

- Abstract No. : F-0075
- Category : Shoulder
- Detail Category : arthroplasty , basic

## **Kinematic analysis of shoulder and scapular motion following reverse total shoulder arthroplasty**

**Hyeon Jang Jeong<sup>1</sup>, Kang Heo<sup>2</sup>, Joo Han Oh<sup>1</sup>**

Orthopedic Surgery, Seoul National University Bundang Hospital , Korea, Republic of<sup>1</sup>  
Orthopedic Surgery, Kanghan Seoul Orthopedic Clinic , Korea, Republic of<sup>2</sup>

### Introduction and Background

Reverse total shoulder arthroplasty (rTSA) reliably improves pain and mobility, however, its impact on dynamic glenohumeral (GHM) and scapulothoracic motion (STM) during activities of daily living (ADLs) remains unclear. This study investigated three-dimensional kinematic changes before and after rTSA, and examined whether scapulohumeral ratio (SHR) varies by shoulder condition or ADL type.

### Material and Method

Thirty patients undergoing rTSA were evaluated using a three-dimensional motion analysis system. Three ADLs, including upward reaching (UR), hair combing (HC), and perianal hygiene (PH), were assessed preoperatively (Pr) and 1 year postoperatively (Po). The affected shoulder was compared with the contralateral side (CL). Motion vectors, GHM, and STM were analyzed across sagittal, coronal, and transverse planes. Pathologic changes were defined as differences between Pr and CL, and residual postoperative deficits were defined as differences between Po and CL.

### Results

Overall motion vectors during ADLs did not differ among Pr, Po, and CL (all  $p > 0.05$ ). SHR varied significantly by ADL (all adj.  $p < 0.05$ ), but not by shoulder condition (all  $p > 0.05$ ).

Preoperatively, overall ranges of motion (ROMs) were significantly reduced compared with CL (all  $p < 0.05$ ). UR and HC showed abnormal GHM with earlier initiation angles and decreased ROM, whereas PH demonstrated no GHM abnormalities. STM showed no pathologic changes across all ADLs.

Postoperatively, ROMs improved but did not reach CL levels (all adj.  $p < 0.05$ ). Residual GHM deficits persisted during UR and HC, including lower peak flexion and abduction angles (all  $p < 0.05$ ). PH demonstrated preserved postoperative GHM but showed STM initiation abnormalities, with reduced anterior tilt and scapular external rotation initiation angles.

### Conclusions

SHR during ADLs is activity-dependent and minimally affected by rotator cuff pathology or rTSA. Residual deficits differ by ADL, indicating that targeted, task-specific rehabilitation strategies may better address the distinct biomechanical demands required for functional recovery.

