

Towards optimal reverse total shoulder arthroplasty design: reconsidering the role of lateralized implants

Sam-Guk Park, Hyun-Gyu Seok

Department of Orthopedic Surgery, Yeungnam University Medical Center, Daegu, Korea

The current reverse total shoulder arthroplasty (RTSA) concept was introduced by Grammont in 1985 based on the deltoid compensating for rotator cuff function and stabilizing the shoulder joint [1]. In the initial design, a medial shift of the center of rotation (COR) allowed for greater deltoid use during forward flexion and abduction, and a distal shift of the COR extended the deltoid moment arm for better function [2,3]. However, problems such as loss of shoulder contour, reduced stability of the artificial joint, weaker external and internal rotation, and scapular notching were associated with medialization of the COR in early implants [4-6].

The concept of lateralization was introduced to address issues related to tension in the rotator cuff and deltoid, to restore active external rotation, and to increase impingement-free range of motion, thereby improving both active and passive internal rotation [7,8]. The lateralization of RTSA includes both glenoid and humeral lateralization, collectively referred to as global lateralization. Grammont's Delta III prosthesis is commonly used as a reference point for RTSA and has a global lateralization of 13.1 mm [9]. Most prior meta-analyses [4,10] agree that lateralized RSA provides better restored axial rotation compared to the original Grammont-style prosthesis, and Hao et al. [11] should be congratulated that further clarified that lateralized RSA produces superior axial rotation. While lateralization of the COR addresses many disadvantages of the conventional implant, excessive lateralization may induce complications such as stress fracture of the

scapular spine and subacromial notching [12]. Therefore, to improve clinical outcome, it is important to balance the advantages of medialization and lateralization [13]. Future research should focus on identifying patient variables identifying appropriate candidates for each prosthesis design.

Hao et al. [11] also considered subscapularis repair an important factor for axial rotation. Several studies have been conducted on the effectiveness of subscapularis repair following RTSA. One meta-analysis revealed that subscapularis repair significantly reduced the risk of dislocation [14]. According to another meta-analysis, subscapularis repair led to superior results in internal rotation but inferior results in abduction compared to a control group [15]. In contrast to these studies, Clark et al. [16] found that subscapularis repair did not significantly affect the rate of complications, dislocation events, range of motion, or pain.

Therefore, the strength of this study is that the authors performed a subgroup analysis that included the degree of lateralization and subscapularis repair, even though the study did not include a lateralized RTSA without subscapularis repair group. This is in contrast to previous meta-analyses that only differentiated between lateralization and medialization of the COR. Although the quality of the included studies and heterogeneity of the axial rotation evaluation method is a weakness of this study, the results are expected to help shoulder surgeons determine the degree of preoperative medialization or lateralization.

Received: January 8, 2024 Revised: February 6, 2024 Accepted: February 7, 2021

Correspondence to: Sam-Guk Park

Department of Orthopedic Surgery, Yeungnam University Medical Center, Yeungnam University College of Medicine, 170 Hyeonchung-ro, Nam-gu, Daegu 42415, Korea

Tel: +82-53-620-3640, Fax: +82-53-628-4020, E-mail: radiorth@ynu.ac.kr, ORCID: <https://orcid.org/0000-0002-1135-5179>

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NOTES

ORCID

Sam-Guk Park <https://orcid.org/0000-0002-1135-5179>

Hyun-Gyu Seok <https://orcid.org/0000-0002-7244-2698>

Author contributions

Conceptualization: SGP. Supervision: SGP. Writing – original draft: SGP. Writing – review & editing: HGS, SGP.

Conflict of interest

Sam-Guk Park is an editorial board member of the journal but was not involved in the peer reviewer selection, evaluation, or decision process of this article. No other potential conflicts of interest relevant to this article were reported.

Funding

None.

Data availability

None.

Acknowledgments

None.

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