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**Advancements in the Management of Spine Disorders**  
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Haldeman S, Kopansky-Giles D, Hurwitz EL et al.

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## **ABSTRACT**

*Spinal disorders and especially back and neck pain affect more people and have greater impact on work capacity and health-care costs than any other musculoskeletal condition. One of the difficulties in reducing the burden of spinal disorders is the wide and heterogeneous range of specific diseases and non-specific musculoskeletal disorders that can involve the spinal column, most of which manifest as pain. Despite, or perhaps because of its impact, spinal disorders remain one of the most controversial and difficult conditions for clinicians, patients and policymakers to manage. This paper provides a brief summary of advances in the understanding of back and neck pain over the past decade as evidenced in the current literature. This paper includes the following sections: a classification of spinal disorders; the epidemiology of spine pain in the developed and developing world; key advancements in biological and biomechanical sciences in spine pain; the current status of potential methods for the prevention of back and neck pain; rheumatological and systemic disorders that impact the spine; and evidence-based surgical and non-surgical management of spine pain. The final section of this paper looks to the future and proposes actions and strategies that may be considered by the international Bone and Joint Decade (BJD), by providers, institutions and by policymakers so that we may better address the burden of spine disorders at global and local levels.*

## **ANALYSIS**

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## Introduction

This esteemed group of authors has put together a nice summary of the advances in the understanding of back and neck pain over the past decade as evidenced in the current literature. The article is too long and complex to fully review in this format, but we have pulled out some of the points relevant to the practicing clinician. If you are interested in further elaborations regarding research, spinal disorders in developing countries, the bone and joint decade task force and surgical advancements we would strongly recommend you take the time to read the article yourself to get the full picture (contact Dr. Shawn Thistle if you are interested).

## TRENDS IN SPINAL DISORDERS

Spinal disorders are difficult to manage due to the complexity of the spinal column and the range of disorders that may present in clinical practice. These disorders have been classified in multiple ways but the most widely accepted classification includes four well-defined clinical categories:

1. *Spinal disorders with serious or systemic pathology*: Congenital, developmental, neoplasm, infection, serious trauma, inflammatory diseases (1-2% of spinal pain).
2. *Spinal pain with neurological deficits*: Nerve root, spinal cord or cauda equina compression (5-10% of spinal pain).
3. *Non-specific spinal pain (mechanical pain or strain)*: This accounts for 90% or more of those that experience spinal pain. There is growing evidence that it is not possible to identify the causative structure, pathology or source of pain in the majority of these patients.
4. *Spinal pain referred from non-spinal pathology*: This can include systemic, abdominal and pelvic pathologies.

A recent review identified over 200 treatment options for managing LBP (1). Unfortunately, very few have any significant evidence to support their use.

Degenerative changes and disc abnormalities found in imaging studies, once thought to be relevant as causative factors in LBP, have been shown to be of limited concern as the foundation of LBP. As opposed to structural problems that have been classically linked to LBP, big risks of developing back pain have been associated with socioeconomic status, level of education, body mass index, smoking and self-perceived health status. Depression and psychological distress are likely both causes and consequences of back and other musculoskeletal pain. On the other hand, physical activity appears to improve prognosis. Pain and disability frequencies vary according to type of occupation and job demands. The increased risk of developing LBP include high physical load, low job satisfaction, monotonous work, poor social support and high-perceived stress and job demands.

Studies have demonstrated that in workers, the incidence of activity-limiting neck pain can be as high as 50%. Workers in jobs requiring prolonged sitting, repetitive or precision work or awkward postures are at increased risk of neck pain. These problems are very common in workers throughout the developed world and results in appreciable disability and reduced productivity.

Evidence strongly suggests that the prevalence of back and neck pain has increased in developed countries, while measures of mental health, physical functioning, work or school limitations and social limitations among adults with spine problems worsened. Heart disease and stroke are the only

conditions with significantly higher health-care expenditures.

## **RESEARCH, PREVENTION & MANAGEMENT**

Much of the research on the spine, its function and pathology has focused in the fields of anatomy, neurophysiology, pathology and biomechanics, along with their interactions with one-another. Basic science is being used to understand the mechanisms of common interventions such as spinal manipulation and its effects on spinal stiffness and muscle function.

What continues to perplex researchers is defining the pathological cause or pain generator for spinal pain in specific individuals. The association with degenerative changes that can affect the intervertebral disc and/or facet joints is the most common theory. More current research has shown that the in-growth of nociceptive neurons, expression of neurotrophic and pain-inducing molecules, increased expression of inflammatory cytokines and a progressive loss of viable disc cells has been associated with degenerative disc disease and furthered the concept of the painful disc. Patient-centred therapies will allow for better outcomes bringing to light the differences between disc degeneration and 'normal aging'. We may even see, sometime in the not so far future, the use of anabolic growth factors and stem cell therapies for the treatment of degenerative disc disease. Even though there have been many scientific achievements towards the understanding of spinal pain, only the future will tell us if these breakthroughs will actually have any effect on the incidence and impact of these conditions.

## **PREVENTION**

Unfortunately, according to the evidence surrounding the prevention of LBP, it appears unlikely that a primary episode of back pain can be prevented in most people. The problem is that there is a wide variance of external and intrinsic factors influencing the onset and recurrence of back pain. The most influential risk factor for any episode of back pain is a history of back pain in the previous 12 months.

European guidelines have suggested physical exercise to reduce the frequency and duration of repeat episodes of back pain. Information and education about back problems should also be considered. Recently, there is an (albeit limited) amount emerging evidence that maintaining a healthy weight, stopping smoking and daily physical exercise may have protective effects.

## **CLINICAL PRACTICE GUIDELINES**

First and foremost, it is important for the clinician to differentiate specific local or systemic diseases from non-specific musculoskeletal disorders as this will influence treatment. Therefore, a detailed history and physical examination followed by appropriate/necessary additional studies to make the correct diagnosis is crucial prior to starting a treatment program. Clinical practice guidelines also recommend the use of screening protocols and diagnostic imaging or electrodiagnostic testing to rule out cervical spine fracture in patients presenting with neck pain and/or substantial neurologic findings.

For non-specific neck pain, there is not sufficient evidence for the use of diagnostic imaging. Non-invasive evidence-based interventions recommended include spinal manipulation or mobilization,

combined with exercise therapy and patient education. Epidural injections or decompression surgery can be used for short-term improvement of neck pain with radicular symptoms, but not non-specific neck pain.

Treatment for low back pain should focus on patient education, advice to remain active and short-term use of acetaminophen, non-steroidal anti-inflammatory drugs, or spinal manipulative therapy to relieve symptoms. Therapeutic exercises, behavioural therapy, analgesics or opioid medication can be used for symptoms beyond 6 weeks. Epidural injections or decompression surgery can be used for spinal disorders with neurological involvement.

There is increasing evidence for spine surgical procedures including stem cell transplantation for disc regeneration, disc implants, vertebroplasty or kyphoplasty for tumours of the spine and fracture repair. Motion preservation surgical techniques are increasingly being used, however, with limited evidence on long-term follow-up and cost effectiveness. Inter-spinal implants under local anaesthesia have become the preferred surgical treatment for spinal stenosis, replacing open procedures in many patients.

With all the efforts in spinal treatments it must be noted that there has been increased spine-related health-care expenditures in the past decade that have not resulted in improved health status. Taking this into account, it is crucially important that we not prioritize clinical interventions ahead of public health and preventive approaches to reduce the burden of spinal pain and disability. All the technological advancements in the world will remain useless if we are not improving the health of individuals with spinal pain.

### **THE BONE & JOINT DECADE**

In the last decade we have been fortunate to have seen an increase in the amount of research devoted to spinal disorders. The research has concentrated in the fields of epidemiology, population-based research, and experimental studies on disc pathology, neurophysiology and spinal biomechanics. Furthermore, we have also seen advancements in the assessment of diagnostic techniques, prevention approaches and treatments. The developments of the clinical guidelines for treating spinal pathologies is instrumental in bridging the gap between researchers and clinicians and connecting various health care professionals and ensuring everyone is on the same page.

The Bone and Joint Decade Multidisciplinary Guideline Development Committee's goal is to aggregate guidelines from multiple disciplines and identify areas of consensus. By 2015 the goal is to develop and culturally adapt evidence-based, practical, multidisciplinary, patient-centered guidelines for prevention and management of spinal disorders. The goal will be to initiate a public education programs and work towards prevention. There will be a concerted effort to empower patients to participate in care, as well as to target primary-care physicians and home-education programs for community-based spine care. Through this work by the international Bone and Joint Decade we will hopefully see a merging of information and ideas by providers, institutions and policymakers to better address spinal disorders within our communities and around the world.

### **Additional References**

1. Haldeman S, Dagenais S. A supermarket approach to the evidence-informed management of chronic low back pain. Spine Journal 2008; 8(1): 1–7.

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