

clinical conduit

by Ed Mulligan, PT, DPT, OCS, SCS, ATC

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.

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Upcoming Courses for 2016

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(Leg, Ankle, and Foot)

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

Single course attendance is allowed on a space-available basis

This is the final year that I will be offering this series. Please consider joining us for my final year of teaching this content.

Greater Trochanteric Pain Syndrome - Part 6:



There is limited research on the prognosis pertaining to GTPS. In a recent case control study, Fearon found patients with GTPS had poor quality of life and higher pain and physical impairment comparable to people with end stage hip osteoarthritis awaiting a total hip arthroplasty (Fearon, Cook, Scarvell, Neeman, Cormick, & Smith, 2014). Additionally, they reported a dramatic reduction in employment status in patients suffering from GTPS with an odds ratio of work disability at a rate even lower than end stage hip osteoarthritis. Referenced in a systematic review, 49% to 100% of patients returned to baseline physical activity after receiving a local steroid injection as the primary treatment of GTPS (Lustenberger, et al, 2011).

Follow up times in each study included in the systematic review varied from four months to four years, and the number of injections varied

from four months to four years, and the number of injections varied from one to five making it challenging to determine an accurate time frame for recovery after a steroid injection. Authors of a single randomized control trial comparing a steroid injection to usual care (analgesics and physiotherapy as an option) concluded that a single steroid injection had a statistically significant reduction in pain at three months compared to usual care; however, at twelve months there was no difference in pain and function between the groups (Brinks, Van Rijn, Willemsen, Bohnen, Verhaar, Koes, & Biermanzeinstra 2011). Also cited in this systematic review 66% to 83% of patients returned to sport or job at three months after a course of rest, physical therapy, ultrasound, steroid injection, ice and heat (Lustenberger et al., 2011). Segal (Segal et al., 2007) showed (after multivariate analysis) that GTPS did not alter physical activity scores but bilateral GTPS was significantly associated with a higher 20-meter walk time and chair stand time.

Based on limited prognostic re-

search at least one quarter of patients with GTPS will have a complete absence of symptoms at one year. It appears that about half of the patients will report a temporary improvement in symptoms and this increases to approximately 2/3 of patients following a corticosteroid injection to the peritrochanteric area. Similarly, 2/3 of patients who received physiotherapy noted improvement in pain and function at one year (Lievence et al, 2005). It is unknown the exact indicators or length of time that must pass before conservative measures can be deemed a failure and surgical solutions should be considered to resolve the problem.

Outcome tools/measurements:

A critical element of patient management is to baseline and monitor a patient's status through the use of self-reported measurement tools. There are a number of body region specific and "quality-of-life" instruments that can be used to provide insight into the impact of the condition and its change as ...

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Basketball Theme Issue: Injury Epidemiology

Much as I did with the September issue, I am going to dedicate this issue to the sport of basketball. Again, with the start of the basketball season, I thought it would be fun to dedicate an issue to some medical issues and concerns related to basketball. Whether you're a fantasy player or just want to understand the injuries that happen to your team (mine is the Mavericks) – I hope you find some interest in this theme issue.

There have been two descriptive epidemiological studies reporting on the injury rates and demographics in basketball. One of the studies reflected on injuries in the NBA and the other reported on injuries in collegiate basketball. The "NBA" study was published in *Sports Health* in 2010 by Drakos et al and based on the injury database (from 1988-2005) maintained by each team's athletic trainers. The database is quite comprehensive including the pathology, time and place of onset, and mechanism of injury. Injury follow-up data includes the number of games/practices missed, support devices worn, injury reserve status, hospitalization, surgery, and medications. A summary of the findings are on page 3.

- continued on page 3

GTPS Exercise Intervention Strategies continued



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

This is the final installment of this series. The full article can be found in *Phys Ther Sport*. 2015 Aug;16(3):205-14



treatment is rendered. To date, a disease specific functional outcome measure for GTPS has not been created. However, the Lower Extremity Functional Scale (LEFS) is a commonly used region specific reported outcome tool. It is a 20-item questionnaire, with a 5-point scale ranging from 0 "extremity" to 4 "no difficulty" to measure the patient's functional ability. The LEFS has construct validity (0.64 to 0.80) and is a reliable test-retest measure (ICC 0.80 to 0.94) of lower extremity musculo-skeletal dysfunction (Brinkley, Stratford, Lott, & Riddle, 1999). There is a 5-point margin of error, meaning a patient's true score could be ± 5 points and the minimal detectable change and the minimal clinically important difference is the same ± 9 (Binkley et al., 1999). The LEFS is considered to have a low ceiling and floor effect, easy to administer, and is frequently used in clinical practice and for research (Binkley et al., 1999).

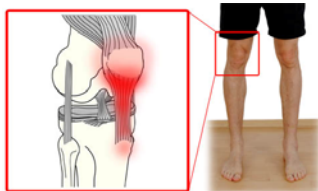
The Copenhagen Hip and Groin Outcome Score (HAGOS) is another region specific outcome tool designed for physically active younger to middle-aged patients, with hip and groin pain. This questionnaire has construct validity ($r = 0.37$ to 0.73) and has a reliable test-retest outcome measure (ICC 0.82 to 0.92). The HAGOS is a 100 point self-report survey of functional ability with 6 subscales (symptoms, stiffness, pain, quality of life, ADL function and sports participation) that score from 0 to 4. A detectable change in score for the HAGOS is 5.2 on any of the 6 subscales (Thorborg, Holmich, Christensen, Petersen, & Roos, 2014).

Another outcome measure for young physical active patients with hip pathology is the International Hip Outcome Tool-33 (iHOT-33). The iHOT-33 is a region specific, self-report questionnaire, scored on a 100 point visual analog scale that measures functional ability. It has good test-retest reliability (ICC = 0.78) and construct validity ($r = 0.81$) with a minimal clinically important difference of 6 points after hip arthroscopy (Mohatadi, Griffin, Pederson, Chad, Safran, & Parsons, 2012). A final self-report outcome tool that could be used for assessment of the athlete's status is the Hip Outcome Score (HOS); however, the validity of this tool has been validated for an alternate hip pathology population (femoroacetabular impingement). Additionally, it has well-established reliability and known values for a minimally clinically important difference for both its activities of daily living and sports subscales. A limitation in its utility is that items related to donning/doffing shoes and socks is not used in the scoring and this activity provides a valuable onset in the decision making for the presence or absence of GTPS (Lodhia, Slobogean, Noonan, & Gilbert, 2011). Currently, we recommend the LEFS, HAGOS and iHOT-33 as the best available outcome tools to measure function in patients with GTPS.

Generic outcome tools of physical activity and quality of life measures include: The University of California at Los Angeles Activity Score (UCLA Activity Score); a ten point scale ranging from inactive to participation in high impact sports (Cohen, Huang, Ciccotti, Dodson, & Parvizi, 2012), the SF-36 and the SF-12 which are outcome measures of health-related quality of life; (Bilbao, Quintana, Escobar, Las Hayas, & Orive, 2011), and the Lower Extremity Activity Scale (LEAS) measuring the level of ambulation (Salek, Mullhall, Bershady, Gromrawi, White, Buyea, & Krackow, 2005). Since there is not a single outcome measure for GTPS the patient's age, functional mobility, physical activity and quality of life should be considered in selecting the most appropriate hip outcome tool.

While acceptable outcomes are generally accomplished in patients with GTPS there is an inadequate level of high quality research to guide examination insights, intervention strategies, or prognostic outcomes. Given the prevalence and disabling quality of this syndrome additional research is warranted to clarify an optimal management approach.

Is there a way to decrease the risk for patellar tendinitis in jumping athletes?



Unfortunately, patellar tendon pain and dysfunction is a common malady that affects jumping athletes. This is particularly true in basketball and volleyball. There have been a couple of studies that have tried to answer your question. A research team from The Netherlands conducted survey studies to try to identify risk factors that could explain the high prevalence of injury in these sports. In their initial cross-

sectional study they found through logistical regression analysis that age, male sex, higher level of competition, and volleyball participation (as opposed to basketball) were significant risk factors. In a prospective follow-up study they found a prevalence of 13% and quantified that males were twice as likely to have the problem. However, no other sports-related variables could be identified risk factors. A study published in 2011 by Backman LJ et al in the *Am J Sports Med* found that decreased

dorsiflexion as measured by the lunge test had a significantly higher risk of patellar tendinitis if their dorsiflexion was less than 36° . This increased prevalence was even higher if the athlete had suffered previous sprains. My recommendation is to limit the total tendon load through activity modification, ensure gastroc/soleus flexibility, and apply post-practice preventative measures (icing)

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

Mavericks Injuries



Since the team's inception, I have been a huge Dallas Mavericks basketball fan. This should be an interesting year as two of our critical players are returning from significant surgical procedures last season. Chandler Parsons had knee surgery and Wesley Matthews had an Achilles tendon repair. The health and longevity of these two players will probably dictate the success of the team this year. So what does the literature tell suggest about the prognosis for these two players?

We know that Achilles tendon ruptures are a devastating injury for basketball players. A study of all Achilles ruptures over the past 23 years was published in the *Am J Sports Med* a couple of years ago. They found that 7 of the 18 players injured during this time period were unable to return to the NBA. We're already ahead on this stat as Wesley Matthews has returned and played well in his first game of the season. The 11 players who did return played in about 70% of their games but their player efficiency rating was decreased by 4.57 in the first year and 4.38 in the 2nd year. It will be interesting to see if Matthews can return to his previous level of play but the history of this injury would suggest there might be a drop off in performance.

Chandler Parsons had some type of bone marrow stimulating microfracture procedure to address articular cartilage defects; however, the exact surgical procedure has never been released to the public. There are a couple of studies that have reflected on performance and return to sport following microfracture. The mean time to return to sport was about 7 months (which is about where Parsons is now) but their minutes per game was reduced by 3-5 minutes. About 20-30% did not return to sport and those that did had about a 3 point decrease in their power rating and a significant decreased in points scored per game.

Here's to hoping that both players can beat the odds and return to a healthy and productive year of basketball.



Basketball Injury Epidemiology continued -



Here is a summary of some of the more interesting findings. The incidence of injury was 19 injuries per 1000 athletic exposures. About half the injuries occurred in games and half in practice. The average age of players injured was 27 and there were no correlations between injury rate, height, weight, or years of experience. I would have guessed that older players were more likely injured but age was not statistically significant. No surprise that lower extremity injuries represented about 60% of all injuries and accounted for about 72% of missed game time. The leg/ankle/foot was the most common area of injury and represented about 30% of the injuries with the ankle accounting for about half of these injuries. The thigh/knee/patella were the second most common area at about 26% with patellar injury being slightly more common than knee injuries. The third most common area was to the lumbar spine at 11%. Obviously, upper extremity injuries are less common in basketball

Ankle sprain injury is not surprising given the lateral agility and jumping/landing mechanics inherent to the sport. Also problematic was patellofemoral pain. Although it didn't cause as much game time loss it was frequently cited as a reason for missed practice time. The authors suggested that the use of high or mid-top shoes have been used to decrease ankle injury frequency but the lone study that has evaluated the impact of shoe design failed to show a strong relationship between shoe design (high, mid, or low-top) and injury frequency. (Barrett JR et al, *Am J Sports Med*, 1993.

The NCAA epidemiology conducted by Dick R et al, found similar conclusions. Their study spanned a 16-year period from 1998-2004. They found similar injury epidemiology. 10 game and 4 practice injuries per 1000 athletic exposures. This is roughly the same as the professional injury rate with the exception of a lower practice rate of injury. They also reported that approximately 60% of injuries were to the lower extremity with ankle ligament sprains as the most common form of injury. The most common injury

requiring at least 10 days of missed time was internal derangements of the knee. They also found an increasing number of injuries to the head and face and attributed this more recent trend to the tolerance for more physical contact. Taping, bracing, and neuromuscular retraining were emphasized as the means by which to decrease the injury rate to the areas most commonly involved with competitive basketball.

Knee Reference

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Barrett JR, Tanji JL, Drake C, Fuller D, Kawasaki RI, Fenton RM. High- versus low-top shoes for the prevention of ankle sprains in basketball players. A prospective randomized study. *Am J Sports Med*. 1993 Jul-Aug;21(4):582-5.



"Featured Internet Link"



<http://www.orthoguidelines.org/go/auc/>

The American Academy of Orthopaedic Surgeons began developing Appropriate Use Criteria in 2011 as a tool to implement Evidence-based Clinical Practice Guidelines. These criteria were created to inform clinicians for whom a procedure should be done. This involves using clinician expertise and experience, in conjunction with the relevant evidence, to rate the appropriateness of various treatments in a set of hypothetical, but clinically realistic, patient scenarios. It is an interesting algorithm and worth your time to review.

Indication Profile	Procedure Recommendations
Age/Maturity <input type="radio"/> Open Physes <input checked="" type="radio"/> Closed/Closing Physes <25 years of age <input type="radio"/> >25 years of age	<input checked="" type="checkbox"/> ACL Reconstruction --Autograft 8 <input checked="" type="checkbox"/> ACL Reconstruction --Allograft 7
Activity Level <input checked="" type="radio"/> Participates in cutting/pivoting sport <input type="radio"/> Does not participate in cutting/pivoting sport	<input checked="" type="checkbox"/> ACL Functional Knee Brace without reconstruction 4 <input checked="" type="checkbox"/> Self-directed exercise program without reconstruction *
Presence of Advanced Arthritis <input type="radio"/> Advanced Arthritic Changes <input type="radio"/> Mild to Moderate Arthritic Changes <input checked="" type="radio"/> No Arthritic Changes	<input checked="" type="checkbox"/> Supervised Rehabilitation program without reconstruction 3 <input checked="" type="checkbox"/> Activity Modification without reconstruction 3
Presence of Repairable Meniscal Tear <input checked="" type="radio"/> No Repairable Meniscal Tear <input type="radio"/> Repairable Meniscal Tear	
Non-Operative Measures <input type="radio"/> Patient did not fail optimal non-operative measures <input checked="" type="radio"/> Patient failed optimal non-operative measures	

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@EdMulliganPT

continuing ED

1901 Pintail Parkway
Euless, TX 76039

Phone: 817-488-2061
Fax: 817-684-7201
Email: mulliganpt@tx.rr.com
www.continuing-ed.cc



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CORE Education Series for 2016



Next year will be our company's last year to provide the CORE education series. We've had a blast over the years learning with our colleagues but it has come time to turn our weekend attention to other priorities. Our granddaughter (and her future siblings and cousins) will all be back in the Dallas area in 2017 and we don't want to miss a minute of their childhood. It has been said to not retire until you have something to retire to ... and we do. I will still be available to teach occasional private courses but will leave the bulk of post-professional education duties to many of my competent colleagues. I will still continue with my academic appointment at the University (for as long as they'll have me) - I just want to free up most of my weekends to devote to other interests. So, I hope you'll consider joining us in 2016 for the final CORE (clinical orthopedic residency education) series. If you'd like a comprehensive overview of orthopedic physical therapy (literally from head to toe) based on the APTA's definition of advanced specialty practice - this is the course for you. We've had over 40 individuals use this series as the backbone of their preparation for the orthopedic specialist exam. The exact weekend dates for next year are now available on our web site. I'll still be around - just spending more time on the job that I enjoy the most - being a grandpa. More information about the CORE education series is available at <http://continuing-ed.cc/residency-course>



Home Studies

Femoroacetabular Impingement Syndrome



Although hip injuries only represent about 5% of basketball injuries in the cited epidemiological studies, that incidence may rise as the studies that have established injury rates were published previous to a full understanding of femoroacetabular impingement problems. The first published article did not appear in the literature until 1999 and we're still in the infancy of understanding the prevalence and impact of this pathology. I recently provided a lecture at the TPTA annual conference on this injury and found a number of interesting trends. First, we have very little evidence on which to base our treatment decisions. Only case studies and case series are available to direct our intervention strategies. We do have a little more information on the diagnosis of the problem. At this time imaging findings are the best way to confirm (or rule in) the problem in the presence of an appropriate symptomatic presentation (unresolved groin pain that has a "mechanical" quality). We do have some special test that help rule out the problem (FABER/FADIR).

My experience has been that activity modification, capsular mobilization, and neuromuscular retraining of core musculature (particularly the gluteals) have been the most valuable treatment strategies.

We recently updated our web site to a new platform and have eliminated some of our old home studies and will be in the process of adding a number of additional new studies over the next year. The most recent edition is a 3 CCU-credit on the evidence-based management of femoroacetabular impingement syndrome. I believe it represents the current best practice strategies to govern your care. Over the next year I intend to add new home studies on the following topics. Greater Trochanteric Pain Syndrome, Tibiofibular Syndesmosis (High Ankle) Sprains, Shoulder Radiology, Principles of Rehabilitation for the Throwing Athlete, Post-Operative Management of Articular Cartilage Procedures of the Knee, Functional Testing for the Athletic Patient, Barefoot Running and Minimalist Shoes, Diagnostic Accuracy of Special Tests of the Shoulder, Hip, and Knee, Critical Inquiry and Research Methodology, and Evidence-Based Practice: Accessing and Using the Literature

If you'd like more information on our home studies they can be found at <http://continuing-ed.cc/home-study-order>. These are all TPTA approved and can be accessed free of charge. A post-test for CEU credit for a reasonable fee is also available.

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Foot-Ankle Anatomy	.3 CEUs
Knee Osteoarthritis	.2 CEUs
Achilles Tendinopathy	.2 CEUs
Lateral Ankle Instability	.2 CEUs
Plantar Fasciitis (undergoing updates)	.2 CEUs
Knee Meniscal Injuries	.2 CEUs
Femoroacetabular Impingement Syndrome	.3 CEUs
Principles of Joint Mobilization	.2 CEUs
Functional Anatomy of the Shoulder	.3 CEUs
Subacromial Impingement Syndrome (undergoing updates)	.2 CEUs
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