P 

PROTECTION
Avoid activities and movements that increase pain during the first few days after injury.

E 

ELEVATION
Elevate the injured limb higher than the heart as often as possible.

A 

AVOID ANTI-INFLAMMATORIES
Avoid taking anti-inflammatory medications as they reduce tissue healing. Avoid icing.

C 

COMPRESSION
Use elastic bandage or taping to reduce swelling.

E 

EDUCATION
Your body knows best. Avoid unnecessary passive treatments and medical investigations and let nature play its role.

&

L 

LOAD
Let pain guide your gradual return to normal activities. Your body will tell you when it's safe to increase load.

O 

OPTIMISM
Condition your brain for optimal recovery by being confident and positive.

V 

VASCULARISATION
Choose pain-free cardiovascular activities to increase blood flow to repairing tissues.

E 

EXERCISE
Restore mobility, strength and proprioception by adopting an active approach to recovery.

E-Learning Course 1.10 PEACE & LOVE

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2020-Dubois, B. & J.-F. Esculier. Soft-tissue injuries simply need PEACE and LOVE. *British Journal of Sports Medicine* 54 (2): 72-73.

Rehabilitation of soft-tissue injuries can be complex. Over the years, acronyms guiding their management have evolved from ICE to RICE, then on to PRICE and POLICE. Although widely known, these previous acronyms focus on acute management, unfortunately ignoring subacute and chronic stages of tissue healing. Our contemporary acronyms encompass the rehabilitation continuum from immediate care (PEACE) to subsequent management (LOVE). PEACE and LOVE outline the importance of educating patients and addressing psychosocial factors to enhance recovery. While anti-inflammatories show benefits on pain and function, our acronyms flag their potential harmful effects on optimal tissue repair. We suggest that they may not be included in the standard management of soft-tissue injuries.

2020-Finucane, L. M., A. Downie, C. Mercer, S. M. Greenhalgh, W. G. Boissonnault, A. L. Pool-Goudzwaard, J. M. Beneciuk, R. L. Leech & J. Selfe. International Framework for Red Flags for Potential Serious Spinal Pathologies. *Journal of Orthopaedic & Sports Physical Therapy* 50 (7): 350-372.

The International Federation of Orthopaedic Manipulative Physical Therapists (IFOMPT) led the development of a framework to help clinicians assess and manage people who may have serious spinal pathology. While rare, serious spinal pathology can have devastating and life-changing or life-limiting consequences, and must be identified early and managed appropriately. Red flags (signs and symptoms that might raise suspicion of serious spinal pathology) have historically been used by clinicians to identify serious spinal pathology. Currently, there is an absence of high-quality evidence for the diagnostic accuracy of most red flags. This framework is intended to provide a clinical-reasoning pathway to clarify the role of red flags.

2020-Lin, I., L. Wiles, R. Waller R. Goucke, Y. Nagree, M. Gibberd, L. Straker, C. G. Maher & P. B. O'Sullivan. What does best practice care for musculoskeletal pain look like? Eleven consistent recommendations from high-quality clinical practice guidelines: Systematic review. *British Journal of Sports Medicine* 54 (2): 79-86.

Objectives: To identify common recommendations for high-quality care for the most common musculoskeletal (MSK) pain sites encountered by clinicians in emergency and primary care (spinal (lumbar, thoracic and cervical), hip/knee (including osteoarthritis [OA] and shoulder) from contemporary, high-quality clinical practice guidelines (CPGs).

Design: Systematic review, critical appraisal and narrative synthesis of MSK pain CPG recommendations.

Eligibility criteria: Included MSK pain CPGs were written in English, rated as high quality, published from 2011, focused on adults and described development processes. Excluded CPGs were for: traumatic MSK pain, single modalities (eg, surgery), traditional healing/ medicine, specific disease processes (eg, inflammatory arthropathies) or those that required payment.

Data sources: Four scientific databases (MEDLINE, Embase, CINAHL and Physiotherapy Evidence Database) and four guideline repositories.

Results: 6232 records were identified, 44 CPGs were appraised and 11 were rated as high quality (low back pain: 4, OA: 4, neck: 2 and shoulder: 1). We identified 11 recommendations for MSK pain care: ensure care is patient centred, screen for red flag conditions, assess psychosocial factors, use imaging selectively, undertake a physical examination, monitor patient progress, provide education/information, address physical activity/exercise, use manual therapy only as an adjunct to other treatments, offer high-quality non-surgical care prior to surgery and try to keep patients at work.

Conclusion: These 11 recommendations guide healthcare consumers, clinicians, researchers and policy makers to manage MSK pain. This should improve the quality of care of MSK pain.

2020-Sims, J. I., M. T. Chau & J. R. Davies. Diagnostic accuracy of the Ottawa Knee Rule in adult acute knee injuries: a systematic review and meta-analysis. *European Radiology* 30: 4438–4446.

Objectives: This systematic review and meta-analysis aimed to evaluate the current evidence on the diagnostic accuracy of the Ottawa Knee Rule (OKR) for acute knee injuries in adults.

Methods: A literature search of Embase (Elsevier), MEDLINE (U.S. National Library of Medicine), PubMed and Scopus databases (1995 to date; English language) was performed and the relevant references were assessed. Original articles documenting OKR use by emergency physicians to assess adult acute knee injuries were included. Study methodological quality was assessed using the Quality Assessment of Diagnostic Accuracy Studies 2 (QUADAS-2) tool. Results of eligible studies were pooled using random effects or fixed effects modelling to calculate the diagnostic performance of the OKR. The Higgins I^2 test and Begg's association test were performed to assess between-study heterogeneity and publication bias respectively, with Spearman's correlation test for threshold effect.

Results: Eight studies, including 7385 patients, were enrolled and pooled using the random effects model. Sensitivity, specificity, negative likelihood ratio, positive likelihood ratio and diagnostic odds ratio were 0.99 (95% CI, 0.97 to 1.00), 0.49 (95% CI, 0.47 to 0.51), 0.07 (95% CI, 0.02 to 0.24), 1.86 (95% CI, 1.72 to 2.01) and 25.10 (95% CI, 7.18 to 87.70) respectively. Based on the QUADAS-2 criteria, most studies presented low risk of bias and concern regarding applicability.

Conclusions: Application of the OKR can rule out knee fracture and thus avoid unnecessary radiography. These results also translate to improved efficiency, lower medical costs and reduced waiting times.

Key Points:

The Ottawa Knee Rule helps clinicians to rule out fracture in adults with an acute knee injury.

The rule allows a reduction in radiography requests, patient waiting time in the emergency department and healthcare costs.

2019-Culvenor A. G., B. E. Øiestad, H. F. Hart, J. J. Stefanik, A. Guermazi & K. M. Crossley. Prevalence of knee osteoarthritis features on magnetic resonance imaging in asymptomatic uninjured adults: a systematic review and meta-analysis. *British Journal of Sports Medicine* 53 (20): 1268-1278.

Background: Knee MRI is increasingly used to inform clinical management. Features associated with osteoarthritis are often present in asymptomatic uninjured knees; however, the estimated prevalence varies substantially between studies. We performed a systematic review with meta-analysis to provide summary estimates of the prevalence of MRI features of osteoarthritis in asymptomatic uninjured knees.

Methods: We searched six electronic databases for studies reporting MRI osteoarthritis feature prevalence (ie, cartilage defects, meniscal tears, bone marrow lesions and osteophytes) in asymptomatic uninjured knees. Summary estimates were calculated using random-effects meta-analysis (and stratified by mean age: <40 vs ≥40 years). Meta-regression explored heterogeneity.

Results: We included 63 studies (5397 knees of 4751 adults). The overall pooled prevalence of cartilage defects was 24% (95% CI 15% to 34%) and meniscal tears was 10% (7% to 13%), with significantly higher prevalence with age: cartilage defect <40 years 11% (6%to 17%) and ≥40 years 43% (29% to 57%); meniscal tear <40 years 4% (2% to 7%) and ≥40 years 19% (13% to 26%). The overall pooled estimate of bone marrow lesions and osteophytes was 18% (12% to 24%) and 25% (14% to 38%), respectively, with prevalence of osteophytes (but not bone marrow lesions) increasing with age. Significant associations were found between prevalence estimates and MRI sequences used, physical activity, radiographic osteoarthritis and risk of bias.

Conclusions: Summary estimates of MRI osteoarthritis feature prevalence among asymptomatic uninjured knees were 4%–14% in adults aged <40 years to 19%–43% in adults ≥40 years. These imaging findings should be interpreted in the context of clinical presentations and considered in clinical decision-making.

2019-Wu, P.-F., Y.-W. Li, B. Wang, B. Jiang, Z.-M. Tu & G.-H. Lv. Posterior Cervical Foraminotomy Via Full-Endoscopic Versus Microendoscopic Approach for Radiculopathy: A Systematic Review and Meta-analysis. *Pain Physician* 22 (1): 41-52.

Background: Recently posterior cervical foraminotomy (PCF) performed using a minimally-invasive surgery (MIS) approach for cervical radiculopathy due to lateral disc herniation or osseous foraminal stenosis has gained popularity. As 2 dominating MIS techniques, whether FE-PCF or MI-PCF provides superior clinical outcomes remains controversial.

Objectives: To compare clinical success rate, overall incidence of complications and reoperation rate between full-endoscopic posterior cervical foraminotomy (FE-PCF) and microendoscopic posterior cervical foraminotomy (MI-PCF) for cervical radiculopathy.

Study Design: A systematic review and meta-analysis.

Methods: A literature search of Pubmed, Embase and Web of Science was conducted to identify comparative or single-arm studies concerning FE-PCF or MI-PCF. The pooled results were performed by calculating the effect size based on the logit event rate and reported with 95% confidence intervals (CI).

Results: A total of 26 articles with 2003 patients (FE-PCF, 377; MI-PCF, 1626) were included. The pooled clinical success rate was 93.6% (CI: 90.0%~95.9%) for the FE group and 89.9% (CI: 86.6%~92.5%) for the MI group, which was not statistically significant (P = 0.908). Overall complication rates were 6.1% (CI: 3.2%~11.3%) and 3.5% (CI: 2.7%~4.6%) for the FE group and the MI group, respectively, with no significant difference (P = 0.128). Nevertheless, the specific constituents showed apparent disparity, with transient nerve root palsy in the FE group (12/16, 75.0%) and dural tear in the MI group (20/47, 42.6%) being the most commonly reported. the pooled reoperation rate, the FE group (4.8%, CI: 2.9%~7.8%) and the MI group (5.3%, CI: 3.4%~8.2%), also demonstrated no statistical difference (P = 0.741).

Limitations: The indirect comparison eroded the reliability of results inevitably due to the paucity of randomized clinical trials or high quality prospective cohort studies.

Conclusions: Both FE-PCF and MI-PCF can offer an effective and relatively secure treatment for cervical radiculopathy. There was no significant difference in the pooled outcomes of clinical success rate, complication rate and reoperation rate between the 2 approaches.

2018-Lewis, J. & P. O'Sullivan. Is it time to reframe how we care for people with non-traumatic musculoskeletal pain? *British Journal of Sports Medicine* 52 (24): 1543-1544.

The current approach to musculoskeletal pain is failing

The majority of persistent non-traumatic musculoskeletal pain disorders do not have a pathoanatomical diagnosis that adequately explains the individual's pain experience and disability. We contend this has resulted in two concerning developments in the management of people with such disorders. First, structural changes observed on imaging that are highly prevalent in pain free populations, such as rotator cuff tears, intervertebral disc degeneration, labral tears and cartilage changes, are ascribed to individuals as a diagnosis for their condition. In this context, this information may result in the individual believing that their body is damaged, fragile and in need of protection, resulting in a cascade of movement and activity avoidance behaviours and seeking interventions to correct the structural deficits. This trend has led to exponential increases in elective surgery rates and associated costs, while the efficacy of repairing (eg, rotator cuff and medical meniscal tears), reshaping (eg, subacromial decompression) or replacing (eg, lumbar intervertebral discs) the structures considered to be at fault has been substantially challenged. Second, it is arguable that musculoskeletal clinicians have invented treatments for conditions that may not exist or be readily detected (such as trigger points, sacral torsions), and they have developed and perpetuated treatment paradigms (such as 'correcting' upper body posture and muscle imbalances) that do not conform to current research evidence. These two trends have created an expectation that interventions (frequently 'passive') will provide a 'cure', and typically quickly, with minimal self-contribution. This expectation may have been derived from a conversation with a friend or family member, from the Internet or from an advertising campaign, but almost certainly originated from health professionals.

2018-Sihvonen, R., M. Paavola, A. Malmivaara, A. Itälä, A. Joukainen, H. Nurmi, J. Kalske, A. Ikonen, T. Järvelä, T. A. H. Järvinen, K. Kanto, J. Karhunen, J. Knifsund, H. Kröger, T. Kääriäinen, J. Lehtinen, J. Nyrhinen, J. Paloneva, O. Päiväniemi, M. Raivio, J. Sahlman, R. Sarvilinna, S. Tukiainen, V.-V. Välimäki, V. Äärimaa, P. Toivonen & T. L. N. Järvinen; The FIDELITY (Finnish Degenerative Meniscal Lesion Study) Investigators. Arthroscopic partial meniscectomy versus placebo surgery for a degenerative meniscus tear: a 2-year follow-up of the randomised controlled trial. *Annals of the Rheumatic Diseases* 77 (2):188-195.

Objective: To assess if arthroscopic partial meniscectomy (APM) is superior to placebo surgery in the treatment of patients with degenerative tear of the medial meniscus.

Methods: In this multicentre, randomised, participant-blinded and outcome assessor-blinded, placebo-surgery controlled trial, 146 adults, aged 35–65 years, with knee symptoms consistent with degenerative medial meniscus tear and no knee osteoarthritis were randomised to APM or placebo surgery. The primary outcome was the between-group difference in the change from baseline in the Western Ontario Meniscal Evaluation Tool (WOMET) and Lysholm knee scores and knee pain after exercise at 24 months after surgery. Secondary outcomes included the frequency of unblinding of the treatment-group allocation, participants' satisfaction, impression of change, return to normal activities, the incidence of serious adverse events and the presence of meniscal symptoms in clinical examination. Two subgroup analyses, assessing the outcome on those with mechanical symptoms and those with unstable meniscus tears, were also carried out.

Results: In the intention-to-treat analysis, there were no significant between-group differences in the mean changes from baseline to 24 months in WOMET score: 27.3 in the APM group as compared with 31.6 in the placebo-surgery group (between-group difference, −4.3; 95% CI, −11.3 to 2.6); Lysholm knee score: 23.1 and 26.3, respectively (−3.2; −8.9 to 2.4) or knee pain after exercise, 3.5 and 3.9, respectively (−0.4; −1.3 to 0.5). There were no statistically significant differences between the two groups in any of the secondary outcomes or within the analysed subgroups.

Conclusions: In this 2-year follow-up of patients without knee osteoarthritis but with symptoms of a degenerative medial meniscus tear, the outcomes after APM were no better than those after placebo surgery. No evidence could be found to support the prevailing ideas that patients with presence of mechanical symptoms or certain meniscus tear characteristics or those who have failed initial conservative treatment are more likely to benefit from APM.

2018-Spang III, R. C., M. C. Nasr, A. Mohamadi, J. P. DeAngelis, A. Nazarian & A. J. Ramappa. Rehabilitation following meniscal repair: a systematic review. *BMJ Open Sport & Exercise Medicine* 4 (1): e000212.

Objective: To review existing biomechanical and clinical evidence regarding postoperative weight-bearing and range of motion restrictions for patients following meniscal repair surgery.

Methods and data sources: Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guideline, we searched MEDLINE using following search strategy: ((((“Weight-Bearing/physiology”[Mesh]) OR “Range of Motion, Articular”[Mesh]) OR “Rehabilitation”[Mesh])) AND (“Menisci, Tibial”[Mesh]). Additional articles were derived from previous reviews. Eligible studies were published in English and reported a rehabilitation protocol following meniscal repair on human. We summarised rehabilitation protocols and patients’ outcome among original studies.

Results: Seventeen clinical studies were included in this systematic review. There was wide variation in rehabilitation protocols among clinical studies. Biomechanical evidence from small cadaveric studies suggests that higher degrees of knee flexion and weight-bearing may be safe following meniscal repair and may not compromise the repair. An accelerated protocol with immediate weight-bearing at tolerance and early motion to non-weight-bearing with immobilising up to 6 weeks postoperatively is reported. Accelerated rehabilitation protocols are not associated with higher failure rates following meniscal repair.

Conclusions: There is a lack of consensus regarding the optimal postoperative protocol following meniscal repair. Small clinical studies support rehabilitation protocols that allow early motion. Additional studies are needed to better clarify the interplay between tear type, repair method and optimal rehabilitation protocol.

2018-Thorlund, J. B., C. B. Juhl, L. H. Ingelsrud & S. T. Skou. Risk factors, diagnosis and non-surgical treatment for meniscal tears: evidence and recommendations: a statement paper commissioned by the Danish Society of Sports Physical Therapy (DSSF). *British Journal of Sports Medicine* 52 (9): 557-565.

This statement aimed at summarising and appraising the available evidence for risk factors, diagnostic tools and non-surgical treatments for patients with meniscal tears. We systematically searched electronic databases using a pragmatic search strategy approach. Included studies were synthesised quantitatively or qualitatively, as appropriate. Strength of evidence was determined according to the Grading of Recommendations Assessment Development and Evaluation framework. Low-quality evidence suggested that overweight (degenerative tears, k=3), male sex (k=4), contact and pivoting sports (k=2), and frequent occupational kneeling/squatting (k=3) were risk factors for meniscal tears. There was low to moderate quality evidence for low to high positive and negative predictive values, depending on the underlying prevalence of meniscal tears for four common diagnostic tests (k=15, n=2474). Seven trials investigated exercise versus surgery (k=2) or the effect of surgery in addition to exercise (k=5) for degenerative meniscal tears. There was moderate level of evidence for exercise improving self-reported pain (Effect Size (ES)−0.51, 95% CI −1.16 to 0.13) and function (ES −0.06, 95% CI −0.23 to 0.11) to the same extent as surgery, and improving muscle strength to a greater extent than surgery (ES −0.45, 95% CI −0.62 to −0.29). High-quality evidence showed no clinically relevant effect of surgery in addition to exercise on pain (ES 0.18, 95% 0.05 to 0.32) and function (ES, 0.13 95% CI −0.03 to 0.28) for patients with degenerative meniscal tears. No randomised trials comparing non-surgical treatments with surgery in patients younger than 40 years of age or patients with traumatic meniscal tears were identified. Diagnosis of meniscal tears is challenging as all clinical diagnostic tests have high risk of misclassification. Exercise therapy should be recommended as the treatment of choice for middle-aged and older patients with degenerative meniscal lesions. Evidence on the best treatment for young patients and patients with traumatic meniscal tears is lacking.

2018-Vuurberg, G., A. Hoorntje, L. M. Wink, B. F. W. van der Doelen, M. P. van den Bekerom, R. Dekker, C. Niek van Dijk, R. Krips, M. C. M. Loogman, M. L. Ridderikhof, F. F. Smithuis, S. A. S. Stufkens, E. A. L. M. Verhagen, R. A. de Bie & G. M. M. J. Kerkhoffs. Diagnosis, treatment and prevention of ankle sprains: update of an evidence-based clinical guideline. *British Journal of Sports Medicine* 52 (15): 956.

This guideline aimed to advance current understandings regarding the diagnosis, prevention and therapeutic interventions for ankle sprains by updating the existing guideline and incorporate new research. A secondary objective was to provide an update related to the cost-effectiveness of diagnostic procedures, therapeutic interventions and prevention strategies. It was posited that subsequent interaction of clinicians with this guideline could help reduce health impairments and patient burden associated with this prevalent musculoskeletal injury. The previous guideline provided evidence that the severity of ligament damage can be assessed most reliably by delayed physical examination (4–5 days post trauma). After correct diagnosis, it can be stated that even though a short time of immobilisation may be helpful in relieving pain and swelling, the patient with an acute lateral ankle ligament rupture benefits most from use of tape or a brace in combination with an exercise programme.

New in this update: Participation in certain sports is associated with a heightened risk of sustaining a lateral ankle sprain. Care should be taken with non-steroidal anti-inflammatory drugs (NSAIDs) usage after an ankle sprain. They may be used to reduce pain and swelling, but usage is not without complications and NSAIDs may suppress the natural healing process. Concerning treatment, supervised exercise-based programmes preferred over passive modalities as it stimulates the recovery of functional joint stability. Surgery should be reserved for cases that do not respond to thorough and comprehensive exercise-based treatment. For the prevention of recurrent lateral ankle sprains, ankle braces should be considered as an efficacious option.

2017-Beaufils, P., R. Becker, S. Kopf, M. Englund, R. Verdonk, M. Ollivier & R. Seil. Surgical management of degenerative meniscus lesions: the 2016 ESSKA meniscus consensus. *Knee Surgery, Sports Traumatology, Arthroscopy* 25: 335-346.

Purpose: A degenerative meniscus lesion is a slowly developing process typically involving a horizontal cleavage in a middle-aged or older person. When the knee is symptomatic, arthroscopic partial meniscectomy has been practised for a long time with many case series reporting improved patient outcomes. Since 2002, several randomised clinical trials demonstrated no additional benefit of arthroscopic partial meniscectomy compared to non-operative treatment, sham surgery or sham arthroscopic partial meniscectomy. These results introduced controversy in the medical community and made clinical decision-making challenging in the daily clinical practice. To facilitate the clinical decision-making process, a consensus was developed. This initiative was endorsed by ESSKA.

Methods: A degenerative meniscus lesion was defined as a lesion occurring without any history of significant acute trauma in a patient older than 35 years. Congenital lesions, traumatic meniscus tears and degenerative lesions occurring in young patients, especially in athletes, were excluded. The project followed the so-called formal consensus process, involving a steering group, a rating group and a peer-review group. A total of 84 surgeons and scientists from 22 European countries were included in the process. Twenty questions, their associated answers and an algorithm based on extensive literature review and clinical expertise, were proposed. Each question and answer set was graded according to the scientific level of the corresponding literature.

Results: The main finding was that arthroscopic partial meniscectomy should not be proposed as a first line of treatment for degenerative meniscus lesions. Arthroscopic partial meniscectomy should only be considered after a proper standardised clinical and radiological evaluation and when the response to non-operative management has not been satisfactory. Magnetic resonance imaging of the knee is typically not indicated in the first-line work-up, but knee radiography should be used as an imaging tool to support a diagnosis of osteoarthritis or to detect certain rare pathologies, such as tumours or fractures of the knee.

Discussion: The present work offers a clear framework for the management of degenerative meniscus lesions, with the aim to balance information extracted from the scientific evidence and clinical expertise. Because of biases and weaknesses of the current literature and lack of definition of important criteria such as mechanical symptoms, it cannot be considered as an exact treatment algorithm. It summarises the results of the "ESSKA Meniscus Consensus Project" (http://www.esska.org/education/projects) and is the first official European

consensus on this topic. The consensus may be updated and refined as more high-quality evidence emerges.

2017-Beckenkamp, P. R., C.-W. C. Lin, P. Macaskill, Z. A. Michaleff, C. G. Maher & A. M. Moseley. Diagnostic accuracy of the Ottawa Ankle and Midfoot Rules: a systematic review with meta-analysis. *British Journal of Sports Medicine* 51 (6): 504-510.

Objective: To review the diagnostic accuracy of the Ottawa Ankle and Midfoot Rules and explore if clinical features and/or methodological quality of the study influence diagnostic accuracy estimates.

Design: Systematic review with meta-analysis.

Data sources: MEDLINE, EMBASE, CINAHL, SPORTDiscus and Cochrane Library.

Eligibility criteria for selecting studies: Primary diagnostic studies reporting the accuracy of the Rules in people with ankle and/or midfoot injury were retrieved. Diagnostic accuracy estimates, overall and for subgroups (patient's age, profession of the assessor and setting of application), were made. Sensitivity analyses included studies with a low risk of bias and studies where all patients received radiographs.

Results: 66 studies were included. Ankle and Midfoot Rules presented similar accuracies, which were homogeneous and high for sensitivity and negative likelihood ratios and poor and heterogeneous for specificity and positive likelihood ratios (mean, 95% CI pooled sensitivity of Ankle Rules: 99.4%, 97.9% to 99.8%; specificity: 35.3%, 28.8% to 42.3%). Sensitivity of the Ankle Rules was higher in adults than in children, but the profession of the assessor did not appear to influence accuracy. Specificity was higher for Midfoot than for Ankle Rules. There were not enough studies to allow comparison according to setting of application. Studies with a low risk of bias and where all patients received radiographs provided lower accuracy estimates. Specificity heterogeneity was not explained by assessor training, use of imaging in all patients and low risk of bias.

Conclusions: Study features and the methodological quality influence estimates of the diagnostic accuracy of the Ottawa Ankle and Midfoot Rules.

2017-Darlow, B., B. B. Forster, K. O'Sullivan & P. O'Sullivan. It is time to stop causing harm with inappropriate imaging for low back pain. *British Journal of Sports Medicine* 51 (5): 414–415.

Inappropriate imaging for low back pain (LBP) can cause harm in three ways:

1. Misinterpretation of results by clinicians resulting in unhelpful advice, needless subsequent investigations (downstream testing) and invasive interventions, including surgery;
2. Misinterpretation of results by patients resulting in catastrophisation, fear and avoidance of movement and activity, and low expectations of recovery;
3. Side effects such as exposure to radiation.

2017-Doherty, C., C. Bleakley, E. Delahunt & S. Holden. Treatment and prevention of acute and recurrent ankle sprain: An overview of systematic reviews with meta-analysis. *British Journal of Sports Medicine* 51 (2): 113-125.

Background: Ankle sprains are highly prevalent with high risk of recurrence. Consequently, there are a significant number of research reports examining strategies for treating and preventing acute and recurrent sprains (otherwise known as chronic ankle instability (CAI)), with a coinciding proliferation of review articles summarising these reports.

Objective: To provide a systematic overview of the systematic reviews evaluating treatment strategies for acute ankle sprain and CAI.

Design: Overview of intervention systematic reviews.

Participants: Individuals with acute ankle sprain/CAI.

Main outcome measurements: The primary outcomes were injury/reinjury incidence and function.

Results: 46 papers were included in this systematic review. The reviews had a mean score of 6.5/11 on the AMSTAR quality assessment tool. There was strong evidence for bracing and moderate evidence for neuromuscular training in preventing recurrence of an ankle sprain. For the combined outcomes of pain, swelling and function after an acute sprain, there was strong evidence for non-steroidal anti-inflammatory drugs and early mobilisation, with moderate evidence supporting exercise and manual therapy techniques. There was conflicting evidence regarding the efficacy of surgery and acupuncture for the treatment of acute ankle sprains. There was insufficient evidence to support the use of ultrasound in the treatment of acute ankle sprains.

Conclusions: For the treatment of acute ankle sprain, there is strong evidence for non-steroidal anti-inflammatory drugs and early mobilisation, with moderate evidence supporting exercise and manual therapy techniques, for pain, swelling and function. Exercise therapy and bracing are supported in the prevention of CAI.

2017-Karran, E. L., Y. Medalian, S. L. Hillier & G. L. Moseley. The impact of choosing words carefully: an online investigation into imaging reporting strategies and best practice care for low back pain. *PeerJ* 5: e4151.

Background: Low back pain clinical practice guidelines consistently recommend against the routine ordering of spinal imaging; however, imaging is frequently requested in primary care, without evidence of benefit. Imaging reports frequently identify degenerative features which are likely to be interpreted as 'abnormal', despite their high prevalence in symptom-free individuals. The aim of this study was to investigate whether post-imaging back-related perceptions are influenced by providing prior information about normal findings, and to compare the effect of receiving imaging results with best practice care (without imaging). The impact of introducing novel, 'enhanced' reporting strategies was also explored.

Methods: This study was a simulated-patient, randomised, multiple-arm experiment. Patient scenarios were presented to volunteer healthy adult participants via an online survey. In the scenarios, 'virtual' patients with low back pain were randomised to one of three groups. Group 1 received imaging and was pre-informed about normal findings. Group 2 received imaging (without pre-information). Group 3 received best practice care: quality information without imaging. Group 1 was further divided to receive either a standard report, or an 'enhanced' report (containing altered terminology and epidemiological information). The primary outcome was back-related perceptions (BRP), a composite score derived from three numeric rating scale scores exploring perceptions of spinal condition, recovery concerns and planned activity. The secondary outcomes were satisfaction and kinesiophobia.

Results: Full data were available from 660 participants (68% female). Analysis of covariance revealed a significant effect of group after controlling for baseline BRP scores ($F(2,74)=10.4, p<0.001, \eta 2p=.04$). Pairwise comparisons indicated that receiving best practice care resulted in more positive BRPs than receiving imaging results, and receiving prior information about normal findings had no impact. Enhanced reporting strategies also positively impacted BRPs ($F(1,275)=13.06, p<0.001, \eta 2p=.05$). Significant relationships between group allocation and both satisfaction ($F(2,553)=7.5, p=0.001, \eta 2p=.03$) and kinaesiophobia ($F(2,553)=3.0, p=0.050, \eta 2p=.01$) were found, with statistically significant pairwise comparisions again in favour of best-practice care.

Conclusion: Intervention strategies such as enhanced reporting methods and the provision of quality information (without imaging) have the potential to improve the outcome of patients with recent-onset LBP and should be further considered by primary care providers.

2017-Kosik, K. B., R. S. McCann, M. Terada & P. A. Gribble. Therapeutic interventions for improving self-reported function in patients with chronic ankle instability: a systematic review. *British Journal of Sports Medicine* 51 (2): 105-112.

Objective: To identify which therapeutic intervention may be most effective for improving self-reported function in patients with chronic ankle instability (CAI).

Design: Systematic literature review. Articles were appraised using the Downs and Black Checklist by 3 reviewers.

Data sources: PubMed along with CINAHL, MEDLINE and SPORTDiscus within EBSCOhost for pertinent articles from their inception through August 2016.

Eligibility criteria for selected studies: Articles included were required to (1) be written in English, (2) report adequate data to calculate effect sizes, (3) identify patients with CAI, (4) use some form of therapeutic intervention and (5) use a self-reported questionnaire as a main outcome measurement.

Results: A broad spectrum of therapeutic interventions were identified related to balance training, multimodal rehabilitation, joint mobilisation, resistive training, soft-tissue mobilisation, passive calf stretching and orthotics. All of the articles included in the balance training category had moderate-to-strong Hedges g with none of the 95% CIs crossing 0. Hedges g effect sizes ranged from −0.67 to −2.31 and −0.51 to −1.43 for activities of daily living and physical activity, respectively. The multimodal rehabilitation category also produced moderate-to-strong Hedges g effect sizes but with large CIs crossing 0. Hedges g effect sizes ranged from −0.47 to −9.29 and −0.62 to −24.29 for activities of daily living and physical activity, respectively.

Conclusions: The main findings from this systematic review were balance training provided the most consistent improvements in self-reported function for patients with CAI.

2017-Nielsen, S. M., S. Tarp, R. Christensen, H. Bliddal, L. Klokker & M. Henriksen. The risk associated with spinal manipulation: an overview of reviews. *Systematic Reviews* 6: 64.

Background: Spinal manipulative therapy (SMT) is a widely used manual treatment, but many reviews exist with conflicting conclusions about the safety of SMT. We performed an overview of reviews to elucidate and quantify the risk of serious adverse events (SAEs) associated with SMT.

Methods: We searched five electronic databases from inception to December 8, 2015. We included reviews on any type of studies, patients, and SMT technique. Our primary outcome was SAEs. Quality of the included reviews was assessed using a measurement tool to assess systematic reviews (AMSTAR). Since there were insufficient data for calculating incidence rates of SAEs, we used an alternative approach; the conclusions regarding safety of SMT were extracted for each review, and the communicated opinion were judged by two reviewers independently as safe, harmful, or neutral/unclear. Risk ratios (RRs) of a review communicating that SMT is safe and meeting the requirements for each AMSTAR item, were calculated.

Results: We identified 283 eligible reviews, but only 118 provided data for synthesis. The most frequently described adverse events (AEs) were stroke, headache, and vertebral artery dissection. Fifty-four reviews (46%) expressed that SMT is safe, 15 (13%) expressed that SMT is harmful, and 49 reviews (42%) were neutral or unclear. Thirteen reviews reported incidence estimates for SAEs, roughly ranging from 1 in 20,000 to 1 in 250,000,000 manipulations. Low methodological quality was present, with a median of 4 of 11 AMSTAR items met (interquartile range, 3 to 6). Reviews meeting the requirements for each of the AMSTAR items (i.e. good internal validity) had a higher chance of expressing that SMT is safe.

Conclusions: It is currently not possible to provide an overall conclusion about the safety of SMT; however, the types of SAEs reported can indeed be significant, sustaining that some risk is present. High quality research and consistent reporting of AEs and SAEs are needed.

2016-Azam, M. & R. Shenoy. The Role of Arthroscopic Partial Meniscectomy in the Management of Degenerative Meniscus Tears: A Review of the Recent Literature. *The Open Orthopaedics Journal* 10: 797-804.

Background: The use of arthroscopic partial meniscectomy for middle aged to older adults with knee pain is one of the most common surgical procedures with approximately 150,000 knee arthroscopies being carried out in the United Kingdom each year, and about five times that number in the United States. Despite this, the procedure remains controversial. The aim of this paper is to provide a comprehensive review of the role of arthroscopic meniscectomy in patients with degenerative meniscus tears and suggest recommendations for clinical practice.

Methods: A thorough literature search was performed using available databases, including Pubmed, Medline, EMBASE and the Cochrane Library to cover important randomised control trials surrounding the use of arthroscopic partial meniscectomy.

Results: The majority of randomised control trials suggest that arthroscopic partial meniscectomy is not superior to conservative measures such as exercise programmes. Furthermore, one randomised control trial found that arthroscopic partial meniscectomy was not even superior to sham surgery.

Conclusion: There is significant overtreatment of knee pain with arthroscopic partial meniscectomy when alternative, less invasive and less expensive treatment options are equally effective. First-line treatment of degenerative meniscus tears should be non-operative therapy focused on analgesia and physical therapy to provide pain relief as well as improve mechanical function of the knee joint. Arthroscopic partial meniscectomy should be considered as a last resort when extensive exercise programmes and physiotherapy have been tried and failed.

2016-McInnis, K. C. & L. N. Ramey. High–Risk Stress Fractures: Diagnosis and Management. *PM&R* 8 (3): S113-S124.

Stress fractures are common overuse injuries in athletes. They occur during periods of increased training without adequate rest, disrupting normal bone reparative mechanisms. There are a host of intrinsic and extrinsic factors, including biochemical and biomechanical, that put athletes at risk. In most stress fractures, the diagnosis is primarily clinical, with imaging indicated at times, and management focused on symptom–free relative rest with advancement of activity as tolerated. Overall, stress fractures in athletes have an excellent prognosis for return to sport, with little risk of complication. There is a subset of injuries that have a greater risk of fracture progression, delayed healing, and nonunion and are generally more challenging to treat with nonoperative care. Specific locations of high–risk stress fracture include the femoral neck (tension side), patella, anterior tibia, medial malleolus, talus, tarsal navicular, proximal fifth metatarsal, and great toe sesamoids. These sites share a characteristic region of high tensile load and low blood flow. High–risk stress fractures require a more aggressive approach to evaluation, with imaging often necessary, to confirm early and accurate diagnosis and initiate immediate treatment. Treatment consists of nonweight–bearing immobilization, often with a prolonged period away from sport, and a more methodic and careful reintroduction to athletic activity. These stress fractures may require surgical intervention. A high index of suspicion is essential to avoid delayed diagnosis and optimize outcomes in this subset of stress fractures.

2016-van de Graaf, V. A., N. Wolterbeek, E. L. A. R. Mutsaerts, V. A. B. Scholtes, D. B. F. Saris, A. de Gast & R. W. Poolman. Arthroscopic Partial Meniscectomy or Conservative Treatment for Nonobstructive Meniscal Tears: A Systematic Review and Meta-analysis of Randomized Controlled Trials. *Arthroscopy: The Journal of Arthroscopic & Related Surgery* 32 (9): 1855–1865.e4.

Purpose: To conduct a meta-analysis of randomized controlled trials comparing the outcome of arthroscopic partial meniscectomy (APM) with conservative treatment in adults with nonobstructive meniscal tears and to recommend a treatment of choice.

Methods: We systematically searched the databases of MEDLINE, Excerpta Medica Database, Cochrane, the National Health Service Centre for Reviews and Dissemination, and Physiotherapy Evidence Database from inception to May 2, 2016. Two authors independently searched the literature and selected eligible studies. The meta-analyses used a random-effects model. The primary outcome was physical function, measured by knee-specific patient-reported outcomes. Secondary outcomes included knee pain, activity level, the progression of osteoarthritis, adverse events, general health, and quality of life.

Results: We included 6 randomized controlled trials, with a total of 773 patients, of whom 378 were randomized to APM and 395 were randomized to the control treatment. After pooling the data of 5 studies, we found small significant differences in favor of the APM group for physical function at 2 to 3 months (mean difference [MD] = 3.31; 95% confidence interval [CI] = 0.69-5.93; P = .01; I2 = 0% [Lysholm knee score]), and at 6 months (MD = 3.56; 95% CI = 0.24-6.88; P = .04; I2 = 0% (Knee injury and Osteoarthritis Outcome Score [KOOS] and Western Ontario and McMaster Universities Osteoarthritis Index); standardized MD = 0.17; 95% CI = 0.01-0.32; P = .03; I2 = 0% [Lysholm knee score, KOOS, and Western Ontario and McMaster Universities Osteoarthritis Index]). We also found small significant differences for pain at 6 months (MD = 3.56; 95% CI = 0.18-6.95; P = .04; I2 = 0% [KOOS] and MD = 0.56; 95% CI = 0.28-0.83; P ≤ .0001; I2 = 0% [visual analog scale and numeric rating scale]). We found no significant differences after 12 and 24 months.

Conclusions: We found small, although statistically significant, favorable results of APM up to 6 months for physical function and pain. However, we found no differences at longer follow-up.

2016-Wong, J. J., H. M. Shearer, S. Mior, C. Jacobs, P. Côté, K. Randhawa, H. Yu, D. Southerst, S. Varatharajan, D. Sutton, G. van der Velde, L. J. Carroll, A. Ameis, C. Ammendolia, R. Brison, M. Nordin, M. Stupar & A. Taylor-Vaisey. Are manual therapies, passive physical modalities, or acupuncture effective for the management of patients with whiplash-associated disorders or neck pain and associated disorders? An update of the Bone and Joint Decade Task Force on Neck Pain and Its Associated Disorders by the OPTIMa collaboration. *The Spine Journal* 16 (12): 1598-1630.

Background Context: In 2008, the Bone and Joint Decade 2000–2010 Task Force on Neck Pain and Its Associated Disorders (Neck Pain Task Force) found limited evidence on the effectiveness of manual therapies, passive physical modalities, or acupuncture for the management of whiplash-associated disorders (WAD) or neck pain and associated disorders (NAD).

Purpose: This review aimed to update the findings of the Neck Pain Task Force, which examined the effectiveness of manual therapies, passive physical modalities, and acupuncture for the management of WAD or NAD.

Study Design/Setting: This is a systematic review and best evidence synthesis.

Sample: The sample includes randomized controlled trials, cohort studies, and case-control studies comparing manual therapies, passive physical modalities, or acupuncture with other interventions, placebo or sham, or no intervention.

Outcome Measures: The outcome measures were self-rated or functional recovery, pain intensity, health-related quality of life, psychological outcomes, or adverse events.

Methods: We systematically searched five databases from 2000 to 2014. Random pairs of independent reviewers critically appraised eligible studies using the Scottish Intercollegiate Guidelines Network criteria. Studies with a low risk of bias were stratified by the intervention's stage of development (exploratory vs. evaluation) and synthesized following best evidence synthesis principles. Funding was provided by the Ministry of Finance.

Results: We screened 8,551 citations, and 38 studies were relevant and 22 had a low risk of bias. Evidence from seven exploratory studies suggests that (1) for recent but not persistent NAD grades I–II, thoracic manipulation offers short-term benefits; (2) for persistent NAD grades I–II, technical parameters of cervical mobilization (eg, direction or site of manual contact) do not impact outcomes, whereas one session of cervical manipulation is similar to Kinesio Taping; and (3) for NAD grades I–II, strain-counterstrain treatment is no better than placebo. Evidence from 15 evaluation studies suggests that (1) for recent NAD grades I–II,

cervical and thoracic manipulation provides no additional benefit to high-dose supervised exercises, and Swedish or clinical massage adds benefit to self-care advice; (2) for persistent NAD grades I–II, home-based cupping massage has similar outcomes to home-based muscle relaxation, low-level laser therapy (LLLT) does not offer benefits, Western acupuncture provides similar outcomes to non-penetrating placebo electroacupuncture, and needle acupuncture provides similar outcomes to sham-penetrating acupuncture; (3) for WAD grades I–II, needle electroacupuncture offers similar outcomes as simulated electroacupuncture; and (4) for recent NAD grades III, a semi-rigid cervical collar with rest and graded strengthening exercises lead to similar outcomes, and LLLT does not offer benefits.

Conclusions: Our review adds new evidence to the Neck Pain Task Force and suggests that mobilization, manipulation, and clinical massage are effective interventions for the management of neck pain. It also suggests that electroacupuncture, strain-counterstrain, relaxation massage, and some passive physical modalities (heat, cold, diathermy, hydrotherapy, and ultrasound) are not effective and should not be used to manage neck pain.

2016-Yu, H., K. Randhawa & P. Côté; OPTIMa Collaboration. The Effectiveness of Physical Agents for Lower-Limb Soft Tissue Injuries: A Systematic Review. *Journal of Orthopaedic & Sports Physical Therapy* 46 (7): 523-554.

Background: Soft tissue injuries to the lower limb bring a substantial health and economic burden to society. Physical agents are commonly used to treat these injuries. However, the effectiveness of many such physical agents is not clearly established in the literature.

Objective: To evaluate the effectiveness and safety of physical agents for soft tissue injuries of the lower limb.

Methods: We searched 5 databases from 1990 to 2015 for randomized controlled trials (RCTs), cohort studies, and case-control studies. Paired reviewers independently screened the retrieved literature and appraised relevant studies using the Scottish Intercollegiate Guidelines Network criteria. Studies with a high risk of bias were excluded. We synthesized low-risk-of-bias studies according to principles of best-evidence synthesis.

Results: We screened 10261 articles. Of 43 RCTs identified, 20 had a high risk of bias and were excluded from the analysis, and 23 RCTs had a low risk of bias and were included in the analysis. The available higher-quality evidence suggests that patients with persistent plantar fasciitis may benefit from ultrasound or foot orthoses, while those with persistent midportion Achilles tendinopathy may benefit from shockwave therapy. However, the current evidence does not support the use of shockwave therapy for recent plantar fasciitis, low-Dye taping for persistent plantar fasciitis, low-level laser therapy for recent ankle sprains, or splints for persistent midportion Achilles tendinopathy. Finally, evidence on the effectiveness of the following interventions is not established in the current literature: (1) shockwave therapy for persistent plantar fasciitis, (2) cryotherapy or assistive devices for recent ankle sprains, (3) braces for persistent midportion Achilles tendinopathy, and (4) taping or electric muscle stimulation for patellofemoral pain syndrome.

Conclusion: Almost half the identified RCTs that evaluated the effectiveness of physical agents for the management of lower-limb soft tissue injuries had a high risk of bias. High-quality RCTs are still needed to assess the effectiveness of physical agents for managing the broad range of lower-limb soft tissue injuries. The effectiveness of most interventions remains unclear.

2015-Brinjikji, W., P. H. Luetmer, B. Comstock, B. W. Bresnahan, L. E. Chen, R. A. Deyo, S. Halabi, J. A. Turner, A. L. Avins, K. James, J. T. Wald, D. F. Kallmes & J.G. Jarvik. Systematic Literature Review of Imaging Features of Spinal Degeneration in Asymptomatic Populations. *American Journal of Neuroradiology* 36 (4): 811-816.

Background and purpose: Degenerative changes are commonly found in spine imaging but often occur in pain-free individuals as well as those with back pain. We sought to estimate the prevalence, by age, of common degenerative spine conditions by performing a systematic review studying the prevalence of spine degeneration on imaging in asymptomatic individuals.

Materials and methods: We performed a systematic review of articles reporting the prevalence of imaging findings (CT or MR imaging) in asymptomatic individuals from published English literature through April 2014. Two reviewers evaluated each manuscript. We selected age groupings by decade (20, 30, 40, 50, 60, 70, 80 years), determining age-specific prevalence estimates. For each imaging finding, we fit a generalized linear mixed-effects model for the age-specific prevalence estimate clustering in the study, adjusting for the midpoint of the reported age interval.

Results: Thirty-three articles reporting imaging findings for 3110 asymptomatic individuals met our study inclusion criteria. The prevalence of disk degeneration in asymptomatic individuals increased from 37% of 20-year-old individuals to 96% of 80-year-old individuals. Disk bulge prevalence increased from 30% of those 20 years of age to 84% of those 80 years of age. Disk protrusion prevalence increased from 29% of those 20 years of age to 43% of those 80 years of age. The prevalence of annular fissure increased from 19% of those 20 years of age to 29% of those 80 years of age.

Conclusions: Imaging findings of spine degeneration are present in high proportions of asymptomatic individuals, increasing with age. Many imaging-based degenerative features are likely part of normal aging and unassociated with pain. These imaging findings must be interpreted in the context of the patient's clinical condition.

2015-Feger, M. A., J. Goetschius, H. Love, S. A. Saliba & Jay Hertel. Electrical stimulation as a treatment intervention to improve function, edema or pain following acute lateral ankle sprains: A systematic review. *Physical Therapy in Sport* 16 (4): 361-369.

The purpose of this systematic review was to assess whether electrical stimulation (ES), when used in conjunction with a standard treatment, can reduce levels of functional impairment, edema, and pain compared to a standard treatment alone, in patients following a lateral ankle sprain. We searched PubMed, CINAHL, SportDiscus, and Medline (OVID) databases through June 2014 using the terms "ankle sprain or ankle sprains or ligament injury or ligamentous injury," and "electric stimulation or electric stimulation or electrotherapy." Our search identified four randomized control trials, of which, neuromuscular ES and high-voltage pulsed stimulation were the only two ES modalities utilized. Effect sizes and 95% confidence intervals (CI) were estimated using Cohen's d for comparison between treatment groups. Three of four effect sizes for function had 95% CI that crossed zero. Twenty-four of the thirty-two effect sizes for edema had 95% CI that crossed zero. All effect sizes for pain had 95% CI that crossed zero. Therefore, the use of ES is not recommended as a means to improve function, reduce edema, or decrease pain in the treatment of acute lateral ankle sprains.

2015-Frank, J. M., J. D. Harris, B. J. Erickson, W. Slikker, C. A. Bush-Joseph, M. J. Salata & S. J. Nho. Prevalence of Femoroacetabular Impingement Imaging Findings in Asymptomatic Volunteers: A Systematic Review. *Arthroscopy: The Journal of Arthroscopic & Related Surgery* 31 (6): 1199-1204.

Purpose: The aim of this study was to determine the prevalence of radiographic findings suggestive of femoroacetabular impingement (FAI) in asymptomatic individuals.

Methods: A systematic review was performed using Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Studies reporting radiographic, computed tomographic, or magnetic resonance imaging (MRI) findings that were suggestive of FAI in asymptomatic volunteers were included. Cam, pincer, and combined pathologic conditions were investigated.

Results: We identified 26 studies for inclusion, comprising 2,114 asymptomatic hips (57.2% men; 42.8% women). The mean participant age was 25.3 ± 1.5 years. The mean alpha angle in asymptomatic hips was 54.1° ± 5.1°. The prevalence of an asymptomatic cam deformity was 37% (range, 7% to 100% between studies)—54.8% in athletes versus 23.1% in the general population. Of the 17 studies that measured alpha angles, 9 used MRI and 9 used radiography (1 study used both). The mean lateral and anterior center edge angles (CEAs) were 31.2° and 30°, respectively. The prevalence of asymptomatic hips with pincer deformity was 67% (range 61% to 76% between studies). Pincer deformity was poorly defined (4 studies [15%]; focal anterior overcoverage, acetabular retroversion, abnormal CEA or acetabular index, coxa profunda, acetabular protrusio, ischial spine sign, crossover sign, and posterior wall sign). Only 7 studies reported on labral injury, which was found on MRI without intra-articular contrast in 68.1% of hips.

Conclusions: FAI morphologic features and labral injuries are common in asymptomatic patients. Clinical decision making should carefully analyze the association of patient history and physical examination with radiographic imaging.

2015-Gross, A., T. M. Kay, J.-P. Paquin, S. Blanchette, P. Lalonde, T. Christie, G. Dupont, N. Graham, S. J. Burnie, G. Gelley, C. H. Goldsmith, M. Forget, J. L. Hoving, G. Brønfort & P. L. Santaguida; Cervical Overview Group. Exercises for mechanical neck disorders. *Cochrane Database of Systematic Reviews* (1): CD004250.

Review question: We reviewed the evidence about the effect of exercise therapy on pain, disability, patient satisfaction, and quality of life among people with neck pain.

Background: Neck pain is common; it can limit a person's ability to participate in normal activities and is costly. Exercise therapy is a widely used treatment for neck pain. This review includes active exercises (including specific neck and shoulder exercises, stretching, strengthening, postural, breathing, cognitive, functional, eye–fixation and proprioception exercises) prescribed or performed in the treatment of neck pain. Studies in which exercise therapy was given as part of a multidisciplinary treatment, multimodal treatment (along with other treatments such as manipulation or ultrasound), or exercises requiring application by a trained individual (such as hold–relax techniques, rhythmic stabilization, and passive techniques) were excluded.

Study characteristics: The evidence is current to May 2014. We found 27 trials (with a total of 2485 participants) examining whether exercise can help reduce neck pain and disability; improve function, global perceived effect, patient satisfaction and/or quality of life. In these trials, exercise was compared to either a placebo treatment, or no treatment (waiting list), or exercise combined with another intervention was compared with that same intervention (which could include manipulation, education/advice, acupuncture, massage, heat or medications). Twenty–four of 27 trials evaluating neck pain reported on the duration of the disorder: 1 acute; 1 acute to chronic; 1 subacute; 4 subacute/chronic; and 16 chronic. One study reported on neck disorder with acute radiculopathy; two trials investigated subacute to chronic cervicogenic headache.

Key results: Results showed that exercise is safe, with temporary and benign side effects, although more than half of the trials did not report on adverse effects. An exercise classification system was used to ensure similarity between protocols when looking at the effects of different types of exercises. Some types of exercise did show an advantage over the other comparison groups. There appears to be a role for strengthening exercises in the treatment of chronic neck pain, cervicogenic headache and cervical radiculopathy if these exercises are focused on the neck, shoulder and shoulder blade region. Furthermore, the use of strengthening exercises, combined with endurance or stretching exercises has also been shown to be beneficial. There is some evidence to suggest the beneficial effects of specific

exercises (e.g. sustained natural apophyseal glides) with cervicogenic headaches and mindfulness exercises (e.g. Qigong) for chronic mechanical neck pain. There appears to be minimal effect on neck pain and function when only stretching or endurance type exercises are used for the neck, shoulder and shoulder blade region.

Quality of the evidence: No high quality evidence was found, indicating that there is still uncertainty about the effectiveness of exercise for neck pain. Future research is likely to have an important impact on the effect estimate. There were a number of challenges with this review; for example, the number of participants in most trials was small, more than half of the included studies were either of low or very low quality and there was limited evidence on optimum dosage requirements.

2015-Thorlund, J. B., C. B. Juhl, E. M. Roos & L. S. Lohmander. Arthroscopic surgery for degenerative knee: systematic review and meta-analysis of benefits and harms. *BMJ* 350: h2747.

Objective: To determine benefits and harms of arthroscopic knee surgery involving partial meniscectomy, debridement, or both for middle aged or older patients with knee pain and degenerative knee disease.

Design: Systematic review and meta-analysis.

Main outcome measures: Pain and physical function.

Data sources: Systematic searches for benefits and harms were carried out in Medline, Embase, CINAHL, Web of Science, and the Cochrane Central Register of Controlled Trials (CENTRAL) up to August 2014. Only studies published in 2000 or later were included for harms.

Eligibility criteria for selecting studies: Randomised controlled trials assessing benefit of arthroscopic surgery involving partial meniscectomy, debridement, or both for patients with or without radiographic signs of osteoarthritis were included. For harms, cohort studies, register based studies, and case series were also allowed.

Results: The search identified nine trials assessing the benefits of knee arthroscopic surgery in middle aged and older patients with knee pain and degenerative knee disease. The main analysis, combining the primary endpoints of the individual trials from three to 24 months postoperatively, showed a small difference in favour of interventions including arthroscopic surgery compared with control treatments for pain (effect size 0.14, 95% confidence interval 0.03 to 0.26). This difference corresponds to a benefit of 2.4 (95% confidence interval 0.4 to 4.3) mm on a 0-100 mm visual analogue scale. When analysed over time of follow-up, interventions including arthroscopy showed a small benefit of 3-5 mm for pain at three and six months but not later up to 24 months. No significant benefit on physical function was found (effect size 0.09, −0.05 to 0.24). Nine studies reporting on harms were identified. Harms included symptomatic deep venous thrombosis (4.13 (95% confidence interval 1.78 to 9.60) events per 1000 procedures), pulmonary embolism, infection, and death.

Conclusions: The small inconsequential benefit seen from interventions that include arthroscopy for the degenerative knee is limited in time and absent at one to two years after surgery. Knee arthroscopy is associated with harms. Taken together, these findings do not support the practise of arthroscopic surgery for middle aged or older patients with knee pain with or without signs of osteoarthritis.

2014-Graves, J. M., D. Fulton-Kehoe, J. G. Jarvik, & G. M. Franklin. Health care utilization and costs associated with adherence to clinical practice guidelines for early magnetic resonance imaging among workers with acute occupational low back pain. *Health Services Research* 49 (2): 645-665.

Objective: To estimate health care utilization and costs associated with adherence to clinical practice guidelines for the use of early magnetic resonance imaging (MRI ; within the first 6 weeks of injury) for acute occupational low back pain (LBP).

Data Sources: Washington State Disability Risk Identification Study Cohort (D –RISC), consisting of administrative claims and patient interview data from workers' compensation claimants (2002–2004).

Study Design: In this prospective, population–based cohort study, we compared health care utilization and costs among workers whose imaging was adherent to guidelines (no early MRI) to workers whose imaging was not adherent to guidelines (early MRI in the absence of red flags).

Data Collection/Extraction Methods: We identified workers (age >18) with work–related LBP using administrative claims. We obtained demographic, injury, health, and employment information through telephone interviews to adjust for baseline differences between groups. We ascertained health care utilization and costs from administrative claims for 1 year following injury.

Principal Findings: Of 1,770 workers, 336 (19.0 percent) were classified as nonadherent to guidelines. Outpatient and physical/occupational therapy utilization was 52–54 percent higher for workers whose imaging was not adherent to guidelines compared to workers with guideline–adherent imaging; utilization of chiropractic care was significantly lower (18 percent).

Conclusions: Nonadherence to guidelines for early MRI was associated with increased likelihood of lumbosacral injections or surgery and higher costs for out–patient, inpatient, and nonmedical services, and disability compensation.

2014-Kim, T.-H., M. S. Lee, K. H. Kim, J. W. Kang, T.-Y. Choi & E. Ernst. Acupuncture for treating acute ankle sprains in adults. *Cochrane Database of Systematic Reviews* (6): CD009065.

An acute ankle sprain is a sudden−onset injury of the ankle ligaments (tough strands of tissue that connect and stabilise the bones at the ankle). It is one of the most common injuries in the general population as well as in athletes. Acupuncture is frequently used for treating ankle sprains in eastern Asian countries. This review aimed to assess the benefits and harms of acupuncture for the treatment of ankle sprains in adults. We searched the medical literature for studies up to May 2013.

Our review includes 20 studies involving 2012 people with ankle sprains. These studies differed from each other in many ways and compared various types of acupuncture with a variety of standard control interventions. Most studies reported only the 'cure rate' − the number of participants who had recovered at a set time. No study reported on patient−reported assessment of function. Only one study reported on adverse events and found skin problems in individuals receiving over−the−counter traditional Chinese herbal patches as a control intervention. Most trials had flaws in the way they were conducted, which makes their results less reliable; for example, most studies failed to ensure participants did not know which intervention they were receiving.

One study, which compared acupuncture with no treatment, found more people were cured with acupuncture. Most of the eight studies comparing acupuncture plus another standard treatment versus that standard treatment alone found higher cure rates in the acupuncture group. However, we found that pooling these results did not provide conclusive evidence that acupuncture resulted in a better cure rate.

Fourteen studies compared acupuncture with a variety of other non−surgical treatments, such as Chinese herbal patches, hot and cold water, ice packs, Chinese oral herbal medicine and elastic bandages. Some studies found in favour of acupuncture, some in favour of the other treatment and some found a lack of evidence for a difference between the two interventions under test. The pooled results from 11 studies comparing acupuncture versus another non−surgical intervention tended to favour acupuncture, but this evidence was not conclusive.

Currently, we are unable to conclude whether or not acupuncture is more effective than other standard methods for the treatment of ankle sprains in adults because of the very low quality of the available evidence. Because the adverse effects of acupuncture treatment were not described in most of the studies, we are also unable to draw any conclusions about the safety

of acupuncture. Large, high quality studies of acupuncture for sudden–onset ankle sprains in adults are needed.

2014-Toumi, H., R. Davies, M. Mazor, R. Coursier, T. M. Best, R. Jennane & E. Lespessailles. Changes in prevalence of calcaneal spurs in men & women: a random population from a trauma clinic. *BMC Musculoskeletal Disorders* 15: 87.

Background: This study reports the changing prevalence of ankle (Achilles and plantar) spurs with age, in order to comment on their significance to rheumatologists.

Methods: 1080 lateral ankle radiographs from each of 9 (50 men and 50 women) age cohorts from 2 to 96 years old of patients attending a trauma clinic were examined and spurs classified as small or large.

Results: The prevalence of both Achilles and plantar spurs in relation to the age categories and sex was variable. Overall, there was 38% of the population who had a spur (Achilles or plantar) and only third (11%) with spurs at both sites (Achilles and plantar). Large spurs were more prevalent in older individuals (40 to 79 years). There were no large plantar spurs in individuals <40 years of age and only 2% for the Achilles. The prevalence of spurs (Achilles and plantar) was significantly higher for woman than men in individuals <50 years of age. There was a notable moderate positive correlation (r = 0.71) between both plantar and Achilles spurs for women <30 years of age but no correlation for men (r = -0.03).

Conclusion: Plantar and Achilles spurs are highly prevalent in older people and the radiographic appearance of spurs differs between men and women. In individuals < 50 years of age, spur (Achilles and plantar) formation is more common in women than in men. Additionally, there was a notable moderate positive correlation between Achilles and plantar spurs for women <30 years of age.

2014-Webster, B. S., Y. Choi, A. Z. Bauer, M. Cifuentes & G. Pransky. The Cascade of Medical Services and Associated Longitudinal Costs Due to Nonadherent Magnetic Resonance Imaging for Low Back Pain. *Spine* 39 (17): 1433-1440.

Study Design: Retrospective cohort study.

Objective: To compare type, timing, and longitudinal medical costs incurred after adherent versus nonadherent magnetic resonance imaging (MRI) for work-related low back pain.

Summary of Background Data: Guidelines advise against MRI for acute uncomplicated low back pain, but is an option for persistent radicular pain after a trial of conservative care. Yet, MRI has become frequent and often nonadherent. Few studies have documented the nature and impact of medical services (including type and timing) initiated by nonadherent MRI.

Methods: A longitudinal, workers' compensation administrative data source was accessed to select low back pain claims filed between January 1, 2006 and December 31, 2006. Cases were grouped by MRI timing (early, timely, no MRI) and subgrouped by severity (“less severe,” “more severe”) (final cohort = 3022). Health care utilization for each subgroup was evaluated at 3, 6, 9, and 12 months post-MRI. Multivariate logistic regression models examined risk of receiving subsequent diagnostic studies and/or treatments, adjusting for pain indicators and demographic covariates.

Results: The adjusted relative risks for MRI group cases to receive electromyography, nerve conduction testing, advanced imaging, injections, and surgery within 6 months post-MRI risks in the range from 6.5 (95% CI: 2.20–19.09) to 54.9 (95% CI: 22.12–136.21) times the rate for the referent group (no MRI less severe). The timely and early MRI less severe subgroups had similar adjusted relative risks to receive most services. The early MRI more severe subgroup cases had generally higher adjusted relative risks than timely MRI more severe subgroup cases. Medical costs for both early MRI subgroups were highest and increased the most over time.

Conclusion: The impact of nonadherent MRI includes a wide variety of expensive and potentially unnecessary services, and occurs relatively soon post-MRI. Study results provide evidence to promote provider and patient conversations to help patients choose care that is based on evidence, free from harm, less costly, and truly necessary.

2013-Sostres, C., C. J. Gargallo & A. Lanas. Nonsteroidal anti-inflammatory drugs and upper and lower gastrointestinal mucosal damage. *Arthritis Research & Therapy* 15: S3.

NSAIDs are among the most commonly used drugs worldwide and their beneficial therapeutic properties are thoroughly accepted. However, they are also associated with gastrointestinal (GI) adverse events. NSAIDs can damage the whole GI tract including a wide spectrum of lesions. About 1 to 2% of NSAID users experienced a serious GI complication during treatment. The relative risk of upper GI complications among NSAID users depends on the presence of different risk factors, including older age (>65 years), history of complicated peptic ulcer, and concomitant aspirin or anticoagulant use, in addition to the type and dose of NSAID. Some authors recently reported a decreasing trend in hospitalizations due to upper GI complications and a significant increase in those from the lower GI tract, causing the rates of these two types of GI complications to converge. NSAID-induced enteropathy has gained much attention in the last few years and an increasing number of reports have been published on this issue. Current evidence suggests that NSAIDs increase the risk of lower GI bleeding and perforation to a similar extent as that seen in the upper GI tract. Selective cyclooxygenase-2 inhibitors have the same beneficial effects as nonselective NSAIDs but with less GI toxicity in the upper GI tract and probably in the lower GI tract. Overall, mortality due to these complications has also decreased, but the in-hospital case fatality for upper and lower GI complication events has remained constant despite the new therapeutic and prevention strategies.

2012-Bleakley, C. M., P. Glasgow & D. C. MacAuley. Price needs updating, should we call the police? *British Journal of Sports Medicine* 46 (4): 220-221.

The acronym PRICE (protection, rest, ice, compression and elevation) has been central to acute soft tissue injury management for many years despite a paucity of high-quality, empirical evidence to support the various components or as a collective treatment package. Treatment paradigms in sports medicine must be updated based on contemporary research evidence. As a recent example, the widespread use of non-steroidal anti-inflammatory drugs in acute soft tissue injury management has been challenged, particularly with ligament and muscle injuries.

2012-Malla, Y., B. W. Wargo, K. A. Cash, L. Manchikanti, V. Pampati & B. Fellows. A Prospective Evaluation of Complications of 10,000 Fluoroscopically Directed Epidural Injections. *Pain Physician* 15 (2): 131-140.

Background: Among the multiple modalities of treatments available in managing chronic spinal pain, including surgery and multiple interventional techniques, epidural injections by various routes, such as interlaminar epidural injections, caudal epidural injections, transforaminal epidural injections, and percutaneous adhesiolysis are common.

Even though the complications of fluoroscopically directed epidural injections are fewer than blind epidural injections, and have better effectiveness, multiple complications have been reported in scattered case reports, with only minor complications in randomized or non-randomized studies and systematic reviews. Thus, prospective studies with large patient series are essential to determine the types and incidences of complications.

Study Design: A prospective, non-randomized study of patients undergoing interventional techniques from May 2008 to December 2009.

Setting: A private interventional pain management practice, a specialty referral center in the United States.

Objectives: To assess the complication rate of fluoroscopically directed epidural injections.

Methods: This study was carried out over a period of 20 months and included over 10,000 procedures: 39% caudal epidurals, 23% cervical interlaminar epidurals, 14% lumbar interlaminar epidurals, 13% lumbar transforaminal epidurals, 8% percutaneous adhesiolysis, and 3% thoracic interlaminar epidural procedures. All of the interventions were performed under fluoroscopic guidance in an ambulatory surgery center by one of 3 physicians. The complications encountered during the procedure and postoperatively were prospectively evaluated.

Outcomes Measurement: Measurable outcomes employed were intravascular entry of the needle, profuse bleeding, local hematoma, bruising, dural puncture and headache, nerve root or spinal cord irritation with resultant injury, infectious complications, vasovagal reactions, and facial flushing.

Results: Intravascular entry was higher for adhesiolysis (11.6%) and lumbar transforaminal (7.9%) procedures compared to other epidurals which ranged from 0.5% for lumbar, 3.1% for caudal, 4% for thoracic, and 4.1% for cervical epidurals. Dural puncture was observed in a total of 0.5% of the procedures with 1% in the cervical region, 1.3% in the thoracic region, 0.8% with lumbar interlaminar epidurals, and 1.8% with adhesiolysis.

Limitations: Limitations of this study include a single-center study even though it included a large number of patients.

Conclusion: This study illustrates that major complications are rare and minor side effects are common.

2012-Michaleff, Z. A., C. G. Maher, A. P. Verhagen, T. Rebbeck & C.-W. C. Lin. Accuracy of the Canadian C-spine rule and NEXUS to screen for clinically important cervical spine injury in patients following blunt trauma: a systematic review. *CMAJ* 184 (16): E867-E876.

Background: There is uncertainty about the optimal approach to screen for clinically important cervical spine (C-spine) injury following blunt trauma. We conducted a systematic review to investigate the diagnostic accuracy of the Canadian C-spine rule and the National Emergency X-Radiography Utilization Study (NEXUS) criteria, 2 rules that are available to assist emergency physicians to assess the need for cervical spine imaging.

Methods: We identified studies by an electronic search of CINAHL, Embase and MEDLINE. We included articles that reported on a cohort of patients who experienced blunt trauma and for whom clinically important cervical spine injury detectable by diagnostic imaging was the differential diagnosis; evaluated the diagnostic accuracy of the Canadian C-spine rule or NEXUS or both; and used an adequate reference standard. We assessed the methodologic quality using the Quality Assessment of Diagnostic Accuracy Studies criteria. We used the extracted data to calculate sensitivity, specificity, likelihood ratios and post-test probabilities.

Results: We included 15 studies of modest methodologic quality. For the Canadian C-spine rule, sensitivity ranged from 0.90 to 1.00 and specificity ranged from 0.01 to 0.77. For NEXUS, sensitivity ranged from 0.83 to 1.00 and specificity ranged from 0.02 to 0.46. One study directly compared the accuracy of these 2 rules using the same cohort and found that the Canadian C-spine rule had better accuracy. For both rules, a negative test was more informative for reducing the probability of a clinically important cervical spine injury.

Interpretation: Based on studies with modest methodologic quality and only one direct comparison, we found that the Canadian C-spine rule appears to have better diagnostic accuracy than the NEXUS criteria. Future studies need to follow rigorous methodologic procedures to ensure that the findings are as free of bias as possible.

2010-Bleakley, C. M., S. R. O'Connor, M. A. Tully, L. G. Rocke, D. C. MacAuley, I. Bradbury, S. Keegan & S. M. McDonough. Effect of accelerated rehabilitation on function after ankle sprain: Randomised controlled trial. *BMJ* 340: c1964.

Objective: To compare an accelerated intervention incorporating early therapeutic exercise after acute ankle sprains with a standard protection, rest, ice, compression, and elevation intervention.

Design: Randomised controlled trial with blinded outcome assessor.

Setting: Accident and emergency department and university based sports injury clinic.

Participants: 101 patients with an acute grade 1 or 2 ankle sprain.

Interventions: Participants were randomised to an accelerated intervention with early therapeutic exercise (exercise group) or a standard protection, rest, ice, compression, and elevation intervention (standard group).

Main outcome measures: The primary outcome was subjective ankle function (lower extremity functional scale). Secondary outcomes were pain at rest and on activity, swelling, and physical activity at baseline and at one, two, three, and four weeks after injury. Ankle function and rate of reinjury were assessed at 16 weeks.

Results: An overall treatment effect was in favour of the exercise group (P=0.0077); this was significant at both week 1 (baseline adjusted difference in treatment 5.28, 98.75% confidence interval 0.31 to 10.26; P=0.008) and week 2 (4.92, 0.27 to 9.57; P=0.0083). Activity level was significantly higher in the exercise group as measured by time spent walking (1.2 hours, 95% confidence interval 0.9 to 1.4 v 1.6, 1.3 to 1.9), step count (5621 steps, 95% confidence interval 4399 to 6843 v 7886, 6357 to 9416), and time spent in light intensity activity (53 minutes, 95% confidence interval 44 to 60 v 76, 58 to 95). The groups did not differ at any other time point for pain at rest, pain on activity, or swelling. The reinjury rate was 4% (two in each group).

Conclusion: An accelerated exercise protocol during the first week after ankle sprain improved ankle function; the group receiving this intervention was more active during that week than the group receiving standard care.

2009-Stiell, I. G., C. M. Clement, J. Grimshaw, R. J. Brison, B. H. Rowe, M. J. Schull, J. S. Lee, J. Brehaut, R. D. McKnight, M. A. Eisenhauer, J. Dreyer, E. Letovsky, T. Rutledge, I. MacPhail, S. Ross, A. Shah, J. J. Perry, B. R. Holroyd, U. Ip, H. Lesiuk & G. A Wells. Implementation of the Canadian C-Spine Rule: prospective 12 centre cluster randomised trial. *BMJ* 339: b4146.

Objective: To evaluate the effectiveness of an active strategy to implement the validated Canadian C-Spine Rule into multiple emergency departments.

Design: Matched pair cluster randomised trial.

Setting: University and community emergency departments in Canada.

Participants: 11 824 alert and stable adults presenting with blunt trauma to the head or neck at one of 12 hospitals.

Interventions: Six hospitals were randomly allocated to the intervention and six to the control. At the intervention sites, active strategies were used to implement the Canadian C-Spine Rule, including education, policy, and real time reminders on radiology requisitions. No specific intervention was introduced to alter the behaviour of doctors requesting cervical spine imaging at the control sites.

Main outcome measure: Diagnostic imaging rate of the cervical spine during two 12 month before and after periods.

Results: Patients were balanced between control and intervention sites. From the before to the after periods, the intervention group showed a relative reduction in cervical spine imaging of 12.8% (95% confidence interval 9% to 16%; 61.7% *v* 53.3%; P=0.01) and the control group a relative increase of 12.5% (7% to 18%; 52.8% *v* 58.9%; P=0.03). These changes were significant when both groups were compared (P<0.001). No fractures were missed and no adverse outcomes occurred.

Conclusions: Implementation of the Canadian C-Spine Rule led to a significant decrease in imaging without injuries being missed or patient morbidity. Final imaging rates were much lower at intervention sites than at most US hospitals. Widespread implementation of this rule could lead to reduced healthcare costs and more efficient patient flow in busy emergency departments worldwide.

2004-Bachmann, L. M., S. Haberzeth, J. Steurer & G. ter Riet. The Accuracy of the Ottawa Knee Rule To Rule Out Knee Fractures. *Annals of Internal Medicine* 140 (2): 121-124.

Background: The Ottawa knee rule is a clinical decision aid that helps rule out fractures and avoid unnecessary radiography.

Purpose: To summarize evidence about the accuracy of the Ottawa knee rule.

Data Sources: Relevant English- and non–English-language articles were identified from PreMEDLINE and MEDLINE (1966–2003), EMBASE (1980–2003), CINAHL (1982–2003), BIOSIS (1990–2003), the Cochrane Library (2002, Issue 3), the Science Citation Index database, reference lists of included studies, and experts.

Study Selection: Articles were included if they reported enough information to determine the sensitivity and specificity of the Ottawa knee rule for detecting fractures confirmed either radiologically or in combination with follow-up.

Data Extraction: Two reviewers independently extracted data on study samples, the ways that the Ottawa knee rule was used, and methodologic characteristics of studies.

Data Synthesis: Of 11 identified studies, 6 involving 4249 adult patients were considered appropriate for pooled analysis. The pooled negative likelihood ratio was 0.05 (95% CI, 0.02 to 0.23), the pooled sensitivity was 98.5% (CI, 93.2% to 100%), and the pooled specificity was 48.6% (CI, 43.4% to 51.0%).

Conclusion: A negative result on an Ottawa knee rule test accurately excluded knee fractures after acute knee injury. However, because the rule is calibrated toward 100% sensitivity and actual fracture prevalences are usually low, large-scale, multicentered studies are still needed to establish the cost-effectiveness of routinely implementing the rule.

2003-Bachmann, L. M, E. Kolb, M. T. Koller, J. Steurer & G. ter Riet. Accuracy of Ottawa ankle rules to exclude fractures of the ankle and mid-foot: systematic review. *BMJ* 326: 417.

Objective: To summarise the evidence on accuracy of the Ottawa ankle rules, a decision aid for excluding fractures of the ankle and mid-foot.

Design: Systematic review.

Data sources: Electronic databases, reference lists of included studies, and experts.

Review methods: Data were extracted on the study population, the type of Ottawa ankle rules used, and methods. Sensitivities, but not specificities, were pooled using the bootstrap after inspection of the receiver operating characteristics plot. Negative likelihood ratios were pooled for several subgroups, correcting for four main methodological threats to validity.

Results: 32 studies met the inclusion criteria and 27 studies reporting on 15 581 patients were used for meta-analysis. The pooled negative likelihood ratios for the ankle and mid-foot were 0.08 (95% confidence interval 0.03 to 0.18) and 0.08 (0.03 to 0.20), respectively. The pooled negative likelihood ratio for both regions in children was 0.07 (0.03 to 0.18). Applying these ratios to a 15% prevalence of fracture gave a less than 1.4% probability of actual fracture in these subgroups.

Conclusion: Evidence supports the Ottawa ankle rules as an accurate instrument for excluding fractures of the ankle and mid-foot. The instrument has a sensitivity of almost 100% and a modest specificity, and its use should reduce the number of unnecessary radiographs by 30-40%.

2003-Hayward, R. VOMIT (victims of modern imaging technology)—an acronym for our times. *BMJ* 326 (7401): 1273.

Case 1—A request arrives for an urgent neurosurgical consultation. The urgency is reinforced by several telephone calls. A 12 year old boy with headaches has had a head scan—nowadays more likely magnetic resonance imaging (MRI) than computed tomography—that shows an arachnoid cyst. The parents have been told that the clinical diagnosis of migraine (the scan was performed "just to be on the safe side") has been changed to something more sinister. The parents are terrified, their fears not at all eased by being referred to a brain surgeon. After all, everyone knows that when doctors talk about a "cyst" they really mean cancer.

1997-Stiell, I. G., G. A. Wells, R. H. Hoag, M. L. A. Sivilotti, T. F. Cacciotti, P. R. Verbeek, K. T. Greenway, I. McDowell, A. A. Cwinn, G. H. Greenberg, G. Nichol & J. A. Michael. Implementation of the Ottawa Knee Rule for the Use of Radiography in Acute Knee Injuries. *JAMA* 278 (23): 2075–2079.

Context: The Ottawa Knee Rule is a previously validated clinical decision rule that was developed to allow physicians to be more selective and efficient in their use of plain radiography for patients with acute knee injuries.

Objective: To assess the impact on clinical practice of implementing the Ottawa Knee Rule.

Design: Controlled clinical trial with before-after and concurrent controls.

Setting: Emergency departments of 2 teaching and 2 community hospitals.

Patients: All 3907 consecutive eligible adults seen with acute knee injuries during two 12-month periods before and after the intervention.

Intervention: During the after period in the 2 intervention hospitals, the Ottawa Knee Rule was taught to all house staff and attending physicians who were encouraged to order knee radiography according to the rule.

Main Outcome Measures: Referral for knee radiography, accuracy and reliability of the rule, mean time in emergency department, and mean charges.

Results: There was a relative reduction of 26.4% in the proportion of patients referred for knee radiography in the intervention group (77.6% vs 57.1%; $P<.001$), but a relative reduction of only 1.3% in the control group (76.9% vs 75.9%; $P=.60$). These changes over time were significant when the intervention and control groups were compared ($P<.001$). The rule was found to have a sensitivity of 1.0 (95% confidence interval [CI], 0.94-1.0) for detecting 58 knee fractures. The κ coefficient for interpretation of the rule was 0.91 (95% CI, 0.82-1.0). Compared with nonfracture patients who underwent radiography during the after-intervention period, those discharged without radiography spent less time in the emergency department (85.7 minutes vs 118.8 minutes) and incurred lower estimated total medical charges for physician visits and radiography (US $80 vs US $183).

Conclusions: Implementation of the Ottawa Knee Rule led to a decrease in use of knee radiography without patient dissatisfaction or missed fractures and was associated with reduced waiting times and costs. Widespread use of the rule could lead to important health care savings without jeopardizing patient care.