

# Beyond the Spine: A New Clinical Research Priority

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*Over the past two decades, clinical research within the chiropractic profession has focused on the spine and spinal conditions, specifically neck and low back pain. However, there is now a small group of chiropractors with clinical research training that are shifting their focus away from traditional research pursuits towards new and innovative areas. Specifically, these researchers are now delving into areas such as brain injury, work disability prevention, undifferentiated chest pain, hip osteoarthritis, and prevention of pain in children and adolescents to name a few. In this paper, we highlight recent research in these new areas and discuss how clinical research efforts in musculoskeletal areas beyond*

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*Au cours des deux dernières décennies, les recherches cliniques dans le domaine de la chiropratique se concentrent sur la colonne vertébrale et les conditions connexes, en particulier les douleurs cervicales et lombaires. Toutefois, un petit groupe de chiropraticiens formés en recherches cliniques écarte maintenant les sujets de recherche habituels pour privilégier de nouveaux domaines novateurs. Plus précisément, ces chercheurs se concentrent maintenant sur différents sujets, notamment les lésions cérébrales, la prévention de l'incapacité découlant du travail, les douleurs thoraciques indistinctes, l'arthrose de la hanche, et la prévention de la douleur chez les enfants et les adolescents. Dans cet article, on souligne les récentes recherches dans ces nouveaux domaines et discute de la manière dont les efforts de recherche clinique réalisés dans les domaines musculosquelettiques au-delà de*

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*the spine can benefit patient care and the future of the chiropractic profession.*

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## Introduction

Chiropractors with clinical research training have traditionally focused on the spine and its related disorders and especially neck and low back pain. Examples include the recent Decade of the Bone and Joint 2000-2010 Task Force on Neck Pain and Its Associated Disorders<sup>1</sup> as well as several excellent randomized trials of spinal manipulative therapy (SMT) for neck<sup>2</sup> and low back pain<sup>3-5</sup>. Despite these and many other research successes, from 1990 to 2010 disability from spine-related pain has significantly increased, with low back pain now the leading cause of global disability, affecting 10% of the population or more than 600 million people worldwide.<sup>6</sup> Over the same two decades, disability from other musculoskeletal disorders has also increased by 44.6%<sup>7</sup>, and with an aging and increasingly sedentary society this trend is likely to continue and so too will the demand for improved care and prevention. Even patients seeking care for neck and low back pain rarely have pain isolated to just the spine and frequently report co-occurring non-spinal pain, not to mention other co-morbid diseases.<sup>8</sup> Chiropractors already commonly manage a variety of musculoskeletal disorders and at different anatomical sites, not just those related to the spine. Taken together, these facts provide a good basis to promote the growth of clinical research efforts in other non-spinal musculoskeletal areas.

Moreover, with the growing burden of musculoskeletal disorders there is a need for chiropractors to become more involved and integrated in interdisciplinary collaborative research efforts aimed at improving the understanding and care of such complex disorders. Increasing multidisciplinary clinical research collaboration was among the top priorities in the recently published research agenda for the chiropractic profession in Europe.<sup>9</sup> Further, a recent letter to the editor from this publication, opined that the fate of

*la colonne vertébrale peuvent améliorer les soins aux patients et contribuer à l'avenir de la chiropratique.*

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MOTS CLÉS : lésion cervicale, incapacité découlant du travail, douleur thoracique, O.P., recherche, chiropratique

the chiropractic profession depends on research and education as well as the capacity for chiropractors to function and thrive in interdisciplinary collaboration.<sup>10</sup> One way to secure the future growth of the chiropractic profession may be to prioritize support for clinical research in musculoskeletal areas beyond the spine and more specifically, clinical research that's interdisciplinary and collaborative in nature. Presently, a group of chiropractors with post-graduate clinical research training are involved in innovative, collaborative research efforts in important, but less traditional areas of research such as mild traumatic brain injury (MTBI), work disability prevention, undifferentiated chest pain, hip osteoarthritis, and prevention of spine pain in children and adolescents to name a few. The aim of this commentary is twofold: to highlight recent findings from several examples of collaborative clinical research and discuss how clinical research efforts in areas beyond the spine can enhance the capacity for interdisciplinary collaboration, improve outcomes for patients and solidify the future growth of the chiropractic profession.

## Discussion

### *Research Examples: MTBI*

In 2004 the WHO Collaborating Centre for Neurotrauma, Prevention, Management and Rehabilitation (WHO Task Force) published the first-ever systematic review on the course and prognosis of MTBI.<sup>11</sup> Ten years later, the International Collaboration on Mild Traumatic Brain Injury Prognosis (ICoMP) undertook a series of systematic reviews and best-evidence syntheses to update the WHO Task Force findings.<sup>12</sup> This 21-member collaboration was led by Dr. J. David Cassidy, a chiropractor and epidemiologist, and included 5 other chiropractors as well as other top international clinician/research scientists in brain injury.

Overall, the ICoMP results indicate post-traumatic symptoms including neck pain and headache are common sequelae after MTBI.<sup>13</sup> Spinal-related pain appears strongly associated with overall MTBI recovery<sup>14</sup> and reducing MTBI-associated somatic pain (e.g., spine and head pain) may help improve recovery. One ICoMP paper by Jan Hartvigsen, another chiropractor/epidemiologist and his colleagues showed that those suffering on-going MTBI symptoms after a traffic collision-related MTBI sought more care from allied health professionals, including chiropractors, over the course of the first year after the injury.<sup>15</sup> The overall findings from the ICoMP suggest that chiropractors can make important contributions, both from a research and a clinical perspective in the area of MTBI.

Athletes are a particular group in need of better evidence-informed care for sport-related concussion. Head-injuries to high-level athletes and the ensuing media attention has sensationalized issues surrounding concussion for the general public, including amateur and recreation level athletes, and this creates the potential for confusion and misinformation. An ICoMP systematic review on prognosis after sport concussion led by Carol Cancelliere, a chiropractor pursuing a PhD degree in clinical epidemiology addressed issues and concerns surrounding concussions in athletes, including immediate vs. delayed return to play, the possible risks associated with repeat concussions, physical and cognitive sequelae of concussions, and others.<sup>16</sup> Chiropractors involved in the care of athletes are well-positioned to incorporate the ICoMP's evidence-based findings to help make better informed decisions and improve the outcome for concussed athletes of all levels, as well as better educate parents and coaches.

Finally, prognostic research on MTBI is now shedding light on possible similarities between MTBI and other traumatic injuries. For instance, similar post-traumatic symptoms can occur after whiplash, or MTBI or other orthopedic-related injuries; these symptoms include headache, dizziness, nausea, fatigue, concentration and memory problems and spinal pain, to name a few.<sup>13,14,17</sup> This suggests that these symptoms are not specific or unique to either MTBI or whiplash, but may be a non-specific response to trauma-related physical or psychological stress in general. This is underscored by the fact that predictors of recovery are less related to injury type, but more re-

lated to, for instance, patients' expectations and beliefs about recovery.<sup>14,18</sup> In other words, whether a patient has sustained a MTBI or a whiplash injury, those who expect to recover more slowly have a worse prognosis than those who are more optimistic about their recovery. In addition, previous research in whiplash suggests that those who rely on passive coping strategies recover more slowly than those that don't.<sup>19</sup> One of the ICoMP reviews identified predictors strongly associated with self-reported recovery after MTBI, and they appear quite similar to those determining whiplash recovery, or patients suffering from other traumatic conditions or non-specific spinal pain.<sup>13</sup> Further clinical research would help to develop the evidence-base needed to better define the relationship between MTBI and other traumatic injuries.

#### *Research Examples: Work Disability Prevention*

Managing RTW can be difficult for clinicians because the determinants of RTW can be far reaching, extending well beyond those of the injury and may involve psychosocial issues such as depression and job dissatisfaction, workplace issues such as lack of modified duties, unsupportive supervisor and co-workers and insurance issues such as complicated compensation programs and delayed benefits.<sup>20-23</sup> With various influences on the RTW process, a multidisciplinary rehabilitation approach using clinical and occupational interventions can be beneficial. One of us (JK) developed and designed a coordinated and tailored work rehabilitation (CTWR) program that was later tested in a randomized controlled trial in Denmark. The trial compared the effectiveness of the CTWR program to conventional case management and included an interdisciplinary team of chiropractors and others that collaboratively screened and tailored RTW specific rehabilitation plans for participants.<sup>24</sup> Overall the CTWR group showed reduced sickness-absence-hours after 6 months and the results indicate that effective CTWR recommendations include psychological therapy to address RTW barriers, promoting workplace supervisor support and attending roundtable work-related discussions. This important piece of clinical research highlights how chiropractors can be effective multidisciplinary RTW team members, skilled in effectively guiding injured workers back to sustained employment. Dr. Patrick Loisel a leading WDP researcher, who pioneered RTW interventions at the workplace, largely influenced this work.<sup>25</sup> Dr. Loisel

is currently offering training to chiropractors in work disability prevention through the Canadian Memorial Chiropractic College.

#### *Research Examples: Undifferentiated chest pain*

An attack of acute chest pain can have many causes, not all of which are dire. In fact, after serious pathology such as myocardial infarction has been ruled out, these patients are often discharged from the emergency department (ED) with the diagnosis of undifferentiated chest pain, i.e. chest pain of unknown origin. Though seemingly benign, the pain associated with this type of chest pain and the lack of available treatment options makes managing these patients a challenge for medical professionals and they often re-present to the ED with the same problem.<sup>26</sup> An often over-looked cause of acute undifferentiated chest pain is pain from the cervico-thoracic muscles and joints, creating a subtype of this condition termed musculoskeletal chest pain. A recent Danish randomized controlled trial by Mette Jensen Stochkendahl, a chiropractor and PhD clinical researcher and her colleagues compared chiropractic care, including SMT of the thoracic and/or cervical spine to the normal self-management program for patients presenting to the Odense University Hospital in Denmark with acute musculoskeletal chest pain.<sup>27,28</sup> The results demonstrated a positive change in self-perceived chest pain and an improved change in pain intensity in favour of chiropractic care. Additionally, patients receiving chiropractic care reported significantly less thoracic spine and shoulder-arm pain. This study suggests that chiropractic care may help speed recovery for patients with acute musculoskeletal chest pain presenting to the ED. While these results are indeed significant for patients, there are also conceptual aspects of this study important for chiropractors: the intervention was delivered by eight community-based chiropractors, making this study highly relevant to those in everyday practice; it demonstrates how inter-professional collaboration, in this case chiropractic, cardiology, nuclear medicine and biostatistics can improve the outcomes for patients with challenging musculoskeletal conditions where medical treatments are limited or non-existent; and, this study serves as an example of how chiropractors may play a role in an otherwise unknown or poorly known area of musculoskeletal patient care.

#### *Research Examples: OA of the hip*

The societal burden of OA is substantial and estimated to continue to increase over the coming decades<sup>29,30</sup> In Canada alone, an estimated 4.4 million were living with the disease in 2010 resulting in significant reduced quality of life and risk of increased mortality.<sup>31,32</sup> Contrary to popular belief, not all patients diagnosed with hip and knee OA will require joint replacement surgery. A recent study documented that only 20% of patients have had hip replacement surgery up to 28 years after the initial radiographic diagnosis.<sup>33</sup> Further, in primary care the average time from initial radiographic diagnosis until referral for an orthopedic evaluation has been estimated at 82 months (i.e., 6 years and 10 months).<sup>34</sup> These important studies call for cost-effective and safe interventions for primary care patients who do not require or want an operation. The current evidence-based clinical guidelines for hip and knee OA<sup>35-37</sup> recommend an initial combined core intervention of non-pharmacological treatment focusing on patient education, exercise and if indicated, weight loss. Furthermore, recently published clinical trials<sup>38-40</sup> have demonstrated manual therapy having a clinically significant effect either as a mono or as co-intervention for patients with hip OA.

Last year, a Danish multidisciplinary three-arm parallel group randomized clinical trial by Eric Poulsen, a chiropractor and PhD clinical researcher and colleagues demonstrated that patient education (PE) combined with manual therapy (MT) was more effective than usual care in reducing pain and improving self-reported function and quality of life for patients with hip OA.<sup>40</sup> Nearly 80% of the patients receiving the MT + PE intervention classified themselves as improved versus only 22% in a group receiving only PE and 13% in the usual care groups. Even more, within the MT + PE group, 62% of patients experienced a 25% or more reduction in pain from baseline to 6 weeks, resulting in a number needed to treat (NNT) of just three. These results have important implications for patients: one out of every three patients who suffer OA of the hip would experience clinically significant reductions in pain after 6 weeks of a combined intervention of MT and a PE program. The study was completed at Odense University Hospital and the University of Southern Denmark where chiropractors and physicians are trained together; the practical aspects of the project involved collaboration between general medical practitioners, physiotherapists, orthopaedic surgeons and chiropractors.

### *Research Examples: Prevention and early treatment of musculoskeletal problems in children and adolescents*

Pain from musculoskeletal disorders can start early in life<sup>41,42</sup> and children and adolescents with pain have a higher risk of experiencing pain as adults<sup>43</sup>. Therefore research into prevention and early effective treatment should remain a high priority for chiropractors.<sup>44</sup> Indeed two Danish landmark research projects will contribute with important new knowledge and help to define the role of chiropractors in this area.<sup>45,46</sup> One of those projects, the Childhood Health, Activity, and Motor Performance School Study (CHAMPS), which is headed by an orthopaedic surgeon, is a school-based study where 1,800 children in schools in the town of Svendborg, Denmark are cluster randomized offering either the normal two hours per week of physical education or six hours of physical education.<sup>46</sup> Four chiropractors are involved in the CHAMPS study as PhD students and several other chiropractors are involved either as senior scientists and supervisors or as clinicians. A large number of diverse research projects run by medical specialists from a range of fields, including physiotherapists and chiropractors are involved with this project and chiropractors will lead research that closely maps the occurrence and course of musculoskeletal problems in school children as well as evaluating the effect of age-specific physical education on back pain.

### **Conclusions**

Chiropractors trained as clinical researchers are making substantial scientific contributions in major non-spinal musculoskeletal areas such as MTBI, arthritis, prevention, WDP and public health. These new collaborative clinical research examples serve to demonstrate the capacity for research success in clinical areas beyond the spine, which is encouraging news for musculoskeletal patients who are in need of better evidence-informed management, but also for the chiropractic profession, which will be able to play a stronger and more integrated role in improving the outcomes for these patients.

A recent commentary on the global challenges for the chiropractic profession suggested the need to prioritize the limited available research funds in order to both maximize the capacity for success and achieve measureable outcomes clinicians can actually use.<sup>47</sup> Over the past nearly 40 years, up to \$80 million has reportedly been spent

(across health professions) on the traditional research pursuit of determining the effectiveness of SMT for acute and chronic non-specific low back pain (LBP).<sup>48</sup> SMT is at present a well established part of evidence-based clinical practice guidelines for LBP<sup>49,50</sup> and these represent the informed application of research evidence to clinical care. That's not to suggest it's time to close the book on SMT research; however, to determine further effects of treatment will likely require research methods beyond what has been previously applied, including for example using advanced trial designs that are large enough in size to detect treatment-specific effects in well-defined subgroups within the cluster of patients with non-specific low back pain.<sup>9,51</sup> This example serves to highlight the need to challenge the existing state of affairs and possibly for the chiropractic profession to establish a new clinical research priority and more specifically to focus on innovative and higher yield research investment opportunities. To start, prioritizing funds for clinical research, that is to say research that directly benefits and informs the care of patients, in particular clinical research in other non-spinal musculoskeletal areas and that involves interdisciplinary collaboration may garner better and earlier returns per research dollar (i.e., outcomes clinicians can use). With increased funding, clinical researchers can continue to innovate in these and other non-traditional research areas, thereby benefiting patients and the future of the profession.

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