continuing ED

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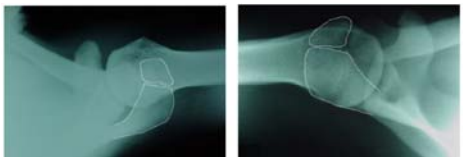
clinical conduit

by Ed Mulligan, PT, DPT, OCS, SCS, ATC

Os Acromiale

A Case Report on an unusual cause of Subacromial Impingement

Inside this issue



Axillary views of right and left shoulders with acromion and os acromiale outlined

This patient was a 34 year-old black male with a chief complaint of acute pain and limited motion during elevation maneuvers in both the scapular and frontal planes. The symptom onset was gradual and insidious in nature but had been exacerbated by a new job working on an automotive assembly line. He reported a history of multiple episodes of minor shoulder pain but was now unable to work or participate in recreational softball and basketball secondary to pain and limited mobility. He was referred to physical therapy with a diagnosis of shoulder impingement syndrome on an "eval and treat" prescription from his primary care provider. During the initial evaluation he reported that x-rays had been taken but he was unaware of their results. I was able to secure the radiologist's summary that reported a type III (hook shaped) acromion with bilateral **os acromiale**. This could be a significant finding in relationship to his chief complaint and while therapy would be unable to remedy this congenital abnormality it may have a prognostic influence on the outcome.

Os acromiale results from the failure of the acromial secondary centers of ossification to fuse which normally occurs at about 18-20 years of age. The appearance is a normal variant than can be mistaken for a fracture on an axillary lateral view. The reported prevalence of this condition has ranged from 1-15% in the general population. The abnormality can also be seen as a double density sign (overlap of two transversely elongated radiographic cortical densities) on a standard AP view or as a cortical irregularity on the supraspinatus outlet view. This finding is present bilaterally in approximately 62% of the cases. The sensitivities for each of the 3 views was reported by Lee, et al, 2004, to be 94% for the axillary view, 82% for AP view, and 74% for the supraspinatus outlet view. The specificity for each view was 100% for the axillary view, 95% for the AP view, and 98% for the outlet view. The interobserver kappa reliability of the three views ranged from .88 (axillary) to .66 (AP) to .70 (outlet).

Impact on Rehabilitation

The incidental finding of an os acromiale could certainly contribute to the structural …

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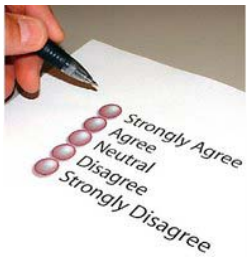
Likert Scales



A Likert scale is psychometric gauge commonly used in questionnaires, and is the most widely used scale in survey research. In fact, I use them in our course evaluations to facilitate feedback from the participants. When responding to a Likert questionnaire item, respondents specify their level of agreement to a statement. The scale is named after its inventor, psychologist, Renis Likert.

An important distinction must be made between a *Likert scale* and a *Likert item*. The Likert scale is the sum of responses on several Likert items. Because Likert items are often accompanied by a visual analog scale (e.g., a horizontal line, on which a subject indicates his or her response by circling or checking tick-marks), the items are sometimes called scales themselves. This is the source of much confusion; it is better, therefore, to reserve the term *Likert scale* to apply to the summated scale, and *Likert item* to refer to an individual statement.

A Likert item is simply a statement which the respondent is asked to evaluate according to any kind of subjective or objective criteria; generally the level of agreement or disagreement is measured. Most …

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2010 Schedule

Lumbopelvic Course
April 10-11, 2010
– Plano, TX

Cervical Course
Nov 13-14, 2010
- Plano, TX

UT SOUTHWESTERN MEDICAL CENTER

Advanced Orthopedic Physical Therapy Series – Dallas, TX

Part 1: Manual Therapy: Jan 30-31
Part 2: Cervicothoracic Spine: Mar 27-28
Part 3: Upper Extremity: May 15-16
Part 4: Lumbopelvic Spine: Jul 17-18
Part 5: The Hip and Knee: Aug 21-22
Part 6: The Lower Quarter: Sep 25-26

A detailed description of the course content and learning objectives is available at our web site — www.continuing-ed.cc

Os Acromiale continued

irritation of the soft tissues traversing through the suprahumeral outlet and mimic the impairments and functional limitations typically associated with subacromial impingement syndrome. Bigliani, et al. 1991, reported that an unfused acromial epiphysis could decrease the volume of the subacromial space. This patient had an acutely hyperpainful presentation with significant irritation upon elevation (self-report NPRS of 9/10) which diminished to mild levels when the arm was resting in the dependent position (NPRS of 1/10). I saw him for just seven visits with an initial emphasis on education, rest, ice, dexamethasone iontophoresis, and posterior glenohumeral capsular mobilizations. Subsequent treatments addressed cervicothoracic hypomobility and poor scapulothoracic neuromuscular control. Upon discharge he had a significant reduction in his provocative pain level (down to 2/10) and was able to lift his arm overhead without pain. Because he had relatively good strength in his pain-free range I was hopeful that he had not yet sustained significant rotator cuff degenerative damage.

While there is controversy regarding the influence of acromial morphology on the likelihood of success with the conservative management of impingement syndrome (Morrison, 1997 and Wang, 2000 showed correlation with morphology and degree of conservative success while Moses, 2006, Chang, 2006, and Prato, 1998 do not believe acromial shape is a primary cause of impingement) I believe this patient has a decent short-term prognosis given that he continues with his home program of exercise. At worst, I believe (and he concurred) that at least he has prolonged the need for a surgical solution.

According to Kurtz, et al, 2006, when conservative management fails to relieve symptoms, surgical intervention should be considered. Options would include acromiale excision, ORIF, and/or arthroscopic decompression. Excisions are reserved for smaller fragments (pre-acromions). ORIFs are indicated for larger fragments to maintain optimal deltoid function. Concurrent rotator cuff repairs could also be performed as necessary.

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Kurtz CA, etal. Symptomatic os acromiale. *Am Acad Orthop Surg*. 2006 14(1):12-19.

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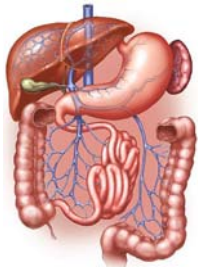
Sammarco VJ. Os acromiale: frequency, anatomy, and clinical implications. *J Bone Joint Surg Am.* 2000, 82:394-400.

Question of the Month – Gastrointestinal Screening



I have a patient with a complaint of diffuse abdominal and lower thoracic pain. What kind of findings should I look for to rule out serious illness?

Reference:

Sparkes V, Prevost AT, Hunter JO. Derivation and identification of questions that act as predictors of abdominal pain of musculoskeletal. *Eur J Gastroenterol Hepatol.* 2003 Sep;15(9):1021-7.

That is an excellent observation that you should screen (not diagnose) for diseases of a visceral origin in a patient with a diffuse complaint of thoracic or abdominal pain. As you know, the segmental innervations of the digestive system organs is at the mid to lower thoracic levels and these symptoms can often be concurrent with or confused by musculoskeletal disorders.

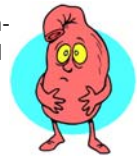
Somatic pain is quite misleading and tends to alternate or migrate in its location. These patients usually have a hard time describing a mechanism of injury and the frequency, duration, and intensity of their symptoms are not as sensitive to a particular posture or activity level. Visceral pain is usually "duller" and non-specific when it is referred but can be quite specific and sharp when acute exacerbations are present.

My suspicion of gastrointestinal (GI) involvement would be heightened if the patient has a past medical history of serious GI involvement or long-term use of NSAIDs, corticosteroids, or narcotic medications. Symptoms to be on the lookout for include dysphagia (difficulty swallowing), nausea/vomiting, heartburn/indigestion, and/or specific food intolerance for upper GI disorders. If there is lower GI (bowel dysfunction) involvement you might ask about the presence of incontinence, constipation or diarrhea, or changes in the caliber or color of their waste.

Sparks, et al, 2003, published a prediction rule (a cluster of clinical findings) that could help you in the decision to request further medical evaluation of your patient.

If the patient answers *"Yes"* to the questions 1) Does coughing, sneezing, or taking a deep breath make your pain feel worse?, ***and*** 2) Do activities such as bending, sitting, lifting, twisting, or turning over in bed make your pain feel worse? ***and*** answers *"No"* to the question" - Has there been any change in your bowel habits since the start of your symptoms?" then it is likely a complaint that is musculoskeletal in origin. SN = .67; SP = .84, + LR = 4.2; -LR = 0.39.

If in addition to the previous questions if the patient also reports *"No"* to the following two questions the specificity of musculoskeletal symptom generation goes up to .96 with a + LR of 16.8. These questions are: 1) Does eating certain food make your pain feel worse?, and 2) Has your weight changed since your symptoms started.



This is good information to keep in mind as we strive to become direct access practitioners.

Questions you would like addressed in a future issue can be sent to mulliganpt@tx.rr.com

Likert Scales continued -

often an ordered 5-response level is used although any number of levels can be applied. Research has suggested that using a higher number of level response will typically result in a higher mean score skewed towards the higher end of the scale's continuum.

The format of a typical five-level Likert item is:

❍ **Strongly disagree** ❍ **Disagree** ❍ **Neither agree or disagree** ❍ **Agree** ❍ **Strongly agree**

The Likert scaling example above is a bipolar scaling method that allows either a positive or negative response to a statement. Sometimes a 4-point scale is used; this is to force a choice since the middle option of *"Neither agree or disagree"* is not available.

Likert scales may be subject to distortion from several causes. Respondents may avoid using extreme response categories (central tendency bias); agree with statements as presented (acquiescence bias); or try to portray themselves in a more favorable light (social desirability bias). Designing a scale with balanced keying (an equal number of positive and negative statements) can obviate the problem of acquiescence bias, since acquiescence on positively keyed items will balance acquiescence on negatively keyed items, but central tendency and social desirability are somewhat more problematic.

After the questionnaire is completed scoring and analysis can take place. Each item may be analyzed separately or in some cases item responses may be summed to create a score for a group of items. Hence, Likert scales are often called summative scales.

Whether individual Likert items can be considered as interval-level data, or whether they should be considered merely as ordered-categorical data is the subject of disagreement. Many regard such items only as ordinal data, because, especially when using only five levels, one cannot assume that respondents perceive all pairs of adjacent levels as equidistant. On the other hand, often (as in the example above) the wording of response levels clearly implies a *symmetry* of response levels about a middle category; at the very least, such an item would fall between ordinal- and interval-level measurement; and to treat it as merely ordinal would lose information. Further, if the item is accompanied by a visual analog scale, where equal spacing of response levels is clearly indicated, the argument for treating it as interval-level data is even stronger.

When treated as ordinal data, Likert responses can be collated into bar charts, central tendency summarized by the median or mode, dispersion summarized by the range across quartiles (but some would say not the standard deviations as this would require interval or ratio data), or analyzed using non-parametric tests such as the chi-square, Mann-Whitney, Wilcoxon signed-rank test, or Kruskal-Wallis tests.

Responses to several Likert questions may be summed, providing that all questions use the same Likert scale and that the scale is a defendable approximation to an interval scale, in which case they may be treated as interval data measuring a latent variable. If the summed responses fulfill these assumptions, parametric statistical tests such as the analysis of variance can be applied. Data from Likert scales are sometimes reduced to the nominal level by combining all agree and disagree responses into two categories of "accept" and "reject". The chi-square or McNemar tests are common statistical procedures used after this transformation.

Gluteal Tendinopathy

A common complaint in elderly females is lateral hip pain. These patients are often referred with a diagnosis of trochanteric bursitis. However, in my experience it is quite common for the patient to have a degenerative tendon change in the hip abductors (tendinopathy) that accompanies this complaint. An article in *Arthritis & Rheumatism* last year evaluated the diagnostic accuracy of two tests to evaluate the presence of gluteal tendinopathy against the gold standard of an MRI.

The two tests were a single leg 30-second stance test (SLST) and resisted external derotation test (ERT) while in a supine position. Both tests were considered positive if they reproduced the subject's chief pain complaint. The stance test did not allow ipsilateral trunk side-bending to unload the gluteals from stabilizing the pelvis. The study subjects were elderly females (mean age = 68) with chronic complaints (mean duration = > one year).

The results of the study were quite impressive. The SLST was 100% sensitive and 97% specific while the ERT was 88% sensitive and 97% specific. Although not calculated in the study, both the positive and negative likelihood ratios of these tests would represent moderate to significant shifts in the probability of bursal irritation and/or tendinopathy being present (or not).

The authors cautioned that it's important to make a patient stand for the full 30 seconds on one limb as only 30% of the subjects realized their pain complaint in the first 5 seconds of standing.

Resisted ERT with the hip flexed 90°

Another 40% had to stand at least 15 seconds. This study did have some limitations in regard to reproducibility and confirmation of the test's value in a cohort of patient's with other types of hip pathologies (as opposed to the asymptomatic controls used in this study).

While the identification of the pathology is important, therapists are more concerned about what to do about it. If the musculotendinous structures in the hip are histologically similar to other body parts (Achilles, patellar, supraspinatus, ECRB, etc) this study may indirectly imply that high-intensity, tensile eccentric training may be an important ingredient in the rehab program prescribed for these types of patients.

Lequsne M, et al. Gluteal tendinopathy in refractory greater trochanter pain syndrome: Diagnostic value of two clinical tests. *Arthritis Rheum*. 2008, 59(2):241-246

"Featured Internet Link"

APTA Blog

http://movingforwardapta.blogspot.com/

A great way to stay current on APTA issues and news is to follow our association's president, Dr. Scott Ward's comments, on the APTA's "Moving Forward" blog. He posts his thoughts about once a week with the opportunity to interact through comments or participate in on-line polls that are regularly conducted.

Content in the past couple of months has ranged from corporate wellness to health care reform to direct access and its impact on our practice.

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Previous issues are archived at
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"An education isn't how much you have committed to memory, or even how much you know. It's being able to differentiate between what you know and what you don't."

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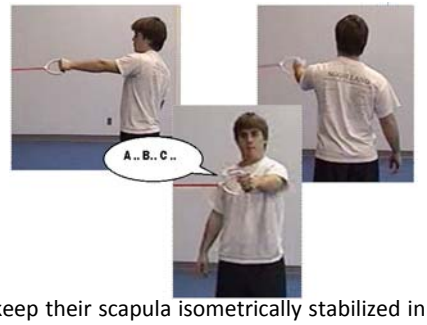
Scapular Alphabet

Rehabilitation Exercise Technique



One of my favorite home program exercises is what I call the "scapular alphabet". It is simple to perform, only needs a piece of elastic band or tubing, and works on the endurance quality of the scapular stabilizers. The patient positions themselves with the shoulder elevated to 90 degrees in the sagittal plane and backs away from the elastic band's attachment site to create some mild tension. From this position, the scapula is fully retracted and held in this position as the glenohumeral joint is moved to allow the distal end of the extremity to spell out the letters of the alphabet. It is important that the patient understand that they should keep their scapula isometrically stabilized in the initially retracted position while the small motions of the shoulder outline the letters of the alphabet. Discourage "large" letters as the patient will lose their position of scapular stability. If the patient does a 180 degree turn they can pre-position the scapula in a protracted position while spelling out the letters of the alphabet. Additionally, the line of the tubing could be placed perpendicular to the extended upper extremity so as to work against a "protracting or retracting" force as the alphabet is spelled. This exercise is harder than it looks. Going through the alphabet usually takes at least 30 seconds and to repeat this in 4-5 different positions can be quite challenging for a lot of deconditioned patients.

Featured Home Study Program

Subacromial Impingement Syndrome

Pec minor tightness has been implicated as an impairment that can contribute to subacromial impingement syndrome. If the length of the pec minor is limited it can cause the scapula to protract, depress and tilt in an anterior direction. All of these orientations can narrow the outlet for the suprahumeral structures to pass and potentially cause compressive impingement and altered scapular mechanics during elevation of the extremity. During the examination process a couple of ways have been suggested to identify a "tight" pec minor. The vertical height of the acromion from the table in a supine position has decent intra/intertester measurement reliability but lacks information on what is an ideal or normal distance. An alternative method proposed by Borstad, et al, in *Phys Ther*, in 2006, showed a method to differentiate a "short" vs. "long" pec minor by dividing the distance from the suprasternal notch to the coracoid process anteriorly by the distance from the thoracic spinous process to the acromion posteriorly. The ratio for a "short" pec minor hovered around .61 while a "long" pec minor ratio was around .65. The current shortcoming of this method is its current lack of known measurement reliability. If impairments contributing to subacromial impingement are of interest you may find our independent study on this topic valuable. This TPTA approved home study can be viewed or read free of charge. A post-test for CEU credit is available at http://www.continuing-ed.cc/homestudy.htm for a reasonable fee for clinicians licensed in Texas and Oklahoma.

Sternal Notch to Coracoid Distance

Thoracic Spinous Process to Acromion

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