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Non-rigid Fixation Results in Higher Failure Rates Compared With Screws Following Arthroscopic Glenoid Reconstruction

Luke Heinrichs MD FRCSC, Ivan Wong MD FRCSC

Dalhousie University



Disclosures

Dr. Luke Heinrichs:

- Nothing to disclose.

Dr. Ivan Wong:

Speakers Bureau

- Smith and Nephew, DePuy Synthes Mitek Sports Medicine, Linvatec, Bioventus

Research Support

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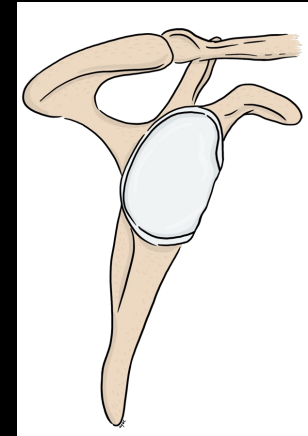
Organizations

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Arthroscopic glenoid reconstruction

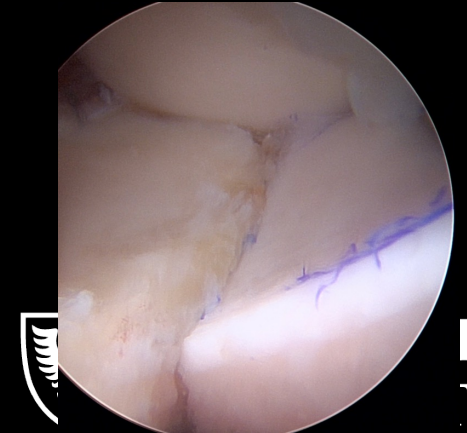
- Arthroscopic anatomic glenoid reconstruction (AAGR) is a surgical technique that has gained popularity for treatment of shoulder instability with glenoid bone loss
- Both screw and button fixation has been described for arthroscopic anatomic glenoid reconstruction (AAGR) with frozen allograft¹⁻⁴
- Screw fixation has been previously shown to result in better outcomes than button fixation⁵, but reasons remain unclear

Anterior glenoid bone loss



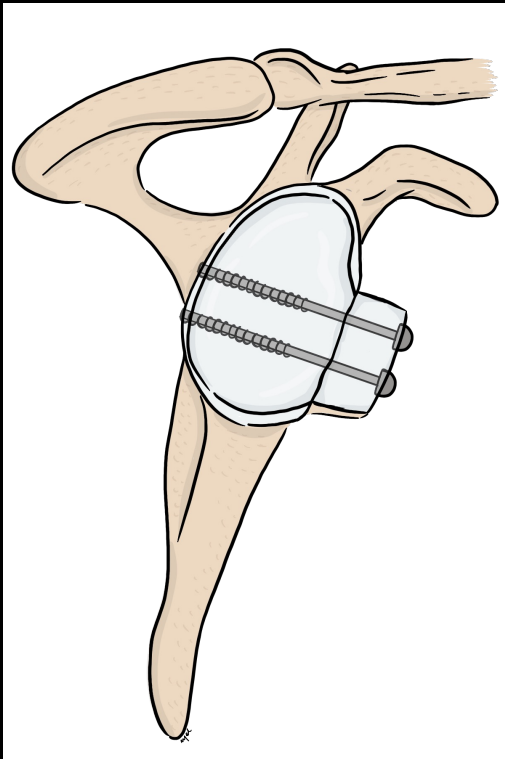
Images by Melissa Peñuelas

AAGR with DTA

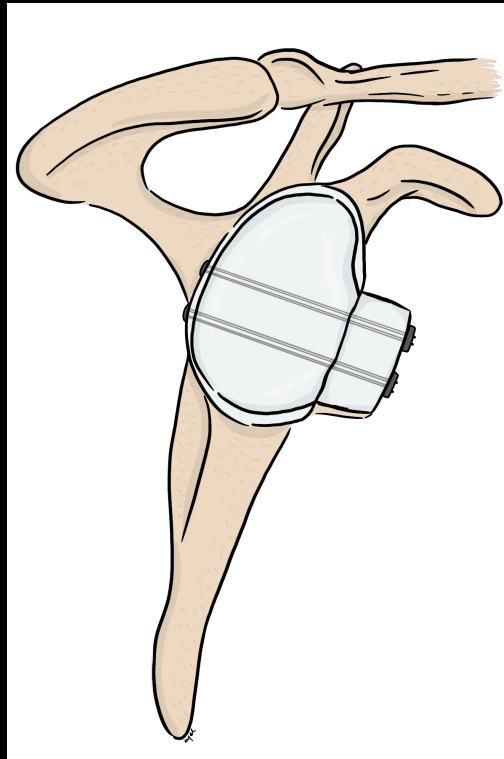


Purpose

Screw Fixation



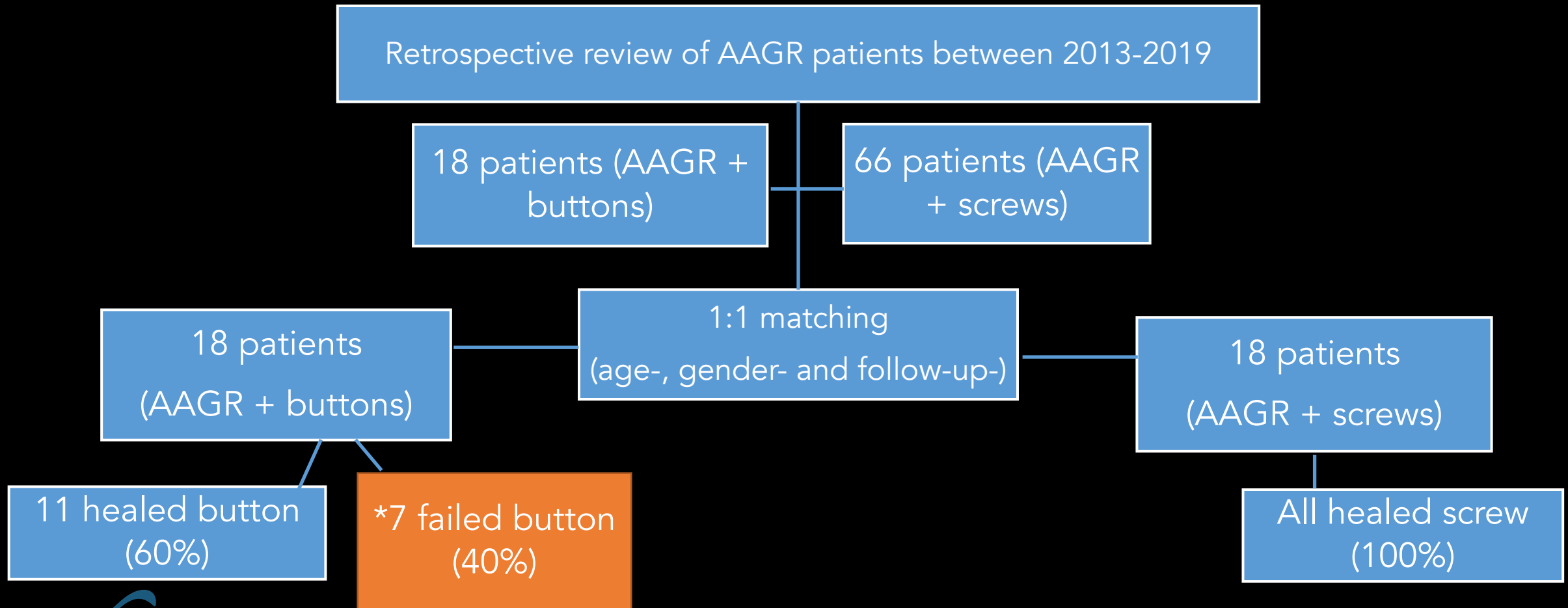
Button Fixation



The purpose of this study was to retrospectively evaluate patients who had redislocation/failure to identify factors that may affect failure rates for AAGR

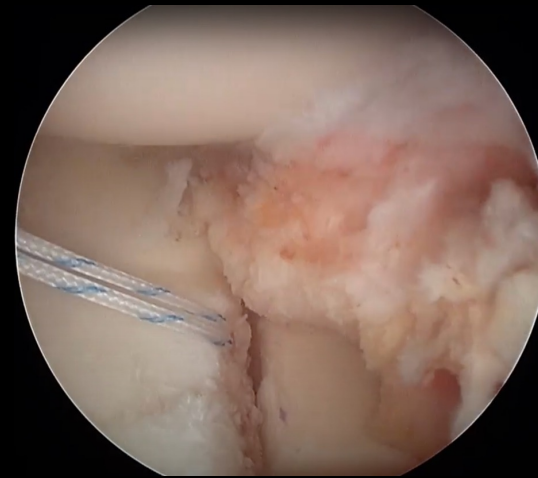
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Patient Selection

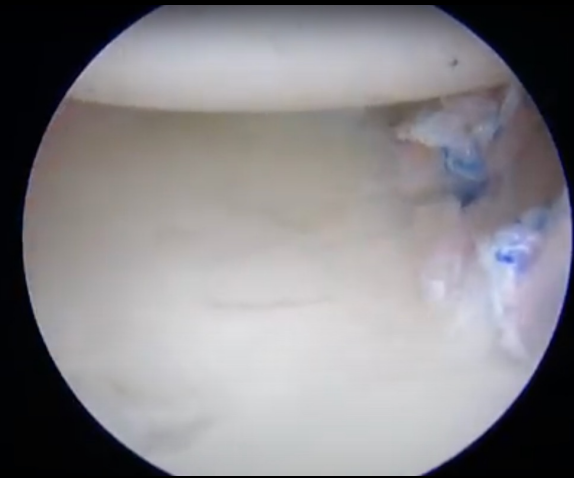


Arthroscopic videos used to evaluate surgical factors in patients who had failure

- Graft placement
 - Ideally: (1) below equator, (2) flush with glenoid rim, (3) flat or concave angle
- Fixation quality/issues and graft contact
- Soft tissue quality and quality of soft tissue repair
 - Ideally: (1) covering graft, (2) secured at rim, (3) inferior to superior shift, (4) balanced humeral head
- Presence of Hill-Sachs/addition of Remplissage



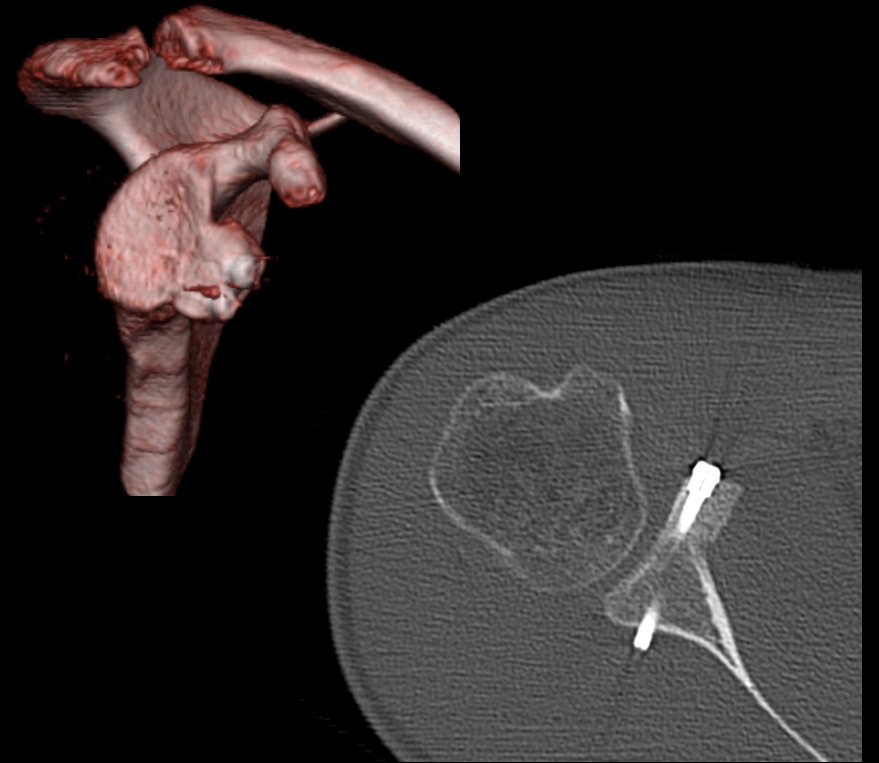
Patient with button fixation showing graft after tensioning



Soft tissue repair

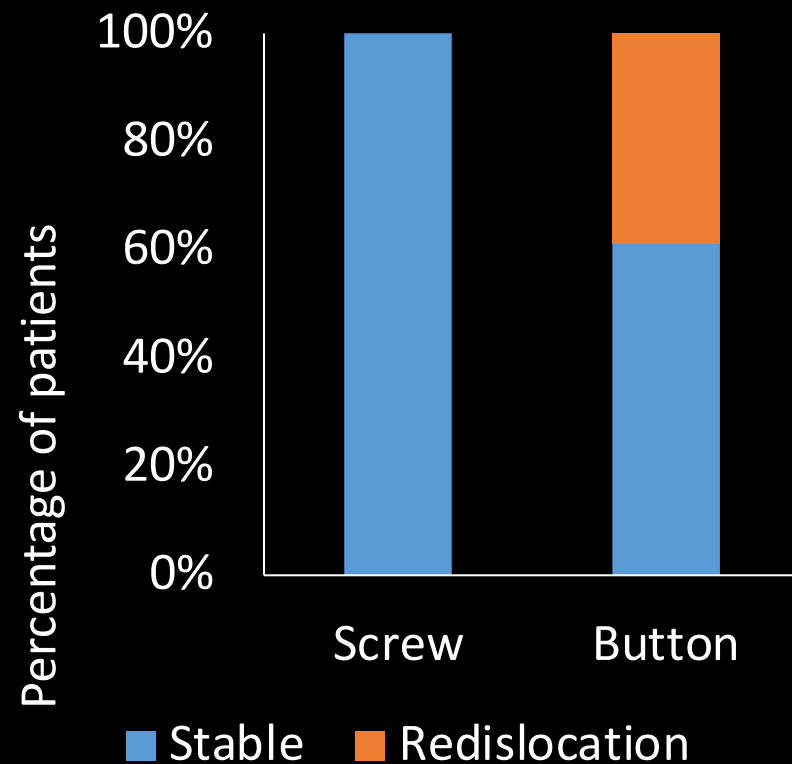
Other factors included in the analysis

- Postoperative X-ray and CT scan used to evaluate:
 - graft position, screw and button angle, button pull through, graft remodeling/union
- Patient demographic factors
 - age, gender, BMI, type of surgery



Axial CT showing graft union, screw angle

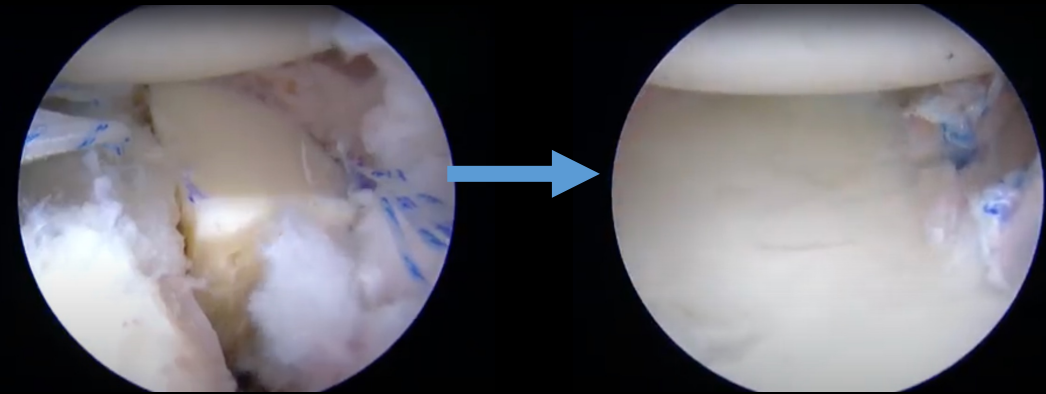
Seven patients with non-rigid fixation had dislocation requiring reoperation but had comparable demographics



	Screw Fixation (n=18)	Button Fixation; <u>no</u> redislocation (n=11)	Button Fixation; <u>redislocation</u> (n=7)	p value ($\alpha=0.05$)
Age at Surgery (years \pm SD)	26.19 \pm 9.34	33.33 \pm 15.22	25.82 \pm 5.95	n.s.
Sex (M/F)	13/5	9/2	4/3	n.s.
BMI (kg/m ² \pm SD)	26.26 \pm 3.82	24.58 \pm 3.29	28.91 \pm 3.16	n.s.
Primary/Revision	7/11	5/6	2/5	n.s.
Pre-operative WOSI	57.28 \pm 26.37	51.30 \pm 28.60	66.66 \pm 20.86	n.s.

Surgical factors and postoperative imaging was normal

- Patients had well-positioned grafts
 - (1) 7/7 below equator, (2) 5/7 flush with rim, (3) 6/7 flat or concave
- 7/7 grafts appeared well-fixed with good contact, with no gapping/mismatch
- 6/7 patients had excellent soft tissue repair
- 7/7 patients had Hill-Sachs lesions, 1/7 had Remplissage for Hill-Sachs
 - *Overall 36/36 had evidence of Hill-Sachs, 1/18 button and 2/18 screw had Remplissage



Graft position and soft tissue repair for patient with button-fixation and subsequent redislocation

All 7/7 failures had significant graft resorption on subsequent imaging

- Those that did not fail had a larger post-operative glenoid A-P dimension ($28.7 \pm 3.3\text{mm}$ versus $25.7 \pm 6.8\text{mm}$)



Button fixation; redislocation



Screw fixation



Different fixation, different result?

- Button fixation using tensioning device does create rigid/stable construct⁶
- Biomechanical study comparing screw fixation with button fixation has shown similar graft displacement with cyclic loading and load to failure⁷⁻¹⁰
 - Biomechanical strength of either fixation method during duration of healing/remodeling is unknown
- Comparison of non-rigid and rigid fixation is lacking¹¹
 - Hardy showed a lower rate of redislocation with screws in a series of patients treated with Latarjet with either screw or button fixation¹²
 - Long term follow-up unknown



Patient with button fixation 3-months (left) and 18-months (right) post-op

Conclusions

- AAGR with non-rigid fixation had high rate of recurrent dislocation (7 out of 18 patients)
- We did not identify a common surgical, patient, or radiographic factor specific to patients who failed
- Patients who dislocated did subsequently have significant resorption and smaller postoperative A-P glenoid dimension
- Further study needed to evaluate fixation methods, assess whether type of graft impacts clinical outcomes



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