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The Coraco-Gleno-Scapular Line: A Novel Tool For Evaluating Glenoid Bone Defects In Shoulder Instability

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Faculty Disclosure Information

- SICOT - Chair of the Education Committee; Member of the Sports Traumatology and Arthroscopy Committee; Member of the Foot and Ankle Committee
  Member of the Communications and Publications Committee, ICRS
  Member of the Mentorship Committee, International Orthopaedic Diversity Alliance (IODA)
  Honorary Member of the South American Arthroscopy Society (SLARD)
  Editor and Member of Board of World Orthopaedic Concern International
  Vice President of World Orthopaedic Concern - India
  Member of Executive Committee, Indian Cartilage Society (ICS)

  Deputy Editor, Journal of Clinical Orthopaedics and Trauma (Elsevier)
  Section Editor, Indian Journal of Orthopaedics (Springer)
  Section Editor, Journal of Arthroscopic Surgery and Sports Medicine (Scientific Scholar)
  Associate Editor, Journal of Orthopaedic Case Reports (Springer); Journal of Arthroscopy and Joint Surgery; Journal of Orthopaedics (ScienceDirect)

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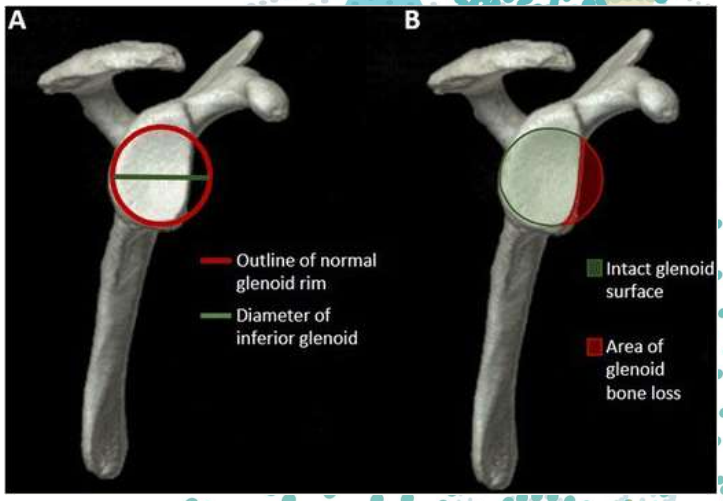
Introduction

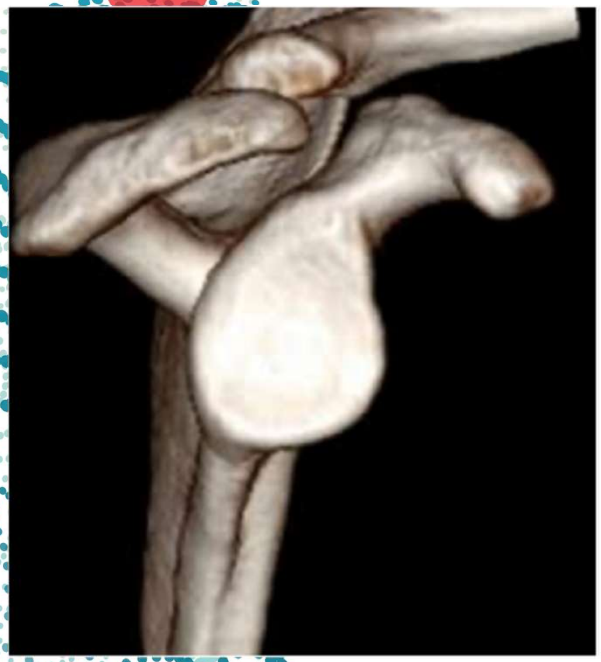
- **Problem:** Glenoid bone loss significantly influences surgical decisions in shoulder instability
- **Challenge:** Existing assessment methods are complex and not easily applicable in outpatient settings
- **Solution:** Introduction of the **CGS line** – a simple and reliable assessment method using en-face 3D CT



Rationale & Objective

- **Rationale:** Need for a clinic-friendly screening tool to guide treatment (e.g., Bankart vs. Latarjet).
- **Objective:** Validate the CGS line as a predictor of critical glenoid bone loss (≥17%).

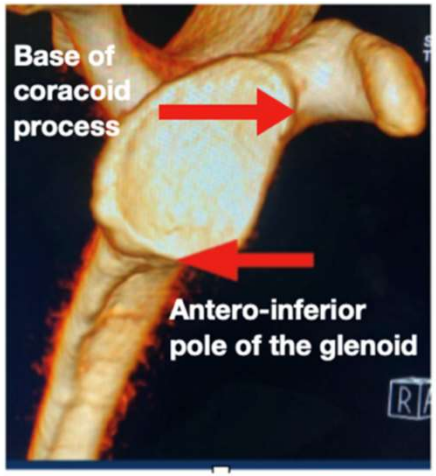
Methods – Study Design



- **Design:** Prospective observational study
- **Subjects:** 50 normal right shoulders (age 18–40)
- **Exclusions:** Dislocation history, injury, prior shoulder surgery
- **Tools:** 3D CT with humeral subtraction
- **Ethics:** IRB approval & informed consent obtained

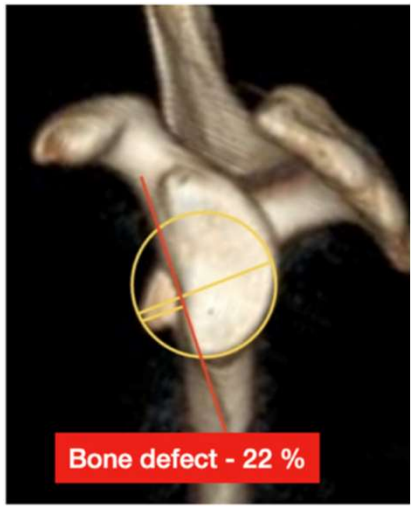
Defining the CGS Line

- **Definition:** Line from **base of coracoid** → **anterior glenoid** → **anteroinferior pole**
- **Use:** Demarcates the anterior glenoid zone most likely involved in bone loss

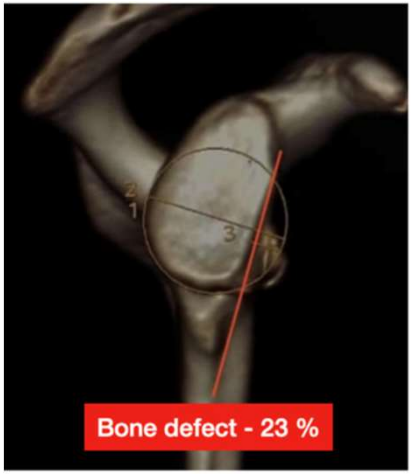


Measurement Techniques

- **Best-Fit Circle Area Method:**
  % bone loss = (anterior area / total area) × 100



- **Glenoid Index Linear Method:**
  % bone loss = (anterior width / total width) × 100



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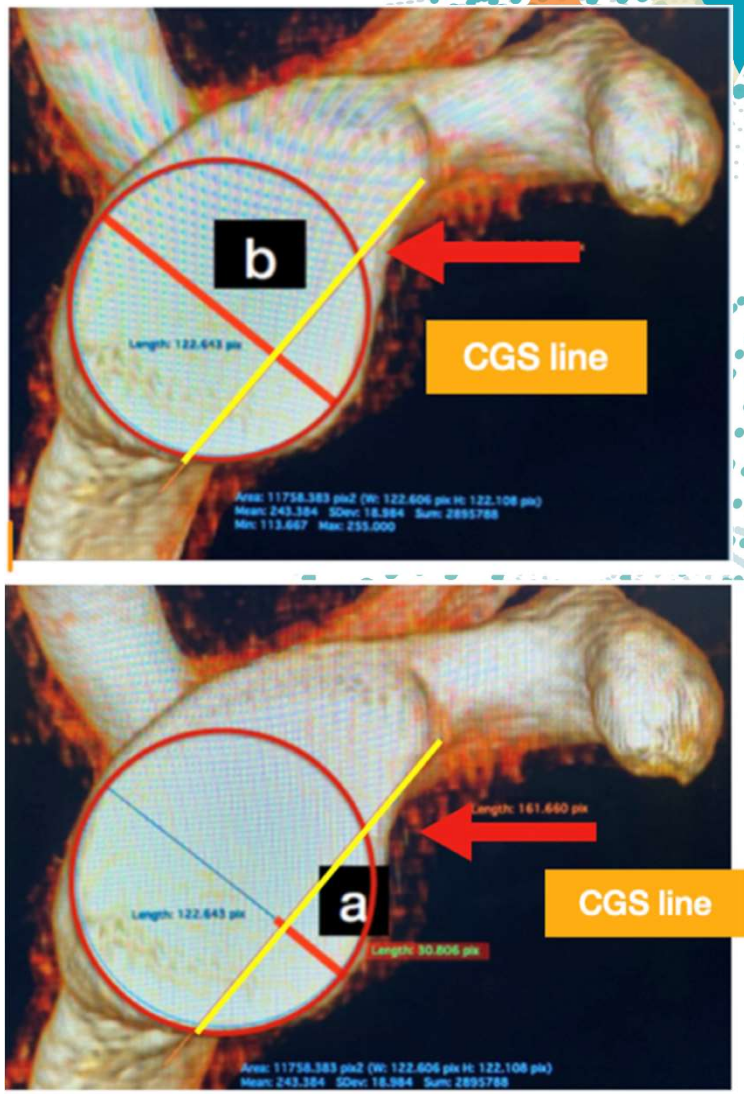
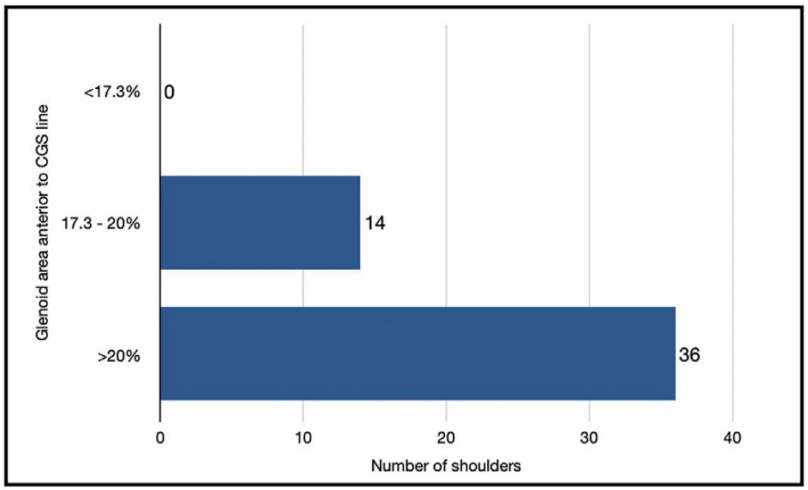
Results – Quantitative Data

- **Mean Age:**
  32.26 ± 8.39 yrs
- **Bone loss (Area):**
  17.94% – 31.69% (mean = 22.19%)
- **Bone loss (Diameter):**
  22.77% – 35.26% (mean = 27.20%)
- **Interobserver Reliability:**
  ICC = 0.87 (CI: 0.70–0.93)



Key Findings

- No subject had <17.5% bone loss (area method)
- 36/50 patients had >20% bone defect
- CGS line method is consistent across observers
- Strong correlation with critical thresholds reported in prior literature (Shin et al. 17.3%)



Graph illustrating the distribution of predicted bone loss percentages using the surface area method. CGS, Coraco-Gleno-Scapularline.

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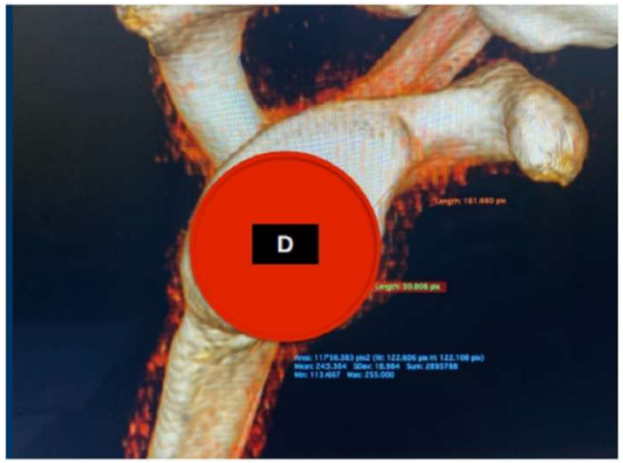
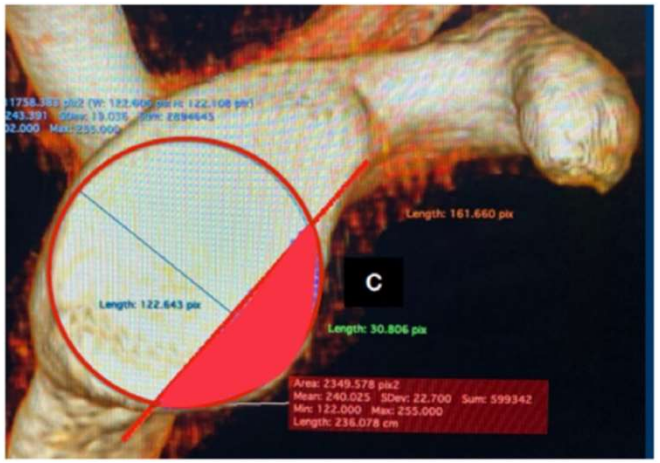
Clinical Relevance

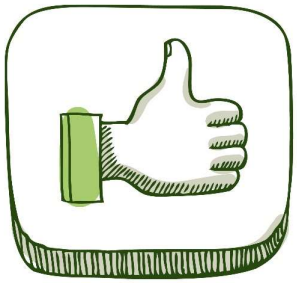
- **CGS Line is a reliable screening tool** in outpatient settings
- Helps determine early whether Latarjet procedure may be required
- Requires no special software or intraoperative estimation





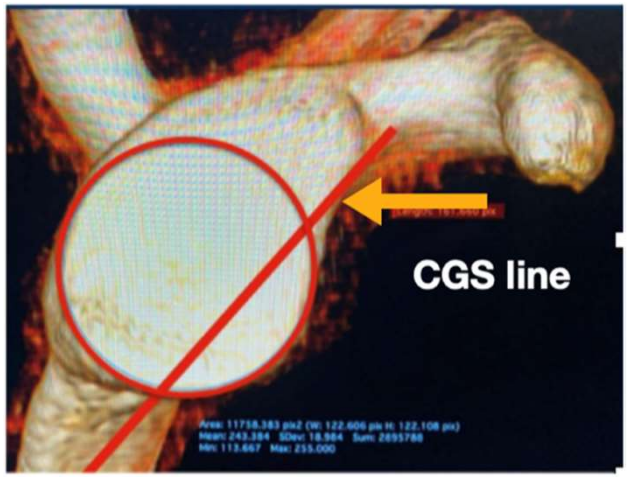
Discussion & Limitations

- **Advantages:** Fast, reproducible, cost-effective
- **Limitations:**
  - Small sample size
  - Imaging tool dependency
  - Assumption of circular geometry
- Supports previous evidence of critical bone loss between 17–27%



Conclusion

- The CGS line is a simple, effective tool for assessing glenoid bone loss.
- **Recommendation:**
  Use it for **clinic-based screening** and **preoperative planning**.
- **Next Steps:** Larger-scale validation studies



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References

1. **Min KS**, Horng J, Cruz C, Ahn HJ, Patzkowski J. Glenoid bone loss in recurrent shoulder instability after arthroscopic Bankart repair: a systematic review. *J Bone Joint Surg*. 2023;105(22):1815–21.
2. **Walter WR**, Samim M, LaPolla FW, Gyftopoulos S. Imaging quantification of glenoid bone loss in patients with glenohumeral instability: a systematic review. *Am J Roentgenol*. 2019;212(5):1096–105.
3. **Shin SJ**, Kim RG, Jeon YS, Kwon TH. Critical value of anterior glenoid bone loss that leads to recurrent glenohumeral instability after arthroscopic Bankart repair. *Am J Sports Med*. 2017;45(9):1975–81.
4. **Koo TK**, Li MY. A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *J Chiropr Med*. 2016;15(2):155–63.
5. **Rerko MA**, Pan X, Donaldson C, Jones GL, Bishop JY. Comparison of various imaging techniques to quantify glenoid bone loss in shoulder instability. *J Shoulder Elbow Surg*. 2013;22(4):528–34.
6. **Min KS**, Sy JW, Mannino BJ. Area measurement percentile of 3-dimensional computed tomography has the highest interobserver reliability when measuring anterior glenoid bone loss. *Arthroscopy*. 2023;39(6):1394–402.

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