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Title: Surgical Treatment Options for Articular Cartilage Defects of the Glenohumeral Joint: A Systematic Review

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have nothing to disclose.



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Introduction

- Damage to articular cartilage is most common in weight-bearing joints such as the hip, knee, and ankle, but may also be present in non-weight-bearing joints such as the shoulder.^{1,2}
- While a number of joint-preserving surgical interventions with established efficacy exist for cartilage defects of the knee, and have been adapted for use in the glenohumeral (GH) joint, there still exists no clear consensus amongst orthopaedic surgeons on the indications, outcomes, and safety profile of the different surgical treatment techniques for chondral defects of the GH joint.^{2,7,9,10,11}



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Objective & Methods

- The purpose of this systematic review was to compare the clinical outcomes and safety profile of different joint-preserving surgical interventions in patients with focal chondral lesions of the GH joint.
- A literature search was conducted using PubMed, Embase, and Medline
- Inclusion: patients who underwent a joint-preserving surgical procedure to treat a focal chondral defect of the glenoid, humeral head, or both
- Exclusion: patients with diffuse cartilage defects, non-English studies, animal or cadaveric studies, non-surgical studies, review articles, technique articles without outcomes, and case reports



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Results

Study Characteristics & Patient Demographics

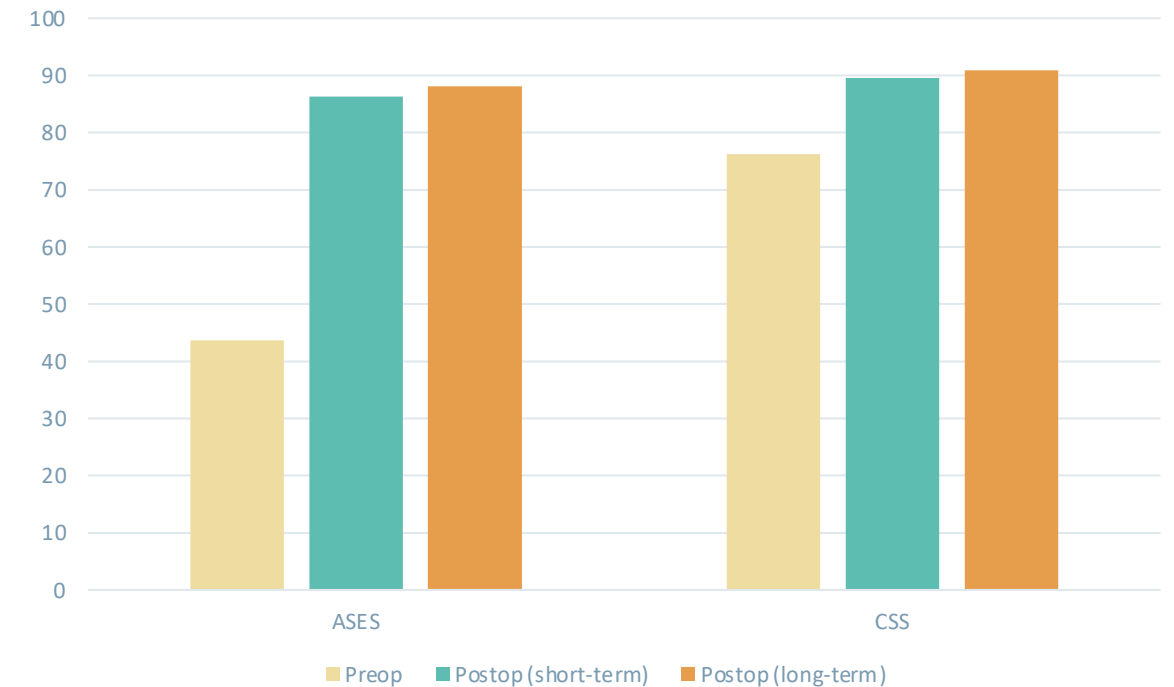
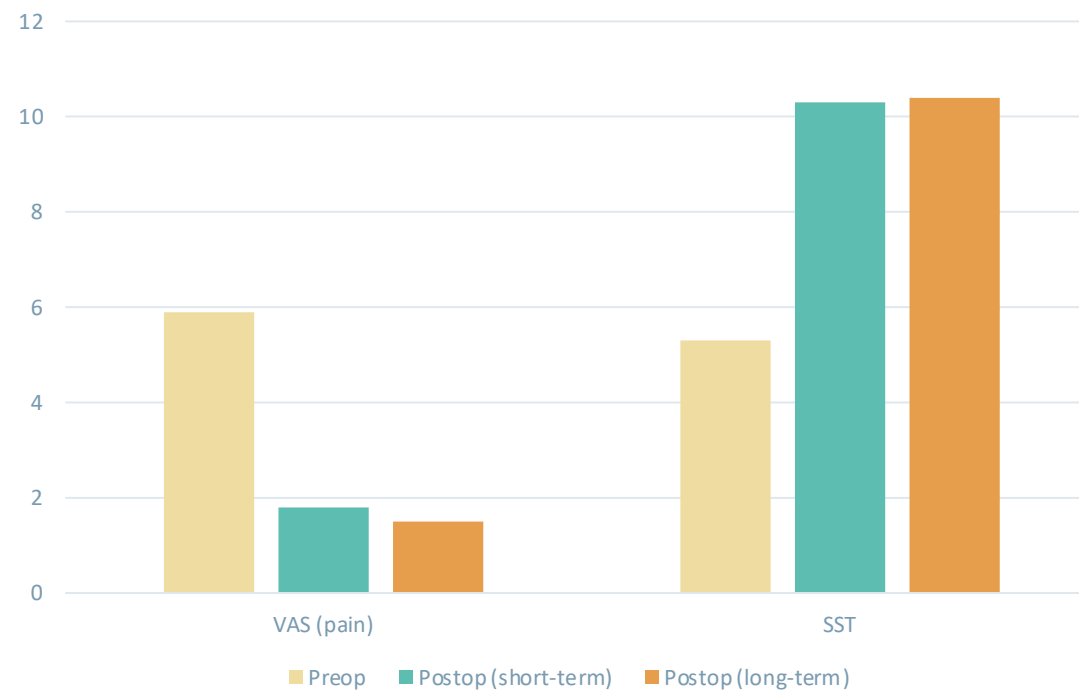
Study	Treatment type	Sample size (at final f/u)	Mean f/u, years	Mean age, years	Lesion location	Mean lesion size, cm ²
Boehm et al. (2020)	ACI	7	2.7	43	7H	H: 3.0
Buchmann et al. (2012)	ACT-Cs	4	3.4	29	2H, 1G, 1GH	H: 6.0, G: 2.0
Cameron et al. (2002)	Arthroscopic debridement	61	2.8	50	19H, 12G, 30GH	36 > 2.0 & 25 < 2.0
Frank et al. (2010)	Microfracture	12 (13 shoulders)	2.3	37	10H, 6G, 1GH	H: 5.1, G: 1.7
Hünnebeck et al. (2017)	Microfracture	32	8.8	56	N/A	N/A
Millett et al. (2009)	Microfracture	30 (31 shoulders)	3.9	43	12H, 13G, 6GH	N/A
Wang et al. (2018)	Microfracture	13 (14 shoulders)	10.2	36	8H, 5H, 1GH	H: 5.2, G: 1.5
Siebold et al. (2003)	Microfracture + periosteal flap	5	2.2	32	5H	H: 3.1
Kircher et al. (2009)	OAT	7	8.8	45	6H, 1G	H: 1.5, G: 1.3
Riff et al. (2017)	OCA	20	5.5	25	20H	N/A

ACI: autologous chondrocyte implantation; ACT-Cs: autologous chondrocyte transplantation with collagen membrane seeding; OAT: osteochondral autologous transplantation; OCA: osteochondral allograft transplantation, f/u: follow-up; H: humeral head; G: glenoid; GH: both articular surfaces

Results (cont.)

Patient-Reported and Functional Outcome Measures

- Wang et al. and Kircher et al. were the only studies that reported values for outcomes at short-term (mean 2.3 years for both) as well as long-term (mean 10.2 years and 8.8 years, respectively) time points.
- No decay was seen between short- and long-term outcomes, suggesting that the improvements were sustained over time.



**For the VAS, a decrease in the score demonstrates improvements in pain*

Results (cont.)

Imaging Results

- Siebold et al. reported that, of the 5 patients included in their study, 2 patients with preop OA deteriorated postop. The other 3 patients had no preoperative signs of OA and showed no signs of change postop.
- Kircher et al. reported that all 7 patients experienced progression of OA at first follow-up, but only 3 patients showed preop signs of OA. Two patients who had preop signs of OA showed further progression of OA at final follow-up.
- Hünnebeck et al. reported that patients with preop signs of OA progressed to higher stages (according to the Samilson and Prieto classification) than those without preop signs



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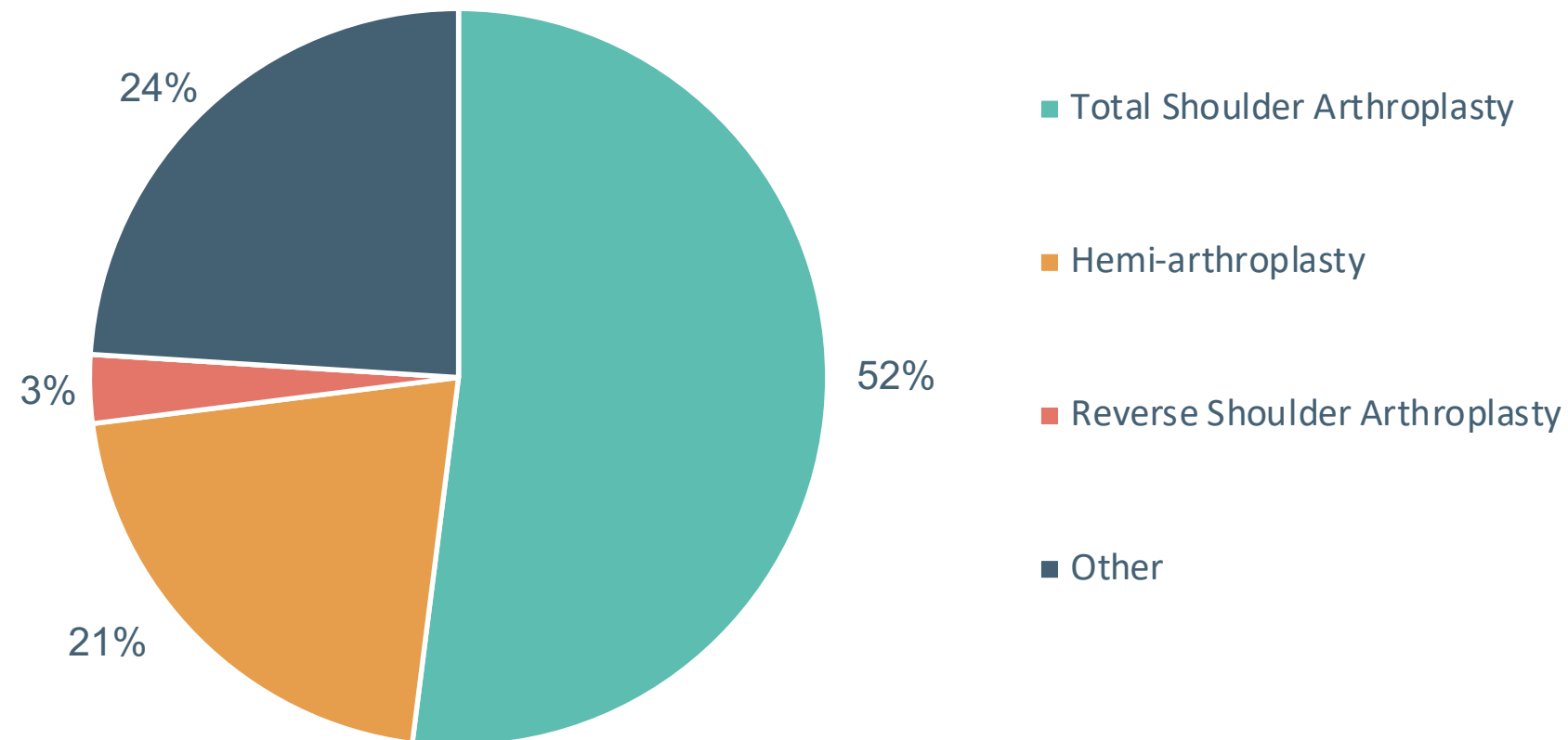
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Results (cont.)

Reoperations

Across all studies, a total of 29 patients (15%) underwent subsequent shoulder surgery, with 22 (76%) of these reoperations being shoulder arthroplasties



Discussion

- Patients with unipolar lesions improve significantly better than patients with bipolar lesions.
- Cameron et al. reported that return of pain and ultimate failure were significantly related to lesions greater than 2 cm².
- The reported rate of surgical complications was very low, appearing only in two patients: one treated with ACI and one treated with OAT. However, the need for subsequent procedures is a significant concern, as it was reported in almost all studies.
- In most studies that reported imaging results, progression of GH OA was commonly reported. Overall, patients without any preoperative signs of OA generally had better outcomes.



Conclusions

- Microfracture appears to be the most commonly used intervention for the treatment of chondral defects of the GH joint.
- Although there is still no clear consensus as to which joint-preserving approach should be the standard of care, the findings of this systematic review demonstrate improvements in patient-reported and functional outcomes across all studies, with most patients experiencing pain relief.
- Progression of osteoarthritis and the substantial need for reoperations remains a concern that should be considered and discussed with this patient population.



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