Total wrist arthroplasty
A clinical, radiographic and biomechanical investigation

Av

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Akademisk avhandling

Avhandling för medicine doktorsexamen i medicinsk vetenskap
med inriktning kirurgi,
som kommer att försvaras offentligt
fredagen den 7 oktober 2016 kl. 13.00,
Bohmansonsalen, Örebro Universitetssjukhus

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Abstract


Aim: To study patient-related functional outcome measures, implant survival and radiographic loosening after total wrist arthroplasty (TWA) using four different implants. To evaluate a new TWA design biomechanically and clinically.

Methods: The studies included two cohort studies with prospectively collected data (n=206 and n=219), an anatomic and kinematic analysis in a cadaveric model and a pilot study (n=20).

Results: The Maestro TWA had a significantly greater improvement of radi al/ulnar deviation than the Biax and Remotion TWAs. Summarized patient-related functional outcome was significantly better for the Maestro than for the Remotion TWA. Cumulative implant survival after 8 years was 94% for Remotion, and 95% for Maestro implants. Radiographic loosening five years postoperatively was present in 26% of the Biax wrists, 18% of those with Remotion, and 2% of those with Maestro. Following TWA with the new implant design in a cadaveric model, there were no statistically significant changes compared to a native wrist regarding flexion, extension, radial deviation, the extension/radial deviation component of the dart-thrower’s motion, or the circumduction range of motion. Clinically, there was significant improvement of COPM, PRWE and VAS pain scores. Wrist extension and ulnar deviation improved, while grip strength remained largely unchanged.

Conclusions: TWA is a surgical procedure which may offer a high level of patient satisfaction. Implant design may affect patient-related functional outcome after TWA. Implant survival as well as the frequency of radiographic loosening differed considerably between the four types of implants and might be a result of different implant design. Kinematic analysis of the new TWA design suggests that a stable and functional wrist is achievable with this design. Surgical placement of the new total wrist implant was reproducible and the implant yielded good patient-related outcome measures in the short term. Since TWA is an evolving procedure, further studies are warranted in order to refine indications and the place for TWA in modern hand surgery.

Keywords: Wrist, Arthroplasty, Rheumatoid, Biomechanics, Functional outcome, Implant survival.

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