continuing ED

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clinical conduit

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During the past year my colleagues and I have focused on the evaluation and management of lateral hip pain. This has culminated in presentations at the Combined Sections and TPTA annual meetings. Over the next 4 issues we will reprint our findings on Greater Trochanter Pain Syndrome as to be published in *Physical Therapy in Sport* in 2015.

Inside this issue

Greater Trochanteric Pain Syndrome (GTPS): Part 3
Special Tests and Diagnostic Confirmation

Based on the collective works of multiple contributors (Ege Rasmussen & Fanø, 1985; Schapiro, et al., 1986; Sheep & Matson, 1996), a clinical cluster of signs and symptoms is recommend-ed as the diagnostic criteria for the presence of GTPS. These authors recommend that the patient must present with achin pain in the lateral hip and distinct tenderness in the proximity of the greater trochanter. In addition, at least one of the following four findings must be present; 1) pain at the end range of motion for hip abduction and adduction or internal and external rotation; 2) a positive FABER (flexion, abduction, external rotation position) test; 3) pain with resisted hip abduction; or 4) non-radicular pattern of pain extending down the lateral thigh. The diagnostic accuracy of this cluster has not been established. In patients with the presumptive diagnosis of trochanteric bursitis the examiner should also assess for the possibility of gluteal tendon pathology. This can be represented by pain, weakness, or a lag during resisted hip abduction testing (Kaltenborn, Bourg, Gutzei, & Kalberer, 2014).

Similar to a tear of the rotator cuff, a lag sign with hip abduction represents a possible tear of the gluteal tendon while pain in single leg stance with resistive rotation may signal a tendinopathy. Reproduction of symptoms in single leg stance has been looked at from both the standpoint of static stance and the presence of a Trendelenburg sign. Bird (Bird et al., 2001) found the presence of a Trendelenburg sign (see below) is both reliable and accurate with a sensitivity of 73% and specificity of 77% in patients with MRI evidence of a torn tendon.

A more recent study evaluated the likelyhood of tendopathic changes on MRI in the presence of lateral hip pain during a 30 second unilateral stance task. The authors found excellent accuracy with a specificity of 97% and 100% sensitivity in the seventeen subjects that completed the study (Lequesne, Mathieu, Vuillemin-Bodaghi, Bard, & Djian, 2008). In the same study, the paper reported a test of resisted internal rotation test from a position of 90° flexion and maximal hip external rotation. (see below). Reproduction of the lateral hip pain during resisted hip internal rotation back to neutral also had a high correlation with the presence of tendon change on MRI with a sensitivity of 88% and specificity of 97%.

Passive and active assessment of the frontal plane contractile function of the hip may also prove insightful. GTPS is most often aggravated by passive adduction and active abduction (Lustenberger, Ng, Best & Ellis, 2011). Bird (Bird et al., 2001) found that pain with resisted hip abduction had a sensitivity of 73% but only 46% specificity indicating the side lying abduction manual muscle test is better at ruling out than ruling in the problem.

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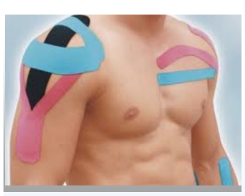

The (lack of) Evidence for Kinesio Taping Application

At the risk of alienating some of my readers, I'm going to argue against the use of kinesio tape. I can already hear some of the comments … "but my patient's consistently find that it helps". That may be true but the literature does not support their perception. We certainly should not discount patient expectation and values but I believe it is our professional responsibility to temper some of these desires with information that has survived scientific scrutiny. So, if you disagree, argue with the literature, or better yet, design a study to investigate this popular intervention strategy.

I also should credit many of the thoughts on page 3 to the insightful research commentary provided by Chris Showalter, PT, OCS, COMT, FAAOMPT at the Maitland-Australian Physiotherapy Seminars web site - http://www.ozpt.com/research_commentary.php

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GTPS continued …

The diagnostic precision of hip abductor manual muscle testing may be enhanced by testing in a variety of sagittal plane positions or with variable lever arm lengths. It may be that more provocative or stressful abduction forces can be created in single limb stance where the abductors function to stabilize the pelvis. In the same study they found less sensitivity but better specificity in identifying partial or complete gluteus medius tears with resisted internal rotation of the hip with findings of 55% and 69% respectively. Unfortunately, neither the calculated positive or negative likelihood ratios would significantly alter the probability of the condition being present or absent. The Ober test is described as mechanism to evaluate for ITB (tensor fascia latae/gluteus maximus) tightness and may cause compressive pain over the trochanter but has not been studied for its accuracy as a specific predictor of GTPS.

The references provided in this article are available as full citations in a bibliography available on-line at our web site - wwww.continuing-ed.cc

I also would like to acknowledge my colleagues and co-authors for their contributions to the manuscript. Thank you to:

Dr. Emily Middleton, PT, DPT, OCS, CSC
Dr. Meredith Brunette, PT, DPT, OCS

The hip lag sign is a test described by Kaltenborn (Kaltenborn et al, 2014), in which the ability to hold an anti-gravity position of hip abduction is used to detect a gluteus medius tear (see below). From a lateral decubitus position, the examiner passively abducts the extended and internally rotated hip and asks the patient to actively hold this position when the examiner releases the limb. The test is considered positive if the foot drops more than 10 cm or the patient cannot hold the internally rotated position. The reported accuracy as judged against an MRI standard is 89% sensitive, 97% specific with a number needed to diagnose of 1.6. It has been suggested that this type of screening is particularly important in that a rupture of the gluteal tendon is often under recognized. In a survey of French orthopedic surgeons it was found nearly half (45%) were unaware of the potential for this condition and 13% never consider this pathology in their differential diagnosis (Cormier, Berthelot, & Maugars, 2006).

An algorithmic approach to defining GTPS and differentiating it from hip osteoarthritis was proposed in a recent article (Fearon, Scarvell, Neeman, Cook, Cormick, & Smith, 2013). Based on an acceptable operational definition of GTPS the authors compared the clinical presentation of patients with GTPS and patients with advanced stages of osteoarthritis. The results from a battery of active, passive, and resistive physical examination procedures and functional movements along with the degree of restriction and pain response to a FABER and Ober test were collected. While no single data point could thoroughly differentiate the two groups an algorithm was developed for two general presentations of hip pain. For patients with a non-specific hip pain, a restricted and painful Ober test indicated the presence of GTPS. If the Ober test was normal, the ratio of passive to active internal rotation range of motion was the next step in the decision tree. If the ratio was greater than 1.5 (more passive than active range of motion) the clinician could use the patient's response to resisted internal rotation to differentiate GTPS from osteoarthritis. GTPS was present if the patient had pain with resisted internal rotation and osteoarthritis if this maximal isometric contraction did not cause pain. This algorithmic perspective comes to the same conclusion as an external de-rotation test (Figure 4). Pain with resisted internal rotation that causes lateral hip pain should be labeled as GTPS. Conversely, if the passive to active range of motion ratio was less than 1.5, pain to passive internal rotation indicates osteoarthritis while no pain suggests the GTPS diagnosis. This logic seems in concert with the typical contractile soft tissue dysfunction model.

A simpler, but different algorithm was proposed for those that had the more typical lateral hip pain presentation. In this case, the presence of a symptom reproducing FABER test indicated GTPS while a negative response to the flexed, abducted, and externally rotated position suggested osteoarthritis. Based on calculated likelihood ratios, moderate probability shifts were present with a sensitivity of 81% and specificity of 82% based on the outcome of the FABER test. The conclusion of this study suggested that GTPS should be defined as a presentation of non-specific hip pain with no difficulty in donning shoes and socks, which is a flexion-abduction-external rotation movement, yet pain on palpation in the area of the greater trochanter (Fearon et al, 2013).

The diagnosis of GTPS is assisted with imaging studies. MRI showed good accuracy for the diagnosis of tears of the gluteus medius and gluteus minimus tendons. The identification of an area of hyperintensity superior to the greater trochanter on a T2-weighted image had the highest sensitivity and specificity for tears at 73% and 95%, respectively (Cvitanic, Henzie, Skezas, Lyons, & Minter, 2004). However, Blankenbaker (Blankenbaker, Ulrick, Davis, De Smet, Haaland, & Fine, 2008) found a high prevalence (50%) of peritrochanteric T2 imaging abnormalities in patients without trochanteric pain. Consequently, imaging findings should be used to support or confirm the diagnosis in the context of a thorough clinical examination as opposed to the sole criteria for the identification of GTPS.

The high prevalence of this pathology in combination with its effect on quality of life issues speaks to the urgency for effective and efficient intervention strategies. In the July issue we'll begin to talk about intervention strategies for GTPS.

Reference

Showalter C. 5 recent studies question the effectiveness of kinesio taping at http://www.ozpt.com/research_commentary_item.php?id=38&H=Y accessed on March 6, 2015.

"Featured Internet Link"

Smart Phone Apps

www.apps4pt.tk/

I've found a lot of good physical therapy related applications for my smart phone. This web site has a number of suggestions on applications that may be valuable to you. Here are a few on my phone that I reference regularly.

RH Labs – Lab Values
TiltMeter – Inclinometer
PubMed on Tap – Lit Review
Epocrates – Pharmacology

Kinesio Taping continued -

Beneficial physiological effects have been attributed to a variety of common impairments seen in musculoskeletal injury and dysfunction. Below is a summary of recent high quality evidence. I found 2 systematic reviews, 2 meta-analyses and one randomized controlled trial published since 2012. Here is what I found.

1. Does kinesio taping effect muscle strength in healthy adults? NO

   Meta-analysis of 19 studies with 530 subjects Capso R et al, J Sci Med Sport 2014.

2. Is kinesio taping better than other interventions in treating chronic musculoskeletal pain and disability? NO.

   No significant differences in 17 controlled trials. In fact, the title of this article asks "Is it time to peel off the tape and throw it out with the sweat? Lim EC. Br J Sports Med. Doi: 10.1136/bjsports-2014-094151. "

3. Does the evidence support the use of kinesio taping in a variety of common conditions? NO.

   Systematic review of 12 studies and nearly 500 subjects for shoulder, knee, back, neck, and foot conditions found no difference between KT and sham taping or placebos. Parreira PC. Physiotherapy. 2014. 60:(1)31-39.

4. Can KT prevent injuries in sports. Probably NOT.

   Meta-analysis revealed only one study of athletes in a poorly designed meta-analysis. Authors concluded there was little to no quality evidence to support the injury prevention concept. Williams S et al, Sports Med. 2012. Feb (42)2:153-164

5. Does kinesio taping reduce swelling? NO.

   This comment is based on a single study on the effect of edema reduction in acute ankle sprains. Authors found taping of no value. Nunes GS, Vargas VZ, Wageck B, Hauphental DP, Luz CM, de Noronha M. KinesioTaping does not decrease swelling in acute, lateral ankle sprain of athletes: a randomized trial. J Physiother. 2015 Jan;61(1):28-33.

I think evidence is mounting. Kinesio taping has not been proven to address strength, pain, disability, swelling, or strength deficits. Other than that—tape away and be sure to use a fluorescent color. O.K. that was a cheap shot, but remember, don't get mad at the messenger. Argue with the evidence.

Cubital Tunnel Syndrome Positional Provocation

Cubital tunnel syndrome is commonly described as a compression neuropathy in the cubital tunnel but I've found that it is a tensile strain on the nerve that is often most provocative and irritating. A classic complaint is the onset of ulnar paraesthias when the elbow is in a flexed and wrist in an extended posture for a prolonged time. A good example is a long conversation on your cell phone.

Recently, more attention has been directed at looking how shoulder position may affect this condition. Back in 2011, Ochi et al in the *J Shoulder Elbow Surg*, first described the "provocative position" for symptom reproduction. In their study, the described the SIREF test uses progressive elbow flexion while maintaining the limb in 90° of shoulder abduction (slightly in front of coronal plane) and maximal internal rotation, forearm supinated, and wrist and finger extension. Paresthetic symptom reproduction was reproduced within 5 seconds with a sensitivity of 0.87 and specificity of 0.98. This yielded an impressive positive and negative likelihood ratio of 44 and 0.13 respectively.

Last month, this group published another paper that demonstrated that strain on the ulnar nerve increased from 19 to 25% when shoulder internal rotation was added to the maximal elbow flexion position. They also published a study in2013 that saw the sensitivity of these provocative positions go from 36 to 80% when the flexed elbow is maximally internally rotated at the shoulder. I think the message is pretty clear = ulnar neuropathy (cubital tunnel syndrome) is best ruled out when the extremity is placed in a position of prolonged shoulder internal rotation when the elbow is bent

Shoulder Internal Rotation
Elbow Flexion Test
SHIREF Test

Previous issues are archived at
www.continuing-ed.cc/newsletter.htm

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"Challenges are what make life interesting; overcoming them is what makes life meaningful."

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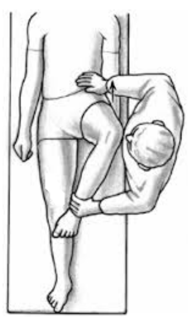
The "Lewit" Exercise

An exercise technique to active the deeper abdominal muscles

I was intrigued by a research report last fall on a new abdominal wall rehabilitation exercise named after a Czech neurologist named Dr. Karol Lewit. The senior author on this paper was Stuart McGill, a well-known Canadian spine biomechanist, who has published extensively regarding core musculature training and rehabilitation. The "Lewit" exercise is performed in a supine crook-lying position with the pelvis in neutral, naturally lordotic position. From this position, the patient forcefully exhales against pursed lips to expel all air with a forceful abdominal contraction. The study's purpose was to see how this exercise electromyographically compared to other abdominal hollowing or bracing techniques while minimizing spinal flexion. The Lewit exercise produced moderate muscle activity in the obliques (20-40% of MVIC) and high levels in the transversus abdominus (over 50%). This was significantly higher than more traditional lumbar stabilization exercises. This might be a good introductory exercise for patients needing local lumbar stabilization – particularly for those that struggle learning typical TA/multifidi recruitment exercises.



Drehmann's Sign

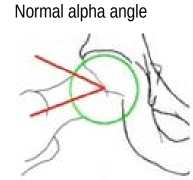
I was reviewing some material on femoracetabular impingement (FAI) and happened across an article about the Drehmann's Sign. This was a new eponym for me so I'd did some research and here is what I found. The Drehmann sign is a characteristic clinical feature in patients with a slipped capital femoral epiphysis (SCFE) where there is an obligatory hip external rotation and abduction that that accompanies hip flexion. It was first described in a German publication in the early 1900s. A more recent study hypothesized that this might be an adapted movement strategy adopted by patients with FAI to avoid the pain of a structural cam impingement on the head/neck of the femur.

Preliminary investigations do seem to indicate that there is a relationship between elevated alpha angles and SCFE patients after years of bony remodeling. The average modified alpha angle in the patients with a positive Drehmann sign was 85 degrees compared to 63 degrees for those with a negative Drehmann sign. Below, is an explanation on the alpha angle. How it is measured and what it may mean.

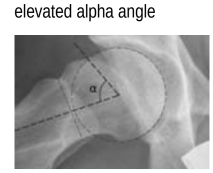
With cam-type impingement, the femoral neck has a below normal offset from the femoral head and demonstrates a diminished or lost transition ("femoral waist deficiency"). Several types of images have been developed to confirm and quantify these findings. The alpha angle is the most widely used (abnormal > 55 degrees), indicating the angle at which the femoral head departs from its normal spherical outline. It is measured on axial views, between two lines from the center of the femoral head through the middle of the femoral neck and through a point where the contour of the femoral head-neck junction exceeds the radius of the femoral head.

As indicated with the Drehmann sign, the transition of the femoral head in SCFE patients creates a modified alpha angle which may lead to FAI symptoms later in life

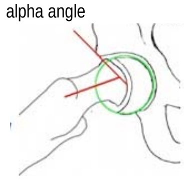
Normal alpha angle



Cam Lesion with elevated alpha angle



SCFE induced elevated alpha angle



If you have more questions about managing orthopedic hip conditions you may enjoy our home study hip injuries. This is a TPTA approved course and can be accessed free of charge. A post-test for CEU credit is available at http://www.continuing-ed.cc/homestudy.htm for a reasonable fee.