NEWSPAPER POST

TheSynapse

The Medical Professionals' Network

MEDICAL IMAGING

Ultrasound Evaluation of the Shoulder

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High-resolution real-time ultrasound US has been shown to be a successful imaging modality for both rotator cuff and non–rotator cuff disorders. Advances in technology have substantially improved US image quality, producing spatial resolution the may exceed that obtained with magnetic resonance imaging. Also, US is inexpensive, fast, and offers dynamic capabilities for examining the patient in multiple scanning planes and specific arm positions or during movements. Ultrasound also allows one to focus the examination on the precise region of maximum discomfort as indicated by the patient.

The rotator cuff consists of four muscles and their tendons: subscapularis, supraspinatus, infraspinatus, and teres minor. Non-rotator cuff structures include the long head of biceps tendon, the subdeltoid bursa and the acromio-clavicular joint.

All rotator cuff tendons are readily visualised with ultrasound (Figures 1-3). The tendon of the long head of the biceps is also well visualized within the bicipital groove (Figures 4 & 5).

Rotator cuff abnormalities represent a spectrum ranging from tendinosis to massive tear. Tendinosis is tendon degeneration without clinical or histologic signs of inflammatory response, and on ultrasound the tendon shows a diffuse heterogeneous hypoechogenicity (Figure 6).

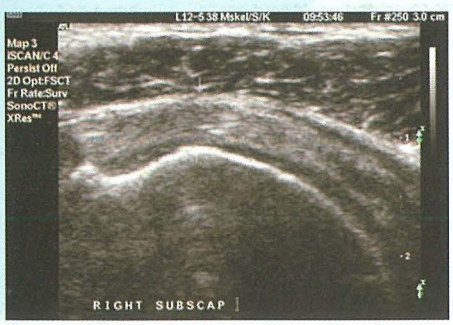

Figure 1. *The subscapularis tendon (arrows) demonstrates an internal fibrillar pattern and lies below the deltoid muscle anterior to the shoulder joint.*

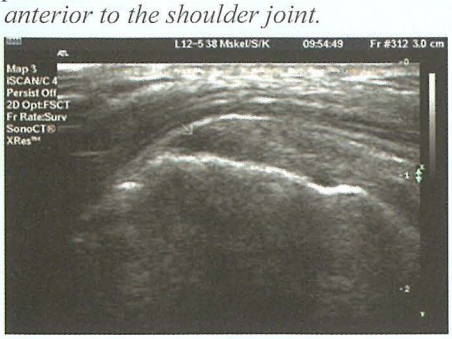

Figure 2. *Supraspinatus tendon is seen as an echogenic band superior to the humeral head, with a convex upper surface; it tapers toward the greater tuberosity. The arrow indicates a hypoechoic area due to tendon anisotropy.*

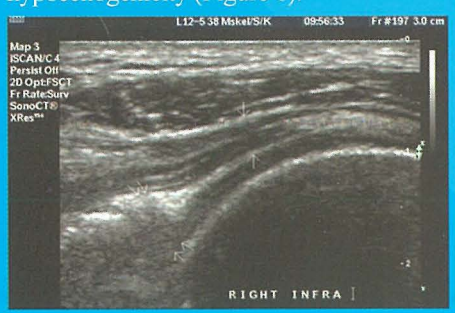

Figure 3. *The infraspinatus tendon (arrows) lies posterior and inferior to the supraspinatus tendon on the posterior aspect of the humeral head. Double arrows outline the glenoid labrum.*

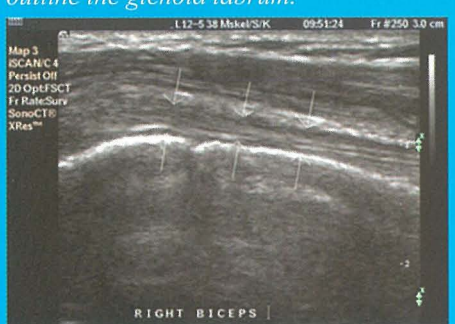

Figure 4. *Biceps tendon, longitudinal view (arrows) is seen as an echogenic structure with an internal fibrillar pattern.*

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Editor's Word

Welcome to another interesting issue of The Synapse Magazine, which actually marks its sixth anniversary. Apart from the regular contributions on radiology and avian influenza, you will find articles on **The Pharmacy of Your Choice** scheme by Mary Ann Sant Fournier, Part I of **Unravelling the Tangle of Genetic Testing** by Dr Chris Scerri and the second and last part of the article discussing the controversial topic – **Data Protection Act**, presented by Professor Pierre Mallia. You will also find articles by Dr Edgar Pullicino on **Treating Gastro-oesophageal reflux disease with sense** and by Dr Charmaine Gauci discussing the **450 daily cases of Infectious Intestinal Disease in Malta.** Furthermore, as part of the series of contributions on stress management, we proudly present the first **Letter from Your clinical psychologist.**

In this issue we get to meet Dr Victor Calvagna, who is often seen on our local media representing the Puttinu Cares Support Group.

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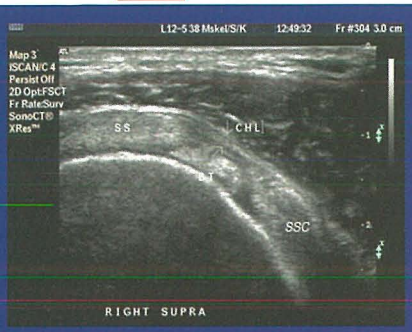

Figure 5. *Biceps tendon in transverse view (BT) lies below the coraco-humeral ligament (CHL, arrows) and between the supraspinatus (SS) and subscapularis (SSC) tendons.*

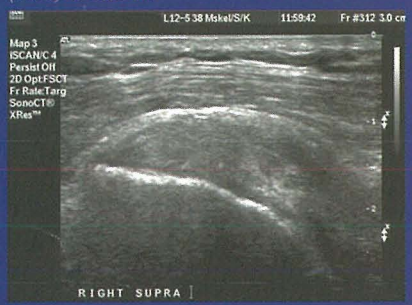

Figure 6. *Supraspinatus tendonosis appears as heterogeneous echogenicity without any focal area representative of a tear.*

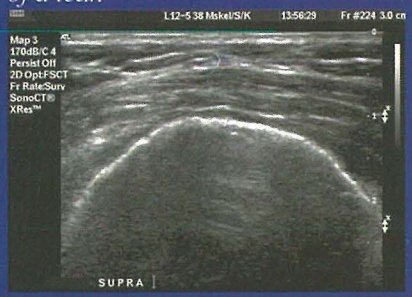

Figure 7. *Complete tear of the supraspinatus tendon with retraction: note that there is no supraspinatus tendon between the deltoid muscle and humeral head.*

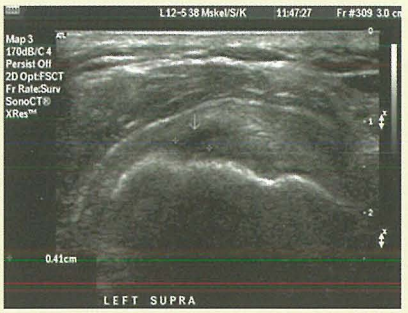

Figure 8. *A full-thickness tear is seen in the supraspinatus tendon involving the anterior aspect of the tendon. The defect fills with anechoic joint fluid.*

With a full thickness tear of the supraspinatus tendon, the tendon is absent on longitudinal view and the deltoid muscle lies in contact with the humeral head (Figure 7). A full thickness tear may only involve part of the tendon, where the tendon defect fills with joint fluid (Figure 8).

A partial-thickness supraspinatus tendon tear may lie either on the articular or the bursal surface of the tendon. An articular-side partial-thickness tear appears as a distinct hypoechoic or mixed hyper-hypoechoic defect of the articular surface (Figure 9). A bursal-side partial-thickness tear produces flattening of the bursal surface, with loss of the superior convexity of the tendon (Figure 10).

Secondary US signs of a tendon tear are surface irregularity of the greater tuberosity (Figure 10) and the presence of fluid in the joint and the bursae (Figure 12). Essential information for the orthopaedic surgeon includes characterization of the tear, the dimensions and location of the tear, and the amount of tendon retraction on the longitudinal view.

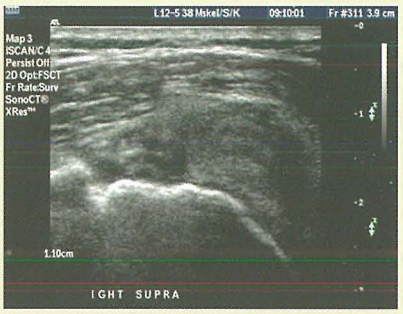

Figure 9. *Supraspinatus tendon, longitudinal view shows an articular-side partial-thickness tear as a distinct hypoechoic defect (arrow) at the tendon's articular surface.*

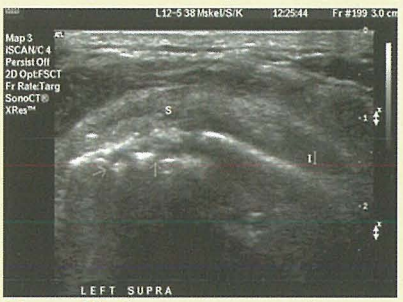

Figure 10. *Supraspinatus tendon articular side partial thickness tear may present as cortical bone irregularity (arrows) at the greater tuberosity. (S = supraspinatus, I = infraspinatus.)*

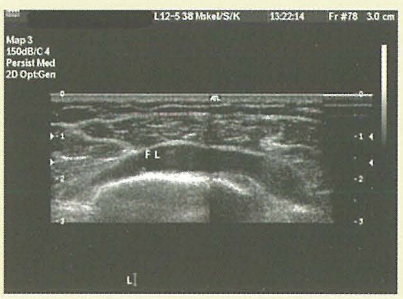

Figure 11. *Greater tuberosity, transverse view. A massive fluid collection (FL) is seen in the subdeltoid bursa.*

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Ultrasound Evaluation of the Shoulder

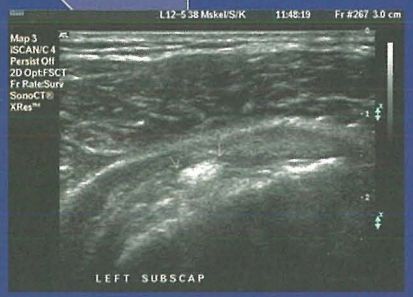

Figure 12. *Subscapularis tendonitis with calcification (arrows).*

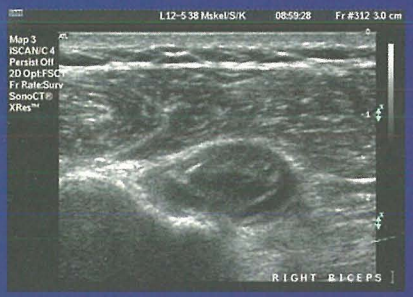

Figure 13. *LHBT, transverse view. The biceps tendon is enlarged with an inhomogeneous echotexture in keeping with tendinosis.*

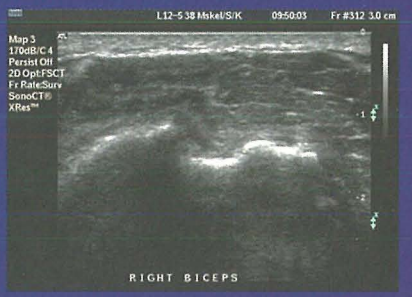

Figure 14. *LHBT, transverse view. Chronic rupture results in absence of the tendon from the bicipital groove.*

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Calcific tendinitis is a common disorder caused by deposition of calcium hydroxyapatite crystals in various shoulder tendons. The cause is considered to be dystrophic, and all tendons can be affected, although the most common site is within the supraspinatus tendon near its insertion (Figure 12).

Long head of biceps tendonosis is seen as thickening of the tendon within the bicipital groove (Figure 13). A long head of biceps tear results in an empty bicipital groove due to tendon retraction (Figure 14).

High-resolution US has been shown to be an efficient imaging modality for the assessment of a wide spectrum of rotator cuff and non–rotator cuff disorders. It is fast and inexpensive and allows dynamic assessment of the joint. It may also be used to guide interventional procedures.

The above short review serves as a pictorial demonstration of the most common disorders in the rotator cuff and surrounding tendons as shown on ultrasound. Ultrasound has become a very valuable tool in the assessment of musculo-skeletal disorders. Further musculo-skeletal applications of ultrasound will be discussed in coming articles.

Acknowledgement: The author would like to thank Dr Martin Borg suggesting the theme of the above article. Further suggestions for future articles from other colleagues would be greatly appreciated.

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