Research Review Service

Presents:
“The Top 20 Papers We Didn’t Review in 2010”

Prepared by:
Dr. Shawn Thistle

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Dear Colleagues,

Each year we publish ~70-80 reviews on Research Review Service summarizing and applying the results of research studies on a variety of manual-medicine topics published in top, peer-reviewed journals. We select and review research that is high quality, pertinent, timely or newsworthy...research that can update the way we treat our patients...research we should all know about. From clinical trials that compare treatment options to review papers that update the state of our knowledge on certain clinical conditions – we make research easy to understand and apply. Our subscribers have full access to new weekly content, as well as our database of existing reviews (~400 in early 2011). Our new reviews are now available as MP3 audio files so subscribers can get their research on the go!

We are also aware there are hundreds (even thousands?) of papers published each year that can positively affect our patient care and keep us current – unfortunately, we cannot possibly review them all. Recently, there has been so much great research published, I thought I would provide brief snapshots of an additional 20 papers that weren’t reviewed on RRS this year! And, it’s FREE!

What follows are brief summaries of these 20 papers, presented in no particular order. A wide variety of topics are covered here so I hope you find something you enjoy. Remember that our regular weekly reviews go into more depth, detail and analysis, as well as focusing our readers on the clinical applications of the studies we review. If you have not yet subscribed to our service, I invite you to visit our website to read some full sample reviews, browse our database of existing review titles, and watch a short video (located on the homepage) where I talk about why I started Research Review Service and what our service offers.

I hope you enjoy this information. Please share this with your colleagues and as always, feel free to contact me anytime if you have questions, suggestions or feedback about RRS.

Regards,

Dr. Shawn Thistle, Founder and President

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Study #1: Previous back injury and disc degeneration...


Summary: Disc degeneration is considered a primary source of low back pain, yet determinants of disc degeneration other than genotype have not been identified. One possible important determinant of disc degeneration that has undergone limited investigation is previous back injury. This study aimed to investigate the effect of injury on lumbar disc degeneration in monozygotic twins with discordant exposures to previous injury/trauma to the lumbar spine. The authors compared disc degeneration between 37 male monozygotic twin pairs with discordant exposures to recalled previous injury/trauma to the lumbar spine. Data on injury history were obtained through an extensive structured interview. Disc degeneration was assessed using quantitative measures of disc height and disc signal intensity on advanced imaging.

Results: Disc degeneration did not differ between twins who reported previous back injury and their uninjured twins. This finding was consistent for both disc height and disc signal intensity regardless of whether average scores or greatest difference at any one lumbar level was used in the analysis. There was also no evidence that a greater period since an injury resulted in greater twin differences in disc degeneration.

Comments: The current study suggests that back injury based on patient report is not an important predictor of future disc degeneration. In recent years, beliefs regarding the determinants of disc degeneration have changed dramatically. It was previously thought that the primary determinants of disc degeneration included age, gender, cigarette smoking, exposure to vehicular vibration and, in particular, occupational physical loading. More recently it has been demonstrated that most of these factors have, at most, a relatively minor influence on disc degeneration. In fact, routine loading may actually have some benefits for the lumbar discs in terms of slowing desiccation. Even though genetic factors seem to be the most consistent influence on disc degeneration, there is still much to be learned.
Study #2: Age and lumbar ROM…is there a relation?


Summary: This systematic review examined the evidence on the effect of age on lumbar range of motion (ROM) in healthy subjects. Illustrating this pattern in a healthy population can help us understand how our patients may differ based on their presenting complaints.

Results: Sixteen studies met inclusion criteria and were analyzed by the authors. These studies suggest that age-related reductions occur in flexion (more in males), extension and lateral flexion particularly from 40 to 50 and after 60 years of age. There was very little age effect on lumbar rotation. Overall, there is strong evidence for a non-linear age-related reduction in lumbar sagittal and coronal ROM after 40 years of age that also appears to be asymmetric in the coronal plane. These factors should be considered during the evaluation of spinal ROM in patients who present with lumbar disorders.

Comments: The results of this study remind clinicians to consider the age of their patients when assessing lumbar ROM, or using it as an outcome during the course of treatment. It should be noted that this study could not elucidate whether decreases in lumbar ROM are inevitable or irreversible, or make inferences on other biomechanical characteristics of the aging spine.

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Study #3: Migraine headache and neck ROM in women


Summary: The aim of this study was to contrast the cervical range of motion (CROM) in women with episodic migraine (EM), transformed migraine (TM), and migraine-free controls (45 total subjects, 15 in each group). It is well known that migraineurs often complain about neck pain, and that individuals with neck pain usually have reduced CROM. Furthermore, neck problems can worsen headaches in individuals with migraine. To date, there is little research assessing CROM in migraineurs.

Results: Compared with controls, individuals with TM had lower CROM values in all parameters, and significant reduction in extension, left lateral flexion and right rotation. Compared with individuals with migraine, the TM group presented significantly reduced mobility only for extension. Migraineurs also had reduced ROM, contrasted to controls, in 5 of the 6 parameters, although significance was seen just for right rotation. There was no correlation between cervical mobility and migraine parameters. The CROM was not reduced for the symptomatic side of migraine, in cases of unilateral pain.

Comments: Although this was a small study, the results suggest that women with episodic or transformed migraine have reduced cervical ROM compared to controls. Since many migraine patients also report neck pain, and a common goal of manual therapists is to restore 'normal' ROM, future research will hopefully examine if there is cause and effect relationship between ROM and migraine that we could positively influence with treatment.

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Study #4: Orthopedic surgeons’ attitudes toward chiropractic


Summary: The goal of this study was to determine the nature of opinions held by orthopedic surgeons toward chiropractic. A 43-item questionnaire was sent to 1000 surgeons in Canada and the US. A response rate of 49% (n=487) was achieved, and the following trends emerged in their responses:

- North American orthopedic surgeons’ attitudes toward chiropractic were diverse.
- 44.5% of respondents endorsed a negative impression, 29.4% held favorable views, and 26.1% were neutral
- Approximately half of respondents referred patients for chiropractic care each year, mainly due to patient request
- The majority of surgeons believed that chiropractors provide effective therapy for some musculoskeletal complaints (81.8%), but disagreed that chiropractors could provide effective relief for non-musculoskeletal conditions (89.5%)
- The majority endorsed that chiropractors provide unnecessary treatment (72.7%), engage in overly-aggressive marketing (63.1%) and breed dependency in patients on short-term symptomatic relief (52.3%)

Comments: This study shed some light onto a relationship that, until this point, has been described with pure speculation or anecdote. The results certainly reveal that surgeons perceive some shortcomings of chiropractic – namely over-treating and making claims about non-musculoskeletal conditions. The profession should aim to improve on these perceptions, and individual practitioners can bear the results of this study in mind when communicating with orthopedic surgeons in their communities.

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Study #5: Glucosamine for lumbar OA and chronic LBP?


Summary: This double-blind, randomized, placebo-controlled trial aimed to investigate the effectiveness of glucosamine (1500mg/day) for pain and disability in patients with chronic low back pain and confirmed degenerative lumbar osteoarthritis. 250 patients were studied – glucosamine was administered for 6 months and follow-ups were performed at 6 months and 1 year.

Results: Among patients with chronic LBP and degenerative lumbar OA, 6-month treatment with oral glucosamine compared with placebo did not result in reduced pain-related disability after the 6-month intervention and after 1-year follow-up.

Comments: The literature to date on glucosamine has been quite variable, with most studies looking at knee and hip arthritis. Although some might argue that 6 months is not long enough as a dosing period, the results of this study are not promising to say the least. There was essentially no difference between the glucosamine and placebo groups after the 6 month treatment period or 6 months after that. For now, glucosamine cannot be recommended with confidence for chronic low back pain with associated lumbar arthritis.

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Study #6: Inciting events in lumbar disc herniation


Summary: To date, no study has investigated the frequency of patient-identified inciting events in lumbar disc herniation (LDH), or their clinical significance. Therefore, the aim of this study was to examine the clinical frequency of patient-identified inciting events in LDH, and to identify associations between the presence of inciting events and the severity of the clinical presentation. The study was conducted as a cross-sectional analysis of data from a cohort study with prospective recruitment, with retrospective data collection on inciting events. One hundred fifty-four adults with lumbosacral radicular pain and LDH confirmed by magnetic resonance imaging were analyzed.

Results: In this study sample, 62% of LDH did not have a specific patient-identified event associated with symptom onset. When there was an inciting event reported, the most common were non-lifting activities, comprising 26% of all LDH. Heavy lifting (6.5%), light lifting (2%), non-exertional occurrences (2%), and physical trauma (1.3%) accounted for relatively small proportions of all LDH. Overall, patient-identified inciting events were not significantly associated with a more severe clinical presentation in crude analyses.

Comments: The results of this study can help guide clinicians as we deal with patients with LDH. It is apparent that many cases of LDH can occur without a specific inciting event. Further, even if an event is reported, this does not seem to correlate well with the severity of the clinical presentation. This supports the concept that disc degeneration and damage leading to overt herniation occurs over time, as a culmination of repeated faulty loading and disc nutrition. Repetitive microtrauma can lead to overt tissue failure even during a task that would seem insufficient to the patient. If a patient believes that a particular strenuous activity either triggered their disc herniation or caused their injury to be more severe, they may be less inclined to comply with treatment recommendations when these involve increased activity or exercise. Communicating in an evidence-informed manner with your patients can help avoid such confusion.
Study #7: IFC for musculoskeletal pain


Summary: Interferential current (IFC) is widely used in clinical practice, despite a general lack of experimental support. Put simply, its clinical efficacy is debatable. The aim of this systematic review and meta-analysis was to analyze the available information regarding the efficacy of IFC in the management of musculoskeletal pain.

Results: Twenty studies fulfilled the inclusion criteria and were analyzed. Seven articles assessed the use of IFC on joint pain; 9 articles evaluated the use of IFC on muscle pain; 3 articles evaluated its use on soft tissue shoulder pain; and 1 article examined its use on postoperative pain. Only 3 of the 20 studies were considered to be of high methodological quality. Studies to date reveal that IFC, when utilized as a supplement to another intervention seems to be more effective for reducing pain than a control treatment at discharge and more effective than a placebo treatment at the 3-month follow-up. However, it is unknown whether the analgesic effect of IFC is superior to that of the concomitant interventions. Further, IFC alone was not significantly better than placebo or other therapy at discharge or follow-up. The authors note that these results must be considered with caution due to the low number of studies that used IFC alone. In addition, the heterogeneity across studies and methodological limitations prevent conclusive statements regarding analgesic efficacy.

Comments: Although the results of this study may not sound very supportive of IFC, it should be noted that only 4 studies to date have evaluated IFC as a stand-alone treatment – each having significant methodological limitations. Having said that, IFC is typically used in conjunction with other therapies, where it appears, at best, to have an additive effect for pain relief (this is what the current literature reflects). Further research is warranted in this area.

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Study #8: Gait alterations in FAI


Summary: Femoroacetabular impingement (FAI) is a morphological hip condition which consists of two main variations:

1) **Pincer impingement**: local or general over-coverage of the femoral head by the acetabulum;

2) **Cam impingement**: decreased concavity of the femoral head–neck junction most commonly in the anterosuperior region

FAI is thought to be associated with early degenerative changes and acetabular labral lesions. It has been reported to cause hip pain in a variety of daily activities including walking. However, the biomechanics of level gait has not been compared between FAI patients and a control group. This study quantified the affect of cam FAI on the three-dimensional kinematics of the hip and pelvis, as well as the 3-D kinetics generated at the hip during walking.

Results: The FAI group had significantly lower peak hip abduction, frontal range of motion (ROM), as well as attenuated pelvic frontal ROM (pelvic roll) compared to the controls during level gait. There was also a trend of the impinged group having a lower sagittal ROM than the controls. However, there were no kinetic differences between the two groups.

Comments: This is the first quantitative study performed on this topic. The results suggest that the decreased hip abduction observed during gait in FAI patients is unrelated to restricted mobility and may be a result of a more complicated compensatory strategy. We could speculate that it is a hip joint stabilization strategy adopted by these patients to compensate for a deficiency in hip musculature functionality (similar changes are observed in patients who have undergone hip replacement). FAI patients also exhibited less hip extension, which could likely be attributed to soft tissue restriction, since soft tissues are the primary restraint to that range of motion. The observed changes may represent strategies adopted by FAI patients to reduce hip pain from prolonged walking. This indicates that there is likely an important soft tissue component to FAI and that it may even involve multiple joints such as the sacro-lumbar joint. If soft tissue does play a role in FAI, it may affect potential manual medicine interventions, and even post-surgical treatment and rehabilitation. These findings may point towards new treatment strategies focusing on adjacent joints such as the lumbosacral spine, and open up multiple avenues for future research.

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Study #9: DNA test to predict progression in scoliosis?


Summary: Adolescent idiopathic scoliosis (AIS) is a common spinal deformity affecting 2% to 4% of the adolescent population. Scoliosis can develop because of a variety of neuromuscular conditions and occurs as a feature in several dozen syndromes. However, the idiopathic, developmental form of scoliosis accounts for 80% of pediatric scoliosis cases. AIS is defined by a lateral spinal curvature of > 10°, without a known cause, and is diagnosed between age 10 and skeletal maturity. AIS affects females and males in nearly a 1:1 ratio; however, progression to a severe deformity occurs more often in females. In patients with curves > 25°, roughly 10-15% will experience progression. From a management perspective it is important to identify these patients. Traditionally, once a scoliotic curve is identified, patients are monitored via sequential radiographic examination to monitor for and attempt to predict progression since clinical factors are not predictive. This is costly to the health care system and exposes the patient to large doses of radiation.

The goals of this study were to develop and test a prognostic DNA test for adolescent idiopathic scoliosis (AIS) and to establish clinically meaningful endpoints for the test.

Results:
- Low-risk scores (< 41 – maximum score = 200) had negative predictive values of 100%, 99%, and 97%, respectively, in the tested populations.
- In the risk model, the authors used cutoff scores of 50 and 180 to identify 75% of patients as low-risk (<1% risk of progressing to a surgical curve), 24% as intermediate risk, and 1% as high-risk.

Comments: Most patients with AIS are monitored as if they have a progressive curve, despite the fact that only 3-4% of those diagnosed with mild scoliosis will develop a severe curve. For each patient who eventually undergoes surgical treatment for a progressive curve, there are many more undergoing unnecessary medical and radiographic surveillance throughout adolescence. As a result, many patients with mild AIS are repeatedly exposed to potentially harmful torso radiographs.

The DNA test used in this study incorporates genotypes for 53 DNA markers and the patient’s presenting Cobb angle. The results are promising (a score under of 1 to 41 had a negative predictive value of 99%), but further studies are required to validate this before it is incorporated fully into clinical practice.
Study #10: Pain & the brain in low back pain patients… developing our understanding of chronicity


Summary:
Existing functional neuroimaging research has shown that chronic low back pain (CLBP) is associated with plastic, pathophysiological changes in the brain, such as a progressive decrease in the gray matter volume of the thalamus and the prefrontal cortex, exaggerated cerebral activation to pain and decreased blood flow in the contralateral thalamus.

The goal of this study was to characterize the cerebral substrates of CLBP, and to explore a possible pathologic pattern of cerebral activation in CLBP patients. This was done by comparing functional MRI scans of asymptomatic patients with CLBP patients.

Results:
- Patients with chronic low back pain showed increased tenderness at the lower back, higher aversive reaction to pain, and augmented low back pain-related cerebral activation
- Activation was observed at the prefrontal, insular, posterior cingulate cortices (PCC), supplementary motor, and premotor areas predominantly in the right hemisphere, but not at the somatosensory cortices in CLBP patients
- LBP patients also showed augmented activation compared with healthy volunteers specifically at the right insula, supplementary motor, and PCC

Comments: Essentially, the low back pain-related activation is characterized by the absence of sensory-discriminative component and the involvement of posterior cingulated cortex. The results of this study tie in nicely with the reviews we posted in 2010 on CENTRAL SENSITIZATION and NEURAL PLASTICITY – two contemporary concepts that are helping us further understand the mechanisms of chronic pain, as well as the most effective methods for treating these patients clinically.

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Study #11: Trunk reflexes in functional ankle instability


Summary: Ankle injuries are extremely common. Clinicians should be concerned that that approximately 40%–75% of individuals who experience an ankle sprain will have ongoing symptoms such as pain or instability. Further, there is evidence to suggest that dysfunction at the ankle joint may be associated more proximal adaptations, which in some cases may predispose individuals to developing low back pain. Repetitive ankle injury can result in both anatomical and functional instability of the ankle. The relationship of such instability to lumbopelvic function has not been extensively studied. Therefore, this study compared trunk and ankle stability measures in subjects with and without functional ankle instability (referred to as FAI below).

Results:
- FAI subjects perceived higher disability in their ankle but had similar reported low back disability as controls
- Although vertical jump heights were similar, time to stabilization was significantly higher in injured ankles compared to non-injured ankles and controls
- Trunk muscle testing revealed significantly delayed reflex times in both flexion and extension in FAI patients

Comments: Although this study could not establish cause and effect between ankle instability and low back/trunk muscle dysfunction – the results do suggest that patients with chronic ankle injuries and instability may display movement and motor control deficiencies at more proximal locations. The authors referred to this as “proximal nervous system adaptations associated with FAI”. Prudent clinicians should bear this in mind and investigate for ankle instability when the ankle is the chief area of complaint, and even in patients with more proximal conditions.

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Study #12: Injection & denervation for chronic LBP

Publication Information:  

Summary:  
Injection therapy and denervation procedures are commonly utilized in the management of chronic low-back pain (LBP) despite uncertainty regarding their effectiveness and safety. Briefly, injection therapy for chronic LBP involves injections of medications, irritants, or proteolytic enzymes into soft tissues outside or within the spine. Denervation procedures involve the application of various types of thermal or radiofrequency energy within the spine. The authors conducted a systematic review of the literature on these interventions.

Results:  
In total, 27 randomized trials were included: 14 on injection therapy and 13 on denervation procedures. 18 (66%) of the studies were determined to have a low risk of bias. Due to the clinical heterogeneity, only two comparisons could be pooled statistically. Overall, there is only low to very low quality evidence to support the use of injection therapy and denervation procedures over placebo or other treatments for patients with chronic LBP. It cannot be ruled out that in carefully selected sub-groups of patients, such as those with a positive response to discography or local anaesthetic nerve block, certain interventional therapies may be of some benefit. As always, the potential benefits must be weighed against possible adverse effects when deciding whether to provide injection therapy or denervation to chronic LBP patients. Unfortunately, the literature to date cannot specifically guide us on this issue.

Comments:  
The results of this study are somewhat disappointing considering the frequency with which these treatments are employed, often before more conservative methods are attempted. Manual medicine practitioners can refer to this sort of evidence if patients ask them about these treatment options while keeping in mind that in most cases, these treatments are outside of our scope of practice (therefore we should be cautious when providing advice and refer when appropriate).

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Study #13: Preventing ankle sprains...


Summary: Ankle sprains are very common. The high incidence of this injury comes with associated economic burden and the potential for negative chronic consequences including disability, physical inactivity and premature joint degeneration. There is a need for preventive measures. Prophylactic taping, braces, specially designed shoes and neuromuscular training (i.e. proprioceptive exercises and balance/coordination training) have been postulated as preventive measures against ankle sprains. Multiple reports have been published in which the effects of each of these preventive measures have been studied. This study summarized the literature on prevention of lateral ankle sprains.

Results: 24 relevant trials were included in the review. Taken together their results suggest that taping, bracing and neuromuscular training were all effective for the prevention of ankle sprain recurrences. The effectiveness of these prophylactic interventions was similar in magnitude when compared with control groups across the studies reviewed by the authors. We should bear in mind that although preventive effects have been reported in a general athletic population, the evidence suggests this overall effect is due to a strong preventive effect in previously injured athletes and that any effect on fresh ankle sprains is either non-existent or very low.

Comments: This study reminds us that we have a role to play in the prevention of subsequent lateral ankle sprains in those who have sustained an injury. This can be achieved through taping, bracing, or a variety of proprioceptive and balance training methods. Our care of these patients should not stop once the pain has subsided. Be proactive and integrate active and supportive measures to prevent recurrence.

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Study #14: Changes in flexion/extension loading patterns in patients with low back pain...


Summary: Range of motion (ROM) is a common component of most clinical evaluations for back pain, and forward and backward bending are crucial aspects of many activities of daily living. Often, clinical examiners only focus on the maximum ROM value and give little thought to the loading patterns throughout the motions. This study sought to investigate the effects of back pain, with and without a positive straight leg raise (SLR) sign, on the loading patterns in the lumbar spine and hip during forward and backward bending.

Results: Electrokinematic sensors and force plates were used to measure forces during 3 consecutive forward/backward bending cycles in controls, LBP and LBP + sciatica patients. Although the loading on the lumbar spine at the end of the range decreased significantly, the loading at the early and middle ranges of forward bending actually increased significantly in people with back pain, especially in those with a positive SLR sign (the sciatica group). This suggests that resistance to movement is significantly increased in people with back pain during this motion.

Comments: Clinicians should be mindful of the forces involved throughout the entire movement when assessing range of motion in the lumbar spine. This study suggests that those with back pain, particularly those with sciatica, experience altered loading patterns during flexion and extension. Even though the available ROM is less, the loading forces may be increased. Researchers should also keep this in mind when studying movement forces and patterns in spinal research. Sometimes the quality of the motion matters just as much as the quantity!
Study #15: Predictors of long-term pain in whiplash...


Summary: Whiplash following a motor vehicle collision can result in significant physical trauma, disability, time off work, financial consequences, health care expenditure and so on. The impact is widespread on many levels. The purpose of this review and meta-analysis was to statistically synthesize the findings from a homogenous subset of prognostic studies to determine potential predictors of persistent whiplash-related pain or disability, when collected within the first 3 weeks following injury (that is, factors that clinicians can readily assess early in treatment).

Results: The results of this study are in agreement with two previous narrative reviews on the topic. The strongest predictor of ongoing problems after whiplash is a rating of high neck pain intensity at intake (defined as greater than 55/100 on a Visual Analog Scale). This study builds on this previous work by indicating the extent of this risk to be nearly a 6-fold increase in the level of risk of ongoing pain or disability. In contrast to the 2 previous narrative reviews, the authors were able to identify 8 additional significant risk factors for persistent problems using a statistical-pooling technique. These include demographic variables (no postsecondary education, female gender) and variables pertaining to initial signs and symptoms (presence of headache or neck pain, previous history of neck pain, catastrophizing, WAD grade). The only collision-related variable to show any predictive value when captured within 3 weeks of the collision is the non-use of a seat belt (however, it should be noted that this was a weaker finding).

Comments: When assessing and initiating management in patients who have experienced a whiplash injury, clinicians should question patients about the factors listed above in order to gain appropriate, evidence-informed insight into the patient’s prognosis.

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Study #16: Addressing rounded shoulder posture…


Summary: Despite the amount of time most of us spend assessing and discussing posture with our patients, there is a general paucity of literature on posture and how we can change it with manual therapy. This is due in large part to the fact that this relationship is difficult to study and measure reliably. This was an interesting, albeit small, randomized trial that investigated the effectiveness of pectoralis minor soft tissue mobilization, strengthening and stretching on rounded shoulder posture (RSP) and lower trapezius strength. Myofascial tightness of the pectoralis minor and weakness or inhibition of the lower trapezius have all been suggested to contribute to rounded shoulder posture (RSP).

In this study, 28 healthy patients with RSP (measured as > 2.5cm distance from the examining table to the posterior AC joint with the patient supine) were treated using a specific soft tissue mobilization technique and a series of stretches and exercises. The control group received placebo touch and some stretching.

Results: To summarize quickly, the treatment group experienced a significant reduction in RSP that was maintained 2 weeks after a single treatment session!

Comments: This study had some flaws and obviously requires replication in larger studies that address some of the shortcomings of this study, but the results do suggest that manual medicine providers should address myofascial tightness in the pectoralis minor and continue to employ self-management strategies including stretching for patients with rounded shoulder posture (or even general postural strain)…further research is certainly required and it would be interesting to include some manipulation or mobilization into a future study to see if that would also help.

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Study #17: Foot orthotics for plantar fasciitis…


Summary: Plantar fasciitis (PF) is a chronic injury which causes pain and inflammation at the origin of the plantar fascia on the plantar surface of the heel. PF is frequently seen in athletic populations (including military recruits and runners) but it is also commonly seen in sedentary patients.

Foot orthotics are commonly prescribed for PF. The purpose of this meta-analysis was to examine the short, intermediate and long-term effects of orthoses on measures of self-reported pain and function in patients with PF. Only randomized control trials and prospective cohort studies were included.

Results: The results of this review indicate that foot orthoses decrease pain and improve foot function in patients with PF, regardless of the specific type of orthotic used (studies included magnetic, non-magnetic, accommodative, functional and custom made orthoses, etc.). An interesting finding was that pain and function outcomes decrease slightly between 6 and 12 weeks compared to less than 6 weeks. This might be due to reduced durability of the orthoses which may decrease motion control. The authors recommend a thorough biomechanical analysis of the foot at regular intervals after orthosis implementation to accurately understand this potential result. It should be noted that there are several limitations of the studies included in this review. The quality of selected studies was not overly high (the average PEDro score of selected studies was only 6.2 out of 10). The main drawback of most studies concerned treatment allocation…although it was mostly concealed, subjects in these studies cannot be blinded because they always have to wear orthoses.

Comments: From a clinical perspective, prudent clinicians may want to suggest foot orthotics as an adjunctive or primary intervention for patients with plantar fasciitis. From a financial perspective, we should also begin with the least expensive option (normally off-the-shelf) before progressing to more expensive options like custom orthotics. Most of the literature to date on orthotics does suggest that the type of orthotic utilized is not terribly important – that is, there doesn’t seem to be an advantage to using custom orthotics versus other options. This is not to say that some patients may benefit from them – just a general trend that you should keep in mind while serving the financial interest of your patients.
Study #18: Leg length inequality and knee osteoarthritis


Summary: Leg length inequality (LLI) is common (cited to occur in up to 70% of people) and it has been suggested that its presence may be associated with osteoarthritis (OA) of the knee – one of the most common and potentially debilitating conditions we face.

This prospective cohort study included over 3000 patients, and aimed to evaluate the nature of the relationship between LLI and knee OA.

Results: The abstract summarizes the results nicely: “Compared with leg-length inequality less than 1 cm, LLI of 1 cm or more was associated with prevalent radiographic (53% vs. 36%; odds ratio [OR], 1.9 [95% CI, 1.5 to 2.4]) and symptomatic (30% vs. 17%; OR, 2.0 [CI, 1.6 to 2.6]) osteoarthritis in the shorter leg, incident symptomatic osteoarthritis in the shorter leg (15% vs. 9%; OR, 1.7 [CI, 1.2 to 2.4]) and the longer leg (13% vs. 9%; OR, 1.5 [CI, 1.0 to 2.1]), and increased odds of progressive osteoarthritis in the shorter leg (29% vs. 24%; OR, 1.3 [CI, 1.0 to 1.7]).”

Comments: To my knowledge, this is the first longitudinal evaluation of LLI and radiographic knee OA performed on a large cohort. The authors observed a LLI of 1 cm or greater in 14.5% of the participants at baseline, and this was significantly associated with prevalent radiographic and symptomatic osteoarthritis at base-line and predicted incident symptomatic knee osteoarthritis 30 months later. Furthermore, in knees with radiographic OA at baseline, shorter legs were at high risk for radiographic progression. These results suggest clinicians may want to evaluate for LLI in at risk patients as inequality may be an important risk factor for knee osteoarthritis.

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Study #19: Respiratory Dysfunction in Neck Pain…


Summary: A link between respiratory function, posture and neck pain has long been proposed by manual medicine providers. Many function-based practitioners spend a great deal of time assessing and addressing breathing patterns in patients with a variety of musculoskeletal complaints. To date, there is not a lot of clinical data on this association. The aim of this pilot study was to investigate the hypothesis that patients presenting with chronic neck pain could have a predisposition towards respiratory dysfunction. Twelve patients with chronic neck pain and 12 matched controls participated in this study. Spirometric values, maximal static pressures, forward head posture and functional tests were examined in all subjects.

Results: Chronic neck patients presented with a statistically significant decreased maximal voluntary ventilation and respiratory muscle strength. Further, there was a strong association between increased forward head posture and decreased respiratory muscle strength in neck patients. These findings seem to support the hypothesis that a common disorder like chronic neck pain can present with problems beyond the musculoskeletal system.

Comments: This study was small and preliminary, but the results were certainly suggestive of a potential relationship between respiratory function, posture and neck pain. Of course, a cause and effect relationship cannot be established from this sort of evidence, but further research is certainly warranted to explore this association and investigate various treatment and intervention options for manual medicine providers. The connection of neck pain and respiratory function could be an important consideration in relation to patient assessment, rehabilitation and consumption of pharmacological agents.

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Study #20: Facet joint adhesions after immobility?


Summary: One theoretical mechanism of putative biomechanical/anatomical beneficial effects of spinal manipulation is that facet joints become hypomobile for a variety of reasons (ex. sedentary lifestyle, repetitive occupation related activities, etc). The hypomobility can result in the development of intra-articular adhesions and degenerative changes in the facets. Spinal manipulation, or adjusting, is thought to gap facet joints and break up these adhesions, which is thought to slow the degenerative processes in the hypomobile joints. Adhesions have been previously identified in many hypomobile joints, but not in the facet joints of the spine. Therefore the objective of this study was to determine if connective tissue adhesions developed in lumbar facet joints after induced intervertebral hypomobility (segmental fixation). The authors used an established rat model in which 3 contiguous segments (L4, L5, L6) were fixed with specially engineered, surgically implanted, vertebral fixation devices. Facet joints of experimental rats (17 rats, 64 facet joints) with 4, 8, 12, or 16 weeks of induced hypomobility were compared with joints of age-matched control rats (23 rats, 86 joints).

Results: Small and medium adhesions were found in rats from all study groups. However, large adhesions were found only in rats with 8, 12, or 16 weeks of experimentally induced intervertebral hypomobility. Significant differences among study groups were found for small, medium and large adhesions. The average number of medium and large adhesions per joint increased with the length of experimentally induced hypomobility in rats with 8 and 16 weeks of induced hypomobility.

Comments: This study produced some interesting results but readers should keep some important limitations in mind: 1) This was done in an animal model only; and 2) complete immobility, as induced in this study, does not represent normal spinal loads, even in very sedentary humans.

These findings are consistent with the hypothesis that joint hypomobility leads to increased adhesion development. The results of this study are also consistent with previously reported findings. Additional research is needed to determine the clinical significance of both adhesion size and the effects of spinal manipulation on facet joints. The authors mention that experiments assessing the effects of standardized high velocity, low-amplitude thrusts and low-velocity, variable amplitude mobilizations on degenerative changes of the facet joints in this animal model are currently underway.
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