Arm Squeeze Test: Distinguishing Neck from Shoulder Pain

Research Review By Dr. Jeff Muir

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Study Title: Arm squeeze test: a new clinical test to distinguish neck from shoulder pain
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Background Information: Localized shoulder pain is a potentially difficult condition to diagnose and manage, owing to the potential for the source of pain to be either the shoulder or a cervical nerve root (1-3). Additionally, the fact that neck and shoulder conditions are often concomitant during advanced age (4,5) and share common innervation and musculature increase the challenge for treating clinicians. There is currently no specific test that can assist practitioners with differential diagnosis to discern between shoulder pain of neck or local origin. Practitioners are left to rely upon a combination of patient history and expensive and time-consuming imaging, orthopaedic and neurological testing, which can cause delays in diagnosis, and therefore treatment.

The authors of this study proposed the development of a simple clinical test that would assist in the differential diagnosis of shoulder pain, and help to differentiate between shoulder pain of neck or local origin. They hypothesized that squeezing the middle third of the upper arm (brachial biceps and triceps area), on the affected side, with a strength necessary to have a moderate compression of skin, subcutis and muscle, would elicit an intense reaction of local pain only in patients with cervical nerve root compression from C5 to T1, and not in those where the pain arises from the shoulder itself. The proposed test is based on the anatomic rationale that in the middle third of the arm, the musculocutaneous nerve (cervical root from C5 to C7), the radial nerve (from C5 to T1), the ulnar nerve (from C7 to T1) and the median nerve (from C5 to T1) are relatively superficial and it is therefore easy to obtain a painful provocation response by squeezing the arm with a moderate compression. PIC

Pertinent Results: A total of 1567 patients presenting with shoulder pain were tested (in addition to a control group comprised of 350 subjects without shoulder pain).

Diagnoses included: posterosuperior rotator cuff tear (n = 903), primary (unrelated to trauma and/or surgery) shoulder adhesive capsulitis (n = 155), degenerative arthropathy of the acromioclavicular (AC) joint (n = 101), calcifying tendonitis of the shoulder (n = 55), glenohumeral arthritis.
grade I–II (n = 48) and a group of patients with cervicogenic shoulder pain (n = 305).

The Arm Squeeze Test was positive in 295/305 (96.7%) of patients with subsequently confirmed cervical nerve root compression (C5-T1), compared with those diagnosed with rotator cuff tear (35/903 [3.87%]), adhesive capsulitis (3/155 [1.93%]), AC arthritis (0/101 [0%]), calcifying tendonitis (1/55 [1.81%]) and glenohumeral arthritis (4/48 [8.33%]) [p

The inter-observer k value was r = 0.81 (0.79–0.82); the intra-observer k value was r = 0.87 (0.85–0.89). Sensitivity was 0.96; specificity ranged from 0.91 to 1; positive prognostic value ranged from 0.89 to 1; negative prognostic value ranged from 0.81 to 0.99; likelihood ratios for an abnormal test result ranged from 10.6 to 48 and likelihood ratios for a normal test result ranged from 0.04 to 0.44.

Clinical Application & Conclusions

The Bone and Joint Decade (2000-2010) Task Force on neck pain determined that routine clinical examination is more effective in ruling out cervical radiculopathy than confirming its presence, and concluded that a combination of history, physical exam, imaging techniques and potentially needle EMG were considered the gold standard to properly diagnose conditions of cervical radiculopathy. The authors determined that the Arm Squeeze Test results differ significantly in patients diagnosed with cervical nerve root compression when compared with those in normal individuals and in those diagnosed with shoulder pathologies. The positivity of the test indicates that the examined patients are more likely to have cervical nerve root compression.

Current tests such as Spurling’s test or brachial plexus tension tests can be useful in determining the source of radicular pain; however, these tests are specific for cervical spine disease, and often occur after an examination of neck motion which includes flexion-extension, lateral rotation and lateral bending. The proposed Arm Squeeze Test is quick and easy to perform and looks like it can help determine the presence of nerve root irritation. The authors propose that the Arm Squeeze Test is a viable and specific option for differential diagnosis of neck/shoulder pain. More research is needed to confirm this result, but clinicians can integrate this simple test into practice and monitor its effectiveness!

Study Methods

Patient Demographics:
1,567 patients (average age 57, range 40–62) complaining shoulder pain were included in this study, of whom 930 (60.5%) were women and 607 men. The source of these patients was a Shoulder Clinical Office and Orthopedic Spine Ambulatory Center. A control group of 350 subjects without shoulder pain was also established.

Inclusion Criteria:
Subjects were between the ages of 40 and 66, with pain localized at the shoulder girdle. Subjects had not received any treatment prior to this study.

Exclusion Criteria:
Subjects younger than 40 or older than 66 years of age were excluded.
Patients with shoulder instability, suprascapular nerve entrapment, os acromiale, insulin dependent diabetes, rheumatoid or serum-negative arthritis, a history of trauma to the shoulder girdle or spine, or those who had already received any treatment for the shoulder pain were also excluded.

Diagnostic Criteria:
Definitive diagnosis of cervical root compression was made based on clinical examination of the cervical spine, shoulder and upper limb; electromyography (for C5 to T1 roots); X-rays (AP and lateral view) and MRI of the cervical spine. For patients with shoulder pathologies, diagnosis was based on clinical and MRI evaluation for rotator cuff tears, adhesive capsulitis, calcific tendon disorders, glenohumeral arthritis and AC arthropathy.

Arm Squeeze Test Procedure:
The “Arm Squeeze Test” involved squeezing the middle third of the upper arm with both hands (simultaneous thumb and fingers compression – thumbs posterior on the triceps muscle, with fingers anterior on the biceps). Pressure was to be sufficient to elicit local pain. Two authors performed the test 3 times in each patient. In advance of this, the pressure applied during the test was measured and practiced with the MicroFET dynamometer (Hoggan Health Industries, West Jordan, UT, USA), with each examiner repeating the test one hundred times. The Arm Squeeze Test was considered positive if the patient reported a pain level of 3 on a 0-10 VAS pain scale.

Study Strengths/Weaknesses

Limitations:
- As a phase I and II diagnostic test, the Arm Squeeze Test has to be validated and requires evaluation in phase III and IV designs before it can be recommended for widespread clinical adoption (6).
- The test itself and the patient assessment utilize subjective measures.
- Although the authors standardized the force of squeezing by use of MicroFET dynamometer, it may not guarantee an absolute precision.
- The authors did not compare the Arm Squeeze Test directly with other clinical tests.

Strengths:
- The authors utilized a large patient population with a varied diagnoses.
- The inter- and intra-tester reliability was tested appropriately and was well documented.
- The authors attempted to maintain repeatability and predictability regarding the force used during physical testing.

Additional References

Related Reviews on RRS
Please refer to the Cervical Spine – Neurological Conditions and Upper Extremities – Shoulder sections of the RRS database for further reviews.