SCIENTIFIC ARTICLE

Complications of Semiconstrained Distal Radioulnar Joint Arthroplasty

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Purpose The Aptis total distal radioulnar joint (DRUJ) prosthesis is a semiconstrained implant designed for treatment of DRUJ arthritis and instability. The purpose of this study was to analyze short-term complications of this device.

Methods We performed a retrospective chart review of patients undergoing semiconstrained DRUJ arthroplasty from 2007 to 2015 at a single institution. Records were analyzed for complications and the need for subsequent surgical procedures.

Results Two senior hand surgeons at one institution performed 52 semiconstrained DRUJ arthroplasties over 8 years. Nineteen complications necessitating operative management occurred in 15 patients (29%). A total of 26 procedures were undertaken to address these complications. Complications included 4 periprosthetic fractures, 3 infections, 2 instances of aseptic loosening, 2 implant component failures, 1 instance of screw loosening, 3 neuromas requiring neurectomy, 2 instances of finger stiffness necessitating extensor tenolysis, and 2 cases of heterotopic ossification at the DRUJ. Three of the 52 implants were revised (6%) and 2 were explanted (4%); 3 of these (6%) were caused by deep infection.

Conclusions There is limited literature on outcomes of the semiconstrained DRUJ prosthesis. Prior studies reported low complication rates, with 0% to 5% revisions. In the current clinical series, 29% of patients required further surgery for complications, the most common reasons for which were periprosthetic fracture and infection. *(J Hand Surg Am. 2017;■(■):1.e1-e9.*

Type of study/level of evidence Therapeutic IV.

Key words Arthritis, arthroplasty, distal radioulnar joint, instability, prosthesis.

Online Exclusive

The distal radioulnar joint (DRUJ) has an essential role in forearm rotation and stable transmission of forces across the forearm and wrist. Untreated injuries to the DRUJ can result in chronic instability or arthritis, causing considerable pain, weakness, and disability. Treatment options for DRUJ arthrosis include ulnar head resection (Darrach), distal ulna hemiresection (Bowers), and DRUJ arthrodesis with ulnar shaft resection (Sauvé-Kapandji).[1–4] Favorable results have been described for all of these interventions, in multiple clinical series, with improvement in both pain and range of motion.[5–8] However, distal ulnar stump instability with convergence of the distal ulna with the radial shaft is a known complication of each of these procedures, and may lead to pain and weakness with gripping and forearm rotation.[5,9–12] Ulnar head arthroplasty has also been described for treatment of DRUJ arthritis.[13–15] However, this hemiarthroplasty procedure relies on an intact sigmoid notch as well as preservation or reconstruction of the triangular

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Received for publication April 18, 2017; accepted in revised form October 22, 2017.

No benefits in any form have been received or will be received related directly or indirectly to the subject of this article.

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0363-5023/17/■ ■-0001$36.00/0
https://doi.org/10.1016/j.jhsa.2017.11.004

TABLE 1. Patient Cohort Characteristics

Patient Characteristics	Value
Age, y	47 ± 13
Range	18–66
Sex (male)	27 (52%)
Dominant hand	30 (58%)
Diabetic	4 (8%)
Smoker	9 (17%)
Workers' compensation	10 (19%)
Patients undergoing prior procedures, n	39 (75%)
Range	0–7
Average procedures in those with prior surgery, n	2.6 ± 1.6
Etiology	
Posttraumatic	29 (56%)
Madelung deformity	10 (19%)
Rheumatoid arthritis	2 (4%)
Nontraumatic	11 (21%)

TABLE 2. Procedures Performed After Aptis DRUJ Arthroplasty That Were Related to Complications

Procedure Performed	Number
Revision of Aptis components	
Explant	2
Revision arthroplasty	1
Two-stage revision	2
Polyethylene ball exchange	1
Revision for screw failure	1
Revision for aseptic loosening of screws and radial peg	1
Open reduction internal fixation for periprosthetic fracture	3
Repair of distal radius nonunion	1
Incision and drainage	4
Neuroma excision	
Dorsal cutaneous branch ulnar nerve	2
Posterior interosseous nerve neurectomy	1
Tenolysis	
Extensor digitorum communis tenolysis	1
Extensor tenolysis with extensor carpi ulnaris transposition	1
Excision of ectopic bone DRUJ	2
Proximal radioulnar joint arthrodesis for creation of a 1-bone forearm (from instability after DRUJ arthroplasty explant)	1

fibrocartilage complex and soft tissue constraints around the DRUJ.[2,16,17]

The Aptis total DRUJ arthroplasty (Aptis Medical, Glenview, KY) is a modular prosthesis that reconstructs the ulnar head as well as the articulating sigmoid notch of the distal radius. Because it is a semiconstrained prosthesis, it also provides stability to the DRUJ, obviating the need for ligamentous stabilizers. Prior studies assessing outcomes of patients undergoing DRUJ arthroplasty are limited, but they reported favorable outcomes with 95% or greater 5-year survival rates, with survival defined as maintenance of the original arthroplasty.[18–22] The current published data on outcomes after DRUJ arthroplasty are limited to case series with sample sizes ranging from 14 to 49 implants; most studies were based on procedures performed by the designer of the implant.[18–22] There is a need for further studies on the implant with larger sample sizes as well as from the perspective of other institutions and other surgeons. In this study, we analyzed the short-term complications of the semiconstrained total DRUJ prosthesis in a single institution study with 2 senior hand surgeons.

MATERIALS AND METHODS

After we obtained approval from our institutional review board, we performed a retrospective chart review of patients who underwent semiconstrained DRUJ arthroplasty from 2007 to 2015 at our institution. Patients were identified by Current Procedural Terminology code. Patients with less than 6 weeks of postoperative follow-up data were excluded. Patient characteristics were collected, including sex, age, etiology of pathology, and prior surgical procedures on the wrist. Radiographs were reviewed to assess for changes in implant positioning, implant loosening at the stem or osteolysis at the collar, defined as lucency greater than 2 mm,[23] periprosthetic fracture, and heterotopic ossification. In addition, details of concomitant procedures and subsequent revision surgery from complications were collected.

RESULTS

Two fellowship-trained hand surgeons at our institution performed a total of 56 semiconstrained total DRUJ arthroplasties in 51 patients from 2007 to 2015. A total of 52 wrists (48 patients) were included in the study; 4 patients were excluded for insufficient short-term follow-up (less than 6 weeks). Median follow-up was 1.6 years. Average age at time of