

# Silicone Arthroplasty After Ankylosis of Proximal Interphalangeal Joints in Rheumatoid Arthritis: A Case Report

Hisham M. Awan, MD, and Joseph E. Imbriglia, MD

## Abstract

Rheumatoid arthritis (RA) can cause severe disability of the hand and fingers. Ankylosis of the finger joints is a known yet underreported manifestation of RA of the hand.

We report the case of a patient who had RA and developed autofusion of the proximal interphalangeal (PIP) joints. At presentation, the PIP joints were fused in 15° of flexion. Silicone PIP arthroplasty was performed. Function improved with 60° of PIP joint motion and no pain.

In this article, we report a case of PIP joint autofusion treated with silicone PIP arthroplasty in a patient with RA. The patient provided written informed consent for print and electronic publication of this case report.

## Case Report

A 56-year-old woman who had had RA for more than 20 years underwent left carpometacarpal arthroplasty and thumb reconstruction. She subsequently presented with complaints of progressively worsening functioning of the left ring and small fingers. On initial evaluation, her PIP joints were fused in about 15° of flexion. Radiographs (**Figures 1A, 1B**) showed severe diffuse arthritis of the hands and complete bony ankylosis of the ring- and small-finger PIP joints with radial deviation of the

Rheumatoid arthritis (RA) commonly affects the hand and fingers, most often at the metacarpophalangeal and proximal interphalangeal (PIP) joints. Synovitis, tendon ruptures, Boutonnière and swan-neck deformities, and joint destruction often occur. Bony ankylosis is not commonly described yet frequently occurs in patients with RA.<sup>1</sup>

Implant arthroplasty is an established treatment for arthritis of the hand and fingers. Indications for its use include RA, osteoarthritis, and posttraumatic arthritis. Most patients treated with implant arthroplasty can expect pain relief and 40° to 65° of PIP joint motion.<sup>2,3</sup> Silicone arthroplasty historically has been used for pain relief but not for restoration of motion in an ankylosed joint. To our knowledge, there are no reports of using implant arthroplasty in the treatment of spontaneous ankylosis in RA. Contraindications for this procedure would include infection, irreparable flexor or extensor apparatus, and severe medical comorbidities.



**Figure 1.** (A) Dorsal and (B) lateral radiographs show severe diffuse arthritis with complete bony ankylosis of the ring- and small-finger proximal interphalangeal joints.

**Authors' Disclosure Statement:** The authors report no actual or potential conflict of interest in relation to this article.

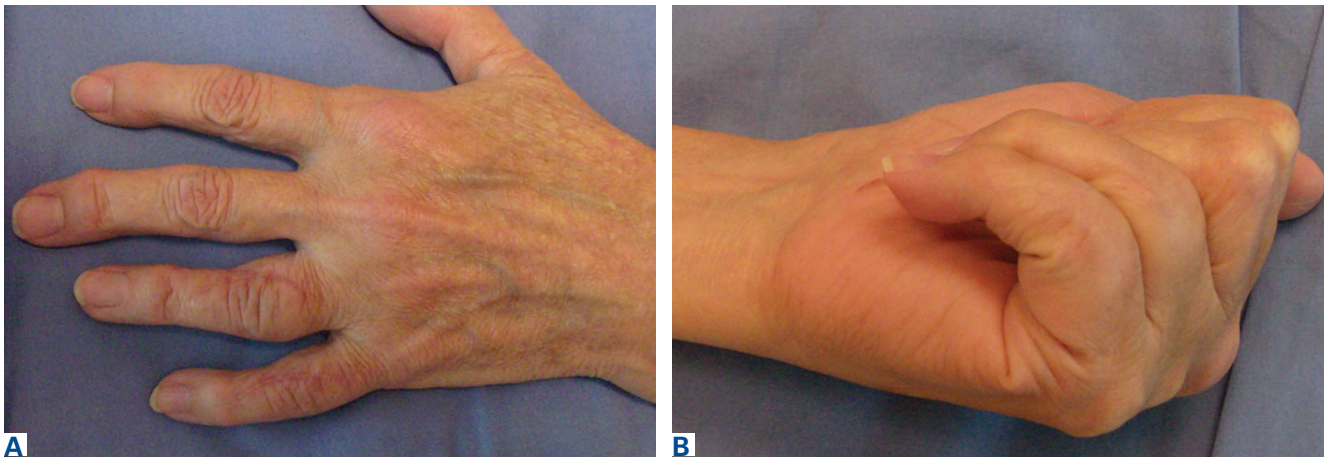


Figure 2. (A) Dorsal and (B) palmar photographs show good alignment of fingers after surgery.



Figure 3. (A) Dorsal and (B) lateral radiographs show implant position (arrows) after surgery.

ring-finger middle phalanx. The patient had minimal pain but wanted improved hand motion and opted for takedown of the ankylosis with silicone PIP joint arthroplasty.

Radial dorsal incisions were made over the PIP joints of the ring and small fingers. As is not the case with arthroplasty for routine PIP joint arthritis, presence of bony ankylosis made identification of the native PIP joint more difficult. The transverse retinacular ligament was identified and opened, and the collateral ligament, which was not ankylosed, was dissected off the proximal phalanx. These landmarks were useful in locating the PIP joint, and proper positioning was confirmed with fluoroscopy. The ankylosed joint space was opened with an osteotome, and about 8 to 10 mm of bone was resected to create space for the instrumentation. As the amount of scarring within the flexor

tendon sheath was not significant, restoration of motion did not require extensive tenolysis. The extensor mechanism was slightly contracted, but the bony resection allowed flexion to be restored. The distal portion of the proximal phalanx was then resected. The proximal and middle phalanges were reamed, and a silicone prosthesis was placed with the finger held straight. The collateral ligament was repaired back to the proximal phalanx with 4-0 polydioxanone sutures placed through a bone tunnel created with a Kirschner wire. The skin was closed with 4-0 nylon, and a postoperative splint was applied.

The initial postoperative course was unremarkable. The patient was immobilized in 10° of PIP joint flexion for 10 days, and therapy was initiated after the splint was removed. Twenty-four months after surgery, the patient was pain-free and had 60° of active PIP joint flexion, with extensor lag of only 10°. Clinically, alignment of the fingers was satisfactory; there was mild persistent radial deviation of 10° to 15° (Figures 2A, 2B). Radiographs showed good positioning of the implants (Figures 3A, 3B) and no sign of coronal instability. The patient was satisfied with her improved functioning and returned to employment as a hospital clerk, working full-time.

### Discussion

RA of the hand and fingers can be painful and disabling. Although there are several treatment options for many of the most common manifestations, options are limited for bony ankylosis of the finger joints. The patient described in this case report had minimal pain, but the loss of motion of the PIP joints in her ring and small fingers created difficul-



ties for her at work. She wanted surgery that would improve the functioning of her fingers. PIP joint arthroplasty traditionally has been the treatment of choice for PIP joint arthritis. In 1985, Swanson and colleagues<sup>2</sup> reported on more than 400 silicone PIP arthroplasties performed over 16 years. Mean range of motion (ROM) was between 45° and 60°, with 70% of patients having ROM of more than 40°. Pain relief was complete in 98% of cases. Complications included implant fracture (5%) and recurrent or new deformities (6.5%). A 10.9% revision rate was noted at minimum 1-year follow-up. Recent implants made of improved biomaterials hold promise, but longer term follow-up is still needed.

Silicone arthroplasty has also been used as an effective treatment for non-RA of the PIP joint. Bales and colleagues<sup>4</sup> reviewed long-term results of silicone arthroplasty for PIP joint osteoarthritis in 22 patients. At a mean of 10 years, mean Quick-DASH (Disabilities of the Arm, Shoulder, and Hand) score was 17, mean visual analog scale score for pain was 0.4, and implant survivorship was 90%. Despite unchanged ROM and considerable implant deformation or fracture, patients' pain relief and satisfaction were consistent.

Hage and colleagues<sup>5</sup> reviewed long-term results of silicone PIP arthroplasty for posttraumatic arthritis in 14 patients. Most of the patients were satisfied: Although they had notable rotational deformity, alignment deviation, and loss of pinch strength and ROM, they were pain-free. The authors concluded that silicone arthroplasty should be used for posttraumatic arthrosis cases in which associated adhesions may be corrected with simple tenolysis, and even in these cases the objective results may not be as good as the subjective outcome.

Kaye<sup>6</sup> used radiographs to determine the incidence of bony ankylosis in 203 patients with RA. Hand and wrist radiographs of 48 (23.6%) of these patients showed ankylosis, and 34 of the 48 patients had 2 or more joints fused. On a questionnaire, patients with ankylosis indicated more difficulty with activities of daily living and more limited activity. The authors concluded that radiographic

bony ankylosis was a relatively common feature of RA and a marker of disease that was clinically, radiographically, and functionally more severe.

The patient described in this case report had a satisfactory result after PIP joint arthroplasty. At 2-year follow-up, she remained pain-free, and her previously ankylosed PIP joint had an arc of motion of 10° to 60°. Most patients with bony ankylosis of PIP joints present with minimal pain and do not seek surgical treatment. However, patients with ankylosis that limits functioning or activities of daily living may wish to pursue intervention that could be restorative. PIP joint arthroplasty may be effective in improving motion in patients with bony ankylosis of the finger joints.

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Dr. Awan is Assistant Professor, Hand and Upper Extremity Center, Department of Orthopaedics, Wexner Medical Center, Ohio State University, Columbus, Ohio. Dr. Imbriglia is Clinical Professor of Orthopaedic Surgery, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania, and an Attending Physician, Hand and Upper Extremity Center, Wexford, Pennsylvania.

Address correspondence to: Hisham M. Awan, MD, Hand and Upper Extremity Center, Department of Orthopaedics, Wexner Medical Center, Ohio State University, 915 Olentangy River Rd, Suite 3200, Columbus, OH 43212 (tel, 614-366-4263; fax, 614-366-0131; email, hisham.awan@osumc.edu).

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