
ORIGINAL RESEARCH

ULTRASOUND MEASUREMENTS AND OBJECTIVE FORCES OF GLENOHUMERAL TRANSLATIONS DURING SHOULDER ACCESSORY PASSIVE MOTION TESTING IN HEALTHY INDIVIDUALS

Nancy Henderson, PT, DPT, OCS¹

Haley Worst, PT, DPT, OCS¹

Ryan Decarreau, PT, DPT, ATC, SCS¹

George Davies, PT, DPT, SCS, ATC, FAPTA¹

ABSTRACT

Background: Clinical examination of capsuloligamentous structures of the glenohumeral joint has historically been subjective in nature, as demonstrated by limited intra-rater and inter-rater reproducibility. Musculoskeletal diagnostic ultrasound was utilized to develop a clinically objective measurement technique for glenohumeral inferior and posterolateral translation.

Purpose: The purpose of this study was to measure the accessory passive force required to achieve end range glenohumeral posterolateral and inferior accessory translation, as well as, to quantify the amount of translation of the glenohumeral joint caused by the applied force.

Study Design: Cross-sectional descriptive correlational study

Methods: Twenty-five asymptomatic subjects between the ages of 18 and 30 were recruited via convenience sampling. Posterolateral and inferior shoulder accessory passive translation was assessed and measured using a GE LOGIQe ultrasound, while concurrently using a hand held dynamometer to quantify the passive force applied during assessment. Normative values for force and translation were described as means and standard deviations.

Results: Mean values for posterolateral translation were 6.5 +/- 4.0 mm on the right shoulder and 6.3 +/- 3.5 mm on the left with an associated mean force of 127.1 +/- 55.6 N and 114.4 +/- 50.7 N, respectively. Mean values for inferior translation were 4.8 +/- 1.7 mm on the right shoulder and 5.4 +/- 1.8 mm on the left with an associated mean force of 84.5 +/- 30.5 N and 76.1 +/- 30.1 N, respectively. There was a significant association between inferior translation and inferior force ($r = .51$). No significant association was found between posterolateral translation and posterolateral force. Significant differences were found between dominant and non-dominant shoulders for posterolateral translation, posterolateral force to produce translation, and inferior translation values.

Conclusions: Force data in the posterolateral and inferior direction is consistent with previously reported data for passive accessory motion testing at the shoulder. The results of this study provide data for glenohumeral translations and actual forces applied. Musculoskeletal diagnostic ultrasound can be a clinically relevant way to objectively measure the translation of the glenohumeral joint for assessing accessory passive motion joint translation while performing mobilizations or passive structure testing. This study provides a basis for comparison for healthy shoulder joints.

Level of Evidence: 2b

Keywords: Diagnostic ultrasound, glenohumeral joint translation, handheld dynamometry

CORRESPONDING AUTHOR

Nancy Henderson, PT, DPT, OCS

Armstrong State University

13040 Abercorn Street, Savannah, GA 31419

Phone: 912.344.2580

Fax: 912.344.3439

E-mail: Nancy.henderson@armstrong.edu

¹ Armstrong State University, Savannah, GA, USA