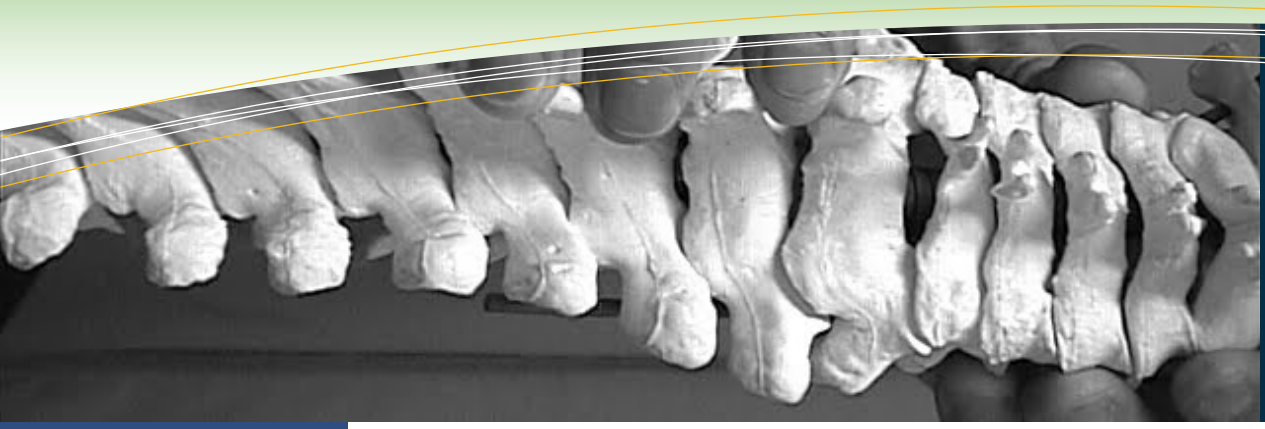
Manual Therapy Research Review



Issue 20
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This issue:

Welcome

Welcome to the 20th issue of the Manual Therapy Review.

In this issue we have a systematic review and meta-analysis from van Dyk et al on the use of Nordic Hamstring Exercises to reduce hamstring injuries, a study by Elmaazi et al looking at the movement of the nucleus pulposis in the cervical disc, a scoping review by Burgi et al investigating the return to play decision following ACL repair and finally a study by Hammerle et al looking at the effects of proprioceptive training on those with dizziness following concussion.

Enjoy, Duncan

Paper One

van Dyk N, Behan FP, Whiteley R. Including the Nordic hamstring exercise in injury prevention programmes halves the rate of hamstring injuries: a systematic review and meta-analysis of 8459 athletes. Br J Sports Med 2019;53:1362–1370

Research question: Does the Nordic hamstring exercise (NHE) prevent hamstring injuries when included as part of an injury prevention intervention?
Design: Systematic review and meta-analysis.
Eligibility criteria for selecting studies: We considered the population to be any athletes participating in any sporting activity, the intervention to be the NHE, the comparison to be usual training or other prevention programmes, which did not include the NHE, and the outcome to be the incidence or rate of hamstring injuries.
Analysis: The effect of including the NHE in injury prevention programmes compared with controls on hamstring injuries was assessed in 15 studies that reported the incidence across different sports and age groups in both women and men.
Data sources: MEDLINE via PubMed, CINAHL viaEbsco, and OpenGrey.
Results: There is a reduction in the overall injury risk ratio of 0.49 (95% CI 0.32 to 0.74, p=0.0008) in favour of programmes including the NHE. Secondary analyses when pooling the eight randomised control studies demonstrated a small increase in the overall injury risk ratio 0.52 (95% CI 0.32 to 0.85, p=0.0008), still in favour of the NHE. Additionally, when studies with a high risk of bias were removed (n=8), there is an increase of 0.06 in the risk ratio to 0.55 (95% CI 0.34 to 0.89,p=0.006).
Conclusions: Programmes that include the NHE reduce hamstring injuries by up to 51%. The NHE essentially halves the rate of hamstring injuries across multiple sports in different athletes.
Trial registration number: PROSPERO
CRD42018106150.

Commentary

Injury prevention in any area of musculoskeletal work is a challenging task. Hamstring injuries are very common and often hard to resolve. Nordic hamstring exercises, or Nordic drops as they are often called have been promoted as an excellent preventative measure for reducing hamstring injuries and have been a key exercise in the FIFA 11+ injury prevention programme. This systematic review by Nicol van Dyk and colleagues has pooled data from relevant studies using the NHE and found that in 8459 athletes and 525 hamstring injuries, a statistically significant and clinically meaningful 51% reduction in hamstring injuries was found. This is very strong evidence which cannot be ignored. Those looking after sports teams that have a high incidence of hamstring strain would be well placed to start implementing such a programme if not already doing so.

Paper Two

Elmaazi, A, Morse, C, Lewis S, Qureshi S, and McEwan I. The acute response of the nucleus pulposus of the cervical intervertebral disc to three supine postures in an asymptomatic population. Musculoskeletal Science and Practice 44 (2019) 102038 https://doi.org/10.1016/j.msksp.2019.07.002

Background: The dynamic disc model refers to the ability of a spinal disc's position to be manipulated by body postures and movements. Research on lumbar discs has indicated movement of the anterior and posterior disc that correlates with posture of the spine. The aim of this study was to assess whether, despite its structural differences, the cervical disc responds to flexed and extended postures in a similar fashion to the lumbar disc.

Method: A repeated measures study. Twenty-five asymptomatic participants (age: 33.7 ± 9.1 years) volunteered. Scans were performed in supine using an Esaote 0.2T magnetic resonance imaging scanner. Participants lay with their cervical spine initially placed in neutral, followed by flexion and finally extension. The position of the posterior disc nucleus pulposus at C5-6 and C6-7 was measured against a vertical line connecting the posterior vertebral bodies above and below each disc.

Results: Changes in cervical spine position were associated with significant changes in posterior disc nucleus pulposus position at both C5-6 and C6-7 ($p < 0.01$ for both). Post hoc testing showed a significant difference in posterior disc nucleus pulposus position at C5-6 between flexion and extension ($p=0.02$). There was similarly a significant change at C6-7 between neutral and flexion ($p=0.001$), and between flexion and extension ($p=0.02$).

Conclusions: These results indicate that the cervical posterior nucleus pulposus is affected by spinal loading, consistent with the concept of the dynamic disc model.

Commentary

This is a very nice mechanistic study investigating the movement of nucleus pulposis in cervical disc (as imaged with MRI) during passive neck flexion and extension. The movement of the nucleus pulposis have been shown to be valid in the lumbar spine via a dynamic disc model and this has been the basis of much of the McKenzie therapy targeted at the lumbar spine. The cervical spine discs have been shown in cadaveric studies by Mercer and Bogduk (1999) to desiccate early in life and therefore may not respond to dynamic loading in the same way as the lumbar spine with McKenzie therapy (Mercer and Jull 1996). This study demonstrates in living spines, that there is movement under flexion and extension loading and that this movement is mostly consistent (posterior movement with flexion, and anterior movement with extension). This study may provide greater support for the rationale of the McKenzie approach in treating neck pain with repeated movements and dynamic loading.

References:

Mercer, B., Bogduk, N. (1999). The ligaments and anulus fibrosus of human adult cervical intervertebral discs. Spine, 24 (7), 619–628.

Mercer, S.R., Jull, G.A. (1996). Morphology of the cervical intervertebral disc: implications for McKenzie's model of the disc derangement syndrome. Man. Ther. 1 (2), 76–81.

Paper Three

Burgi CR, Peters S, Ardern CL, et al. Which criteria are used to clear patients to return to sport after primary ACL reconstruction? A scoping review. Br J Sports Med 2019;53:1154–1161

Objective: To describe the criteria used to clear athletes to return to sport (RTS) following primary ACL reconstruction.
Design: Scoping review.
Data sources: MEDLINE, Embase, CINAHL and SPORTDiscus electronic databases were searched using keywords related to ACL and RTS.
Eligibility criteria: Prospective or retrospective studies reporting at least one RTS criterion for athletes who had primary ACL reconstruction with an autograft.
Results: In total, 209 studies fulfilled the inclusion criteria. RTS criteria were categorised into six domains: time, strength, hop testing, clinical examination, patient report and performance-based criteria. From the 209included studies, time was used in 178 studies (85%), and in 88 studies (42%) was the sole RTS criterion. Strength tests were reported in 86 studies (41%). Sixteen different hop tests were used in 31 studies (15%). Clinical examination was used in 54 studies (26%), patient report in 26 studies (12%) and performance-based criteria in 41 studies (20%).
Summary: Time and impairment-based measures dominated RTS criteria, despite sport being a complex physical and biopsychosocial activity with demands across all aspects of function. Time was included as a criterion in 85% of studies, and over 80% of studies allowed RTS before 9 months. Whether RTS tests are valid - do they predict successful RTS? - is largely unknown.

Commentary
Anterior cruciate ligament injuries is often sport limiting and associated with long term consequences such as the development of osteoarthritis. The incidence of the injury and the frequency of primary repair is on the increase certainly in New Zealand (Sutherland et al 2019). Given that the return to play stage is often the most vital time for players it is surprising that the most valid tests have not been agreed on, as found in this review. Having said that the recent 2016 consensus on RTS (Ardern et al 2016) outlines the following five recommendations to guide the choice of RTS tests:
1. Use a group of tests (test battery).
2. Choose open tasks (less controlled) over closed tasks (more controlled) where possible.
3. Include tests with reactive decision-making elements.
4. Assess psychological readiness to return to sport.
5. Monitor internal and external workload.

The authors of this study do state that the papers in this review were often published before the new guidelines and hence may not be as up to date. Still more work to be done on this important topic!

References:
Sutherland K, Clatworthy, M Fulcher, M and Young, S. (2019). Marked increase in the incidence of anterior cruciate ligament reconstructions in young females in New Zealand, ANZ J Surg, 89, 1151–1155
Ardern CL, Glasgow P, Schneiders A, et al. (2016). Consensus statement on return to sport from the First World Congress in Sports Physical Therapy, Bern. Br J Sports Med, 853–64.

Paper Four

Hammerle, M, Swan, A, Nelson, J, and Treleaven, J. Retrospective review: Effectiveness of cervical proprioception retraining for dizziness after mild traumatic brain Injury in a military population with abnormal cervical proprioception. J Manipulative Physiol Ther 2019;42:399-406

Objective: This study aimed to assess the outcomes of 2 treatments for patients with dizziness after mild traumatic brain injury (mTBI) who demonstrate abnormal cervical spine proprioception (CSP).
Methods: A retrospective records review was conducted on the medical charts of patients treated for dizziness after mTBI who received either standard care (vestibular rehabilitation therapy [VRT]) or cervical spine proprioceptive retraining (CSPR) from 2009 to 2013. All patients included in the analysis were active-duty military with recurring dizziness after mTBI who had at least 1 abnormal CSP test. Patients were excluded for dizziness with a clear peripheral vestibular or central symptom origin, incomplete data, or no CSP assessment, or if both treatments were administered. Forty-eight total patients were included in the final dataset (22 VRT; 26 CSPR). Traditional VRT was compared with CSPR when abnormal CSP tests were present, regardless of the presence or absence of neck pain. A clinician review of records was used to determine improvement of dizziness based on patient reports of symptoms at discharge evaluation (ie, no symptoms for at least 2 weeks).

Commentary
Physiotherapy plays an important role in the management of mTBI. In a lot of cases the cause of the mTBI is concussion either in sport or from other traumatic events such as motor vehicle accidents. The management of the dizziness aspect of this is often the work of the vestibular therapist. However, there are some studies that have suggested adding manual therapy to the treatment of patients with dizziness after concussion is helpful (Reneker et al, 2015; Schneider et al, 2014 & 2016). This study is interesting as it shows that Cervical Spine Proprioceptive Retraining was more effective that standard Vestibular Rehabilitation Therapy. I suspect the truth maybe somewhere in the middle as good manual therapy assessment can help to differentiate those cases that have failed with other types of dizziness retraining and perhaps the Mulligan Dizziness SNAGs could assist in this (Reid et al, 2008)?

References:
Reneker JC, Cook CE. (2015). Dizziness after sports-related concussion: Can physiotherapists offer better treatment than just 'physical and cognitive rest'? Br J Sports Med., 49(8):491-492.
Reid, S et al. (2008). Sustained natural apophyseal glides (SNAGs) are an effective treatment for cervicogenic dizziness. Manual Therapy Volume 13, Issue 4, August: 357-366
Schneider KJ, Meeuwisse WH, Nettel-Aguirre A, et al. (2014). Cervicovestibular rehabilitation in sport-related concussion: a randomised controlled trial. Br J Sports Med.48(17): 1294-1298.
Schneider KJ. (2016). Sport-related concussion: optimising treatment through evidence-informed practice. *J Orthop Sports Phys Ther*.46(8):613-616

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