Arthritis Research UK | primary care centre

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Introduction to Ultrasound Guided Shoulder Injections

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Keele University

Cannock Chase Hospital

The Queen's Anniversary Prizes For Higher and Further Education 2009

Aim: to provide a service that is

- Safe
- Robust
- Cost effective

To enable patients to have an ultrasound guided joint injection, dependent on their clinical need

Aims and Objectives

- Why use ultrasound? - evidence based practice
- Current service
  - Training
  - Technique

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Background

- Steroid joint injections in use for more than 50 years
- Common in rheumatology practice for the last 30 years
- Used as ‘temporary’ control of symptoms or to treat localised flares
- Majority given without imaging guidance following clinical diagnosis of ‘inflammation’

Evidence rating - key

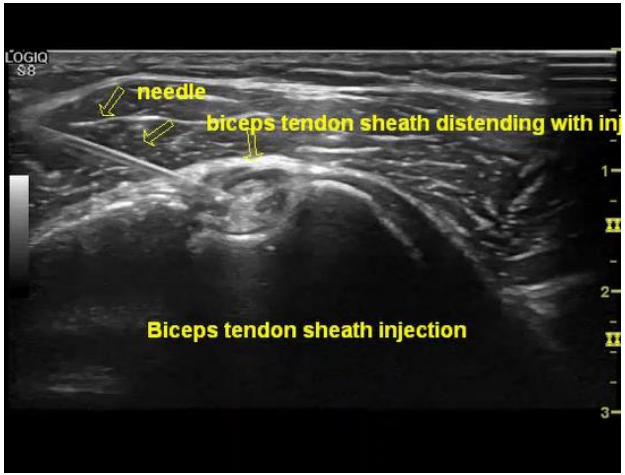
- Systematic reviews and randomised controlled trials ***
- Clinical trials and other evidence of limited scientific value **
- Respected expert opinion *

Indications and evidence for steroid injections (based on ‘blind delivery’)

Shoulder – common indications	
ACJ OA	***
Shoulder capsulitis	***
Rotator cuff tendinopathy	***
Bicipital tenosynovitis	**

CSP guidelines

Is there evidence for the use of ultrasound guidance in steroid injections?



Jones et al (1993)

109 blind injections of steroid + radiographic contrast

Several different joints

Accuracy between 25 and 66%

- 50% of accurate injections were effective
- 23% of inaccurate injections were effective

Eustace et al (1997)

38 blind shoulder injections steroid + radiographic contrast

42% accuracy in GH joint

29% accuracy in SAB

- 28.6% of accurate injections were effective
- 7% of inaccurate injections were effective

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Accuracy improves efficacy

Ultrasound guided injections

Are they accurate more often than blind injections?

Balint et al (2002)

Aspiration of synovial fluid

Compared 32 blind vs 32 USG aspiration

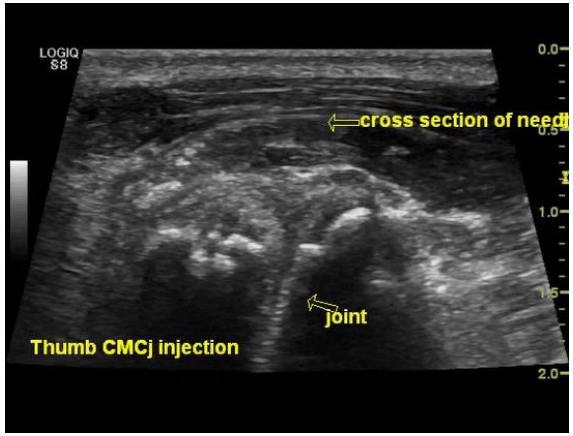
- Blind aspiration – 32% successful
- USG aspiration – 97% successful

Raza et al (2003)

Needle placement into small joints in early RA

Compared 17 blind vs 52 USG placement

- Blind placement – 59% successful
- USG placement – 96% successful



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Accuracy increases efficacy.

Ultrasound guidance increases accuracy.

Does ultrasound guidance increase efficacy?

Bloom et al 2012
Systematic review

USG v blind glucocorticoid injection for shoulder pain

5 papers, 290 participants

Unable to establish advantage in terms of pain, function, ROM or safety of USGI

Sage et al 2013
Systematic review

Clinical and functional outcomes of USG vs blind

6 papers, 307 patients

- Small statistically significant difference in favour of USGI for pain and abduction at 6 weeks.
- No difference in function

Limitations: clinical usefulness and cost effectiveness

SUbacromial imPingement syndrome and Pain: a randomised controlled trial Of ExeRcise and injecTion – Keele University

2x2 randomised factorial trial of 250 patients to test the clinical and cost-effectiveness of individualised exercise, ultrasound-guided shoulder injection or both.

250 patients with shoulder impingement

125 USGI vs 125 blind SAB injection (+ physio)

Conclusions - no significant improvement

Sibbett et al (2009)

148 painful joints randomised to blind or USGI

- Procedural pain = 43% lower with US
- Pain scores at 2 weeks = 58.5% lower with US
- Response rate to joint injection 71.6% blind v. 89.9% US
- 200% increased detection effusion
- 337% increased volume fluid aspirated

‘Use of ultrasound guidance significantly improves outcomes’

Aims and Objectives

- Why use ultrasound? - evidence based practice
- Current service
  - Training
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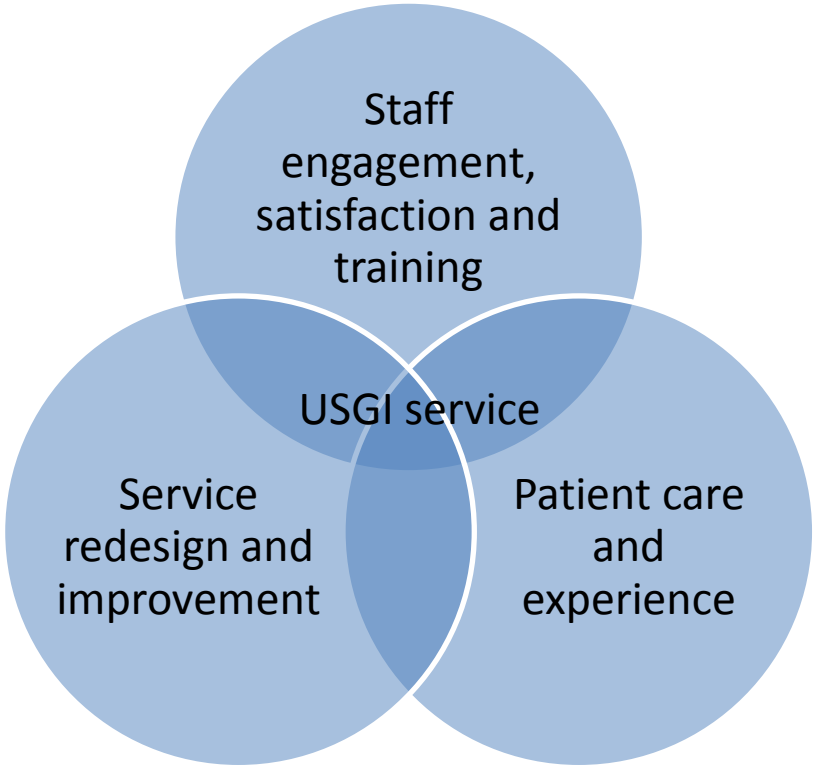
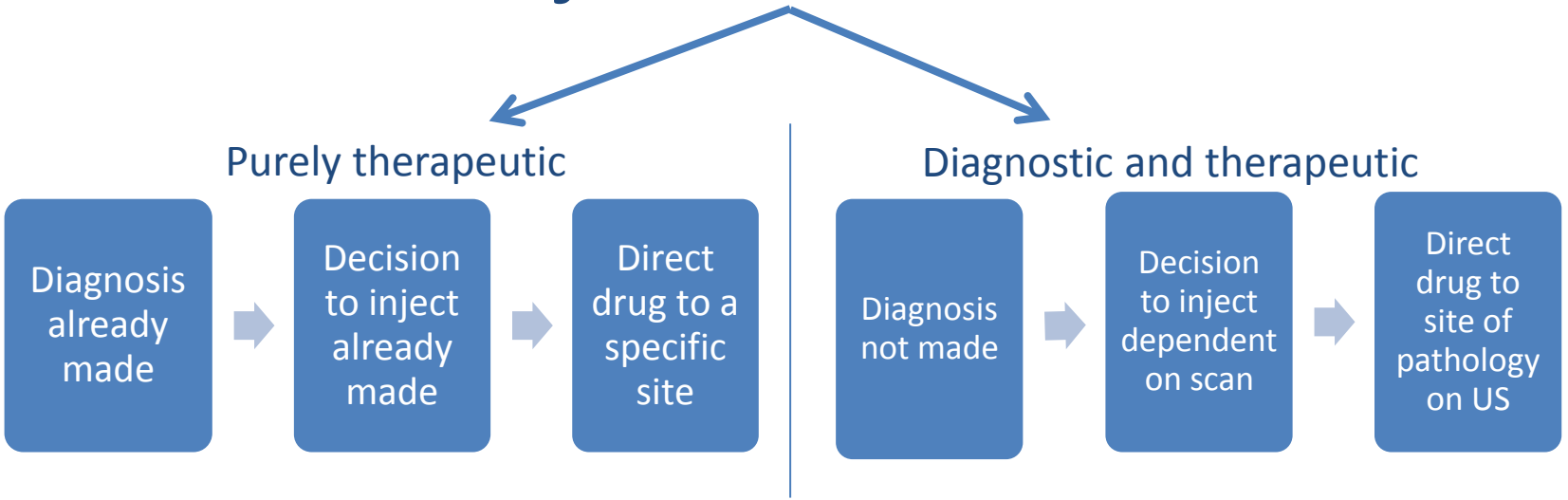
Scope and scale

- Who injects?
- Requirements
- Considerations
- Techniques



Who injects? - the choice



Pre requisite: Skills in 'blind' joint injections
Requires training in:
US instrumentation, US anatomy, needle guidance

Pre requisite: Skills in diagnostic MSK ultrasound
Requires training in:
Joint injections

Advantages of a Multidisciplinary team

- Robust service
- Skills used appropriately
- Financially viable

Our model of training for those with injecting skills:

Certificate in focused Ultrasound Practice

- 5 mandatory study days - Principles of ultrasound
- Self directed study- 120 hours
- 2 assignments - Ultrasound physics based
- Portfolio – Reflective diary, case report, practice log book
- 1 area – 30 hours mentored clinical training, 30 patients

Our model of training for those with ultrasound skills:

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Principles and Practice of Joint and Soft Tissue Injection

- 4 mandatory study days – techniques, asepsis, management of anaphylactic shock, pharmacology, precautions, professional issues
- Portfolio – critical thinking, evidence of formal training, 10 cases, experiential learning, reflection.
- Assignment in topic related to joint injections

How?

- Mentor
- Core subject assessed/achieved
- Ongoing training – each area assessed separately
- Allows ‘stepped’ approach

Clinical Governance

- Providing a constant service
- Competency
- Machine/Images/Reports
- Protocols – training and delivery
  - RCR publications and guidance
  - Clinical competency

		Criteria for US guidance
Shoulder	ACJ Subacroimial bursa Glenohumeral joint Diagnostic aspiration	US guided If confident of diagnosis and previous failed ‘blind’ injection If confident of diagnosis and previous failed ‘blind’ injection If failed ‘blind’ aspiration or if thought to be a difficult joint
Elbow	Tennis/golfers elbow Elbow joint Diagnostic aspiration	If confident of diagnosis and previous failed ‘blind’ injection If confident of diagnosis and previous failed ‘blind’ injection If failed ‘blind’ aspiration or if thought to be a difficult joint
Wrist	Carpal tunnel Wrist joint Tendons/sheaths Diagnostic aspiration	US guidance not indicated If confident of diagnosis and previous failed ‘blind’ injection If confident of diagnosis and previous failed ‘blind’ injection If failed ‘blind’ aspiration or if thought to be a difficult joint
Fingers	Flexor tendons Difficult small joints Diagnostic aspiration	US guided US guided If failed ‘blind’ aspiration or if thought to be a difficult joint
Hip	TB Adductor tendonopathy Hip joint	If confident of diagnosis and previous failed ‘blind’ injection US guided if confident of diagnosis US guided
Knee	Diagnostic aspiration	If failed ‘blind’ aspiration or if thought to be a difficult joint
Ankle	Tibiotalar joint Subtalar joint Tendons/sheaths Retrocalcaneal bursa Diagnostic aspiration	If confident of diagnosis and previous failed ‘blind’ injection US guided If confident of diagnosis and previous failed ‘blind’ injection US guided If failed ‘blind’ aspiration or if thought to be a difficult joint
Foot	Plantar fascia Morton’s neuroma Difficult small joints Diagnostic aspiration	If confident of diagnosis and previous failed ‘blind’ injection US guided if neuroma visible on scan US guided If failed ‘blind’ aspiration or if thought to be a difficult joint

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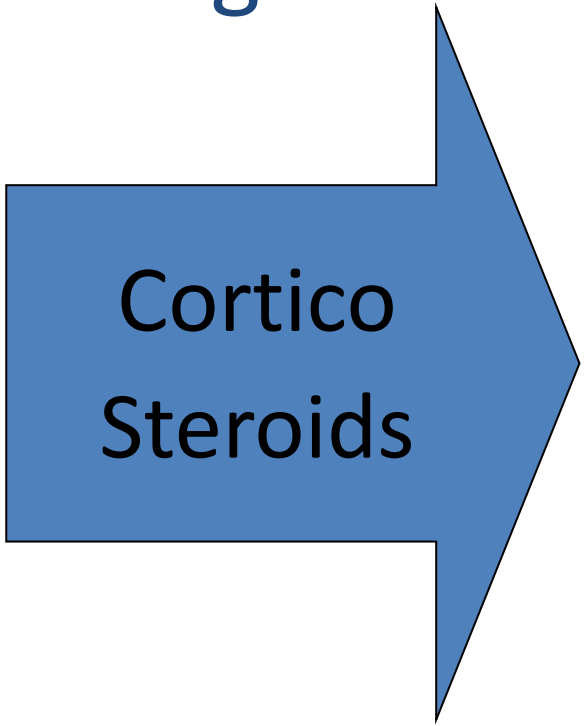
IF CONFIDENT OF DIAGNOSIS AND IT IS A DIFFICULT JOINT OR THE PATIENT HAS HAD A PREVIOUS FAILED BLIND INJECTION

Drugs used in Injection Therapy



- Suppress inflammation in joints and connective tissue
- Suppress inflammatory flares in degenerative joint disease
- Break up the cycle of inflammatory process in low grade re injury

Choice of steroids

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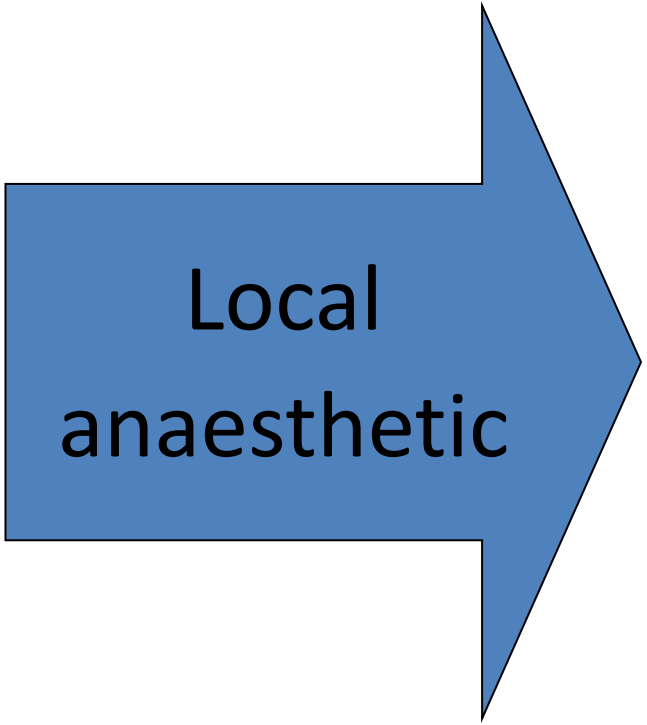
Hydrocortisone Acetate - short action
- **Anti inflammatory potency ***
- **Very soluble – ideal for superficial injections**
- **Common concentration 25mg/ml**

Triamcinalone Acetonide - intermediate action
- **Anti inflammatory potency *******
- **Ideal for bursae and joints**
- **Common concentrations 10 or 40mg/ml**
- **Gives flexibility of volume**

Methyl prednisolone – intermediate action
- **Anti inflammatory potency *******
- **Ideal for bursae and joints**
- **Common concentrations 40mg/ml**
- **May cause more post injection pain than triamcinalone**
- **Available as pre mix with LA**

Drugs used in Injection Therapy



- Cause a reversible block to conduction along nerve fibres
- Pain reduction
- Widens field of effect by increasing volume of injection
- Dilutes steroid therapy reducing risk tissue atrophy
- Can be diagnostic

Responsibilities of injector

Before:

- Check for contra-indications – Hypersensitivity, anticoagulation, infection, diabetes
- Gain informed consent – potential side effects: sepsis, subcutaneous atrophy, post injection flare

Responsibilities of injector

During:

- Aseptic technique - ? Probe covers
- Comfort and dignity of patients

Responsibilities of injector

After:

- After care advice
- Appropriate documentation, images and reports

‘In Plane’

Needle is inserted along the long axis

of the transducer

- the length of the needle is seen in the image

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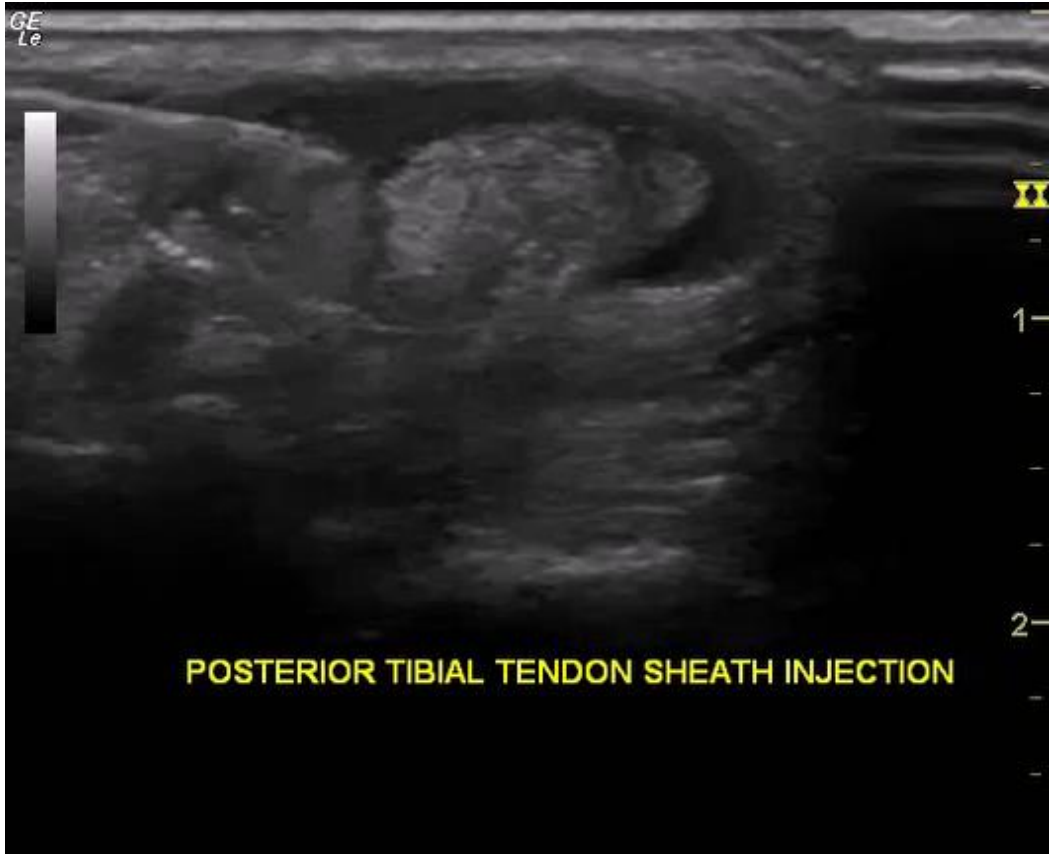
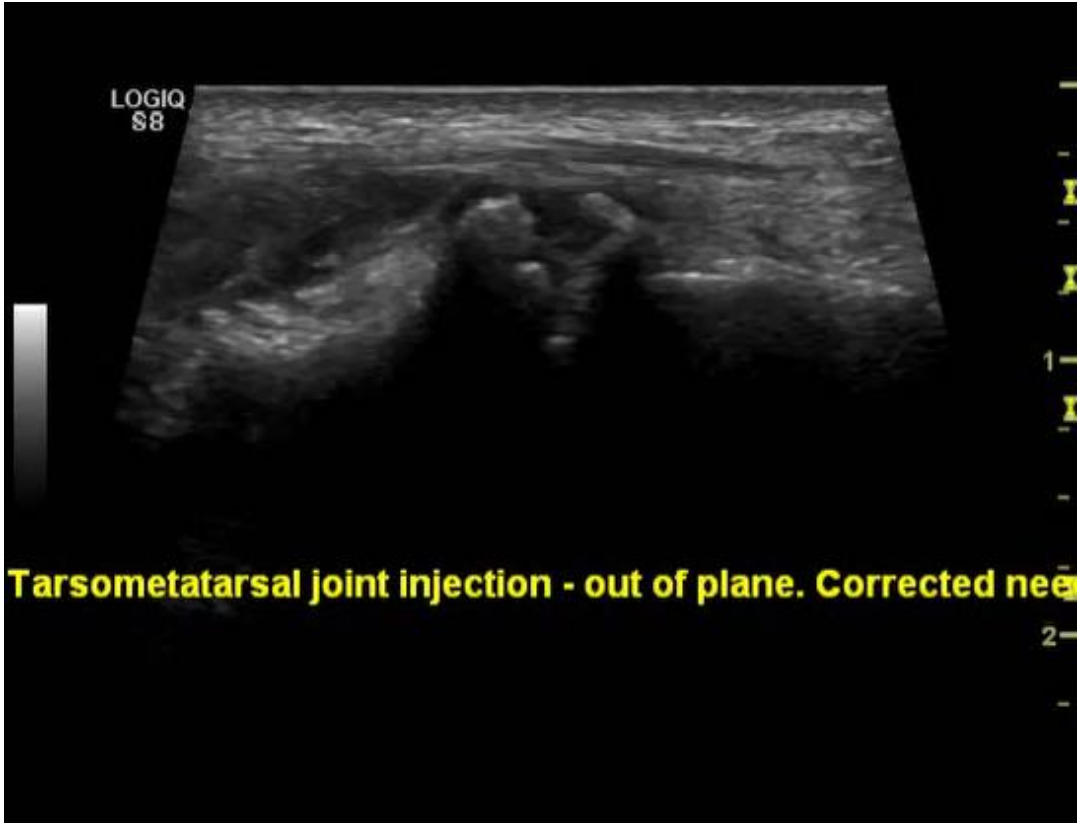


‘Out of Plane’

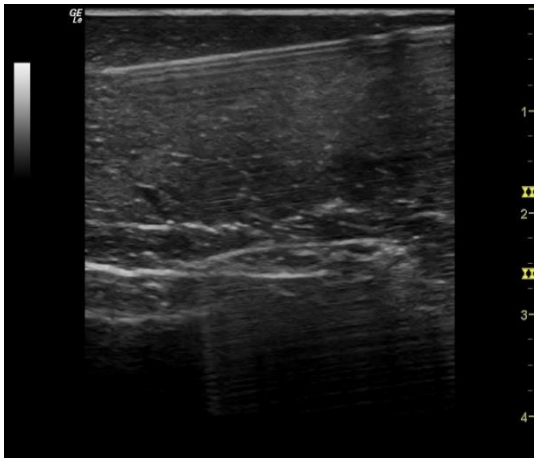
Needle is inserted across the face

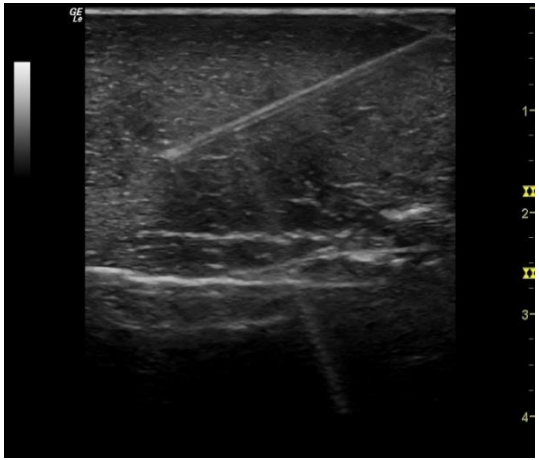
of the transducer

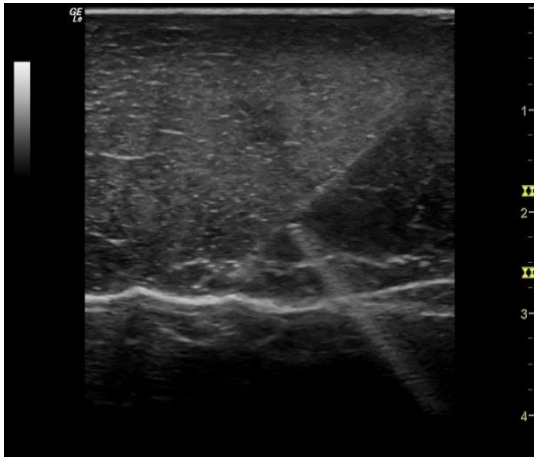
- only a cross-section of the needle is seen


LOGIQ
S8
Tarsometatarsal joint injection - out of plane. Corrected nee
1
2

Angle of needle in relation to the transducer face



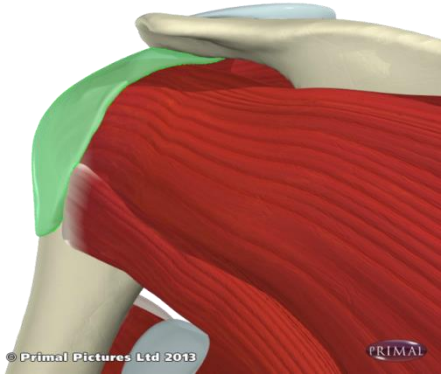




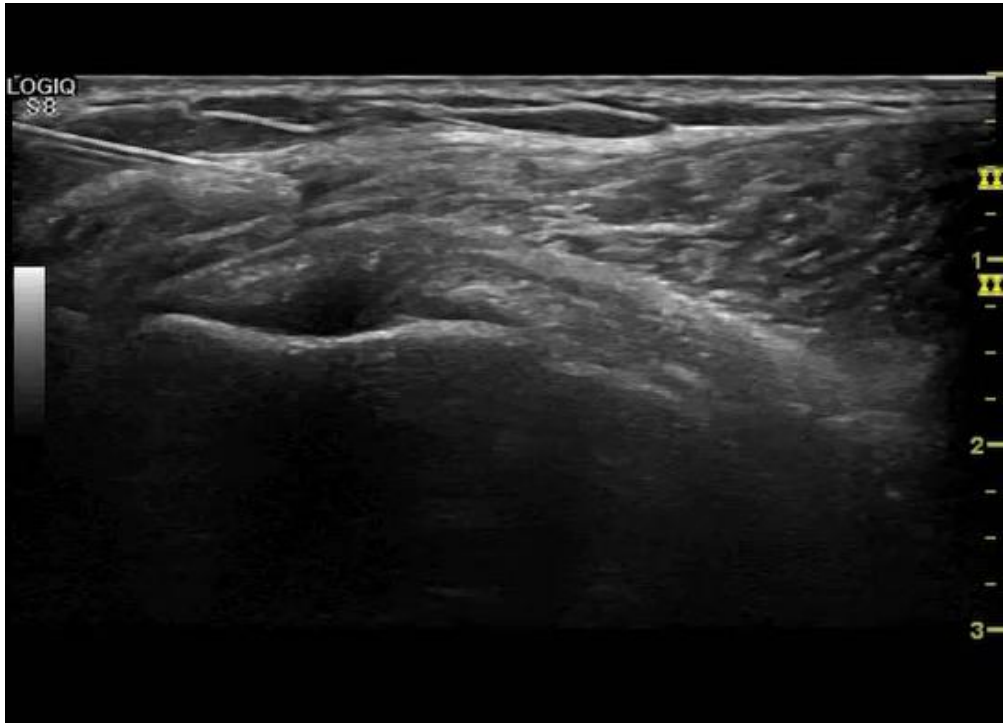
Subacromial bursa

- Seated or supine, arm in internal rotation
- Ultrasound view: LS of supraspinatus tendon/subacromial bursa
- Approach – in plane, lateral to medial

Sundries:
5ml syringe
21g 40mm Green needle
40mg Triamcinolone/4mls lidocaine 1%



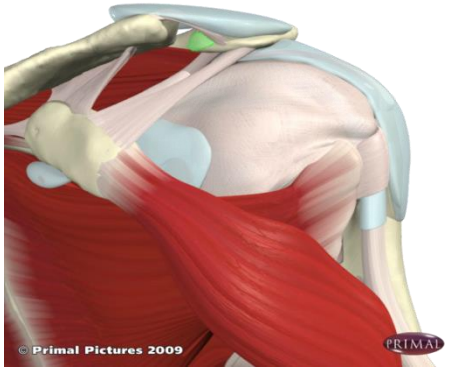
Subacromial bursa



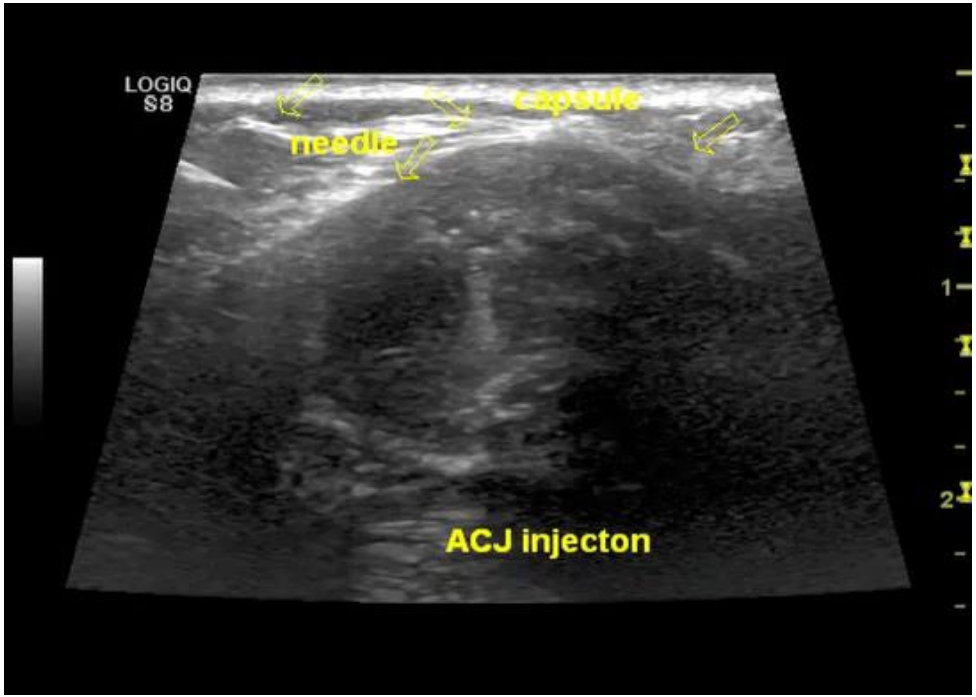
Acromioclavicular joint

- Seated or supine, arm at side
- Ultrasound view: TS of ACJ
- Approach – in plane, anterior to posterior

Sundries:
5ml syringe
23g 25mm Blue needle
20mg Triamcinolone/1ml lidocaine 1%



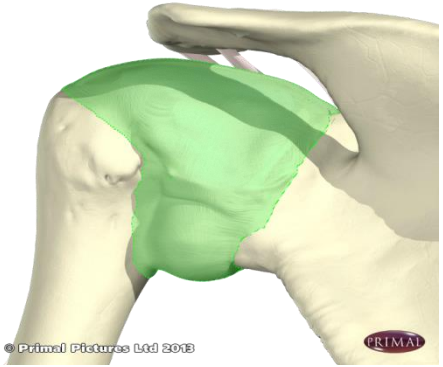
Acromioclavicular joint



Glenohumeral joint

Seated or side lying, arm in adduction, resting on contralateral shoulder
Ultrasound view: LS of GHJ
Approach – in plane, lateral to medial or medial to lateral

Sundries:
10ml syringe
21g 50mm Green needle
40mg Triamcinolone/ 4 - 10mls lidocaine 1%



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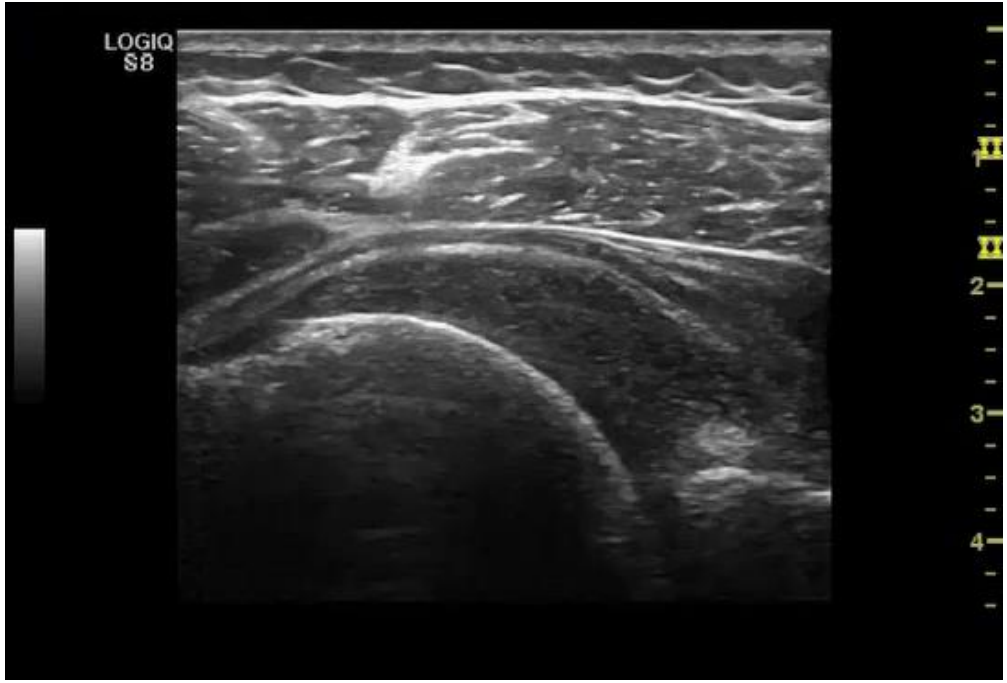
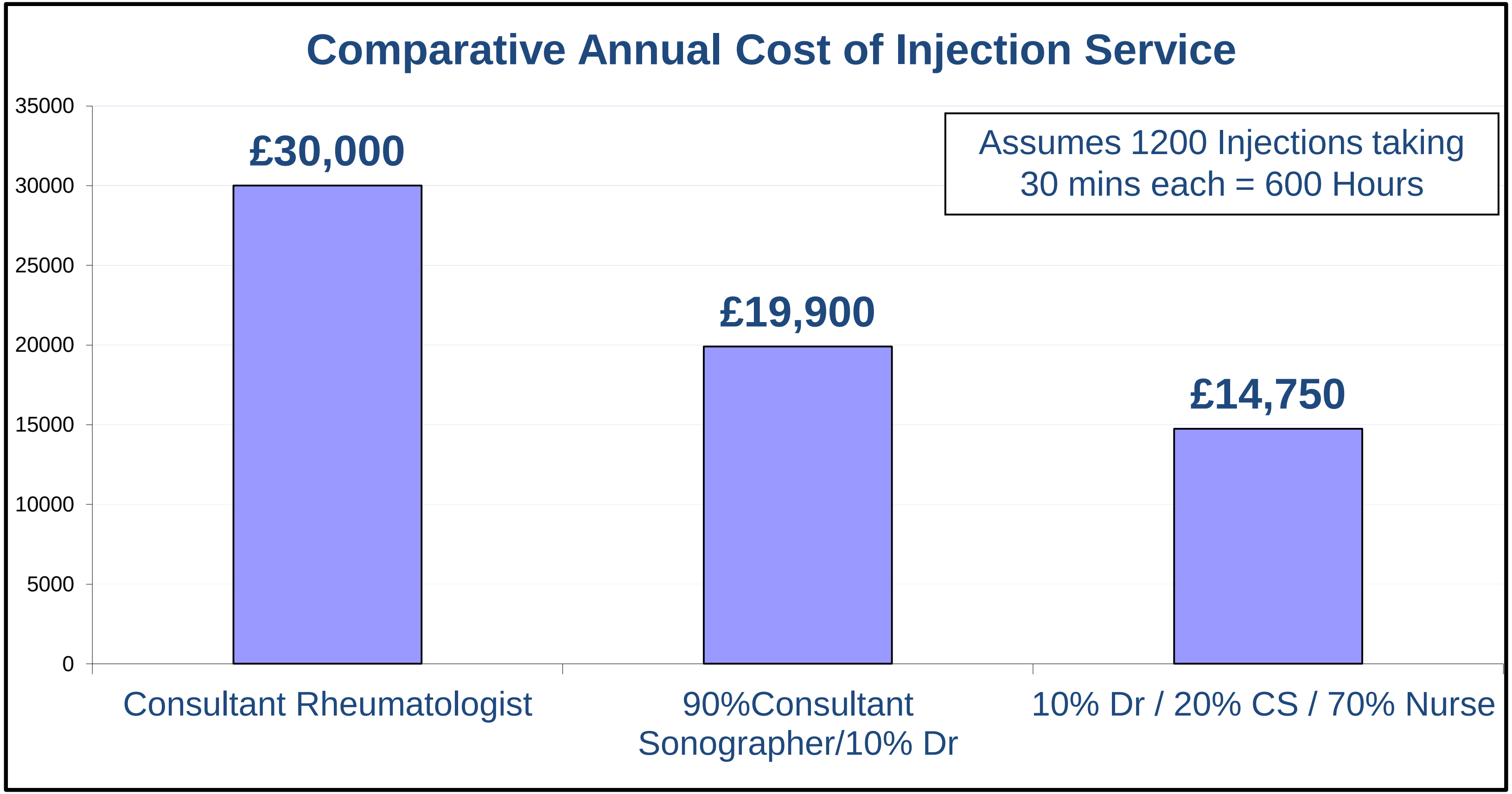
Glenohumeral joint




Comparative Annual Cost of Injection Service
Assumes 1200 Injections taking 30 mins each = 600 Hours
£30,000
£19,900
£14,750
35000
30000
25000
20000
15000
10000
5000
0
Consultant Rheumatologist
90%Consultant Sonographer/10% Dr
10% Dr / 20% CS / 70% Nurse

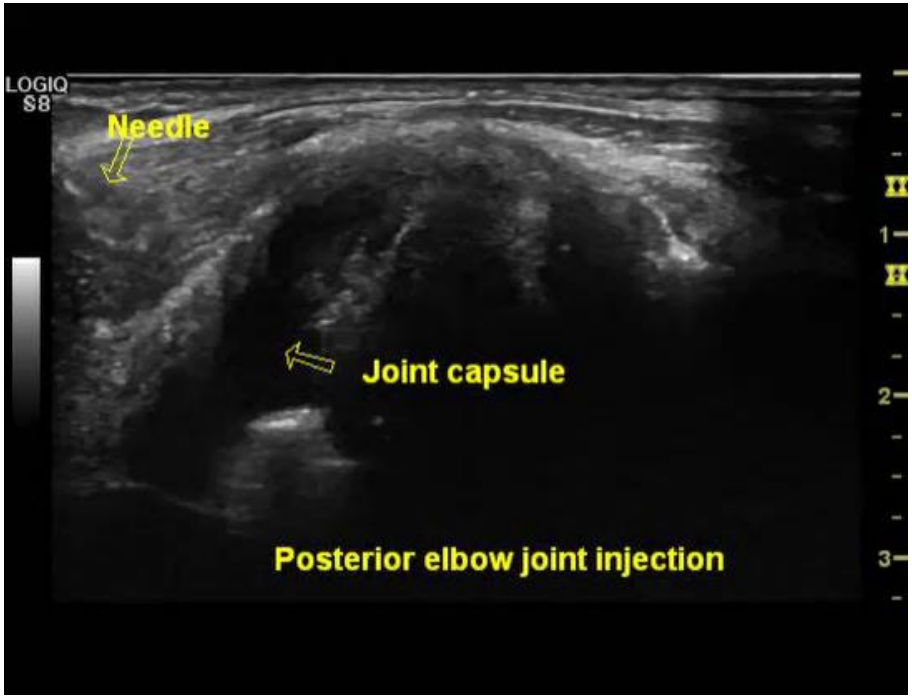
In conclusion

Our aim is to provide a service that is ..

- Safe
- Robust
- Cost effective

To enable patients to have an ultrasound guided joint injection, dependent on their clinical need

Thank you


LOGIQ
S8
Needle
Joint capsule
Posterior elbow joint injection
1
2
3

References

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RCR guidelines http://www.rcr.ac.uk/docs/radiology/pdf/BFCR(12)18_focused_training.pdf

Acknowledgements

Arthritis Research UK | primary care centre

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