

THE VALIDITY AND RELIABILITY OF DYNAMIC ULTRASOUND ON IDENTIFYING SUPRASPINATUS TEARS DURING PASSIVE EXTERNAL ROTATION FROM ZERO TO THIRTY DEGREES

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Background: Passive motion is performed following rotator cuff repair to counter the deleterious effects of immobilization during the initial healing phase following surgery. The amount of safe passive motion has been assessed in animal and cadaveric models, but not in patients who have undergone a rotator cuff repair. The recommended amount of passive motion following rotator cuff repair varies amongst individual surgeons and institutions. In addition, there is controversy surrounding the optimum time to begin passive range of motion. A non-invasive way to assess internal tissue function is by using diagnostic ultrasound imaging. Ultrasound has been used to evaluate the integrity of the rotator cuff both prior to and following rotator cuff repair with greater than 90% accuracy in both populations. The standard position for evaluating the cuff footprint is with the patient's arm extended and shoulder internally rotated. The evaluation of the cuff footprint in this static position does not provide information about how the footprint is affected by movement of the shoulder. The ability to image the rotator cuff footprint during external rotation, a common post-operative exercise following rotator cuff repair, is desirable in order to determine if there is disruption of the tendon attachment during the movement. Ultrasound may be a useful tool for this assessment, however the validity and reliability of this method needs to be established.

Purpose: The purpose of this study is to determine if ultrasound is a reliable and valid tool to identify full-thickness supraspinatus tears during passive external rotation of the shoulder from neutral to thirty degrees. The establishment of these fundamental measurement properties may allow health care practitioners to examine the effect of passive external rotation on supraspinatus tendon integrity following rotator cuff repair, which may help to determine optimum external rotation constraints after rotator cuff repair.

Design: This project is designed as a validity and reliability study.

Subjects: Ten patients with a full thickness supraspinatus tear, as determined by magnetic resonance imaging (MRI), and ten subjects without any shoulder pain or injury will be recruited for this study.

Methods: Subjects will receive ultrasound imaging of the supraspinatus tendon while their arm is passively moved from neutral to thirty degrees of external rotation. The person performing the ultrasound will be blinded to group assignment; and subjects will receive a repeat ultrasound one hour following the initial imaging. The presence of supraspinatus tear will be recorded, measured along the anterior to posterior and medial to lateral axes, and these two values will be multiplied in order to obtain the area of the tear. Validity will be reported as the percentage of supraspinatus tears identified on the ultrasound images compared to the ten identified by MRI; reliability will be reported with an intraclass correlation coefficient for reproducibility of repeated measures of the tear area on ultrasound.