

Differences in Critical Shoulder Angle Between Glenohumeral Osteoarthritis and Rotator Cuff Tears: A Retrospective Radiographic Cohort Study

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BACKGROUND AND AIM

- The critical shoulder angle (CSA) combines glenoid inclination and lateral acromial extent in one radiographic angle (Fig. 1).¹
- A low CSA favours joint compression and osteoarthritis; a high CSA raises superior shear and rotator cuff load (Fig. 2).^{1,2}
- Aim:** compare CSA in primary glenohumeral osteoarthritis (GHOA) and full-thickness rotator cuff tears (RCT) in a UK NHS cohort, where data are sparse, and describe CSA change after repair with acromioplasty.

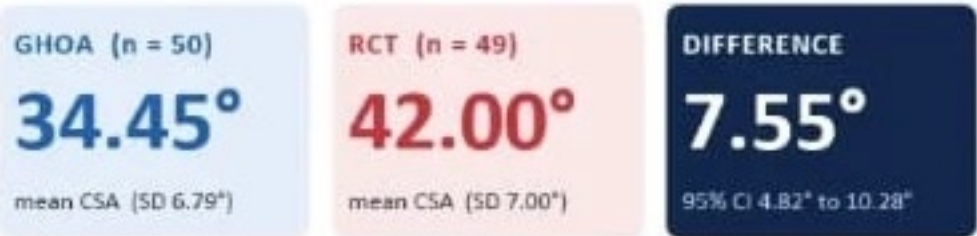


Fig. 1 Line 1: superior to inferior glenoid margin. Line 2: inferior glenoid to lateral acromion.
Fig. 2 Joint force balance. Authors' original illustrations.

METHODS

- Retrospective radiographic cohort, single UK NHS Trust, April 2022 to December 2024 (registered clinical audit L1475).
- 200 screened, 99 included:** primary GHOA (n = 50); degenerative full-thickness RCT on MRI or ultrasound (n = 49).
- CSA measured on true AP (Grashey) radiographs by two senior surgeons.¹
- Welch's t-test, 95% CI, Cohen's d. RCT group re-measured 3 months after arthroscopic repair with acromioplasty.

RESULTS



p < 0.001; Cohen's d = 1.09 (large effect, Welch's t-test)

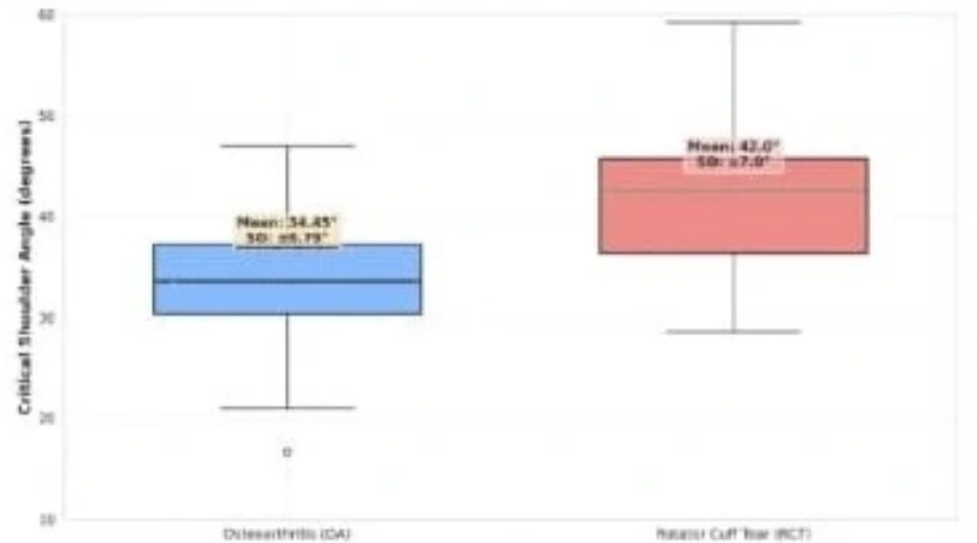


Fig. 3 Preoperative CSA by diagnosis. Group means differ, but individual values overlap.

	GHOA	RCT	p
Age, years (mean ± SD)	69.8 ± 9.2	63.6 ± 11.4	< 0.01
Sex, male / female	22 / 28	27 / 22	0.270
CSA within 30° to 35°, n (%)	14 (28.0%)	6 (12.2%)	–

POSTOPERATIVE CHANGE

–2.18° **42.0° → 39.82°**
mean CSA, paired n = 31
After repair with acromioplasty. Descriptive only: paired films in 31 of 49 (63.3%). Pooled estimate –2.63°.³
Acromioplasty alters the lateral acromial landmark, so part of the fall may be geometric.

CONCLUSIONS

- CSA was 7.55° higher in cuff tears than in osteoarthritis in a UK NHS cohort, consistent with international data.
- Individual values overlap substantially. CSA is a group-level adjunct, not a standalone diagnostic test.
- CSA fell about 2° after acromioplasty. Clinical relevance needs prospective study.

LIMITATIONS

- Retrospective, single centre, extreme-group design.
- No age adjustment: GHOA 6.2 years older (estimated to explain ≤ 0.25° of the difference).⁴
- Observers not blinded; reliability not formally tested.
- 36.7% of RCT group lacked postoperative radiographs.