



Non-Arthroplastic Treatment of Glenohumeral Osteoarthritis

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Introduction

Osteoarthritis of the glenohumeral joint is a common cause of pain and dysfunction. For active individuals, it can have a dramatic impact on quality of life due to limitations in range of motion and pain resulting in significant restriction of activities. A variety of treatment options exist for glenohumeral arthritis ranging from non-operative modalities to total shoulder arthroplasty. However, the diagnosis of early osteoarthritis is difficult to make based on radiographs alone, as articular cartilage loss can be underappreciated in the absence of joint space narrowing.¹ The decision to recommend arthroplasty becomes increasingly challenging when caring for younger patients. Outcomes of shoulder arthroplasty in patients younger than 60 years old are less predictable, and therefore may not be the best option for that particular population.² It is also possible that total joint arthroplasty may be contraindicated in young patients due to functional limitations that the procedure presents postoperatively.³ Not to mention the belief that younger patients' propensity to place greater stress on the prosthesis may result in premature prosthetic loosening, destruction of bone stock, and therefore enhanced complexity of revision surgery.³

The purpose of this review is to evaluate the effectiveness of alternative methods for the treatment of glenohumeral arthritis using non-arthroplastic techniques.

Materials and methods

A literature search was performed using the National Center for Biotechnology Information, National Library of Medicine Databases and Google Scholar. Inclusion and exclusion criteria are listed in table 1.

Inclusion criteria were determined based on type of procedure, follow up for patients involved, and reporting of pre-op and post-op pain levels. Non-arthroplastic procedures also include palliative treatments, injections, and biologics such as platelet enriched plasma. Exclusion criteria were determined based on type of treatment, location of treatment, and whether or not treatment was performed on human patients.

Results

The literature revealed many alternatives to arthroplasty which can be considered for younger patients (less than 60 years of age) who are diagnosed with mild-moderate glenohumeral arthritis.⁴ Table 2 displays the efficacy of the non-arthroplasty procedures that were reviewed. Failure was based on whether or not the patient progressed to full arthroplasty or saw no decrease in pain.

Discussion

Eustace *et al* studied the effect of corticosteroid injection (triamcinolone) patients with chronic shoulder pain. When injections were accurately placed, patients reported greater pain relief compared to the patients with inaccurate injection. However, the benefit of corticosteroid injection did not reach clinical significance.⁵

Nizlan *et al* investigated arthroscopic suprascapular neurectomy. He utilized a shaver and a radiofrequency device to decompress the nerve within the spinoglenoid notch. 75% of the patients reported good-excellent results post-operatively. The authors confirmed the effectiveness of suprascapular neurectomy as a viable procedure in selected patients.⁶

Table 1.

Criteria	
Inclusion	non-Arthroplasty procedure follow up pre-op and post-op pain levels reported
Exclusion	total shoulder arthroplasty animal studies Procedure not performed on glenohumeral joint

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Table 2.

Author	Non-Arthroplastic Procedure	# of patients	follow up (months)	Post op pain relief	Failure rate
Eustace	Carticosteroid injection	37	24	Varied	–
Nizlan	Suprascapular Neurectomy	20	29	Good to Excellent	
Cameron	Arthroscopic Debridement	61	24	Significant	11%
McCarty	Arthroscopic Debridement	19	20	Significant	15%
Richards	Arthroscopic Debridement	8	14	Moderate	–
Millet	Comprehensive Arthroscopic Management	30	32	Good To Excellent	20%
Savoie	Biologic Resurfacing	23	48	Significant	22%
Muh	Biologic Resurfacing	16	60	Minimal	38%
Strauss	Biologic Resurfacing	45	34	Minimal	51%

Cameron *et al*, McCarty *et al*, and Richards *et al* present data on the outcomes of arthroscopic debridement with or without capsular release. These studies support the role of arthroscopic debridement in the treatment of patients with moderate degenerative changes. However, less favorable results were seen in those patients with severe arthritic changes⁷. Specifically, patients with early grade IV osteoarthritis with lesions less than 2 cm in diameter reported significant pain relief and gain of function¹. Additionally, it was concluded that patients with unipolar lesions had significantly greater outcomes than patients with bipolar lesions. It is therefore safe to conclude that arthroscopic debridement with capsular release can delay more significant procedures while improving pain and range of motion.

Millet *et al* examined outcomes of the comprehensive arthroscopic management procedure (CAM). The CAM procedure involves glenohumeral chondroplasty, humeral osteoplasty, osteophyte resection, capsular release, subacromial decompression, axillary nerve neurolysis, biceps tenodesis, and removal of loose bodies.⁸ Significant pain relief was observed in 80% of patients. The authors successfully showed that the CAM procedure improved pain, function, and provided a joint sparing alternative to arthroplasty.⁸

Savoie *et al* investigated arthroscopic resurfacing of the glenoid using a Restore biologic patch combined with capsular release. 65% of patients reported satisfaction at final follow up with only 22% going on to arthroplasty. They concluded that biologic resurfacing provided significant improvement for young patients diagnosed with severe glenohumeral arthritis.⁹

Muh *et al* studied patients upon which he performed open resurfacing of the glenoid and capsular release. He utilized Graftjacket in seven patients and achilles tendon allograft in nine patients. 44% of patients required conversion to total shoulder. Because of the high failure rate, Muh *et al* felt that their hypothesis, that biologic resurfacing would be a durable solution for early shoulder arthritis, was inconclusive.¹⁰

Strauss *et al* reported on 45 patients that underwent open biologic resurfacing using a lateral meniscus allograft

combined with prosthetic humeral head resurfacing or replacement. 51% of patients went on to conversion to total shoulder arthroplasty, or had an ASES score of less than 50 points on a post-op survey.¹¹ Strauss *et al* described their results as having an unacceptable failure rate and proposed that biological resurfacing may have little to no role in the treatment of glenohumeral arthritis.¹¹

After reviewing the relevant literature, it would appear that some common patterns have emerged with regard to particular procedures. Arthroscopic debridement is most successful when performed in young patients (< 60), on lesions less than 2 cm in diameter, and with patients presenting with unipolar lesions of the glenohumeral joint.^{1,7,12} Although outcomes have shown good results, patients who fail arthroscopic debridement accept poor outcomes or go onto arthroplasty.^{1,7,12}

Patients who underwent biologic resurfacing have received mixed results. However, Savoie *et al* demonstrated positive outcomes in their cohort of patients receiving arthroscopic biologic resurfacing.⁹ Muh and Strauss both reported negative outcomes for their procedures using biologic resurfacing with and without utilization of prosthetic humeral head resurfacing.^{10,11} It is worth noting that each of the authors used different materials for grafting during their respective procedures and that the severity of arthritis may be variable from group to group. Therefore, it is possible that more research needs to be conducted on the material used in resurfacing procedures and their respective indications in order to conclude in regards to possible outcomes.

Conclusion

Determining the proper treatment plan for patients with glenohumeral arthritis depends on a multitude of factors including the patient's age and desired activity level, severity of arthritis, and extent of dysfunction. A variety of non-arthroplastic treatment options exist for the younger cohort and/or those presenting with only mild-moderate glenohumeral osteoarthritis. Patients undergoing non-

arthroplastic treatments have demonstrated improved function, decreased pain, and improved quality of life. As research advances, new methods of treating glenohumeral osteoarthritis may emerge. Biologics such as platelet-enriched plasma are showing promise in pain reduction and may one day play a role in the treatment of osteoarthritis.¹³

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