PHYSIO NETWORK
TRANSLATING RESEARCH INTO PRACTICE

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AUTHORS

We are very pleased to have twelve authors in this issue of Physio Network:
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Author: Dr Bronwyn Thompson

Quiz Answers

Click for audio reviews!
Sandy graduated from Pacific University (Oregon) in 1988 with a Master of Science in Physical Therapy and a Doctor of Physical Therapy degree from Des Moines University in December 2013. She has worked in multiple settings across the US with a neurologic and orthopedic emphasis including a focus in pelvic rehabilitation for pain and dysfunction. Sandy teaches and speaks internationally on the treatment of pelvic pain, and the application of pain science into clinical practice.

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Dr. Fiona Wilson is a Chartered Physiotherapist and Associate Professor in the School of Medicine, Trinity College Dublin. She has 30 years postgraduate experience and has worked in practice in the UK, South Africa and Ireland. She practices clinically specializing in exercise approaches to management. She has worked with elite and international athletes throughout her career and was Lead Physiotherapist for Rowing Ireland for 10 years. She has published and presented widely in the area of sports and exercise including a book examining the role of exercise in musculoskeletal disorders.

Sam is the owner of The Strength Therapist & Co-owner of Citizen Athletics. He works with primarily strength athletes and people pursuing their fitness dreams. Additionally, he focuses on educating clinicians and the public at large on health literacy.

Dr. Teddy Willsey is a sports medicine focused physical therapist and private practice owner in Rockville, Maryland. Teddy has an interest in working with high level athletes and return to sport rehab. In addition to practicing PT, Teddy speaks and teaches publicly, writes and blogs regularly, and posts on social media daily. He can be found on Instagram at @strengthcoachtherapy or online at www.teddywillsey.com.

Todd Hargrove is a Certified Feldenkrais practitioner, Certified Rolfer, and author. Todd graduated from Hamilton College in 1990 with a B.A. in Economics, and from the University of Washington School of Law in 1995 with a J.D. While working as an attorney, Todd developed chronic neck and back pain, but eliminated it through self-education, lifestyle change and exercise. Since 2008, he has written a blog at BetterMovement.org, which focuses on applying a modern understanding of pain science and neuroscience to movement-based therapies.
Mariana Wingood is a full time clinician and part-time educator. She is an active member of the Vermont Falls Coalition, Gerontology Society of America, and Academy of Geriatrics. Mariana’s focus is on fall prevention and exercise prescription for older adults. She has presented at a state, national conferences, and international level.

Linda Truong is a physical therapist and PhD student at the University of Alberta, Canada. She has a special interest in ACL injuries. Linda currently works at the Glen Sather Sports Medicine Clinic as the lead physical therapist for the multidisciplinary knee team. Her research focuses on understanding the impact of non-physical needs (e.g. psychosocial) on recovery after sustaining an injury.

Robin Kerr is an Australian trained physiotherapist with 33 years of clinical experience. Her special interests lay in pelvic floor and lumbo-pelvic dysfunction. She is heavily trained in biomechanics and gait lab running analysis, however over the last 20 years has moved towards a focus on motion and the BPS model in the management of persistent pain. You can find more about Robin and her team here www.alchemyinmotion.com.au

Bronwyn Lennox Thompson initially trained as an occupational therapist, graduating from CIT in 1984. She later completed her MSc in Psychology in 1999 at Canterbury University, and in 2015 was awarded her PhD from the Department of Health Sciences at the University of Canterbury, Christchurch, New Zealand. She has worked in pain management for most of her clinical career, with her primary focus on pain management at work. She has practiced in interdisciplinary pain management programmes, private practice, case management both for private organizations, and ACC, primary prevention and secondary prevention, and since 2002, teaching postgraduate papers in pain and pain management at Otago University. To find out more about Bronwyn visit www.healthskillz.co.nz
+ **VIEWPOINT:** IS IT TIME TO REFRAME HOW WE CARE FOR PEOPLE WITH NON-TRAUMATIC MUSCULOSKELETAL PAIN?

**DR SANDY HILTON**

**SUMMARY OF VIEWPOINT**

Explanations for non-traumatic pain fail to explain the individual’s pain experience. Lewis and O’Sullivan propose that this insufficiency results in two main concerns that need to be addressed in order to improve care.

*Imaging can misinterpret normal variation.*

Scans showing structural changes are often taken as proof that the condition of the structure as seen on the image is the reason for the pain felt by the individual. This error persists despite 25 years of a growing body of evidence showing degenerative changes in asymptomatic individuals. The negative health implication of this misunderstanding of normal human variability is that people are led to believe that the imaging shows damage in need of treatment. The resultant evolution of options for repair, replacement, and removal has supported an unfortunate and unhelpful trend of increases in elective surgery, treatments, avoidance of normal activity, and a belief of fragility. The evidence around many of these procedures does not support their continued use.

*Clinical interventions have been developed to treat conditions that may not exist.*

Designing a treatment pathway aimed to correct normal variance preserves the assumption of frailty. Examples include trigger points, postural alignment in the trunk, ribs, sacrum, spine, feet, and even in the internal organs. Treatment paradigms promote certifications and specializations in correcting conditions that are not readily detected or have been shown to be not reproducible (palpation of alignment, identification of trigger points, etc).

Together these two trends promote a cycle of biomechanical assessment and correction to a supposed normal. This promotes a passive “fix-it” structure through advertising campaigns and procedures, which are done to a patient to correct the dysfunction. The authors point out that these terms and treatments “almost certainly originated from health professionals”. This puts the burden of changing the paradigm to a more health-promoting structure on health professionals to upskill themselves on evidence and explanations.

Lewis and O’Sullivan propose treating non-traumatic musculoskeletal pain in the same framework as for other long-term disabilities such as diabetes. The focus is on designing a comprehensive plan to control the impact of the disorder. This includes reasoned education and advice through a collaborative process. Designing such an approach requires the clinician to reframe care to include exercise, education, lifestyle (sleep, diet, stress management, etc), as well as address the contribution of the social determinants of health.
The health benefit of turning away from the “fix-it” paradigm is the elimination of expectation of a magic treatment to “cure” a condition. Risks and benefits of passive treatments must be clearly communicated. How hard is it to make this change? Lewis and O’Sullivan highlight some of the obstacles for clinicians – pain beliefs, professional identity, organizational support, and certainly peer pressures. There are also patient expectations to consider and it is not easy to convince a person who has been told by trusted providers that their “______ is out of alignment and must be put back” that they can instead learn to live well and pursue the activities they love without constant fear of coming “out” or needing to be “put back in”. Some providers have spent their career successfully advertising as specialists able to feel what others have missed. Changing that paradigm will not be easy.

My view is that this change for better health care won’t happen easily. Individual clinicians can change their words and practice patterns. Professional organizations can support the evidence through rigorous screening of topics at conferences and through care in accepting advertisements in journals and exhibit halls. Motivated clinicians need the support of professional organizations in speaking up for the evidence and against things that have been shown to not hold up to their claims. Sticky tape (by any name) is a timely example of a popular treatment that has been shown to not perform as claimed. Will there be advertisements for it in the same journals that publish the research showing the lack of effect? Will it be in exhibit halls?

Changing the way we treat musculoskeletal pain is needed. In this review Lewis and O’Sullivan wrote a lovely summary of the ways to reframe the treatment of non-traumatic musculoskeletal pain and make better clinical choices that are best for health care in general, and for the individual dealing with pain.

“The health benefit of turning away from the ‘fix-it’ paradigm is the elimination of expectation of a magic treatment to ‘cure’ a condition.”

THE ATHLETIC SHOULDER (ASH) TEST: RELIABILITY OF A NOVEL UPPER BODY ISOMETRIC STRENGTH TEST IN ELITE RUGBY PLAYERS

SAM BLANCHARD

BACKGROUND & OBJECTIVE:
In elite sport, measurements of lower limb isometric strength are used to monitor and track force production with minimal influence of sporting ability. The options available to monitor upper limb neuromuscular fatigue until now have been limited to isokinetic dynamometers or hand-held dynamometers. One comes with a time cost to large squads and the other may be limited with force production over 30kg, which is typical for elite rugby athletes. The ability to produce force in the upper limb may be linked to injury incidence involved in long lever mechanics such as a straight arm tackling or repeated tackling efforts under fatigue. This novel study investigated the methodology of a three position isometric test that could be time efficient, reliable and interactive for upper limb measurements in elite sport.

METHODS (WHAT THEY DID):
18 elite rugby players free of any acute injury (<72 hours) were tested in three prone positions, known as the “I”, “Y” and “T” positions.

Three maximum tests in each of the three positions were conducted on each side with a 20 second rest. The contralateral arm is positioned behind the back to reduce the temptation of fixation, instead requiring the athlete to stabilise through the truck and scapular girdle. As a measure of rate of force development (RFD) as well as maximum force production, the athletes were cued to push as hard and fast as possible for 3 seconds.
RESULTS (WHAT THEY FOUND):

The study found excellent reliability for net force production between days of testing in all test positions. With the exception of the ‘I’ position on the non-dominant arm which showed some statistical variation, all other tests and measurements produced consistently high statistical scores, suggesting that this test provides a reliable and efficient measure of upper limb isometric force production.

LIMITATIONS (THINGS TO KEEP IN MIND):

The “why” behind the test was to help monitor force production in athletes who undergo high impact and dynamic long lever collisions, however the test is conducted in the prone position and is designed to reduce fixation through the lower body. While this may not translate purely into sporting action, the methodology reduced variability of movement and compensation that may be seen in a standing test.

Furthermore, the study design did not allow for randomisation of testing positions, which may influence reliability. Finally, the results can be confidently applied to elite rugby players due to the participant population, however the results cannot be generalised to other sports.

VIDEO:
“This test provides a reliable tool for the measurement and on-going monitoring of fatigue in the shoulder girdle.”

**CLINICAL IMPLICATIONS (HOW THIS IMPACTS CLINICAL PRACTICE):**

Sporting actions occur in timeframes of milliseconds. Therefore, having measures of athletic ability to generate and accept force is of great importance. In elite rugby, the prevalence of traumatic shoulder injury is high and this test provides a reliable tool for the measurement and on-going monitoring of fatigue in the shoulder girdle.

The results demonstrate reliability between and within athletes. Baseline testing in the pre-season following familiarisation of the test would therefore allow the clinician to quantify the “cost” of matches and training on the upper limb neuromuscular system, analysing both the trends within a squad or individual athletes. Frequent monitoring after specific high impact training sessions or upper limb conditioning may help inform conversations between performance and coaching disciplines within a club.

With a total time of 6 minutes per player, the clinician could choose whether to monitor “at risk” individuals or frequent whole-squad testing. It also provides an objective measure for return to play following an upper limb injury, with visual feedback for the athlete to assist in a confident return to contact. The ‘T’ position represents the mechanism of tackling with a straight arm whilst the ‘I’ position is comparable to the “try-scorer” injury mechanism.

**STUDY REFERENCE**

ARTICLE 3

DIAGNOSIS, TREATMENT, AND PREVENTION OF ANKLE SPRAINS: UPDATE OF AN EVIDENCE-BASED CLINICAL GUIDELINE

SHRUTI NAMBIAR

BACKGROUND & OBJECTIVE:
Ankle injuries form up to 10% of emergency department consults. Among these ankle injuries, lateral ankle sprains (LAS) have the highest prevalence, both within the general and sporting population. Primary healthcare professionals rely on diverse treatment strategies for injury management. This review aimed to develop a uniform evidence-based guideline for healthcare professionals across disciplines for the diagnosis, treatment, and prevention of acute LAS.

METHODS (WHAT THEY DID):
Multiple databases (Embase, MEDLINE, Cochrane and PEDro), articles from previous guidelines and other sources were searched for relevant data from January 2009 to September 2016. Data selection was done by two researchers, independently. Included articles had participant’s age ≥ 16 years with acute LAS and were published in English, French, Spanish, Danish, German, Swedish or Dutch. Articles including injuries other than LAS, narrative reviews, case reports, and cadaveric studies were excluded. A meta-analysis was performed for all outcomes included in at least two studies.

RESULTS (WHAT THEY FOUND):
194 studies were included in this guideline.

Diagnosis:
Use of the Ottawa Ankle Rules (OAR) is recommended to rule out fracture within the first week post-injury. Presence of hematoma, pain on palpation around the distal fibula and a positive anterior drawer test can help confirm a lateral ankle ligament rupture. Delayed physical examination (4-5 days post-injury) provides better diagnostic accuracy than ultrasonography and arthrography. MRI is recommended if clinicians suspect any high-grade ligament injuries, osteochondral defects, syndesmotic injuries or occult fractures.
**Treatment:**

<table>
<thead>
<tr>
<th>Treatment strategy</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RICE (Rest, Ice, Compression and Elevation)</strong></td>
<td>Cryotherapy along with exercise is the recommended treatment during the acute phase compared to other treatment options (individual aspects of RICE applied alone, and heat with exercise therapy). It reduces swelling and provides short-term improvement in ankle function by allowing weight bearing.</td>
</tr>
<tr>
<td><strong>NSAIDs (Non-Steroidal Anti-Inflammatory Drugs)</strong></td>
<td>Work in the short-term (&lt;14 days) on pain, swelling and ROM. Diclofenac works better on day 1 and 2 vs. piroxicam/ibuprofen to reduce pain with movement.</td>
</tr>
<tr>
<td><strong>Immobilization</strong></td>
<td>&lt;10 days of immobilization (plaster cast/rigid support) with exercises decreases pain, oedema and improves functional outcomes vs. immobilization alone.</td>
</tr>
<tr>
<td><strong>Functional support</strong></td>
<td>Wearing a lace-up or semi-rigid brace for 4-6 weeks provides better outcome versus elastic bandage/rigid tape/kinesiotape/tubigrip/immobilization. Functional support works better in isolated ligament injury versus an ankle ligament injury with associated fractures, and also reduces the risk of recurrent ankle sprains.</td>
</tr>
<tr>
<td><strong>Exercise</strong></td>
<td>Neuromuscular and proprioceptive training should commence early post-injury to improve ankle strength and proprioception, reduce injury recurrence and functional ankle instability, and accelerate work/sport resumption.</td>
</tr>
<tr>
<td><strong>Manual mobilization</strong></td>
<td>Improves ankle DF ROM and reduces pain in the short-term post-LAS. It should be combined with exercise therapy for better functional outcomes.</td>
</tr>
<tr>
<td><strong>Surgical therapy</strong></td>
<td>Recommended for patients with chronic ankle instability, for non-responders to conservative treatment, and professional athletes to help ensure successful return to play. Surgery reduces the prevalence of recurrence better than functional treatment.</td>
</tr>
</tbody>
</table>
“Implementation of the Ottawa ankle rules and delayed physical examination is a valid and cost-effective clinical approach to rule out fractures and diagnose LAS.”

**Expected duration for return to work/sport:**
- Grade I injury: 2-4 weeks
- Grade II or III injury: 6-8 weeks
- Post-surgery: 12-16 weeks

**Predisposing factors/prevention:**

<table>
<thead>
<tr>
<th><strong>Intrinsic factors</strong></th>
<th><strong>Extrinsic factors</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (females)</td>
<td>Type of sport: aeroball, basketball, indoor volleyball, field sports, climbing</td>
</tr>
<tr>
<td>Lower body mass index (BMI)</td>
<td>Wearing high heels</td>
</tr>
<tr>
<td>Playing as a defender or on natural grass (soccer)</td>
<td>In competition, males are at higher risk than females</td>
</tr>
<tr>
<td>Playing competitively</td>
<td></td>
</tr>
</tbody>
</table>

**LIMITATIONS (THINGS TO KEEP IN MIND):**
- There is a lack of evidence on the effect of prevention strategies on first-time ankle sprains.
- Many patients with ankle sprains do not seek medical advice. Therefore, the effect of no treatment is unknown.
CLINICAL IMPLICATIONS (HOW THIS IMPACTS CLINICAL PRACTICE):

While history of LAS has been proposed as a predictor of future ankle injuries, the findings from this review challenge this link. Furthermore, females are at higher risk of suffering LAS, whereas prognosis of injury is more unfavourable for young males. Therefore, management of a LAS patient should commence with a thorough subjective examination discerning these predisposing and prognostic factors.

Implementation of the Ottawa ankle rules and delayed physical examination is a valid and cost-effective clinical approach to rule out fractures and diagnose LAS. In patients with LAS, altered hip kinematics present as increased hip flexion in single-leg drop landing or drop vertical jump tests. Assessment of postural control deficiencies should include single-leg stance tests and the Star Excursion Balance Test (SEBT) in all three directions, especially in the postero-lateral direction. All these tests along with routine physical examination should be performed bilaterally to determine deficits on the injured and uninjured limbs. These tests can also be used as pre-season screening tools, and outcome measures to evaluate treatment progression.

Initial management can either be a short-duration of immobilization or cryotherapy along with exercises. Exercise therapy for LAS should also include gait retraining and unanticipated task training besides addressing the sensorimotor deficits. Adequate rest days should be incorporated within this protocol to allow for recovery of the loaded structures.

Finally, use of functional support, neuromuscular and balance training are the only available prevention strategies to prevent both first-time and recurrent ankle sprains.

+ STUDY REFERENCE


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BACKGROUND AND OBJECTIVE:
The core can be defined as the anatomical region consisting of the lumbo-pelvic-hip complex and the trunk. Theory suggests that core stability (i.e. the strength, endurance, neuromuscular control, and proprioception of the core muscles) may affect lower extremity function. Impaired core stability is thought to alter force transfer, generation, and absorption throughout the kinetic chain, which could potentially lead to injury. The purpose of this study was to systematically review the literature to determine what role core stability plays in lower body injuries in athletes. The authors hypothesized that impaired core stability increases the risk of lower body injuries.

METHODS/WHAT THEY DID:
The authors conducted a systematic literature search using the keywords “injury,” “core stability,” and a dozen synonyms thereof (e.g. “lumbopelvic stability,” “spinal stability,” etc.). They included prospective cohort studies that examined the association between core stability and acute or overuse lower body injuries in competitive athletes. For each study, they scored the methodological quality and extracted relevant data such as sample size, aspect of core stability measured, injury rate, follow-up period, and association between core stability and injury.
RESULTS/WHAT THEY FOUND:

The overall evidence for the role of core stability in lower body injuries in athletes was mixed (see table).

<table>
<thead>
<tr>
<th>Core Stability Aspect</th>
<th>Specific Test</th>
<th>Injury Type</th>
<th>Association with lower body injury?</th>
<th>Strength of conclusion (# of studies)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endurance</td>
<td>Isometric hold times for side planks, and back extension</td>
<td>General lower body</td>
<td>No</td>
<td>Moderate (1)</td>
</tr>
<tr>
<td></td>
<td>Isometric hold time for sit-up</td>
<td>General lower body</td>
<td>Conflicting in males, no in</td>
<td>Moderate (2)</td>
</tr>
<tr>
<td>Strength</td>
<td>Maximal isometric flexion and extension strength</td>
<td>Anterior cruciate</td>
<td>Yes</td>
<td>Low (1)</td>
</tr>
<tr>
<td></td>
<td>Active trunk repositioning</td>
<td>Knee</td>
<td>Yes in females, no in males</td>
<td>Low (1)</td>
</tr>
<tr>
<td></td>
<td>Passive trunk repositioning</td>
<td>Knee</td>
<td>No</td>
<td>Low (1)</td>
</tr>
<tr>
<td></td>
<td>Lumbopelvic displacement during drop jump landing</td>
<td>Exertional medial tibial</td>
<td>Yes in females</td>
<td>Low (1)</td>
</tr>
<tr>
<td></td>
<td>Trunk displacement after sudden unloading</td>
<td>Knee</td>
<td>Yes in females, no in males</td>
<td>Low (1)</td>
</tr>
<tr>
<td></td>
<td>Lumbopelvic movement during dynamic movements</td>
<td>General lower body</td>
<td>Yes</td>
<td>Low (1)</td>
</tr>
</tbody>
</table>

The authors’ search resulted in nine studies, all of moderate to high methodological quality with sample sizes ranging from 32 to 370 and follow-up periods between 6 months and 10 years. Across three studies, there was conflicting evidence for an association between core endurance (as measured by isometric hold times) and general lower body injuries. In one study, isometric core strength was found to be associated with anterior cruciate ligaments (ACL) injuries in skiers. Across five studies, several measures of core neuromuscular control and proprioception were associated with various injuries, especially in females. Due to the design and quantity of the included studies, all conclusions regarding the aforementioned associations were of low to moderate strength.
LIMITATIONS/THINGS TO KEEP IN MIND:

Across the included studies, there was substantial heterogeneity in terms of the aspects of core stability investigated and the specific tests used. The studies also investigated a wide variety of athletic populations and injuries, from exertional medial tibial pain to ACL injuries, general knee injuries, and general lower body injuries. This heterogeneity prevented the authors from analyzing the data quantitatively (i.e. through meta-analysis) and allowed them only to draw qualitative conclusions. In addition, although the review purportedly included studies of competitive athletes only, two of the included studies were conducted on female physical education students.
“While the review certainly shows some evidence for the association of various aspects of core stability with lower body injuries, there remains little consensus regarding how best to measure core stability – especially clinically.”

**Clinical Implications/How This Impacts Clinical Practice:**

TheorY suggests that impaired core stability in its various forms (endurance, strength, neuromuscular control, and proprioception) may be a risk factor for lower body injury. Due to the relatively small number of prospective studies included, along with their substantial heterogeneity, this systematic review provides “preliminary support” for this relationship. While the review certainly shows some evidence for the association of various aspects of core stability with lower body injuries, there remains little consensus regarding how best to measure core stability – especially clinically.

Apart from the core endurance measures, the vast majority of included studies measured core stability using biomechanical techniques. Yet, in their concluding remarks, the authors of the review recommended screening core stability for the purposes of athletic injury prevention and rehabilitation. Because the biomechanical tools used in the studies often are not readily available clinically, this recommendation fails to align with the scope of the review. More research is needed examining clinical core stability tests before firm conclusions can be made regarding the clinical assessment of core stability as a risk factor for injury.

+ **Study Reference**

Question —
True/False: According to this review, core neuromuscular control/proprioception showed a stronger association with lower limb injury in males rather than females.

Click here to link to quiz answer
BACKGROUND & OBJECTIVE:

Anterior cruciate ligament (ACL) rupture is the most common season-ending injury seen in sports, with surgical reconstruction being the standard of care for the vast majority of athletes with goals of returning to sport. It is estimated that one ACL injury costs $38,000 USD, thus representing a significant economic burden to society. This burden falls largely on female athletes, as females are approximately 3 times more likely to injure their ACLs than their male counterparts.

Injury prevention has become a popular topic in recent years with a large focus specifically on ACL injuries. The purpose of this article was to evaluate the effectiveness of the specific components commonly seen in ACL injury prevention programs for females, with the goal of creating best practice guidelines.

METHODS (WHAT THEY DID):

This paper was a meta-analysis with the following 5 inclusion criteria: 1) prospective controlled trial study design, (2) included females, (3) a neuromuscular training (NMT) intervention aimed at reducing ACL injury incidence, (4) a comparison of groups, and (5) frequency of ACL injuries were reported. The primary outcome of interest was ACL injury odds ratio. 18 studies were included in the analyses.

RESULTS/WHAT THEY FOUND:

The results indicate that NMT programs are an effective intervention to reduce ACL injury. Overall, NMT has the potential to reduce injury prevalence from in 1 in 54 females to 1 in 111. The mean cumulative training volume found to be ideal was 57 sessions, 2.5 times per week, lasting an average of 24 minutes. This equates to 18.7 hours over a 23-week pre-season and in-season timeline. One extremely important finding was the lack of effectiveness when the NMT programs were not continued throughout the season.

Interventions led by trained personnel targeting middle and high school aged athletes were the most effective. The sports with the strongest effect size amongst the 18 studies were soccer, basketball, and volleyball. The most effective NMT intervention programs include landing mechanics as well as lower body strengthening exercises. Programs including core strengthening, balance, agility exercise, and stretching were no more effective than programs that did not incorporate these components. While these components were not found to be detrimental, including them might represent a poor use of time and resources.
“One extremely important finding was the lack of effectiveness when the NMT programs were not continued throughout the season.”

LIMITATIONS/THINGS TO KEEP IN MIND:

One of the primary limitations of the ACL prevention NMT program suggested in this paper is the subjectivity of the verbiage surrounding “proper” landing mechanics. While it is mentioned that the goal is to reduce hip internal rotation and adduction during landing, it can be argued that all athletes land and move differently. It would be beneficial to gain a greater understanding of individual differences in landing mechanics and relative strength and how that impacts injury incidence. With more data collected, a screening and individual intervention process could be generated, implemented and studied from this information.

One other limitation is the overall quality of the studies included, as they were moderate, based on PEDro scores. It would be ideal to see higher quality studies with stronger adherence. Moreover, it would also be helpful to gain a greater understanding into why there is such a low level of usage and adherence amongst NMT programs (13-20% across the U.S., and 4% in rural areas).
CLINICAL IMPLICATIONS/HOW THIS IMPACTS CLINICAL PRACTICE:

The three most important intervention focuses for ACL injury prevention are landing technique and stabilization exercises, quad dominant single leg strengthening, and hamstring strengthening. Examples of these exercises include drops, landings, hops, jumps and holds, lunge variations, and hamstring curl variations including Nordic hamstring curls. Programs including core, balance, stretching, and agility exercises were not shown to be any better than programs that did not include these components. That being said, balance exercises can help reduce ankle injuries and should likely still be included in a holistic injury prevention program. Anecdotally, balance can be easily inserted into a program during active rest periods.

One of the most important takeaways from this paper was the importance of continuing prevention programs throughout the season. This presents a potential barrier - sport coaches must be willing to forego an average of 1 hour of practice time per week for injury prevention training, which is likely not feasible in most sporting settings.

Despite our increased understanding of the effectiveness of ACL injury prevention programs, there has not been a decrease in ACL injury incidence. Athletes are not engaging in the required level of injury prevention training. Simply running an 8-week pre-season NMT program is not sufficient. It will take a cultural shift in sport and an increased value placed on physical preparation in order to see a true reduction in the incidence of ACL injuries.

+ STUDY REFERENCE

A PRAGMATIC REGIONAL INTERDEPENDENCE APPROACH TO PRIMARY FROZEN SHOULDER: A RETROSPECTIVE CASE SERIES

SAM SPINELLI

BACKGROUND & OBJECTIVE:
The current clinical practice guidelines for frozen shoulder focus on treatments specifically to the shoulder, none of which receive a strong recommendation. The goal of this case series was to evaluate a regional interdependence approach to treatment, addressing adjacent joints that influence the shoulder while also treating the shoulder itself.

METHODS (WHAT THEY DID):
This study conducted a retrospective analysis of five patients aged 40-66 years old that had been dealing with symptoms for 2-30 weeks and were referred by physician for either frozen shoulder/adhesive capsulitis. Confirmation of condition was done through clinical practice guidelines diagnostic criteria – patients presented with either gradual or insidious onset, pain at end range motion, joint hypomobility, reduction in active range of motion and passive range of motion, with external rotation being reduced by at least 50%. The patients were checked for their unaffected shoulder range of motion being within normal limits and screened for red flags and cervical pathology. Treatment focused on patient education on frozen shoulder, a home exercise program, manual treatments, stretching for the upper kinetic chain (shoulder girdle, shoulder joint, scapulothoracic and humerothoracic muscles, and the spine), strengthening, neuromuscular re-education, and functional training. Treatment success was evaluated through changes in shoulder ROM limitation and Disability of the Arm Shoulder and Hand (DASH) questionnaire.

RESULTS/WHAT THEY FOUND:
There was an average of 14.8 visits over 7.6 weeks, with a 32.4 week average follow up. The patients saw significant improvements in ROM and DASH scores. The patients all had an increase in passive range of motion beyond the standard error of measurement and had a large effect size (d=5.7) at discharge. All patients had a decrease in their DASH score, while 80% had a change greater than the standard error of measurement and the minimal clinically important difference.
“Incorporating a breadth of interventions to address functional deficits in the entire upper extremity and trunk would be supported from this paper.”

LIMITATIONS/THINGS TO KEEP IN MIND:

This study was simply a case series of five that did not control for bias, natural history, or regression to the mean, or have a robust power size.
Clinical Implications/How This Impacts Clinical Practice:

With the growth in research on adhesive capsulitis, we are seeing many changes in the previously held beliefs on it - ranging from removing the inconsistent phases of the natural course it was meant to go through, to altering what are the most efficacious treatments for it.

Previous treatment for adhesive capsulitis has focused primarily on addressing the glenohumeral joint, typically involving manual techniques and some therapeutic exercises specifically for this joint. With this evidence we have some support to begin exploring treatments for adjacent joints in the upper quadrant, particularly those of the rest of the shoulder girdle and spine. Incorporating a breadth of interventions to address functional deficits in the entire upper extremity and trunk would be supported from this paper.

Going forward, rehab professionals should consider utilizing treatments of manual therapy, range of motion, strengthening, neuromuscular re-education, and functional training for these various joints as part of the rehab for adhesive capsulitis based on the individual’s impairments. Hopefully this will also encourage further higher quality research to be done on this topic to deem what aspects are beneficial for patient care, and help us to select the most optimal interventions for our patients presenting with this condition.

+ Study Reference

**EPIDURAL STEROID INJECTION FOR LUMBAR DISC HERNIATION IN NFL ATHLETES**

**DR FIONA WILSON**

**BACKGROUND & OBJECTIVE:**

Low back pain (LBP), specifically disc herniations, is very common in sports such as football. Managing LBP is challenging in high level athletes where early return to sport (RTS) is the primary goal. Conservative treatment of disc herniations is reported as 79% with RTS at a mean of 4.7 months. There is limited research supporting the use of epidural steroid injections in athlete LBP as a result of disc herniation. The aim of this study was to demonstrate the efficacy of epidural steroid injections in RTS after lumbar disc herniation, and to recognise risk factors for failure of this treatment approach.

**METHODS (WHAT THEY DID):**

Retrospective review of medical records of a professional football club from 2003-2010 was conducted. To be included, the player had to sustain a back injury during playing or training resulting in a herniated nucleus pulposus confirmed on MRI. Initial management for players included rest, ice and removal of aggravating activities. All players included in the study had an injection of triamcinolone and anaesthetic and rested for 48 hours. RTS was measured from time of sustaining the injury.

**RESULTS (WHAT THEY FOUND):**

Seventeen male players had a total of 37 injections for 27 lumbar disc herniation episodes from 2003 to 2010. Mean age was 25yrs (range = 22–32yrs). MRI showed that 15 of the disc herniation episodes occurred at the L4–5 level, 11 occurred at the L5–S1 level, and 1 occurred at the L3–4 level. The mean time from injury to injection was 4 days (range =0–14 d). The success rate of RTS for an episode of disc herniation was 89% (24 of 27 episodes) with a mean loss of 2.8 practices (range = 0–12) and 0.6 games (range = 0–2) after the injection. After 27 of the 37 injections, the player was able to RTS without missing any games. After successful RTS, the thirteen players played an average of 2.8 seasons in the NFL (range = 1–6). Risk factors for failing injection therapy included sequestration of the disc on MRI and neurological weakness on examination.
LIMITATIONS (THINGS TO KEEP IN MIND):

This study only reported athletes who had received an epidural injection for LBP and not outcomes of all athletes with LBP in the cohort. This study crucially lacked a control group and it is possible that they may have had the same outcome. Pain scores were not collected from the players, which would have been a better outcome for measuring LBP. No repeat MRI was performed and reported on any players; this is important as the aim was to resolve this specific pathology rather than the global approach of resolving LBP. Co-interventions were not reported, and the authors stated that it is possible that many players were also receiving other treatments. This means it is difficult to conclude that the treatment effect was due to the steroid injection alone.

“This study appears to present an outstanding success rate of 89% RTS and reports a very low time loss from sport as a result of the injury.”
CLINICAL IMPLICATIONS (HOW THIS IMPACTS CLINICAL PRACTICE):

This study appears to present an outstanding success rate of 89% RTS and reports a very low time loss from sport as a result of the injury. However, the authors did not present a strong rationale from a pathophysiological point of view for the role of the steroid. There was a very short time frame from the injury to the injection (4 days) meaning that the LBP was in an acute phase and was starting to resolve anyway. The outcome of players with the same injury who were not treated with injection were not reported from the medical records. Those who work in elite sports will understand the pressure to ‘do something’ when the most appropriate thing is to let natural resolution take place. Coaching and management staff often want to know that maximum possible interventions are tried, and an injection will frequently fulfil this requirement.

The vast majority of acute LBP resolves spontaneously, and it is likely that many of these athletes would have had the same outcome without the intervention. The athletes’ pain was attributed to disc herniation, but this ignores the complexity of LBP. It is possible that the reason for the athletes’ pain was not because of the pathology identified on MRI but for many other reasons. The MRI findings could have been incidental for many; a theory backed up by many studies reporting disc herniation to be common in asymptomatic populations.

Those with the ‘worst’ disc pathology with associated neurological signs did not benefit from injection. It could be argued that these were the ‘true’ disc herniation patients and this reinforces the fact that the injection may not be efficacious for this pathology.

The findings from this study show that steroid injection is generally safe and that nearly all of those who have it for LBP attributed to disc herniation RTS very quickly. However, from this study, it cannot be recommended over conservative treatment alone as this study did not compare the two. The recent Lancet LBP series did not recommend steroid injection for acute LBP, and this study does not present enough evidence to show that this recommendation is different for professional athletes.

+ STUDY REFERENCE

ARTICLE BY DR FIONA WILSON

QUIZ

Question —

According to this study, what were TWO risk factors for failing (not responding to) steroid injection therapy?

Click here for quiz answer
ILLUSORY RESIZING OF THE PAINFUL KNEE IS ANALGESIC IN SYMPTOMATIC KNEE OSTEOARTHRITIS

TODD HARGROVE

BACKGROUND & OBJECTIVE:

Previous research has shown that visuo-tactile illusions have an analgesic effect on hand osteoarthritis (OA). This study sought to determine whether such illusions can have an analgesic effect on knee OA, and whether sustained or repeated illusions might offer cumulative benefit.

METHODS (WHAT THEY DID):

Knee pain intensity (0–100 numerical rating scale; 0 = no pain at all and 100 = worst pain imaginable) was assessed before and after 8 different illusory conditions:

• Two “visual-only” illusions: a headcam showed the knee getting larger or smaller.
• Two “tactile-only” illusions: the skin on the knee was either stretched or compressed.
• Two “congruent visuotactile” illusions: the visual and tactile stimuli were applied at the same time and the same direction (visual stretch and tactile traction; visual shrink and tactile compression)
• Two “incongruent visuotactile” illusions: the visual and tactile stimuli were applied at the same time and opposite directions (visual stretch, but tactile compression; visual shrink, but tactile traction)

After determining which illusion was most analgesic, it was sustained for a longer time period, and repeated over additional sessions, to determine whether it provided cumulative benefit.

RESULTS (WHAT THEY FOUND):

Both congruent visuotactile illusions caused a 25% reduction in pain. Only one of the two incongruent visuotactile illusions reduced pain. The tactile-only and visual-only illusions did not reduce pain. When the congruent visuotactile illusion was sustained, analgesia was prolonged but not increased. When it was repeated, the analgesic effect increased to 40%. However, knee pain returned to baseline within two days after the illusions.
“This study provides further support for the general idea that we experience pain in relation to perceived threat to the body, whether or not that perception accurately reflects the actual condition of the body.”

LIMITATIONS (THINGS TO KEEP IN MIND):

The sample size in this study was small, but statistics suggest it was adequately powered. The ability of one of the incongruent visuotactile illusions to reduce pain conflicts to some extent with one of the theoretical premises of the paper, which is that pain can result from having an inaccurate or “smudged” body image. Although some of the illusions reduced pain, there was no lasting benefit to the intervention.
CLINICAL IMPLICATIONS:

Knee osteoarthritis (OA) affects 3% of the global population. Pain level does not correlate well with the degree of structural damage to the knee shown on imaging. Further, knee pain often persists even after total knee replacement. On the basis of this and other evidence, it is thought that neural factors, including representation of the knee by the brain, play a role in knee OA pain. Multiple lines of evidence suggest that pain is modulated by non-nociceptive sensory information, including visual and tactile information. Further, sensory illusions involving visual and tactile feedback have been shown to modulate pain in a wide variety of circumstances.

This study adds to existing evidence suggesting that manipulation of sensory information can affect pain. While this proves an important theoretical point about the relevance of body representation for pain, it does not currently suggest clinical use of the specific interventions used in this study, for a couple of reasons. Firstly, most practitioners do not have the equipment necessary to perform the illusions. Secondly, the illusions did not provide any lasting pain relief.

That being said, this study provides further support for the general idea that we experience pain in relation to perceived threat to the body, whether or not that perception accurately reflects the actual condition of the body. Thus, perception of threat can be modulated by multiple streams of sensory and cognitive information, not just changes in tissue damage and nociception. Recognition of this fact should inform clinicians’ efforts in the treatment of pain.

STUDY REFERENCE

THE 3-M BACKWARDS WALK AND RETROSPECTIVE FALLS: DIAGNOSTIC ACCURACY OF A NOVEL CLINICAL MEASURE

MARIANA WINGOOD

BACKGROUND & OBJECTIVES:
Clinicians have a countless number of tools to identify an older adult’s fall risk, however, most of them do not include the skill of ambulating backwards. This mobility skill is a higher level functional task that could have increased sensitivity for identifying fallers. Therefore, the authors of this study decided to examine the 3-m backwards walk (3MBW) test. Their objectives were to compare fallers versus non-fallers, report association of the 3MBW with existing measures of fall risk, report the sensitivity and specificity of a series of 3MBW cutoff points to discriminate people who fell from people who did not fall, and compare the diagnostic accuracy for retrospective falls of the 3MBW with other outcome measures.

METHODS (WHAT THEY DID):
Design: Retrospective cohort study
Participants: Community dwelling older adults who were able to ambulate without an assistive device, sign a consent form and did not have a neurological diagnosis.
Assessments completed: Retrospective falls history was collected using an interview question. Assessments tools and cut-off scores used are summarized in Table 1.

“A more challenging assessment tool such as the 3MBW test could be more accurate at identifying fallers than the tools currently used.”
### Table 1: Assessment Tools Used

<table>
<thead>
<tr>
<th>Assessment</th>
<th>What is it measuring?</th>
<th>Description</th>
<th>Cut-off Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timed Up and Go (TUG)</td>
<td>- Mobility</td>
<td>Start sitting, stand up, walk 3 m, turn around, walk back to the chair, and sit down.</td>
<td>13.5 seconds</td>
</tr>
<tr>
<td></td>
<td>- Balance</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Fall risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 times sit-to-stand (5STS)</td>
<td>- Lower extremity strength</td>
<td>Start sitting in a standard chair and perform five sit to stands stand, with the test stopping during the last sit.</td>
<td>15 seconds</td>
</tr>
<tr>
<td></td>
<td>- Fall risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-square step test (4SST)</td>
<td>- Dynamic balance</td>
<td>Create 4 “squares” by tapping a + on the ground. Individuals step clockwise with both feet in each square and after a full rotation they reverse it.</td>
<td>15 seconds</td>
</tr>
<tr>
<td></td>
<td>- Stepping abilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Fall risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Meter Backwards Walk (MBW)</td>
<td>- Backwards walking</td>
<td>Individuals align their heels onto a tape and walk backwards as quickly as possible for 3 meters.</td>
<td>None determined at this time.</td>
</tr>
</tbody>
</table>

**VIDEO:**
**RESULTS (WHAT THEY FOUND):**

**Fallers versus Non-Fallers:** When comparing all of the study results (see Table 2), only the 3MBW identified a significant difference between fallers vs. non-fallers.

**Table 2: Fallers vs. Non-Fallers**

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Fallers Mean (SD)</th>
<th>Non-Fallers Mean (SD)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3MBW</td>
<td>4.8s (2.6)</td>
<td>3.5s (1.3)</td>
<td>0.029</td>
</tr>
<tr>
<td>TUG</td>
<td>9.3s (3.6)</td>
<td>8.0s (2.4)</td>
<td>0.077</td>
</tr>
<tr>
<td>5 STS</td>
<td>12.5s (4.9)</td>
<td>10.3s (2.8)</td>
<td>0.121</td>
</tr>
<tr>
<td>4 SST</td>
<td>9.5s (2.8)</td>
<td>8.1s (1.6)</td>
<td>0.056</td>
</tr>
</tbody>
</table>

**Association of 3MBW and Existing Falls Risk Measures:** 3MBW was significantly associated with age (p=0.007) and all of the other measures (p<0.001).

**Optimal cut-off for 3MBW:** As seen in Table 3, higher cut off scores had higher sensitivity (those walking faster were less likely to report falls) and slower speeds had higher specificity (walking slower had greater likelihood of reporting a fall). After performing an area under the curve analysis 3.5 seconds was identified as the optimal cut-off score.

**Table 3 Optimal Cut-off Value**

<table>
<thead>
<tr>
<th>Cut-Off Value (sec)</th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>78</td>
<td>45</td>
</tr>
<tr>
<td>3.25</td>
<td>61</td>
<td>70</td>
</tr>
<tr>
<td>3.5</td>
<td>74</td>
<td>61</td>
</tr>
<tr>
<td>4.0</td>
<td>48</td>
<td>79</td>
</tr>
<tr>
<td>4.5</td>
<td>39</td>
<td>94</td>
</tr>
</tbody>
</table>

**Diagnostic Accuracy of 3MBW:** When examining individual’s fall risk, a 3.5 sec 3MBW test is more accurate at identifying fallers than the TUG or the 4SST.
LIMITATIONS (THINGS TO KEEP IN MIND):
- The small sample size and being underpowered could limit the significance of some of the findings.
- Retrospective data collection places the study at risk for recall bias.
- The strict inclusion criteria results in a poor representation of everyone above the age of 60, making it difficult to apply the findings to the general public.

CLINICAL IMPLICATIONS (HOW THIS IMPACTS CLINICAL PRACTICE):

The researchers identified that 3.5 seconds is an optimal and accurate cut-off score for identifying fallers. They also identified that those who complete the 3MBW in less than 3 seconds should be classified as low risk and those who complete it in more than 4.5 seconds should be classified as being at high risk of falling. The test was also found to be more accurate in identifying fallers than the TUG, 5STS, and 4SST.

According to this study, a more challenging assessment tool such as the 3MBW test could be more accurate at identifying fallers than the tools currently used. However, future studies with larger sample sizes, broadened inclusion criteria, and prospective fall history are needed to support this study’s conclusions before widespread changes are made to clinical practice.

STUDY REFERENCE

PERCEPTIONS OF REHABILITATION AND RETURN TO SPORT AMONG HIGH SCHOOL ATHLETES WITH ACL RECONSTRUCTION: A QUALITATIVE RESEARCH STUDY.

LINDA TRUONG

BACKGROUND & OBJECTIVE:

Recovery after anterior cruciate ligament reconstruction (ACLR) is a long and arduous journey with only 65% of patients reporting that they return back to their pre-injury sport. Prolonged periods of inactivity, psychosocial factors (e.g. fear of re-injury) and changes in priorities have been established as factors that impact participation in sport and recreation activities after ACLR; however most of this research has been done in adults. This study aimed to develop a better understanding of the positive and negative perceptions of the rehabilitation and return to sport process among adolescents who had not yet returned to sport after ACLR.

METHODS (WHAT THEY DID):

Semi-structured, one-on-one interviews were conducted with adolescents who had an ACLR but had not yet been cleared to return to sport (RTS). A total of 10 participants (aged 15-18 years old) from various sports were interviewed. All participants were in high school, participated in a sports team prior to the ACL injury, and were not greater than 12 months after ACLR. Prior to the interview, participants also completed the Knee Osteoarthritis Outcome Scale, Tegner Activity Scale, Tampa Scale of Kinesiophobia and Athlete Fear Avoidance Questionnaire. Interview questions focused on barriers encountered during rehabilitation, and characteristics (e.g. program strengths, weaknesses, key players during the rehabilitation process, recommendations to improve their experience) that positively or negatively impacted their rehabilitation and RTS processes.

RESULTS/WHAT THEY FOUND:

The common themes generated were barriers for returning to physical activity and positive/negative recovery factors. Barriers to returning to physical activity included physical and psychological factors with a greater emphasis on the psychological barriers playing a role in recovery. Positive recovery factors included receiving proper education on the injury and expected timelines for rehabilitation, setting a mindset to anticipate challenges, and being positive towards rehabilitation and setbacks. Social support such as having a trusting relationship with therapists, social comparison to other athletes who were ahead of them in their rehabilitation and connecting with other athletes with the same injury who have returned to sport were reported as motivating factors. Negative recovery factors included an insufficient amount of attention and guidance from the physio or surgeon, an overly-generalized approach to treatment and highly cautious behaviour from parents about returning to sport.
LIMITATIONS:

This qualitative study had a fairly small sample size (10 participants) which may limit the generalizability of the results to other ACLR patients. However, the purpose of this study was to better understand the experiences of adolescents, and the findings of this study are still applicable and worth considering when dealing with an adolescent with an ACLR. Additionally, perceptions of rehabilitation and RTS may change as the patient progresses further through their rehabilitation, therefore other relevant factors and barriers may have not been identified in this paper.

“Taking the time to thoroughly educate the individual about their injury and setting up realistic expectations and timelines for rehabilitation were positive factors for engaging in rehabilitation and RTS.”
CLINICAL IMPLICATIONS/HOW THIS IMPACTS CLINICAL PRACTICE:

In recent years there has been emerging evidence about the impact of psychosocial and contextual factors on ACL recovery. This study highlighted that adolescents experience many of these same psychosocial barriers after ACLR and that it can impact their rehabilitation and RTS process. Individuals in this study felt that physical objectives were consistently used to measured rehabilitation progress despite many psychological factors arising during critical transition periods during rehabilitation. Providing detailed information on both physical and psychosocial progression throughout the rehabilitation program may help these athletes feel better prepared to overcome the lengthy recovery.

Adolescents are different from adults in that they are still developing physically, emotionally and mentally. When treating adolescents, consideration of their social support and surrounding peers (social comparison to other athletes was found to be either motivating or discouraging), parents’ attitudes and beliefs of rehabilitation and RTS, and connecting them to other athletes with similar injuries who were successful in returning to sport may be useful strategies to help them overcome this injury.

This study showed that very simple strategies can have a huge impact on recovery. Taking the time to thoroughly educate the individual about their injury and setting up realistic expectations and timelines for rehabilitation were positive factors for engaging in rehabilitation and RTS. Additionally, reframing patients’ mindsets to adopt a more positive attitude towards challenges, setbacks and rehabilitation was found to motivating. In contrast, having poor interaction with clinicians and receiving rehabilitation programs that were overly-generalized and not individualized was unmotivating and a barrier to recovery.

Although our primary role as clinicians is to treat the physical impairment, we must also consider the psychological aspects associated with injury. This study provides evidence of how our interactions with patients play a fundamental role in motivating and encouraging patients to progress through their rehabilitation after ACLR.

+ STUDY REFERENCE

EMBODYING THE ILLUSION OF A STRONG, FIT BACK IN PEOPLE WITH CHRONIC LOW BACK PAIN: A PILOT PROOF-OF-CONCEPT STUDY

ROBIN KERR

BACKGROUND & OBJECTIVE:
People experiencing persistent low back pain may exhibit alterations in cortical structure and function, including the areas involved in self-perception of the low back. Perceptions of fragility, weakness or vulnerability of the lumbar spine are common maladaptive beliefs potentially reinforcing factors for ongoing pain and disability.

This pilot study was an investigation into the possibility that real-time manipulated visual input, aimed at altering the size and muscularity of a participant’s back to make it look stronger whilst performing a functional task, could provide input to the brain that may be embodied and modify maladaptive self-perceptions.

METHODS (WHAT THEY DID):
Subjects (n=2) with persistent low back pain and pain experienced during lifting were recruited. An extensive raft of baseline measures relating to low back self-perception were taken.

Test Procedure:
A head mounted video display was worn which manipulated the size and muscularity of the back. Participants watched live video feed of their own back from the rear. They underwent a standardized procedure to promote embodiment, including tactile stimulation during which they watched their back be touched and move whilst they shrugged and altered position.

A lifting task was then performed (weighted basket @ 80% of back pain causing weight - held in a semi-stooped position for 60 seconds) x 3 for each of the 3 randomized video conditions:

Strong: Overlay of heavy back musculature, shoulders at 125% of normal and waste narrowed to 75% of normal width

Reshaped: Widened shoulders and narrowed waist only

Normal: Unmodified view of the back

Embodiment and back self-perception were assessed after each condition.
RESULTS (WHAT THEY FOUND):

Baseline findings:

Subject A (72yrs): Distorted back perception, maladaptive beliefs about his back, high pain intensity and severe disability.

Subject B (34yrs): Non-distorted back perception, minimal maladaptive belief about his back, mild pain and disability.

Outcomes:

Subject A:
- The illusion of a fit and strongly muscled back appeared to decrease pain and fear levels plus increase strength and confidence.
- Displayed high levels of embodiment for each condition with updated perception of his back with each image viewed.

Subject B:
- High levels of embodiment in normal and reshaped condition but not in strong condition
- Pain similar in all conditions
- Confidence greater in reshaped than normal condition

“The ‘Strong Back Illusion’ builds on a previous body of research that has used visual illusion via mirror boxes to understand and treat persistent upper limb and phantom limb pain.”

LIMITATIONS (THINGS TO KEEP IN MIND):

The significant age difference between the two participants (72 vs. 34) may possibly influence the response to a visual illusion and related technology. This study was not a test of efficiency but more an exploration of possibilities, so at this stage confounders are not overly concerning.
CLINICAL IMPLICATIONS (HOW THIS IMPACTS CLINICAL PRACTICE):

This pilot study raises the possibility of functional improvement and reduction of pain levels in people experiencing persistent low back pain via manipulation of visual input using novel video technology. The “Strong Back Illusion” builds on a previous body of research that has used visual illusion via mirror boxes to understand and treat persistent upper limb and phantom limb pain.

Informed persistent LBP therapy is currently working towards Bio-Psycho-Social influenced approaches in management. There is a slow move away from the more traditional operator dominant biomedical model, such as is seen in the exclusive use of hands-on manual therapy. It would appear that in visual illusion therapy, the process is predominantly driven by the low back pain patient with the therapist adopting more of a facilitative role.

The response of Subject A is interesting in that it raises the question of higher cognitive processes being relevant in analgesia. Subject A’s sense of less vulnerability and more strength during the strong back condition possibly highlights the protective nature of pain, and is a good indicator that contextual cues are involved in the experience of persistent low back pain. Taking Subject A’s results further into consideration, the authors suggest that visually-induced analgesia could be mediated via modulation of affective rather than sensory mechanisms. The authors go on to suggest that other explanations as to how the illusion works could be that visual input processing improves spatial processing, which is often disrupted in persistent low back pain.

Although experiencing persistent low back pain, Subject B did not embody the strong back illusion. Interestingly he did not exhibit distorted self-perceptions or maladaptive beliefs about his back at baseline. It could be that shifts in the baseline measures may be reflected in the subject’s response to illusion interventions.

It would appear that changes in embodiment and self-perception can occur rapidly, however it is too early to surmise that these positive changes are lasting, or that given the rigor of a controlled study with sufficient subject numbers that significant results would be seen. Having said that, this study developed a standardized embodiment protocol as well as refined the synchronicity of technical components of the back visual illusion, providing a resource for future research to build upon.

At this point the clinician is in a watch and wait scenario. In light of rapid technological advances and subsequent applications in therapy, it will be very interesting to follow future research on this topic.

+ STUDY REFERENCE


ROBIN KERR

Click to return to Contents Page
SOCIAL COGNITIVE OR LEARNING THEORY USE TO IMPROVE SELF-EFFICACY IN MUSCULOSKELETAL REHABILITATION: A SYSTEMATIC REVIEW AND META-ANALYSIS

DR BRONWYN THOMPSON

BACKGROUND & OBJECTIVE:

One of the most critical aspects of social learning theory/social cognitive theory is self-efficacy: a person’s belief that they can successfully attain a particular outcome in a specific context. Self-efficacy is not a belief that a specific behaviour will lead to a certain outcome in a certain situation, it’s the belief that I can perform that behaviour to produce the outcome.

Self-efficacy is an essential outcome of rehabilitation and is also an important predictor. Higher levels of self-efficacy prior to treatment are associated with better mood, disability and even adherence to the programme itself. Higher levels of self-efficacy at the end of treatment are associated with better long-term outcomes including disability and mood.

METHODS (WHAT THEY DID):

This study was a systematic literature review with meta-analysis of peer-reviewed studies identified from Ovid and SPORTDiscus. The Preferred Reporting Items for Systematic Reviews and Meta-analyses Checklist guided the process. The terms “social cognitive theory” or “social learning theory” were combined with “rehabilitation” to identify the studies.

Studies were included if they were: peer-reviewed, written in English, involved participants with orthopaedic and musculoskeletal conditions and focused on rehabilitation. Studies were excluded if they were: dissertations, review reports, book chapters, non-peer reviewed publications or included patients with other health conditions, or who were being treated primarily for pain. Methodological quality was evaluated using McMaster Quantitative or Qualitative Critical Review Forms.
RESULTS/WHAT THEY FOUND:

25 studies were initially identified, and after review, 20 provided the data for effect size calculations. 10 studies had large effect size (>0.8), 5 had moderate and 5 had small effect size (<0.5), but overall, the mean effect size was large (Cohen’s d = 0.98).

1947 participants took part in the 25 studies included. 78.9% were women, mainly late middle-age with a mean age of 64.8 years +/- 17 years. Conditioning included hip or knee OA, or post-op hip or knee arthroplasty, post-femur or tibia fracture, some sports injuries, some women at risk for osteoporosis, and some following hand trauma.

Few people withdrew from the studies, and those who did were due to a change in diagnosis or other health problems. None withdrew because of negative reactions to self-efficacy focused behaviour change techniques.

Methodological weaknesses in the studies were mainly a lack of a priori sample size justification, lack of measurement tool reliability and validity, and some timing/blinding issues. Qualitative studies had problems mainly associated with failing to report sampling methods, data saturation, lack of clarity around the researcher’s role and relationship with participants, poor discussion of assumptions or biases, and “low perception of confirmability” (in the opinion of the reviewers).

“It is not enough to simply tell patients how to do something in rehabilitation. While this provides them with instruction, it does not engage other aspects that are important in building self-efficacy.”
LIMITATIONS:
The authors are open about the study’s limitations. While there was a large overall effect size, the studies focused primarily on middle-aged or older women with hip and knee OA. Most were conducted pre or post-arthroplasty. While this is a useful group to study because of the increasing numbers of people living with OA, it does not represent the entire population so on the basis of this study there is little evidence to support the same approach being used either for other conditions, or for younger people.

Self-efficacy is, as the authors point out, “a highly task dependent construct”. It is also context dependent. Measurement of self-efficacy must be equally specific, and it is difficult to tell whether the measures administered reflected self-efficacy for the exercises as they were carried out or were related more to activities in the daily lives of participants.

I was curious as to why the qualitative studies were included as there seemed to be little use of qualitative data in the discussion. To me this represents a loss of valuable data that could help clinicians use what is known about self-efficacy in musculoskeletal rehabilitation to greater effect.
CLINICAL IMPLICATIONS/HOW THIS IMPACTS CLINICAL PRACTICE:

Self-efficacy is often discussed by clinicians and in research but there can be a lack of clarity about what it means. This study shows that rehabilitation programmes can increase self-efficacy – but we’re not entirely clear as to what kind of self-efficacy improves.

Self-efficacy influences behaviour both directly and via its effects on other aspects of the behaviour chain. It’s therefore possible for clinicians to target expectancies, identify goals that are both relevant and challenging, and beliefs about barriers and facilitators of the behaviour in question.

It is not enough to simply tell patients how to do something in rehabilitation. While this provides them with instruction, it does not engage other aspects that are important in building self-efficacy. Motivation must also be built – using motivational interviewing, tapping into a person’s values or important roles/activities or occupations. At the same time, demonstrating how to perform various tasks, grading the difficulty and complexity of each task, and helping the person monitor his or her own arousal level will also support developing self-efficacy.

Self-efficacy is context and task dependent so it’s crucial for therapists to move beyond exercises in the safe environment of a clinic or gym setting. Life outside the clinic involves much more unpredictability. The variables may not be those directly related to the movements performed – including factors such as other people’s opinions, the imagined consequences of doing the movements (like not being able to sleep because pain increases, or losing home assistance if doing “too well”), and even simple environmental differences like tread height on stairs, floor covering, lighting and footwear.

Developing a more nuanced and sophisticated understanding of self-efficacy theory will allow physiotherapists and other health professionals to develop innovative and individualised rehabilitation that can improve the effectiveness of therapy.

STUDY REFERENCE

QUIZ

ANSWERS

Article by Travis Pollen

Answer—false, stronger association in females than males

Article by Dr Fiona Wilson

Answer: sequestration of the disc on MRI, and neurological weakness on physical examination

Click author names above to link to the original articles
Be on the lookout for a review on a very interesting new tendon study by tendon expert Seth O’Neill in an upcoming issue of Physio Network.

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