**Evidence for ultrasound-guided shoulder joint injections**
(Version 32-1: 20/03/2023)

**Summary:**

Joint injections can be guided by surface anatomy or ultrasound. The evidence shows that ultrasound guidance improves injection accuracy in the target intra-articular joint space of large joints, including the shoulder. However, the clinical significance or impact on longer-term outcomes needs to be clarified, and there needs to be guidance to recommend their use.

The use of image-guided shoulder joint injections is unproven as it has yet to meet the standards of evidence set for efficacy. Care pathways state that image-guided subacromial injections should NOT be used because trial evidence has demonstrated that image-guided subacromial injections offer no added benefit. Also, the Cochrane review does not support the use of image guidance for injections in the shoulder. Moderate-certainty evidence indicates that ultrasound-guided injection for shoulder pain probably provides little or no benefit over injection without imaging in terms of pain or function, and low-certainty evidence indicates there may be no difference in the quality of life. Furthermore, the NHS England EBI Programme now recommends against image-guided subacromial injection. Therefore, any added cost of image guidance currently appears unjustified.

Image-guided joining injections for the shoulder are therefore rated as an Amber AXA Traffic Light System and should be used in the context of ongoing research. Recent studies and systematic reviews indicate the need for further research to justify the additional cost. Future research should determine the clinical and cost-effectiveness to alter this guidance.

| Technology | Rating | Summary conclusion |
|---|---|---|
| AXA 32: Evidence for ultrasound-guided shoulder joint injections* | Amber | Trial evidence has demonstrated that image-guided subacromial injections offer no added benefit, and NHS England recommends against the procedure. Image-guided joint injections are not recommended outside the context of ongoing research |

*Conditions requiring shoulder injections covered by this guidance include osteoarthritis, frozen shoulder, rotator cuff disorders, acromioclavicular joint disorder, glenohumeral joint osteoarthritis and rheumatoid arthritis. Outside the scope of this review is septic arthritis, which requires immediate treatment.

## Background

Joint injections can be undertaken guided by surface anatomy or by ultrasound. The use of ultrasound guidance has been advocated as a technically superior method for performing intra-articular injections, improving injection accuracy in the target intra-articular joint space of large joints, including the shoulder. [1] The Indications for shoulder joint injections can be diagnostic or therapeutic, and the use of the Oxford Shoulder Clinic guidelines for treatment and referral aids diagnosis.[1]

Conditions requiring shoulder injections covered by this guidance:

- Osteoarthritis
- Frozen shoulder
- Rotator cuff disorders
- Acromioclavicular joint disorder
- Glenohumeral joint osteoarthritis
- Rheumatoid arthritis

**Outside the scope of this review**

- Septic arthritis

**Osteoarthritis**

For the management of Osteoarthritis, NICE guideline [NG226] [3] recommends intra-articular corticosteroid injections when other pharmacological treatments are ineffective or unsuitable or to support the therapeutic exercise.

These injections only provide short-term relief (2 to 10 weeks). NICE also recommends not offering intra-articular hyaluronan injections to manage osteoarthritis.[2]

**Frozen shoulder** (NICE CKS) [3]

CKS considers an intra-articular (glenohumeral) corticosteroid injection early in the course of a frozen shoulder if there is no or slow progress with conservative treatment.

- An appropriately trained and skilled person should administer intra-articular corticosteroid injections.
- Although several steroid preparations are available, triamcinolone or methylprednisolone are the preferred option for many specialists.
- Local anaesthetic (e.g. lidocaine) is frequently used in addition to corticosteroid. Advise the person to rest the injected joint as much as is practical for 24 hours following the injection.

**Rotator cuff disorders** (NICE CKS) [4]

Consider a subacromial corticosteroid injection as part of shared decision-making and in conjunction with other primary care treatments, such as physiotherapy.

[1] https://www.ouh.nhs.uk/shoulderandelbow/information/documents/JRFinal2010poster.pdf
[2] https://www.nice.org.uk/guidance/ng226/documents/draft-guideline
[3] https://cks.nice.org.uk/topics/shoulder-pain/management/frozen-shoulder/
[4] https://cks.nice.org.uk/topics/shoulder-pain/management/rotator-cuff-disorders/

*Do not give more than two corticosteroid injections.*

- A second injection may be given after six weeks, but only to people who have seen improvement following the first injection and need the pain relief to undergo physiotherapy.

*Do not give a corticosteroid injection if:*

- The person has previously received a corticosteroid injection from an experienced healthcare practitioner with minimal or no benefit.
- The person has previously had two injections in the same shoulder.

**Acromioclavicular joint disorder** (NICE CKS) [5]

- Consider corticosteroid injection if the pain is severe.

**Glenohumeral joint osteoarthritis** (NICE CKS) [6]

- Consider a corticosteroid injection for the short-term management of an acute exacerbation of pain due to joint inflammation or temporary symptom control, for example, if surgery has been delayed.

**Rheumatoid arthritis (**NICE BNF**)** [7]

Corticosteroids are injected locally for an anti-inflammatory effect. In inflammatory conditions of the joints, particularly in rheumatoid arthritis, they are given by intra-articular injection to relieve pain, increase mobility, and reduce deformity in one or a few joints; they can also provide symptomatic relief while waiting for disease-modifying antirheumatic drugs (DMARDs) to take effect.

(NICE CKS) [7]

- Seek specialist advice about management. Offer short-term treatment with glucocorticoids, either:
- An intra-articular glucocorticoid injection (for example, methylprednisolone acetate or triamcinolone acetonide) for a localised RA flare, if the expertise is available in primary care.
- The dose depends on the joint's size and the condition's severity.

**Outside the scope of this review,**

**Septic arthritis**

is an emergency and **outside the scope** of this review. It is a serious type of joint infection that should be treated immediately.

- Patients will usually be treated in the hospital with antibiotics given straight into a vein; fluid may be drained from the affected joint, and affected patients will probably have to take antibiotic tablets for several weeks after they leave the hospital.

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[5] https://cks.nice.org.uk/topics/shoulder-pain/management/acromioclavicular-joint-disorders/
[6] https://cks.nice.org.uk/topics/shoulder-pain/management/glenohumeral-joint-osteoarthritis/
[7] https://bnf.nice.org.uk/treatment-summaries/corticosteroids-inflammatory-disorders/

**Methods**
AXA Health's approach involves learning, adapting, and improving care using high-quality, evidence-based strategies. To achieve this, AXA developed a traffic light system to assess the evidence for developing treatments to identify which treatments are safe and effective.
A combination of evidence from NICE guidance, Systematic Reviews, and Randomised Controlled Trials generates traffic light ratings.

The following definitions are used in the traffic light system:
Green: Conventional Treatments* that have met the standards of evidence we've set for safety and efficacy.
Amber: Unproven Treatments that have met the standards of evidence we've set for safety but not efficacy.
Red: Unproven Treatments* that have not met the standards of evidence we've set for safety.

**Search Strategy**
The following databases were searched: the Trip Database (www.tripdatabase.com) - which searches the primary higher-level evidence sources, e.g., NICE, AHRQ, Cochrane etc.; PubMed (https://pubmed.ncbi.nlm.nih.gov/) - covers the leading journal articles and Google - used for general searching and to look for specific documents from the FDA, Aetna, NHS etc.

**Analysis**
Each piece of evidence retrieved is subjected to an assessment of its quality and the overall effect. Based on this evidence, an overall conclusion is reached, and a traffic light rating is awarded where appropriate. This evidence is then shared with key stakeholders for critical feedback.

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**Results of the Evidence Review**

**General**

**2021:** Shoulder Pain Diagnosis, Treatment and Referral Guidelines for Primary, Community and Intermediate Care.

These care pathway guidelines for the shoulder have been written in collaboration with the NHS Evidence-Based Interventions (EBI) programme.

Treatment in primary care/Community triage and intermediate services recommendations

- Image-guided subacromial injections should **NOT** be used.
- Trial evidence has now demonstrated that image-guided subacromial injections offer no added benefit.

- The NHS England EBI Programme now recommends against image-guided subacromial injection.

**2020:** Evidence-Based Interventions List 2 Guidance (2020) Academy of Medical Royal Colleges

- Image-guided subacromial injections are not recommended in primary, intermediate or secondary care.
- Evidence does not support the use of guided subacromial injections over unguided subacromial injections in treating subacromial shoulder pain.
- Other image-guided shoulder injections should only be offered under the guidance of a secondary care shoulder service.

2019: Clinical indications for image-guided interventional procedures in the musculoskeletal system: a Delphi-based consensus paper from the European Society of Musculoskeletal Radiology (ESSR)—part I, shoulder

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**Systematic Review Evidence**

2019 Cochrane review: Image-guided glucocorticoid injection versus injection without image guidance for shoulder pain

The Cochrane review included 19 trials (randomised or quasi-randomised) covering 1035 participants. Fourteen trials included participants with rotator cuff disease, four with adhesive capsulitis, and one with mixed or undefined shoulder pain.

The review concluded:

- Our updated review does not support the use of image guidance for injections in the shoulder.
- Moderate-certainty evidence indicates that ultrasound-guided injection in the treatment of shoulder pain probably provides little or no benefit over injection without imaging in terms of pain or function, and low-certainty evidence indicates there may be no difference in the quality of life.
- We are uncertain if ultrasound-guided injection improves participant-rated treatment success due to very low-certainty evidence.
- Low-certainty evidence also suggests ultrasound-guided injection may not reduce the risk of adverse events compared with non-image-guided injection.
- No serious adverse events were reported in any trial. The lack of significant benefit of image guidance over injection without image guidance to improve patient-relevant outcomes or reduce harm suggests that any added cost of image guidance appears unjustified.

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Since the Cochrane review, two newer systematic reviews have been published:

**2021:** Image-Guided Versus Blind Corticosteroid Injections in Adults With Shoulder Pain: A Systematic Review and Meta-Analysis

The review included 1136 participants from 20 RCTs, concluding:

- The image-guided approach was associated with significant improvement in pain and shoulder functionality.
- No significant difference was observed between the two approaches in terms of disability scores and side effects.

2022: Systematic review and meta-analysis on the effectiveness of ultrasound-guided versus landmark corticosteroid injection in the treatment of shoulder pain: an update (2022).

The review included 18 trials and 1010 patients; the review concluded:

- Our analysis showed that US-guided CS injection was effective in treating various shoulder diseases.
- Further research on the cost-effectiveness of US-guided CS methods is needed."

Aetna has a document on ultrasound guidance from 2022.

**Osteoarthritis**
**2022** NICE Osteoarthritis: assessment and management (update)
**Evidence reviews for the clinical and cost-effectiveness of intra-articular injections for the management of osteoarthritis**

Intra-articular hyaluronic acid (non-image guided) compared to placebo .
Are image-guided injections more clinically effective than palpation-guided injections for acromioclavicular joint (ACJ) pain? (2017)

Clinical bottom line

- There is limited evidence that steroid injections to the ACJ, administered under ultrasound guidance (US-guidance) is no more effective than those using a palpation guidance method in terms of reducing pain and increasing function in the short (3 weeks) and medium term (6 months).
- There is no evidence for long term outcomes (12 months onwards). Further research is needed to justify the additional cost and wait times of US-guided over palpation-guided injections in light of similar clinical outcomes.

**Frozen shoulder**
See the Cochrane review.

**Rotator Cuff**

Effectiveness of Ultrasound-Guided Versus Anatomic Landmark-Guided Corticosteroid Injection on Pain, Physical Function, and Safety in Patients With Subacromial Impingement Syndrome: A Systematic Review and Meta-analysis (2022)
The review included 12 RCTs covering 891 patients. The authors found:

- *Ultrasound-guided injection of corticosteroids is potentially superior to anatomic landmark-guided injection in improving the clinical symptoms of subacromial impingement syndrome;*
- *However, these findings should be interpreted with some caution as the quality of evidence was rated as moderate to very low."*

Also, in the Cochrane review, most trials were for rotator cuff

**Acromioclavicular joint disorder**
No specific SRs to address the population.

**Glenohumeral joint osteoarthritis**
No new evidence beyond Cochrane or NICE guidance.

**Rheumatoid arthritis**
No specific SRs to address the population.

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