

## VOMPTI December End of Month Review

### **Nick**

Tilley BJ, Cook JL, Docking SI, Gaida JE. Is higher serum cholesterol associated with altered tendon structure or tendon pain? A systematic review. *Br J Sports Med.* 2015; 49:1504-1509.

Any article regarding tendon dysfunction with Jill Cook as an author is probably worth reading. In the opening literature review, the authors make several noteworthy points regarding characteristics of patients with tendon pain, some of which were new to me: 1/3 of cases involving tendon pain occur in inactive individuals, obesity and fat distribution have been associated with tendinopathy (even in non weight bearing tendons), and multiple studies have shown an association between elevated cholesterol and tendon rupture. The last association is what was examined and portrayed in greater detail and breadth in this systematic review and meta-analysis.

The authors explain in detail their methods for data and article collection, inclusion and exclusion criteria. 17 studies were included in the final analysis and it was determined that there in the area of interest there is moderate quality research.

Compared to controls, individuals with tendon pain had significantly higher total cholesterol, LDL-C, triglycerides, and lower HDL-C. Achilles tendon thickness (typically associated with tendon pathology) was greater in individuals with elevated total cholesterol and triglycerides. A high pain intensity was associated with both elevated triglycerides and lower HDL-C. In a secondary analysis, it was determined that there was an increased rate of Achilles tendon rupture in women taking statin medications.

The authors comment about several possible mechanism through which poor blood lipid profiles may contribute to tendon pathology. Cholesterol accumulates in tendons, potentially disrupting the collagen matrix. Elevated cholesterol levels in macrophages and mast cells also drives chronic low grade inflammation termed “para-inflammation.” An increase in mast cell and macrophage accumulation has recently been observed in individuals with tendon pain, support this hypothesis.

In conclusion, this article supports a potential metabolic mechanism for tendon pain and injury. As investigation into this relationship continues, patients should be adequately informed of this relationship and encouraged to participate in appropriate ways to improve metabolic health for the preservation of proper tendon structure and function.

### **Oksana**

Immediate combined effect of gastrocnemius stretching and sustained talocrural joint mobilization in individuals with limited ankle dorsiflexion: A randomized controlled trial. Min-

Hyeok Kang, Jae-Seop Oh, Oh-Yun Kwon, Jong-Hyuk Weon, Duk-Hyun An, Won-Gyu Yoo.  
Published online: April 2 2015

Everyone needs at least 10 degrees of dorsiflexion passive range of motion (PROM) when they walk. Limited ankle motion contributes to compensatory movements such as early heel-off, subtalar joint pronation and midtarsal joint dorsiflexion (DF). These compensatory movements contribute to a hypermobile midfoot leading to further injuries. One of the first solutions to increased ankle DF is a standing calf stretch. It was found that standing stretch with the knee extended increased ankle DF PROM due to the increased tolerance to stretching; however, there wasn't a difference in ankle DF when walking after stretching. There's more than just a simple standing calf stretch, the joint may have insufficient talocrural (ankle joint) motion. Studies have shown that ankle mobilizations fix the talus at the end-range of the posterior talor glide which facilitates better ankle motion when walking. Combining both a standing calf stretch and talar ankle glides have been found to improve ankle motion when walking.

This study has 24 male participants. Inclusion criteria includes volunteers with <10 degrees of DF knee extended, > 10 degrees of ankle DF PROM with the knee flexed, > 5 degrees in difference in ankle DF PROM between knee flexed and knee extended. Exclusion criteria includes: surgical histories in the lower extremity, fractures, neurological diseases and hip/ knee flexion contractures. Participants were arranged in combined stretching and joint mobilizations (n=11), stretching alone (n=11). Outcome measures included: time to heel-off and ankle DF before heel-off, ankle DF PROM with knee extended, posterior talar glide, and displacement of the muscular tendinous junction of the medial gastrocnemius. Limitations include a small sample size, a potential of increased force applied to the ankle for the combined joint mobilizations and stretching group, ankle DF PROM is assessed in non-weight bearing while gait is weight bearing, and immediate changes no lasting changes.

## **Laura**

### **Safety of Thrust Joint Manipulation in the Thoracic Spine: A Systematic Review**

Emilio J. Puentedura, William H. O'Grady

Journal of Manual and Manipulative Therapy. Sept 2015;13;154-61.

Puentedura and O'Grady have recently published a systematic review in the Journal of Manual and Manipulative Therapy on the current reports of adverse events to thrust joint manipulation (TJM) of the thoracic spine. The authors analyzed 10 case reports and case series from 1950 to 2015 that recorded adverse events following thoracic TJM. The adverse events recorded ranged from spinal cord injuries, pneumothorax/hemothorax, and dural sleeve injury resulting in cerebrospinal fluid leak. These injuries were accompanied by symptoms including progressive weakness/paraesthesia in the lower extremities, thoracic pain, nausea, SOB/dyspnea,

neck stiffness, headache, and photophobia. Practitioners involved ranged from chiropractors, an osteopathic physician, and a physical therapist and symptom onset ranges from hours to 2 weeks post application. Interestingly, all of the reports were published by physicians providing care after the adverse event. Therefore, insufficient information was provided in terms of indication and presence of contraindication/precautions. We are not aware of the background information and screening process that was performed prior to the technique and whether or not the adverse event resulted from clinician error or the underlying issues just could not be detected. This information would have been useful to see, however we are constrained to only making assumptions about each case.

In a letter to the editor of *Journal of Manual and Manipulative Therapy* in response to the systematic review, Roger Engel, Sybramanyam R. Velmulpad, and Paul Dougherty warn about the use of case reports as a measure of safety. Negating the use of a denominator in the data undervalues the clinical applicability of the evidence. Through individual case reports, we are unaware of the actual prevalence of these adverse events and therefore we cannot relate the actual frequency of adverse events to total number of TJM's performed. We can however know that there is a risk of adverse events after these techniques and regardless of the situation, clinicians must take a thorough patient history, use proper screening tools, apply clinical reasoning, and use the technique with great care and skill if appropriate.

The study included adverse events that had longer duration and more severity that are classified as distressing and unacceptable to the patient and requires further treatment. The authors also discuss transient side effects following TJM to the thoracic spine that have been recorded in the literature but were excluded from this study. These include increase in pain, headache, discomfort, and fatigue. There are several studies in the literature following mild side effects after TJM that are worthy of review to allow clinicians full understanding of the potential risks of a technique. For obvious reasons, any unwarranted side effect is undesirable to a clinician whether mild and transient or severe and longer-lasting. It's important to not only realize the risk of serious adverse events but also the risk of less serious, mild side effects to inform patients of all potential risks in addition to benefits.

As a novel physical therapist who is breaching into new realms of interventions and skills that I can apply into clinical practice, I appreciate the recent systematic review that has been written by Puentedura and O'Grady on the safety and risk of adverse effects by thrust joint manipulation to the thoracic spine. This commonly applied technique by physical therapists and other healthcare practitioners is useful and recommended for managing multiple pain generators including mechanical neck pain and shoulder pain. As stressed throughout training, the crucial keys with any thrust joint manipulation is the assessment, screen, and initial set up of the technique. Assessment of the patient to deem appropriateness of the technique and screen for contraindications and precautions is of the utmost importance to avoid any unwanted side effects and more serious adverse events. Proper set-up of the technique to allow the lowest amplitude force to minimize load to the spine is also essential for a safe and effective application.

## **Sean**

Prevalence of Associated Lesions in Anterior Cruciate Ligament Reconstruction

Correlation With Surgical Timing and With Patient Age, Sex, and Body Mass Index

Objective of this study was to analyze patients undergoing ACL reconstruction and their correlation with prevalence of meniscal and cartilage lesions and timing of surgery.

Inclusion criteria were diagnosis of ACL rupture only. Exclusion criteria were multiligamentous injury, previous ligamentous, meniscal, or cartilage surgery; or previous realignment surgery.

Sample size of 1069 patient's selected, 840 were athletes that ruptured their ACL during sports activity.

Results:

There was a significant increase in the risk of associated lesions for patients undergoing surgery >12 months after injury. The risk of a medial meniscal tear increased significantly if waiting time was >12 months; however, risk of lateral meniscal tears did not increase with timing off surgery. Medial femoral condyle injuries increased after 12 months as well. Interestingly, increasing age was associated with a reduction of lesions to the lateral meniscus as well.

This article gives us clinically relevant information that we can use for prognostic purposes and to have on our radar when we encounter patient's that fit this criteria.

<http://ajs.sagepub.com.cuhsl.creighton.edu/content/43/12/2966.full.pdf+html>

<http://www.ncbi.nlm.nih.gov.cuhsl.creighton.edu/pubmed/26473010>

## **Alex**

Wong YY, Smith RW, Koppenhaver S. Soft Tissue Mobilization to Resolve Chronic Pain and Dysfunction Associated With Postoperative Abdominal and Pelvic Adhesions: A Case Report. *J Orthop Sports Phys Ther.* 2015;45(12):1006-16.

**DOI:** 10.2519/jospt.2015.5766

Resident Article Review – Alex Bengtsson, DPT, CSCS

This case study looks at use of STM and IASTM in a pt with a history of chronic low abdominal and hip pain after multiple abdominal surgeries including 2 C-sections and several laparoscopic procedures. The current episode of pain started 1 year prior to PT eval, which led to

a laparoscopic adhesiolysis 2 months later and a 21-week PT treatment ending one week before IE by the author. The first PT treatment consisted of therex and hip flexor stretching, but no MT, incl, STM. The pt did not experience significant improvements in pain and fxn.

Evaluation:

- R low abd/ant hip pain and weakness; pain = superficial
- Primary fxn limitation: unable to run or do curl ups – active military, unable to pass physical readiness test (PRT); pt's demographic requirements for curl ups = 43 in 2' or less
- Dx by orthopedic surgeon: Iliopsoas tendinitis

Exam:

- Pain at rest=2/10, with fxn movement incl curl ups=7-8/10 (lift/carry/twist/abd exercises) – return to 2/10 after 1-2 minutes
- GROC = no change since prev PT IE
- L/S AROM WNL; reproduction of syx (pain) with R ROT
- Hip A/PROM = WNL, pain in all directions (R hip)
  - PAMs, special, provocative testing not performed due to pain
  - (+) Thomas test for hip FLX tightness and reproduction of syx
- Palpation
  - Mod-sev pain R LQ (med and sup to ASIS)
  - Mod-sev pain incisions inf to umbilicus
  - Sev scar hypomobility
  - Increased ST density
- Diff Dx List
  - Iliopsoas tendinitis/bursitis (-)
  - Hip jt dysfunction (-)
  - Mechanical LBP (-)
  - SIJ dysfunction (-)
  - Inguinal/abd hernia (-)
  - Intra-abd adhesions

POC (7 weeks, 10 sessions)

- STM, IASTM
- Therex, self-STM, stretching

Outcome

- 0/10 pain at rest and after 50 curl-ups
- Pain free L/S and hip ROM, WNL
- (-) special/provocative tests (hip)
- GROC = +6 (a great deal better)
- Long term: passed PRT 6 and 12 months after PT

## Discussion/Clinical Pearl

Despite the low level of evidence of case studies, this one is very interesting in the sense that the pt had received previous surgical and PT treatment without any significant improvement. The outcomes achieved in this study suggest the effectiveness of MT in a pt with chronic adhesions in regards to both pain and functional outcomes. What stands out is the change in functional pain free ability (50 curl ups) in just 10 sessions over 7 weeks, when the previous bout of PT consisted of 21 visits in 10 weeks without improvement. Furthermore, the MT appeared to be very pt specific in the study, which is highlighted in the videos posted online (<http://www.jospt.org/doi/suppl/10.2519/jospt.2015.5766>), suggesting a higher level of required clinical reasoning.