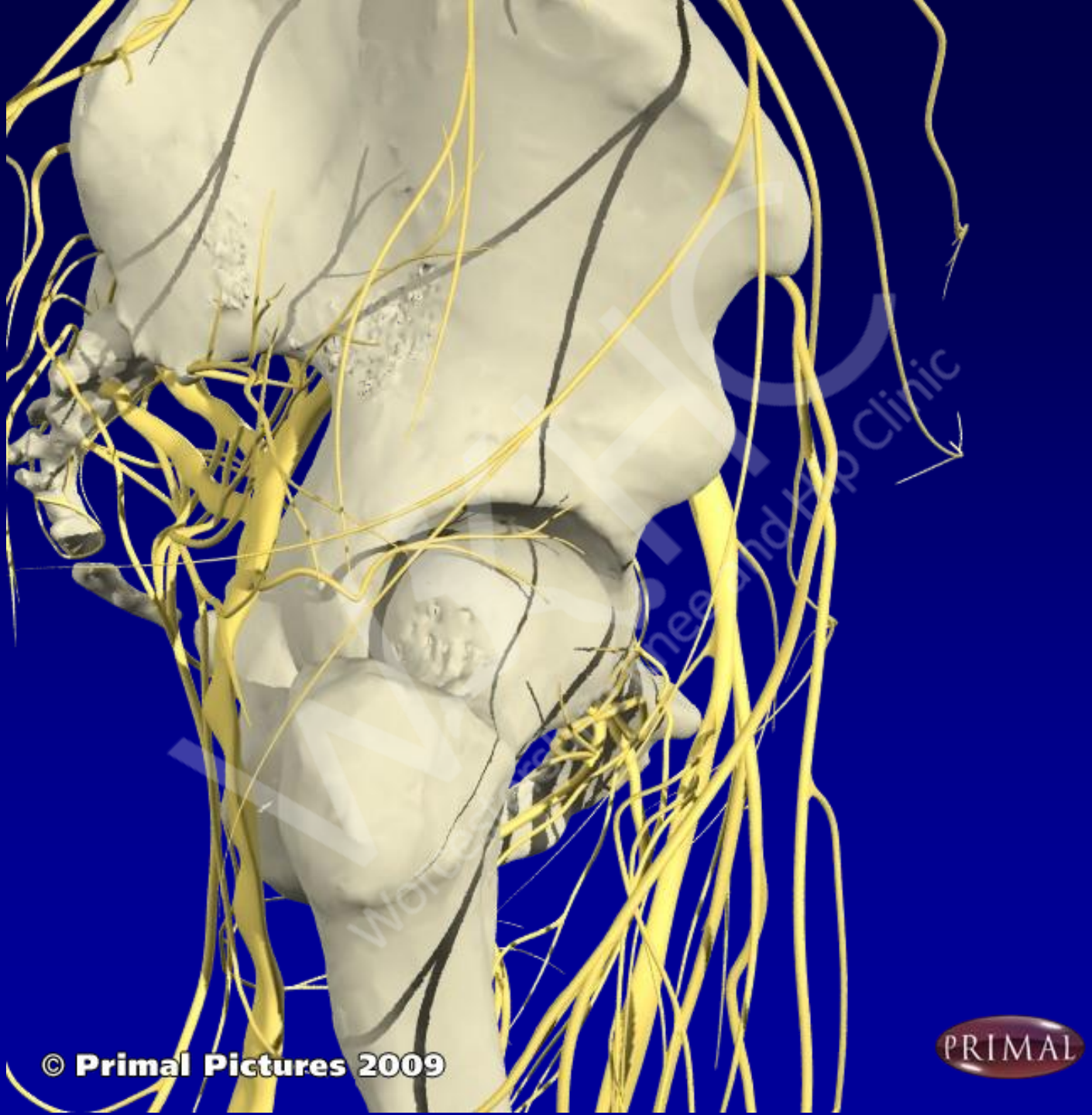
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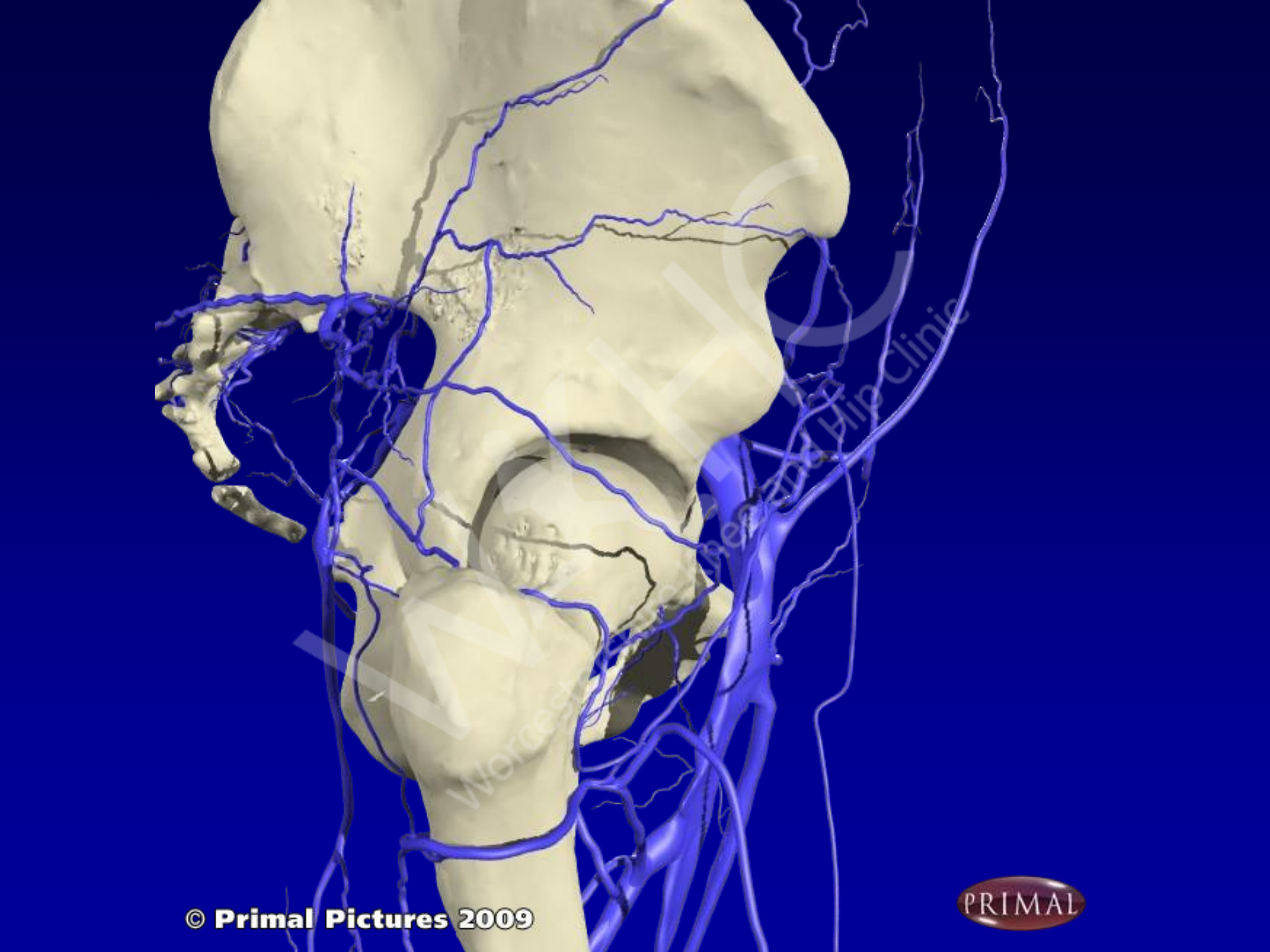
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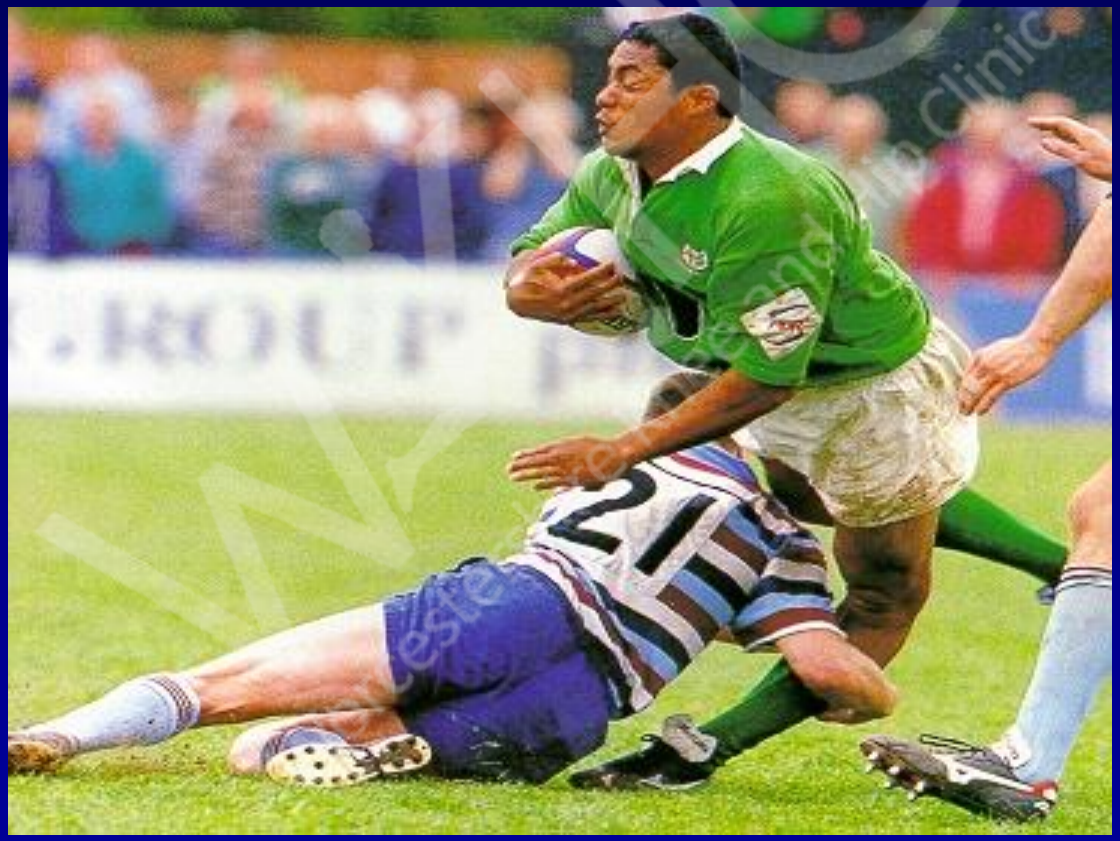
KNEE

History & Physical Exam of the Injured Knee

Assessing a knee injury

- Components of the assessment include
  - Focused history
  - Attentive physical examination
  - Thoughtfully ordered tests/studies

Focused History



Differential Diagnosis of Knee Haemarthrosis

ACL tear

Meniscal Tear

Fracture

Focused History Questions

- **Onset of Pain**
  - Date of injury or when symptoms started

- **Location of pain***
  - *Anterior*
  - *Medial*
  - *Lateral*
  - *Posterior*

Focused History Questions

- **<u>Mechanism of Injury</u>** ***-helps predict injured structure***
  - **Contact or noncontact injury?***
    - **If contact, what part of the knee was contacted?**
      - Anterior blow?
      - Valgus force?
      - Varus force?
  - **Was foot of affected knee planted on the ground?****

Focused History Questions

- **Injury-Associated Events***
  - *Pop* heard or felt?
  - *Swelling* after injury (immediate vs delayed)
  - *Catching / Locking*
  - *Buckling / Instability* (“giving way”)

Instability - Example

Patellar dislocation

Historical Clues to Knee Injury Diagnoses

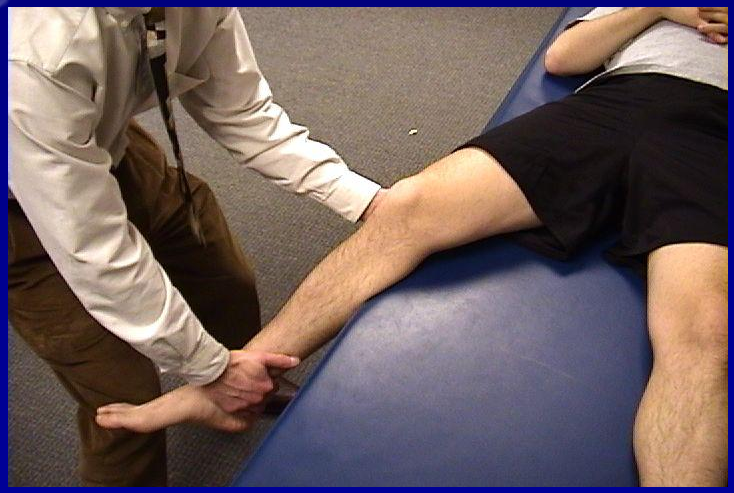
Noncontact injury with “pop”	ACL tear
Contact injury with “pop”	MCL or LCL tear, meniscus tear, fracture
Acute swelling	ACL tear, PCL tear, fracture, knee dislocation, patellar dislocation
Lateral blow to the knee	MCL tear
Medial blow to the knee	LCL tear
Knee “gave out” or “buckled”	ACL tear, patellar dislocation
Fall onto a flexed knee	PCL tear

Physical Exam - General

- Develop a standard routine*
- Alleviate the patient's fears

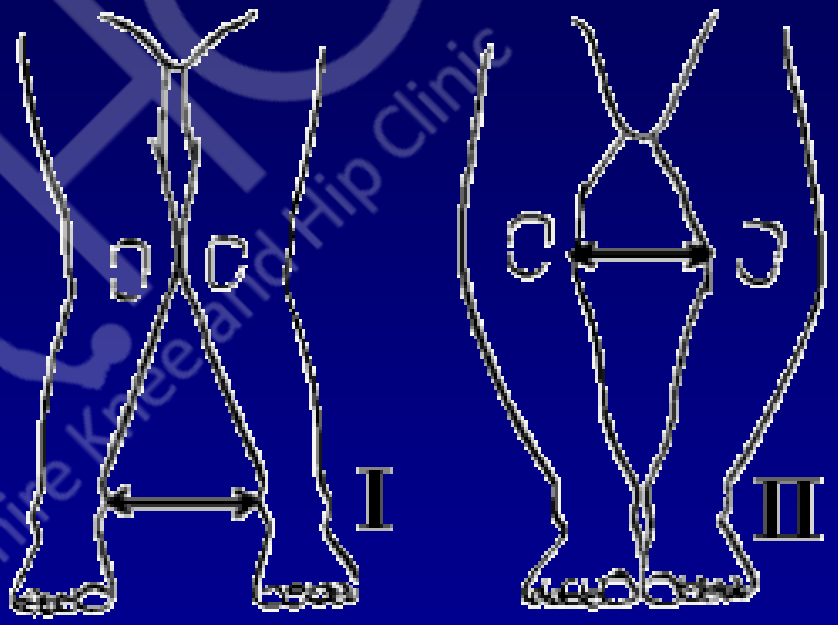
<u>GENERAL STEPS</u>

Inspection	Look
Palpation	Feel
Range of motion	Move
Strength testing	
Special tests	



Observe – Static Alignment

- Patient then brings medial aspects of knees and ankles in contact

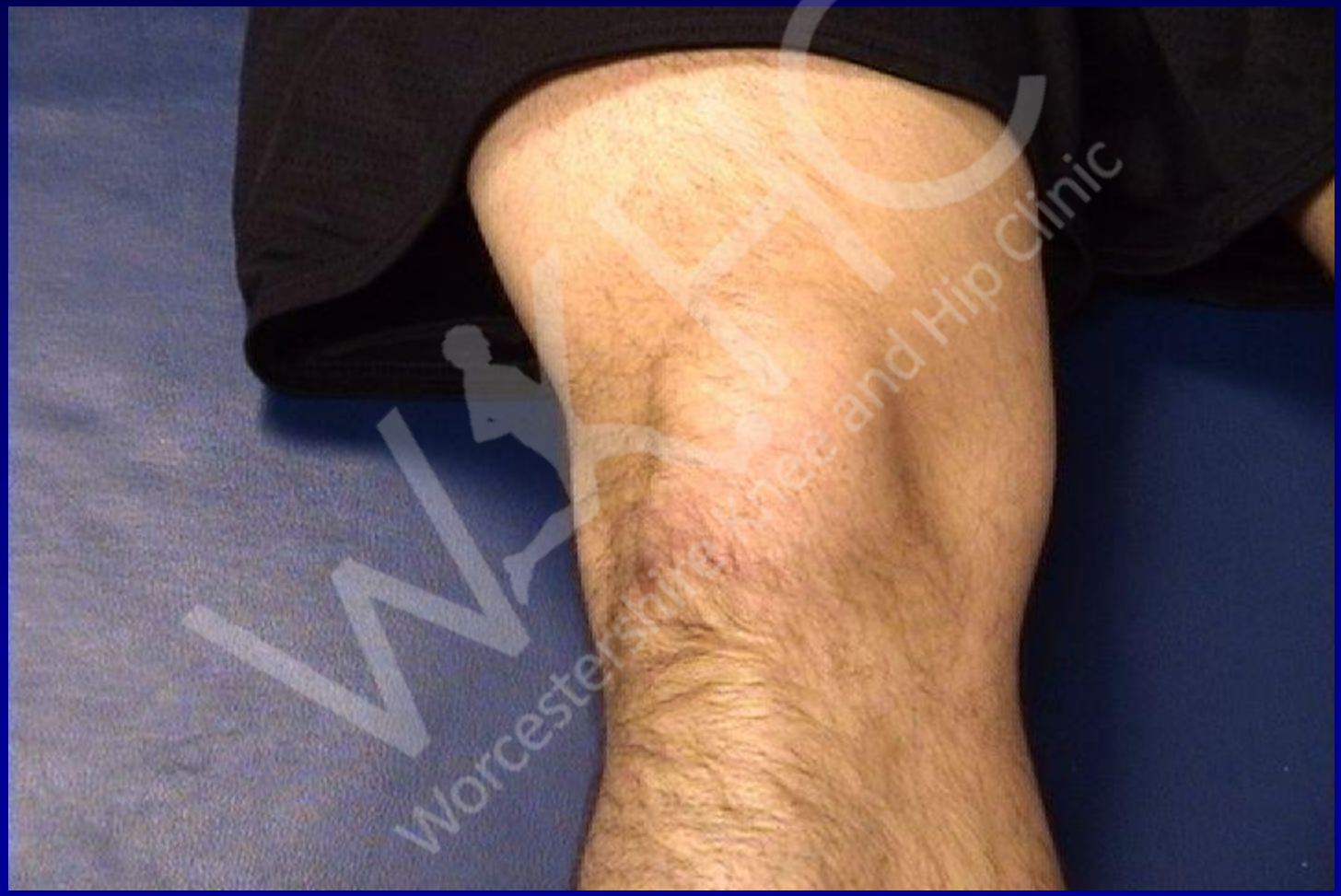


Genu valgum **Genu varum**

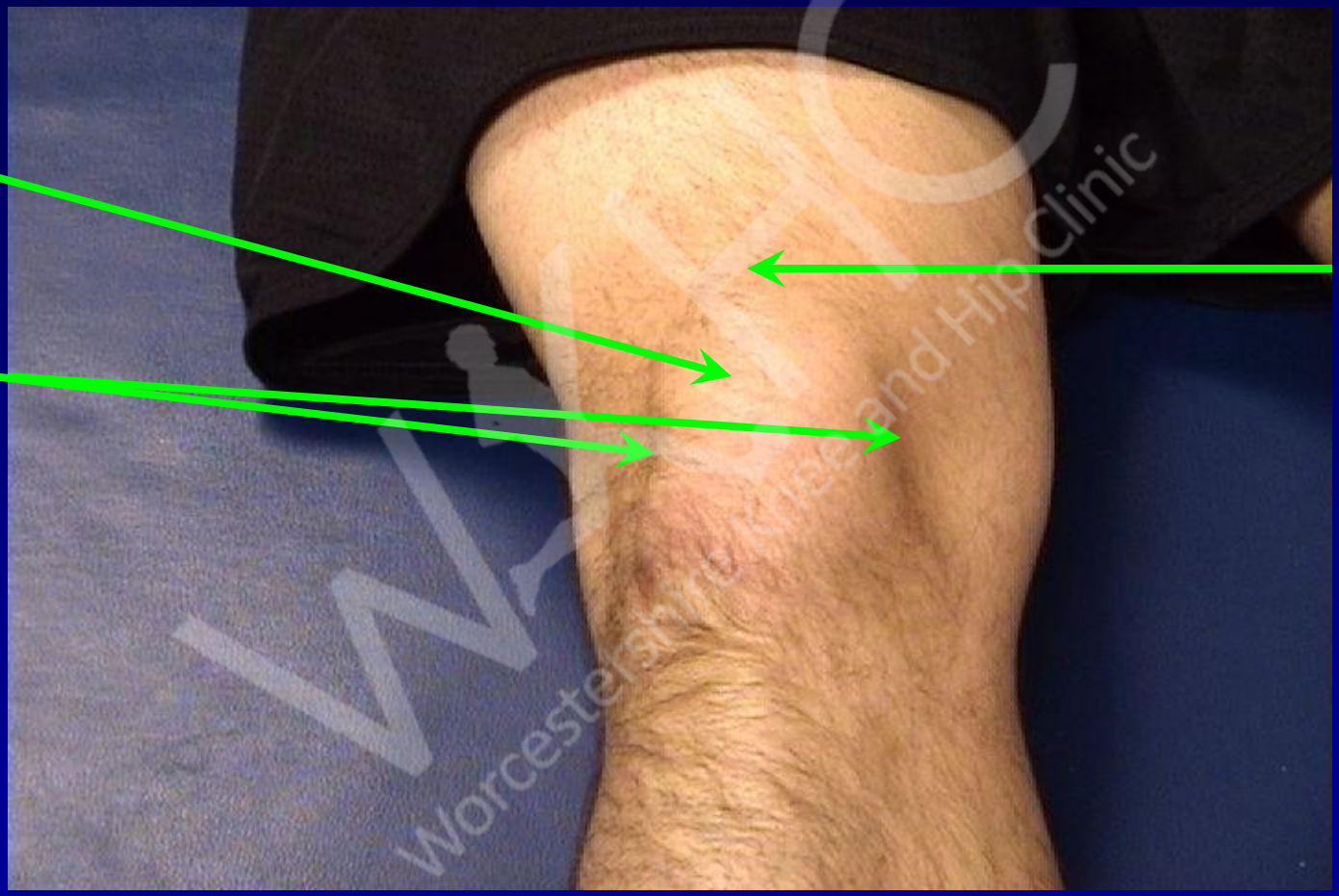
Inspect Knee

- Evidence of local trauma
  - Abrasions
  - Contusions
  - Lacerations
- Patella position
- Muscle atrophy
- Warmth
- Erythema
- Effusion*

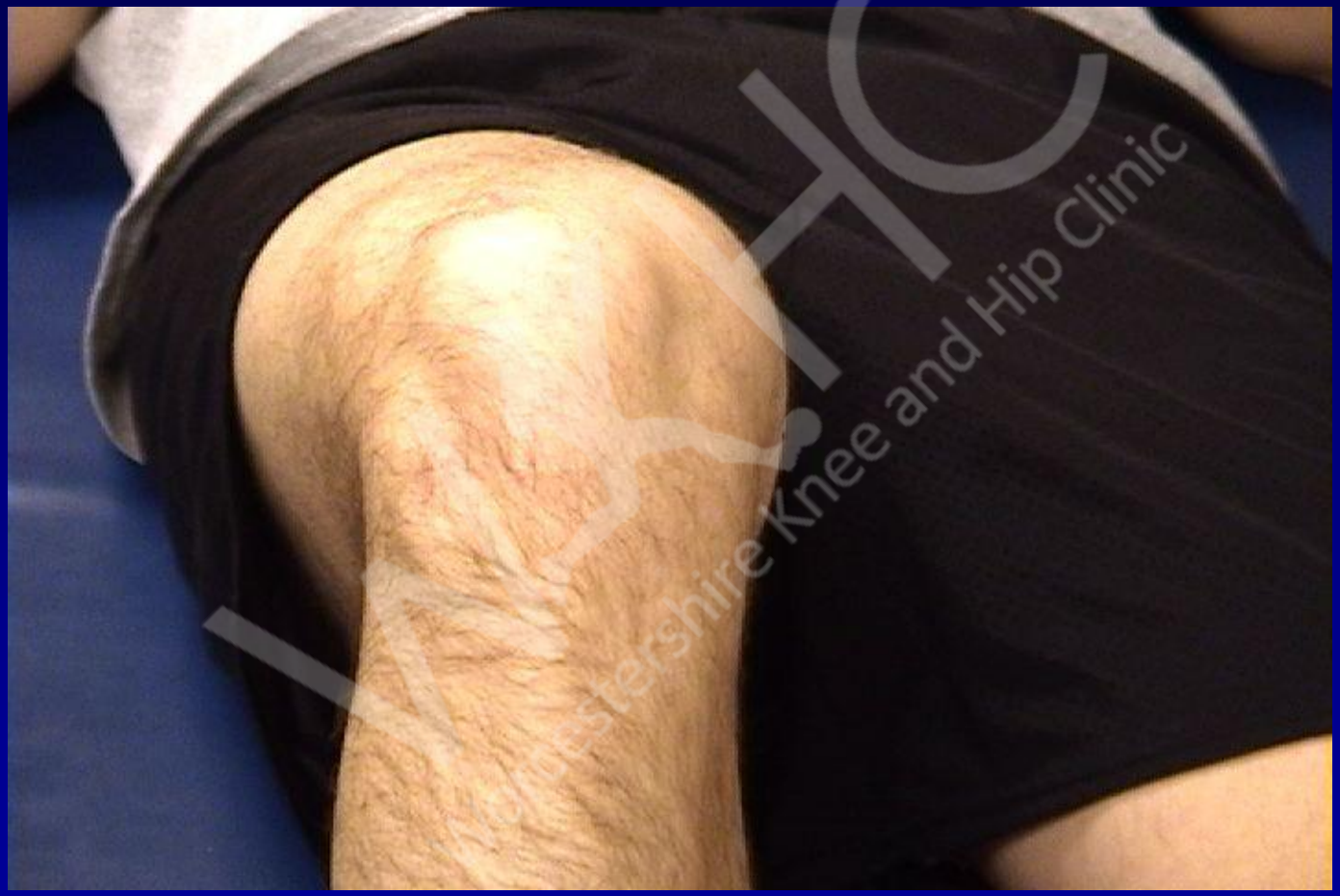
Normal Knee – Anterior, Extended



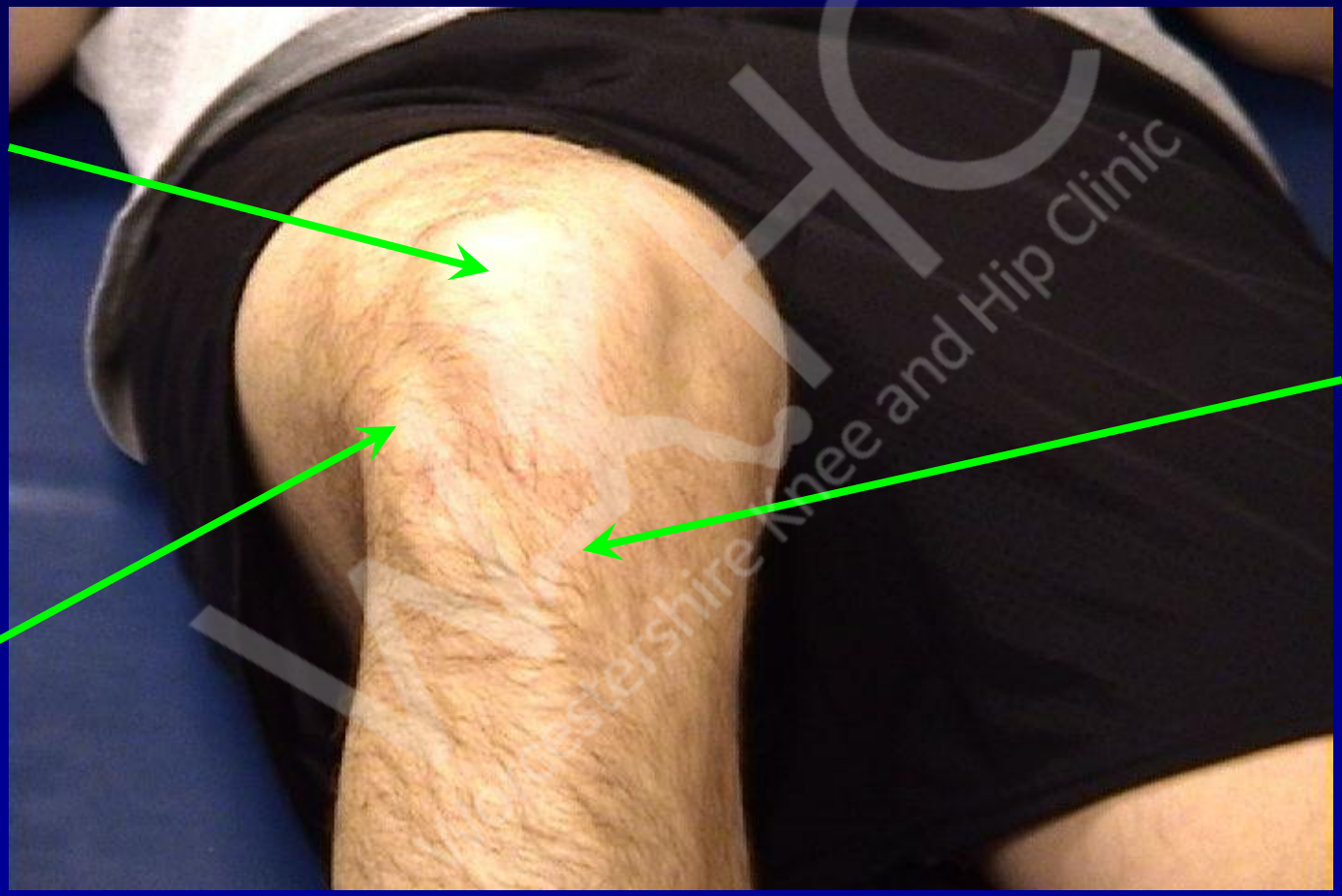
Surface Anatomy - Anterior, Extended*



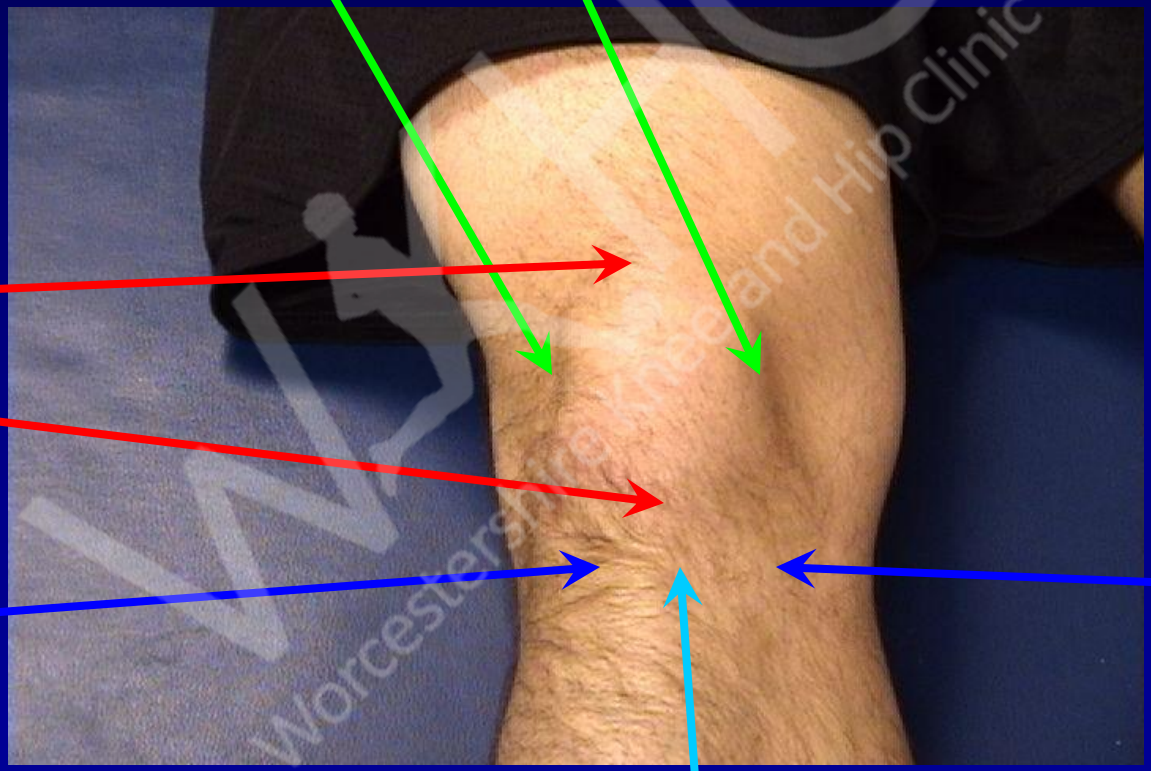
Normal Knee – Anterior, Flexed



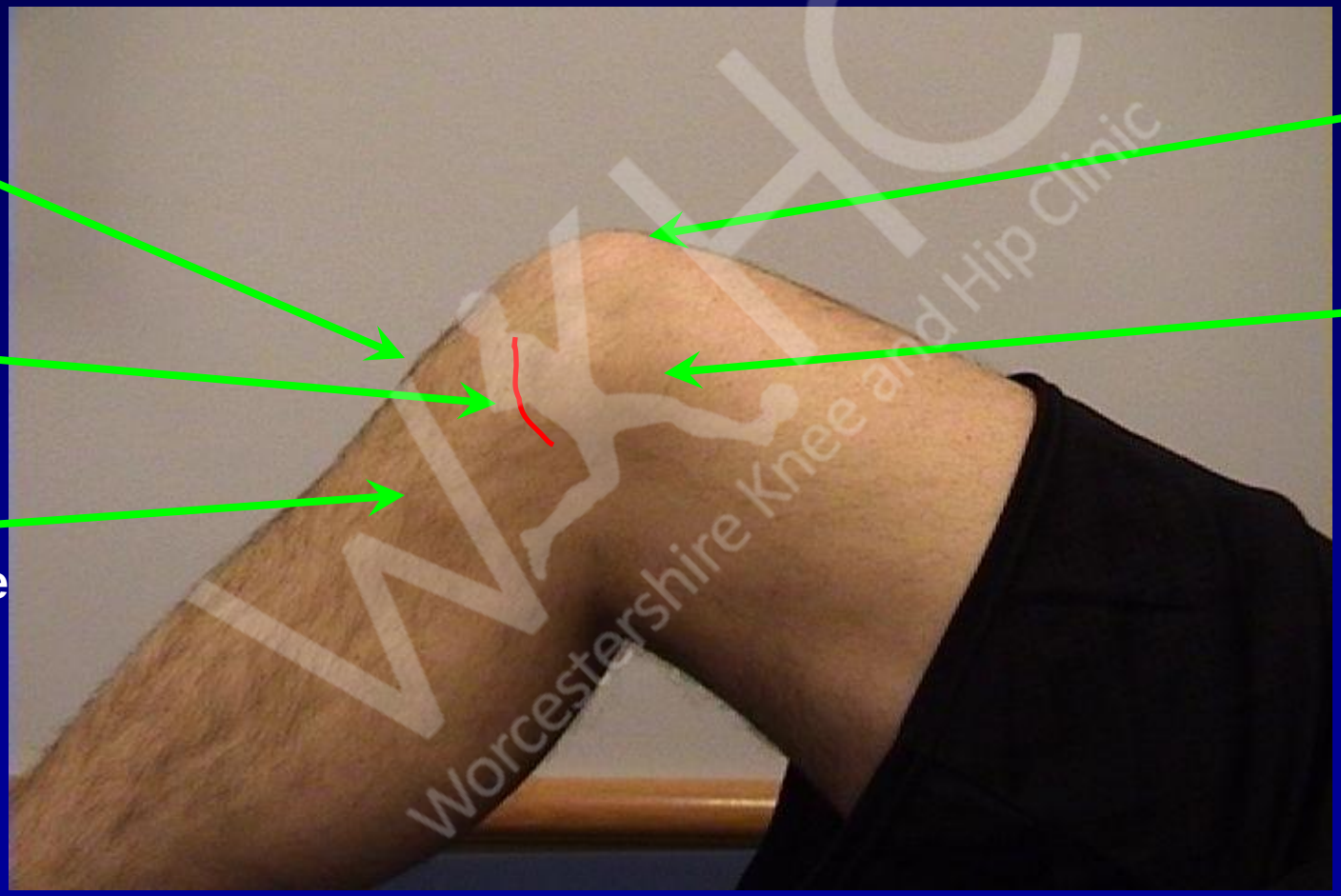
Surface Anatomy - Anterior, Flexed



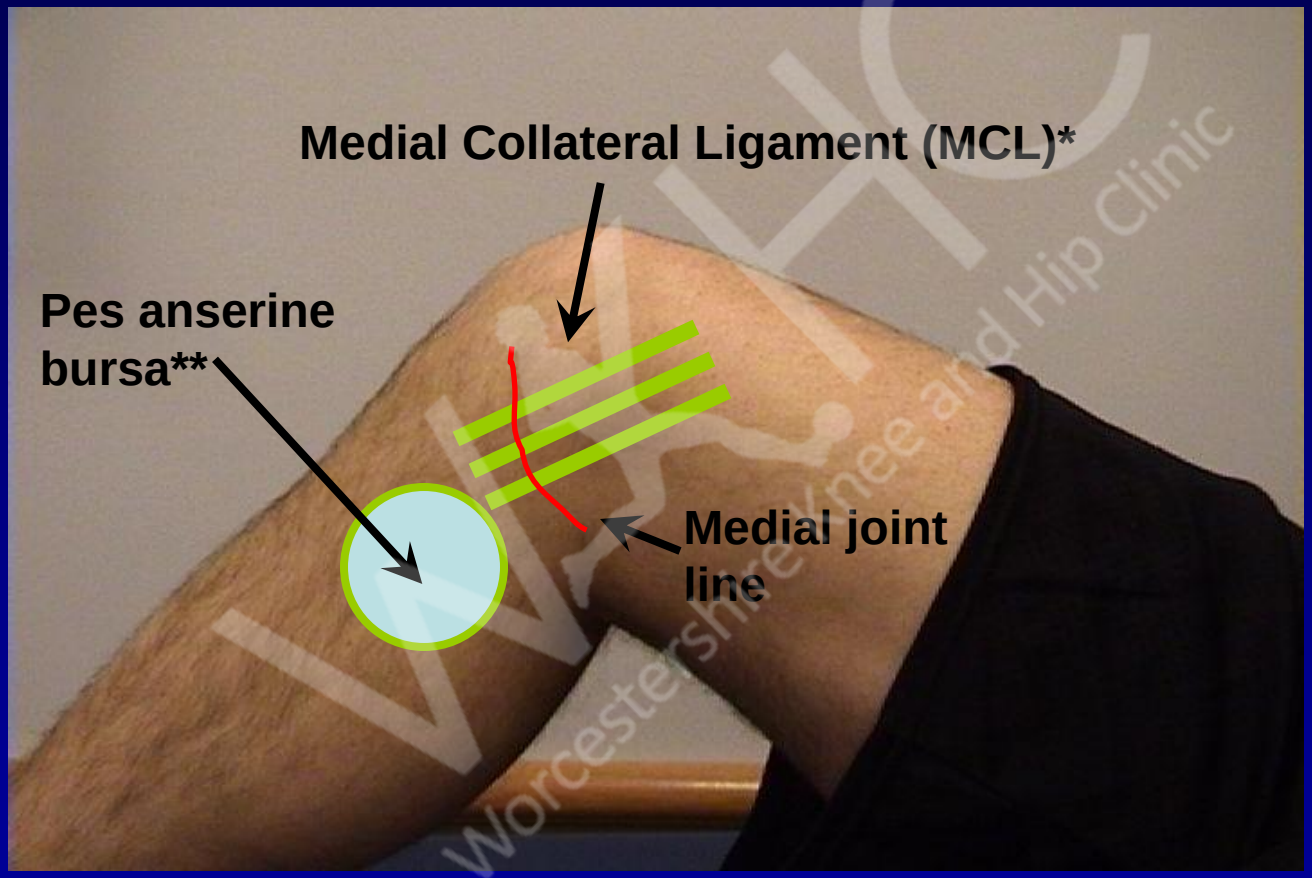
Palpation – Anterior*



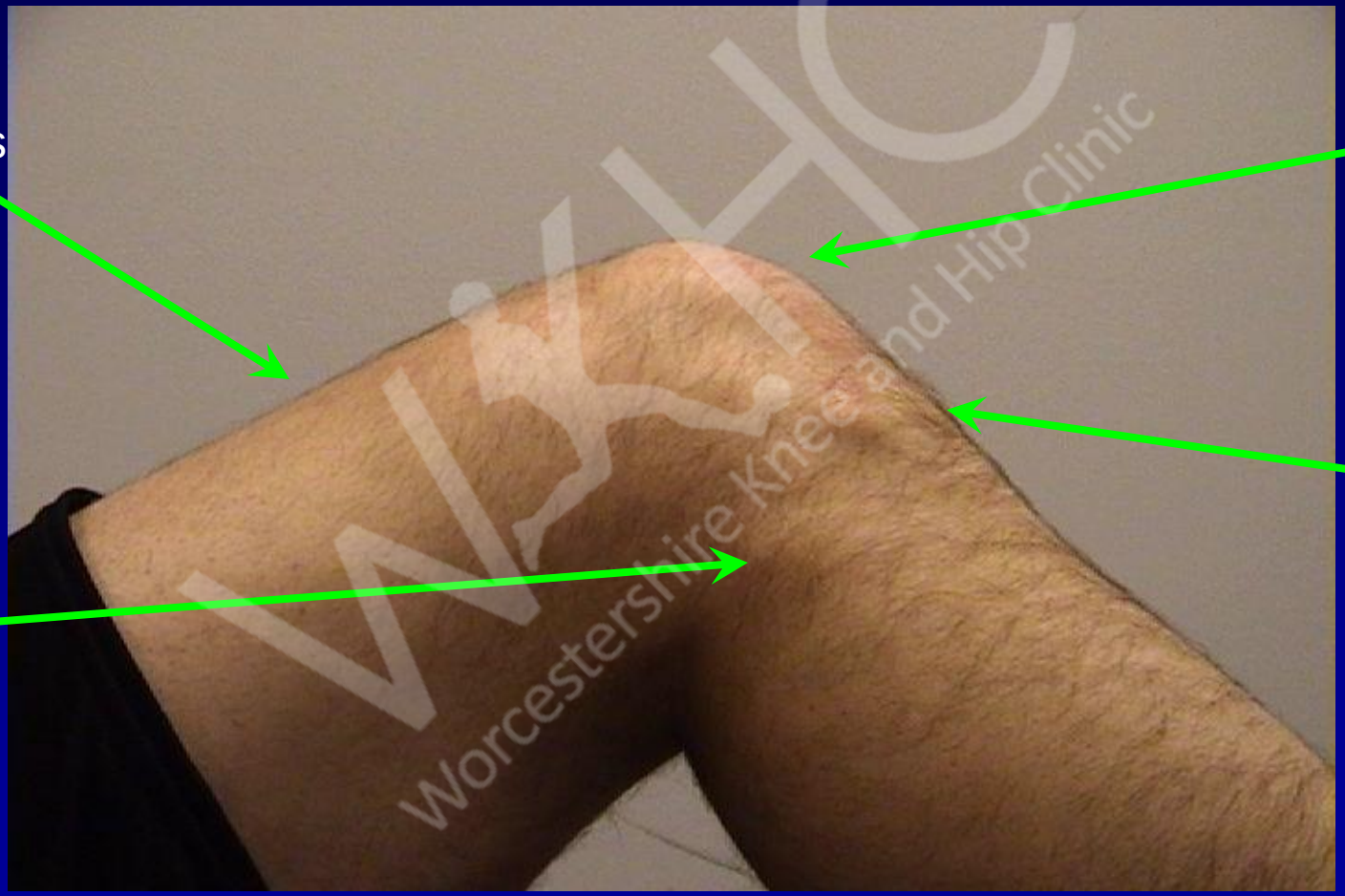
Surface Anatomy - Medial



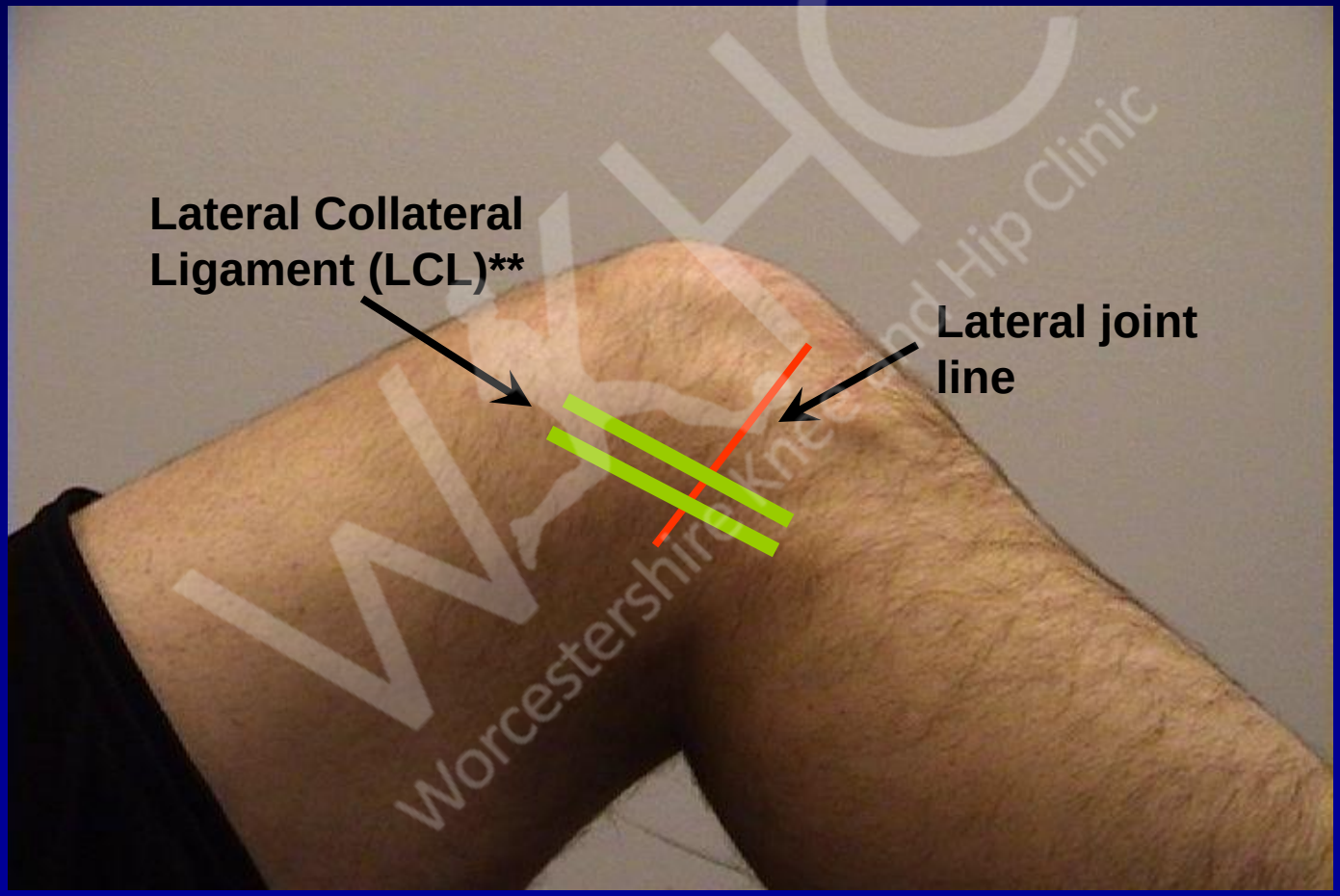
Palpation - Medial



Surface Anatomy – Lateral



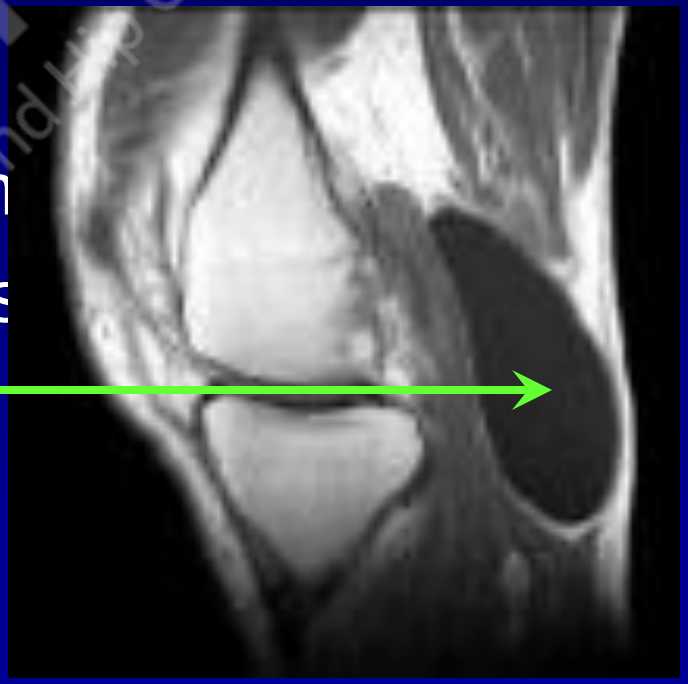
Palpation – Lateral*



Palpation - Posterior

- Popliteal fossa*

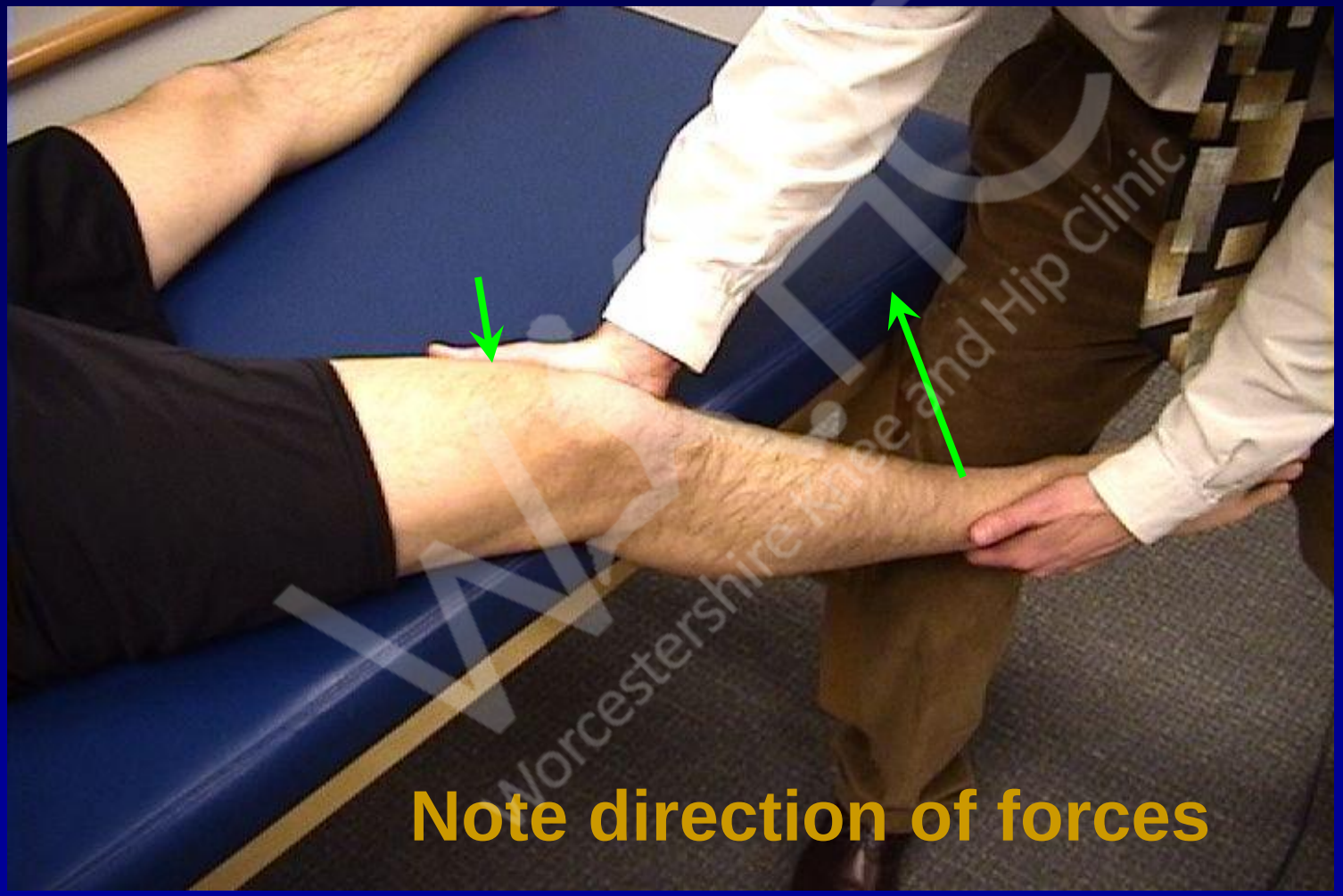
- Abnormal bulges
  - Popliteal artery aneurysm
  - Popliteal thrombophlebitis
  - Baker's cyst



Collateral Ligament Assessment

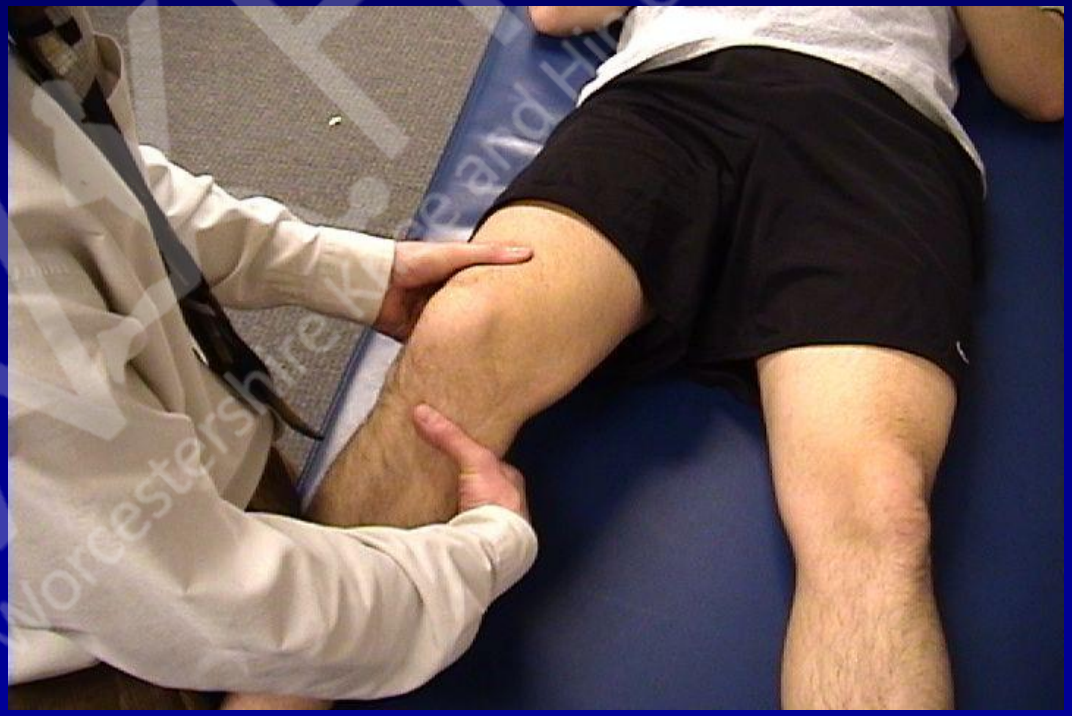
Valgus Stress Test for MCL*

Varus Stress Test for LCL*



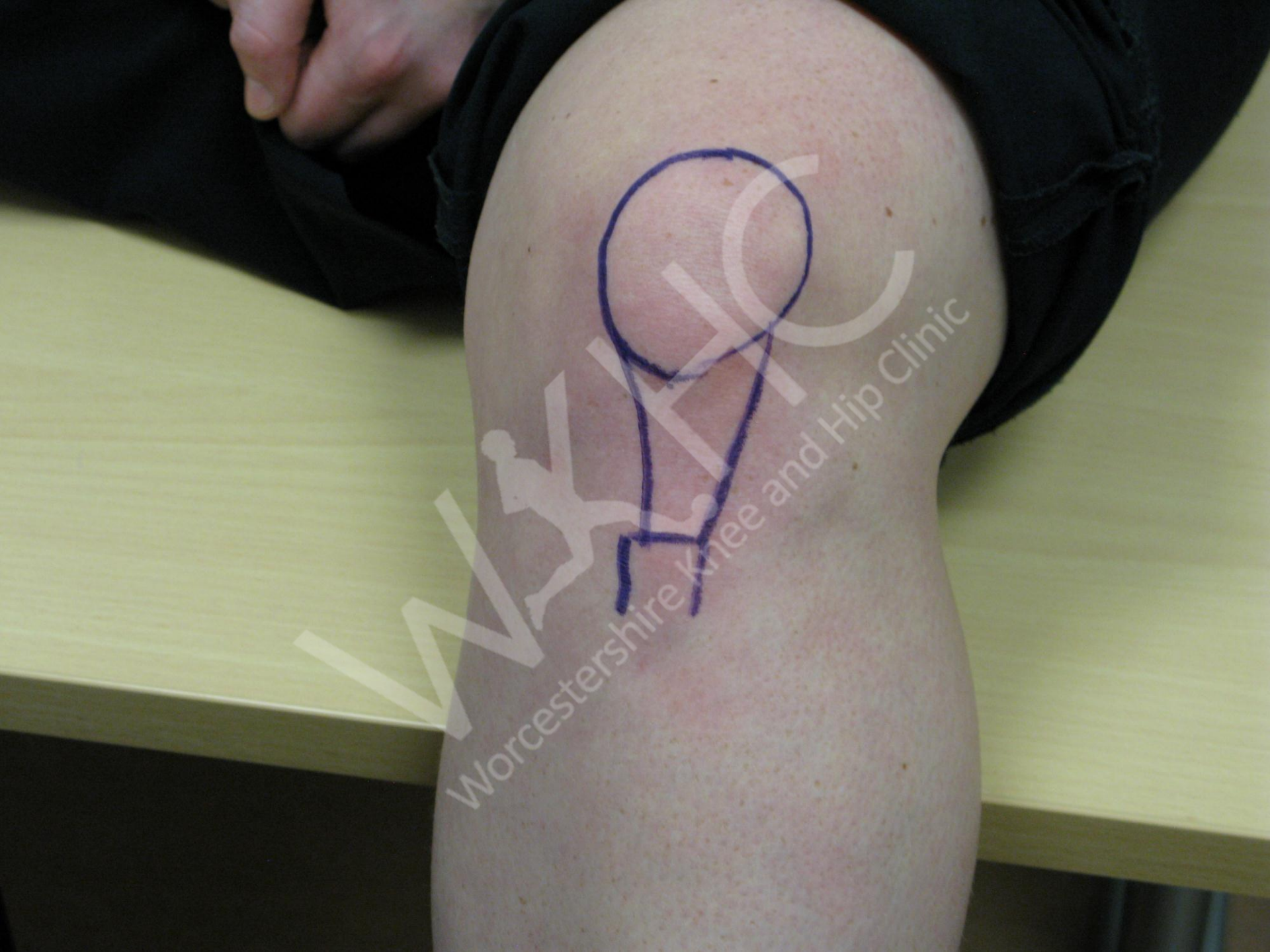
Lachman Test*

- Patient Position
- Physician hand placement



KNEE PROBLEMS

- OA
- RA
- Gout
- Pyrophosphate disease
- Inflammatory arthropathies
- Pre patella bursitis
- Infra patella bursitis
- Pes Anserinus inflammation
- Popliteal cyst (Bakers)
- Referred from hip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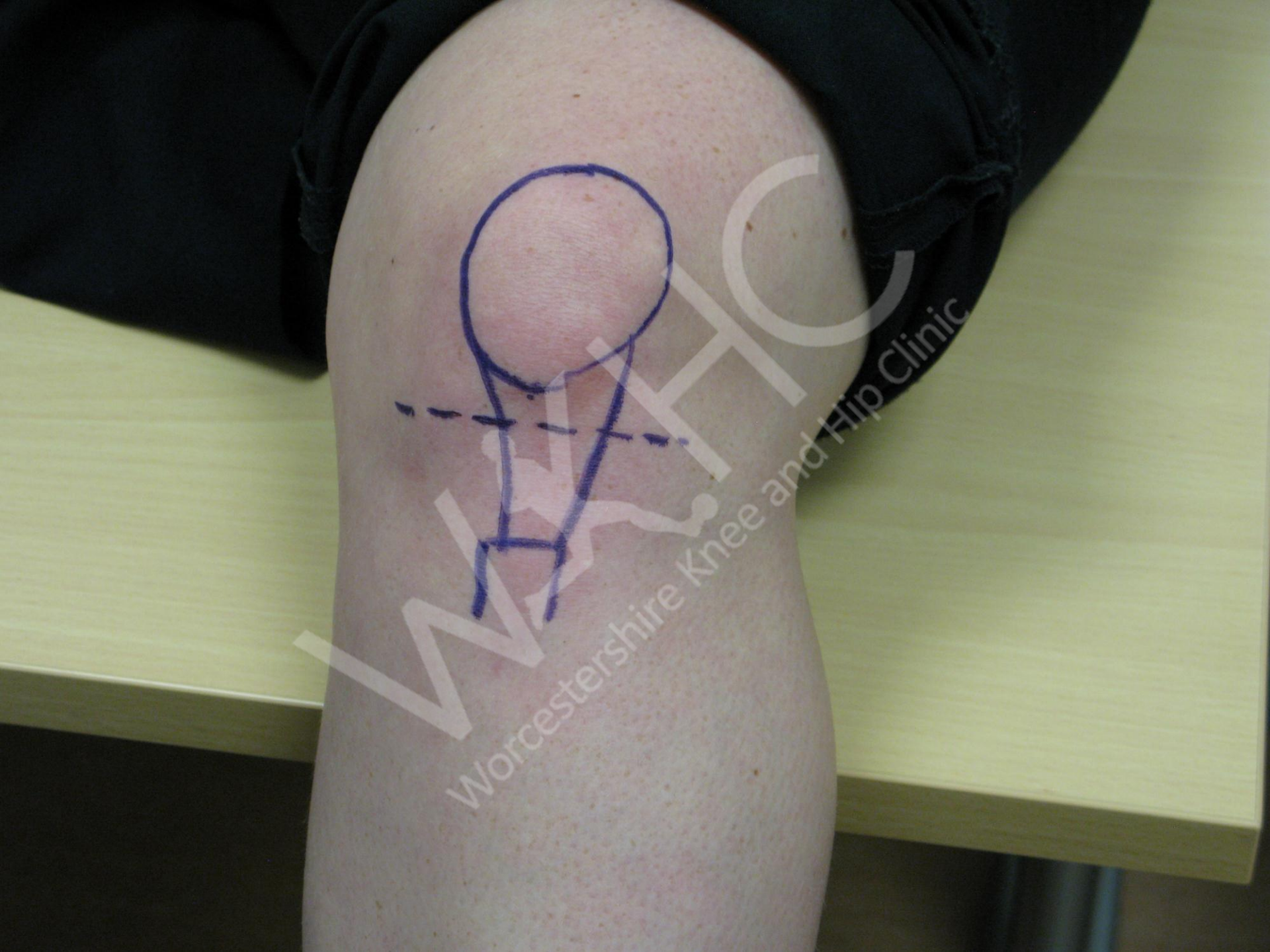
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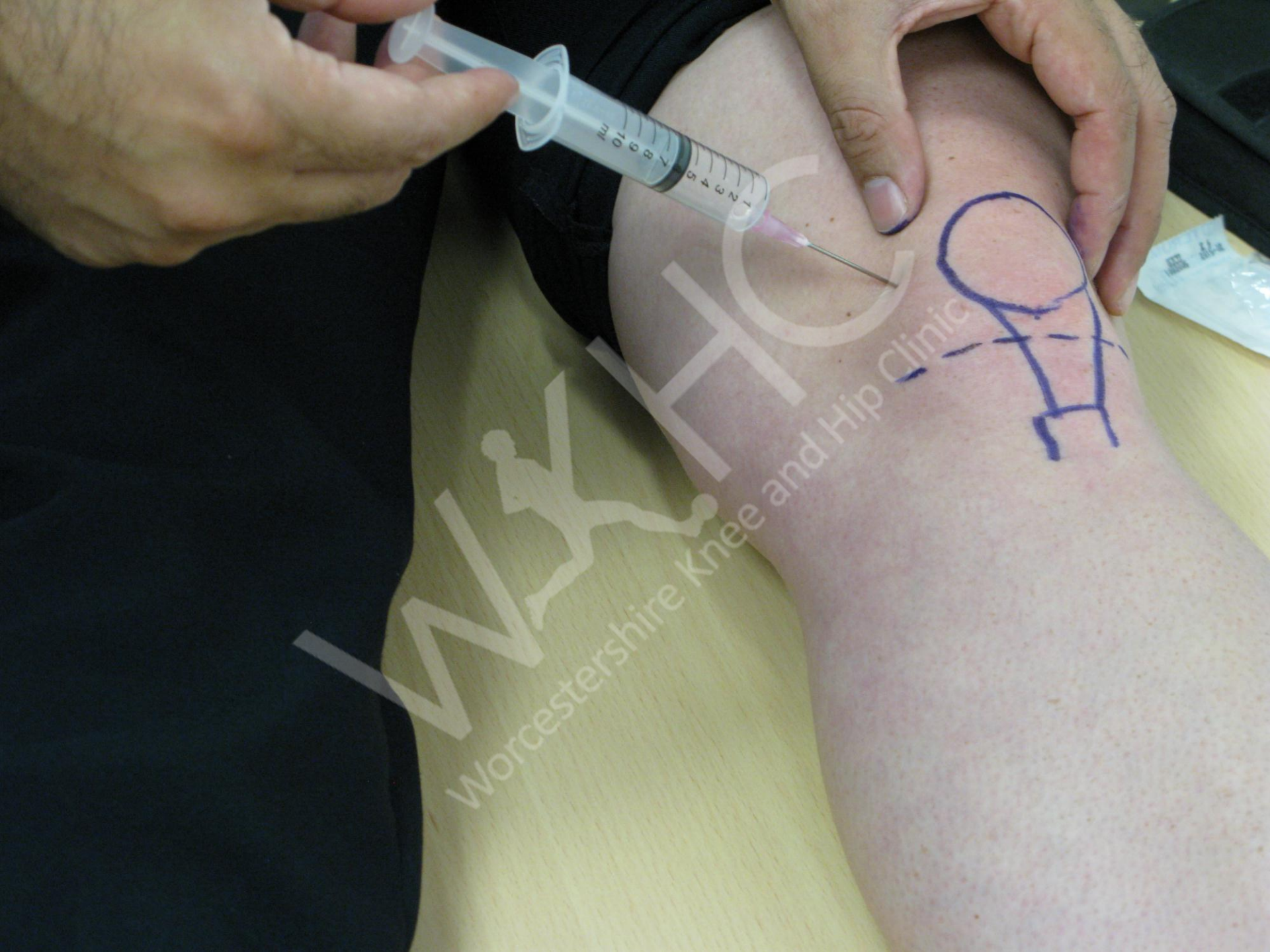
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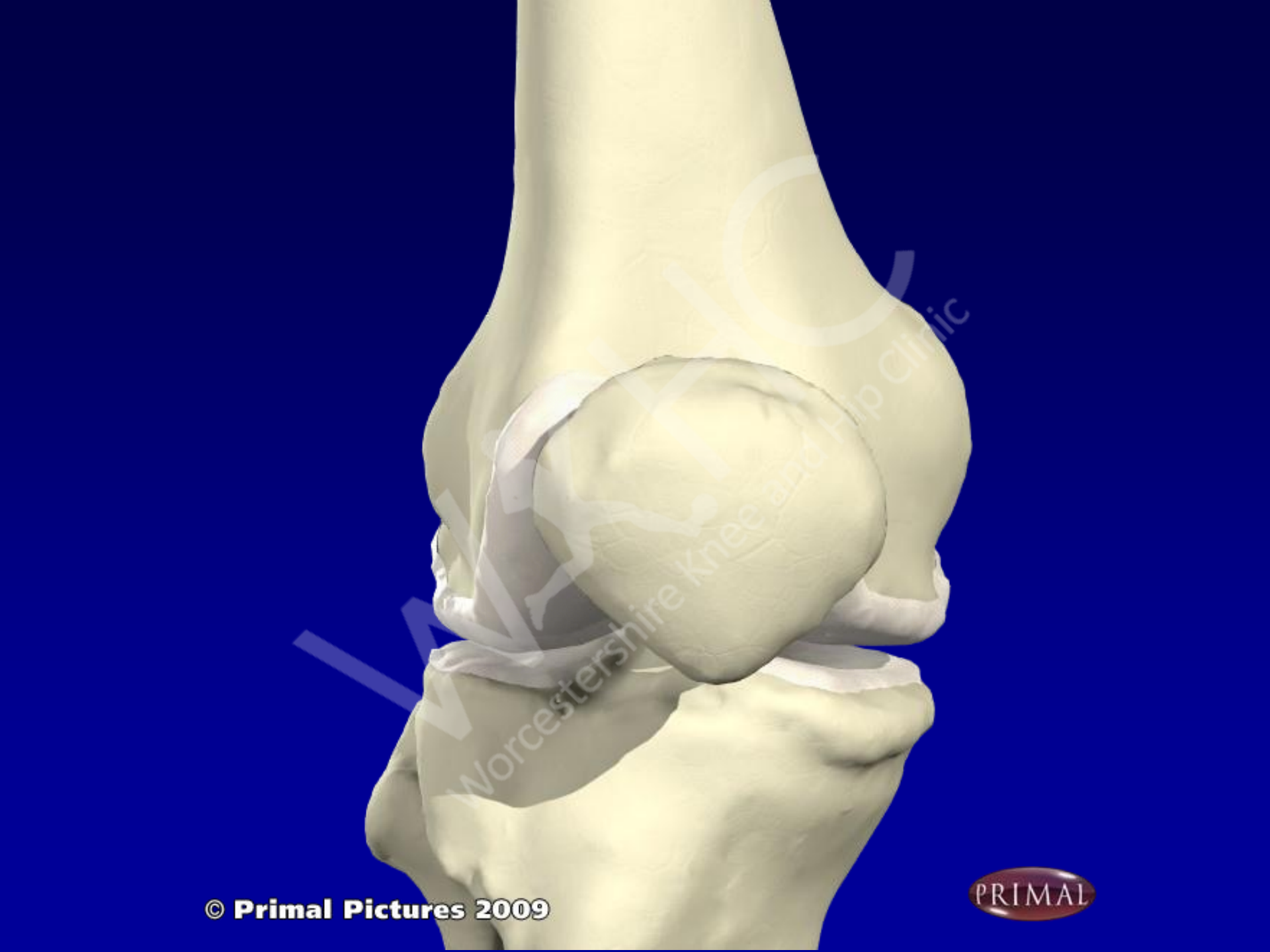
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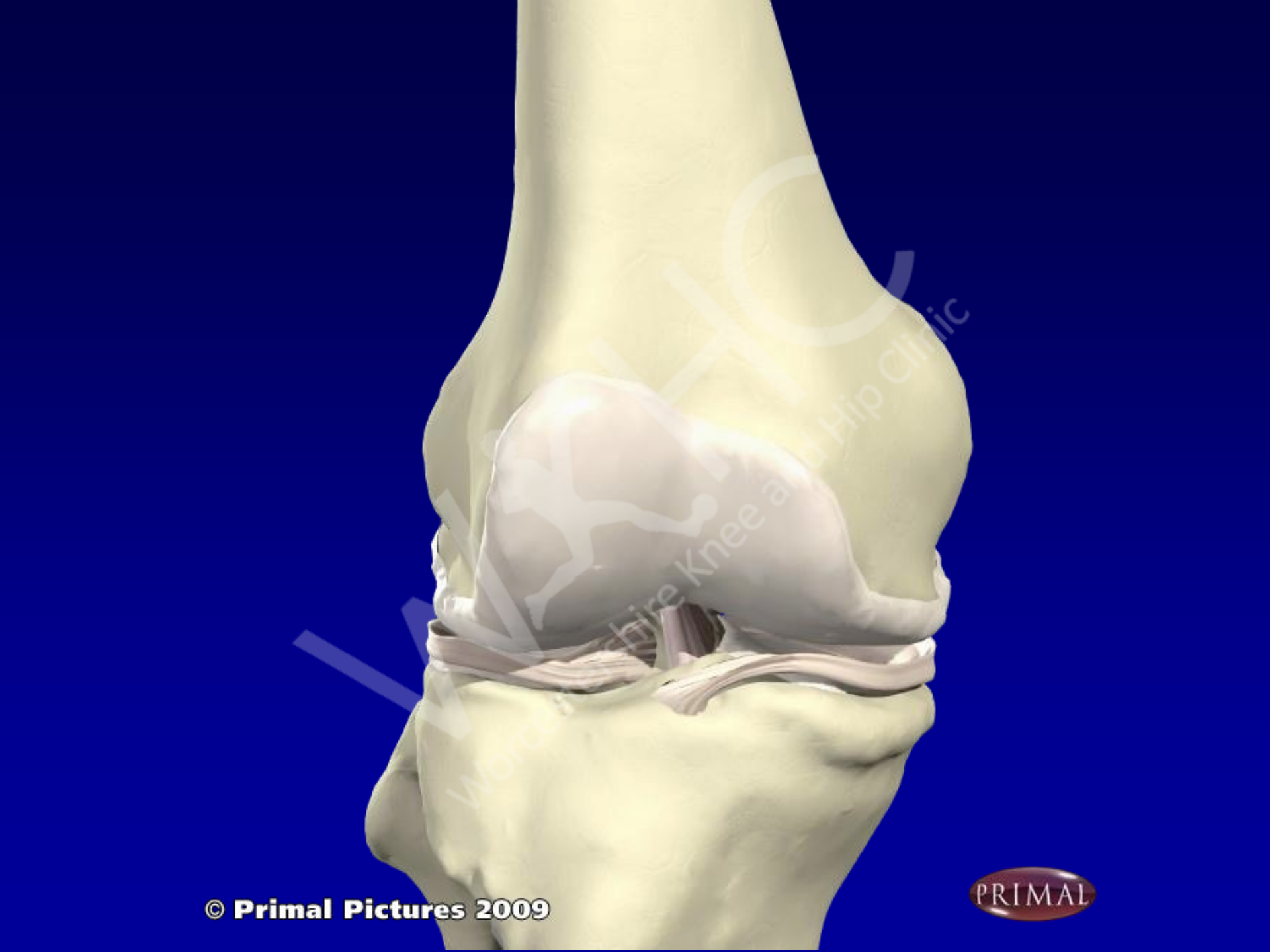
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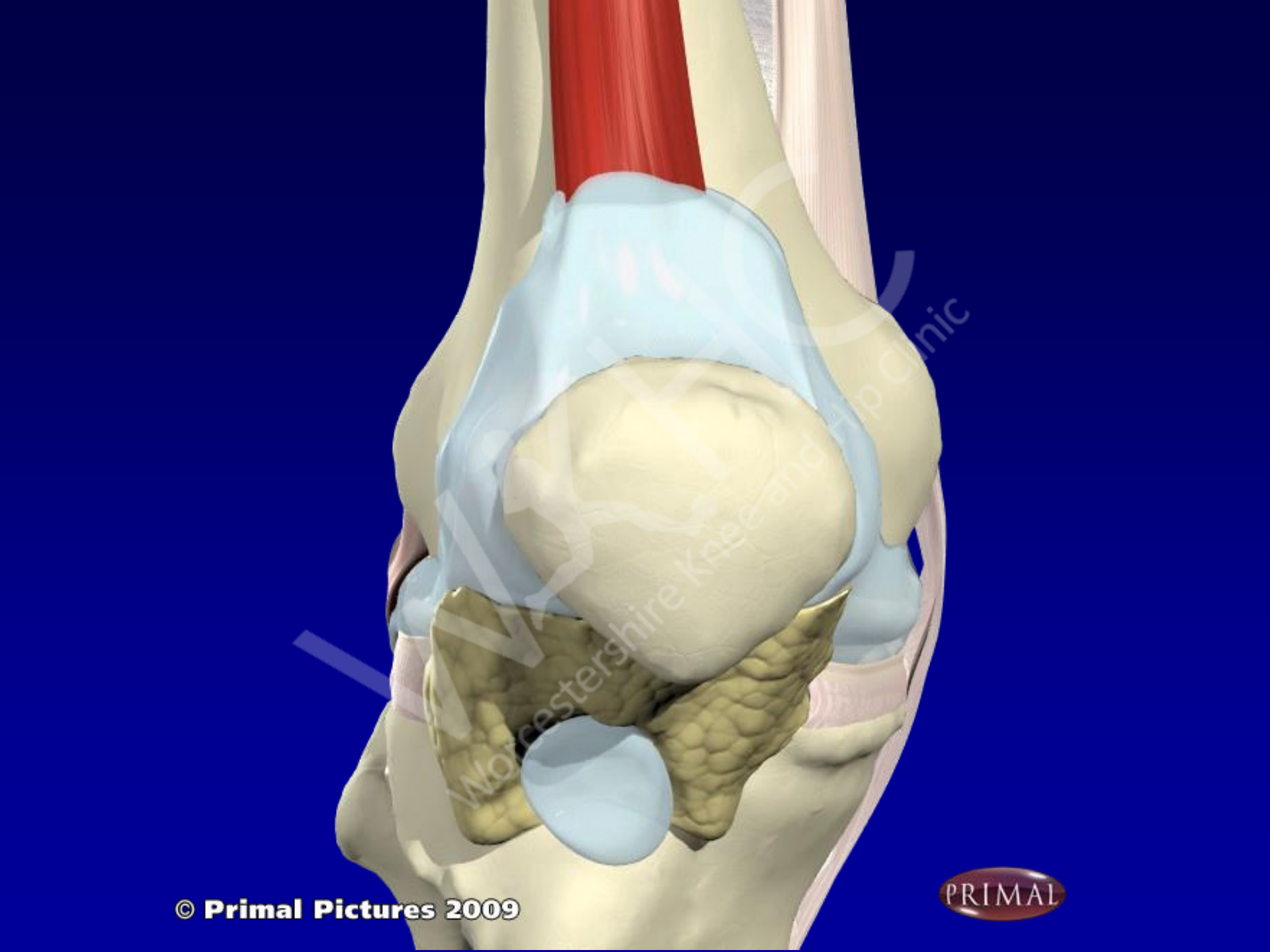
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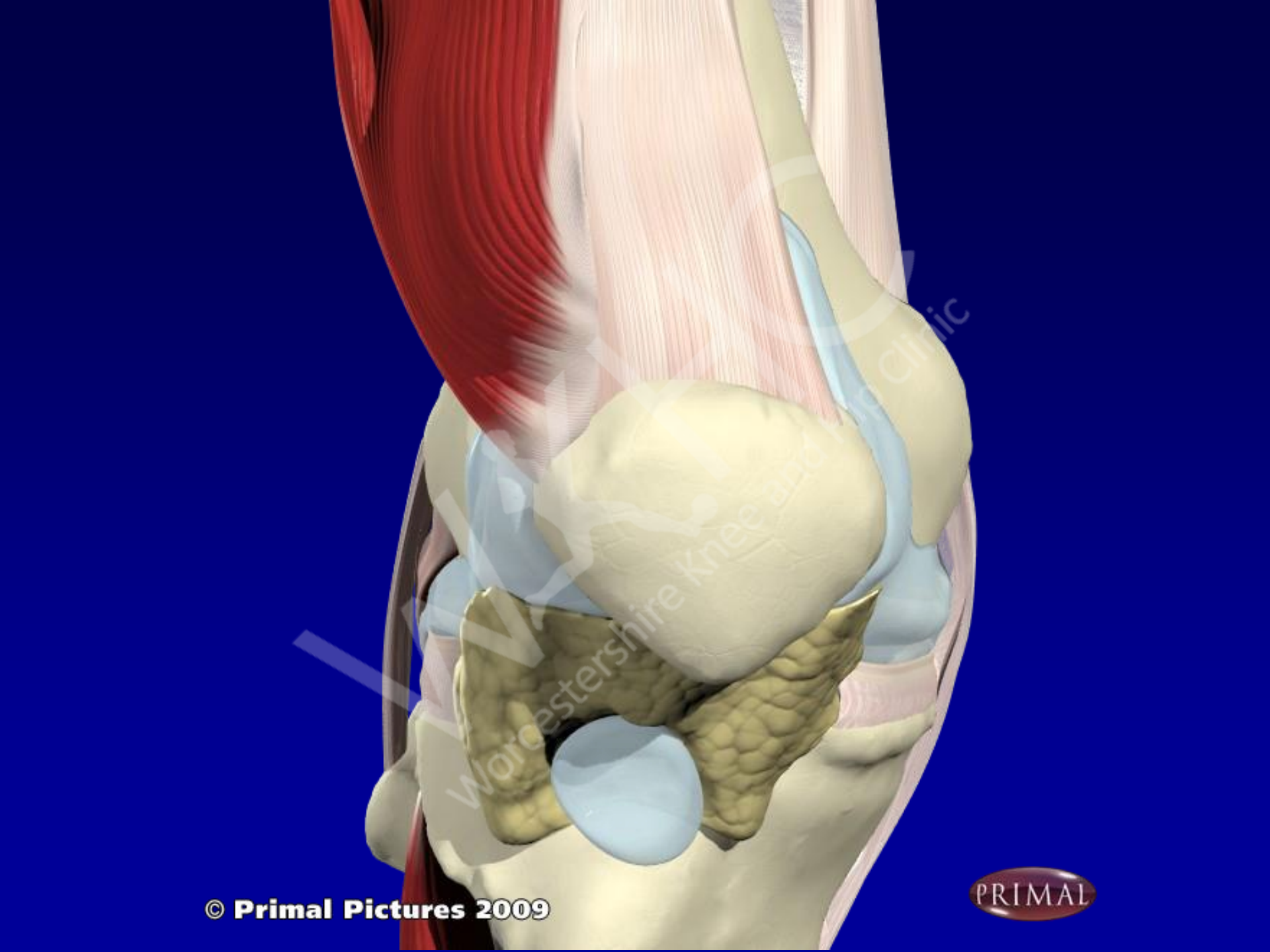
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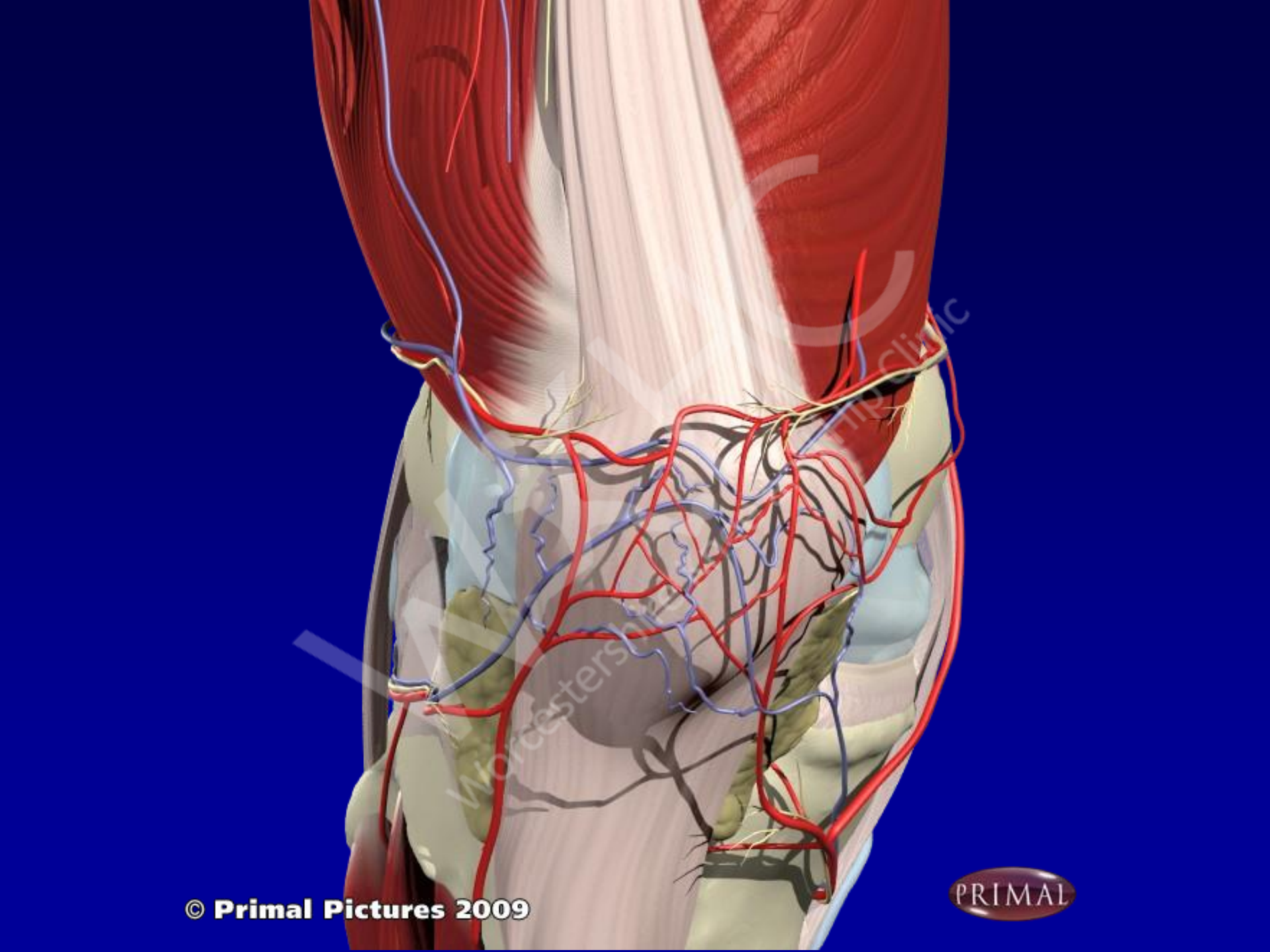
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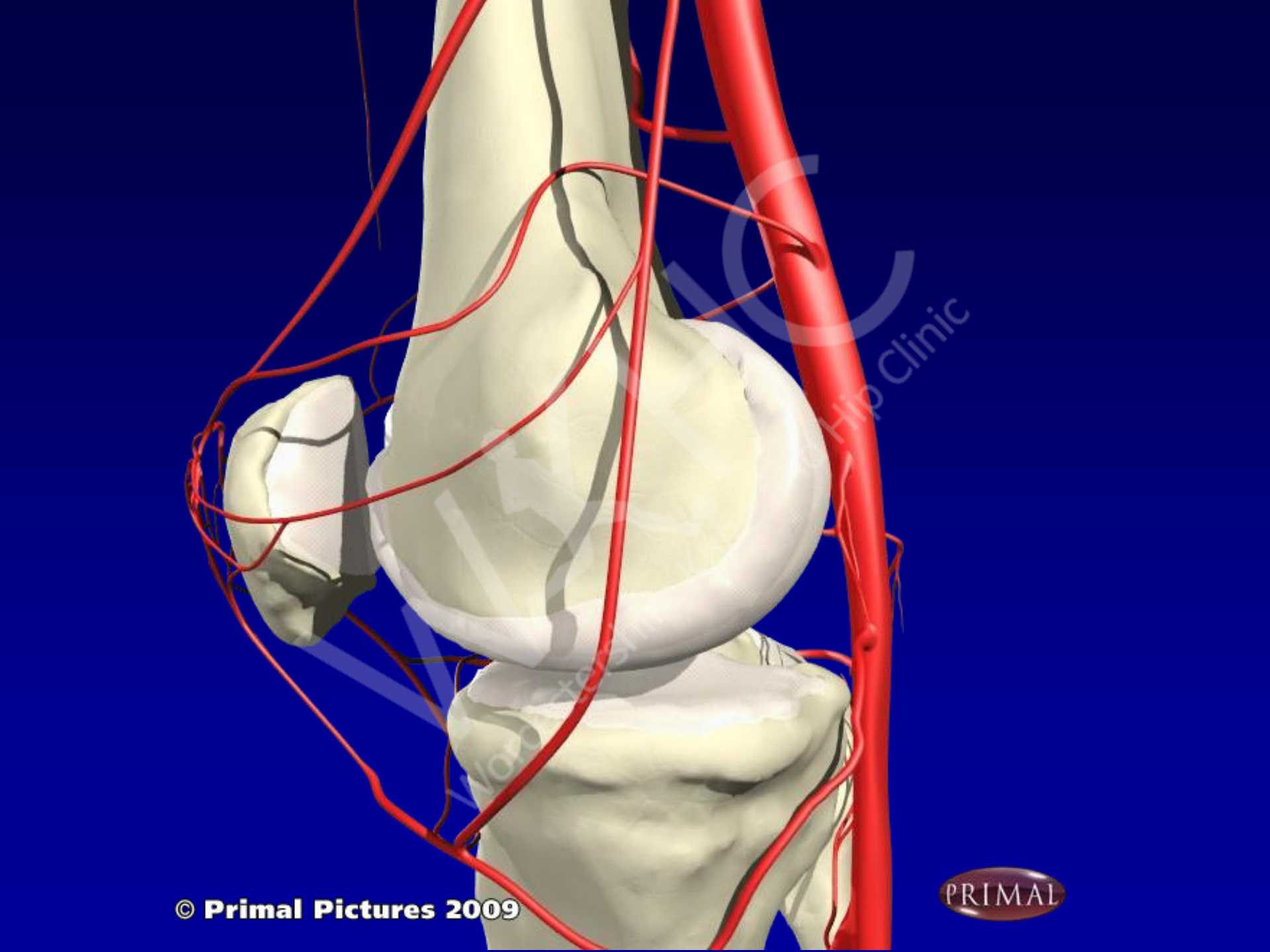
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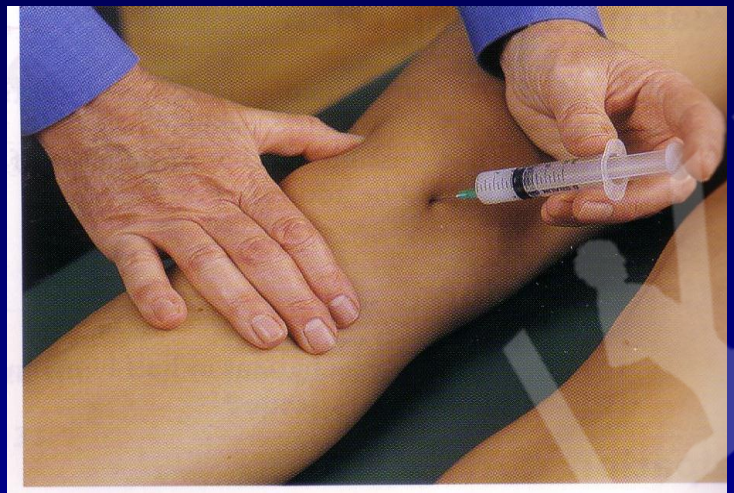
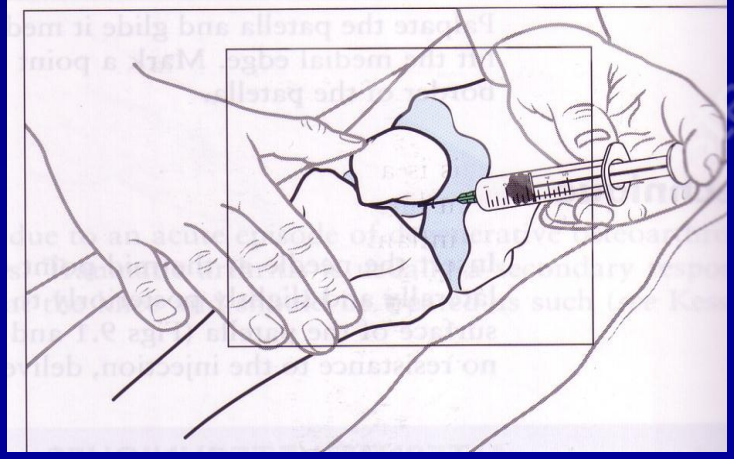
Knee Injection Sites

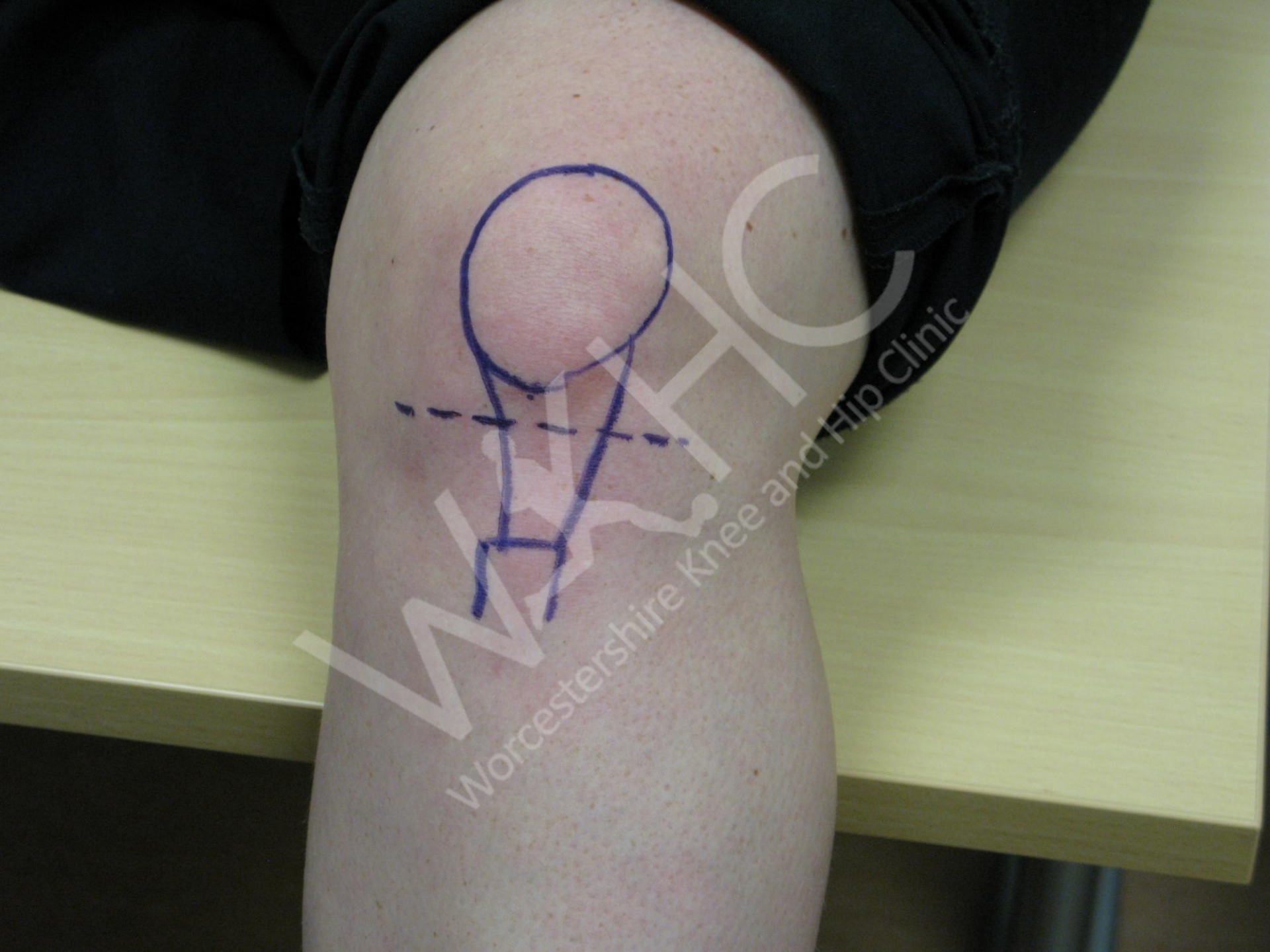
- Medial or lateral approach, aim upper 1/3 patella towards suprapatella pouch.
- Pull patella towards you so the gap between the patella and femur can be felt
- Aspirate confirms correct position, absence in a swollen joint usually indicates incorrect position.
- You do not need to go directly into knee, the SP pouch is part of knee joint and is less painful than piercing capsule.

Knee joint
Medial approach





- Landmarks:Midpoint/upper third medial patellar border – push patella medially to identify medial edge. Insert needle under patella
- Position: Lying with knee extended. Milk fluid into joint space - aspirate then inject
- Needle:Blue or green
- Steroid: 20-40mg
- LA: 8-9mls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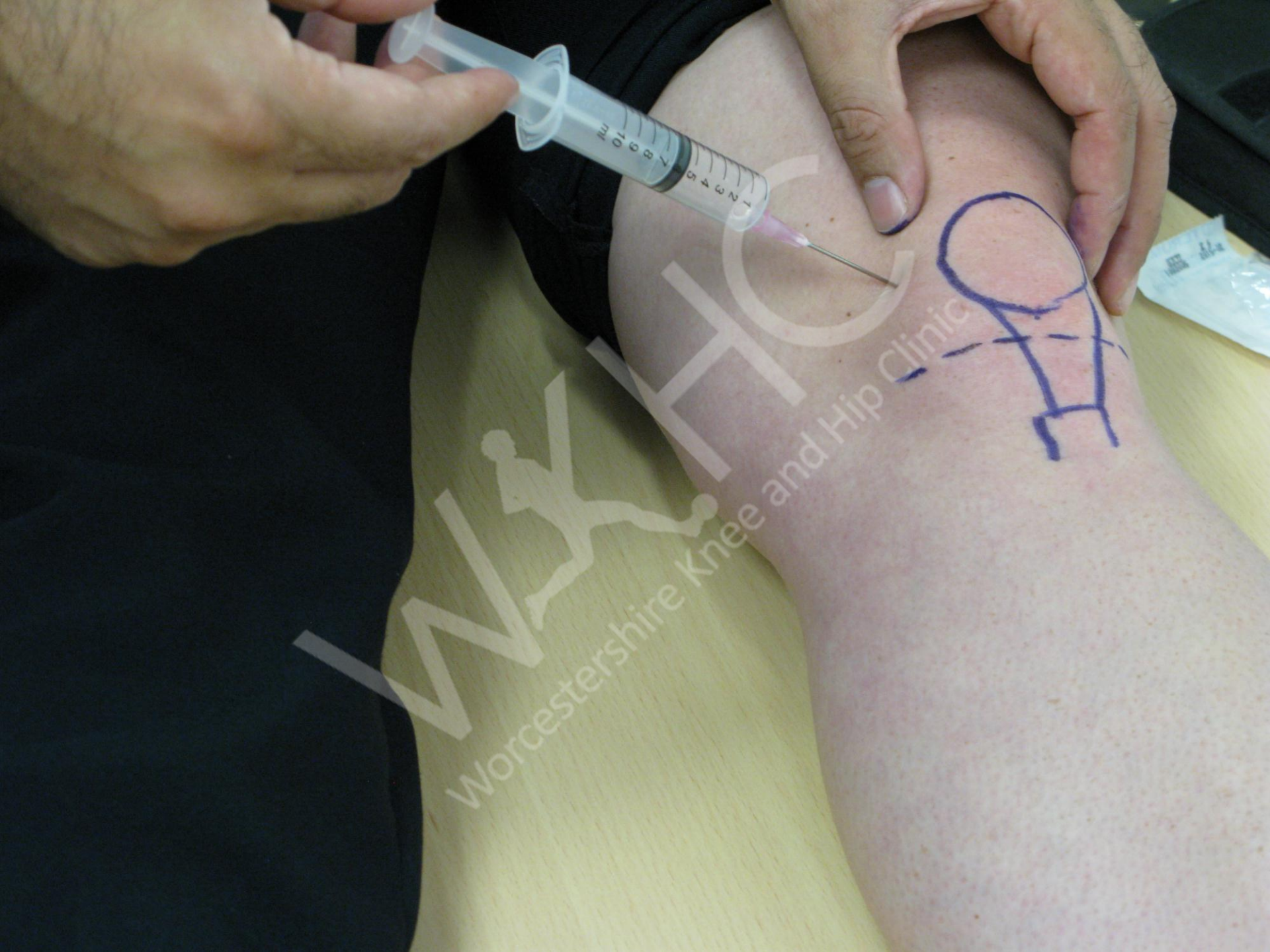
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Knee Injection

- If you are in the wrong place DO NOT DIG AROUND LOOKING FOR THE GAP. Main pain caused by needling the periosteum

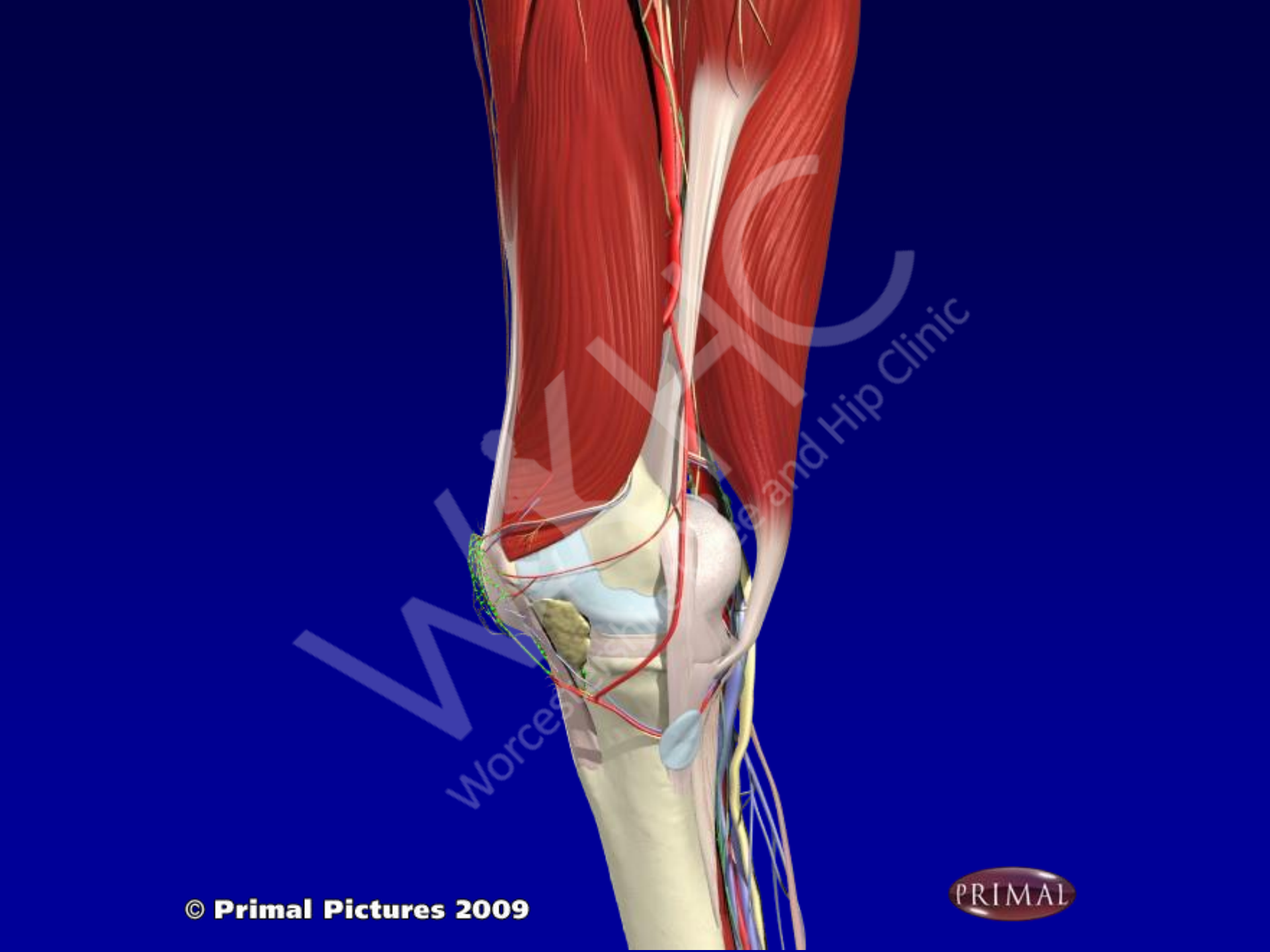
- Come out re-examine your landmarks and try again after re-cleaning skin and change needle.

Bursae around the knee

- Pre-patella bursa (housemaids knee)
- Infra-patella bursa (preachers knee)
- Popliteal bursa (Bakers ‘cyst’)
- Anserine bursa

Anserine bursa

- Common in OA especially with valgus knee. Also RA.
- Patient localises pain to site and tender
- Inject 40mg Depomedrone and Lidocaine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Politeal cyst/bursa

- Directly connected to knee joint
- Fluid comes from knee
- One way valve, cannot return to knee,
- No need to aspirate bursa will refill.
- After injection, bursa will settle with time (months)
- Rarely requires surgery, only if chronic and obstructing movement significantly.

Referred pain to knee

- If the knee looks normal the pain is persistent remember to check the rotation of the hip (can the patient reach shoe or sock by laterally rotating and flexing hip)
- If reduced, need to xray of hip.
- Knee pain may be the only symptom of significant OA in the hip.

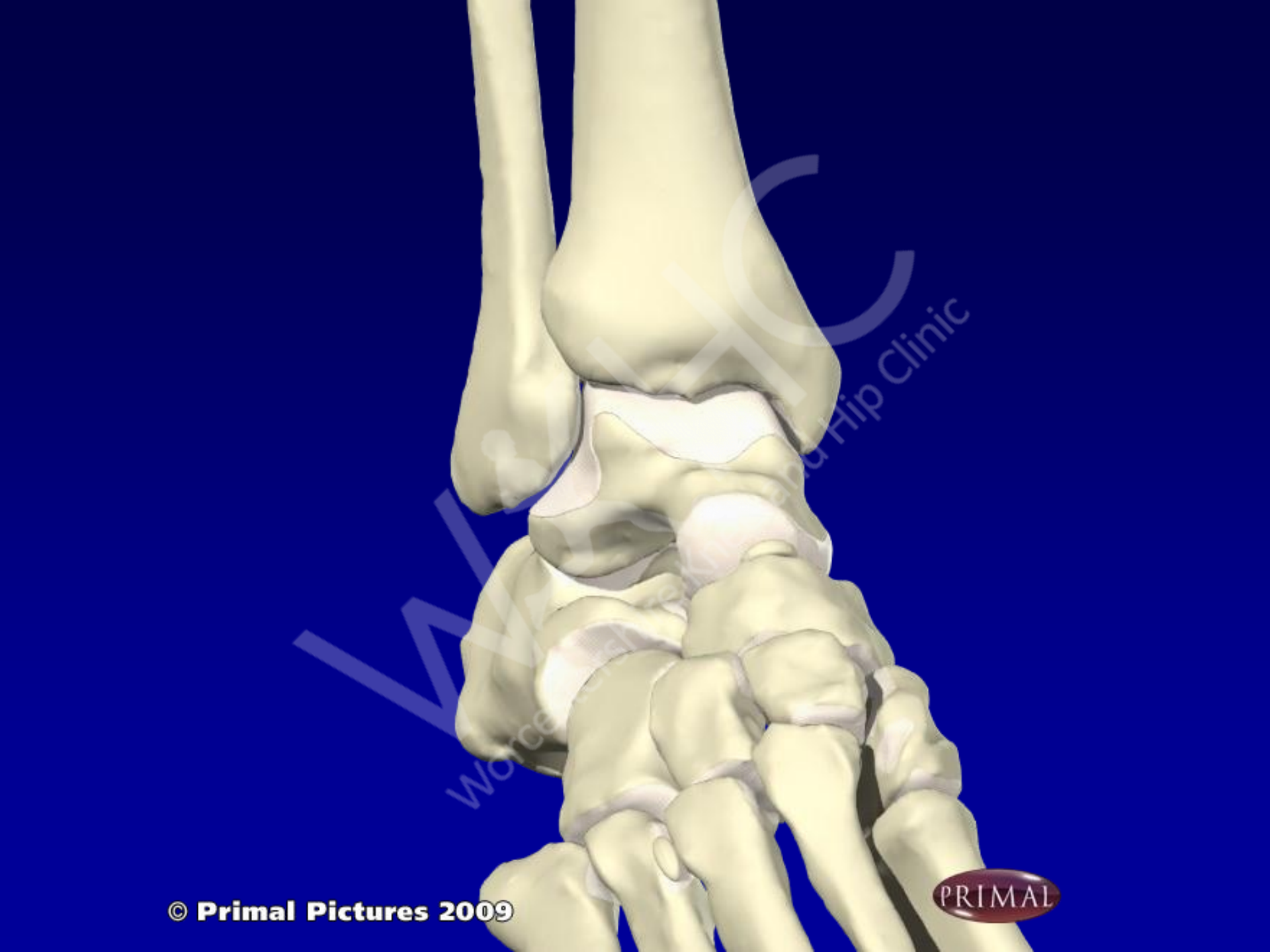
ANKLE JOINT

Ankle

- OA
- RA
- GOUT
- Other inflammatory arthropathies

Injection of ankle

- Just medial or lateral to extensor hallucis longus
- Dorsalis pedis artery lies just lateral to EHL
- Angle needle to run parallel to upper surface of talus or direct towards medial malleolus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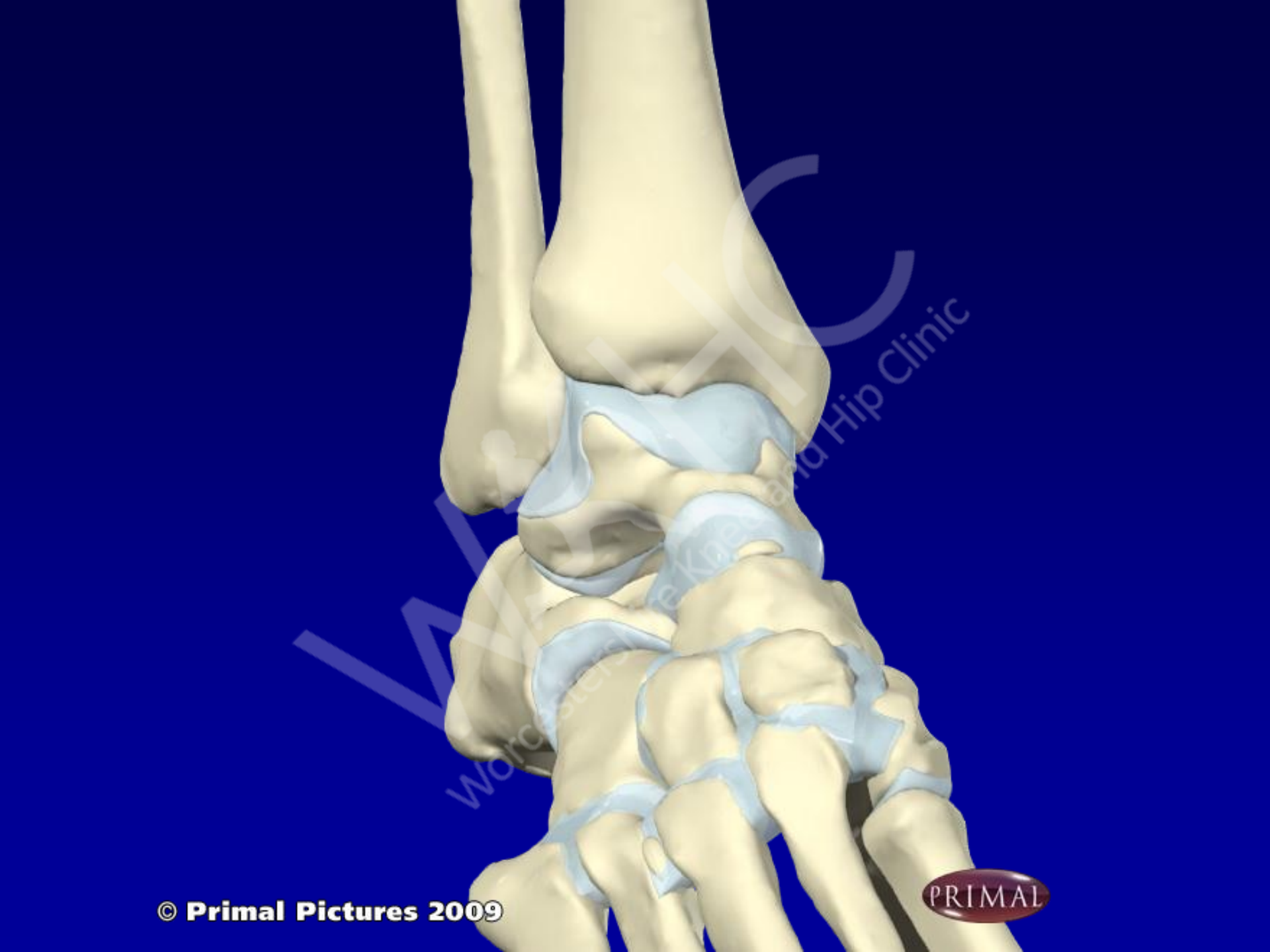
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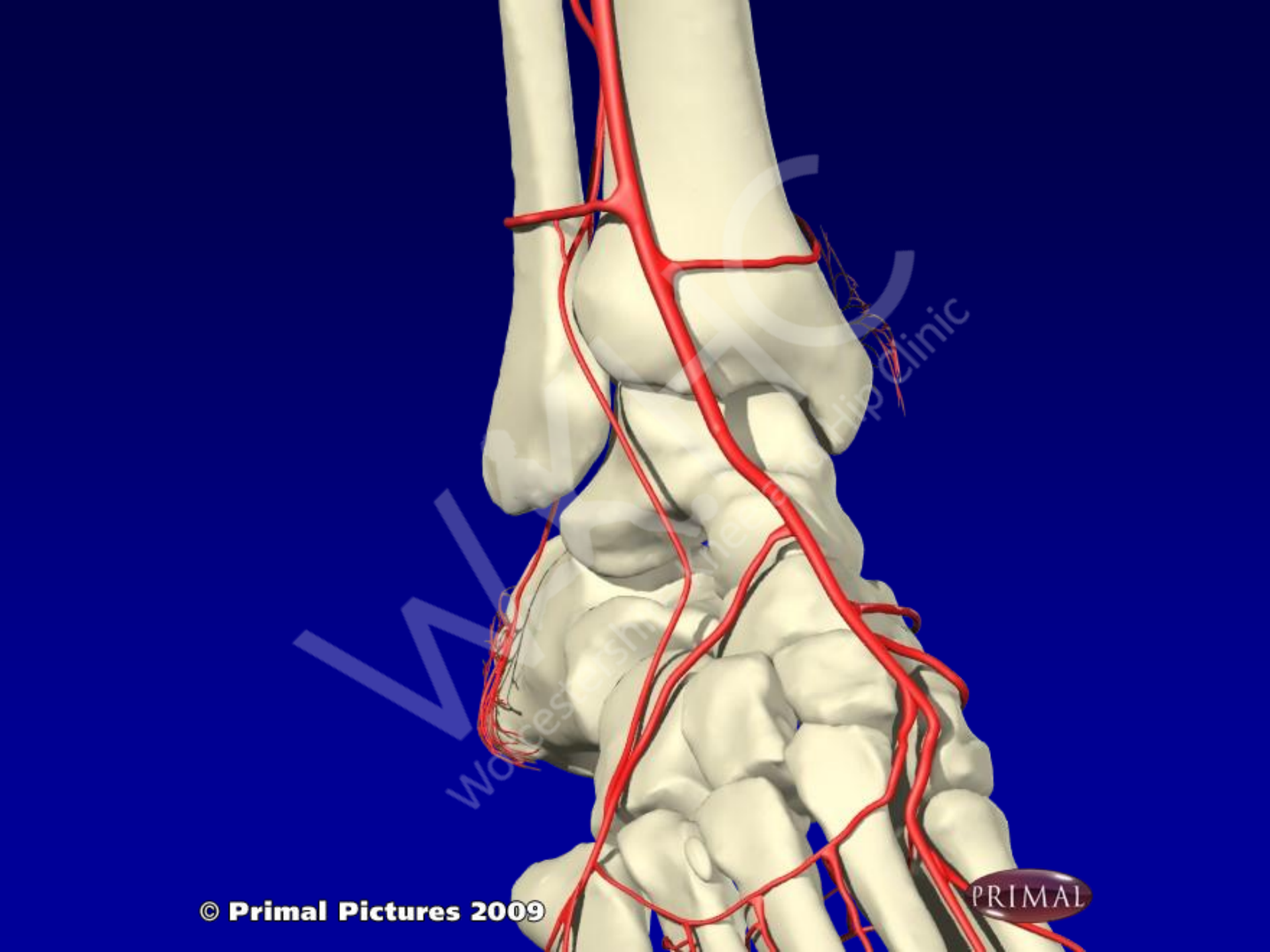
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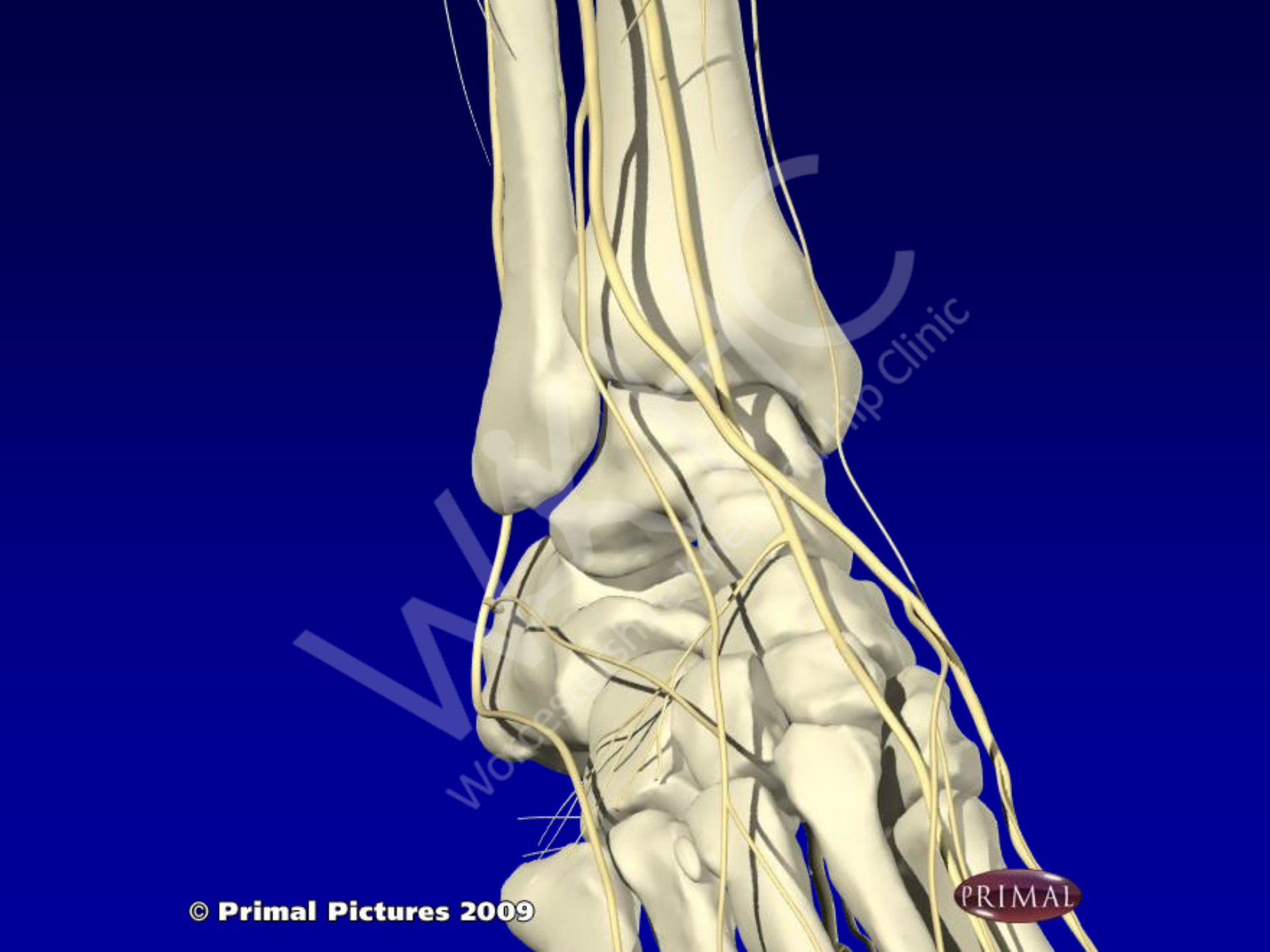
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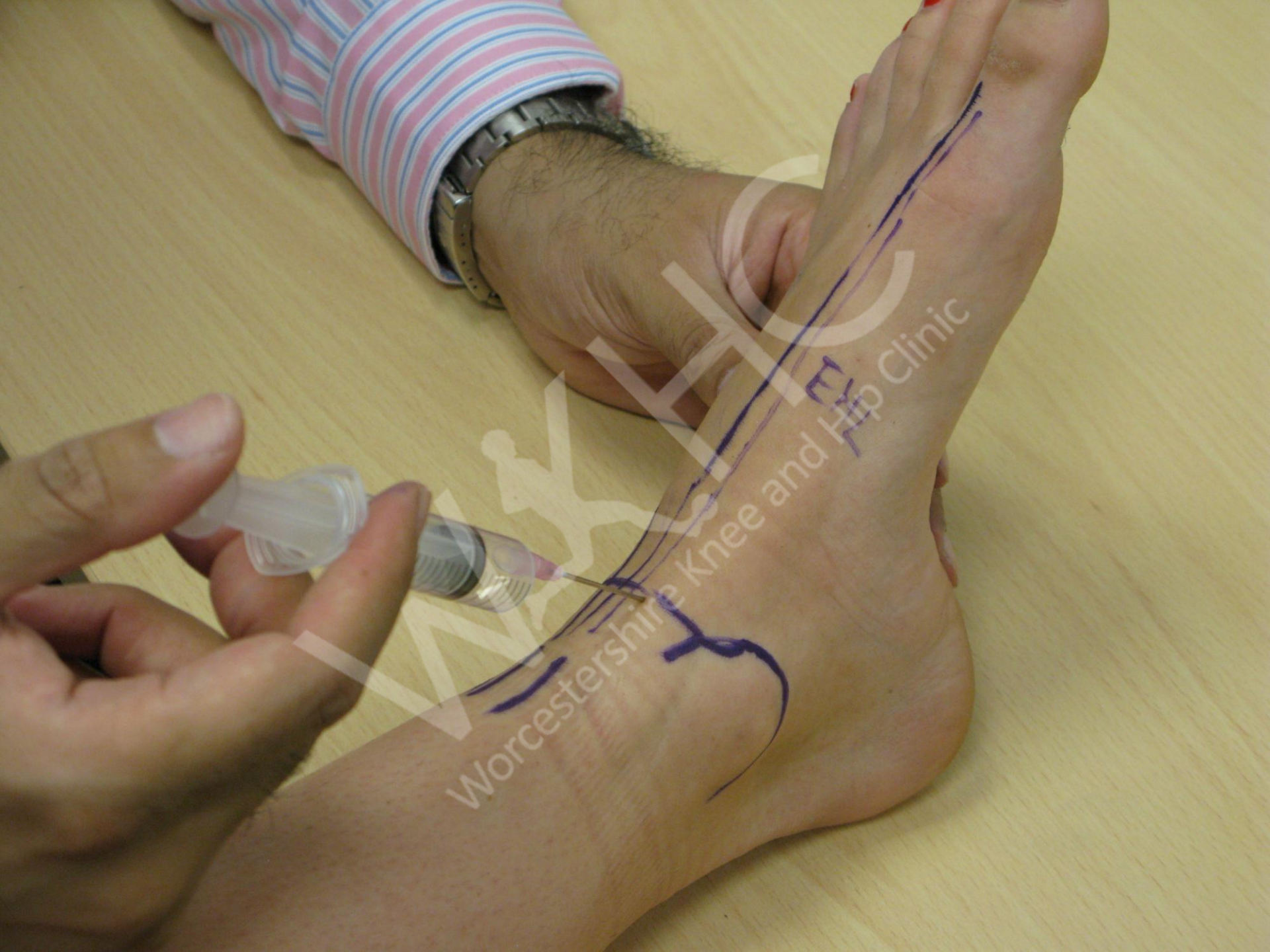
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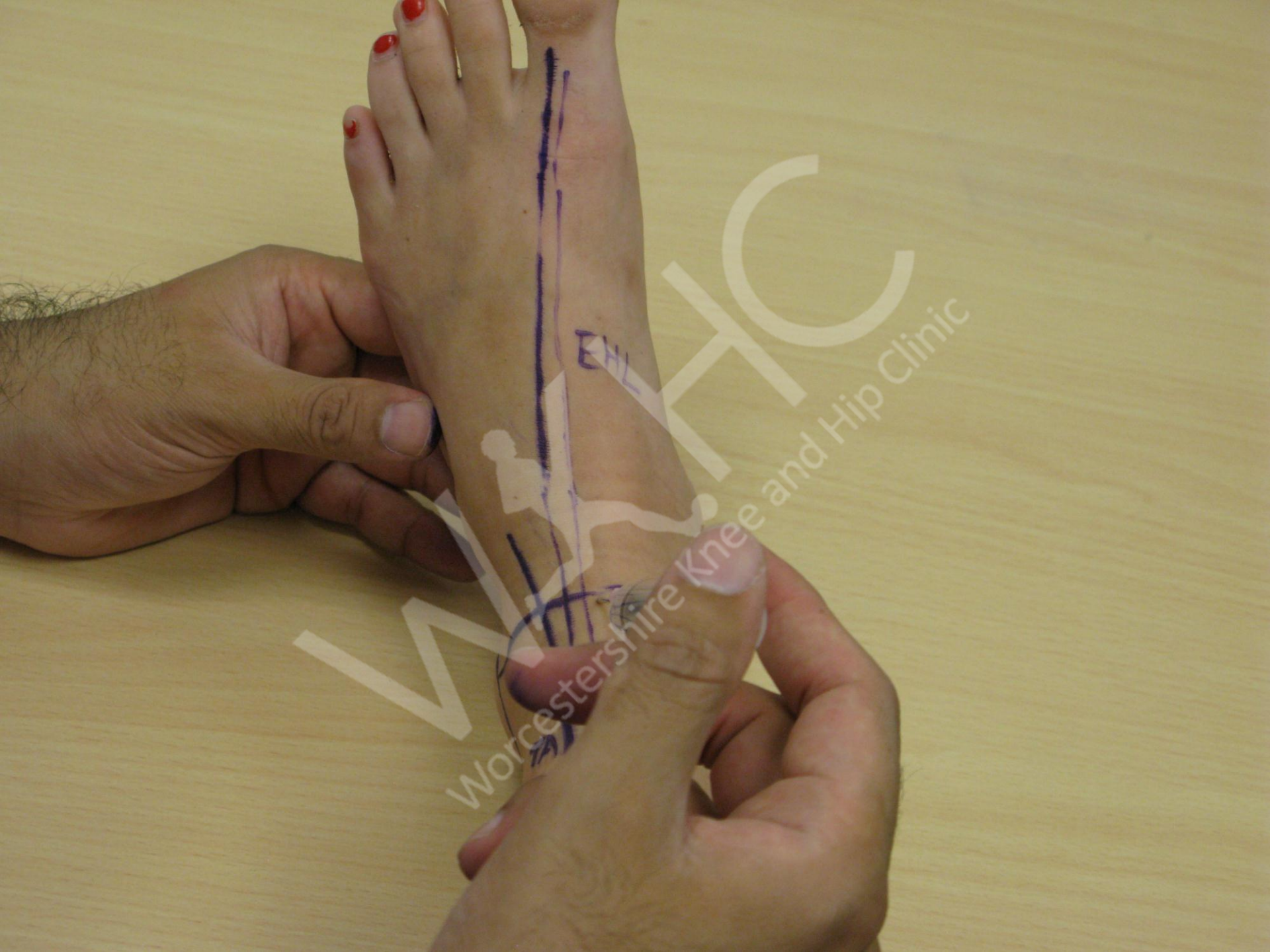
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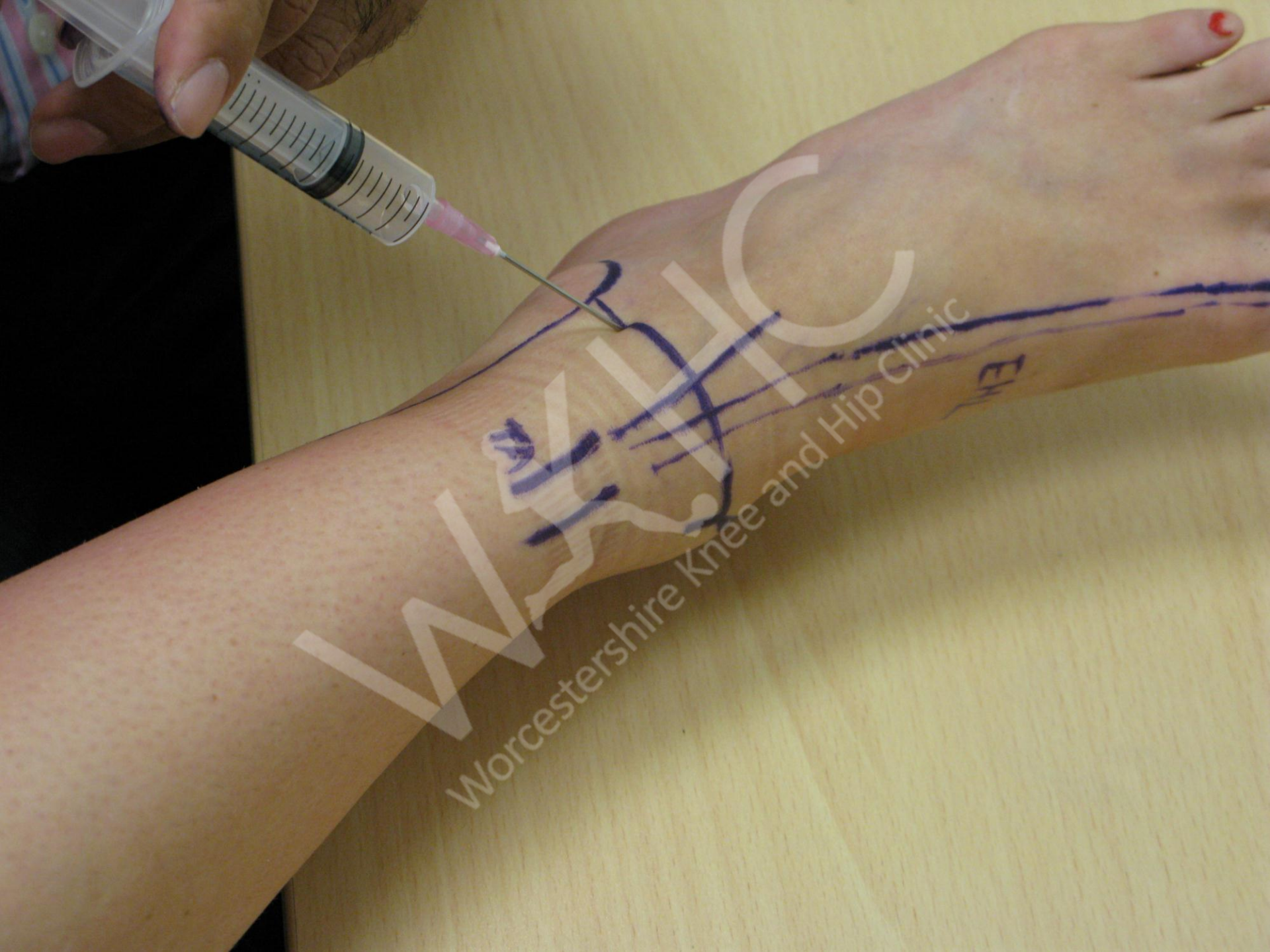
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Achilles Tendonitis

- Inflammation of tendon and its insertion
- Can be associated with AS and Reiters or occur on its own
- Diffuse inflammation not amendable to injection (also risk or rupture)
- Treat with heel pad and stretching

Plantar Fascitis

- Pain under heel on WB
- Pain worse getting out of bed or after inactivity
- Pain can extend along medial foot
- May or may not have spur, not the cause. Xray does not change management
- Treatment:
- Lose weight
- Gel heel pads/ Arch support
- Injection if mobility impaired

Injection of Plantar Fascitis

- Pain under heel
- Medial approach less painful

- 40 mg Depomedrone/ lidocaine mix by medial approach


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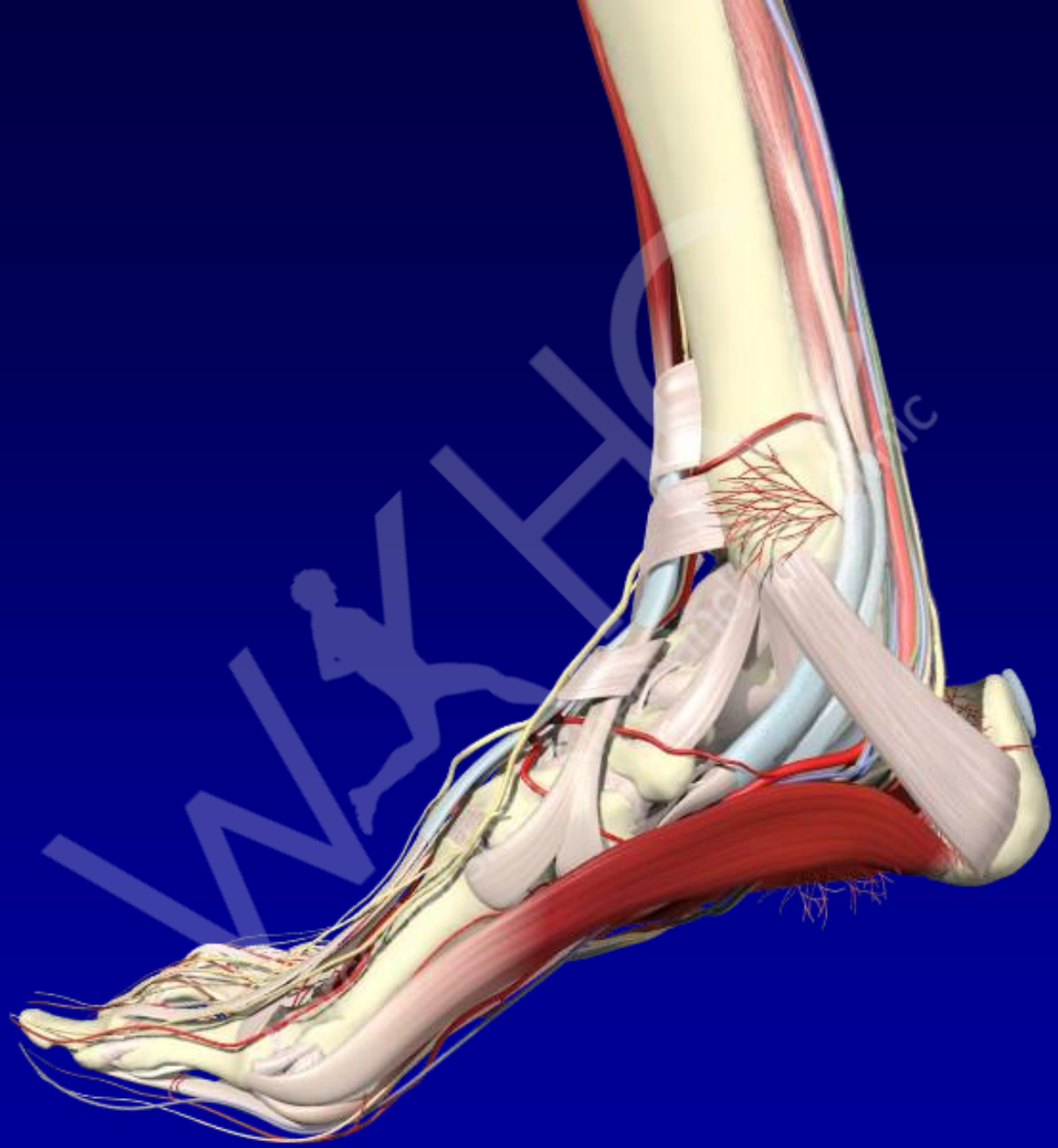

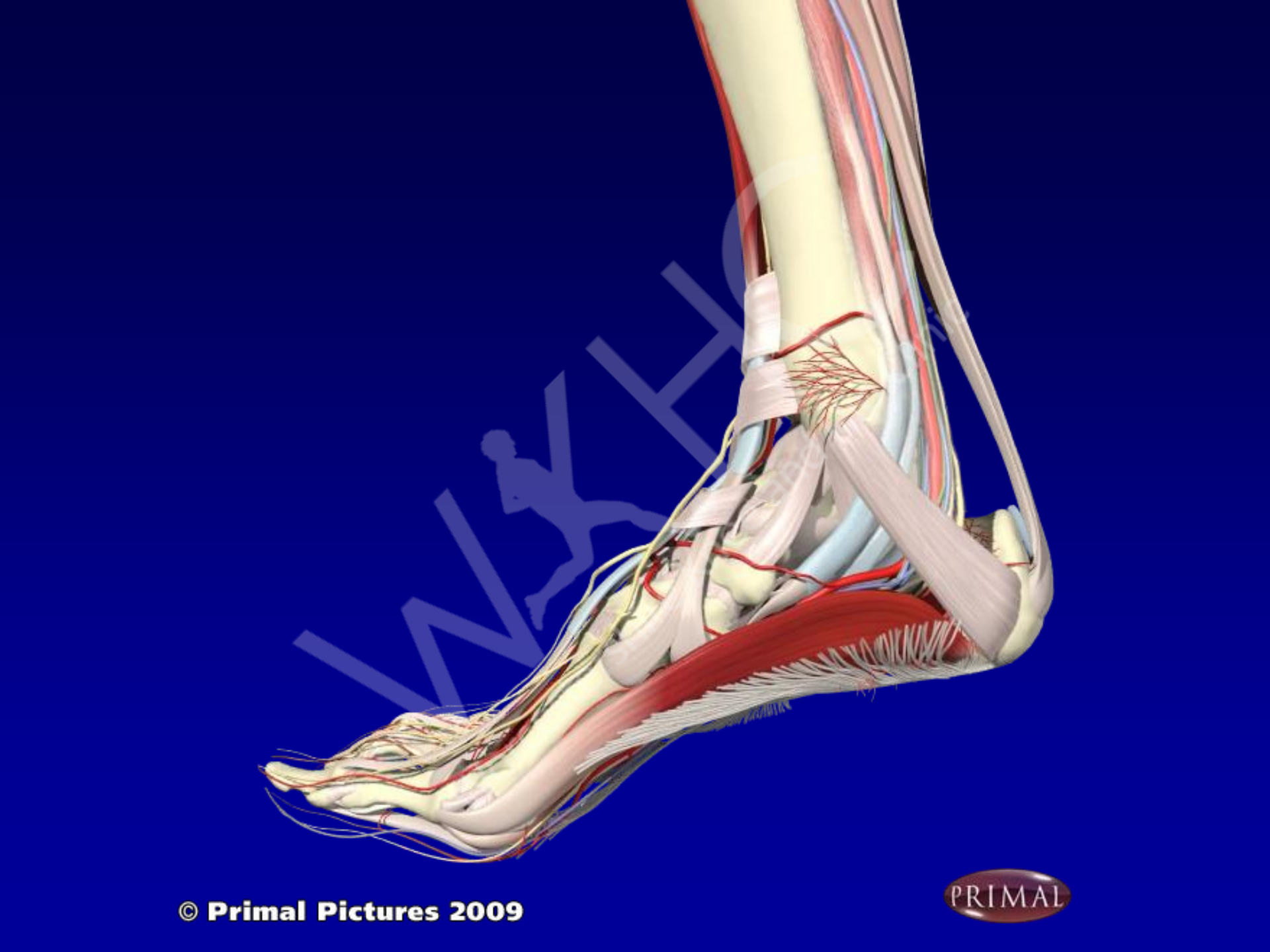
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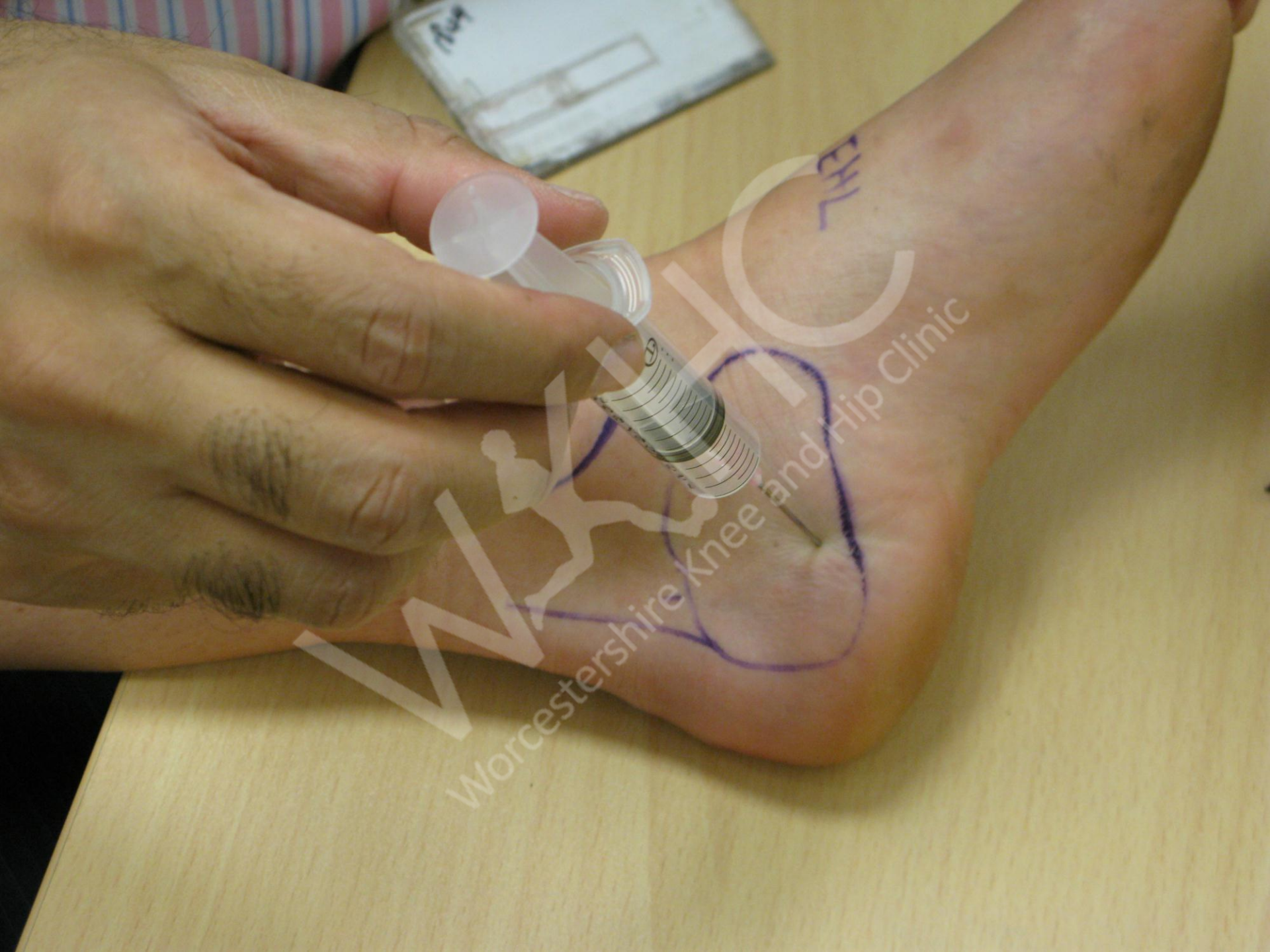
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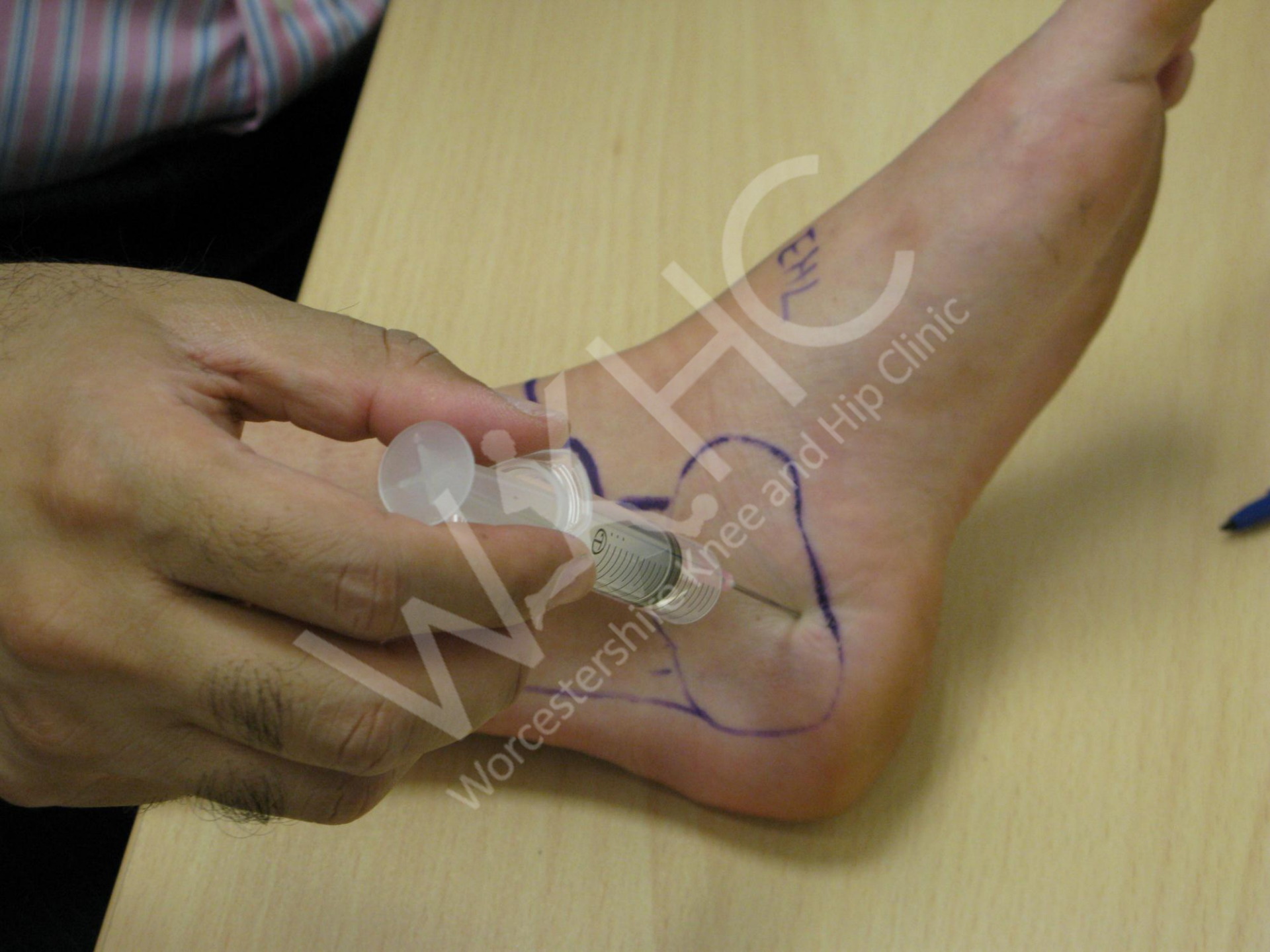
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THE END