

Intraobserver and Interobserver Reliability in Glenoid Track Measurement on 2-Dimensional Computed Tomography

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INTRODUCTION: Risk factors for recurrent shoulder instability include male sex, contact sports, younger age, glenoid bone loss, and glenoid track. The concept of the glenoid track was first described by Yamamoto in 2007. Several studies have demonstrated the validity and clinical application of the glenoid track. The glenoid track was originally measured in a cadaveric model and intraobserver and interobserver reliability has been performed in 3-dimensional reconstruction models, which is not true to clinical practice. The reliability of measuring the glenoid track in true to practice, 2-dimensional imaging has not been described. The purpose of this study is to assess the intraobserver and interobserver reliability in glenoid track measurement using 2-dimensional computed tomography.

METHODS: Electronic medical records from 2009 to 2019 were reviewed for active-duty military personnel who underwent a bony augmentation procedure (e.g., Latarjet or distal tibial allograft) for recurrent glenohumeral instability. Two-dimensional computed tomography images were reviewed for glenoid and humeral head bone loss; patients with both glenoid and humeral head bone loss were included in the study. Measurement of the glenoid track was performed as described by Di Giacomo. Prior to starting the study, a standardization course was conducted on measuring glenoid track. True to practice, the measuring surgeon selected the image to be measured, and each surgeon measured the glenoid track of all images on two separate iterations.

RESULTS: Three fellowship trained attending and 4 orthopaedic residents measured the glenoid track on 38, 2-dimensional CTs. Intraobserver reliability was shown to have moderate reliability among all reviewers (ICC=0.459; p-value<0.001). The kappa value for interobserver reliability among all reviewers was moderate for glenoid diameter (ICC = 0.567; 95% CI, 0.474-0.663), moderate for glenoid defect (ICC= 0.61; 95% CI, 0.517-0.702), poor for Hill- Sachs lesion (ICC = 0.328; 95% CI, 0.232-0.441), moderate for glenoid track (ICC = 0.668; 95% CI, 0.584-0.75), and fair for HSL on/off track assessment ($\kappa = 0.267$, p-value <0.001).

DISCUSSION AND CONCLUSION: Our study shows that assessment of glenoid track is more reliable among fellowship trained attending surgeons; among fellowship trained attendings, both the interobserver and intraobserver reliability of measuring the glenoid track is good, and agreement on whether the lesion is on-track or off-track is moderate.