

# clinical conduit



## What is the best way to measure clinical outcomes for the shoulder?

### Inside this issue

Shoulder Outcome Tools	1
Cuboid Syndrome	1
Spinal Accessory Nerve Lesion	2
Sitting Posture	3
Dynamic Hamstring Stretch	4
Scapular Significance Home Study	4

### Upcoming Course Schedule

#### Shoulder Course

Feb 10-11 - Plano, TX

#### Lumbopelvic Course

Mar 31-Apr - Grapevine, TX

#### Pilates Course

Mar 24-25 - Iowa City, IA  
Aug 18-19 - Plano, TX

#### Knee Course

June 9-10, 2007 - Plano, TX

#### Cervical Course

Nov 3-4, 2007 - Grapevine

#### Foot-Ankle Course

Nov 18-19, 2006 - St. Louis  
Mar 3-4, 2007 - Salina, KS  
Sep 29-30, 2007 - Grapevine

We are all curious as to how are patient's are progressing. One of the best ways to gauge their ultimate status is to use a functional outcome tool. The ideal functional measurement device is easy to complete, has demonstrated reliability, and strong construct validity. The instrument should have a low correlation with age (although most current outcome tools seem to be influenced by age) and not inter-nally redundant. Finally, an out-come tool should be responsive which is defined by its ability to precisely detect a change in the patient's status.

Reliability implies that the test results are consistent over time and that the scales or tools utilized were stable and repeatable. Pearson coefficients (r) and interclass correlation coefficients (ICC) are common statistical measures

of reliability with values approaching 1.0 being the most desirable.

Validity implies that the outcome tool measure represents the question of interest (function). More specifically, construct validity is the authenticity of the measurement instrument in a specific test situation or as judged against a theoretical concept. In other words, construct validity is the how the tool compares to the current "gold standard".

Responsiveness is the ability of the tool to gauge a change in functional status (beyond chance) over time. This characteristic of an outcome tool is normally expressed with a standard error of measure (SEM) which can be used to calculate the minimal detectable difference (MDC) on the scale itself.

What are some of the more popular and common shoulder outcome tools that are used today? Let me provide you a brief overview of some of the scales I have used or

have been popularized in the literature.

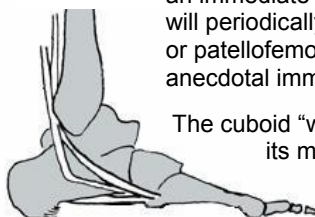
**CMS** – the Constant-Murley Score is an age specific shoulder scoring system adopted by the European Society for Shoulder and Elbow Surgeons. The tool requires both self report of subjective variables such as pain and ADL ability along with a physical exam of strength and motion. The 100 point scale has limited research with reliability ICC values of .80 - .87 and is not intended for diagnoses of instability.

**ASES** – the American Shoulder & Elbow Surgeons Standardized Shoulder Assessment is a self report form for general shoulder problems. Each scale of pain and function represent 50% of the potential 100 point score. The responsiveness of the scale may be limited by having only four options for each item but is has been shown to be a reliable (ICC = .84-.96) tool with a SEM of 6.7 points and MDC of 6-16 points.

*continued on page 2*

## Cuboid Syndrome

We all like "miracle" cures. Isn't it great when you provide an intervention that has an immediate and significant effect? I've found that some of my taping techniques will periodically afford this type of response (modified Low-Dye arch support taping or patellofemoral medial glide/tilt correction). Another intervention that shares this anecdotal immediate success is the manipulation of the cuboid.



The cuboid "whip" is a high velocity, low amplitude thrust to adjust a cuboid when its medial side has spun in a plantar direction by the pull of the peroneus longus following a traumatic inversion sprain of the ankle.

*- continued on page 3*

## Shoulder Outcome Measures continued ...

### References

CMS  
[www.shoulder.doc.co.uk/education/article.asp?#59](http://www.shoulder.doc.co.uk/education/article.asp?#59)

DASH  
[www.dash.iwh.on.ca/](http://www.dash.iwh.on.ca/)

ASES  
[www.ases-assn.org/](http://www.ases-assn.org/)

SST  
<http://www.orthop.washington.edu/UserFiles/File/sst.pdf>

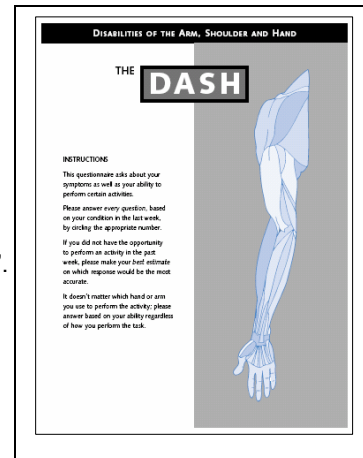
Legin BG, et al. The Penn shoulder score: reliability and validity. *J Orthop Sports Phys Ther.* 2006; 36:138-151.

Stiller J, et al. Outcomes measurement of upper extremity function. *Athletic Therapy Today.* 2005; 10(3):15-17.

**DASH** – (Disabilities of the Arm, Shoulder, and Hand). This is a self report tool designed in the late 90s by the American Academy of Orthopedic Surgeons to evaluate symptoms and upper extremity functional status to determine the relative impact of the disorder. The 100 point scale has 30 items measuring function and the effect of pain symptoms on the subject's physical, social, and emotional status. The shortcoming of this tool is that it has some overlapping questions and may be to "general". The reliability of the tool is high (ICC = .96) with a SEM of 4-7 points and MDC of 12-13.

**SST** – The Simple Shoulder Test is an 12 question ("yes" or "no") self report tool to document functional improvement in a specific case. It is useful for a general shoulder population and gauges the ability of the subject in a variety of functional tasks. It is unlikely to detect clinically important changes because of the limited, dichotomous response options and may not differentiate between patients with similar diagnoses. It is, however, a very universal and practical assessment tool. I'm not aware of any research on its utility.

There are many other useful outcome tools that are also available. The **Penn Shoulder Score** was shown to be a reliable and valid measure for reporting the outcome of patients with a variety of shoulder disorders in an issue of the Journal of Orthopedic and sports Physical Therapy last year. Other commonly used tools include the **UCLA** (UCLA Shoulder Rating Scale), the **SPADI** (Shoulder Pain and Disability Index), and the **WOSI** (Western Ontario Shoulder Instability Index) which is a disease specific quality of life measurement tool for instability.



*I have a patient who sustained a shoulder dislocation when a 140 pound drill hit him on the shoulder. His MRI was negative for rotator cuff and labral tears. His symptoms are a "pulling" and "stinging" in his upper trap and periodic anteroinferior glenohumeral subluxations. Flexion is limited to 90° and abduction (which usually causes the subluxation) to 70°. Internal and external rotations are also severely limited.*

*His scapula is depressed on the involved side and wings when he sits more erectly. He's most comfortable when sitting with "rounded" shoulders. Muscular wasting and atrophy are notable on the UT/supraspinatus, intrascalenes, and lats. Muscle bulk and definition in the deltoids and below the scapular spine look good and symmetrical.*

*Here's the interesting thing--I can stabilize his scapula into retraction/depression and he has full shoulder mobility—although he is unable to do this himself. When he "subluxes" it actually starts with an uncontrolled protraction of the scapula, I hear a "clunk," then the humeral head translates anterior and inferior.*

*My colleague and I are completely baffled by this. He denies any tingling or numbness and has good muscle definition of his rotator cuff and deltoid--it's the proximal scapular musculature that seem to lack the control. Any insights and/or recommendations would be greatly appreciated.*

A.R., PTA - Georgia

## Question of the Month



Sounds to me like he may have injured his spinal accessory nerve during the accident. The nerve is rather superficial and susceptible to traumatic blows. Poor trapezius control would explain the inability to control protraction as the traps are the antagonist to the scapular protractors. You can use the "flip" test to check for a nerve lesion (or confirm with an EMG/NCV). Isometrically resist external rotation with the arm in a dependent position while monitoring the medial scapular border. If the scapula lifts of the thorax (internally rotates) it indicates a spinal accessory nerve lesion where the middle and lower trap can not stabilize the scapula. Altered trapezius innervation could also explain some of his inability to elevate the extremity or actively replicate your passive positioning.

His instability would also be affected by the chronic protracted position of comfort. Weisser, (*Am J Sports Med*, 1999) showed that chronic scapular protraction results in excessive strain, and ultimately, insufficiency in the anterior band of the inferior glenohumeral ligament which is the primary passive stabilizer to anterior translation of the glenohumeral joint.

Finally, the recurrence of the instability (given resolve of the potential neuropraxic injury) is subject to the sex, age, and activity level of the patient. The recurrence rate is much higher in younger (60-90% recurrence in males > 20) and middle age males (30-60% in males 20-40) who've had traumatic dislocations. The rate of recurrence is also influenced by the patient's ADL expectations and requirements with redislocation much higher for those exposed to overhead demands or activities of high risk. Hope that helps.

Questions you would like addressed in a future issue can be sent to [mulliganpt@comcast.net](mailto:mulliganpt@comcast.net)

**Important Studies**

Jennings J, Davies GJ. Treatment of cuboid syndrome secondary to lateral ankle sprains: a case series. *J Orthop Sports Phys Ther.* 2005 Jul;35(7):409-15.

Mooney M, Maffey-Ward L. Cuboid plantar and dorsal subluxations: assessment and treatment. *J Orthop Sports Phys Ther.* 1994;20(4):220-6.



The cuboid "whip"



**"Featured Internet Link"**



[www.freefulltext.com](http://www.freefulltext.com)

This site provides direct links to over 7000 scholarly periodicals which allow some or all of their online content to be viewed by anyone with Internet access for free. The issue(s) which are available for free are indicated for each title on the alphabetical periodical lists. The site is designed to optimize searching for specific articles for which you already have the citation. If some of the articles you need are not available for free online, you may obtain them for a fee through a document delivery service. If you need to "search" for articles on a particular subject it's probably better to start with a bibliographic database such as [PubMed](http://pubmed.ncbi.nlm.nih.gov/).

**Cuboid Syndrome** continued -

While not a common injury I do think it is one that has seen a lot more of us that we seen of it. In other words, it may be something we often overlook. It has been estimated that this finding is a complication of a traumatic inversion sprain in 4-6% of cases. The literature reports it's also a common finding amongst ballet dancers accounting for up to 17% of the injuries in one study.

Some report this dysfunction is more common in pronated feet. My experience is that this statement is true when the onset is concurrent a traumatic inversion sprain. Dancers may be predisposed because of the hyperflexibility inherent to the sport and the fact that the midtarsal and tarsometatarsal joints have greater mobility when the subtalar joint is pronated.

Signs and symptoms of the syndrome may include 1) Point tenderness over the dorsal or plantar cuboid; 2) Pain/weakness noticeable in the propulsive phase of gait; 3) A slight depression over the dorsal cuboid evident upon inspection (a lump on the plantar surface is much harder to detect); 4) Reproduction of symptoms with a cuboid dorsal glide; and 5) local ecchymosis and effusion although this may be hard to detect if injury is a sequelae of a traumatic sprain

Differential diagnosis should rule out 1) Sinus Tarsi Syndrome; 2) Fracture of the lateral process of the talus; 3) Peroneal tendonitis or subluxation; 4) Jones Fractures; and 5) Talocrural loose bodies and/or osteochondral damage. An important precaution when the injury is part of a traumatic inversion sprain is the application of the Ottawa Fracture Prediction rule or the use of radiographs to rule out a fracture prior to manipulation. You want to ensure that fractures and 3° (complete ligament disruptions) have been ruled out prior to the intervention. I would wait at least 4-7 days following a traumatic injury to let swelling and pain subside before trying this manipulative technique.

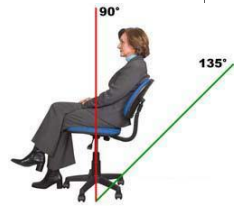
To perform the cuboid manipulation use the following steps

1. Face the plantar surface of the patient's foot. The patient can be prone lying with the knee bent 70-80° or standing (in a "horseshoeing" position).
2. The thumbs are placed over the medial aspect of the cuboid. I locate the cuboid by palpating the styloid process and then moving slightly proximal.
3. Your fingers are draped around the forefoot resting on its dorsal surface. Ensure the fingers are distal to the cuboid. The ankle is in a comfortable amount of dorsiflexion.
4. The foot is slightly plantarflexed and the knee extended while providing a high velocity, low amplitude flick on the medial plantar surface of the cuboid in a dorsolateral direction.
5. You may hear a "pop" but a cavitation is not absolutely necessary to restore normal arthrokinematics or decrease symptoms.
6. If the technique is not helpful you may want to try some type of deep soft tissue mobilization to the proximal peroneals which may be hypertonic and maintaining the subluxation.

I recommend either a felt pad be taped under the cuboid and/or a modified "Low-Dye" arch support taping be performed following the manipulation. My experience is the more acute the injury - the more likely you are to have an immediate and significant reduction of symptoms. Chronic injuries are more likely to need multiple manipulations

**Best Sitting Posture?**

I was watching ABC World News one night last November and they had an interesting news story. It was from a study present-



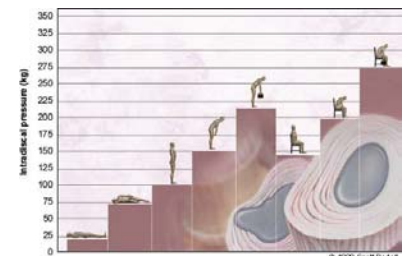
ed at the recent Radiological Society of North America's annual conference that showed sitting at a 135° thigh-to-trunk angle was the best biomechanical sitting position (as opposed to the more traditional 90° posture). The researchers studied 22 healthy subjects with no history of LBP and found this reclined posture produced less "strain" on the spinal disks and placed the associated muscles and tendons in a more relaxed position. The picture below shows the positional MRI scanner (Fig. 1) that was used in the study and I could not help but notice if you rotated the picture 90° (Fig. 2) the patient was in a position that therapists (Fig. 3) have known for years to be a comfortable resting posture. While I'm not sure of the practicality of adopting this position as a typical sitting posture it is certainly a good position in which to begin training the deep lumbar stabilizer muscles like the transversus abdominus and multifidi.



Figure 1 -Subject in MRI scanner



Figure 2 - picture rotated 90° to show position of reduced pressure and strain



The pressure on the intervertebral disc is increased during sitting and bending postures, as opposed to standing or recumbent positions from Nachemson A. Disc pressure measurements. *Spine* 1981;6:93-7.

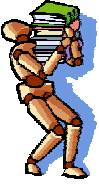


## continuing ED

1901 Pintail Parkway  
Euless, TX 76039

Phone: 817-488-2061  
Fax: 817-684-7201  
Email: [mulliganpt@comcast.net](mailto:mulliganpt@comcast.net)  
[www.continuing-ed.cc](http://www.continuing-ed.cc)

The "Clinical Conduit" newsletter is an every other month publication available to any allied health care provider free of charge upon request. Individuals who would like to be included on the email distribution list should contact the editor at [mulliganpt@comcast.net](mailto:mulliganpt@comcast.net).



The true measure of wealth is how much you'd be worth if you lost all your money

  
continuing ED



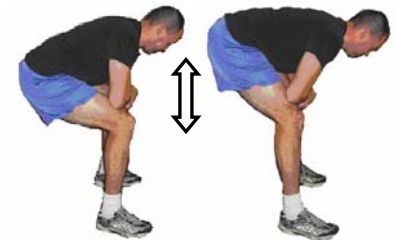
Happy  
New Year!

## Dynamic Hamstring Stretch

## Rehabilitation Exercise Technique

While traditional static stretching has been shown to be an effective way to improve ROM it doesn't seem to translate well to a functional improvement in mobility. To train the contractile unit and avoid temporary performance limitations it may be wise to employ a more active and dynamic form of motion attainment. An exercise I like called the "hip lift" can be used to achieve this goal. The exercise is performed by backing the hips up to a smooth surface and resting the forearms on the thigh. From this position, brace the spine in a neutral posture and then actively extend the knees to cause the buttocks to slide up and down the wall. The movement is performed in a controlled manner with a gradual increase in the speed and range as the tissue "warms up". The motion is done for 20-30 repetitions during a one-minute period pausing briefly at the top of the motion on each repetition.

A good way to gauge the effectiveness of this exercise is to have the patient compare their pre and post exercise ability to bend over and touch the toes. It is common for the patient to note a significant improvement in flexibility. I've found this exercise is an excellent way to prepare the hamstrings for subsequent rehabilitative or athletic activities.



## Featured Home Study Program Scapular Significance: An Orthopedic Perspective

We all appreciate the important role the scapula contributes to normal shoulder function. Many studies have demonstrated that a smooth, coordinated scapular recruitment strategy is imperative in avoiding upper quarter pathology. In the last issue I presented the concept of a scapular retraction test's ability to reveal the true, composite strength of the supraspinatus as evaluated by an "empty can" manual muscle test. A recent study in the *Journal of Orthopedic and Sports Physical Therapy* looked at another test popularized by Kibler called the Scapular Assistance Test (SAT). This test evaluates the role of the scapular force couple (serratus and trapezius) to minimize symptom reproduction during active arm elevation.



### Home Studies Now Available Study and learn at your own pace at home!

Foot-Ankle Anatomy	.3 CEUs
Achilles Tendinopathy	.2 CEUs
Lateral Ankle Instability	.2 CEUs
Knee Meniscal Injuries	.2 CEUs
Orthopedic Hip Injuries	.2 CEUs
Goniometric Examination	.2 CEUs
Principles of Joint Mobilization	.2 CEUs
Functional Anatomy of the Shoulder	.3 CEUs
<b>Scapular Significance: Ortho Perspective</b>	<b>.2 CEUs</b>
Proximal Humerus Fracture Rehab	.2 CEUs
Examination-Treatment of Hand/Wrist	.3 CEUs
Ethics and Professional Responsibility	.2 CEUs

Convenient access to web based content relevant to your practice needs. Only \$12.<sup>50</sup> per contact hour to meet your relicensure requirements.

The aim of this study (JOSPT; 2006 36(9):653-660) was to see if the SAT had appropriate intertester reliability. The SAT is performed by providing a lateral and upward force to the inferior angle of the scapula with one hand while pulling the scapula into posterior tilt with other. The patient is asked if this assistance minimizes their "painful arc" complaint. If the response is positive it would indicate that serratus and lower trapezius functional training should be prioritized in your intervention strategy. The authors found a very high percentage agreement in interpreting the test between examiners with moderately high kappa values. The kappa coefficient adjusts the rate of examiner concurrence to account for chance agreement.

If you're interested in learning more about the role of the scapula in shoulder function you may want to look at our on-line home study entitled "Scapular Significance": An Orthopedic Perspective. This inservice 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.

[www.continuing-ed.cc](http://www.continuing-ed.cc)