

REVIEW ARTICLE

Twenty-first-century management of non-specific spinal pain: A narrative review of the paradigm shift in management of back and neck pain

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ABSTRACT

Non-specific spinal pain is a leading cause of disability worldwide and traditional approaches to management have failed to address the societal burden of spinal pain. This narrative review describes the shift in approach to the management of non-specific spinal pain over the past two decades and outlines key recommendations in modern practice guidelines that are informed by these changes. Implementation of evidence-based practice for spinal pain remains a challenge.

Keywords: *practice guidelines, spinal pain, biopsychosocial model*

Introduction

Over the past few decades, there has been a paradigm shift in the management of back pain and neck pain which reflects the body of scientific evidence in the field. This shift has involved a change in the overall approach from a predominantly biomedical model to a more holistic, biopsychosocial model. This review describes the key changes in approaches to spinal pain management and the recommendations of clinical practice guidelines which reflect these changes. The challenges of implementing change in clinical practice and a framework for translational research that will redesign and modernize spinal pain management are also discussed.

The twentieth-century biomedical model considered spinal pain and disability to be necessarily caused by an underlying pathology and thus focused primarily on the identification and treatment of a specific biological cause [1]. Additionally, the biomedical model assumes the patient as a passive recipient of care and that health professionals are responsible for treatments [2]. While the biomedical model applies well to the management of serious spinal conditions like spinal fracture/dislocation or cauda equina syndrome, it has limited application for non-specific spinal pain. The majority of cases of spinal pain are non-specific with symptoms having no clearly identifiable patho-anatomical cause.

A biomedical focus can have inadvertent negative consequences in patient management by encouraging an endless pursuit of an anatomic cause for a person's pain. Application of the biomedical model in the management of musculoskeletal conditions can lead to excessive and unnecessary use of imaging and complex investigations. It can also lead to invasive interventions like spinal surgery that are often ineffective and potentially harmful [3]. It can also foster an external locus of control, poor self-efficacy, and dependence on health care which are associated with higher levels of disability and poor recovery. These practices also drive the escalating costs of caring for people with spinal pain [1, 4].

In the late 1970s, the biopsychosocial model was introduced in psychology practice to encompass the multifaceted nature of disease and illness [5]. This model was adopted in the management of low back pain in the 1990s and was subsequently adopted more broadly for other spinal pain conditions [6]. The biopsychosocial model considers pain and disability as a complex interaction of many factors that influence or modulate the condition [1]. Several systematic reviews have demonstrated that psychological distress, depressed mood, and negative pain behaviors (e.g. passive coping strategies, fear-avoidance beliefs) contribute to poorer

prognosis for pain and disability in people with spinal pain [7]. Application of the biopsychosocial model for spinal pain involves assessment and management of clinical, psychological, environmental, and social factors that contribute to the symptoms or are risk factors for chronicity [2,6,8-10]. These elements are the basis for specific guideline recommendations on the assessment and treatment of spinal pain [2].

The past two decades have seen a rise in the publication and implementation of clinical practice guidelines for spinal pain. Guidelines aim to facilitate best practice by providing a framework for managing and evaluating practice [11] and are supported by the best available evidence and current approaches. Modern spinal pain guidelines, despite having some inconsistencies, demonstrate common overarching themes including use of diagnostic triage, judicious use of

imaging, need for identification of barriers to recovery, focus on active interventions, judicious use of passive treatments, and routine review of outcomes. The inclusion of recommendations consistent with these themes in the twenty spinal pain guidelines is summarized in Table 1.

Synthesis of Evidence

Diagnostic Triage

Recent guidelines for back and neck pain recommend diagnosis based on triage. This involves firstly identifying serious pathologies and those with neurological compromise, and then classifying those without these conditions as 'non-specific' [12-29]. Triage-based diagnosis assists health professionals to make informed decisions about the need for

Table 1. Consistency of Guideline Recommendations with Key Themes of 21st-century Spinal Pain Management

	Diagnosis based on triage	Identification of barriers to recovery	Judicious use of imaging	Judicious use of passive interventions	Focus on active interventions	Routine review of outcomes	Appropriate referral to secondary care
Bier <i>et al.</i> , 2018 [14]	✓	✓	—	✓	✓	✓	✓
Blanpied <i>et al.</i> , 2017 [33]	—	✓	✓	✓	✓	—	—
Canada TOP, 2015 [24]	✓	✓	✓	✓	✓	✓	✓
Chenot <i>et al.</i> , 2017 [20]	✓	✓	✓	✓	✓	✓	✓
Chou <i>et al.</i> , 2007 [18]	✓	✓	✓	✓	✓	✓	✓
Colorado Division of Workers' Compensation, 2014 [29]	✓	✓	✓	✓	✓	✓	✓
Cote <i>et al.</i> , 2016 [27]	✓	✓	✓	✓	✓	✓	—
Guzman <i>et al.</i> , 2008 [15]	✓	—	✓	✓	✓	—	—
Monticone <i>et al.</i> , 2013 [28]	✓	✓	✓	✓	✓	—	—
Moore <i>et al.</i> , 2005 [16]	✓	✓	—	✓	✓	—	—
NICE, 2016 [22]	✓	✓	✓	✓	✓	✓	—
Norwegian Back Pain Network, 2002 [21]	✓	✓	✓	✓	✓	✓	✓
NSW ACI, 2016 [19]	✓	✓	✓	✓	✓	✓	✓
Staal <i>et al.</i> , 2014 [26]	✓	✓	—	✓	✓	✓	✓
Stochkendahl <i>et al.</i> , 2018 [36]	—	—	✓	✓	✓	—	—
Scholten-Peeters <i>et al.</i> , 2002 [13]	✓	✓	—	—	✓	✓	✓
SIRA, 2014 [12]	✓	✓	✓	✓	✓	✓	✓
TRACsa, 2008 [17]	✓	✓	✓	✓	✓	✓	✓
Van Tulder <i>et al.</i> , 2006 [25]	✓	✓	✓	✓	✓	✓	—
Van Wambeke <i>et al.</i> , 2017 [23]	✓	✓	✓	✓	✓	✓	—

✓ - consistent, — - no recommendation provided

further tests, treatments, and referrals [30]. For example, people with serious conditions such as fractures or dislocations may warrant specific medical or surgical treatment [30]. In contrast, the majority of back and neck pain is classified as non-specific and therefore does not require a search for a putative anatomical cause and requires conservative guideline-based treatment [31,32].

Risk Assessment

The guidelines recommend identification of psychosocial risk factors that could potentially delay recovery [12-14,16-29,33] in line with the more holistic, biopsychosocial model. These factors include fear avoidance, anxiety, passive coping, beliefs about pain and recovery, lack of support, occupational barriers, and preference for passive treatments [34,35]. Some guidelines also recommend the use of validated self-report outcome measures and prognostic screening tools to more objectively assess risk level, pain, disability, function, health status, psychological symptoms, and quality of life [12-15,17,19,22,23,25-29,33]. Results of risk assessments allow for tailoring of interventions to address the modifiable risk factors and to avoid overtreatment of those at low risk.

Radiological Imaging

The guidelines consistently recommend judicious use of imaging in the management of back and neck pain and caution against the routine use of X-ray and other imaging techniques [12,15,17-25,27-29,33,36]. Accordingly, more recent guidelines advocate applying relevant clinical decision rules (e.g. Canadian Cervical-spine Rule, American College of Radiology Appropriateness Criteria) to determine the need for an X-ray [12,15,17,33]. Use of computed tomography (CT) and magnetic resonance imaging (MRI) is recommended only for cases of suspected serious spinal pathology or neurological compromise based on results of a thorough history and examination [12,25,17-25,28,29,33,36]. These recommendations are aimed at changing the well-documented overuse of imaging for spinal pain [37,38] and are in line with the premise that management decisions are often not determined by radiological findings [39]. Additionally, the recommendations aim to reduce potential harms such as radiation exposure [40,41], unhelpful biomedical focus, and progression to unnecessary surgeries.

Interventions

Recommendations about treatments emphasize active interventions and targeted time-limited use of passive interventions as adjuncts to an active approach [12-29, 33]. This is reflective of contemporary practice that encourages

self-management and return to activity, promotes self-efficacy, and prevents further disability. Active interventions such as exercise, advice, and education are considered the mainstays of management for back and neck pain regardless of duration or stage of injury [12-29,33]. Simple analgesics and non-steroidal anti-inflammatory drugs are also recommended for first-line pain relief [12,15,17-26,28,29]. Passive interventions including manual therapy [12,14-29,33] and electrotherapy [12,17,28,33] where recommended, are proposed as adjuncts to exercise reflecting the more active patient-focused approach. Some guidelines also recommend avoiding long-term use of passive treatments or use only in circumstances where improvement is demonstrated to avoid issues of dependence [12,14].

Routine Review

Some guidelines also recommend regular monitoring and review at specific time points in order to assess treatment response, determine the need to modify or manage, and refer people who are not recovering to other disciplines [12-14,17-27,29]. While the time points for review varied between guidelines, there is a common theme of identifying people who are not recovering and arranging for further assessments of recovery barriers. Many of the guidelines recommend referral for second opinion from allied health specialists, psychologists, and rehabilitation specialists in a shift away from referral to spinal surgeons for non-specific spinal pain [12-14,17-27,29]. These recommendations challenge the assumption that slow recovery necessarily has a biomedical or surgical explanation and is in line with the assessment of psychological and social barriers to recovery.

Challenges in Guideline Implementation

Many of the spinal pain guidelines have been supported by robust implementation strategies to encourage the translation of evidence into practice with varying success. These strategies include those that target health professionals such as educational interventions as well as organizational and regulatory mechanisms such as financial and governance arrangements [42]. However, despite the volume of research that investigated the effectiveness of these strategies, results remain inconsistent and the optimal strategy to improve practice is yet to be determined. Educational strategies such as meetings, outreach, and use of opinion leaders have resulted in only modest improvements in select aspects of practice [43-46]. Large-scale change and modernization of spinal pain management in clinical practice remains elusive.

There is evidence that current clinical practice in spinal pain management reflects elements that remain entrenched in the 20th-century biomedical framework. A recent audit of insurer files of whiplash claimants demonstrated excessive use of specialized imaging and passive interventions, inadequate risk assessment, and inconsistent review and referral [47]. Similar deficiencies were found in studies that investigated service delivery for people with back pain [48]. A particular deficiency that has been extensively studied is the overuse of imaging in spinal pain [37,38]. This reflects the misdirected search for anatomical causes and is in some ways symptomatic of an ongoing biomedical obsession in spinal pain management.

A number of factors have been identified that influence practitioners' willingness to adopt guideline recommendations. This qualitative study of practitioner attitudes [49] suggested that the practitioners are less likely to adopt guideline recommendations that conflicted with their current practice framework and therefore required actual practice change. Guideline-related factors such as clarity [50] and detail of the recommendations [51] also influenced practitioner acceptance. Patient-related factors including individualization of guideline recommendations to patients [52] and alignment with perceived patient expectations [51,52] further hindered the adoption of guidelines to practice. These findings demonstrate the complexity of practice change, highlighting the need to consider multiple factors in the development of strategies to promote best practice.

A potential strategy for encouraging greater uptake of 21st-century practice in spinal care is redesigning of service delivery using a translation research framework. A framework such as the SAX Institute Translational Research Framework outlines a series of steps from development to system-wide application of innovations [53]. These steps include: idea generation, feasibility, efficacy, replicability/adaptability, effectiveness, scalability, and monitoring [53]. The idea generation, feasibility, and efficacy stages might be further enhanced using intervention mapping methodology [54]. Many of the processes of spinal pain management such as obtaining patient history, physical examination, use of radiology, and referral to allied health were developed for patient management under a biomedical model. Redesigning these processes with input from key stakeholders including patients, practitioners, health administrators, and funding bodies might enhance modern aspects of practice like triage, risk assessment, effective provision of patient-centered active treatments, and monitoring of outcome. This approach to redesign also allows for innovations to be tailored to a local context to enhance stakeholder acceptance and local relevance.

Conclusion

This article highlights the need for effective translational research designs and implementation strategies that involve genuine collaboration and co-design involving patients and health practitioners, to meet the global challenge of spinal pain. Back and neck pain are highly prevalent conditions and a significant burden for individuals and society [55]. The fact that they remain the leading causes of disability worldwide [55] demonstrates that the approaches to management that were developed in the 20th century do not work. Despite this, there has been a slow uptake of approaches advocated by guidelines that are based on the best available research which translates to many people with back pain being deprived of appropriate care.

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