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To See Or Not To See? That Is The Question. Ultrasound Guidance To Improve Accuracy When Injections Are Used In Tendinopathies: Two Cadaveric Studies.

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Faculty Disclosure Information

- Nothing to disclosure.

Background & Aim:
Treating supraspinatus tendinopathy and patellar tendinopathy presents challenges for healthcare professionals.
This study aims to assess the **precision of needle interventions** in these conditions, comparing **ultrasound-guided** and **blind** approaches.

Methods:
Two cadaveric studies were conducted, involving injections under **ultrasound guidance or blindly**, with **randomization** of specimens and practitioners.

A 1cc infiltration of **colored natural latex** was performed to mark the site infiltration.

Ultrasound: 5-16 MHz linear array transducer in longitudinal and transversal view.

- Physician`s average age of 36.9 years (range of 25 to 59 years)
- Invasive therapies with needles: experience of 6.9 years (range of 2 to 25 years)
- Use of musculoskeletal ultrasound: average experience of 3.3 years (ranging from 1 to 15 years)

The main response variable was analyzed, this being the **average distance to the point of the tendon to be treated (bullet point)** in the different anatomical cuts, categorizing this mean as ***precision*.**

Supraspinatus tendinopathy: 20 fresh cadaveric shoulders and **30 experienced musculoskeletal** ultrasound practitioners performed *4 ultrasound-guided and 4 unguided punctures each*, totaling **240 punctures** analyzed in 3 anatomical cuts.

Once the infiltrations were done, the extremities were frozen at -40°C for 1 month. Then, serial cuts, 1cm thick on the sagittal plane

Immediately after making the cuts, we proceeded to identify the three most significant serial cuts that allowed us to collect information on the location of the latex and photograph it

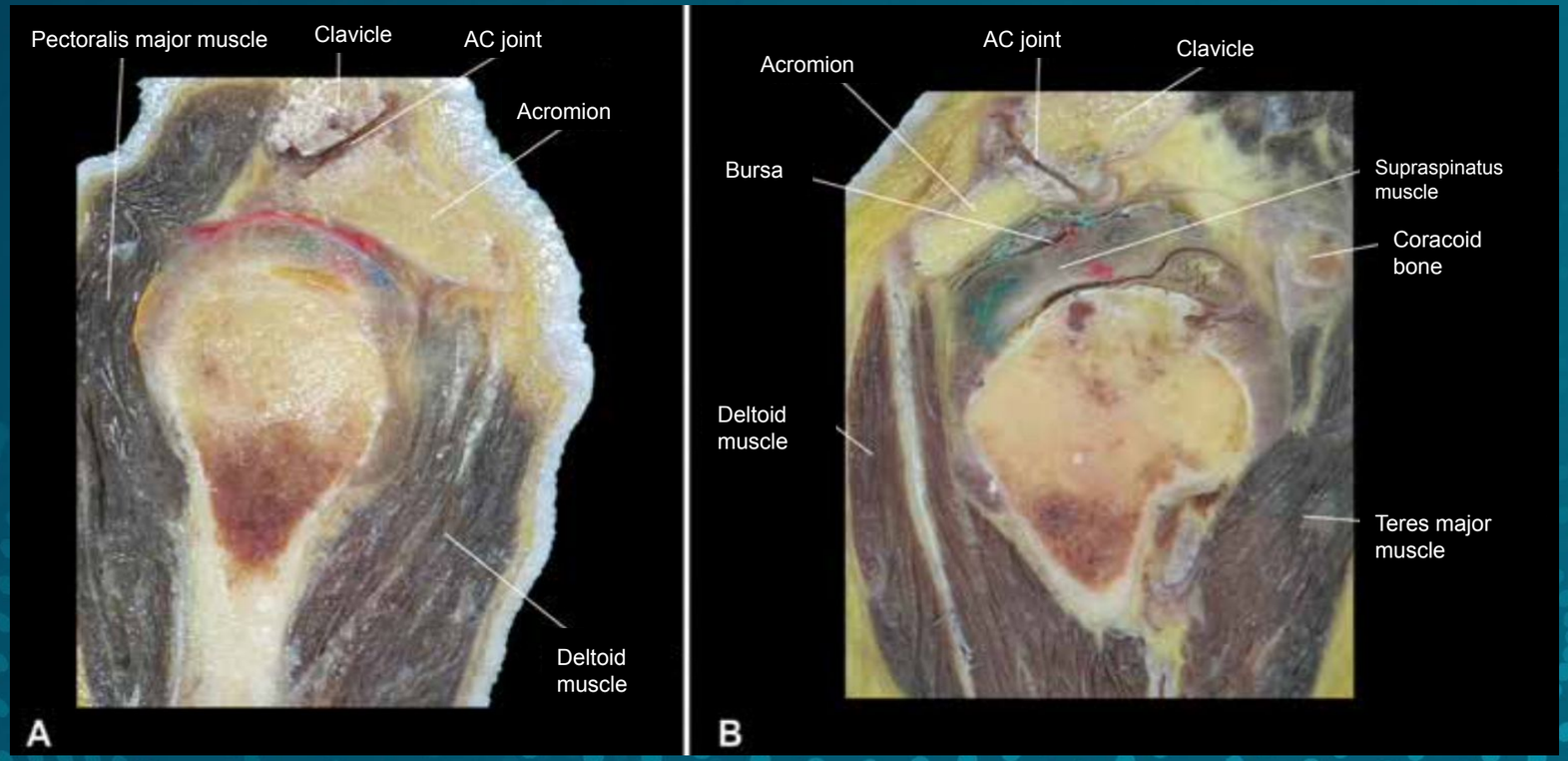
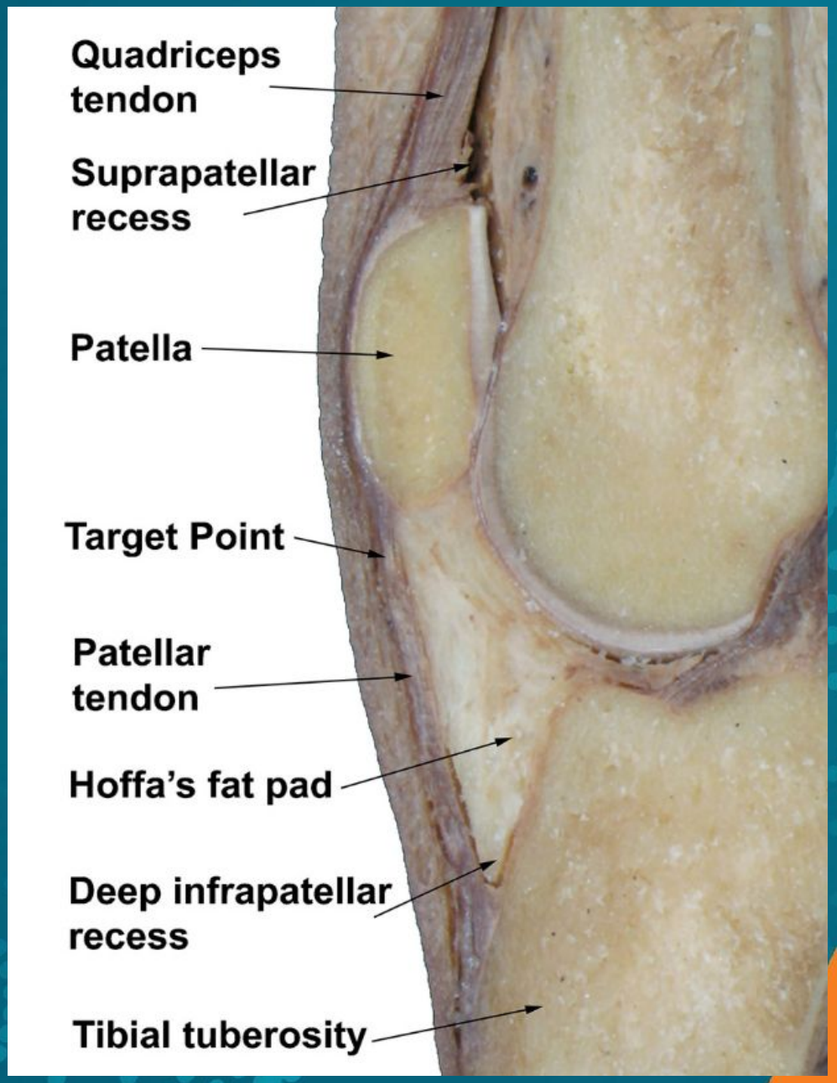


Figure A-B. Coronal section of the glenohumeral joint.
In colors, the punctures are identified (colored latex).
It can be observed that without the ultrasound control, the infiltrations were made in the SSE tendon as well as in adjacent structures.

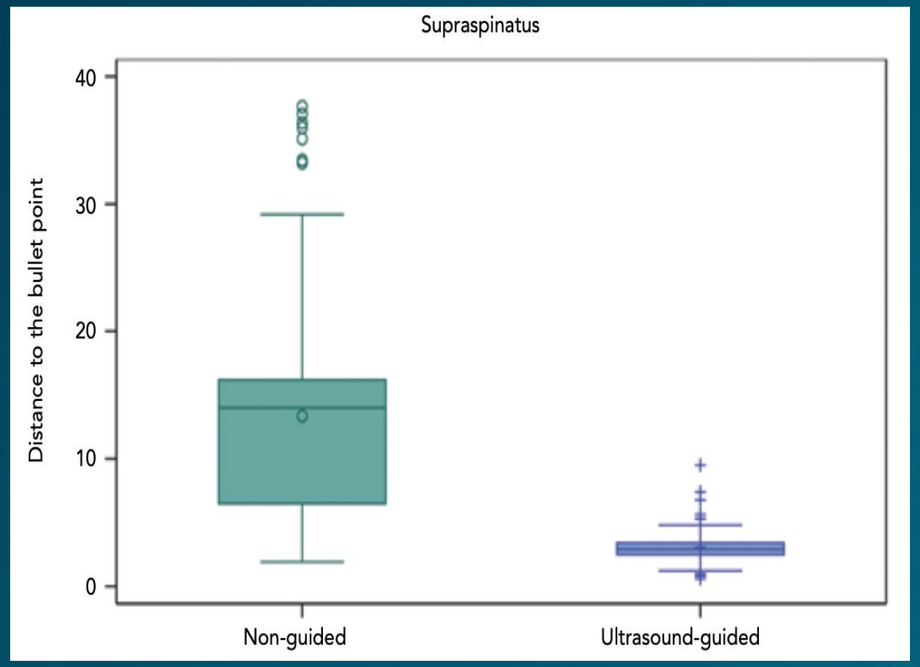
Patellar tendinopathy:

26 knees from fresh cadavers were used, and **26 experienced practitioners** conducted *6 ultrasound-guided and 6 blind punctures* each, resulting in **312 injections** analyzed across 2 anatomical cuts.

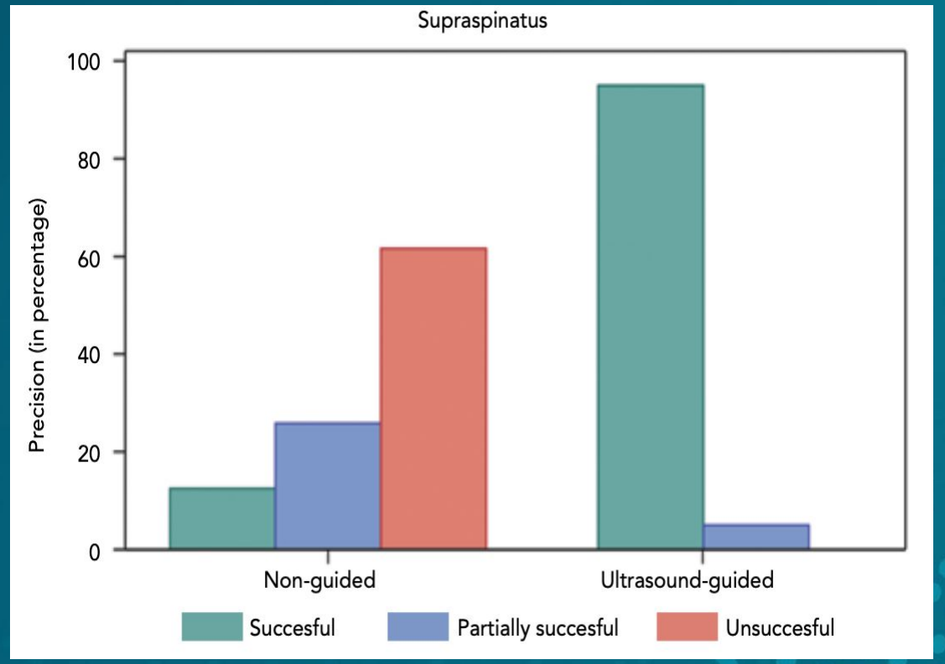


Same methodological analysis. Computer analysis of the images, Fiji (Fiji Is Just ImageJ) software was used. (Open source software focused on analyses of biological images)

Results



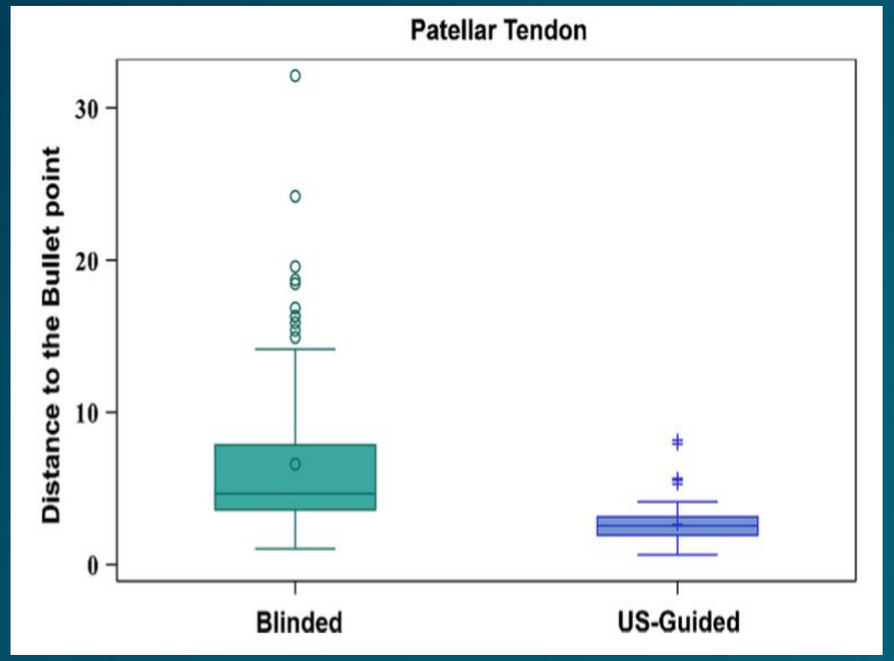
Distance to the bullet point from the punctures.



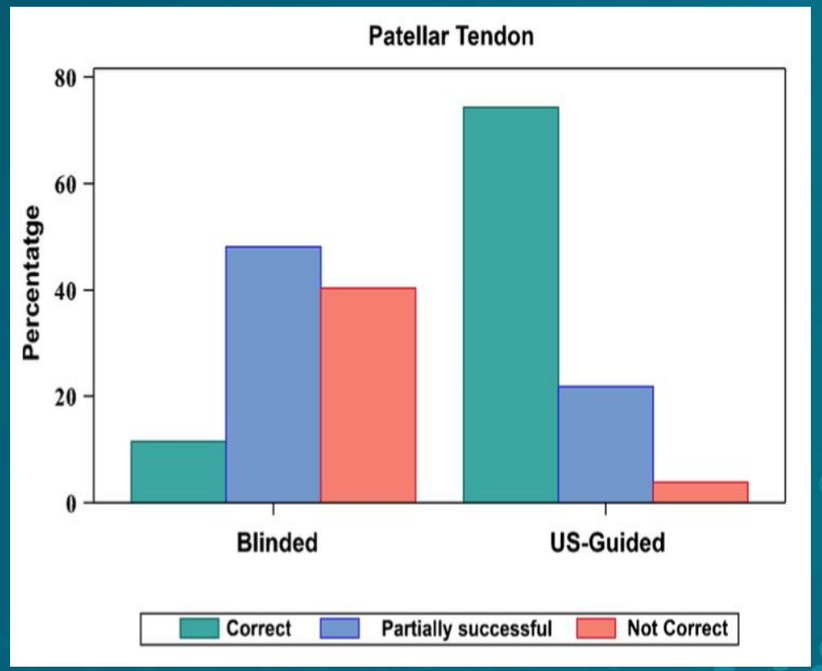
Precision of the ultrasound-guided or blind infiltrations.

Supraspinatus: ***unguided*** punctures → **10mm farther from the target** than ultrasound-guided punctures, ***ultrasound-guided*** punctures achieving **95% precision** and **unguided punctures only 12.5% precision.**

Results



Distance to the target point of the punctures performed in both an ultrasound-guided mode (green) and those performed blind (blue)



Distance to accuracy of the ultrasound- guided or blind infiltrations. Standing out in the target point is 100% infiltrations, 100% in green with the partially successful ones in blue and the wrong ones in red. Note the clear difference in the green bar of the ultrasound-guided infiltrations over the blind

Patellar: ***unguided*** injections → also on average **10mm away from the target** point compared to ultrasound-guided injections, with ***ultrasound-guided*** injections achieving an **accuracy of 74.36%** and **unguided injections only 11.54% accuracy (p < 0.0001).**

Significant differences ($p<0.0001$) in the distance from the target point were observed in both studies.

Ultrasound-guided interventions significantly improve accuracy
compared to blind injections.

This finding emphasizes the importance of **ultrasound guidance when injection treatments are needed** for these conditions, such as injections of *platelet-rich plasma (PRP)*, *ultrasound-guided galvanic electrolysis technique (USGET)*, *polidocanol*, *or stem cells*.

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