

Chiropractic Care and Immune Function: What you really need to know from the literature

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Abstract: The purpose of this literature review is to report the Top Five papers forming the current evidence on chiropractic care and immune function. The paper covers five significant studies, include meta-analyses and systemic reviews, in order to create context and background for the case reports included in this issue of the *Journal*.

Despite strong debate, it is clear from the included reviews and meta-analyses that evidence for SMT modulating biochemical markers of immune function does indeed exist. This literature review found evidence for improvements in inflammatory cytokines, specifically IL-beta and TNF-alpha, interleukin (IL) 1 β and the neurotransmitter Substance P. Other included evidence shows indications that SMT may impact neurotensin, oxytocin and immunological biomarkers.

Further research will be beneficial in terms of raising the quality of evidence, examining asymptomatic and symptomatic patients, and defining the mechanisms behind the observed improvements. However, the current evidence provides a strong starting point for future efforts

Indexing Terms: Chiropractic, Subluxation, Immunity.

Introduction

The subject of chiropractic care and its impact on immune function has been a topical issue in recent times. Given the significance immunity now takes in civil and private discourse, it is imperative that chiropractic care advances its dialogue on this issue.

While the human immune system is complex, comprising everything from organs to white blood cells, the lymphatic system, antibodies, cytokines, signalling molecules, cortisol levels histamines and more, this literature review will focus on biochemical and inflammatory markers in chiropractic-based literature.

The purpose of this literature review is to provide background and context for the series of case reports put forward in this issue of the *Asia Pacific Chiropractic Journal*. For the purposes of this study, the five most significant papers have been selected and critiqued.

... There is sufficient evidence to refute false claims that chiropractic care has no impact the status of immunity ...'



The studies

A study published in the *Journal of Manipulative and Physiological Therapeutics* in 2006 investigated the relationship between spinal manipulation and the production of inflammatory cytokines, specifically IL-beta and TNF-alpha, and the neurotransmitter Substance P. Spinal manipulation involved a single adjustment to the thoracic spine (Teodorczyk-Injeyan, Injeyan and Reugg, 2006). The 64-participant study examined the effect of a single adjustment to the thoracic spine 'on the production of inflammatory cytokines, tumor necrosis factor α , and interleukin (IL) 1 β , in relation to the systemic (in vivo) levels of neurotransmitter substance P (SP)'. The double-blinded study involved blood and serum cultures taken at baseline, 20 minutes after the adjustment and two hours post adjustment in order to ascertain the relevant levels.

This study showed significant differences between control and sham groups and the intervention groups, both in terms of cytokine levels, tumor necrosis factor α , and interleukin (IL) 1 β . Pro-inflammatory cytokine secretion was significantly lower in the spinal manipulative therapy groups ($P < .001-05$). However, substance P secretion remained unchanged. While the study indicated a 'time-dependent attenuation of LPS-induced production of the inflammatory cytokines unrelated to systemic levels of SP' suggestive of a link between SMT and 'down-regulation of inflammatory type responses' the study was not able to draw clear conclusions as to the mechanism behind these changes beyond suggesting it may lie in the central nervous system (Teodorczyk-Injeyan, Injeyan and Reugg, 2006).

Similarly, although with more inconclusive results, a recent systemic review and meta-analysis was conducted to determine the potential effect spinal manipulation has on various biochemical markers in asymptomatic and symptomatic populations. The analysis utilised the GRADE tool to assess the quality of evidence, finding moderate quality evidence supported spinal manipulations ability to influence biochemical markers (Kovanur-Sampath, Mani, Cotter, Gisselman and Tumilty, 2017). The ability of spinal manipulation to alter cortisol levels was also supported by moderate quality evidence. Low quality assessed evidence suggested spinal manipulation may exceed control at post-intervention follow up assessments of Substance P, neurotensin, and oxytocin levels. A significant note on this study is that it utilised SMT on asymptomatic populations, and thus more studies on symptomatic populations would be beneficial. Additionally, it 'must be noted that the SMT being utilised was from the University of Otago's, School of Physiotherapy, and the included participants may not have been receiving a chiropractic adjustment or high-velocity, low-amplitude thrust, the effect of this key difference remains unknown'.

Following previous studies that supported the ability of spinal manipulation to increase cytokine production, Teodorczyk-Injeyan et al (2010) conducted another study that looked more closely at the effect increased IL-2 on the humoral arm of the immune system. The humoral immune system refers to the cells involved in the production of antibodies, including the generation of memory B cells which mediates long-term immunity to previously encountered pathogens - the basis of vaccines and a contentious topic in the current pandemic age. The study assessed antibody production in vitro by stimulating peripheral blood mononuclear cells with either a control mitogen or human recombinant IL-2 taken from the participants.

Serum samples across the experimental and control groups were taken at baseline, 20 minutes, and 2 hours following intervention, and antibodies were cultured and assessed via immunoassays. IL-2 induced IgG and IgM were considerably amplified in cultures from the groups receiving spinal manipulation. Particularly, the group receiving manipulation with cavitation showed significantly elevated IgG synthesis at 20 minutes, and elevated IgM at 2 hours. The repeated drawback for clinical translation again applies to this study, in that the study utilised a healthy population, and further assessed immune modulation through in vitro methods. In vitro methods, while informative, do not account for the complex and uncontrolled

environment in vivo, and thus the effect seen in the body may vary from these findings. This greatly impairs the validity of any interpretation of the findings within the context of real clinical practice.

A review into the effects of HVLAT on the immune-endocrine system was conducted in 2019, including trials focusing on either cortisol levels or immune system impact. (Columbi & Testa, 2019) Studies investigating changes in cortisol changes included both healthy and symptomatic participants, while the studies focusing on immune system impact included only a healthy population. The review concluded that spinal manipulation was able to activate the immune-endocrine system, however the resulting effects of HVLAT on the relevant biomarkers was varied and occasionally conflicting between studies.

These studies form the background for a more novel study published in 1994 investigating the benefit spinal manipulation can have for HIV positive individuals. The study analysed CD4+ cell counts across patients with HIV, half of which received regular spinal manipulation in the form of an upper cervical adjustment. (Selano et al, 1994) The group that received the regular adjustments were found to have an increased level of CD4+ cell counts, an increase of 48%, while the control patients had a decrease in CD4+ cells. While the sample size for this study was small, with only 10 patients making up the population from which data was obtained, it provides support for the activation of the immune system following spinal manipulation. It is also one of the only studies included in this current review that consists of an entirely symptomatic population, and further a population receiving treatment for an issue that is not musculoskeletal pain.

Conclusion

Despite strong debate, it is clear from the above reviews and meta-analyses that evidence for SMT modulating biochemical markers of immune function does indeed exist. While there is certainly room for more chiropractic-specific data, and for increased quality of evidence especially in terms of the length of the effect, symptomatic vs, asymptomatic populations, and the difference between subluxation-based care and other modalities, to say there is no evidence that chiropractic can impact immune function is a significant overstatement as seen in the papers above.

A limitation of this literature review is that it does not and cannot take into consideration the vast number of case reports that indicate improvements in immune function concomitant with chiropractic care. While case reports cannot be used to draw conclusions that may be generalised to the wider population, they do create a basis for further research as they capture the single responses to often longer courses of care, and may better describe the individualised nature of chiropractic and the response of the patient who benefits from it.

Further research is certainly required to answer questions pertaining to the mechanism behind such improvements, and to address the full breadth of immune changes that may occur beyond those spelled out in this review and its associated papers.

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About the Case Report project

This Case Report is a part of the [ASRF Case Report Project 2021](#), a project designed to gather client studies from chiropractors and transform them into much-needed case reports, focused on the effects of chiropractic care on clinical presentations highly relevant to chiropractic, such as stress, immunity and adaptability. This project was made possible by the generous fundraising and contributions of ASRF supporters.

