EDITOR'S CHOICE

Silicone Metacarpophalangeal Arthroplasty for Osteoarthritis: Long-Term Results

Nathan T. Morrell, MD,* Arnold-Peter C. Weiss, MD†

Purpose To demonstrate that silicone metacarpophalangeal (MCP) arthroplasty provides excellent long-term outcomes with a low complication rate in osteoarthritis patients.

Methods A consecutive cohort of 35 patients with osteoarthritis of 1 or more MCP joints undergoing anatomically neutral silicone MCP arthroplasty was followed over a 15-year period. Functional outcomes including strength and range of motion (ROM), as well as complications, were recorded. All patients were available for long-term assessment including radiographs and outcomes questionnaire.

Results Average follow-up for the cohort of 35 patients (40 implants) was 8.3 years (range, 2−17 years). Average age was 58 years (range, 42−80 years) with 22 men and 13 women. In 31 patients, a single MCP joint was involved (middle finger, 20; index finger, 10; little finger, 1). The dominant hand was involved in 23 patients. Seven (of 14) patients had a concomitant RCL reconstruction of the index finger MCP joint; no other digit had a collateral ligament reconstruction. Average final visual analog scale pain score was 0.3 of 10. Average final active ROM arc was from 4° (range, 0°−20°) to 73° (range, 50°−90°) of flexion. One patient had a revision MCP arthroplasty for a 97% clinical survivorship. Radiographs demonstrated fractured implants in 5 of 40 (12.5%) implants, but none exhibited instability, pain, or ROM deterioration. Average Michigan Hand Outcomes Questionnaire score was 82 (of 100) at final follow-up.

Conclusions Silicone arthroplasty is effective in the treatment of primary MCP osteoarthritis. Implant survivorship is 97% (clinical) and 88% (radiographic) in long-term follow-up. *(J Hand Surg Am. 2018;43(3):229−233. Copyright © 2018 by the American Society for Surgery of the Hand. All rights reserved.)*

Type of study/level of evidence Therapeutic IV.

Key words Arthroplasty, MCP, osteoarthritis, silicone.

PRIMARY OSTEOARTHRITIS OF THE metacarpophalangeal (MCP) joint is relatively rare, especially compared with MCP involvement in rheumatoid arthritis. Osteoarthritis most commonly affects the second and third MCP joints, although the first through fifth may also be involved.[1] Osteoarthritic changes of the second and third MCP joints can also be seen in pseudogout and hemochromatosis, and these etiologies should be considered when working up patients with nonrheumatoid MCP arthritis.[2,3] Patients typically present with pain, loss of motion, dysfunction, and possibly disfigurement. Nonsurgical measures are like those for other osteoarthritic hand joints, that is, activity modification, orthosis fabrication, nonsteroidal anti-inflammatory medication, and intra-articular corticosteroid injection; medical management may be indicated if pseudogout or hemochromatosis is present.[4,5] When nonsurgical treatments fail, or patients are not

*From the *Department of Orthopaedics, University of Vermont, Burlington, VT; and the †Department of Orthopaedics, Brown University/Rhode Island Hospital, Providence, RI.*

Received for publication February 7, 2017; accepted in revised form October 10, 2017.

A.-P.C.W. receives royalties from Depuy, Inc. (Warsaw, IN).

Corresponding author: Arnold-Peter C. Weiss, MD, University Orthopedics, 2 Dudley St., Suite 200, Providence, RI 02905; e-mail: apcweiss@brown.edu.

0363-5023/18/4303-0005$36.00/0
https://doi.org/10.1016/j.jhsa.2017.10.010

FIGURE 1: A typical posteroanterior radiograph demonstrates loss of joint congruity and joint narrowing.

FIGURE 2: The resected MCP head demonstrates focal cartilage loss.

satisfied with the results of nonsurgical management, surgical intervention may be considered.

Silicone MCP arthroplasty has been well established in the treatment of rheumatoid arthritis of the hand, with long-term improvement in hand function and excellent patient satisfaction.[6–9] Such treatment has not been as well studied in the nonrheumatoid patient, although there have been several studies recently that have shed optimism on the use of silicone arthroplasty in nonrheumatoid patients.[4,5,10] The purpose of this study was to report long-term outcomes of silicone MCP arthroplasties performed for primary osteoarthritis over a 15-year period.

MATERIALS AND METHODS

Institutional review board approval was obtained for a retrospective study of patients with osteoarthritis having received silicone MCP implants. All patients who had undergone silicone MCP arthroplasty for primary osteoarthritis by the senior author (A.-P.C.W.) from 1999 to 2014 were identified and reexamined at study follow-up. An anatomically neutral (30° prebend) implant was used in all cases (NeuFlex; DePuy Orthopaedics, Warsaw, IN). Operative reports were reviewed and the presence or absence of collateral ligament reconstruction was noted. Functional outcome parameters of range of motion (ROM), lateral stability, visual analog scale pain scores (patient-reported pain scored 0−10, 10 being the most severe) and complications related to the implant or surgical procedure were noted. Radiographs were performed to assess implant fracture. The Michigan Hand Outcomes Questionnaire was used to assess patient-reported outcomes. Preoperative radiographs always demonstrated joint narrowing and noncongruent joint surfaces at the relevant joint, consistent with osteoarthritis (Fig. 1).

The surgical technique involved longitudinal splitting of the extensor tendon mechanism, recession of both collateral ligaments, and transverse osteotomy at the distal flare of the metacarpal shaft. The resected metacarpal head always demonstrated full-thickness loss of cartilage, although most often in a centralized and slightly volar location on the MCP head (Fig. 2). An awl was used to open both intramedullary canals followed by sequential broaching to the maximum size possible (Fig. 3A). Following trial implant sizing, the definitive implants were placed with the finger/implant stability checked in full extension (Fig. 3B) and full flexion (Fig. 3C). If joint laxity was noted before surgery in the index finger, the radial collateral ligament (RCL) was tightened through 2 bone holes in the second metacarpal using 3-0 nonabsorbable suture; in non−index finger implants, no collateral ligament repair was performed. The ulnar sagittal hood was released and the radial sagittal hood imbricated with 3-0 nonabsorbable suture only in cases of ulnar subluxation of the extensor tendon. The extensor tendon was closed separately from the joint capsule (Fig. 4). Postoperative radiographs were obtained (Fig. 5).

The postoperative protocol involved orthosis fabrication with a bulky dressing that maintained the MCP joint in approximately 30° of flexion, but allowed for immediate proximal and distal interphalangeal joint motion, for 2 weeks, followed by formal hand therapy for an additional 4 to 6 weeks. Active