Paper #8 ONE AND TWO-YEAR CLINICAL OUTCOMES FOR A STANDARD ALL-POLYETHYLENE GLENOID COMPONENT WITH A FLUTED CENTRAL PEG: ANALYSIS OF 1270 INDIVIDUAL PATIENTS FROM 11 DIFFERENT CENTERS

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Background: Many different anatomic glenoid components are currently in the marketplace, and new ones are being added each year. Broad-based, multicenter data are necessary to establish the track record for existing components against which the value of new components can be compared. We hypothesized that the clinical outcomes for patients from eleven different centers using an all-polyethylene glenoid component with a fluted central ingrowth peg would demonstrate consistent, substantial and clinically important improvement in comfort and function.

Methods: We obtained outcome data on 1270 individual patients from eleven different centers using an all-polyethylene glenoid component with a fluted central peg. Rather than considering the average outcomes over a range of followup intervals in the different studies, we analyzed individual patient outcomes at two discrete time points: one and two years after surgery. We compared the improvement for each patient to published values for the minimal clinically important difference (MCID) and calculated the percent of maximal possible improvement.

Results: The mean±SD preoperative scores improved from SST 3±2, ASES 37±15, Constant score 36±16, and Penn score 30±19 to two-year means of SST 10±2, ASES 90±12, Constant 76±13, and Penn 80±24. A high percentage of patients exceeded the MCID in outcome scores (SST: 96%, ASES: 98%, Constant: 94%, Penn: 93%) and obtained at least 30% of the maximum possible improvement (SST: 95%, ASES: 98%, Constant: 91%, Penn: 87%). Clinical outcomes were not worse for the 41% of shoulders with preoperative type B glenoids or for the 30% of shoulders with more than 15 degrees of glenoid retroversion.

Conclusion: Surgeons in 11 independent practices were able to obtain robust clinical outcomes in an international group of over 1200 individual patients using a basic all-polyethylene glenoid component to address the range of glenohumeral arthritic conditions encountered in their practices. These data for a standard glenoid component in current widespread use provide a benchmark against which the value of new component designs can be compared.

Level of Evidence: Level IV Therapeutic

Key Words: glenoid; ingrowth; all-polyethylene; peg; clinical outcomes; Minimal Clinically Important Difference; Percentage of maximal possible improvement.

Paper #9 JOINT CONTACT CHANGES WITH UNDER-SIZED PROSTHETIC RADIAL HEADS

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Introduction: When implanting a prosthetic radial head, its long-term articulation with the opposing articular cartilage should be considered. Several studies have explored the effects of prosthesis shape and geometry on radiocapitellar contact profiles. Contact areas and pressures have been found to differ significantly between radial head prostheses and native radial heads. Significant differences in the contact mechanics of nonanatomic and anatomic radial head prosthesis designs have been reported; particularly their contact with the lateral trochlear ridge. These abnormalities might be lessened by down-sizing the diameter of the prosthetic head, which is recommended routinely by some surgeons. Our aim was to evaluate radiocapitellar contact pressures in two different commercially available radial heads both sized according to their respective manufacturers' recommendations as well as under-sized by 2 mm. We hypothesized that radiocapitellar contact pressures would be improved in a nonanatomic prosthesis, but not with an anatomic prosthesis tested in neutral and extension.

Methods: Eight fresh-frozen cadaveric elbows were aligned in neutral-extension and loaded with 100 N using a custom testing apparatus. Radiocapitellar contact pressures were recorded using a TekScan® thin-film pressure sensor. Prosthetic radial head replacement was performed with two prostheses: the Anatomic® RH and the Evolve® Proline RH prosthesis. Each design was sized according to the manufacturer's recommendations, and then again using 2 mm smaller radial heads.

Results: Representative patterns of contact are illustrated in Figure 1. Average and peak pressures were significantly higher with the Evolve® than the Anatomic® prostheses($p < 0.03$ and 0.02 respectively). Peak pressures (Fig. 2) decreased from 4.2 ± 0.5 MPa to 2.9 ± 0.3 MPa for the Anatomic® RHs and from 5.6 ± 0.5 MPa to 3.9 ± 0.6 MPa when the Evolve were undersized by 2mm. The mean pressures for the Anatomic® RHs (1.4 ± 0.1 MPa) did not change significantly with under-sizing (1.3 ± 0.1 MPa, $p = 0.12$); whereas, the mean pressures of the Evolve (1.6 ± 0.1 MPa) significantly reduced with under-sizing (1.4 ± 0.1 MPa, $p < 0.02$).

Conclusion: Both mean and peak pressures were initially high for Evolve® RH sized based on the short axis diameter and were improved with further under-sizing by 2 mm. Peak, but not mean, contact pressures were improved by under-sizing the Anatomic® prosthesis based on the long axis diameter. These findings support the clinical recommendation of some surgeons to undersize the Evolve® prosthesis by 2 mm smaller diameter than the current manufacturer