

# New Treatment Option for Wrist Instability

There's a new kid on the block and his name is distal radioulnar joint or DRUJ. In plain English that means a replacement of the wrist joint. More specifically, we're talking about the place where the radius (forearm bone on the thumb side of the wrist) connects to the ulna (forearm bone on the little finger side).

What's so special about this guy? Well, his predecessor (the joint replacement used before this one was designed) failed too many times -- the previous prosthesis (replacement device) loosened, broke, backed out, or had to be removed because the patient was still in so much pain.

This new C-type prosthesis is a simple rod made of chromium cobalt that is inserted down the length of the ulnar bone. It is attached to the radius with a shorter cross piece also made of chromium cobalt. The shorter radial component has a circle-shaped head with a plastic lining on the inside of the round end. That ring is placed inside a hole cut into the radius just above the wrist.

What makes this device unique is the fact that it has only two parts. Other wrist replacements have four pieces. In the new C-type units, both pieces are coated with hydroxyapatite, a calcium crystal that helps form bone mineral. When placed inside or next to the bone, this coating gives new bone cells a compatible surface to attach to. In other words, the hydroxyapatite surface promotes bone growth filling in and around the prosthesis.

The new prosthesis is also unusual in that it allows the ulnar rod to move up and down inside the bone (piston-like action) while still turning (rotating) around the radius. Rotation is made possible by the ring on the end of the radial component. Each prosthesis was custom made (sized) for individual patients.

Not all 19 C-type prosthetic devices were the same. The surgeons fiddled around with the design a bit. Some of the radial units had rounded corners; others were rectangular. From start to end of the study, they used three different models of the same basic prosthesis type. Over time, they were able to increase the tolerance of the ring. Tolerance refers to the amount of force the part can withstand without bending or breaking.

The success of this new distal radioulnar joint prosthesis was measured in 19 patients using before and after measurements of wrist pain, grip strength, wrist range-of-motion, hand and wrist function, and disability. Disability was measured using a specific assessment tool called the Disabilities of the Arm, shoulder, and Hand (DASH) questionnaire.

Everyone was followed at regular intervals during the first year (three, six, and 12 months after surgery). Annual measurements were recorded after that first year. Some patients were followed for as long as seven years. An occupational therapist did all of the clinical measurements. X-rays were also taken to look at bone formation and position of the prostheses.

Of the 19 patients enrolled in the study, 12 still had the new distal radioulnar joint (DRUJ) prosthesis at the end of the first year. Those patients who had the implant removed either had ongoing pain during movement, loosening, or just didn't want the device left in. For the patients who still had the DRUJ implant, results were good-to-excellent with decreased pain, increased movement, and improved function.

The authors compare the results of their patients in this study with patient results using other types of implants. They conclude that their two-part implant is superior to the main alternate choice still left on the market: the Alkmaar and Schecker four-piece prosthesis. After they modified the new C-type implant to

improve ring tolerances, the number of implants that had to be removed for any reason dropped to zero.

This new C-type distal radioulnar joint replacement isn't the final word on wrist replacements. It is more likely a stepping stone from a device that didn't work to one that will be even more superior to the one just studied.

Relieving pain while improving motion, strength, and function are fairly easy items to measure. So there should be no problem obtaining data needed to compare current options to future prostheses that come available.

The availability of improved implants is good news for anyone with a painful, weak, and unstable wrist joint. In time, the failure rate for wrist artificial joints will drop closer to zero. It's also possible that more patients will be eligible for this type of wrist replacement. Right now, it's fairly limited to those who develop osteoarthritis after trauma or injury to the wrist and to patients who have the tip of the ulna (at the wrist end) removed for any reason.

Reference: Arnold H. Schuurman, MD, PhD, and Teun Teunis, BSc. A New Total Distal Radioulnar Joint Prosthesis: Functional Outcome. In *The Journal of Hand Surgery*. October 2010. Vol. 35A. No. 10. Pp. 1614-1619.