Physical examination can detect the presence or absence of cruciate ligament injury

Synopsis


Question: What is the diagnostic accuracy of the physical examination in diagnosing a torn meniscus or ligament of the knee? Data sources: Studies were identified by searching MEDLINE (1966-2000) and HealthSTAR (1975-2000). Study selection: English language articles that compared the results of physical examination of the knee to a reference standard such as arthroscopy, arthrotomy or MRI were selected. Data extraction: Two raters assessed the methodological quality of studies and extracted data to calculate likelihood ratios with 95% confidence intervals for single tests (eg Lachman) and for the complete physical examination. Summary likelihood ratios (LR) (ie pooling across studies) were calculated using a random effects model. Main results: Fifteen studies evaluated anterior cruciate (ACL) injury, five studies evaluated posterior cruciate (PCL) injury and nine studies evaluated meniscal injury. No articles were identified that adequately examined the lateral pivot shift test, the posterior drawer test or any of the tests for medial or lateral ligament injury. ACL injury: The summary positive likelihood ratio (+LR) for the complete physical examination was 25.0 (95% CI 2.1 to 306) with a negative likelihood ratio (-LR) of 0.04 (0.01 to 0.48). The summary LRs for the anterior drawer were 3.8 (0.7 to 22.0) and 0.30 (0.05 to 1.5). A single study adequately evaluated the Lachman test providing a +LR of 42.0 (2.7 to 651.0) and -LR of 0.1 (0.0 to 0.4). PCL injury: The summary LRs for the complete physical examination were 21.0 (2.1 to 205.0) and 0.05 (0.01 to 0.50). One study evaluated the abduction stress test with a +LR of 94 (6 to 1487) and -LR of 0.1 (0.0-0.4). Meniscal injury: The summary LRs for the complete physical examination were 2.7 (1.4 to 5.1) and 0.4 (0.2 to 0.7); McMurray test 1.3 (0.9-1.7) and 0.8 (0.6-1.1), joint line tenderness 0.9 (0.8-1.0) and 1.1 (1.0-1.3). Joint effusion and the medial lateral grind test were each evaluated in one study. For joint effusion the LRs were 2.7 (0.4 to 86.0) and 0.7 (0.5 to 0.9) and for the medial lateral grind test 4.8 (0.8 to 30.0) and 0.4 (0.2 to 0.6).

Conclusions: The physical examination can detect the presence or absence of ACL or PCL injury, however diagnostic accuracy is lower for meniscal injury. In the diagnosis of cruciate ligament injury the composite examination is generally more predictive than a single test and the Lachman test is more accurate than the anterior drawer.

Commentary

Confidence in the findings of studies investigating test accuracy is affected by the quality of the “gold standard” against which test results are compared (Deeks 2001) and also by whether the examiner is blind to the gold standard diagnosis (Deeks 2001; Lijmer et al 1999). As well, the study subjects tested should be like those tested clinically because if subjects known to have the condition are included, test accuracy can be inflated (Lijmer et al 1999). Solomon et al (2001) ranked the quality of evidence against the following criteria: independent blind comparison of examination results with the reference standard and at least 50 consecutive, relevant subjects. However, the authors then pooled results across studies with very different quality. My view is that it would have been preferable to partition the findings according to quality and base decisions on best evidence.

If one only considers results from studies that passed all quality filters a less convincing picture emerges on the value of the clinical examination. There is conflicting evidence on the value of the general examination in diagnosing ACL injury with one study reporting relatively poor diagnostic accuracy (+LR 1.4, -LR 0.67) while another reported quite good accuracy (+LR 96.0, -LR 0.04). The poorer results for the ACL tests were obtained for a study of acute injury, while the better results were for tests of both acute and chronic subjects. Pooling of results may not be sensible for these different populations. There is evidence that a general examination is useful for identifying PCL injury (+LR 90, -LR 0.10) and meniscal injury (+LR = 4.6, -LR = 0.3). However, it would be helpful to see these findings replicated by another study and the general examination described and the required skill levels identified.

Ongoing studies in this field are warranted and deserve the attention of physiotherapists.

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References


Synopsis


**Question:** Does fusion surgery reduce pain and disability more than conservative treatment in patients with severe chronic low back pain? **Design:** Multicentre randomised controlled trial. **Setting:** Nineteen orthopaedic departments in Sweden. **Patients:** Two hundred and ninety-four patients aged 25-65 years with chronic low back pain (CLBP). Criteria for inclusion were pain duration at least two years, back pain more pronounced than leg pain, sick leave for at least one year, with previous conservative treatment and a score of at least 7 out of 10 points on a pain and function scale where 10 points was “severe pain and no function”. Exclusion criteria were psychiatric illness, spine surgery in the last two years, and specific radiological findings such as spondylolisthesis and spinal stenosis. Five patients (2%) were lost to follow-up after two years. **Interventions:** Two hundred and twenty-two patients were allocated to the surgery group and 72 to a non-surgical group. The non-surgical program was constructed on a consensus basis and used as a guideline with the possibility of local modifications and variations. The main components were different physiotherapy modalities such as information and education, TENS, cognitive and functional training, coping strategies, in addition to acupuncture and injections. **Outcomes:** Primary outcomes included 1) back and leg pain measured on a visual analogue scale; 2) functional disability measured with the Oswestry, Million and General Function Scale disability questionnaires; 3) patient overall assessment; and 4) work status. Outcomes were assessed at two years by an independent observer, and analysed according to the intention-to-treat principle. **Result:** Groups were comparable at baseline. Back pain reduced by 33% in the surgical group compared with 7% in the non-surgical group ($p < 0.001$). Leg pain reduced by 18% in the surgical group compared with a 21% increase in the non-surgical group ($p = 0.005$). Disability, as measured by the three different instruments, was reduced from 25% to 31% in the surgical group compared with 4% to 8% in the non-surgical group ($p$ values from 0.015 to 0.004). In the surgical group, 63% rated themselves as “much better or better” compared with 29% in the non-surgical group ($p < 0.001$). In the sub-group of those not in work before inclusion, 39% returned to work in the surgical group compared with 23% in the non-surgical group ($p = 0.049$). **Conclusion:** In patients with severe chronic low back pain, lumbar fusion provides greater improvement in pain, disability and work status than uncontrolled non-surgical treatment.

Commentary

The search for effective treatment for patients with CLBP makes this study very important and highly needed for both patients and society. Many CLBP patients consider surgery as “a magic bullet”, but back surgery has so far not been compared with conservative treatment in a randomised controlled trial. The main purpose of Fritzell’s study was to evaluate whether lumbar fusion could reduce pain and decrease disability more effectively than commonly recommended non-surgical treatment in patients with severe chronic low back pain.

Before randomisation, the patients were told by the surgeon that no treatment method, as far as was known, was superior to any other. The non-surgical treatment program was constructed on a consensus basis and used only as a guideline with the possibility of wide modifications and variations. The inclusion period extended over six years (1992-1998), a period during which several systematic reviews on conservative treatment of CLBP were published, which may have changed the therapists’ approaches considerably during the study period. The modalities, the specific dose of treatment and compliance is unknown. The non-surgical group should therefore be considered a control group rather than an alternative treatment group.

Statistically, all primary outcome measures were significantly in favour of surgery. On average, however, both groups still suffered from pain and disability two years after treatment, indicating that even lumbar fusion did not cure this selected group of patients completely. Thirty-seven per cent of the patients in the surgical group rated their result as unchanged or worse. Fusion surgery may be a valid option for patients with longstanding lumbar pain, but this study alone does not provide conclusive evidence to support increased use of lumbar fusion.

Additionally, the placebo effect following surgery is known to be more powerful than non-surgical treatment methods. The fact that many of the patients in the non-surgical group probably had been through conservative treatment in an earlier phase, with an unsuccessful result, may to a certain degree explain the differences between the groups.

Scientifically valid studies comparing surgical fusion with well defined multidisciplinary treatment programs are therefore needed.

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Critically Appraised Papers

A hand brace improve symptoms and function in carpal tunnel syndrome

Synopsis


Question: Does a novel hand brace improve symptoms and function in patients with carpal tunnel syndrome? 

Study design: Randomised, controlled clinical trial using concealed allocation. Setting: A hospital neurology clinic in Italy. Patients: Of 151 patients referred for possible carpal tunnel syndrome to the clinic, 83 met the following inclusion criteria and were recruited: predominantly one hand with carpal tunnel symptoms (pain, numbness, paresthesia in median nerve distribution) and signs (hypesthesia in median nerve distribution, thenar atrophy, positive Phalen test); and at least one abnormal median nerve electrophysiological study. Exclusion criteria included: history of previous carpal tunnel surgery; rheumatoid arthritis; carpal tunnel syndrome related to systemic diseases; pregnancy; and clinical and electrophysiologically signs of polyneuropathy. Main outcome measure: Boston Carpal Tunnel Questionnaire yielding separate symptom severity and functional limitation scores ranging from 1 (best) to 5 (worst). Secondary outcomes included subjects' opinion of recovery ("moderate improvement", "minimal improvement", "no change" and "worse") and EMG measures. Intervention: All subjects agreed not to commence any other treatment during the intervention period (4 weeks) nor to change their usual activities. The intervention group (n = 41) wore a hand brace at night for four weeks. The brace (Manubrace) consists of 1) a palmar strap with Velcro fastening to tighten the distal heads of 2nd and 5th metacarpal bones; 2) a triangular pad positioned dorsal to digits 2 and 5; 3) a dorsal strap connected by adjustable Velcro fasteners to a wrist band; and 4) a stabilisation component for the other aspects of hand and wrist. Compliance was high, with 38 subjects wearing the brace on all or most nights. The control group (n = 42) had no treatment. Results: Groups were comparable at baseline and only three patients were lost to follow-up (one intervention and two controls). At both 2 and 4 weeks follow-up, the brace group had fewer symptoms and functional limitation than the control group (all p < 0.001). For example, at 4 weeks the mean (SD) for symptoms was 1.54 (0.4) in the brace group v. 2.61 (0.6) in the control group and for functional limitation 1.48 (0.5) in the brace and 2.03 (0.7) in the control group. The brace group reported greater recovery than the control group (p = 0.006). For example 40/40 braced patients reported improvement v. 10/40 controls. There were no between-group differences in EMG measurements. Conclusion: When consistently worn at night, the Manu hand brace significantly reduced symptoms and functional loss in patients with carpal tunnel syndrome.

Commentary

The anatomic rationale proposed for the Manu splint includes changes to the shape of the carpal tunnel and reduction in the presence of the lumbricals in the tunnel. Given our understanding of carpal tunnel syndrome, these are plausible mechanisms. As well, because the methodology used in this study is strong, we can have confidence in the authors’ conclusion that the hand brace significantly reduced symptoms and functional loss in patients with carpal tunnel syndrome. However, it has been my experience that patients can report improvement, not cure, with conservative treatment and thus still require surgery. It is important to the understanding of the management of carpal tunnel syndrome to distinguish between improvement and cure. How many patients required further treatment or surgery? Longer term follow-up in this trial could have provided this important information.

Given the high prevalence and associated costs of carpal tunnel syndrome, new treatment options, like this splint design, should be a priority for physiotherapy research. This clinical trial established that the splint was more effective than no treatment, however we already know that night splinting of the wrist at neutral is effective in minimising carpal tunnel symptoms (Burke et al 1994). Clinical therapists should consider this splint promising, but experimental. Before embracing this new splint design we need to compare its effectiveness with that of existing splints. We also need to investigate the optimal application of splints, as wear time influences success (Walker et al 2000). Furthermore, as there are a number of other physiotherapy treatments that can be used as adjuncts in the treatment of CTS, the role of this new splint in a comprehensive physiotherapy program should also be considered.

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References
