

# clinical conduit

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## Upcoming Courses for 2014

Advanced Manual Therapy Series  
Clinical Orthopedic Rehab Education

2014 Dates - Plano, TX

- Part 3: Lumbopelvic Spine - Jul 12-13 - full
- Part 4: Hip/Knee-Aug 16-17 - full
- Part 5: The Lower Quarter-Oct 11-12  
(Leg, Ankle, and Foot) - full

A detailed description of the course content and learning objectives is available at our web site — [www.continuing-ed.cc](http://www.continuing-ed.cc)

Single course attendance is allowed on a space-available basis

## Clinical Practice Guidelines for Managing Osteoarthritis

A recent paper in the *Archives of Physical Medicine and Rehabilitation* provided an excellent critical overview of the most current clinical practice guidelines regarding the non-operative management of osteoarthritis. The authors scoured all relevant databases for practice guidelines developed from evidence-based research, consensus, or expert-panels over the past 13 years. 17 guidelines with non-operative treatment strategies were accepted for analysis. 40 unique interventions were identified and each was graded for their quality. For each guideline recommendation the intervention was weighted by a score reflecting the level of evidence from which the intervention originated and/or the overall strength of the recommendation offered by the authors of the guidelines.

From the seventeen guidelines, 16 recommended exercise therapy, 13 recommended "education", and 11 recommended weight management and equipment (ADL or walking devices). In descending order, other intervention recommendations cited included taping (9), thermotherapy (9), electrical stimulation (7), self-management (7), acupuncture (5), manual therapy (5), psychosocial interventions (5), and spa/hydrotherapy (2). Most of you would recognize many of the guideline resources and included specialty discipline professional associations, research societies, and governmental health agencies. These included well-known groups such as American Academy of Orthopedic Surgeons, American College of Rheumatology, European League Against Rheumatism, Osteoarthritis Research Society International, and the Ottawa Panel.



As might be expected there were some inconsistencies between guidelines but generally they agreed with one another in regards to whether or not a particular intervention is effective. The review did not attempt to evaluate the efficiency of these interventions from a cost perspective. The areas with the greatest discrepancy included interventions familiar to most physical therapists – massage therapy and modalities (ultrasound, laser, and electrical stimulation). Page 2 has a further breakdown on the strength of recommendation for each of the most commonly cited treatment approaches.

- continued on page 2

## Are ACL Injury Prevention Programs Cost Efficient?

I think everyone is on board with the idea that neuromuscular retraining programs are an effective means to reduce the risk for anterior cruciate ligament tears. At least 8 high quality trials have been published over the last 15 years that offer testimony to this sentiment. The next question to ask is if the costs of these programs to deliver are a financially sound investment. Forget, the subjective value of preventing an injury from a "personal" or "team" perspective but do we save healthcare money by providing this type of service. Well, that exact question was posed (and answered) in a provocative study that used a hypothetical decision-making model to contrast the cost of providing either an ACL-screening or an ACL-training program against the expected cost of a necessary surgical intervention in the event of a torn ACL. The study was published last month in the *Journal of Bone and Joint Surgery* and provided by a group of researchers at Columbia University Medical Center.

The study model was based on implementing strategies for 14-22 year-old athletes competing in organized sports where the effectiveness of an ACL prevention intervention has been established by the literature (soccer, volleyball, basketball, etc). The cost models were based on three different intervention strategies: 1) no intervention or screening; 2) enrolling all athletes in preventative neuromuscular training programs; and 3) screening all athletes and enrolling those identified as "at risk" in a retraining program. The assumption for the reference cost was that all injured athletes would undergo a surgical reconstruction. The neuromuscular training program costs were based on the implementation of proven pre-performance



- continued on page 3

## OA Guidelines continued ...

### REFERENCE

Larmer PJ, Reay ND, Aubert ER, Kersten P. Systematic review of guidelines for the physical management of osteoarthritis. Arch Phys Med Rehabil. 2014 Feb;95(2):375-89. PubMed PMID: 24184307.

Interventions that were **strongly recommended** included education (unspecified “type” or mechanism), therapeutic exercise (aerobic, strength training, aquatic therapy), weight loss, wedged insoles, TENS, knee bracing (unloader type devices), and appropriate footwear. Yoga, stretching, and manual therapy were also strongly recommended but not cited as frequently in practice guidelines. Recommend interventions (not strongly) included taping, walking assistance devices, tai-chi, electrical stimulation, and multi-modal physical therapy. Ultrasound was recommended with caution. Interventions reported as unsupported included laser therapy, magnetic bracelets, massage, acupuncture, and psychosocial interventions or cognitive behavioral therapy. It is important to note that while these were non-region specific recommendations for osteoarthritic symptoms most of the guidelines specifically addressed either hip or knee osteoarthritis.



### Systematic review and Meta-analysis from 17 international organizations

Strongly Recommended	Recommended	Cautiously Recommended	Unsupported	NOT Recommended
<ul style="list-style-type: none"> <li>• Therapeutic Exer</li> <li>• E.Stim/TENS</li> <li>• Equipment <small>(braces/insoles/shoe wear)</small></li> <li>• Education</li> <li>• Manual Therapy</li> <li>• Weight Loss</li> <li>• Hydrotherapy</li> </ul>	<ul style="list-style-type: none"> <li>• WBing Assist</li> <li>• Taping</li> <li>• Thermotherapy</li> </ul>	<ul style="list-style-type: none"> <li>• Ultrasound</li> </ul>	<ul style="list-style-type: none"> <li>• Laser</li> <li>• Magnets</li> <li>• Acupuncture</li> <li>• Massage Therapy</li> </ul>	<ul style="list-style-type: none"> <li>• Electro-accupuncture</li> </ul>

*How do you assess multifidi function in you low back pain patients?*



## Question of the Month Multifidi Contraction

I have always had a difficult time with palpating the multifidi muscles and confidently interpreting their status. Maybe it's my technique? I usually have the patient in quadruped or prone and ask them to lift their contralateral arm slightly up off the table. My finger finds the spinous process and drops immediately lateral into the soft tissue space. During the arm lift I'm trying to determine if I can feel a "slight" swelling of the muscle. Honestly, I'm not always confident in what I feel. For this reason I was intrigued by a recent study in the *Spine Journal* that evaluated the reliability and validity of a new clinical test (called the multifidus lift test or MDT) that could be used to detect normal or abnormal multifidi function.

The study used the % thickness change from a relaxed to submaximal contraction state during the MDT as the reference standard for evaluating the concurrent validity of two different examiner's assessment. Additionally, they evaluated the intertester agreement between the two examiner's findings. The study methodology was excellent although we were not told of the blinded ultrasonographer's reliability (only their experience) in determining the reference standard.

The study found that there was a substantial level of agreement between examiners in determining whether or not there was a "robust" contraction at both the L4-5 and L5-S1 levels. A high level of correlation was also established between the examiners' findings and the ultrasonographic findings at the L4-5, but not the L5-S1 level. The study also found that

reliability and validity were not affected by the use of a small hand held weight during the arm lift.

The authors did an excellent job in discussing the limitations and application of the findings. First, it should be pointed out that these were "expert" and experienced physical therapists so it unknown if this level of agreement could be reached with other physical therapists. Secondly, I noticed that the average BMI of the subjects was 25 which may be lower than some of our patients with chronic low back pain. Finally, while these results are encouraging that we have a method to detect an important impairment we have not established the exact % of change in muscle thickness that constitutes an "abnormal" contraction and we still need to identify the responsiveness of this test (degree of error) and how its application will change our clinical practice perspectives.

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

## ACL Injury Prevention Cost Considerations cont -



warm-up training routines as used with the FIFA-11 and PEP. Screening strategy costs were based on the resources necessary to do either instrumented or clinical observation of anthropometric data and kinematic analysis during drop-jump landings.

The decision-making exploration was based on a number of well-referenced assumptions. The authors also included the range of costs for sensitivity analysis but the primary assumptions were as follows:

1. Surgery would cost \$8000
2. Neuromuscular training would cost \$1.25/player/season.
3. \$1.50/player/season for screening (by an ATC) using visual assessment techniques
4. The injury rate would be 0.03 per player per season.
5. Neuromuscular training would provided a risk ratio of 0.38 (or a 62% reduction in injury incidence)
6. The sensitivity and specificity of the screening procedure would be 65 and 60% respectively

The primary reference case estimated that the neuromuscular training program would reduce the injury incidence from 0.03 to 0.01 and the screening would reduce the injury rate from 0.03 to 0.02. As an example, a school district with 1,000 athletes should expect 30 torn ACLs but that could be reduced to about 10 with training or 20 with screening.

The results showed, on average, the cost of neuromuscular training would cost \$100/player/season less than surgery. For screening prevention, the cost reduction was \$25/player/season. As an aside, the authors showed a 3-5% increase in "quality-of-life" self assessments with the prevention strategies.

In other words, the cost of the (prevented) second or third surgery is higher than the cost of the comprehensive training or screening programs. Based on the range sensitivity analysis this statement would be true even if the surgical costs dropped to as low as \$1000.

I'm reminded of a sentiment that says we should provide EKG screening for all athletes to prevent adverse cardiac events. Although there is the potential to reduce these potentially serious events the cost of such intervention is prohibitive in the U.S. for anything less than the professional level. This does not seem true with preventing ACL injury - it works and it saves money. The athletic cost of injury to the knee is finite but this hypothetical analysis suggests we cannot only prevent these injuries from occurring but direct some of the revenue stream towards the rehabilitation experts who can provide these services.

## Clinical Practice Guideline Non-Arthritic Hip Conditions



The "C" sign is the shape the hand makes to describe the deep, medial hip pain common to labral pathology. Image from Byrd JW, AJSM, 2014.

For those of you who follow this newsletter you know I'm a big fan of the Clinical Practice Guidelines developed by expert clinicians from the Orthopedic Section and published in the *Journal of Orthopedic and Sports Physical Therapy*. The June issue of *JOSPT* contains the latest guideline and covers non-arthritic hip pain (this would include femoroacetabular impingement, structural instability, and internal derangements). You may remember that the hip OA practice guidelines were published back in 2009.

These guidelines are a stark indictment on our level of confidence regarding where we are in regards to "proven" interventions in regards to the management of labral-related pathologies. Our only excuse is that it was just 15-20 years ago that these injuries were largely unrecognized by the medical community. Looks like we have some research validation work to do. Below is a reminder on what the letter designations mean in regards to the grades of recommendation.

GRADES OF RECOMMENDATION BASED ON	STRENGTH OF EVIDENCE
A	Strong evidence A preponderance of level I and/or level II studies support the recommendation. This must include at least 1 level I study
B	Moderate evidence A single high-quality randomized controlled trial or a preponderance of level II studies support the recommendation
C	Weak evidence A single level II study or a preponderance of level III and IV studies, including statements of consensus by content experts, support the recommendation
D	Conflicting evidence Higher-quality studies conducted on this topic disagree with respect to their conclusions. The recommendation is based on these conflicting studies
E	Theoretical/foundational evidence A preponderance of evidence from animal or cadaver studies, from conceptual models/principles, or from basic science/bench research supports this conclusion
F	Expert opinion Best practice based on the clinical experience of the guidelines development team

### SUMMARY of RECOMMENDATIONS

<b>Risk Factors</b>	<b>F</b>
<b>Diagnostic Classification</b>	<b>C</b>
<b>Differential Diagnosis</b>	<b>F</b>
<b>Outcome Measures</b>	<b>A</b>
<b>Physical Exam Impairment Measures</b>	<b>B</b>
<b>Patient Education and Counseling</b>	<b>F</b>
<b>Manual Therapy Intervention</b>	<b>F</b>
<b>Therapeutic Exercise Intervention</b>	<b>F</b>
<b>Neuromuscular Re-education Intervention</b>	<b>F</b>

Remember F is not "failing". It means that we're relying solely on expert opinion and have a huge need for more research into the effectiveness and efficacy of these issues.

### Reference

Swart E, Redler L, Fabricant PD, Mandelbaum BR, Ahmad CS, Wang YS. Prevention and screening program for anterior cruciate ligament injures in young athletes: a cost-effectiveness analysis. *J Bone Joint Surg*. 2014; 96:705-711



### "Featured Internet Link"



One of my students showed me an iPad app that seemed to be an excellent multisensory learning tool for students who need instruction or reminders on anatomy, pathological conditions, or surgical procedures. The company makes a variety of applications but the "Decide Series" for shoulder, spine, hand, knee, and ankle/foot regions seemed like they'd be especially valuable for orthopedic rehab clinicians. You can even annotate on the anatomical pictures which seems like an excellent mechanism to educate our patients on their injury. There is a "free" version for iPhone and iPads if you just search "Decide" in the App store. There are more elaborate applications available for purchase as well.



Previous issues are archived at  
[www.continuing-ed.cc/newsletter.htm](http://www.continuing-ed.cc/newsletter.htm)



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### CORE Education Series for 2015

We're in the midst of another great year of education with our Clinical Orthopedic Rehabilitation Education (CORE) series. All of our programs in the series are sold out for this year but we are planning to continue the series for the sixth year again in 2015 for those who'd like a comprehensive overview of orthopedic physical therapy (literally from head to toe) based on the APTA's definition of advanced specialty practice. We are proud to announce that again this year all three of our orthopedic residents and many of last year's participants were successful in securing their orthopedic specialist certification using this series as their didactic backbone to prepare.

For those that would like a more comprehensive learning and mentoring experience you may want to consider participating in one of our APTA accredited residency programs at UT Southwestern. We are now accepting applications for our 2015 residency positions. We will accept 3 full-time positions in our orthopedic program and one for our new sports physical therapy program. Residents attend the education series as well as practicing in our orthopedic faculty clinic or satellite sports medicine center. More information about the CORE education series is available at <http://www.continuing-ed.cc/residencycourse.htm>. Resident employment information can be found at <http://www.utsouthwestern.edu/education/school-of-health-professions/programs/residency-programs/index.html>.

When you ask a question - be open to the "real" answer.



## Concerns regarding Biceps Brachii Demand following Labral Repair



One of the first muscles that we can begin to strengthen following some post-operative shoulder surgeries is the biceps brachii. Obviously this is contraindicated following procedures such as distal biceps repairs, bicep tenodesis, or labral repairs. Under these circumstances you may need to protect the tendon for 8-12 weeks to allow adequate bone-to-tendon healing. It would help if we knew the electromyographic bicep demand of some of our typical shoulder rehabilitation exercises so that we good stage an increasing demand on the contractile unit as it heals. A new study in the *American Journal of Sports Medicine* provided this exact type of insight. This descriptive laboratory study used surface electromyography to gauge the EMG activity of 8 muscles (including the biceps and triceps) during 16 exercises. Based on the EMG findings I've created a "demand" classification hierarchy to assist the clinician in creating a progressive stimulus ranging from low to high loads. The chart below shows the results from the study along with the % of maximal voluntary contraction elicited in the biceps brachii with each exercise. It makes sense to me that in the healing phase the low demand tasks would be safe with a progression towards the moderate demand activities post-immobilization and the highest demand activities reserved to begin after 3 months of healing. Based on my interpretation of the results the "formula" is pretty straight forward. Exercise with a short lever arm (elbow flexed) and the shoulder internally rotated and forearm pronated to reduce load demands on the bicep.

High Demand (% MVIC) > 25%		Moderate Demand (% MVIC) 10-24%		Low Demand (% MVIC) < 10%	
Fwd Flex in ER and forearm sup	36%	Upper Cut	19%	Fwd Flex in sidelying	10%
Elbow Flex in forearm sup	35%	Forearm Sup	15%	Serratus Punch	9%
Full Can Elevation	29%	D2 Flex Diagonal	13%	ER at 0 Abd	8%
		ER in 90 Abd	11%	D1 Flex Diagonal	8%
				Int Rot at 0 Abd	6%
				Seated Row	6%
				Knee Push Up +	5%
				Prone Extension	4%
				Int Rot at 0 Abd	2%

If you'd like a good review on the anatomy and functional biomechanics of the shoulder you may enjoy our TPTA approved written home study that covers this topic. This self-study is approved by the TPTA 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.

### Home Studies Now Available

Study and learn at your own pace at home!

- Medical Screening for the PT .3 CEUs
- Knee Osteoarthritis .2 CEUs
- Pharmacology for the PT .2 CEUs
- Radiology for the PT .3 CEUs
- Goniometry 101 .2 CEUs
- Foot-Ankle Anatomy .3 CEUs
- Achilles Tendinopathy .2 CEUs
- Lateral Ankle Instability .2 CEUs
- Plantar Fasciitis .2 CEUs
- Knee Meniscal Injuries .2 CEUs
- Orthopedic Hip Injuries .2 CEUs
- Principles of Joint Mobilization .2 CEUs
- Functional Anatomy of the Shoulder .3 CEUs**
- Scapular Significance: Ortho Perspective .2 CEUs
- Proximal Humerus Fracture Rehab .2 CEUs
- Subacromial Impingement Syndrome .2 CEUs
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