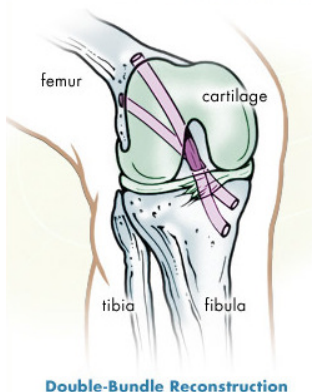
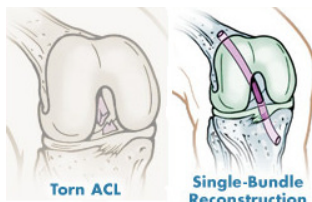


clinical conduit



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Single vs. Double Bundle ACL Grafts

The anatomically “accurate” double-bundle reconstruction technique is proposed to better simulate the biomechanical control provided by the anterior cruciate by mimicking the kinematic restraint offered by each of the native bundles of the ligament. In particular, it is hypothesized that the double-bundle graft may better control the rotational torque in the knee that may be responsible for the periodic residual symptoms and osteoarthritic disease progression after the reconstruction.

Proponents of the double-bundle technique often use the “door hinge” analogy to explain the advantage of this surgical technique. The traditional, single-bundle technique is like a door swinging on a single hinge – it will open and close but the hinge has to work excessively. With a double-bundle graft you get to

share the kinematic guidance of the knee’s motion between two “hinges” or bundles which may result in less “wear and tear” on the joint.

While biomechanical considerations for the surgical procedure are important, it would seem that the real litmus test for this procedure’s effectiveness would be to evaluate the consequent outcomes after the surgery. As this procedure is relatively new it would be hard to ascertain its long-term effectiveness; however, many recent studies have tried to evaluate the surgical technique’s ability to improve stability and function.

A meta-analysis study (summary of randomized controlled trials) was published last summer in the *American Journal of Sports Medicine* by Meredick RB, et al.

- continued on page 2

Probably one of the hottest orthopedic/sports medicine topics in the literature during the past year has been the discussion on the value and necessity of a “double-bundle” graft versus the traditional single graft technique used to stabilize a knee following an injury to the anterior cruciate ligament.

Remaining 2009 Course Schedule

Athletic Performance Course
May 30-31 – Grapevine, TX

Knee Course
May 2-3 – Iowa City, IA
July 11-12 – Plano, TX

Cervical Course
Aug 15-16 – Grapevine, TX

Shoulder Course
June 27-28 – Tulsa, OK
Sept 26-27 – Plano, TX

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



Scratch Collapse Test for Cubital Tunnel Syndrome

Cubital tunnel syndrome is an entrapment neuropathy of the ulnar nerve in the bony channel between the olecranon and medial epicondyle of the elbow. The nerve becomes dysfunctional secondary to prolonged or repetitive pressure, ischemia, or traction stresses. Diagnostic suspicion is based upon clinical examination findings which typically include pain and/or paresthetic sensory changes in the ulnar distribution along the medial forearm distal to the site of the entrapment. In more chronic conditions, motor deficits may become apparent as the 4th and 5th digits begin to claw into the “benediction” or “papal” position. Many special tests have been described to detect this injury which include a + Wartenberg’s sign (an abducted 5th digit), a + Froment’s sign (flexor pollicis substitution for the adductor pollicis which is innervated by the ulnar nerve), and a + Tinel’s sign (reproduction of symptoms with percussion of the nerve in the cubital tunnel). Recently, a new test has been proposed in the literature called the “**Scratch Collapse Test**” to identify this injury and help differentiate it from other causes of medial forearm paresthesia such as thoracic outlet syndrome, cervical radiculopathy, or a handle bar palsy from distal entrapment of the ulnar nerve in . . .

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Anterior Cruciate Ligament Bundles continued ...

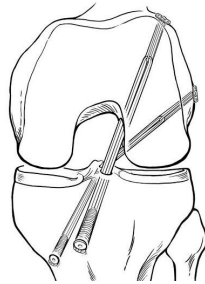
References

Meredick RB, et al. Outcomes of single versus double-bundle reconstruction of the anterior cruciate ligament: a meta-analysis. *Am J Sports Med.* 2008; 36(7):1414-21

Gadikota HR, et al. Biomechanical comparison of single-tunnel-double-bundle and single-bundle anterior cruciate ligament reconstructions. *Am J Sports Med.* 2009 Mar 4 [Epub ahead of print]

Fu FH, et al. Primary anatomic double-bundle anterior cruciate ligament reconstruction: a preliminary 2-year prospective study. *Am J Sports Med.* 2008 Jul;36(7):1263-74.

Lewis PB, et al. Systematic review of single-bundle anterior cruciate ligament reconstruction outcomes; a baseline assessment for consideration of double-bundle techniques.



This paper evaluated 11 studies that utilized both hamstring and patellar tendon single and double-bundle autografts. While there was a slight trend towards decreased anterior translation in the double-bundle technique as measured by knee arthrometer testing there was not a difference in the pivot shift phenomenon which is thought to be a better indicator of the knee's rotary stability. Another biomechanical study performed on cadaveric specimens by Gadikota, et al, in the same journal showed that while the double-bundle reconstruction through a single tunnel better restored anterior translation in more terminal extension positions it raised concerns that it may over constrain this translation at lower angles of knee flexion.

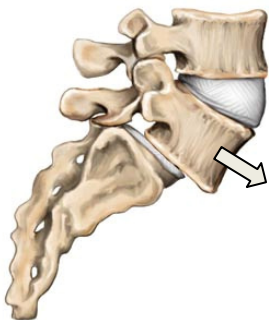
One of the pioneers in double-bundle grafting, Freddie Fu, an orthopedic surgeon at the University of Pittsburgh, published one of the first prospective outcome studies evaluating the double-bundle technique at a 2-year follow-up. This case series of their first 100 subjects showed good outcomes in regards to range of motion, stability (both anterior translation stability and control of the pivot shift), functional outcomes, and patient satisfaction. While his preliminary data shows promise for this technique it still does not answer the question of its superiority over the more traditional single-bundle technique. The dilemma for surgeons is if they should utilize a double-bundle technique when the safe and predictable results of a more traditional technique have been established in a systematic review from a significant body of unbiased outcome data. Isn't it encouraging to see that the medical community continues to seek the best means to surgically address a common problem in our patients who are unable to cope or adapt in the absence of their anterior cruciate ligament but wish to continue with their active lifestyle?



Question of the Month – Spondylolisthesis

Is surgery inevitable in a young athletic patient with spondylolisthesis?

Would prolotherapy have any value?



Treating an athletic spondylolisthesis can be a challenge. The condition is normally exacerbated by sports that require lumbar hyperextension and rotational movements (football lineman, gymnasts, dancers, kicking in soccer, etc) but will usually respond to rest (3 months withdrawal from sport at a minimum) and corset like thoracolumbosacral bracing (although there is less evidence to support this intervention's efficacy).

Generally, the degree of slippage is the most useful parameter to guide treatment and prognosticate further slippage and the possible need for surgery (both the bony imaging and MRI should be able to evaluate the degree of slippage). Obviously, higher grade slips (Grades III-IV-V with more than 50% slippage have the potential for greater disability and a higher likelihood

of neurological progression when compared with lesser slips. This is particularly important in the skeletally immature athlete. Some surgeons may even consider surgical stabilization if the athlete is still in their growth spurt as the likelihood for further slippage is elevated.

The non-surgical management's primary objective is to alleviate symptoms and allow for a safe return to competition. Most will have a good outcome with transversus abdominus-multifidi training (particularly if they meet the stabilization classification criteria (*see last issue*), hamstring stretching, aerobic conditioning (non-rotational, hyperextension, or axial loading movements), anti-lordotic postural training, and appropriate rest. If these efforts fail (and I wouldn't personally make that decision until a minimum of 6-12 months have passed) the gold standard is a surgical fusion.

The most important consideration in the determination of sta-

tus is the patient's neurological status and performance capabilities. Many of these athletes will remain at least slightly symptomatic but in the absence of dermatomal, myotomal, deep tendon reflex, or B/B changes I think you can use the athlete's comfort and athletic capability as the guide for return to activity.

As for the prolotherapy, I'm not sure how this might help. This is a "bony" instability not a ligamentous laxity. So while the condition is a hypermobile segment by definition I would still favor dynamic stabilization as the non-surgical intervention of choice. Additionally there is, at best, conflicting evidence regarding the efficacy of prolotherapy injections for patients with chronic LBP. The Cochrane review concluded that it is NOT effective as a stand-alone treatment but **MAY** be effective when combined with exercise intervention.


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

Reference:

Cheng CJ, Makinnon-Patterson B, Beck JL, Mackinnon SE. Scratch collapse test for evaluation of carpal and cubital tunnel syndrome. *J Hand Surg.* 2008; 33A:1518-1524.



“Featured Internet Link”

 **Orthopaedic Scores**
www.orthopaedicscore.com

For those that are mathematically challenged I found a great web site that will automatically calculate your outcome measurement scores. Rather than having the patient record their functional abilities on a hard copy they can go directly to this site and enter their information on a web-based interactive calculator. The site has the following outcome measurement tools available.

HIP: Harris Hip Score, Oxford Hip Score, Hip Disability and Osteoarthritis Outcome Score, and Western Ontario and McMaster Universities Osteoarthritis Index.

KNEE: Knee Society Score, Tegner-Lysholm Knee Scale, Knee Injury and Osteoarthritis Outcome Score, Modified Cincinnati Rating System

ANKLE: American Foot and Ankle Score

SHOULDER: Constant Shoulder Score, UCLA Shoulder Rating Scale, Disabilities of Arm, Shoulder, Hand Scale, Quick DASH, Rowe Score, and Oxford Instability Score

ELBOW: MAYO Wrist Score

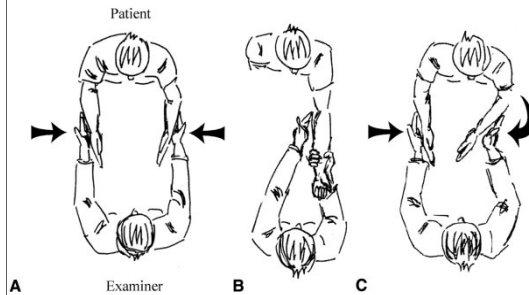
LUMBAR SPINE: Oswestry Low Back Pain Score

The site is free to access and does not require any confidential or personal data to be provided. You can then print out scores for your documentation requirements.

Scratch Collapse Test *continued -*

Guyon’s canal in the hypothenar eminence area.

The Scratch Collapse Test is performed by comparing the results of a shoulder external rotation strength test before and after a light “scratch” or “swipe” with the fingertips along the course of the compressed nerve. The originators of the test hypothesize that if the patient has allodynia (*a painful response from a normally non-painful stimulus*) due to compression neuropathy, a brief loss of muscle strength will be detected. In their investigation the authors noted this transient inhibition of tonic voluntary muscle activity was generally a response reserved for those with ulnar neuropathy and that a cutaneous silent period caused shoulder muscle inhibition in response to the noxious scratch stimulus of the skin overlying a chronically constricted nerve.



The accuracy of the test was quite impressive with an overall accuracy of 89% in a population of 169 pathological subjects and 109 controls. The sensitivity of the test was 69%, specificity 99% (great at ruling in the diagnosis) with a positive and negative predictive value of 96% and 86%, respectively. The calculated likelihood ratios with this test would be a +LR of 69 (significant shift in probability) and a -LR of .31 (small shift in probability to rule out the problem). The authors do note that practice is needed to ensure that the scratch stimulus is applied directly over the compromised ulnar nerve to ensure diagnostic accuracy.

Management of cubital tunnel should include activity modification, ergonomic recommendations, and rest from offending activities. Splinting in mid range flexion with adequate pressure relief in the area of the ulnar nerve can keep the elbow out of the stressful positions of excessive flexion and eliminate direct pressure stress on the nerve itself. As the symptoms begin to subside, ulnar neurodynamic glide (tensioner and slider) exercises may be helpful. Failed conservative interventions may necessitate subsequent surgical decompression, epicondylectomy, and/or transposition.

Consumer Reports®

Good news for the Physical Therapy profession. In the May issue of Consumer Reports their Health Ratings Center surveyed more than 14,000 of their subscribers who had experienced low back pain (LBP) but never had surgery. Of these respondents, over half said that their LBP severely limited their activities of daily living and nearly 90% said it recurred throughout the year.

The following represents the % of these patients that were (very or completely) satisfied with the interventions offered by different disciplines.

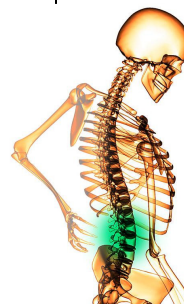
Chiropractic	59%
Physical Therapy	55%
Acupuncturist	53%
Physician Specialist	44%
Primary Care Physician	34%

While it is encouraging to see a decent % of patients having a favorable response to “physical therapy” I wonder what specific interventions were helpful. After all, “physical therapy” is a profession and not a treatment. Was it manual therapy, therapeutic exercises, postural and activity education, and/or physical agents that created a positive change? We know that (unfortunately) our delivery of care for LBP is not as homogenous as it could be if we consistently applied interventions based on sign and symptom classification.

My suspicion on why chiropractic and physical therapy care were relatively successful is because of their focus of “hands-on” care. These techniques tend to be patient specific and create an environment in which a relationship is built with the patient. I try to routinely use my time during the application of manual techniques to discuss postural recommendations, activity precautions, general fitness, nutrition and weight loss, and the expectant course (resolving within 1-2 months) of most non-specific bouts of low back pain.

Maybe the most interesting aspect of the survey

was that nearly 60% of the respondents lamented they had not done enough exercise for their LBP. No profession is better suited to fulfill this desire. We are the musculoskeletal movement experts that can prescribe an appropriate exercise program to not only help them get over the current issue but avoid the alarming recurrence rates.



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Orthopedic Physical Therapy Residency

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



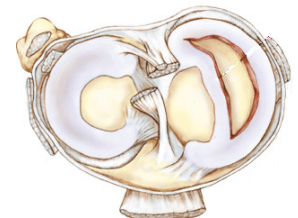
I am pleased to announce that the Department of Physical Therapy at UT Southwestern Medical Center's School of Health Professions will be offering a residency-based educational opportunity beginning in January of 2010. The selected residents will be offered a twelve-month employment contract with the University as a Clinical Affiliate. The resident will see patients in the faculty practice and work under the supervision of a designated mentor and the faculty members who see patients in the department's orthopedic clinic. The Resident will maintain an 80% patient load including time reserved for collaborative care with their mentor. The resident will be allotted time for additional learning opportunities such as journal club participation, academic instruction in the undergraduate DPT program, inservice presentation, research projects physician rounds, poster/platform presentation development, and attendance at 6 two-day weekend intensive educational courses. The residency format is based on a structured, comprehensive approach to examination and treatment of orthopedic spinal and extremity dysfunction. The content will be based upon the American Physical Therapy Association's description of advanced orthopedic clinical practice and include didactic, laboratory, and clinical practice components. At the completion of the residency the resident will be fully prepared and qualified to sit for the American Board of Physical Therapy Specialty's Orthopedic Clinical Specialist certification (OCS) examination. Applicants should have at least 6 months of experience in an orthopedic setting, licensure or board eligibility to practice physical therapy in the state of Texas, and current CPR/BLS certification. The salary for this position will be commensurate with the applicant's qualifications and experience. Benefits include free tuition to the long-term orthopedic and manual therapy education series, full medical coverage, OCS exam and application fees, 2-weeks vacation, and paid professional membership dues. For more information please contact Ed Mulligan at 214-648-1553 or email at ed.mulligan@utsouthwestern.edu. Additional information can be found on the UT Southwestern web site at www.utsouthwestern.edu/orthoptresidency.



Featured Home Study Program Evaluation and Management of Knee Meniscal Injury

Recent studies in the literature have supported the perspective that a "cluster" of findings is much more accurate in diagnosing a specific pathology as opposed to the reliance on a single "special test". A study in Arthroscopy by Lowery DJ, et al, in 2006 evaluated the accuracy of a composite of clinical findings in detecting meniscal injury. The authors evaluated the accuracy of this cluster with and without the concurrent presence of an anterior cruciate ligament (ACL) tear or the presence of osteoarthritis (OA). The following five variables were identified:

1. history of "catching" or "locking"
2. pain with forced hyperextension
3. pain with maximal flexion
4. pain or an audible click with a McMurray's test
5. joint line tenderness with palpation.



Statistical analysis showed a significant relationship between the number of positive findings and the likelihood of a meniscal tear as confirmed by arthroscopic evaluation. If all five findings were present (in the absence of the ACL or OA co-morbidity) there was a 92% positive predictive value and this value remained over 75% if any three of the findings were present. The presence of an ACL injury decreased the positive predictive value to 67% (in other words, this concurrent pathology may cause some of the five variables to be present); however, the presence of OA increased the predictability to 100%. This is a level II diagnostic study and still needs to be validated in an independent sample of patients. If you need a good review on the evaluation and management of knee cartilage pathology you may be interested in our home study on meniscal injuries. This TPTA approved inservice can be read free of charge. A post-test for CEU credit is available at <http://www.continuing-ed.cc/homestudy.htm> for a reasonable fee.

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