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**The natural course of low back pain: a systematic critical literature review**

**The treatment experience of patients with low back pain during pregnancy and their chiropractors: a qualitative study**

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Research

**Skeletal muscle contractility, self-reported pain and tissue sensitivity in females with neck/shoulder pain and upper Trapezius myofascial trigger points-- a randomized intervention study**

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**Abstract (provisional)**

**Background**

In relation to Myofascial Triggerpoints (MFTTrPs) of the upper Trapezius, this study explored muscle contractility characteristics, the occurrence of post-intervention muscle soreness and the effect of dry needling on muscle contractile characteristics and clinical outcomes.

## Methods

Seventy-seven female office workers (25-46yrs) with and without neck/shoulder pain were observed with respect to self-reported pain (NRS-101), pressure-pain threshold (PPT), maximum voluntary contraction (Fmax) and rate of force development (RFD) at baseline (pre-intervention), immediately post-intervention and 48 hours post-intervention. Symptomatic and asymptomatic participant groups were each randomized into two treatment sub-groups (superficial (SDN) and deep dry needling (DDN)) after baseline testing. At 48 hours post-intervention participants were asked whether delayed onset muscle soreness (DOMS) and/or post-needling soreness had developed.

## Results

Muscle contractile characteristics did not differ between groups at baseline. Forty-six individuals developed muscle soreness (39 from mechanical testing and seven from needling). No inter-group differences were observed post-intervention for Fmax or RFD for the four sub-groups. Over the observation period, symptomatic participants reported less pain from both SDN ( $p=0.003$ ) and DDN ( $p=0.011$ ). However, PPT levels were reduced for all participants ( $p=0.029$ ). Those reporting DOMS experienced significant decreases in PPT, irrespective of symptom state or intervention ( $p=0.001$ ).

## Conclusions

In selected female neck/shoulder pain sufferers, maximum voluntary contraction and rapid force generation of the upper Trapezius was not influenced by clinically relevant self-reported pain or the presence of diagnostically relevant MFTTrPs. Dry needling, deep or superficial, did not affect measured functional outcomes over the 48-hour observation period. DOMS affected participants uniformly irrespective of pain, MFTTrP status or intervention type and therefore is like to act as a modifier.

Trial registration

Clinical Trials.gov- NCT01710735

Significance and Innovations

The present investigation is one of the first to examine the hypothesis of gross muscle contractile inhibition due to the presence of diagnostically relevant MFTrPs.

Individuals suffering from clinically relevant levels of self-reported pain are able to tolerate maximum voluntary contraction testing, but delayed onset muscle soreness (DOMS) is a likely side-effect irrespective of symptom status. As a consequence, its confounding effect during subsequent testing must be taken into account.

**The complete article is available as a provisional PDF. The fully formatted PDF and HTML versions are in production.**

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**Research**

## **The United States Chiropractic Workforce: An alternative or complement to primary care?**

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### **Abstract (provisional)**

#### **Background**

In the United States (US) a shortage of primary care physicians has become evident. Other health care providers such as chiropractors might help address some of the nation's primary care needs simply by being located in areas of lesser primary care resources. Therefore, the purpose of this study was to examine the distribution of the chiropractic workforce across the country and compare it to that of primary care physicians.

#### **Methods**

We used nationally representative data to estimate the per 100,000 capita supply of chiropractors and primary care physicians according to the 306 predefined Hospital Referral Regions. Multiple variable Poisson regression was used to examine the influence of population characteristics on the supply of both practitioner-types.

## Results

According to these data, there are 74,623 US chiropractors and the per capita supply of chiropractors varies more than 10-fold across the nation. Chiropractors practice in areas with greater supply of primary care physicians (Pearson's correlation 0.17, p-value < 0.001) and appear to be more responsive to market conditions (i.e. more heavily influenced by population characteristics) in regards to practice location than primary care physicians.

## Conclusion

These findings suggest that chiropractors practice in areas of greater primary care physician supply. Therefore chiropractors may be functioning in more complementary roles to primary care as opposed to an alternative point of access.

**The complete article is available as a provisional PDF. The fully formatted PDF and HTML versions are in production.**

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## The natural course of low back pain: a systematic critical literature review

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## Abstract (provisional)

### Background

Most patients in the secondary care sector consulting for low back pain (LBP) seem to have a more or less constant course of pain during the ensuing year. Fewer patients with LBP in the primary care sector report continual pain over a one-year period. However, not much is known about the long-term course of LBP in the general population. A systematic critical literature review was undertaken in order to study the natural course of LBP over time in the general population.

### Methods

A search of articles was performed in Pubmed, Cinahl and Psychinfo using the search terms 'epidemiology'; 'low back pain' or 'back pain'; 'prospective study' or 'longitudinal study'; 'follow-up',

'natural course', 'course' or 'natural history'; 'general population' or 'working population'. Inclusion criteria were that one of the objectives was to study the course of (L)BP in the adult population, that the period of follow-up was at least 3 months, and that there were three points of observation or more. The review was undertaken by two independent reviewers using three checklists relating to description of studies, quality and outcomes. The course of LBP was established in relation to those who, at baseline, were reported not to have LBP or to have LBP. Would this course be stable, fluctuating, worsening, or improving over time? A synthesis of results in relation to common patterns was presented in a table and interpreted in a narrative form.

## Results

Eight articles were included. Articles were different on time span, the number of surveys, and the definition of LBP. In six of the seven relevant studies, for those with no LBP at baseline, relatively substantial stable subgroups of people who continued to be LBP free were identified. In six of the seven relevant studies, definite stable subgroups of continued LBP were noted and improvement (becoming pain free) was never reported to be a common finding.

## Conclusion

The status of LBP in individuals of the general population appears to be relatively stable over time, perhaps particularly so for those without LBP at baseline.

**The complete article is available as a provisional PDF. The fully formatted PDF and HTML versions are in production.**

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### Research

## **The treatment experience of patients with low back pain during pregnancy and their chiropractors: a qualitative study**

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## Abstract

## Background

Chiropractors regularly treat pregnant patients for low back pain during their pregnancy. An increasing amount of literature on this topic supports this form of treatment; however the experience of the pregnant patient with low back pain and their chiropractor has not yet been explored. The objective of this study is to explore the experience of chiropractic treatment for pregnant women with low back pain, and their chiropractors.

## Methods

This qualitative study employed semi-structured interviews of pregnant patients in their second or third trimester, with low back pain during their pregnancy, and their treating chiropractors in separate interviews. Participants consisted of 11 patients and 12 chiropractors. The interviews consisted of 10 open-ended questions for patients, and eight open-ended questions for chiropractors, asking about their treatment experience or impressions of treating pregnant patients with LBP, respectively. All interviews were audio-recorded, transcribed verbatim, and reviewed independently by the investigators to develop codes, super-codes and themes. Thematic saturation was reached after the eleventh chiropractor and ninth patient interviews. All interviews were analyzed using the qualitative analysis software N-Vivo 9.

## Results

Five themes emerged out of the chiropractor and patient interviews. The themes consisted of Treatment and Effectiveness; Chiropractor-Patient Communication; Pregnant Patient Presentation and the Chiropractic Approach to Pregnancy Care; Safety Considerations; and Self-Care.

## Conclusions

Chiropractors approach pregnant patients with low back pain from a patient-centered standpoint, and the pregnant patients interviewed in this study who sought chiropractic care appeared to find this approach helpful for managing their back pain symptoms.

## **Keywords:**

Pregnancy; Chiropractic; Qualitative; Exercise; Spinal manipulative therapy; Nutrition; Adverse effects

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## **Systematic review**

**What is the prevalence of musculoskeletal problems in the elderly population in developed countries? A systematic critical literature review**

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## **Abstract**

### **Background**

The proportion of older people will be tripled by the year 2050. In addition, the incidence of chronic musculoskeletal (MSK) conditions will also increase among the elderly people. Thus, in order to prepare for future health care demands, the magnitude and impact of MSK conditions from this growing population is needed. The objective of this literature review is to determine the current prevalence of MSK disorders in the elderly population.

### **Methods**

A systematic literature search was conducted in Pubmed on articles in English, published between January 2000 and July 2011. Studies from developed countries with prevalence estimates on elderly people (60+) on the following MSK conditions were included: Non-specific extremity pain, rheumatoid arthritis, osteoarthritis, osteoporosis, and back pain. The included articles were extracted for information and assessed for risk of bias.

### **Results**

A total of 85 articles were included with 173 different prevalence estimates. Musculoskeletal disorders are common in the elderly population, but due to heterogeneity of the studies, no general estimate on the prevalence of MSK can be determined. Women report more often MSK pain than men. Overall, prevalence estimates either remain fairly constant or increase slightly with increasing age, but with a tendency to decrease in the oldest (80+) people.

### **Conclusions**

Musculoskeletal disorders remain prevalent in the elderly population. Given the increasing proportion of elderly population in the world population and the burden of MSK diseases among the elderly people, efforts must be made to maintain their functional capacity for as long as possible through optimal primary and secondary health care.

### **Keywords:**

Systematic literature review; Musculoskeletal disease; Elderly population; Osteoarthritis; Rheumatoid arthritis; Osteoporosis; Back pain

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### **Research**

## **A replication of the study 'Adverse effects of spinal manipulation: a systematic review'**

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## **Abstract**

### **Objective**

To assess the significance of adverse events after spinal manipulation therapy (SMT) by replicating and critically reviewing a paper commonly cited when reviewing adverse events of SMT as reported by Ernst (J Roy Soc Med 100:330–338, 2007).

### **Method**

Replication of a 2007 Ernst paper to compare the details recorded in this paper to the original source material. Specific items that were assessed included the time lapse between treatment and the adverse event, and the recording of other significant risk factors such as diabetes, hyperhomocysteinemia, use of oral contraceptive pill, any history of hypertension, atherosclerosis and migraine.

### **Results**

The review of the 32 papers discussed by Ernst found numerous errors or inconsistencies from the original case reports and case series. These errors included alteration of the age or sex of the



patient, and omission or misrepresentation of the long term response of the patient to the adverse event. Other errors included incorrectly assigning spinal manipulation therapy (SMT) as chiropractic treatment when it had been reported in the original paper as delivered by a non-chiropractic provider (e.g. Physician).

The original case reports often omitted to record the time lapse between treatment and the adverse event, and other significant clinical or risk factors. The country of origin of the original paper was also overlooked, which is significant as chiropractic is not legislated in many countries. In 21 of the cases reported by Ernst to be chiropractic treatment, 11 were from countries where chiropractic is not legislated.

## **Conclusion**

The number of errors or omissions in the 2007 Ernst paper, reduce the validity of the study and the reported conclusions. The omissions of potential risk factors and the timeline between the adverse event and SMT could be significant confounding factors. Greater care is also needed to distinguish between chiropractors and other health practitioners when reviewing the application of SMT and related adverse effects.

## ***Keywords:***

MeSH; Chiropractic; Spinal manipulative therapy; Adverse effects