50 Years Ago in CORR

Arthrography of the Shoulder Joint

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The diagnosis and understanding of shoulder disorders has advanced dramatically in recent years. As with most human disorders, such as the many forms of arthritis [1], the number of known separate entities has increased over time. This increase is in part due to new and evolving diagnostic techniques. Arthroscopy of the shoulder

joint was described by Burman in 1931 [2]. Burman claimed to have examined over 90 joints in adults and children, including examinations of the wrist, elbow, hip, knee, and ankle. The technique did not gain widespread use until the 1970s when instrumentation had substantially improved. (Obtaining sufficiently bright light bulbs, for example, was a problem eventually

solved by fiber optics). The introduction of MRI in the 1970s [3, 4] was followed in the 80s with application of the technique to study the normal shoulder [5] and, shortly thereafter, to identify rotator cuff tears [7, 8]. With increasing refinement of the sequences and the ability to distinguish tissues with higher and higher resolution, MRI has allowed researchers and clinicians

Fig. 7 Cuff tear. (Top, left) Note dye appearing above and “around the corner” of the greater tuberosity of the humerus. (Top, right) Anteroposterior view in internal rotation. Note line of dye above and “around the corner” of the greater tuberosity of the humerus. (Bottom, left) Axillary view. Noted are the dye accumulation in normal postero-inferior joint recess, overlaid by dye in the subdeltoid bursa as a wider, more extensive dye shadow. (Bottom, right) Findings at surgery. Black silk suture is attached to retracted and ruptured cuff. Note the attritional changes at the facets of the greater tuberosity of the humerus from which the cuff has ruptured. (Reprinted with permission and © Lippincott Williams & Wilkins, from Samilson et al. Arthrography of the shoulder joint. *Clin Orthop Relat Res.* 1961;20: 21–32.)

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to noninvasively identify abnormalities not previously possible.

Prior to MRI, clinicians relied on arthrography to identify intra-articular abnormalities of the shoulder joint. According to Samilson et al. [11], arthrography was introduced in 1933 by Oberholzer [9]. The technique was certainly well established by the late 1940s [6, 10]. In 1960, Samilson and colleagues [11] comprehensively described the technique and appearance of the normal shoulder and in shoulders with a number of disorders: rotator cuff tears (see Fig. 7), tears or dislocations of the bicipital tendon, subluxation, frozen shoulder. Despite the fact that surgeons could better define these lesions by arthrography, the technique likely remained of limited use since they could diagnose most patients clinically and, even when diagnosed, the treatment options were limited. Open surgery could be performed for some shoulder conditions, but the surgery itself often required the patient to go through prolonged rehabilitation with unreliable relief of pain or restoration of function. By the time open and arthroscopic techniques had sufficiently evolved to make surgery a reliable alternative in the 1990s, MRI had largely supplanted traditional plain radiographic arthrography. Today, a

wide variety of disorders, such as the so called “SLAP” lesion (superior labral tear from anterior to posterior), can be readily diagnosed by MRI and treated arthroscopically.

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