

Chiropractic Physicians' Knowledge of Pediatric Concussions

Research Paper

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Abstract

Introduction

Recent legislation in the state of Ohio now allows chiropractic physicians who possess certain credentials to both diagnose and clear young concussion patients.^{2,3} Unfortunately, little if any existing research examines the knowledge and abilities of chiropractic physicians regarding the management of this condition. Therefore, the purpose of this study was to provide a general overview of chiropractic physicians' knowledge regarding the diagnosis and management of pediatric concussions.

Methods

A survey was emailed to 1,344 chiropractors in the state of Ohio. Of those who were contacted, 71 completed the survey. The survey included questions regarding demographics, patient scenarios, and concussion management.

Results

Although 66.7% of chiropractors qualified to care for concussions reported the utilization of guidelines, the rate dropped to 35.2% when all respondents were included (Question 12 Appendix B). There were statistically significant differences concerning familiarity with the Graded Symptom Checklist ($p=0.001$) and the Post-Concussion Symptom Scale ($p=0.007$). In addition, the results of a question regarding the implementation of graduated return-to-play protocols were found to be borderline significant ($p=0.06$).

Conclusion

The results of the study indicated that chiropractors who possess the credentials required by law are more knowledgeable than those who do not. However, more research is necessary to confirm these results.

Introduction

In recent years, chiropractic physicians have become increasingly involved in the diagnosis and treatment of young athletes who have sustained concussions. Historically, the chiropractic profession has focused on the treatment of musculoskeletal conditions. According to the World Federation of Chiropractic, the profession can be defined as “a health profession concerned with the diagnosis, treatment, and prevention of mechanical disorders on the function of the nervous system and general health.”¹ However, this definition has begun to expand. In 2014, the state of Ohio passed legislation that includes chiropractors as healthcare professionals qualified to diagnose and clear concussed pediatric patients.² Revisions of Ohio House Bill 487 specify that physicians of chiropractic sports medicine, physicians of chiropractic neurology, and certified chiropractic sports physicians who meet certain criteria are qualified to take on larger responsibilities in concussion diagnosis and treatment.³ This legislation may signify the beginnings of a new trend in sports medicine and concussion management.

As chiropractors become more involved in the care of young athletes, their knowledge must be assessed to ensure that they can competently care for pediatric patients. However, no current studies investigate the abilities of chiropractic physicians in regards to the assessment and management of concussions. With the exception of several small literature reviews and case studies involving the treatment of concussion-related problems, no existing research evaluates chiropractors and their knowledge regarding pediatric concussions.^{4,5} However, because chiropractors now possess a larger role in caring for young athletes, it is important that their knowledge and abilities are assessed. Therefore, the purpose of this study was to provide a general overview of chiropractic physicians’ knowledge regarding the diagnosis and management of pediatric concussions.

Methods

The proposed study was submitted to Cedarville University's Institutional Review Board for the Protection of Human Subjects and received approval to proceed as specified on April 2, 2015. An online survey was constructed using Qualtrics software. The Youth Sports Concussion Committee has recommended that chiropractors manage concussions in accordance with the 2012 Zurich Consensus Statement on Concussion in Sport.^{3,6} Therefore, all knowledge-based questions were derived from the information presented in this document.⁶ The first item included in the survey was an informed consent statement. The survey consisted of an additional 15 closed-ended questions and 2 open-ended responses (Appendix A). Six questions collected information regarding participant demographics such as type of practice and years of experience. The survey also included three scenarios in which concussion was a differential diagnosis. The final section included questions concerning concussion assessment tools, clinical practice guidelines, and return-to-play protocols. Additional knowledge-based questions investigated the implementation of appropriate return-to-play guidelines for concussed athletes.

The survey was distributed electronically to 1,344 chiropractors who were licensed through the Ohio State Chiropractic Board. Each potential participant was forwarded an e-mail containing a cover letter and a link to the survey. Of those who were contacted, 71 completed the survey. Before participating, each of the respondents read and agreed to an informed consent statement approved by the University's Institutional Review Board for the Protection of Human Subjects.

Statistical Analysis

Quantitative data was collected and analyzed using SPSS 23 software. The priori alpha level was set at less than 0.05%. Pearson Chi-Square and Fisher's Exact Test were used to assess

for differences related to type of practice and years of experience. In addition, qualitative data from the open-ended responses was analyzed for common themes and groups.

Results

Of the 1,344 chiropractors who were contacted, 71 completed the survey. Fifteen (21.1%) possessed credentials allowing them to diagnose and treat concussed high school athletes under the new state legislation. The remaining 56 (78.9%) respondents either did not provide their credentials or did not possess credentials that qualified them to manage concussions without the supervision of a physician. Over half of the respondents (54.9%) reported 15 or more years of experience and 15.5% reported 5 to 10 years of experience. The majority of respondents (84.5%) cared for patients of all ages. Thirty (42.3%) participants reported caring for less than 12 concussions a year, 22 (31%) managed 1 to 3 concussions per month, 2 (2.8%) cared for more than 1 concussion per week, and 16 (22.5%) reported no previous experience (Question 3 Appendix B). Approximately one-third of participants (36.6%) felt very comfortable managing concussions and 26.8% felt moderately comfortable. Only 9.9% and 8.5% reported feeling slightly uncomfortable and very uncomfortable, respectively. When presented with a question regarding cognitive rest, 57% strongly agreed that it is recommended until all symptoms resolve while 22.5% somewhat agreed (Question 15 Appendix B). Less than half (45.1%) of the respondents strongly disagreed with allowing athletes to progress to the next step of a graduated return-to-play protocol following the reappearance of symptoms and 18.3% were neutral or unsure (Question 17 Appendix B). However, the majority of respondents (85.9%) strongly agreed that same-day return-to-play should never be allowed regardless of age, injury severity, or activity levels (Question 16 Appendix B).

There were several notable differences when results were compared by type of practice. Unsurprisingly, chiropractors who possessed credentials allowing them to diagnose and treat concussed athletes reported caring for these patients more frequently ($p=0.004$). In addition, these chiropractors were more likely to report the use of guidelines such as the Zurich consensus statement ($p=0.014$). Although there were no significant differences regarding familiarity with ImPACT testing, chiropractors who are qualified to care for concussion patients under the new legislation reported high levels of familiarity with the Graded Symptom Checklist ($p=0.001$) and the Post-Concussion Symptom Scale ($p=0.007$). In addition, there was borderline significance ($p=0.06$) regarding the correct progression of a graduated return-to-play protocol (Question 17 Appendix B). When results were compared based on years of experience, a statistically significant difference ($p=0.034$) was found regarding a scenario in which the patient displayed delayed onset of symptoms (Question 6 Appendix A). In this scenario, participants who reported higher levels of experience were more likely to diagnose the patient with a concussion.

Several open-ended responses regarding credentials and preferred guidelines were also included in the survey. Although several participants did not possess the credentials required by state legislation, they provided additional educational experiences and certifications including degrees in a field related to sports medicine, coaching certification through Heads Up Football, experience as a team physician, and completion of related continuing education courses. Twenty participants also reported the guidelines and resources that they referred to in their clinical practice. The Acute Concussion Evaluation and the American Academy of Neurology guidelines each received three mentions. The American Chiropractic Board of Sports Physicians guidelines and the Cantu guidelines were both listed twice. Finally, the Colorado guidelines received one mention.

Discussion

Statistically significant differences were found regarding use of guidelines and familiarity with assessment tools. Chiropractors who possessed the required credentials were more likely to express familiarity with the Graded Symptom Checklist and the Post-Concussion Symptom Scale than those who did not. In addition, these participants were more likely to have used guidelines during their clinical practice. Finally, although the results were deemed borderline significant, these participants were more likely to disagree with allowing an athlete to progress to the next step of a graduated return-to-play program if the following step had provoked symptoms. Notably, of the chiropractors who did not possess the required credentials, 21.4% chose neutral/unsure while only 13% and 14% chose strongly agree and somewhat agree, respectively. These results indicate that chiropractors who do not possess the required credentials are less knowledgeable regarding return-to-play guidelines. As there were no significant differences based on years of experience or frequency of management, these results may have been due to differences in educational requirements.

Certified chiropractic sports physicians (CCSP) are licensed through the American Chiropractic Board of Sports Physicians.⁷ Doctors of chiropractic are eligible to take the certification examination if they complete a minimum of 100 hours in an accredited postgraduate education program, earn a master's degree in exercise science or a similar program, complete one year in a sports medicine residency program, or hold a current Athletic Trainer Certification.⁷ In addition, candidates must receive post-graduate education regarding emergency procedures and cardiopulmonary resuscitation.⁷ Chiropractic physicians of sports medicine (DACBSP) are also licensed through the American Chiropractic Board of Sports Physicians.⁷ Eligible candidates must hold CCSP credentials while completing 200 hours of postgraduate

education in an accredited program or earning a master's degree in a program related to sports medicine.⁷ Those who do not possess these credentials must complete a sports medicine residency prior to the completion of the oral and practical certifying examinations.⁷ Chiropractic physicians of neurology (DACNB) are licensed through the American Chiropractic Neurology Board and must complete 300 hours of post-doctoral coursework and complete both written and practical examinations.⁸ Because of the educational requirements, chiropractic physicians who possess these credentials may be more knowledgeable regarding pediatric concussions and, as a result, better equipped to handle the diagnosis and treatment of these injuries.

Regarding years of experience, there was a significant difference when respondents were presented with a scenario involving a patient with delayed onset of symptoms. Participants who reported more years of experience demonstrated an increased tendency to diagnose the patient with a concussion. This may indicate that healthcare professionals become more sensitive to symptoms with experience. However, although the scenario focused on the delayed onset of symptoms, there may have been other factors that affected how participants responded.

Although no previous studies have included chiropractors, multiple studies have assessed pediatricians and primary care providers. In the current study, 66.7% of qualified chiropractors reported the utilization of guidelines or similar resources and the rate dropped to 35.2% when all respondents were included (Question 12 Appendix B). A study examining management strategies among pediatricians found that 84% of the pediatricians surveyed used a published guideline.⁹ Because the new state legislation has been in effect for a relatively short period of time, chiropractors may not have needed to use guidelines in their clinical practice. However, this gap may need to be addressed, particularly if state legislation expands to include all chiropractic credentials. As noted previously, respondents also showed some deficits regarding

cognitive rest and graduated return-to-play protocols. Research regarding other healthcare providers has demonstrated similar knowledge gaps. In studies assessing front-line primary care providers, only 37% were shown to correctly apply graduated return-to-play protocols.¹⁰ In addition, 31% of physicians did not encourage cognitive rest through a reduction of screen time and many healthcare providers failed to provide appropriate return-to-learn recommendations.^{10,11} However, multiple studies have examined the benefits of promoting cognitive rest and correctly implementing a stepwise return-to-activity immediately following the cessation of symptoms.^{12,13} Therefore, it is essential that all healthcare professionals integrate both into the care of young athletes.

This study possessed several limitations. First, the study attracted a low response rate of approximately 5%. In addition, participants may have been more likely to respond if they considered themselves to be knowledgeable regarding concussion assessment and management. Therefore, caution must be taken with the generalization of these results. As this was the first known study to include chiropractic physicians, it was designed to provide a general overview of their knowledge and abilities. However, it does not provide detailed information regarding specific areas of concussion diagnosis and treatment.

Despite these limitations, the results of this study provide guidance for future research. Larger sample sizes can provide more accurate results regarding the knowledge and abilities of chiropractic physicians. In addition, future studies should examine specific topics such as concussion diagnosis, symptom identification, and implementation of return-to-play protocols. The effects of continuing education and additional certifications should also be examined as these factors may influence the knowledge and abilities of chiropractic physicians. Finally, future

research should include both chiropractic physicians as well as other healthcare professionals to allow for more effective comparisons.

Conclusions

Based on the results of this study, chiropractic physicians who possess the credentials required by state legislation are more knowledgeable than those who do not, particularly in regards to diagnostic tools and return-to-play protocols. Athletic trainers and other healthcare professionals who may refer concussed athletes must be advised of these differences. In addition, they must ensure that the chiropractors who care for their athletes possess the credentials specified under the new state legislation. Although more research is necessary to confirm these findings, the results of this study indicate that chiropractors who possess the required credentials are adequately knowledgeable regarding the diagnosis and treatment of pediatric concussions.

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Appendix A

Question 1: Years of experience:

- <5 years
- 5-10 years
- 10-15 years
- >15 years

Question 2: What patient populations do you encounter during a typical week? Mark all that apply:

- Children (ages 12 and younger)
- Adolescents (ages 13-18)
- Young adults (ages 19-35)
- Middle-aged adults (ages 36-55)
- Older adults (ages 56 and older)

Question 3: How frequently do you manage concussions?

- >1 case per week
- 1-3 cases per month
- <12 cases per year
- Never

Question 4: How would you describe your level of comfort with managing concussions?

- Not at all comfortable
- Slightly comfortable
- Somewhat comfortable
- Moderately comfortable
- Very comfortable

Question 5: Please state your credentials (example: Physician of Chiropractic Neurology) and any additional specializations or certification:

Question 6: A 16-year-old male presents 2 days following a helmet-to-helmet collision with another player during football practice. He had no symptoms following the collision and he finished the practice. He is complaining of a moderate headache that began the day following the collision. His mother reports that he has been more irritable than normal. How likely would you be to diagnose this patient with a concussion?

- Very likely
- Somewhat likely
- Somewhat unlikely
- Very unlikely

Question 7: A 14-year-old male presents 4 days following a wrestling meet. The patient reports being flung to the ground and landing on his upper back and shoulders. The patient experienced an initial headache and neck pain. His symptoms have progressively worsened since the injury. He reports that his pain and headache increases when he tries to practice with his team. How likely would you be to diagnose this patient with a concussion?

- Very likely
- Somewhat likely
- Somewhat unlikely
- Very unlikely

Question 8: A 12-year-old female reports 1 week following a head injury. She reports colliding with a teammate while attempting to head a soccer ball. Her only signs/symptoms were an initial mild headache lasting several hours and a small “goose egg.” She did not seek medical care after the injury. The following day, she returned to school and completed a practice with no symptoms. She states that she has had difficulty sleeping since the injury and has been experiencing a feeling of mental “fogginess” and an inability to focus. How likely would you be to diagnose this patient with a concussion?

- Very likely
- Somewhat likely
- Somewhat unlikely
- Very unlikely

Question 9: Please rate your level of familiarity with Immediate Post-Concussion Assessment and Cognitive Testing otherwise known as ImPACT:

- Not at all familiar
- Slightly familiar
- Somewhat familiar
- Moderately familiar
- Very familiar

Question 10: Please rate your level of familiarity with the Post-Concussion Symptom Scale:

- Not at all familiar
- Slightly familiar
- Somewhat familiar
- Moderately familiar
- Very familiar

Question 11: Please rate your level of familiarity with the Graded Symptom Checklist

- Not at all familiar
- Slightly familiar
- Somewhat familiar
- Moderately familiar
- Very familiar

Question 12: Do you, or have you ever, referred to clinical practice guidelines and/or similar resources such as the 2012 Zurich consensus statement when managing concussions?

- Yes
- No

Question 13: If yes, please list the clinical practice guidelines and/or similar resources:

Question 14: How would you describe your level of familiarity with sport-related concussion legislation in the state of Ohio?

- Not at all familiar
- Slightly familiar
- Somewhat familiar
- Moderately familiar
- Very familiar

Question 15: Following a concussion, cognitive rest is always recommended until all symptoms have resolved:

- Strongly agree
- Somewhat agree
- Neutral/unsure
- Somewhat disagree
- Strongly disagree

Question 16: Same-day return-to-play should never be permitted regardless of age, severity, or activity levels:

- Strongly agree
- Somewhat agree
- Neutral/unsure
- Somewhat disagree
- Strongly disagree

Question 17: During the implementation of a graduated return-to-play protocol, an athlete who experiences symptoms after the completion of a step may progress to the next step if symptoms resolve within 24 hours:

- Strongly agree
- Somewhat agree
- Neutral/unsure
- Somewhat disagree
- Strongly disagree

Appendix B

Question 3: How frequently do you manage concussions?				
>1 per week 2 (2.8%)	1-3 per month 22 (31%)	<12 per year 30 (42.3%)	Never 16 (22.5%)	
Question 12: Do you, or have you ever, referred to clinical practice guidelines and/or similar resources such as the 2012 Zurich consensus statement when managing concussions?				
Yes 25 (35.2%)			No 46 (64.8%)	
Question 15: Following a concussion, cognitive rest is always recommended until all symptoms have resolved.				
Strongly Agree 41 (57.7%)	Somewhat Agree 16 (22.5%)	Neutral/Unsure 3 (4.2%)	Somewhat Disagree 7 (9.9%)	Strongly Disagree 3 (4.2%)
Question 16: Same-day return-to-play should never be permitted regardless of age, severity, or activity levels.				
Strongly Agree 61 (85.9%)	Somewhat Agree 2 (2.8%)	Neutral Unsure 2 (2.8%)	Somewhat Disagree 6 (8.5%)	Strongly Disagree 0 (0%)
Question 17: During the implementation of a graduated return-to-play protocol, an athlete who experiences symptoms after the completion of a step may progress to the next step if symptoms resolve within 24 hours.				
Strongly Agree 8 (11.3%)	Somewhat Agree 8 (11.3%)	Neutral/Unsure 13 (18.3%)	Somewhat Disagree 10 (14.1%)	Strongly Disagree 32 (45.1%)