

## ORIGINAL ARTICLES



### The Types and Frequencies of Improved Nonmuskuloskeletal Symptoms Reported After Chiropractic Spinal Manipulative Therapy

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#### ABSTRACT

**Objective:** To investigate the frequency and types of improved nonmuskuloskeletal symptoms reported after chiropractic spinal manipulative therapy.

**Design:** Retrospective information obtained by chiropractors through standardized interview of patients on return visit within 2 weeks of previous treatment.

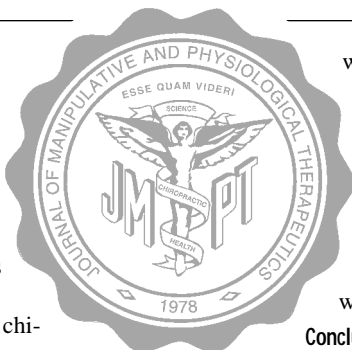
**Setting:** The private practice of 87 Swedish chiropractors (response rate 81%).

**Subjects:** Twenty consecutive (presumably naïve) patients per chiropractor (1504 valid questionnaires returned, 86% of optimal number of replies).

**Intervention:** Spinal manipulation with or without additional therapy provided by chiropractors.

**Main Outcome Measures:** Self-reported improved nonmuskuloskeletal symptoms (reactions).

**Results:** At least 1 reaction was reported after the previous treatment in 21% to 25% of cases. Of these responses, 26%



were related to the airway passages (usually reported as “easier to breathe”), 25% were related to the digestive system (mostly reported as “improved function”), 14% were classified under eyes/vision (usually reported as “improved vision”), and 14% under heart/circulation (about half of these reported as “improved circulation”). The number of spinal areas treated was positively associated with the number of reactions.

**Conclusion:** A minority of chiropractic patients report having positive nonmuskuloskeletal reactions after spinal manipulative therapy but such reports cluster predominantly around specific symptoms. It would be interesting to find out if these can be verified objectively and, if so, to investigate if they are caused by the treatment or if they are signs of natural variations in human physiology. (*J Manipulative Physiol Ther* 1999; 22:559-64)

**Key Indexing Terms:** Chiropractic Manipulation; Muskuloskeletal System; Side Effects; Digestion; Circulation; Respiration; Vision

#### INTRODUCTION

Chiropractors are occupied primarily with the treatment of painful backs; however, historically they have dealt with many kinds of ailments. More than 100 years ago, D.D. Palmer, the founder of chiropractic, reported his first chiropractic patient to have been a partially deaf man, in whom he diagnosed “a vertebra racked from its normal position.”<sup>1</sup> The man’s hearing was restored soon after a chiropractic adjustment to the fourth thoracic vertebra.<sup>1</sup>

Since then, many chiropractors have had the dual role of treating painful conditions of the spine and attending to various symptoms and signs indicative of visceral conditions. This practice is based on the concept that abnormalities in

the spinal column may cause nerve interference, which in turn can induce disorders or diseases involving segmentally related visceral organs. Spectacular “cures” have been reported, based solely on clinical observations.

In modern chiropractic practice, particularly in Scandinavia, clinicians appear to be moving away from the organic concept to the musculoskeletal symptomatic relief model. Thus, in a recent Swedish study, a nonmuskuloskeletal problem was reported as the primary symptom only by 1 of 625 chiropractic patients.<sup>2</sup>

The 2 main reasons for this shift may be an improved academic standard, resulting in a reduced number of practitioners who are willing to base their practice solely on anatomic-physiologic-based hypotheses and a desire on the part of chiropractic practitioners to be included in mainstream health care, making it necessary to curtail the scope of practice to make it more evidence-based.

Much has been written on the subject of spinal manipulative therapy (SMT) and somatovisceral conditions. Nansel and Szlazak,<sup>3</sup> in a review of 350 articles appearing over the last 75 years on this subject, conclude that suitable evidence is lacking for the rationale of the somatovisceral theory. The authors argue instead that somatic dysfunction of the spine may create signs and symptoms that mimic internal organ disease. Hence, the removal of the spinal dysfunction may remove the symptoms and signs of an organic disease or disorder that never was there in the first place.

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"We are conducting a research project and would like to ask you a question. All information is confidential and you will be anonymous.

Almost all our patients consult us because they have problems with their spine. Sometimes after treatment our patients report positive changes that do not seem to be directly associated with the spine.

(Schematic picture of spine-organ connections shown to patient)

As you can see from this picture, our body is governed by the nervous system.

An explanation of such positive changes could be that the treatment of the spine affects the nervous system.

(Pause)

I would like to ask you: Have you experienced any positive changes that do not seem to have anything to do with your back problem? For example anything positive with your: hearing, sight, ability to smell, breathing, circulation, digestion, lower parts, sexual organ, skin, or other?"

Fig 1. Standardized text read to all study participants.

Nonetheless, although there seems to be a general belief that chiropractic treatment of organic diseases is "politically incorrect," many chiropractors obviously remain open to this possibility.<sup>4</sup> Hence, although they likely believe that their main task is the treatment of painful conditions of the spine, they also accept the possibility that SMT may have, as an extra bonus, an unexpected positive effect on other bodily functions. A recent survey of a small sample of Danish chiropractors showed that almost all thought that SMT may at times have an effect on various organic disorders.<sup>5</sup>

This belief is understandable, if patients and chiropractors think that there may be a causal correlation between the treatment and various improvements, regardless of their type. After all, in the clinical world most temporal evidence (such as any improvement after treatment) is taken for granted. The daily clinical situation does not provide a control group.

Our goal was to find out how frequently patients report nonmusculoskeletal symptomatic improvements and to find out more about the types of such reactions that patients believe to be associated with chiropractic treatment. Because we could find no statistics on this issue in the literature, we decided to collect our own data.

This was carried out as a project in which a local Swedish team learned how to conduct a study of this type under supervision by the first author. The steps of project planning, data collection, and data analysis were preceded by a series of lectures and workshops. All local activities were coordinated and supervised by one individual. Data were analyzed by the entire project group.

## METHODS

All legally recognized and actively practicing chiropractors who were members of the Swedish Chiropractors' Association in early 1998 were invited to take part in the

**Date:**

**Gender:** male, female

**Age:** 18-24, 25-44, 45-64, 65+

**Patient's primary complaint** (several responses possible): cervicgia, brachialgia, cephalgia, dizziness, dorsalgia, lumbalgia, sciatica, shoulder problem, hip problem, extremity problem, other.

**How many treatments\* has the patient received in this clinic the last 3 months?** 1, 2-3, 4-6, 7+

**When did the patient receive the last treatment?** Last week, 1-2 weeks ago

**Type of treatment at the last visit?** SMT, Soft tissue treatment, other (specify)

**Which area was manipulated at the last visit?** C0-C3, C4-T1/1st rib, T2-L1/ribs, L2-S1/SI-joints, Coccyx, other (specify)

**Other comments:**

\*treatment = consultations

Fig 2. Additional questions in questionnaire.

study. Those who wished to participate were asked to collect information on 20 patients by using standardized interview questionnaires. Patients had to be aged  $\geq 18$  years. Further inclusion criteria were (1) the patient's primary symptom had to be musculoskeletal; (2) the patient had to have been treated in that clinic within the last 2 weeks (ie, the interview took place on a follow-up visit); and (3) the treatment must have included SMT.

Several pilot studies were conducted by the project group with the purpose of designing a suitable questionnaire and interview approach that enabled patients to understand what types of reactions they were supposed to report on, without influencing them to provide biased replies. When patients understood the process without having to ask additional questions and the rate of reactions stabilized across the pilot clinics, the procedure was considered suitable and the main study proceeded.

Data collection took place during 3 weeks of May 1998. The chiropractors could select any week during that period when they wanted to collect their data. Because of the extra time spent with the interviews, most preferred to spread the data collection over several days. This modification was considered acceptable, provided patients were included consecutively during specific hours and/or days and not admitted into the study for other specific reasons.

Patients who fulfilled the inclusion criteria were asked by the chiropractor if they wished to participate in the study. If they agreed, a standardized text was read to them (Figure 1). They were asked if they had any unexpected positive non-musculoskeletal changes after the previous treatment. They were also shown a schematic drawing to illustrate the somatovisceral concept. Answers from patients who had something to report were entered on the questionnaire. The relevant organ/function was marked in the relevant box, and the

**Table 1.** Patients' primary symptom, number of treatments over last 3 months, and the areas of spinal manipulative therapy (n = 1504)

Descriptor	Number	Percentage
Patients' primary symptoms*		
Cervicalgia	496	33%
Brachialgia	162	11%
Cephalgia	178	12%
Dizziness	7	5%
Dorsalgia	403	27%
Lumbalgia	928	62%
Sciatica	248	16%
Shoulder problem	78	5%
Hip problem	65	4%
Extremity	87	6%
Other	0	0%
Number of visits previous 3 months		
1	372	25%
2-3	693	46%
4-6	328	22%
7+	85	6%
Unknown	26	2%
Area treated at previous visit*		
C0-C3	598	40%
C4-T1/1st rib	619	41%
T2-L1/ribs	772	51%
L2-S1, SI-joints, and/or coccyx	1025	68%
Other	79	5%
Unknown	48	3%

The 95% confidence interval never exceeded  $\pm 2$ .  
 \*More than one reply possible per patient.

response was further described. If the patient had nothing unusual to report, the questions about reactions were left blank. Other information collected is listed in Figure 2.

Considerable efforts were put into the information, recruitment, and supervision processes during the data collection stage. Each member of the local project team was responsible for a certain number of colleagues and attempted to make several personal contacts with them to encourage full participation.

Validating the data was not possible, but for some of the variables a comparison could be made with a study of similar design conducted 3 years before on largely the same chiropractic population.<sup>2</sup>

Participation was voluntary, and data were collected anonymously. Permission to conduct this type of study was not necessary, as stated by the Regional Scientific Ethics Committee.

### Data Analysis

Data cleaning and analysis were completed manually. The frequency of the various reactions was estimated, and the frequency of reactions in relation to the number of areas treated. Areas treated have been defined in Table 1.

Negative side effects and positive musculoskeletal side effects mistakenly reported as unexpected nonmusculoskeletal side effects were excluded from the analysis. A decision had already been made after the pilot studies to ignore reports of general well-being, happiness, relaxation, and/or improved sleep because they were thought to be normal consequences of improved symptoms of musculoskeletal pain.

**Table 2.** Distribution of reactions per patient (n = 1504)

Number and percentages of patients with		
0 reactions	1162	77%
1 reaction	258	17%
2 reactions	57	4%
3 reactions	21	1%
4 reactions	4	<1%
5 reactions	1	<1%
6 reactions	1	<1%

The 95% confidence interval never exceeded  $\pm 2$ .

**Table 3.** Number of reactions per patient in relation to the number of areas treated (ie, C0-C3, C4-T1/1st rib, T2-L1/ribs, L2-SI/SI joints, coccyx, other)

Number of areas treated per patient	Number of reactions per patient		
	0	1	$\geq 2$
1 (n = 565)	478 (85%)	77 (14%)	10 (2%)
2 (n = 496)	385 (78%)	82 (16%)	29 (6%)
3 (n = 288)	196 (68%)	65 (23%)	27 (9%)
4 (n = 155)	101 (65%)	38 (24%)	16 (10%)

## RESULTS

### Participation Rates

At the time of the study there were 110 eligible chiropractors practicing in Sweden, of whom 107 were willing to participate in the study. Eighty-seven (81%) of 107 participating chiropractors returned their questionnaires before the deadline. They collected 1571 questionnaires, of which 1504 were valid. This represented 86% of the optimal number of questionnaires. Sixty-seven questionnaires were excluded because it was unclear whether all inclusion criteria were met for these respondents.

The reasons for nonparticipation among chiropractors varied. Before entry in the study, some said they were too busy (n = 2) or that the standard routine was to tell patients that they can expect improvement of nonmusculoskeletal symptoms with the treatment (n = 1). After having entered the study, chiropractors not responding gave no reason (n = 7), said they were too busy (n = 4), handed in their data after deadline (n = 4), changed their mind (n = 2), said they did not have enough patients (n = 2), or were unable to respond as a result of illness (n = 1).

### Description of the Final Patient Study Sample

Fifty-five percent of the patients were women. The largest groups were aged 25 to 44 years (41%) and 45 to 65 years (38%). SMT was the sole therapy in 44% of cases.

Patients' primary symptoms, number of treatments over the last 3 months, and the areas of manipulation are shown in Table 1.

### Was the Study Sample Similar to that of a Previous Study of Similar Design?

Response rate among the chiropractors and the age and sex distribution of patients appeared to be similar to a previous study of similar design.<sup>2</sup> As in the previous study, low

Table 4. Number of unexpected positive reactions per system/organ

Type of reaction	Number	Type of reaction	Number	Type of reaction	Number
Respiration/lungs (n = 120)		Less tingling	1	Less testicular pain	2
Easier to breathe	98	"Better"	3	Better prostatic function	1
Asthma/allergy better	6	Vision/eyes (n = 64)		Menses function again	1
Improved ability to smell things	3	Clearer/better/sharper vision	49	Bleed less at ovulation	1
Less short of breath	2	Focus better	2	Less swollen	1
Less feeling of pressure over the chest	2	Less pressure/pain	2	Less pain during sex	1
Cough disappeared	1	Eyes more open	2	"Better"	1
Pain on respiration disappeared	1	Double vision disappeared	1	Hearing/ears (n = 25)	
Runny nose improved	1	Visual disturbance disappeared	1	Less ringing in ears	10
"Better"	6	Tunnel vision disappeared	1	Better hearing	8
Digestive system (n = 118)		Better eye movements	1	Feeling of fullness gone	3
Improved function	92	Less itchy	1	Less pain	3
Less pain	11	Less secretion	1	"Better"	1
Less gastritis	6	"Better"	3	Skin (n = 15)	
Less nausea	4	Urinary tract/kidneys (n = 26)		Acne/eczema better	8
Easier to swallow	1	Easier to urinate	11	Not so sensitive to sun	1
"Better"	4	Less frequent urination	9	Softer face	1
Circulation/heart (n = 67)		More frequent urination	2	Look younger	1
Improved circulation	34	Cramp in bladder	1	Skin feels fresher	1
Less tachycardia	13	Less accumulation of fluid	1	Feeling of hot face gone	1
Less feeling of pressure in chest	5	Urinary tract inflammation	1	Back of thigh drier	1
Less double beats	3	better		"Better"	1
More even pulse	3	Incontinence	1	Other (n = 6)	
Reduced blood pressure	2	Sexuality/sex organs (n = 21)		Stronger nails	2
Increased heart rate	1	Dysmenorrhoea better	7	Numbness in tongue gone	1
Feeling stronger	1	Less abdominal pain	2	Better ability to taste things	1
Less swollen	1	Less discharge	2	Stronger hair	1
		Increased libido	2	Hiccups gone	1

back pain was the most common primary symptom followed by neck pain/headache. Similar to the other study, the lumbo-pelvic area was most frequently subjected to treatment. We therefore concluded that the final study sample of patients probably was representative of its target population.

#### Unexpected Positive Nonmusculoskeletal Side Effects

At least 1 positive nonmusculoskeletal side effect was reported after 342 of 1504 of treatments (23%, 95% confidence interval [CI] 21-25). The total number of reactions was 462. The number of reactions per patient is shown in Table 2. There was a positive gradient for the number of reactions per patient in relation to the number of spinal areas treated (Table 3). Of those treated in 1 spinal area only, 15% (95% CI 12-18) reported at least 1 reaction. The corresponding estimates for 2, 3, and 4 spinal areas, respectively, were 22% (95% CI 18-26), 32% (95% CI 27-37), and 35% (95% CI 28-42).

#### Different Types of Unexpected Positive Side Effects

The different types of reactions, categorized by organ or system, are shown in Table 4, as are further subclassifications of all 462 reactions.

Reactions were most commonly grouped under the following systems/organs: the respiratory system (26%, 95% CI 22-30); the digestive system (25%, 95% CI 21-29); the circulation/heart (14%, 95% CI 11-17); and eyes/vision (14%, 95% CI 11-17).

Of the 462 reported reactions, the most commonly reported subclassifications were easier to breathe (21%, 95% CI 17-25); improved digestive function (20%, 95% CI 16-24); clearer/better/sharper vision (11%, 95% CI 8-14); better cir-

ulation (7%, 95% CI 5-9); changes to heart rhythm/blood pressure (5%, 95% CI 3-7); and less ringing in the ears/improved hearing (4%, 95% CI 2-6).

In some questionnaires, the type of reaction had not been specified but was only reported as "better" under specific systems/organs.

#### Some Specific Findings

Among the 8 persons who reported better hearing, the thoracic spine was manipulated in all cases, the lower cervical spine in 7 cases, the lumbar spine in 5 cases, and the upper cervical spine in 4 cases.

The person in this study (a man) who reported the largest number of positive reactions (n = 6) noted improvements in vision, heart rhythm, respiratory function, the appearance of his skin, digestive ease, and sexual function.

The 2 persons who reported "stronger nails," noted that they had also received nutrition supplements prescribed by the chiropractor.

In retrospect, 3 of the reactions perhaps should have been removed as a result of the possibility of being secondary to the sensation of general well-being that goes with reduced back pain symptoms. These reactions were "feeling stronger" (circulation/heart), "increased libido" (sexuality/sex organs), and "look[ing] younger" (skin).

Five of the reactions might have been of musculoskeletal origin and also perhaps should have been removed. These responses were "less feeling of pressure over the chest" (n = 2), "pain on respiration disappeared" (respiration/lungs), "less tingling" (circulation/heart), and "numbness in tongue gone" (other).

### Summary of Findings

Approximately 1 (25%) of 4 patients reported at least 1 improved nonmusculoskeletal symptom after chiropractic SMT. Among the patients who reported such reactions, 1 reaction per patient was most common. There was a positive association between the number of areas treated and reports of positive reactions. Reactions were most commonly reported for the respiratory and digestive systems (together accounting for about half of the reactions), followed by circulation/heart function, and the eyes/vision. Several clusters of reactions were identified for these systems/organs, primarily “easier to breathe,” “improved digestion,” and “better vision.”

### DISCUSSION

This study showed that approximately 25% of patients, when asked, report improvements of various symptoms that appear to be nonmusculoskeletal in origin. It is interesting that many of these positive side effects are sufficiently similar to allow several relatively large subgroup classifications. Improved breathing, digestion, circulation, and vision were the most common examples.

Eight cases of improved hearing were also identified. Curiously, all these patients had been treated in the thoracic spine (exact level unknown), although always in combination with some other spinal region. Hence, it is not known if they were associated with the fourth thoracic vertebra, as in the case of D.D. Palmer’s famous patient.<sup>1</sup>

Having identified the frequency and types of reactions, two questions now arise. Was the reporting of reactions correct, and was the link between treatment and reactions causally associated?

#### Was the Reporting of Reactions Correct?

Many of these presumed reactions were familiar to the research team. Hence, the face validity in relation to the types of reactions appeared reasonable. Overreporting as a result of bias among the patients and the chiropractors was unlikely, considering that the patients were naïve (none had sought care primarily for a nonmusculoskeletal condition). The belief of the research team was that there is no tradition among Swedish chiropractors in general to emphasize this aspect of patient care. This opinion is supported by the previous clinical epidemiologic study of Swedish chiropractors, in which only 1 of 625 patients consulted primarily for a nonmusculoskeletal symptom.<sup>2</sup>

Underreporting could of course also have occurred, for example, if the chiropractor’s demeanor indicated that these types of reactions do not occur or should not be reported or if the patients did not understand what was meant by the question or could not recall previous reactions. However, the research team, in personal contact with all the chiropractic participants, formed the opinion that Swedish chiropractors, in general, are genuinely interested in getting more objective information on this topic. Patients were uniformly informed, including being shown a schematic drawing based on experiences during extensive pilot testing of the survey instru-

ment. The recall period was limited to a maximum of 2 weeks.

Another problem is that our estimate of reported reactions (23%) refers to the general patient population. Thus it is not known if the proportion of reactions would be the same in specific subpopulations, such as in patients who have specific organic problems. In other words, the appropriate denominators for the various reactions are unknown.

The clinical reality of these reports is also unclear. For example, some of the “scattered” reactions seem to lack credibility, such as “better prostatic function” (sexuality/sex organs), “not so sensitive to sun” (skin), “back of thigh drier” (skin), and “stronger hair” (other). Some patients may be more sensitive or imaginative than others, such as the person who reported 6 rather peculiar reactions.

However, most patients who noticed an improvement report only 1 reaction, and there are some consistently recurring statements, such as “easier to breathe” and “improved hearing,” which support chiropractic folklore. Nonetheless, it would be necessary to confirm their veracity through objective tests. This is an important issue, as shown in a previous uncontrolled study of SMT in asthmatic patients. Although these patients often reported improved lung status after the treatment, this response did not correlate well with the objective tests that measured the true extent of bronchospasm.<sup>6</sup>

#### Was the Link Between Treatment and Reaction Causally Associated?

Whether the statistical link between treatment and reaction is causal or not cannot be shown with the present study design. Although a temporal link is a prerequisite for a causal association, the absence of an untreated control group makes it impossible to say whether these reactions are treatment-specific or if they simply represent normal fluctuations of common symptoms of physiologic function.

In the case of SMT and asthma, again, we are aware of 2 high-quality, published, randomized controlled trials that both failed to show that chiropractic SMT is an effective method to treat asthma.<sup>7,8</sup> These results surely contrast with the subjective reporting of improvement in the study without a control group.<sup>6</sup> Obviously, unless more controlled randomized trials are conducted in this area, this issue will never be resolved.

Another factor we looked at was the dose-response gradient. Our hypothesis was that if these reactions were indeed the result of a physiologic rather than a psychologic process, the number of reactions per patient would be positively associated with the number of areas treated. This was confirmed. The occurrence of reported reactions increased gradually with the number of areas treated to be about twice as many in those having been treated in 4 areas than those treated in only 1 area.

### CONCLUSION

Some patients did report an improvement of nonmusculoskeletal symptoms after chiropractic SMT. Whether these reports reflect real physiologic improvements or are based on subjective impressions is not known; if they are real, it is un-

clear whether they are the result of the treatment or whether they are coincidental events. However, the finding of a positive dose response does warrant further investigation.

We do not wish to purport any specific hypotheses about this issue. We simply wish to point out that this subject is suitable for further research. We hope that our estimates of the frequency with which the various reactions occur can help in the planning of additional studies into this domain. Ideally, such studies would measure validated physiologic responses of symptomatic and asymptomatic subjects in controlled randomized trials.

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