

# Axial Length and Overstuffing Affects Radiocapitellar Pressures, A Cadaveric Study

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## Background

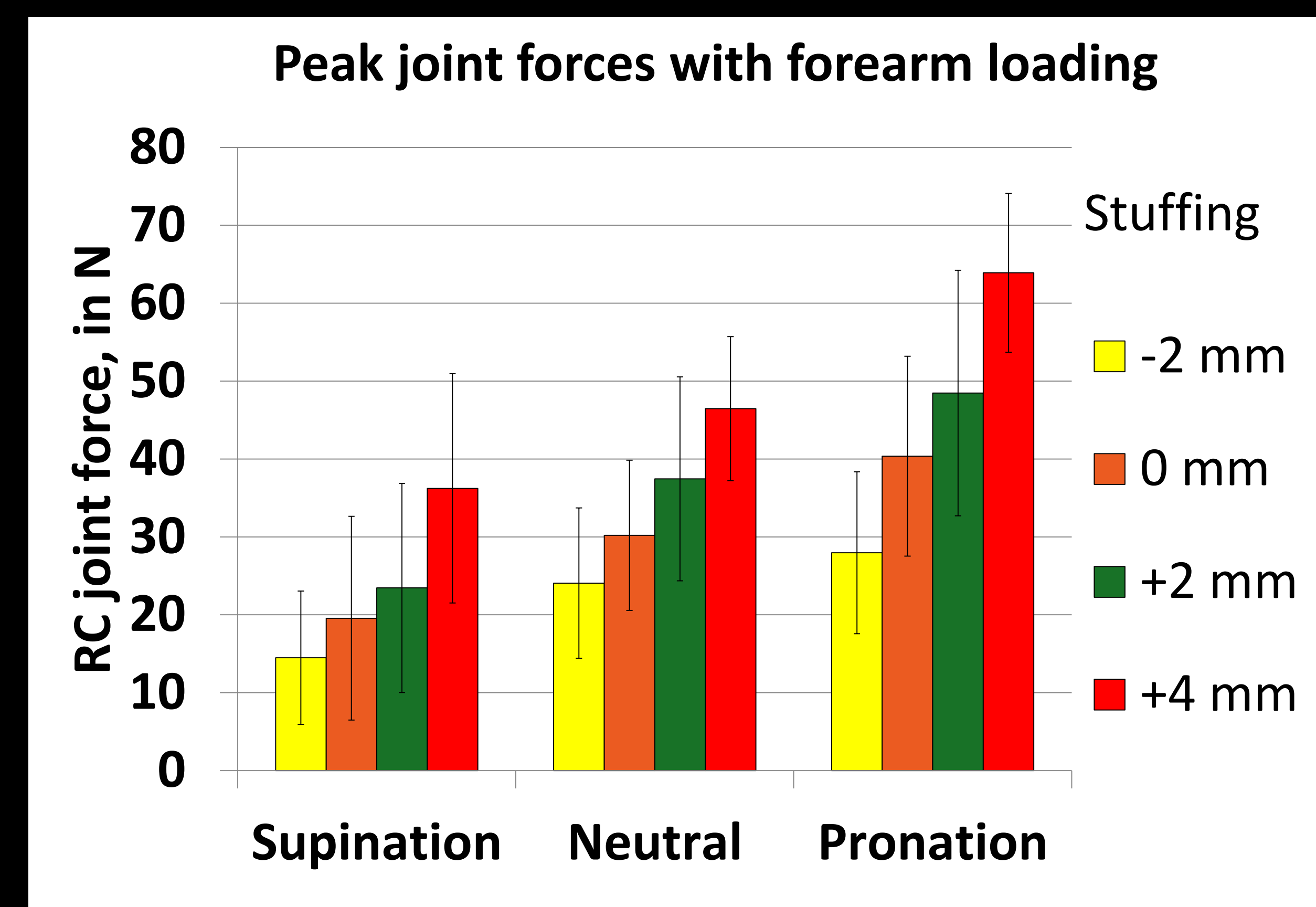
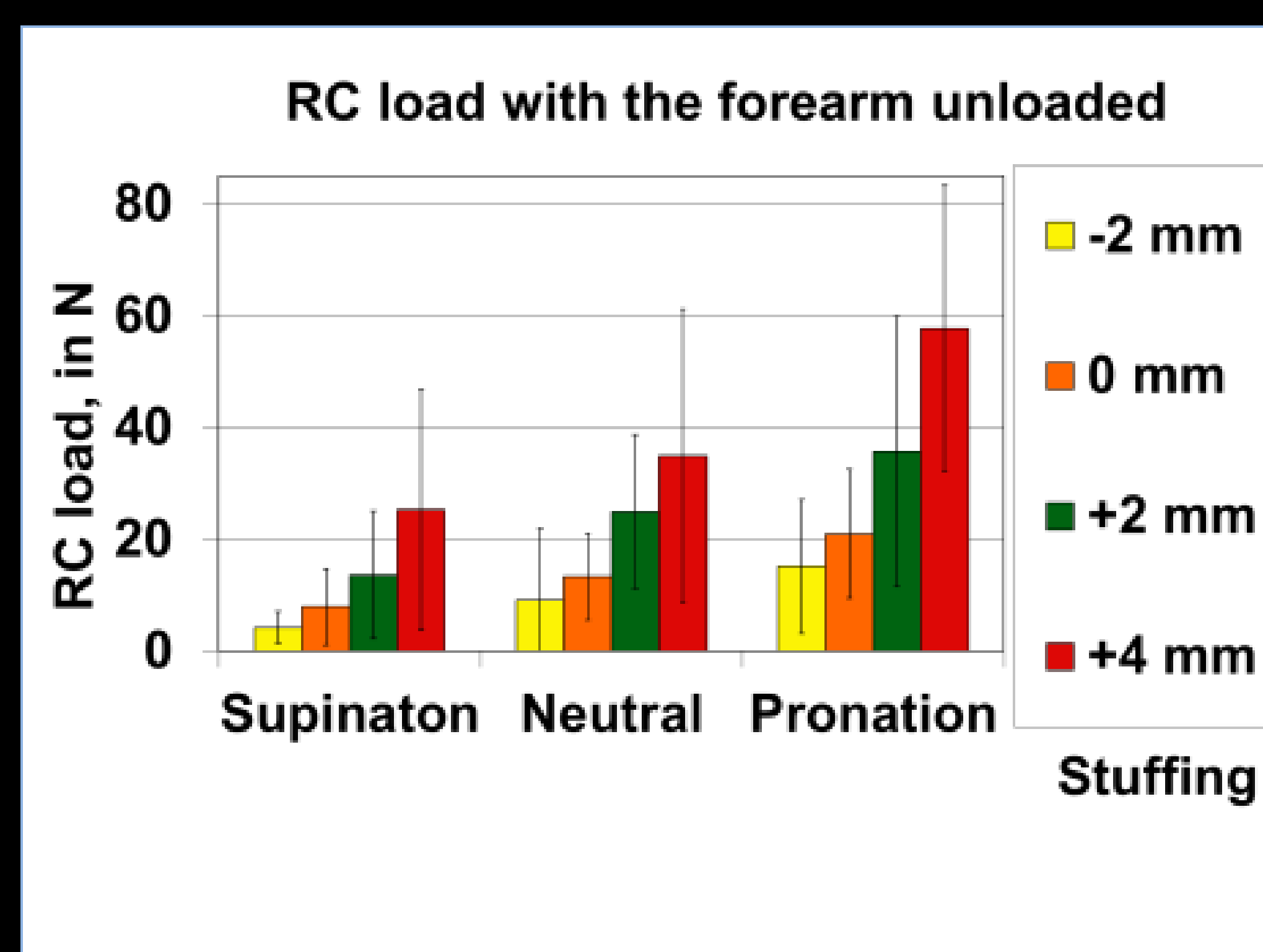
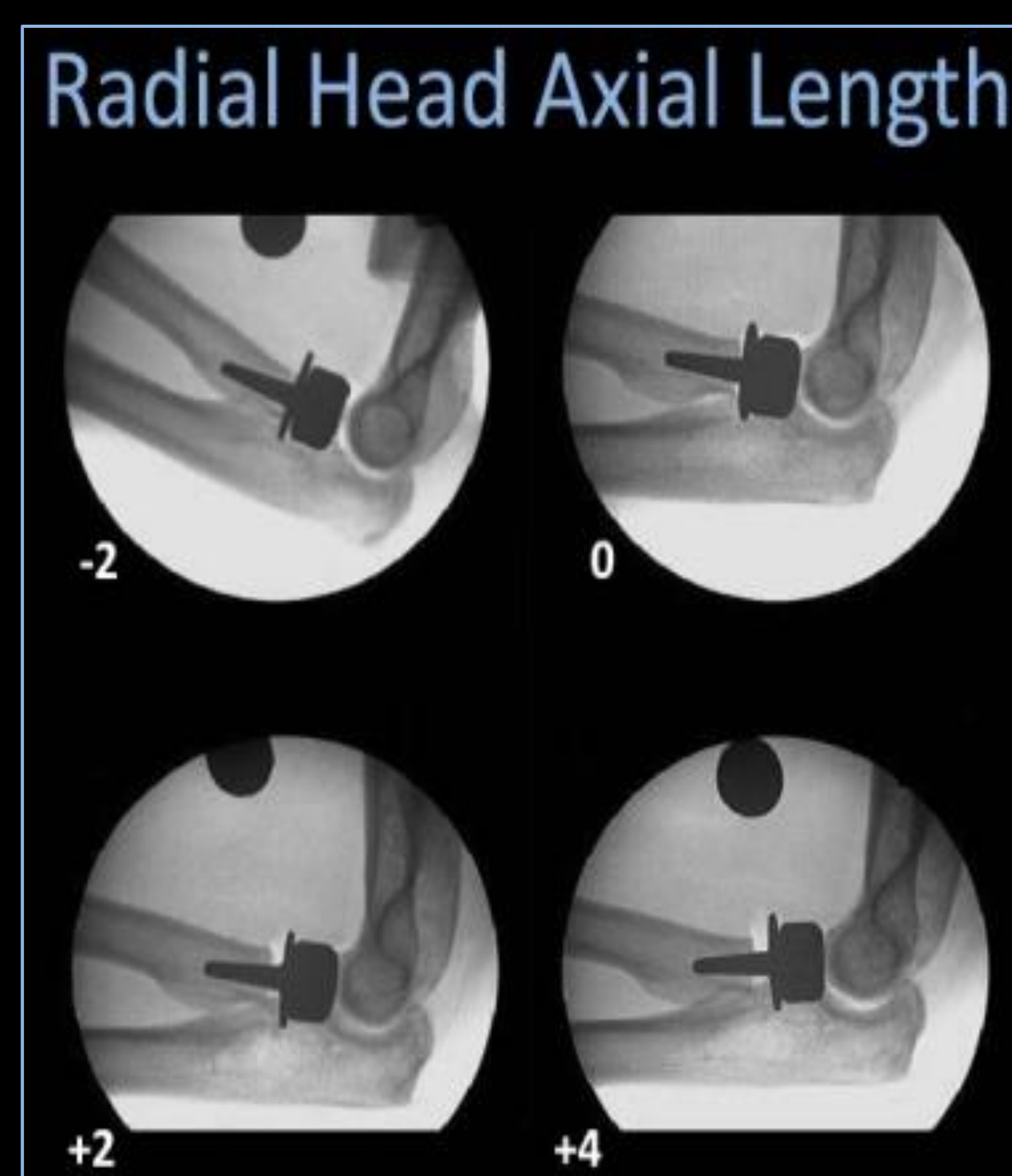
Successful results following radial head arthroplasty are dependent upon proper component position and size. Insertion of an implant that is incorrectly sized significantly alters stability, elbow kinematics and load transfer leading to unfavorable results and poor clinical outcomes. We examine the effects of alteration of axial length of the radial head prosthesis on radiocapitellar joint force.

## Methods

Seven fresh-frozen cadaveric arms were utilized. Radial heads were resected and a monoblock, metal radial head prosthesis was implanted. In situ adjustments of radial head length were made in 2 mm increments to create an understuffed (-2), neutral (0), and overstuffed (+2, +4) effect. Forearms were cyclically loaded with the forearm in neutral, sixty degrees of pronation, and sixty degrees of supination. Radiocapitellar forces were measured using Tekscan (Boston, MA) sensors with radial head length set at -2 mm, 0 mm, +2 mm and +4 mm and comparisons were made with native length radial heads. Multivariant ANOVA with Tukey's post hoc comparisons was used for statistical analysis.

## Results

Radiocapitellar joint forces in arms that were understuffed (-2), neutral (0), overstuffed (+2, +4) were 24.07 +/- 9.65 N, 30.21 +/- 9.63 N, 37.45 +/- 13.09 N, 46.47 +/- 9.25 N. There was a noted stepwise increase in force transmitted with progressive axial lengthening. Radiocapitellar forces were 1.5x greater with radial head overstuffing (+4) compared to native length radial heads (0) (p<0.01).



## Summary

Successful results following radial head arthroplasty are dependent upon proper component position and size. In this cadaveric model progressive radial head lengthening was associated with a stepwise increase in force transmitted. Radiocapitellar forces were 1.5x greater with radial head overstuffing (+4) compared to native length radial heads (0) (p<0.01). Sizing of the radial head implant plays a critical role in restoring native radiocapitellar pressures and may prevent accelerated wear at the radiocapitellar joint after radial head arthroplasty.

## Disclosure

None of the authors have any financial disclosures to make related to this research.

