

Patient Specific Instrumentation for Humerus in Reverse Total Shoulder Arthroplasty

Heedong Lee, Jae-Chul Yoo, Anna Seo, HWANSUN LEE

In this video, we demonstrate a patient-specific instrumentation (PSI) system for the humerus in reverse total shoulder arthroplasty (RTSA). Precise humeral head osteotomy and accurate stem insertion are critical for successful RTSA outcomes. However, few studies have focused on improving the surgical precision of the humeral component. To address this, we developed a custom-designed, 3D-printed PSI guide that assists in both osteotomy and stem placement.

Preoperative planning was performed using Reconeasy software (SeeannSolution, Incheon, Korea), and the PSI guides were fabricated using 3D printing technology. The guide system consists of three components:

1. Humerus contact guide – A patient-specific, 3D-printed component precisely designed to fit the patient's humerus.
2. Saw and reamer guide – A reusable metallic part that attaches to the contact guide, designed to guide the saw blade and reamer while withstanding mechanical impact.
3. Broach and stem guide – A posterior attachment to the resected humerus that prevents valgus or varus malalignment during broach and stem insertion.

We believe this system can facilitate humeral head osteotomy at the planned height, angle, and version, while also ensuring accurate stem alignment according to the preoperative plan.