



Current and emerging concepts in the management of rotator cuff tears

The majority of patients who undergo rotator cuff surgery experience excellent pain relief but return to high levels of function are less predictable and re-tear rates remain an important concern. Certain populations and tear types pose unique challenges. The aim of this focused issue is to provide expert opinion on current and emerging strategies to manage some of these challenging aspects of shoulder surgery.

Currently there is little consensus regarding the optimum treatment of partial rotator cuff tears. Surgical options for the symptomatic patient include tear completion and repair, in-situ repair, and debridement only. Recent systematic review has demonstrated that transtendinous repair is associated with more pain and inferior function in the first three months post-operatively, when compared to tear completion and repair. However, no difference in re-tear rates or other clinical outcomes was detected at final follow up (1). Despite that, because of concerns about post-operative stiffness, both of these popular repair options are less frequently utilized in professional throwing athletes. Instead, debridement represents the mainstay of surgical treatment in this population but return to the pre-injury level of sport remains unpredictable regardless of which option is chosen (2). An alternative newly emerging strategy to address partial tears without the need to perform a repair is the Regeneten implant (Smith & Nephew, Andover, MA, USA). This bioinductive collagen patch is easily inserted and secured over the tear arthroscopically. The patch is reported to increase native tissue at the tear site and therefore reduce strain. Potential advantages of this technology include avoidance of tear completion and/or repair, shorter surgical duration, quicker rehabilitation, and a lower risk of stiffness. Thon *et al.* explain the rationale behind the implant and share promising clinical results for its application in both partial and full thickness tears (in association with repair) (3). However, it is important to note that the current literature includes only a small number of cases, no long-term data exists, and specific studies in high demand athletic populations have not yet been undertaken. Further study is therefore required in order to define the role of this technology, but early outcomes are encouraging and hint at the potential for a paradigm shift in how we deal with partial tears.

Another controversial and rapidly developing area in rotator cuff surgery is the management of young patients with symptomatic irreparable tears. Surgical options include debridement only, partial repair, bridging inter-positional graft, superior capsule reconstruction (SCR), tendon transfer, and reverse shoulder arthroplasty (RSA). However, as a result of concerns regarding high rates of complications in young patients undergoing RSA there is a logical desire to avoid it in this population (4). Consequently, SCR has become an increasingly popular option. Although SCR is associated with significantly improved functional outcome scores it is important to note that the radiological graft failure rate has been reported to range from 4.2–55% at relatively short follow-up (5). This finding raises concerns about the possible longevity of promising early clinical results. An alternative option that may be suitable for a subset of patients is the subacromial balloon spacer (InSpace Balloon, OrthoSpace, Caesarea, Israel). Knapik *et al.* provide a narrative review of the rationale for the procedure and the reported clinical outcomes (6). The authors highlight that the spacer has been shown to significantly improve pain and range of motion, but that approximately one third of patients may progress to RSA. Potential advantages of the balloon spacer over alternative surgical options for irreparable tears include the short surgical time and less onerous rehabilitation, perhaps making the procedure most suitable for older patients and those with co-morbidities. However, there is currently an absence of high-quality comparative studies to help define the precise role and indications for each of the available surgical options for this challenging clinical problem.

Older patients with repairable tears also present pitfalls. These arise due to intra-operative difficulties related to osteoporosis and poor-quality tendon tissue, and concerns regarding substantially higher re-tear rates. However, Nolte *et al.* demonstrate in a narrative review that cuff repair in elderly patients is valuable (7). Specifically, they report that healthy elderly patients benefit equally from cuff repair when compared to their younger counterparts. The authors conclude that comorbidities, but not chronological age, appear to be independent risk factors for failure. A further consideration in addressing the intra-operative pitfalls of cuff repair surgery in elderly patients is the optimal selection of implants. This can be disconcerting given the plethora of available options. Aristizabal and Barber provide a masterclass in biomaterial and

biomechanical characteristics of current anchors and suture materials and provide a comprehensive overview of important factors for surgeons to consider when selecting implants for cuff repair in a wide range of common scenarios, including the older patient (8).

Finally, a major concern in athletic populations undergoing rotator cuff surgery is the likelihood of return to the pre-injury level of sport. Seiter *et al.* comprehensively review the epidemiology and outcomes of rotator cuff repair in athletic populations (2). The authors report that return to sport is not predictable, particularly in professional athletes and those involved in overhead sports. The detailed review is an excellent resource for guiding appropriate expectations after surgery, including the timing of return to sport, and usefully categorises the evidence into specific sports categories and age groups.

In summary, this focused issue tackles some of the most challenging aspects of rotator cuff repair in contemporary practice. The expert opinions and narrative literature reviews provided in each of the included articles are invaluable in guiding clinical practice. I would like to thank all of the authors for their contributions to this focused issue.

Acknowledgments

Funding: None.

Footnote

Provenance and Peer Review: This article was commissioned by the editorial office, *Annals of Joint* for the series “Current and Emerging Concepts in the Management of Rotator Cuff Tears”. The article did not undergo external peer review.

Conflicts of Interest: The author has completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/aoj-2020-rct-06>). The series “Current and Emerging Concepts in the Management of Rotator Cuff Tears” was commissioned by the editorial office without any funding or sponsorship. Dr. AS served as the unpaid Guest Editor of the series and serves as an unpaid editorial board member of *Annals of Joint* from Sep 2019 to Aug 2021. Dr. AS reports personal fees from Smith & Nephew within the last 36 months, outside the submitted work. The author has no other conflicts of interest to declare.

Ethical Statement: The author is accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Received: 15 May 2020; Accepted: 25 May 2020; Published: 15 July 2020.

doi: 10.21037/aoj-2020-rct-06

View this article at: <http://dx.doi.org/10.21037/aoj-2020-rct-06>

doi: 10.21037/aoj-2020-rct-06

Cite this article as: Saithna A. Current and emerging concepts in the management of rotator cuff tears. *Ann Joint* 2020;5:24.