

clinical conduit

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Unintended Discovery: Scapular to Rotator Cuff Strength Ratio

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2010 Schedule



Lumbopelvic Course

April 10-11, 2010
- Plano, TX



Cervical Course

Nov 13-14, 2010
- Plano, TX



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

Dr. Ross Querry and I presented a poster at the TPTA Annual Conference last month that has some interesting findings. Like most research you often end up discovering information other than what our original hypothesis proposed. I was quite surprised that we could not correlate improved shoulder external rotation force production when the scapula was actively facilitated or passively stabilized in a retracted position. What we did find was a significant difference between symptomatic and asymptomatic subjects in the strength of the external rotators (regardless of scapular condition) and a difference in the ratio of strength between scapular retractors and rotator cuff external rotators. This is an on-going study where

we hope to expand the rather homogenous subject population and see if the current trends suggested in the conclusion continue. Here is the abstract of our study for your review

Title: The Effect of Scapular Repositioning or Stabilization on Glenohumeral External Rotation Strength in Subjects with and Without Shoulder Pain

Purpose: Physical examination of patients with shoulder injury frequently involves assessment of contractile function. A decrease in neuromuscular strength or control of the external rotators has been implicated in many shoulder pathologies. This decrease has been attributed to infraspinatus and teres minor muscle weakness, but it may be influenced by the ability of the scapula to provide a stable anchor from which to function. This control-led laboratory study evaluated if external rotation force production is influenced by scapular retraction through active facilitation or manual stabilization.

Subjects: 14 female subjects (mean age of 22.6 years \pm 1.2, mean height of

65.8 inches \pm 2.7, and mean weight of 131.8 pounds \pm 16.5) were recruited for assessment of their glenohumeral external rotation peak force under nine unique conditions of positioning and scapular placement. Additionally, the peak force for scapular retraction was assessed in each subject. Of the 28 shoulders available for testing, 4 subjects representing 6 shoulders were identified as currently symptomatic based on Quick DASH scores over 5/100 (mean = 12 \pm 8.8) and some level of pain reported on a numerical rating scale (0-10) during test procedures. There were no significant differences in age, height, or weight between the two groups.

Methods: Following a standardized warm-up and stretching protocol each subject's shoulder external rotation force was tested in two seated positions (S90 - 90° abduction and external rotation and S45 - 45° of elevation in the scapular plane and neutral rotation) and one prone position (P90 -

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Using Technology to Keep You Current

It's next to impossible to keep up with all of the information that is published each year. Even if you hone your area of clinical interest down to a small subset of the profession it can be overwhelming to keep up with all the articles that may be applicable to your day-to-day patient care responsibilities. One method that has helped me to stay current is to use the "push" technology provided by many reputable sources of medical literature. Probably the best known of these resources is PubMed. Pubmed is the health-related database of the National Library of Medicine. Using a free "MyNCBI" account you can have new citations e-mailed to you automatically based on predetermined search topics. To use this service you must first register for a MyNCBI account. Once this is accomplished you'll have a "Save Search" option and PubMed will send you a link to all new articles relevant to your search terms at a self-selected frequency. If interested, please go to page 3 for instructions on how to set up this type of service.



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Scapular to Rotator Cuff Strength Ratios continued ...

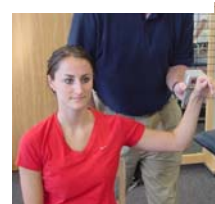
90° abduction and external rotation) under three different scapular conditions (natural resting position, active scapular retraction, and manual scapular stabilization) by a single examiner.

Data Analysis: A one-way analysis of variance was used to compare the force production means between scapular conditions and test positions. Unpaired t-tests were used to compare force production means between the symptomatic and asymptomatic groups and unpaired t-tests were used to compare the external rotation to scapular retraction (ER:SR) force production ratios between the symptomatic and asymptomatic groups.

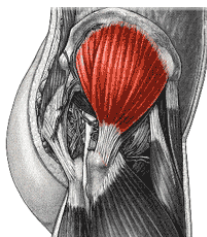
Results: Statistical analysis did not reveal any significant difference ($p > 0.5$) in force production between scapular placement test conditions for any of the shoulder positions in both the symptomatic and asymptomatic subject groups. There was a significant difference ($p < 0.05$) in external rotation force production between the symptomatic and asymptomatic subjects in all shoulder positions but not for scapular retraction force production ($p > 0.05$). External rotation force production as a percentage of body weight ranged from 4-7% in the symptomatic group and 5-11% in the asymptomatic group. ER:SR peak force ratio ranged from .32-.65 in the symptomatic group and .38-.81 for the asymptomatic group. The ratio in the prone position was the lowest and not significantly different between symptomatic and asymptomatic groups. There was a significant difference in the ER:SR ratio for the S90 position ($p < 0.01$) and the difference in the S45 position was significant at a p level of 0.08 between groups.

Conclusions: External rotation peak force production is not significantly effected by actively facilitating or manually stabilizing the scapula in a position of retraction in healthy or symptomatic shoulders; however, external rotation peak force capability is significantly altered by the position in which it is evaluated. External rotation force production is maximized in a sitting posture with the glenohumeral joint in its resting position. Net external rotation force is decreased in a prone position when the middle trap is required to anchor the scapula and the external rotators must overcome the influence of gravity to assume the testing position. Preliminary data regarding ER:SR force in sitting suggests that these ratios may help to differentiate healthy and symptomatic shoulders in this homogenous subject population. Further study is ongoing to validate these initial findings and expand the normative data base by age, gender, and specific glenohumeral pathology.

Clinical Relevance: Clinical examination of external rotation is altered by test position and symptomatic subjects may demonstrate lower force production and decreased ER:SR force ratios when evaluated in a sitting position.



Question of the Month - EMG Evidence for Gluteus Medius Exercise Training



Do you have a preferred method to train the gluteus medius?

B.S., PTA, - TX

Reference:

Distefano LJ, Blackburn JT, Marshall SW, Padua DA. Gluteal muscle activation during common therapeutic exercises. *J Orthop Sports Phys Ther.* 2009 Jul;39(7):532-40.

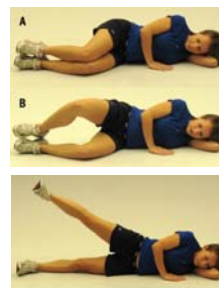
There are a variety of exercise activities that will challenge the gluteus medius and they should be prescribed on an individualized basis dependent upon each patient's unique impairments, functional limitations, and desired activity level.

If your question centers around the intensity of the contraction to gauge its difficulty there was an interesting study in *JOSPT* this past summer that evaluated the EMG activity in the gluteals during a variety of exercises. While this study was not an exhaustive list of mechanisms to train the muscle it did offer some insights into the EMG difficulty of each exercise. I've divided the exercises they studied into weight bearing and non-weight bearing categories. I usually start with clam shells with the hips flexed to either 30 or 60°. Once the patient can do 3-5 sets of 20 repetitions.

I'll increase the challenge by having them separate the ankles slightly during the exercise or adding resistance at the distal part of thigh (weight cuffs or elastic band). My final progression is to lengthen the lever arm and perform side lying abduction. To ensure proper form I will make the patient lie with their back to the wall to discourage hip flexion or trunk rotation substitution maneuvers. Another form of non-weight bearing gluteus medius training would be quadruped hip abduction or quadruped knee dips.

If the patient is weight bearing I like band-resisted side steps (keeping the pelvis level), single leg squats, or single leg dead lifts. These last two exercises are primarily sagittal plane motions with a lot of gluteus maximus activity as validated in the aforementioned study. The pictures to the right represent a number of gluteal exercises with the percentage of maximal

voluntary isometric contraction (MVIC) noted.



Side lying Clam Shells at 30° (A) - 30% MVIC

Side lying Clam Shells at 30° (B) - 40% MVIC

Side lying Abduction - 81% MVIC



Single Leg Squat - 64% MVIC



Single Leg Deadlift - 58% MVIC



Lateral Band Walk - 61% MVIC

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

Push Technology continued -



Use this hyperlink to register for a free MyNCBI account –

<http://www.ncbi.nlm.nih.gov/sites/myncbi/register/>



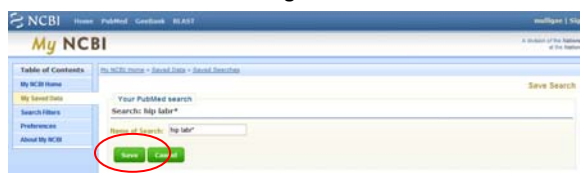
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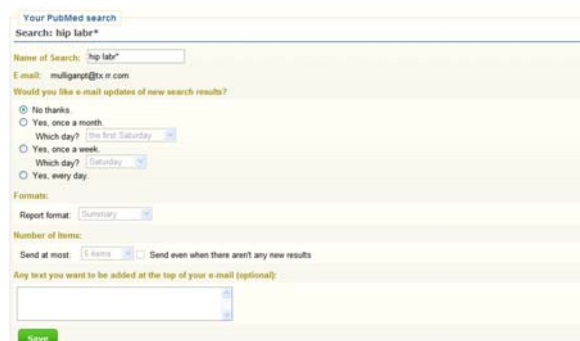


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Advanced Physical Therapy Practice Clinical Orthopedic Residency Education Series



We are very excited to offer our first series of advanced manual therapy courses next year as a complement to the orthopedic residency program at UT Southwestern

Medical Center. This program is open to all licensed physical therapists. The curriculum has been developed by a team of clinical experts with advanced credentials and training who teach in the physical therapy program at UT Southwestern.

The content is modeled after the description of orthopedic physical therapy practice as defined by the American Board of Physical Therapy Specialties. The goal of the series is to prepare the experienced clinician with a comprehensive education experience that will expose them to the type of content that is likely to be a part of the orthopedic specialty exam (OCS).

The learning objectives for this advanced series of courses is for the participant to:

- Integrate clinical reasoning skills based on the best current evidence into their practice management
- Conduct an effective and efficient subjective interview and comprehensive objective examination
- Implement evidence-based interventions based on their evaluation
- Differentiate pathological conditions of the upper and lower quadrant
- Perform effective manual therapy techniques
- Prescribe appropriate therapeutic exercise programs
- Critically analyze current scientific literature

Over 6-weekends these lab intensive courses will present a current, evidence-based approach to the evaluation and management of orthopedic pathologies from head to toe. For more information or to register for the courses please visit our web site at <http://www.continuing-ed.cc/residencycourse.htm>.



"Featured Internet Link"

Settlement of NATA vs. APTA Lawsuit



Last month the American Physical Therapy Association and National Athletic Trainer's Association settled the lawsuit filed by the NATA in 2008. The suit alleged that the APTA had violated antitrust laws and sought injunctive and other relief. The APTA denied any factual basis for these allegations and contended the NATA's claims lacked any merit. Broadly, the dispute centered on the ability of athletic trainer's to provide manual therapy services. My hope is that both associations are satisfied with the outcome and that this dispute will ultimately result in improved cooperation and communication between the two associations that admirably represent their membership.

Here is the link to the joint statement signed by the president of each association.
http://www.apta.org/AM/Template.cfm?Section=News_Archive&Template=/CM/ContentDisplay.cfm&ContentID=64482

Here is the link to the APTA's interpretation of the joint statement for its membership.
http://www.apta.org/AM/Template.cfm?Section=News_Archive&Template=/CM/HTMLDisplay.cfm&ContentID=64475

Here is a link to the NATA's response and highlights their perspective on the settlement.
<http://www.nata.org/fairpractice/FairPracticeSettlementDiscussion100809.pdf>

Wherever you stand on this issue I believe that both professions provide important roles in promoting the health and wellness of the patients and clients they serve.

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



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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@tx.rr.com



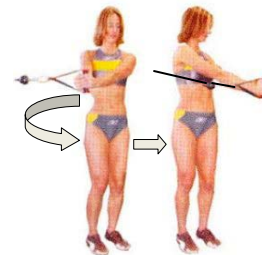
"Even a plethora of anecdotes and testimonials can not trump scientific proof"



Concentric - Eccentric Pronation - Supination through Trunk Rotation in the Transverse Plane

Rehabilitation Exercise Technique

There are many injuries that could benefit from better strength or motor control of lower extremity pronation and supination. While many think of pronation and supination as subtalar joint motions we know that tibial rotation (with subsequent femoral rotation) is an obligate result of calcaneal inversion and eversion at the subtalar joint. Whether this kinetic chain relationship moves from proximal to distal or distal to proximal, rotation of the lower extremity will result in subtalar pronation and supination. To train the muscles that control lower extremity rotation you can provide overload in the transverse plane with a pulley system or elastic tubing. When rotating to the left (as pictured above) against resistance the muscles that internally rotate (or pronate) the right lower extremity are acting concentrically while the return motion would require eccentric control of the same internal rotators at the hip, knee, and subtalar joint. An even more functional movement for the right lower extremity would be to rotate to the right with the resistance positioned to the left. In this instance the rotation would require the concentric supination and eccentric pronation which is similar to the muscular demands imposed during most ambulatory activities. These exercises can be done bilaterally and progressed to unilateral weight bearing to train important hip rotators (gluteals) along with the peroneals, anterior tibialis, and posterior tibialis musculature.



Featured Home Study Program Ethics and Professional Responsibility

What is the difference between ethics and morals? The Greek derivative of "ethics" comes from the word *ethos*, which means character. The Latin origin of ethics comes from the term *mores* that means customs. Although "morals" and ethics are sometimes used interchangeably they do have distinct differences.

Ethics is the practical and theoretical structure by which morals are formed. Morals include ethically examined practices, but can also include scenarios or perspectives that have not been ethically analyzed or judged. Examples might include social customs, prejudices, and lifestyles. No one should feel compelled to abide by another person's morality, although individuals are clearly obliged to comply with organized ethical and legal mandates.

Ethical behavior is important because it intrinsically makes people feel better about themselves if they work and act in such a manner. On a professional level, ethics promote good business. A time tested truth is that over the long run, ethical associations perform better than unethical groups. Ethical standards simply push our profession to truly determine what "is best" through disciplined, internal accountability. In fact, the credibility of our profession rests not only on technical competence, but also on the public's trust and expectation that we will judge the quality of our service and validate its legitimacy. Many states now require education in professional conduct. We have a TPTA approved written home study that will meet this requirement and explain the rules and regulations that define our practice and professional responsibilities. This inservice can 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.



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

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Achilles Tendinopathy	.2 CEUs
Lateral Ankle Instability	.2 CEUs
Plantar Fasciitis	.2 CEUs
Knee Meniscal Injuries	.2 CEUs
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Principles of Joint Mobilization	.2 CEUs
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Scapular Significance: Ortho Perspective	.2 CEUs
Proximal Humerus Fracture Rehab	.2 CEUs
Subacromial Impingement Syndrome	.2 CEUs
Examination-Treatment of Hand/Wrist	.3 CEUs
Ethics and Professional Responsibility	.2 CEUs

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