

PREVALENCE OF MUSCULOSKELETAL INJURIES SUSTAINED BY STUDENTS WHILE ATTENDING A CHIROPRACTIC COLLEGE

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ABSTRACT

Objective: The purpose of this study was to assess the prevalence, distribution, severity, risk factors of, and response to musculoskeletal injuries to the low back, hand/wrist, and neck/shoulder among chiropractic students while receiving and/or administering adjustments/manipulation while attending a chiropractic college.

Methods: The study was an epidemiologic survey of chiropractic students at all levels of training (n = 890) at one chiropractic college. A self-administered anonymous 3-paged questionnaire was used. The questionnaire was divided into sections for collecting data separately on injuries associated with receiving or administering chiropractic adjustments.

Results: The response rate was 64.3% with 62.6% male respondents. The overall prevalence of injuries sustained in college was 31.5%, 44.4% of which was exacerbations of prior complaints. Injuries from receiving adjustments/manipulation were most prevalent to neck/shoulder (65.7%), whereas hand/wrist injuries were most common when administering adjustments (45.6%). The risk difference among students receiving adjustments was 81.6/1000 neck/shoulder injuries, and the etiologic fraction was 76.6%. The risk difference was 170/1000 hand/wrist injuries with etiologic fraction of 96.5% among students administering adjustments. Diversified, Gonstead, and upper cervical adjusting techniques were perceived to be the most injury-related.

Conclusion: Some students enroll in a chiropractic college with preexisting injuries that can easily be exacerbated. Others sustain new injuries of moderate severity from receiving and administering adjustments. Potential risk factors may include height, body mass index, and nonexercising. The risk factors and mechanisms responsible for the high levels of hand/wrist injuries need further examination. This research identifies an important need to design a comprehensive and logical protocol to prevent injury to chiropractic students. (*J Manipulative Physiol Ther* 2009;32:140-148)

Key Indexing Terms: *Cumulative Trauma Disorders; Chiropractic; Low Back; Wrist; Neck; Risk*

Practicing chiropractors, such as most health practitioners, are at risk for work-related musculoskeletal injuries (MSIs). Little is known about the distribution, severity, or important risk factors of these injuries so that prevention can be addressed. Only a few studies have investigated injuries associated with chiropractic practice.¹⁻⁵ Rupert et al² conducted a comprehensive study that focused on the type of injuries sustained by US chiropractors and

behavioral changes as a response to those injuries. The study identified low back (LB), hand/wrist (H/W), and neck/shoulder (N/S) as the dominant areas of complaints. As a result of injury, some chiropractors changed their techniques, frequency or duration of work, or left the profession.

For some professions, injury history, area of practice specialization, or work environment has been identified as potential risk factors for work-related injuries.

In a longitudinal study on the natural history of LB problems, Smedley et al⁶ reported that earlier history or clinical signs of back problems have predicted back pain/injury claims at work among nurses⁷ and recommended further cohort study designs. In 2005, a follow-up study was conducted to that effect on LB pain beginning at entry to the nursing school. It has been determined that the lifetime prevalence of back pain increased sharply during nursing school and that back pain at entering the nursing school was a predictor for back-related pain and disability. Although the nature of the association was unclear, it was likely that back pain was exacerbated during nurse training activities.⁷

Specialty area of practice or job setting has been thought to be a risk factor for work-related musculoskeletal disorders^{8,9} in most professions. Among physical therapists,

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Paper submitted September 12, 2007; in revised form September 1, 2008; accepted September 23, 2008.

0161-4754/\$36.00

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doi:10.1016/j.jmpt.2008.12.012

the underlying assumption, apparently, is that a particular specialty area has inherent risks because practitioners use a limited number of techniques.⁸ Bork et al,¹⁰ who related specialty area to work-related musculoskeletal disorders, investigated the relationship between tasks and symptoms and found that manual therapy as performed by physical therapists was related to wrist, hand, and elbow and that neurologic rehabilitation was related to LB pain.⁸ Also, among dentists and dental hygienists, the prevalence of musculoskeletal symptoms of the hand and carpal tunnel syndrome is significantly high.¹¹⁻¹⁴ Upper extremity tendinitis and other symptoms are rampant among workers handling paper currency and industrial clerical workers.^{15,16} To gain further understanding on the natural history of these complaints, a number of studies have been conducted involving the student population of various disciplines.¹⁷⁻¹⁹ Chiropractic is largely specialized, using manual therapy (adjustment/manipulation) that in itself stands as a risk factor. However, very little has been done with the chiropractic student population in this regard.^{20,21}

Chiropractic manipulation is a heterogeneous art with complex motor skills.²² A plethora of discrete techniques with unique requirements and distinct manipulative procedures are associated with them as they are applied. For the procedures to be therapeutically safe and functionally effective, a number of biomechanical variables (speed and magnitude/duration of applied force) on the part of the practitioner need to be accurately controlled.^{23,24} Thus, it becomes important for students in chiropractic colleges to learn and hone the necessary psychomotor skills, agility, strength, and flexibility to safely and properly deliver these procedures. For this to be accomplished, chiropractic students typically serve as patients and/or interns at different points in their academic career. Practicing “highly skilled” unfamiliarized techniques and/or serving as subjects for their novitiate colleagues during training potentially exposes these students to risk of injuries. Repetitions (block practice) and frequency/volume (mass practice) are dominant in chiropractic technique classes, and these have long been touted to have potentially damaging effects too, especially in the acquisition phase when the neuromuscular system is adapting to the altered demands associated with learning manipulative procedures.²⁵⁻²⁸

The primary mechanisms associated with H/W injuries may include thrusting, lifting, and twisting. The role of thrusting as a risk factor to wrist injury during chiropractic manipulations may seem obvious. However, risks posed by lifting and wrist twisting are still latent, potent, or implicit, especially among chiropractic interns who have not yet fully mastered the principles underlying most manipulative techniques and procedures. In neck adjusting, for example, interns have the tendency of bearing part of the patient’s weight (by lifting) in conjunction to twisting their wrists while rotating the patient’s neck.²⁹⁻³¹ The applied stress may often result in a unit of deformation (strain) beyond the linear

elastic limit, yield point, and ultimate strength region of both the wrist of the adjuster and neck of the patient. This process may, therefore, result in rupturing the ligaments/tendons and thus destabilizing the wrist.

The purpose of this study was to assess the prevalence, distribution, severity, risk factors, and responses to MSIs among chiropractic students. The focus is directed to injuries to the LB, H/W, and N/S that have been previously identified as primary sites of injury among practicing chiropractors.

METHODS

Study Design and Subjects

The study was an epidemiologic survey of chiropractic students at all levels of education and was administered only to students at the Parker College of Chiropractic in Dallas, Texas. Help was solicited from other colleagues to administer the survey across the school during lecture hours. The survey instrument was a self-reporting, anonymous questionnaire that was designed to capture information on the prevalence of MSI to LB, H/W, and N/S as specific injury-prone anatomical regions dominant among chiropractors.² The 3-paged document was divided into 5 sections for clarity purposes and to reduce confounding. Section A asked questions regarding history of injury before entering a chiropractic college. Section B focused on injuries sustained in the college while receiving adjustments from interns. Section C addressed training-related activities/adjustment techniques and injuries incurred as a result of giving adjustments. Section D dealt with general issues related to the effects of and responses to injuries sustained in the college. Section E gathered demographic information (sex, age [in years], level of training in college [of trimester], and self-reported height [in feet and inches] and weight [in pounds]).

Questions were adopted from the Standardized Nordic and Outcome Assessment Health Status Questionnaires³²⁻³⁴ and were critiqued by research colleagues. A draft version was pretested on a pilot group of students, and the feedbacks were implemented. The proposal of this study was approved by both the Research Committee at Parker Research Institute, Dallas, Texas, and the institutional review board.

Data Analyses

Surveys with largely incomplete responses were eliminated from the final analyses that were performed using SPSS version 15.0 for Windows (SPSS Inc, Chicago, Ill). The height of the respondents, originally reported in feet and inches, was converted to inches only, and body mass index (BMI) was calculated from weight and height using the formula $BMI = [703 * \text{weight} / (\text{height})^2]$. The BMI values were further dichotomized into “normal weight” ($BMI < 25 \text{ kg/m}^2$) and “overweight/obese” ($BMI \geq 25 \text{ kg/m}^2$). Descriptive statistics were computed for the demographic variables (age, BMI, and

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