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Anatomic Radial Head Arthroplasty: The Importance of Implant Angle

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Background

- optimal implant design for Radial Head Arthroplasty (RHA) is still subject to debate
- Anatomic RHA have the theoretical benefit of mimicking the native radial head and reducing radiocapitellar and radioulnar joint contact forces
- The angle of the radial head stem with respect to the proximal radius shaft (radial stem angle, RSA) will influence the positioning of the radial head replacement and radiocapitellar and proximal radioulnar joint contact pressures
- no previous reports investigating the role of implant positioning on reoperation of anatomic RHA

Hypothesis

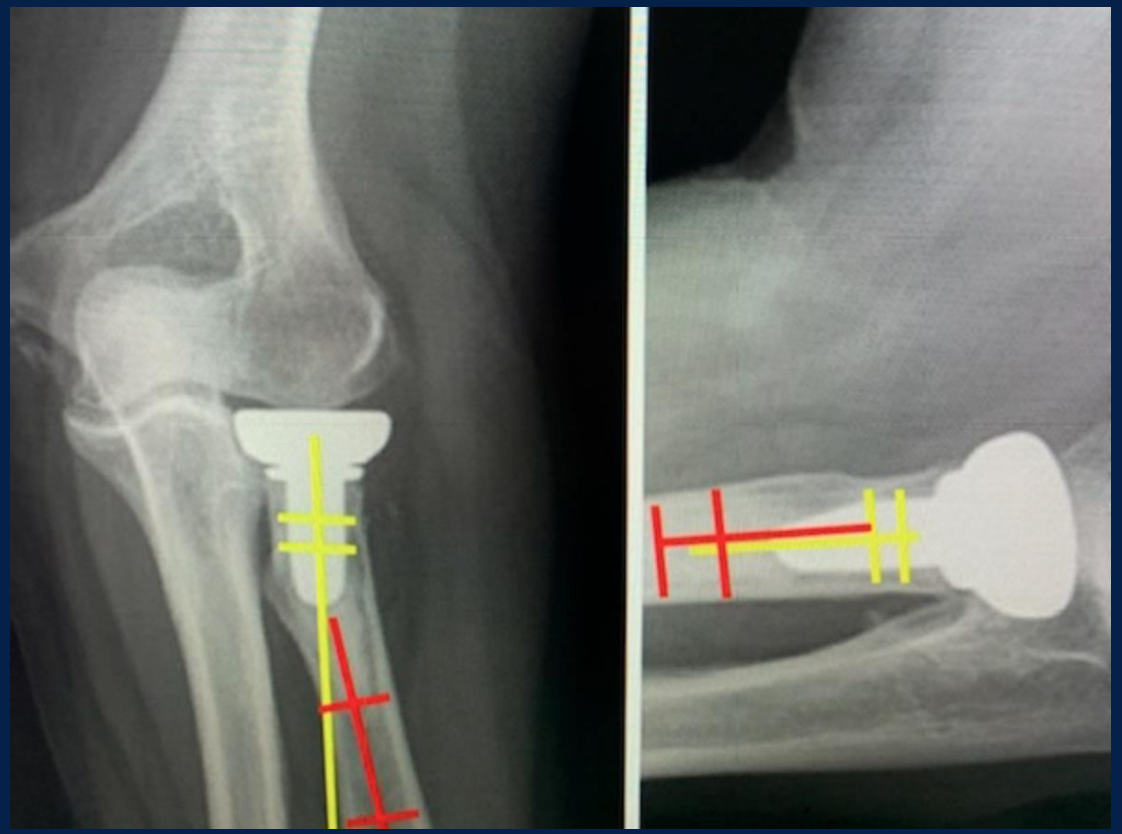
The aim of this study is to characterize the risk of RHA failure with respect to the stem angle in anatomic RHA design

Hypothesis: variances in the placement of the implant stem leading to increased radial stem angle in an anatomic radial head arthroplasty design will contribute to radial head arthroplasty failures

Methods

- Retrospective review
- Inclusion criteria: adult patients with >6mo radiographic follow-up
- Failure defined as the need for reoperation
- Radial stem angle (RSA) is defined by the angle between a line projected down the center of the radial head stem and the intersecting line drawn down the shaft of the radius
  - Measured on AP and Lateral elbow XR

Radial Stem Angle (RSA)



Results

Comparison of Anteroposterior and Lateral Radial Stem Angles by Implant Failure

Radial Stem Angle	Intact		Failed		p value
	Mean	SD	Mean	SD	
Anteroposterior RSA	14.7	6.8	13.6	4.8	0.96
Lateral RSA	4.9	3.2	14.6	4.9	**0.01**

Multivariable Analysis to Predict RHA Failure

	Odds Ratio	95% CI	p value
Radiocapitellar Arthritis (Broberg Morrey)	0.74	0.03 - 12.59	0.837
Stress Shielding (Chanlalit)	1.4	0.38 - 7.95	0.635
Radiolucency			
None	1	Reference	
To the Collar	0.73	0.01 - 67.33	0.883
To the Stem	9.72	0.19 - 2942.06	0.305
Stem Angle			
Lateral RSA	1.65	1.21 - 2.89	**0.015**
Anteroposterior RSA	0.95	0.67 - 1.25	0.713

Conclusions

- Prosthesis positioning in anatomic implants remains understudied
- Higher lateral RSA increases the risk of reoperation
- Further research is warranted to better understand the mechanism of failure