The sixth official issue of Physio Network containing twelve author research reviews
We are very pleased to have twelve authors in this issue of Physio Network:

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Author: Todd Hargrove

Quiz Answers
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Scot Morrison is a board certified orthopaedic physical therapist and certified strength coach who views rehabilitation as a process of identifying what goals matter to an individual, assessing where they currently are, and then creating an adaptive and systematic plan to get there. Scot currently practices in Portland, OR with a sports medicine emphasis. He also consults with various sports organizations and individual athletes.

Jean-Francois Esculier completed his Bachelor of Physiotherapy at the University of Ottawa and his Masters and PhD at Laval University, Canada. He is currently a Postdoctoral Research Fellow at the University of British Columbia, practices as a Physiotherapist at the Allan McGavin Sports Medicine Clinic in Vancouver, and lectures worldwide about running injuries through The Running Clinic.

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 programs, 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.
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Dr. Jarod Hall, PT, DPT, OCS, CSCS is a physical therapist in Fort Worth, TX. His clinical focus is orthopedics and therapeutic neuroscience education. Jarod is a board certified Orthopedic Clinical Specialist and Certified Strength and Conditioning Specialist. Jarod is also an adjunct instructor at the UNTHSC DPT program in the orthopedics, pain sciences, and manual therapy curricula. Dr. Hall presents continuing education at the local, state, national level and is an internationally recognized evidence based blogger.

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 biopsychosocial model in the management of persistent pain. You can find more about Robin and her team here www.alchemyinmotion.com.au
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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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.

Todd Hargrove is a Certified Feldenkrais practitioner, Certified Rolf er, 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.
METHODS (WHAT THEY DID):

The researchers searched biomedical databases to find randomised controlled trials that assessed the effectiveness of neurophysiological pain education as a treatment for adults with chronic back pain. The primary research question involved meta-analyses to estimate the pooled effects of education on pain and disability. They also looked at the effects on measures of beliefs such as fear of movement and catastrophizing. A secondary aim was to investigate whether different types of education intervention had different effects, and whether it made a difference if education was delivered individually or in groups. Along the way they did the usual systematic review practices like; double screening of the search results to make sure they didn’t miss any studies, double-checking data extraction to catch mistakes, assessment of risk of bias to make sure estimates are credible, and assessment of the overall quality of evidence to give an indication of how certain we can be about the size of the pooled effects.
RESULTS/WHAT THEY FOUND:

They found 7 relevant RCTs, generally of fairly small size (total n=313) and methodological quality was mixed. None of the studies assessed the effect of education on its own, but rather education plus other interventions versus the other interventions alone. The other interventions were typically things like manual therapy, exercises and general advice.

The main finding was low to moderate quality evidence that a treatment package containing a pain neurophysiology education component was effective in reducing pain and disability compared to treatment that did not include the education component. The pooled effects were pretty small; about 1 point on a 1-10 pain scale, and a roughly equivalent effect size on disability. These effects were present at the end of treatment, and endured up to 3 months after. The effects on beliefs and subgroup analyses were inconclusive, as there were too little data to make conclusions on these secondary aims.

LIMITATIONS (THINGS TO KEEP IN MIND):

The most important limitation with this review is the variation between studies in terms of education interventions, co-interventions, and control interventions, and the small number and size of the included studies. This means that we need to be a bit cautious when interpreting the findings. While the authors did use the GRADE approach, and concluded that quality of evidence for effects on pain was moderate, my reading of the data is that this is being somewhat generous. In practice, low quality evidence means that the real effects of a treatment in the clinic might be quite different to the size of the effects reported in this meta-analysis.
This systematic review was conducted more or less to contemporary best-practice standards. They found that adding neurophysiological pain education to other treatments brings a modest added benefit in terms of pain and disability to people with chronic back pain. The limitations mean that we can’t be to certain how big this added benefit will be in practice.

There are a couple of issues that are not discussed in the study that are quite important when it comes to the clinical implications. The first is a question of clinician capacity; delivering effective and accurate neurophysiology education with the goal of addressing maladaptive beliefs and cognitions is a specific skill and may require significant training and expertise. Second is integration of the education component into the broader treatment package; if the goal of education is re-alignment of beliefs it is worth considering how these beliefs interact with other treatment components, exercise prescription, medication, general activity advice, manual therapy, etc. Finally, practical consideration of how a substantive time investment in education will fit in with treatment context, including; the reimbursement system, patient expectations, delivery of other intervention components, and availability of time.

The findings from this study indicate that providing education centered on improving understanding of the neurophysiology of pain is a useful adjunct to treatment of people with chronic back pain.

"Providing education centered on improving understanding of the neurophysiology of pain is a useful adjunct to treatment of people with chronic back pain"
ARTICLE BY STEVE KAMPER

QUIZ

By how many points on a 1-10 pain scale did including pain neurophysiology education improve pain levels compared to treatment without pain education?

Click here to link to quiz answer
LOW RATES OF PATIENTS MEETING RETURN TO SPORT CRITERIA 9 MONTHS AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION: A PROSPECTIVE LONGITUDINAL STUDY

SCOT MORMISON

BACKGROUND & OBJECTIVE:

A significant and growing body of data exists to indicate that testing physical and psychological abilities is necessary for making return to play decisions. A time frame of 6 months following ACL reconstruction has been used traditionally, but this has been challenged by data showing longer time frames result in better outcomes on testing and injury risk. The authors in this study looked at performance on a return to play test battery at 6 and 9-month intervals in order to determine if there was a significant difference in results.

METHODS (WHAT THEY DID):

ACLR patients were recruited by a single researcher from a rehabilitation facility with data collected between 2015 and 2017. Initially 81 patients met the inclusion criteria but only 61 were included after attrition was accounted for. Patients were taken through the test battery twice; both at 6.5 ± 0.7 and 9.5 ± 0.9 months after ACLR. The battery included tests for knee flexion and extension strength (Isokinetic at 60/120/300o/s), jumping (triple hop, side hop, and single leg hop tests), landing task assessment (Landing Error Scoring System) and outcome scores (International Knee Documentation Committee Subjective Knee Form (IKDC) and the Anterior Cruciate Ligament–Return to Sport after Injury Scale (ACL–RSI)). A 2x2 ANOVA was used to compare 6 and 9 months, involved and uninvolved legs, and hamstring and patellar tendon grafts. A power analysis indicated a need for a sample of 27 with an effect size of 0.50 and alpha of 0.05 in order to achieve a power of 0.80. In addition they also performed a regression analysis looking at the ability of the individual tests to predict passing the test battery.
RESULTS/WHAT THEY FOUND:

Of the 62 patients included only 2 (3.2%) passed all tests at 6 months and that only increased to 11 (11.3%) by the 9-month mark. For the strength tests only 5 (8.1%) passed at 6 months and 13 (21%) patient at 9 months. However 39 (62.9%) passed the jump tests at 6 months and 48 (77.4%) at 9 months. The numbers who obtained passing scores on the IKDC and ACLR-RSI went from 58.1% to 62.9% and 59.7% to 72.6% at 6 and 9 months respectively. They also found that those with a hamstring graft tended to score better than patellar tendon on selected tests including limb symmetry index measured at 60°/s at 9 months.

LIMITATIONS/THINGS TO KEEP IN MIND:

The authors point out that the recommendations given were based on the results on the chosen tests. No follow-up on return to play status was made. This study also only looked at a single center treatment group over time who were using a rehabilitation approach that had previously been described. There was also some dropout due to lack of motivation among other reasons.
CLINICAL IMPLICATIONS/HOW THIS IMPACTS CLINICAL PRACTICE:

This study adds to the existing literature in suggesting that the decision to return athletes to play based on time frames is likely misguided. Even at the 9-month mark the vast majority of patients were not passing standard tests at a level sufficient to warrant return to play. Quadriceps strength was revealed to be one of the main predictors of whether the individual would be able to pass the rest of the tests. However, the change in scores between 6 and 9 months were below the minimal detectable change. This indicates that the training load during the 3 months between testing was insufficient to elicit adaptations in force output.

Practically, this indicates two main points that the clinician can take away. First, dedicated and valid tests must be used when making decisions on readiness. In addition, a measure of knee extension torque would appear to again be one of the most important measures to assess. Second, loading strategies must be monitored in order to ensure that the desired adaptations are occurring. Underloading is a reoccurring theme that cannot be addressed without feedback loops being implemented and acted on.

“Quadriceps strength was revealed to be one of the main predictors of whether the individual would be able to pass the rest of the tests”

STUDY REFERENCE

ARTICLE BY SCOT MORRISON

QUIZ

Which tests were ACLR patients more likely to pass at the 9-month mark – strength tests or jump tests?

Click here to link to quiz answer
EFFECTIVENESS OF MANUAL THERAPY ON PAIN AND SELF-REPORTED FUNCTION IN INDIVIDUALS WITH PATELLOFEMORAL PAIN: SYSTEMATIC REVIEW AND META-ANALYSIS

DR JEAN-FRANÇOIS ESCULIER

BACKGROUND & OBJECTIVE:

Patellofemoral pain (PFP) is a very common orthopaedic condition. Clinical management of PFP typically consists of multimodal interventions potentially including exercises, education, taping and manual therapy. Some previous studies have attempted to address symptoms of PFP through the inclusion of manual therapy (MT), which could include patellofemoral joint, tibiofemoral joint or lumbar spine/sacroiliac joint mobilizations. The aim of this systematic review and meta-analysis was to evaluate and summarize the evidence for the effectiveness of MT interventions (either used alone or in combination with other interventions), compared with other interventions, placebo, or sham for pain and self-reported function in individuals with PFP.

METHODS (WHAT THEY DID):

The authors searched four databases for randomized clinical trials. To be included in the review, studies had to include some form of manual therapy intervention directed at the patellofemoral joint, lower extremity or lumbar spine, either alone or combined with other interventions. Two reviewers independently extracted data from the included studies and rated them using the Cochrane Risk of Bias tool. The authors then combined studies that evaluated similar outcomes in a meta-analysis process so that conclusions could be drawn.
RESULTS (WHAT THEY FOUND):

Nine studies were included in the final review. The authors reported these main findings:

- 6 studies demonstrated a clinically meaningful improvement in pain scores with the inclusion of manual therapy
- 4 studies met a clinically significant improvement in function
- Moderate evidence for short-term pain relief benefits (6 weeks or less) of manual therapy directed at the patellar region in those with PFP, when compared to a control or sham intervention.
- There may be short-term added benefits for pain reduction with the inclusion of manual therapy as part of a more comprehensive approach

“Manual therapy likely adds little value to an active intervention that includes exercise therapy”
LIMITATIONS (THINGS TO KEEP IN MIND):

There are major limitations to this review. Several included studies used manual therapy as part of multimodal interventions. Some of these studies had manual therapy only as a minor component, in combination with exercises, foot orthoses or taping. Even though the authors conclude that manual therapy can have short-term clinically meaningful benefits on pain in those with PFP, it is impossible to determine if any of these effects are due to manual therapy, or due to all the other components of these multimodal interventions. If studies using multimodal physiotherapy had been classified as such, very weak effects of manual therapy on pain and function would have resulted. Another major limitation is that every study used its own protocol for manual therapy, hence making it difficult to combine studies together.

CLINICAL IMPLICATIONS (HOW THIS IMPACTS CLINICAL PRACTICE):

Misleading conclusions have to be taken with a grain of salt. Appropriate interpretation of the data gathered from the systematic review outlines that manual therapy likely adds little value to an active intervention that includes exercise therapy. Results from this review should not provide physiotherapists with a strong rationale to use manual therapy as part of their treatment plan for PFP. The latest consensus statement on PFP released by a group of international experts and based on the current literature (Crossley et al., 2016) outlined that manual therapy may actually not provide additional benefits. While not discouraging the use of manual therapy, clinicians are encouraged to focus on an active approach that incorporates exercises targeting the hip and quadriceps muscles. A multimodal intervention combining exercises with proper education and taping, for example, would be significantly more evidence-based than performing patellar mobilizations.
**BACKGROUND & OBJECTIVE:**

There have been many models used for clinical reasoning in low back pain, and this paper proposes another one. The difference between this model and previous ones is that it attempts to incorporate the multiple factors known to influence both pain and disability associated with low back pain. The authors use the International Classification of Functioning, Disability and Health as a way of framing the various factors and argue that clinicians should assess for the presence of elements included in each of the five domains to establish those that might contribute to the person’s presentation. Further detailed assessment could then be used to determine where treatment should be directed.

This paper details how the model was developed, basing it on current research but also incorporating classification systems for what they deem “nociceptive” pain drivers, along with “nervous system dysfunction” drivers. Distinguishing between the two factors is a key element in determining treatment focus. Once the primary “drivers” are identified, clinicians are directed to also identify comorbidity factors such as mental health problems, and other physical health problems such as diabetes or other painful musculoskeletal problems.

Cognitive-emotional “drivers” are also identified, incorporating tools such as the StartBack questionnaire or Orebro Musculoskeletal Screening Questionnaire. There is some attention paid to behavioural factors (such as Waddell’s signs and the BAT-Back). Domain five is identified as “contextual drivers” in which workplace and family contributors are identified. Aspects such as job satisfaction, the presence of modified work, the person’s relationships with those at work can be identified, along with the influence of family relationships, though relatively little attention is paid to social factors outside of employment.

Finally, the paper discusses how this model might be applied in practice, using two case studies to demonstrate how it might be used. Responses within each of the five “drivers” can be mapped on a pentagonal diagram, indicating where the clinician might put his or her effort – or refer to other members of the team.

The authors argue that this model provides for integration of various factors that until now have not been readily synthesised within physiotherapy clinical reasoning models. The authors acknowledge that much physiotherapeutic intervention is based on biomechanical or deficits of body functions and structures and suggest that by clearly identifying other factors that are also present, clinicians might have greater success.
METHODS (WHAT THEY DID):

This paper does not have a methods section as it is not an experimental paper, but rather a description or synthesis.

RESULTS/WHAT THEY FOUND:

The paper presents a useful overview, and a pragmatic approach to assessing and integrating biopsychosocial factors known to influence outcomes in musculoskeletal pain (not just low back pain). The two-tiered approach where common and important factors are screened first, on top of less common or factors more difficult for physiotherapists to manage outside a team context, has appeal because it helps physiotherapists recognise that these factors do contribute.

“By clearly identifying other factors that are also present, clinicians might have greater success”

LIMITATIONS/THINGS TO KEEP IN MIND:

We could all argue that certain contributors to pain and disability are omitted. We could also argue that the model is somewhat simplistic given that pain may be a combination of several different mechanisms.

I also wonder at the breadth of knowledge a single profession is being asked to bring to their assessment – particularly given the relatively limited training in psychosocial and contextual factors included in many training programmes.

The model also hasn’t been “field tested” to identify whether using it provides better outcomes for clients/patients or clinicians. Important aspects such as inter-rater reliability haven’t been established (i.e. given the same patient, would two therapists identify the same “drivers”? Would their treatments differ? Does this matter?).
CLINICAL IMPLICATIONS/HOW THIS IMPACTS CLINICAL PRACTICE:

A clinical reasoning tool provides a template or framework to shape the way the problems a person comes to treatment for are defined. It’s like a lens through which clinicians view the world. As such I think this model is lightyears ahead of many of the systems previously introduced.

The challenges are in how well clinicians are trained to identify “drivers”, and whether they may skip over some because of lack of familiarity and/or confidence. There have been numerous cries of “this isn’t in my scope of practice” when psychosocial factors are discussed, and although this paper articulates the rationale for including them all, I don’t think it will directly address some of the issues known to influence what happens in the clinic. Things like lack of knowledge/training; lack of confidence; concerns about time wastage; funding; peer attitudes and so on all feature when physiotherapists think about routinely including psychosocial factors in both assessment and treatment.

A further consideration that isn’t introduced in this paper is the known relationships between these variables or “drivers”. There are known causal relationships between, for example, poor sleep and increased pain. Negative emotions are associated with reports of higher pain. Pain behaviours are associated with catastrophising, and catastrophising is associated with anxiety sensitivity and the pursuit of social support.

The authors appear to suggest that if a factor is identified, and it’s modifiable, then it may become a target of therapy. I think this may inadvertently reinforce some unhelpful beliefs about behaviour change in pain management. By pointing out that a person has unhelpful beliefs about their pain, the focus may turn to giving education to “correct” the beliefs. While this might be useful for those who are ready to hear this information, for others this approach is less helpful.

Skills, concern about scope, confidence and a very simplified model may restrict the use of this helpful heuristic for clinical reasoning. I hope we can see future iterations where aspects are developed in more detail and I look forward to seeing this model disseminated more widely among physiotherapists.
TWENTY-YEAR FOLLOW UP STUDY COMPARING OPERATIVE VERSUS NONOPERATIVE TREATMENT OF ANTERIOR CRUCIATE LIGAMENT Ruptures IN HIGH-LEVEL ATHLETES

LINDA TRUONG

BACKGROUND & OBJECTIVE:

Anterior cruciate ligament (ACL) injuries are common knee injuries that occur during sport. These injuries result in functional impairment, decreased sport participation, reduced quality of life and are associated with the development of post-traumatic knee osteoarthritis (OA). Presently, ACL injuries are managed operatively with ACL reconstruction (ACLR) or nonoperatively. However, no specific treatment option has been established as superior in reducing long-term disability or preventing the development of OA after ACL injuries. This study aimed to compare the long-term outcomes in high-level athletes with ACL injuries who were managed either operatively or nonoperatively.

METHODS (WHAT THEY DID):

Patients with ACL injuries and Tegner scores between 7-9 were eligible for inclusion in this study. The Tegner Score is a subjective questionnaire regarding activity level (see image).

All patients were required to complete at least 3 months of a physical therapy exercise program. If patients had persistent symptoms of instability despite rehabilitation, ACLR was offered.

In total, 25 patients underwent ACLR between 1994-1996 and 25 patients who opted for nonoperative management were pair matched with the operative group based on age, sex and Tegner score before injury. Both groups were then followed for 20 years and comparison of outcome measures between the matched pairs were done at 10 and 20-year follow-ups. Outcomes included radiographic x-rays to measure knee OA and generalized OA, patient reported outcomes on function (Lysholm score, IKDC, KOOS, Tegner score), functional stability tests (1-legged hop tests and clinical knee exam) and number of meniscectomies.
RESULTS/WHAT THEY FOUND:

Over the 20 years, 1 patient from the nonoperative group underwent delayed ACLR and 4 patients from the operative group had a graft rupture. 1 patient from the operative group had a total knee arthroplasty.

At the 20-year follow up, there were no differences between the operative or nonoperative groups on radiographic knee OA or generalized OA, patient reported outcomes, or number of meniscectomies after ACL injury. No difference was found between groups on functional stability in the 1-legged hop tests. The operative group had better stability on the clinical knee exam. Knee OA was present in 80% of patients in the operative group and 68% in the nonoperative, but this result was not statistically significant.

LIMITATIONS/THINGS TO KEEP IN MIND:

This study had a relatively small sample size and therefore may not have enough power to detect a significant association between the two groups. The study also included high-level athletes that rated themselves competitive. Therefore, caution should be taken when generalizing to recreational populations.

The study began in 1992. Since then, both surgical and rehabilitation management of ACL injuries has evolved. At that time, 3 months of an exercise program was viewed as normal, but we now know that this is not sufficient to restore the deficits that occur with ACL injuries. The innovation in ACL management today may yield different results if this study was to be reproduced.
Restoring functional stability after an ACL injury is the primary goal of treatment. This study sheds light on the possibility that patients who choose nonoperative management of their ACL injuries can achieve the same level of function and activity level as patients with ACLR. Further, nonoperative management did not result in greater levels of knee OA or long-term disability. This is important when providing education and treatment options to patients after an ACL injury. Although ACLR is widely accepted as the primary treatment option for ACL injuries, this study contributes to a growing body of evidence that ACLR is not the only treatment option for ACL injuries. Consideration of the patient’s goals, function and lifestyle demands are some factors that should be considered when providing recommendations on treatment options.

Regardless of treatment, patients with ACL injuries have a higher risk of developing knee OA compared to a healthy knee. Therefore, rehabilitation after an ACL injury should include strategies to optimize short and long-term knee health. Patients should be educated on ways to reduce further injuries (i.e. safe return to sport, implementing an injury prevention program) and be provided with knowledge regarding OA.

“ACLR is not the only treatment option for ACL injuries”

Finally, patients should be given the opportunity to trial conservative management following an ACL injury. If instability symptoms persist, then discussion and referral for operative management should be considered. Too often patients are not presented with different treatment options for ACL injuries and are pushed towards operative treatment. By properly educating patients, we empower patients to make an informed decision on the best pathway for managing their ACL injury.

ARTICLE BY LINDA TRUONG

QUIZ

True/False – At the 20-year follow-up, there was no difference in functional stability in the 1-legged hop tests between the operative and nonoperative groups.

Click here for quiz answer
AGE STEREOTYPES’ EFFECTS ON MOTOR LEARNING IN OLDER ADULTS: THE IMPACT MAY NOT BE IMMEDIATE

MARIANA WINGOOD

BACKGROUND & OBJECTIVE:

Language is a powerful tool that is often under-valued and forgotten. However, the words clinicians use can have secondary/unintentional circumstances, including effects on motor learning and performance. Those working with older adults need to be extra vigilant in their language use, especially with terminology that may reflect implicit or explicit forms of ageism. Ageism was defined by Dr. Robert Butler in 1968 as a “systematic stereotyping and discrimination against people because they are old” and unfortunately it still exists today. Ageist beliefs can result in internalized self-perception of aging and affect an older adult’s health-related outcomes. This has been studied on multiple occasions and the results are consistent: self-perception of aging affects performance on both cognitive and motor tasks. The researchers of this study took a closer look at the effects of age-based stereotype on a balance task. They examined the effect of stereotype on both immediate and delayed motor performance. With the primary purpose of determining whether stereotypes influence motor learning in older adults.
METHODS (WHAT THEY DID):

*Subjects Selected:* Female (age range 60-76 years old) recruited from a female physical activity group.

*Procedure:* Participants were instructed to stand on a wobble board (left/right deviation of max 18°) and maintain it in a horizontal position for as long as possible. After the initial trial, participants were given specific instructions based on the randomly pre-assigned category (a negative stereotype group, a positive stereotype group, and a control group)—see Table 1 for details.

*Table 1: Instructions for each pre-assigned category*

<table>
<thead>
<tr>
<th>Control Group</th>
<th>Negative Stereotype</th>
<th>Positive Stereotype</th>
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<tbody>
<tr>
<td>Performance on this balance task was not influenced by age.</td>
<td>- Their performance would be compared with performance of young adults.</td>
<td>- Their performance would be compared with performance of participants 20 years older.</td>
</tr>
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All participants performed a learning phase consisting of 10 trials with 90-s breaks. Twenty-four hours later a retention test was completed. A retention test is performed to assess the persistence of an improved performance. This is done by requiring the participant to perform a practiced task after a period of time during which the task was not practiced. In this case it was used to assess the effects of stereotype manipulation (positive vs. negative) on relatively permanent change/learning of the novel balance task—standing on the wobble platform.
RESULTS/WHAT THEY FOUND:

According to this study older adults receiving a negative age stereotype did show reduced performance on the balance task during the retention test. It is important to note that these effects were only noted during permanent learning and not during the practice phase. Meaning that the effect of stereotype threats may not be visible immediately but are visible long term.

LIMITATIONS/THINGS TO KEEP IN MIND:

The primary limitations are that there is limited generalizability (subjects included only female) and a limited retention test. It would be good to complete a follow-up study with subjects including males and females as well as the retention test performed a week/month later.
CLINICAL IMPLICATIONS/HOW THIS IMPACTS CLINICAL PRACTICE:

There are a couple of theories to explain the results of this study:

Theory 1: Older Adults have an improved ability to regulate emotions, however, they also have a defensive self-regulatory strategy with a preventative focus. This strategy has been found to be beneficial for performance in the short term, immediately after the stereotype induction. However, long term this can lead to cognitive exhaustion, which may be why the participants were not affected immediately after the negative age stereotype but were affected 24 hours later.

Theory 2: Decreased self-efficacy/diminished confidence may threaten participant’s task-relevant attention. Attention is required for long term learning and may explain the degradation during the retention test.

Additional studies would be required to determine the cause of these results. However, that is not the purpose of this article. This article helped identify the detrimental effects of negative age stereotyping on motor learning. The results emphasize the importance of eliminating ageism and age-related stereotype. Older adults are a heterogeneous group and they should be treated as individuals with individualized assessments and interventions.

Overall, the results of this study confirm the importance of the words we say. As healthcare workers we need to eliminate both implicit/explicit forms of ageism. This includes not acting surprised when an older adult is participating in an activity “not expected” for someone their age. In closing, our society needs to stop portraying “old” as an undesirable state.

“The results emphasize the importance of eliminating ageism and age-related stereotype”

+ STUDY REFERENCE


MARIANA WINGOOD
PRAGMATICALLY APPLIED CERVICAL AND THORACIC NONTHRUST MANIPULATION VERSUS THRUST MANIPULATION FOR PATIENTS WITH MECHANICAL NECK PAIN: A MULTICENTER RANDOMIZED CLINICAL TRIAL

DR JAROD HALL

BACKGROUND & OBJECTIVE:

It has been reported that both NTM and TM produce comparable physiological effects that facilitate pain reduction, change neuromuscular input and alter the inflammatory state caused by injury, yet these two interventions have not been compared in a pragmatically applied clinical setting. Research has demonstrated that the neuro-physiological effects of manual therapy (MT) occur locally where the MT is applied, segmentally, and at the supraspinal level. However, due to the temporary nature of the treatment effects of MT, it has been recommended that both NTM or TM not be utilized in isolation and instead should be combined with therapeutic exercise to attain longer-term benefits. To date, there have been no studies conducted to examine the impact of a pragmatically applied TM versus NTM approach to both the cervical and thoracic spines in patients with neck pain. The purpose of this study was to compare the effectiveness of pragmatically applied TM to that of NTM, targeting the symptomatic level of both the cervical and thoracic spines in patients with mechanical neck pain.

METHODS (WHAT THEY DID):

This study was designed as a multicenter RCT. Patients were eligible if they presented with mechanical neck pain, were between the ages of 18 and 70 years, scored a minimum of 20% on the Neck Disability Index, and reported 2/10 or greater on the 24-hour NPRS. All participating clinicians were OMT (orthopedic manual therapy) advanced practitioners as defined by AAOMPT. In clinical studies, clinical equipoise can often be a confounding factor influencing the outcomes and confounding data. In this study, a 2-part control was placed for measuring the impact of clinical equipoise. First, global belief of overall technique effectiveness was measured at the beginning of the clinical trial. Second, following the examination of each patient, the treating clinicians rated their clinical opinion of which OMT technique they felt would be more effective for that patient. The techniques and dosage parameters for the MT interventions were determined pragmatically. The experimental groups received either NTM or TM, targeting the symptomatic level, to both the cervical and thoracic spines. The treating clinician performed either graded oscillatory technique or a high-velocity, low-amplitude thrust to the most symptomatic segment of both the cervical and thoracic spines. The type of NTM/TM, direction of thrust/grade and direction of oscillation of NTM were at the discretion of the clinician. Additionally, a HEP was provided to both groups that included AROM exercises for both the cervical and thoracic spines and deep cervical flexor (DCF) exercises.
RESULTS/WHAT THEY FOUND:

The final analysis included 103 patients – 48 randomized to receive TM and 55 to receive NTM. The results of this study found no between-group differences in disability, pain, or motor performance among patients with mechanical neck pain who received a concordant NTM or TM to both the cervical and thoracic spines.

LIMITATIONS/THINGS TO KEEP IN MIND:

A sample of convenience was used rather than a more sophisticated type of random sample. Treating clinician and patients could not be blinded to group allocation. No long-term follow-ups were collected on patient outcomes. Patient preference for treatment was not measured. This is important because previous data has demonstrated patient preference for treatment interventions has direct implications for success of treatments.
When applied pragmatically, both NTM and TM produce similar improvements in pain and disability for patients with mechanical neck pain. This, along with previous findings, implies that mechanisms of action likely do not differ greatly between TM and NTM, and that manual therapy may produce a more general and/or non-specific treatment effect rather than an effect specific to the parameters of the isolated intervention. In addition, previous research has demonstrated patient preferences/expectations of specific interventions, manual handling confidence of the treating clinician, and patients’ perception of a clinician’s expertise all play a role in treatment outcomes. Given this information, clinicians should defer to utilizing interventions in which they are most comfortable or those that a patient has preference for.

Despite similar outcomes from both TM and NTM, it may be prudent for clinicians to either feel comfortable with a variety of manual interventions or have a referral network of diverse providers in order to better meet patient expectations within the framework of a comprehensive evidence-based treatment approach. In conclusion, a combination of MT and exercise is effective for the treatment of neck pain regardless of specific MT treatment technique when utilized in a pragmatically assigned manner in which clinical equipoise is controlled for.

"Clinicians should defer to utilizing interventions in which they are most comfortable or those that a patient has preference for stiffness"
Based on prior research mentioned in this review, name one factor that should help therapists decide which manual therapy technique to use?

Click here for quiz answer
WHAT WORKS AND DOES NOT WORK IN A SELF-MANAGEMENT INTER-VENTION FOR PEOPLE WITH CHRONIC PAIN? QUALITATIVE SYSTEMATIC REVIEW AND META-SYNTHESIS

ROBIN KERR

BACKGROUND & OBJECTIVE:

This systematic review and meta-synthesis is a qualitative exploration into the perceptions of people with chronic pain, asking what aids and hinders their ability to incorporate self-management skills into their daily lives following a self-management intervention program.

METHODS (WHAT THEY DID):

PRISMA & ENTREQ requirements were met for a thematic synthesis of data from the 33 included studies (512 participants). Factors that could be considered “Enablers” and “Barriers” to an individual’s ability to incorporate self-management strategies into their daily lives were identified and correlated into themes.

RESULTS/WHAT THEY FOUND:

(A) Enablers of Self-Management:

Theme 1: Self-Discovery – the ability to distinguish self (body, thoughts and feelings) from pain
Theme 2: Feeling Empowered – knowledge, pacing, relaxation, cognitive techniques, exercise
Theme 3: Supportive Ambience – health care providers/family/work

(B) Barriers to Self-Management:

Theme 4: Sustained Motivation – overwhelming effort required to manage pain
Theme 5: Distress – pain, anxiety, stress, depression, limited problem-solving ability
Theme 6: Unsupportive Ambience – health care providers/family/work
LIMITATIONS/THINGS TO KEEP IN MIND:

- Qualitative meta-synthesis can downplay the significance of data from individual studies.
- Follow-up periods in the included studies ranged from 0-72 months post-intervention, making the most important influencers difficult to determine.

“Clinicians can enhance therapeutic alliance via open and non-judgemental communication, recognizing the struggle and listening with empathy, and valuing the person’s thoughts/feelings.”
CLINICAL IMPLICATIONS/HOW THIS IMPACTS CLINICAL PRACTICE:

Active approaches to self-management of chronic pain have been found to provide positive clinical outcomes, however that does not always al-lay the exhausting day to day struggle of some individuals with chronic pain. Active self-management programs mentioned in the study incorporate such cognitive and behavioural strategies as:

- Self-reflection
- Goal Setting
- Problem Solving
- Acceptance and commitment therapy
- Therapeutic Alliance with the clinician
- Pacing
- Meditation/Mindfulness/Relaxation
- Exercise
- Counselling
- Ergonomic advice
- Interactive Pain Neuroscience Education
“ENABLERS” OF SELF-MANAGEMENT

**Self-discovery:**

In this scenario there is a shift of perception from “struggling with” to “coping with” pain. Education on pain neuroscience and peer learning in support groups are effective ways to change core beliefs regarding pain. Altering the individual’s relationship with pain, a sense of empowerment may further increase their confidence to problem solve, goal set and employ a more “trial and error” and “in the present” process, ultimately snowballing their self-efficacy beliefs.

**Feeling Empowered:**

It is imperative that the skills learnt in an intervention program can be put into real life practice and used as “tools”, allowing the person to regain a sense of control. This may entail further 1:1 input from the clinician if the “tool” use is suboptimal. Empowerment may also come from a shift in the level of acceptance within the individual of pain being “a part of myself” rather than the original focus on becoming “fully pain free”. Pain support group dynamics can also empower via a sense of normality, shared learning, peer validation and positive role modelling in an empathic environment.

**Supportive Ambience:**

Collaborative support from clinicians, family & friends and work environment can further grow self-discovery and self-empowerment. Clinicians can enhance therapeutic alliance via:

- Developing their own communication skills, e.g. Motivational Interviewing
- Facilitating pathways for the person to improve their communication skills be that verbal, written or artistic.
- Open and non-judgmental communication
- Recognizing the struggle and listening with empathy
- Valuing the person’s thoughts/feelings
- Sharing decision-making
- Guided problem solving
- Provision of constructive feedback
Family & Friends can assist self-management in the home via:

- Actively participating in the intervention program
- Believing and understanding the issues with the person in pain
- Improving communication between all stakeholders

Work Environment can assist via:

- Symptom legitimization
- Work place modifications

“BARRIERS” TO SELF-MANAGEMENT

**Sustained Motivation:**

Failure to complete the day to day “active pain management” strategies can lead to feelings of guilt, self-criticism and self-dislike. The act of accepting pain as part of “self” was reported as an act of surrender by some. This was particularly felt by those with heavy biomedical beliefs in causation of their pain during flare-ups. Here the clinician may provide support via booster sessions and facilitation of well-informed peer group support.

**Distress:**

Ongoing pain can result in distress, with the presence of stress, fatigue, anxiety and depression. These factors promote negative cognitions and referral to appropriate counselling could be required.

**Unsupportive Ambience:**

The invisible nature of pain can result in the person’s suffering being incomprehensible to significant others. People in pain need to develop communication skills that lead to productive discussions with clinicians, family/friends and workmates. They need the ability to describe their pain experiences, state treatment preferences and discuss management plans.

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METHODS (WHAT THEY DID):

A cross-sectional study design was used. Participants were included if between 35 and 70 years old and had lateral hip pain for at least 3 months with an average intensity of 4 or more out of 10 on a numeric scale. Several tests were used in the diagnosis of gluteal tendinopathy which are worth noting as they may prove useful in clinic. To be included participants needs to report pain on direct palpation of the gluteal tendon insertions on the greater trochanter and test positive (have lateral hip pain) on at least 1 of the following 6 tests:

- FABER (Flexion Abduction External Rotation)
- FADER (Flexion Adduction External Rotation)
- Isometric muscle contraction in FADER test position
- Adduction test
- Isometric muscle contraction in adduction position
- Single leg stance on affected leg for 30 seconds

Those that met these criteria then went on to have an MRI to confirm diagnosis. 204 participants were recruited, 82% of which were female. The mean age was 55 years with a range between 36 and 71. Psychological factors were assessed using a collection of questionnaires including the Pain Catastrophizing Scale, the Pain Self Efficacy Questionnaire and the Patient Health Questionnaire. Quality of life and physical activity were also assessed alongside waist girth and hip abductor strength. VISA-G (reliable and valid disability score for gluteal tendinopathy, see https://www.researchgate.net/publication/304168478_Visa_G_with_scoring) was used to assess severity and classify participants into 3 subgroups; mild, moderate and severe. A numeric scale was also used to assess average and worst pain ratings over the previous week.
RESULTS (WHAT THEY FOUND):

The severe group had significantly higher pain catastrophizing and depression scores and lower pain self-efficacy compared to both the mild and moderate severity groups. Quality of life and activity levels were also significantly lower in the severe group. Waist girth was greater in the severe group compared to the mild group, and females showed significantly greater BMI in the severe group compared to both the mild and moderate groups. There were no significant differences in hip abductor muscle torque between the groups.

LIMITATIONS (THINGS TO KEEP IN MIND):

The main consideration with this study is that cause and effect are hard to establish i.e. we can’t assume that psychological factors lead to higher levels of severity in gluteal tendinopathy. There is also no control group to compare with which would be useful to see if physical and psychological factors differed between those with gluteal tendinopathy and healthy participants.
The key message here that more severe pain and disability was associated with psychological distress and quality of life rather than hip abductor strength highlights the importance of recognising psychosocial factors in tendinopathy. Such factors aren’t often included in the current ‘just load it’ approach often recommended for tendon pain.

The percentage of people with problems with anxiety and depression was roughly double in the severe group compared with the mild and moderate groups. This suggests mental wellbeing may be a significant factor for some and perhaps warrants a multi-disciplinary approach.

Excellent qualitative research by Sean McAuliffe and colleagues has revealed that many patients with tendon pain are concerned about damaging their tendon, unsure about activity levels and fearful of movement. Such concerns may hinder their adherence to rehab and present a barrier to loading exercises that may help pain and function. It’s important to empathise with these concerns and recognise the impact tendon pain can have on life and valued activities.

A final thought – while hip abductor strength wasn’t significantly different between the groups in this study, it has been found to be reduced in people with gluteal tendinopathy compared to healthy subjects. Strengthening the hip abductors may therefore be a valuable part of managing gluteal tendinopathy alongside addressing psychosocial factors, education and facilitating a guided return to goal activities.

“More severe pain and disability was associated with psychological distress and quality of life rather than hip abductor strength”

DO NOT THROW THE BABY OUT WITH THE BATHWATER; SCREENING CAN IDENTIFY MEANINGFUL RISK FACTORS FOR SPORTS INJURIES

DR TEDDY WILSEY

BACKGROUND & OBJECTIVE:

Current injury prediction strategies assume only individual risk factors. They are not able to quantify, account for, or predict the complex and unpredictable environments athletes encounter. Recent debates have questioned the effectiveness and efficacy of screening as part of the injury prevention process. Therefore, the purpose of this editorial was to address the increasingly popular narrative that screening tools lack efficacy, and therefore lack clinical utility.

METHODS (WHAT THEY DID):

As this paper was an editorial, the ‘methods’ and ‘limitations’ sections are not applicable.

“While injury prevention screening does not hold up to rigors of research to predict injury, it should not be immediately disregarded as lacking clinical relevance”
RESULTS/WHAT THEY FOUND:

While injury prevention screening does not hold up to rigors of research to predict injury, it should not be immediately disregarded as lacking clinical relevance. The results of a movement screen provide a repeatable way to objectively observe, examine, and compare athletes. Furthermore, they are extremely helpful for young clinicians still honing their observation and exam skills.

While it is fully recognized that injury prevention screening has not proven to be efficacious for its original purpose, an over-simplification to remove them from clinical practice would not be advisable. They should be termed movement screens, not injury prevention screens. They still hold merit in the context of evaluating individual athletes from a movement assessment standpoint. They paint the whole picture that an examination on a clinical table cannot. They show how isolated joint measurements of range of motion and strength work in concert.

While injury prevention screens have not been shown to be accurate in predicting injury, injury prevention strategies in training for groups of athletes have been shown to be extremely effective. Ideally, the injury prevention approach should cast a wide net. It should include both high and low risk athletes. It should be designed not specifically for the athlete, but for the demands of their sport. It should consider injuries most commonly seen in their sport as well as amongst their demographic. An injury prevention program should be synonymous with training. It should be sport and demographic specific. It should factor in strength demands, mobility demands, energy system demands, as well as competitive time of year.

Movement screens should be framed as strategies to assess individuals – that’s it. There should not be an injury prevention term attached to them. Movement screens can be extremely helpful to quickly assess and individualize specific aspects of training in a team environment. One example is the differences in stretching required in athletes depending on their natural ligamentous laxity. This can usually be observed fairly quickly in a few flexibility tests and history questions.

London epidemiologist Geoffrey Rose described the prevention paradox: to paraphrase, a universal prevention approach that includes both a low and high-risk population would in absolute terms benefit more athletes than a targeted approach for high-risk athletes only. Therefore, it would be ideal to include all your athletes in an injury risk and prevention program, not just the ones selected via screening, injury history, and injury risk stratification.
CLINICAL IMPLICATIONS/HOW THIS IMPACTS CLINICAL PRACTICE:

The most valuable and actionable piece of clinical information in this paper is the idea of injury risk being based on time, or temporal factors. Temporal factors include what exactly is happening at the time of injury, previous training, competition cycle, current injury state (i.e. do they have a sore knee?), general physical preparedness, level of fatigue, immediate level of fatigue at the time of injury, nutrition and hydration status, etc. The list of factors that can influence an injury is endless.

In the context of the discussion regarding the temporal nature of injury, it would be ideal to create a method to repeatedly perform screening tests over time. One example would be assessing physical readiness and altering playing or practice time in order to mitigate injury risk. If we were able to stratify injury risk in a test or objective number, it would undoubtedly be influenced by current training demands, sport demands, and physical readiness. These variables are both measurable and objective. They are commonly used in sport science, data aggregation, and athlete monitoring programs.

In conclusion, it is impossible to predict injury and remove all risk. The prevention and prediction process should include a combination of temporal factors as well as non-modifiable factors including injury history, and results of a physical and movement evaluation. A movement screen can be helpful in customizing athlete programming, but it is not an effective means to prevent injury.

+ STUDY REFERENCE


DR TEDDY WILLSEY

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COGNITIVE FUNCTIONAL THERAPY: AN INTEGRATED BEHAVIORAL APPROACH FOR THE TARGETED MANAGEMENT OF DISABLING LOW BACK PAIN

DR SANDY HILTON

BACKGROUND & OBJECTIVE:
Low back pain (LBP) is described as the leading cause of disability and uses a large portion of health care dollars globally. A biopsychosocial approach that addresses the multidimensional components of the complexity of pain is encouraged in modern pain care. The authors of this study propose that the approach of Cognitive Functional Therapy (CFT) fulfills this multi-dimensional reasoning framework and allows clinicians to identify the individual contributing factors and create a modifiable treatment plan that is aligned with the patient’s goals. This paper lays a framework for individualized care that aims to build self-efficacy and “break the cycle of pain-related distress and disability.”

METHODS (WHAT THEY DID):
This is a perspective paper; there is not a method section. They classify the multidimensional factors associated with LBP as:
- Pain Characteristics
- Pathoanatomical Factors
- Physical Factors
- Psychological Factors (cognitive and emotional)
- Social Factors
- Lifestyle Factors
- Health-related Factors

These factors are assessed as part of the interview and taken into consideration in designing a program for the patient along with a physical examination that includes sensory and movement assessment.

Treatment from a CFT approach has 3 key components:
- Making sense of pain
- Exposure with control
- Lifestyle change
RESULTS (WHAT THEY FOUND):

This paper describes the theoretical perspective for CFT with 3 case studies presented. The team finds successful outcomes per their reports, although no specific data is given in this paper beyond the case studies.

“Cognitive Functional Therapy (CFT) ... allows clinicians to identify the individual contributing factors and create a modifiable treatment plan that is aligned with the patient’s goals”

LIMITATIONS (THINGS TO KEEP IN MIND):

As stated by the authors, they have a bias towards this framework as they are doing research and teaching courses on it. Additionally, there may be a problem with implementation of the described interventions in some settings based on payment/visit limitations. This is not a limitation of CFT itself, rather an institutional and regulatory challenge. On page 416, Figure 2 describes the triage of LBP, with a “low disability/complexity profile” vs a “moderate to high disability/complexity profile”. The clinical journey of 8-12+ weeks for the moderate to high group may be outside the allowed course of care for some people due to regulatory limitations.

Clinicians who work in settings or with 3rd party payors that limit access to care would need to adapt the CFT protocols to fit within their system. However we don’t know if a “CFT influenced” approach would be as effective.
CLINICAL IMPLICATIONS (HOW THIS IMPACTS CLINICAL PRACTICE):

Utilizing a biopsychosocial approach is an established option for comprehensive patient care and CFT falls within this approach. The recommendations and format of the evaluation process with CFT is a common sense view that provides a path for clinicians to follow as they work with individuals dealing with persistent pain.

I think this format, while described specifically for LBP, is modifiable and flexible enough to allow for working with most pain presentations. Utilizing the framework to consistently ask about contributing factors during the evaluation process would be a sensible place for a curious clinician to test this framework in clinical practice.

The reflective nature of CFT encourages the individual to come up with alternative ways of moving and to find new strategies that will fit within their particular lifestyle. The framework does not limit clinicians to a particular manual therapy or movement philosophy, although it does strongly adhere to current pain science and recommendations for verbiage that supports non-catastrophizing, non-threatening words.

In summary, while the CFT research is yet to be replicated through multi-center or outside groups, the underpinning principles of evaluation, assessment, and treatment are sound and adhere to current understanding on treating pain from a biopsychosocial perspective.

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RUN CLEVER—NO DIFFERENCE IN RISK OF INJURY WHEN COMPARING PROGRESSION IN RUNNING VOLUME AND RUNNING INTENSITY IN RECREATIONAL RUNNERS: A RANDOMIZED CONTROLLED TRIAL

TODD HARGROVE

BACKGROUND & OBJECTIVE:

Rapid increases in training load from running is a contributing factor to many running-related injuries. This study investigated whether there would be a difference in injury rate between two groups using different running load progressions: one focusing on progressing intensity and the other volume.

METHODS (WHAT THEY DID):

447 healthy recreational runners (defined as people who ran 1-3 times per week for the past 6 months) were randomized into two groups: intensity and volume. Each group performed the same eight-week training program and then performed different programs for the next 16 weeks.

The intensity group increased the weekly volume of running at a “hard” pace (VO2max above 88%). The volume group increased the total running volume at an “easy” pace (VO2max below 80%).

Both groups ran three times per week in a program that was periodised into 4-week blocks with structured progression/regression. In the first week in each block, weekly running volume would progress 23%, and in the last week running would regress 10%.
RESULTS/WHAT THEY FOUND:

Despite the differences in the training programs, the injury rates between the two groups were not significantly different.

LIMITATIONS (THINGS TO KEEP IN MIND):

Prescribed running intensities were based on estimated VO2max of each individual, which was done according to an algorithm described by Jack Daniels. The algorithm calculates VO2max based on performance in one of several running tests. It may be that different methods of prescribing running intensity would lead to different results.

Further, several participants dropped out after the preconditioning period, which may have reduced the statistical power of the study, making it less capable of finding differences between the groups.
CLINICAL IMPLICATIONS/HOW THIS IMPACTS CLINICAL PRACTICE:

Running is one of the most popular forms of recreational exercise, but repetitive stress injuries are extremely common. Recreational runners experience on average 7.7 injuries for every 1000 hours they run.

Rapid changes in training volume and intensity are known to increase injury rate. This study showed that even small changes in either volume or intensity can significantly increase the rate of injury. However, it should be noted that the definition of “injury” used in this study is relatively broad: it was defined as any reduction in the volume or intensity of running for one week due to pain.

“In rapid changes in training volume and intensity are known to increase injury rate.”

In the “preconditioning” phase that all the runners performed, about 7% were injured in both groups. In the intervention phase, in which either volume or intensity were increased, the rate of injury approximately doubled in each group (16% and 19%, respectively).

The authors of this study hypothesized that 15% more runners in the intensity group would sustain an injury, due to the increase in the musculoskeletal load. The hypothesis was rejected, so this study provides little guidance as to the best way to progress a running program while reducing the risk of injury. Further studies should investigate whether a tailored approach, based on individual feedback about readiness to progress, would lead to superior results. However, based off the results from this study, it appears that increasing running intensity or running volume similarly increase the risk of injury.

+ STUDY REFERENCE

Ramskov D, Rasmussen S and Sørensen H et al. (2018) Run Clever – No difference in risk of injury when comparing progression in running volume and running intensity in recreational runners: A randomised trial. BMJ Open Sport & Exercise Medicine, 4(1), e000333.
QUIZ

ANSWERS

Article by Steve Kamper
Answer: 1

Article by Scot Morrison
Answer: Jump tests

Article by Linda Truong
Answer: True

Article by Jarod Hall
Answer: patient preference/expectations; OR therapist confidence/comfortability with treatment technique; OR contraindications/precautions

Click author names above to link to the original questions