NeuFlex and Swanson Metacarpophalangeal Implants for Rheumatoid Arthritis: A Prospective Controlled Clinical Trial

Earl R. Bogoch, Benjamin G. Escott, Kara Ronald
Department of Surgery, Keenan Research Center, Li Ka Shing Knowledge Institute, St. Michael’s Hospital, University of Toronto, Toronto, ON, Canada

Introduction: Arthroplasty of the metacarpophalangeal joint for patients with rheumatoid arthritis is performed to restore function, reduce pain and improve the aesthetic appearance of the hand. The Swanson implant, first reported in 1968 is the most widely used and studied implant for MP arthroplasty. Swanson MP arthroplasty successfully restores MP extension but may be accompanied by a loss of MP flexion. The NeuFlex implant, first reported in 1998 is preflexed to 30 degrees to facilitate flexion and has a palmar hinge location to improve biomechanics and peak stresses. This prospective controlled clinical trial compares the outcomes of metacarpophalangeal (MP) arthroplasty in rheumatoid arthritis patients using the Swanson (S) and NeuFlex (N) MP implants.

Materials and Methods: Forty hands (37 patients) were randomized and evaluated preoperatively and at one year following MP arthroplasty in all four fingers. The primary outcome was maximum active postoperative flexion. Secondary outcomes include range of motion, ulnar drift, grip strength, Sollerman hand function score and patient-reported outcome (Michigan Hand Questionnaire).

Results: Both implants restored extension and corrected flexion deformities. The NeuFlex implant, which is pre-flexed at 30°, preserved more flexion at the MCP joint than the Swanson implant in all digits (summed) (N:74.5°; S:55.8°; p=0.005), with the greatest difference observed in the fifth digit (N:69.6°; S:48.7°; p=0.009). There was no significant difference in extension of all digits (summed) between the NeuFlex and Swanson implants (N: -20.8°; S: -13.8°; p=0.29). The total arc of motion improved in all digits, with no significant differences between the NeuFlex and Swanson groups in the second through fourth digits (N:53.8°; S:43.8°; p=0.154); a significantly greater improvement was observed in the NeuFlex group for the fifth digit (N:53.3°; S:42.5°; p=0.028). Both implants corrected ulnar drift deformity, while neither led to loss of grip strength. Hand function as measured by Sollerman score and Michigan Hand Questionnaire (MHQ) improved significantly in both groups (p=0.0119, p<0.0001, respectively) with no significant difference between the Swanson and NeuFlex implants, except for MHQ function, aesthetics, and overall scores, which demonstrated superiority of the Swanson implant.

Discussion: Overall, there was a significant improvement in the range of motion, deformity and grip strength following MP arthroplasty for the full patient group. While both implants restored similar amounts of extension, the NeuFlex implant maintained greater flexion and total range of motion, with the greatest difference in the fifth digit. The Swanson implant had better MHQ function and aesthetics sub-scores.