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Lateral Radial Head Offset can be indicative of epicondylitis – A new radiological parameter

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Conflicts of Interest

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I (and/or my co-authors) have something to disclose.

All relevant financial relationships have been mitigated.

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Background

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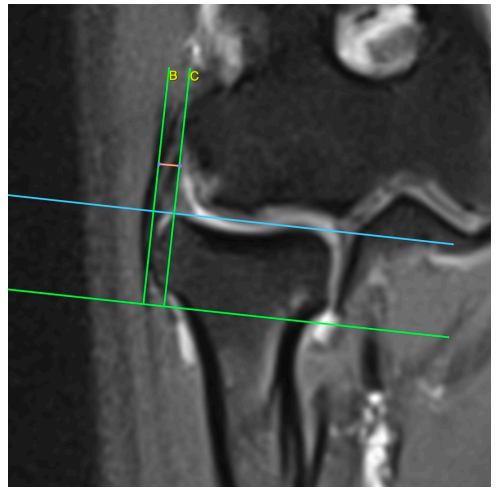
Etiology of chronic epicondylitis radialis (cER) ≠ definitely clarified

- **Female**

- **Lifestyle factors:**
  - smoking history
  - manual labor
  - BMI, hypercholesterolemia & statin treatment

- **Structural?**
  - Multiple corticoid injections (refractory epicondylitis)
  - Instability

Anatomy?



„Balcony Effect“

Ideka, 2024, Journal of Orthopaedic Research
Chen, 2024, J Hand Ther
Kholinne, 2021, AJSM

Lee, 2013, Clin Orthop Surg
Shiri, 2006, Am J Epidemiol

Methods

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Symptomatic cER (n=37)

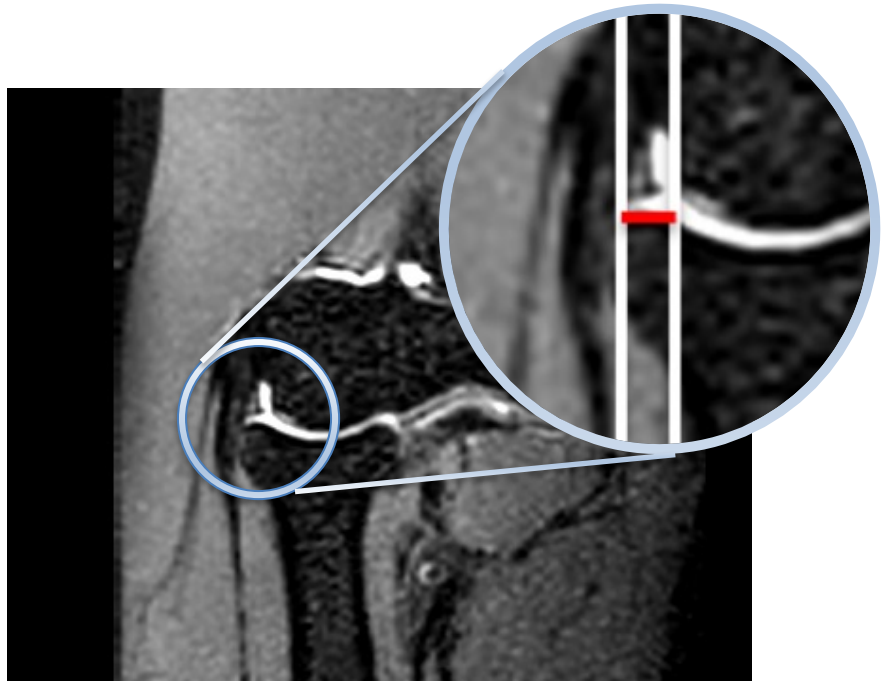
- 11/2020 to 07/2023 with Symptoms > 3 months
- No trauma in pat. history
- Preoperative MRI
  - Arthroscopic debridement of ECRB
- No therapy other than physiotherapy

versus

Healthy Controls (n=40)

- 40 healthy elbows

Lateral offset (mm) of radial head



Additional measurements:

- posterior radial head translation
- diameter radial head
- Lateral epicondyle prominence

Hackl, 2015, J Hand Surg Am

Methods

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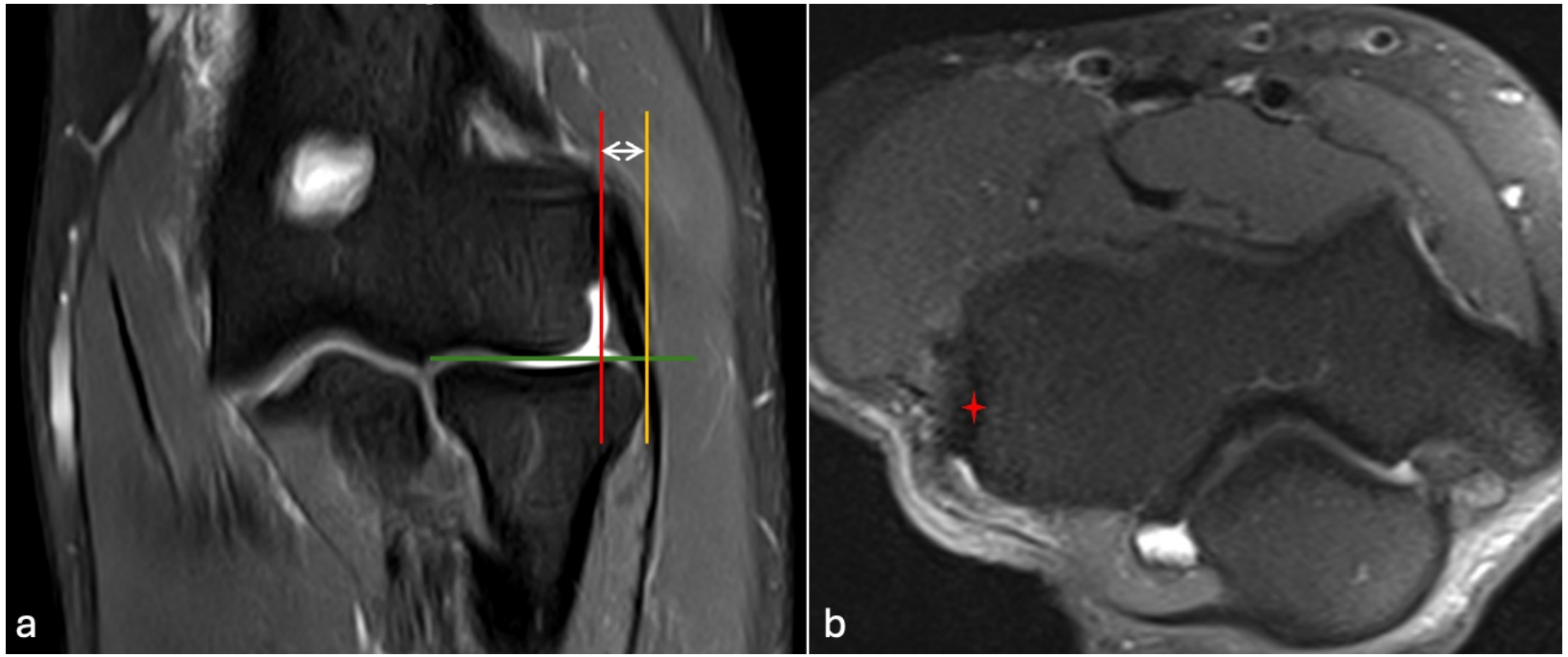

Measurement of the **lateral radial head offset** (a): The center of the radial head was identified in the coronal plane, and a tangent line was drawn along its joint surface as a reference (green line). A perpendicular line was then placed at the most lateral point of the radial head (yellow line). The center of the common extensor tendon origin (b) was located on the lateral condyle (red asterisk), and the corresponding coronal plane was determined. A second perpendicular line was drawn through this center (red line), and the distance between the two lines was measured in millimeters (white arrow).

Measurements

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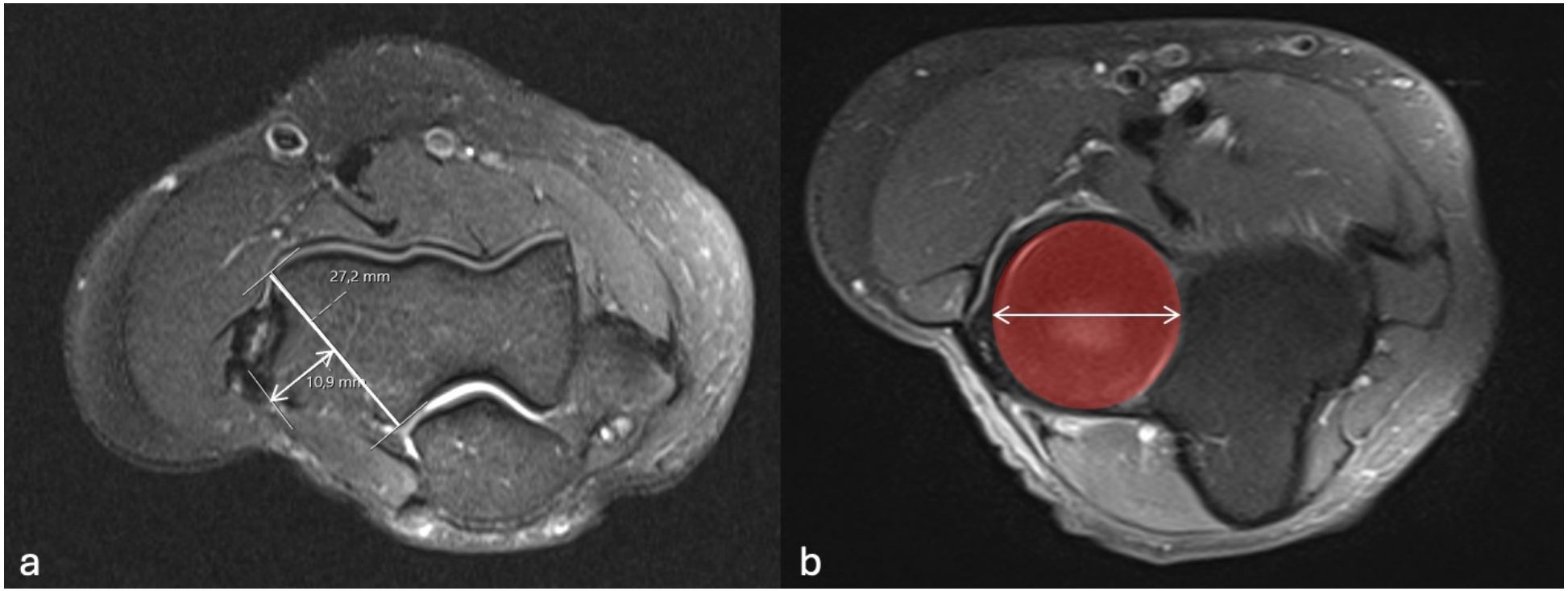
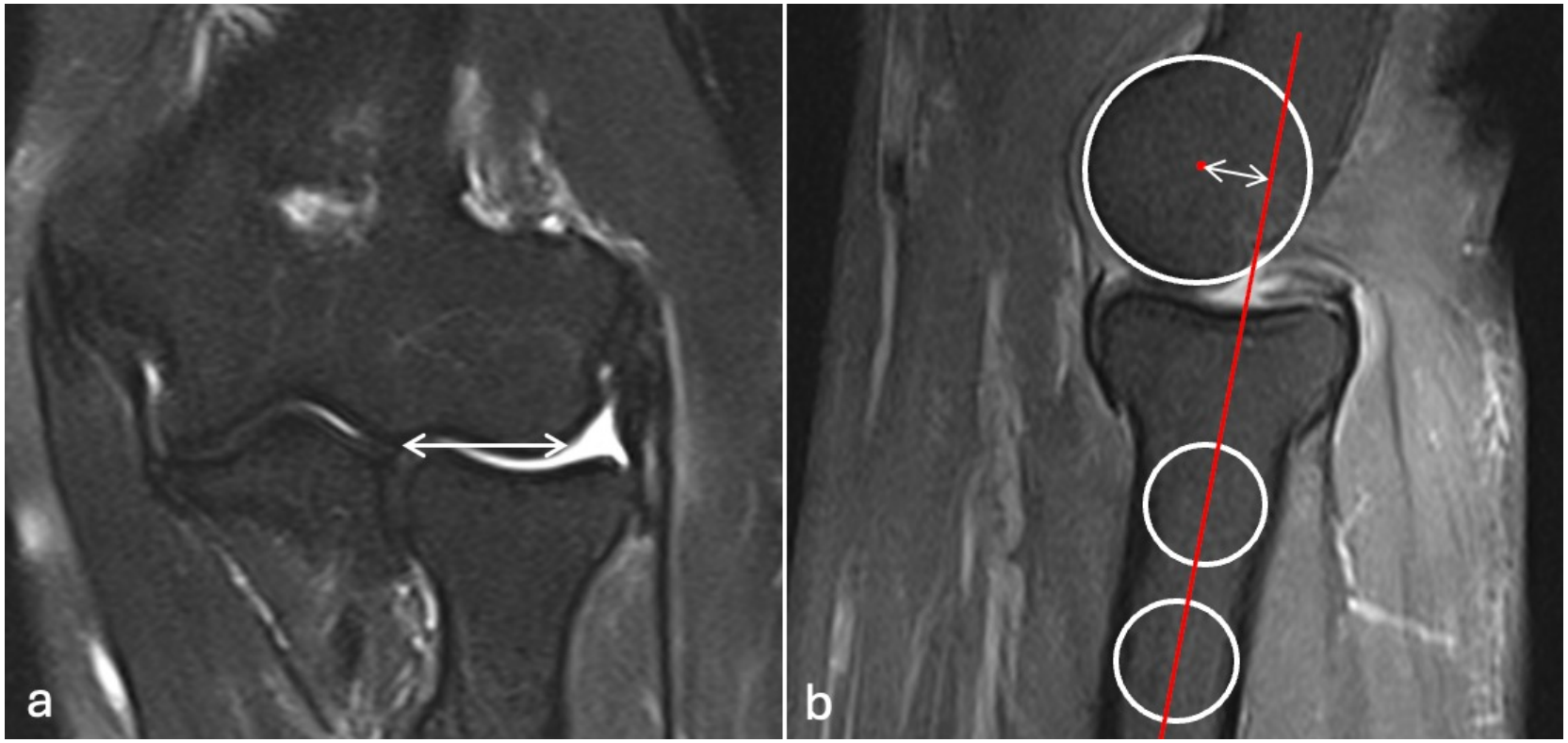


Measurement of the **lateral epicondyle prominence** (a) was measured as the perpendicular distance from the most prominent point of the lateral epicondyle to a line connecting the proximal anterior (lateral trochlea humeri) and posterior (lateral fossa olecrani) borders of the lateral humeral cartilage in the axial sequence in millimeters (white arrow). **The radial head diameter** (b, white arrow) was measured in millimeters in the first axial sequence, where the radial head was fully depicted (red circle).

Measurements



Capitellum width (a) was measured in millimeters in the coronal plane where the radial head center was identified (white arrow). **Posterior radial head translation** (b) was defined as the distance between the center of the capitellum (red dot) and the radial shaft axis (red line) in millimeters, according to Hackl et al. [6]

Results

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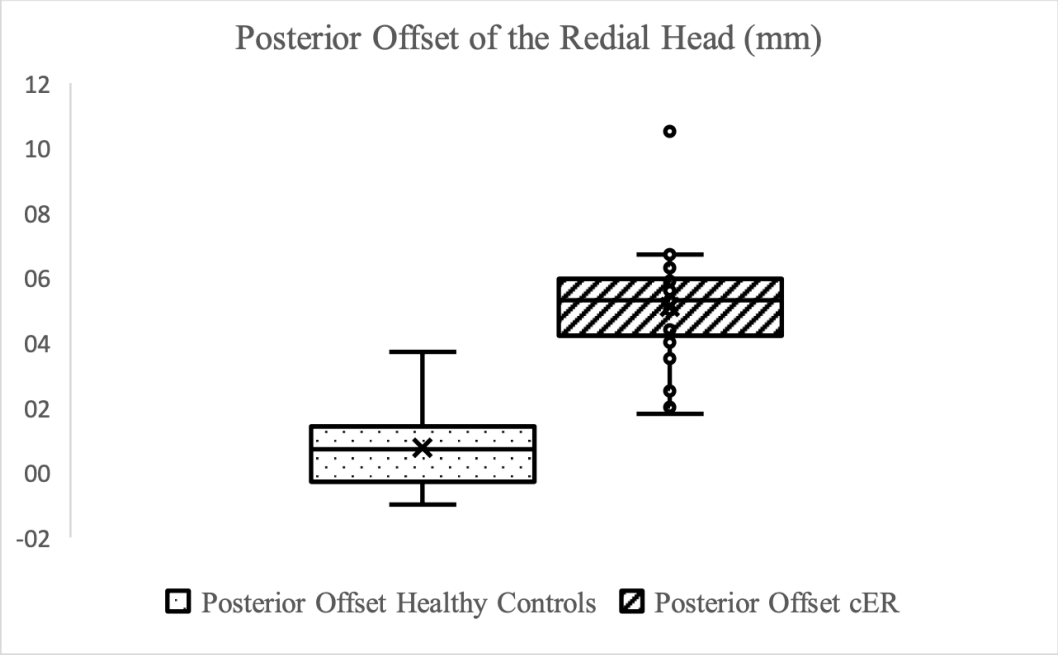
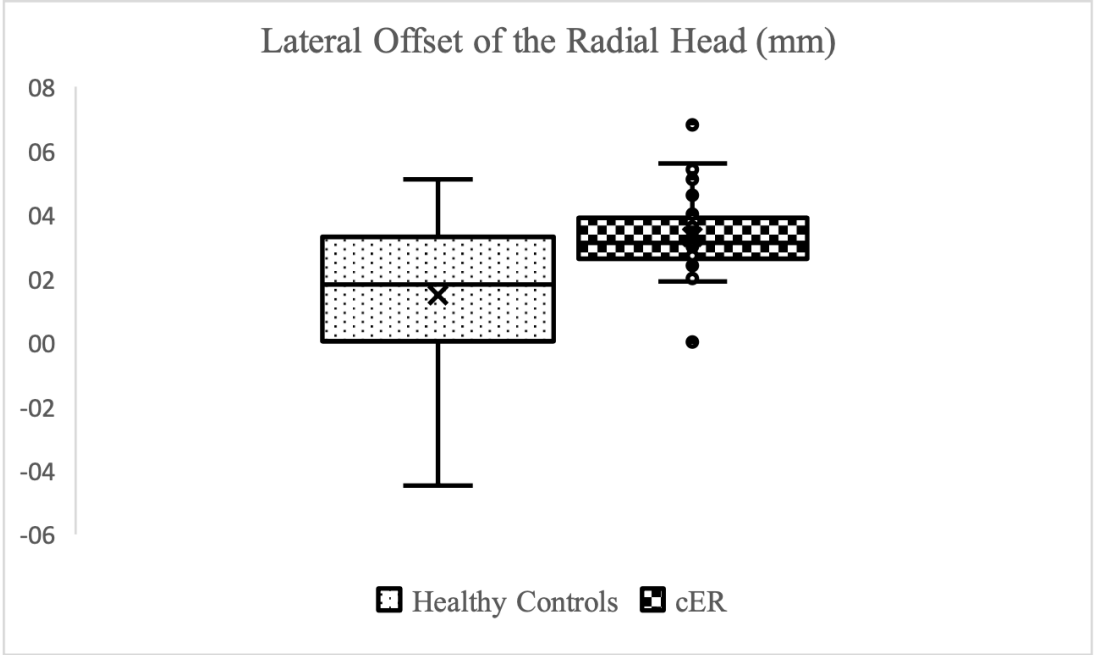


Boxplot diagram showing the difference in the posterior radial head translation (mm) of healthy controls versus patients with chronic epicondylitis humeri radialis (cEHR) in millimeters (mm).
Statistical significance (*, $p < 0.050$).



Boxplot diagram showing the difference in lateral offset of the radial head of healthy controls versus patients with chronic epicondylitis humeri radialis (cEHR) in millimeters (mm).
Statistical significance (*, $p < 0.050$).

Results

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Paramter	chronic ER	healthy controls	p - value
n	n=37	n=40	n.s.
age (a)	48.2 ± 7.6	31.3 ± 7.0	p < .001
sex			
male n (%)	17 (45.9%)	20 (50%)	n.s.
female n (%)	20 (54.1%)	20 (50%)	n.s.
BMI	25,5 ± 4,1	24.3 ± 8.4	n.s.
measurments radial head			
posterior radial head translation (mm ± SD)	5.1 ± 1.5	0.7 ± 1.2	p < .001
radial head diameter (mm ± SD)	22.4 ± 4.1	22.2 ±3.7	n.s.
lateral radial head offset (mm ± SD)	3.3 ± 1.2	1.5 ± 2.1	p < .001
lateral epicondyle prominence	11.8 ± 6.2	11.8±1.6	n.s.

* ICC: r = *.64,* p < 0.001

Limitations

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- Retrospective design led to non-standardized MRI protocols in the cER group
- MRIs with suboptimal quality were excluded
- Elbow positioning (supination and extension) may affect joint congruity
- Significant age difference exists between groups.
- Age remains a potential confounder.

Conclusion

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The lateral radial head offset & posterior radial head translation were significantly higher in patients with cEHR compared to healthy controls on MRI.

This indicates an increased lateralization and posteriorization in the radiohumeral joint, which may be the result of inadequate dynamic joint stabilization at the onset of cEHR.

References

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