

A survey of Fellows in the College of Chiropractic Sports Sciences (Canada): their intervention practices and intended therapeutic outcomes when treating athletes

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Objective: *To compile baseline data regarding the treatment practices and therapeutic outcomes that fellows of the College of Chiropractic Sports Sciences Canada (CCSS(C)) strive for when treating athletes.*

Design: *Cross-sectional self-report mail out survey of CCSS(C) fellows.*

Participants: *Current registered fellows of the CCSS(C) as determined by the College at the time of survey distribution.*

Results: *The majority of questioned fellows believe that they can cause direct and specific improvements in an athlete's sport performance. The most commonly utilized therapeutic intervention was spinal joint manipulation/mobilization. The most anticipated outcomes following the treatment of athletes with the goal of affecting athletic performance were "changing or improving aberrant body mechanics," "restoring or improving aberrant muscle function," and "improving joint function or reducing joint dysfunction."*

Conclusion: *The majority of respondent fellows of the CCSS(C) believe their therapy to be effective in enhancing an athlete's sport performance.*

(JCCA 2010; 54(4):282-292)

KEY WORDS: Sport Sciences, fellows, performance, manipulation

Objectif : *Compiler des données de base concernant les méthodes de traitement et les résultats thérapeutiques que les membres du Collège chiropratique des sciences de sports (Canada) (CCSS(C)) cherchent à mettre en pratique au moment de traiter les athlètes.*

Processus : *Sondage transversal d'auto-évaluation par la poste des membres du (CCSS(C)).*

Participants : *Membres actuels du (CCSS(C)), selon le Collège au moment de l'envoi du sondage.*

Résultats : *La majorité des membres interrogés croient être en mesure d'améliorer de façon directe et particulière le rendement d'un athlète. L'intervention thérapeutique la plus couramment utilisée était la manipulation/mobilisation vertébrale. Les résultats espérés suite au traitement destiné à améliorer le rendement des athlètes étaient de « modifier ou améliorer la mécanique corporelle aberrante », « restituer ou améliorer la fonction musculaire aberrante », et « améliorer la fonction des articulations ou réduire la dysfonction des articulations ».*

Conclusion : *La majorité des répondants du CCSS(C) croient que leur thérapie permet d'améliorer le rendement d'un athlète.*

(JCCA 2010; 54(4):282-292)

MOTS CLÉS : sciences de sports, membres, performance, manipulation

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Disclaimer: This original research was approved by the Canadian Memorial Chiropractic College Research Ethics Board. Funding for this project was provided by the Canadian Memorial Chiropractic College. The authors have no commercial associations that might pose a conflict of interest in connection with the submitted article.

Introduction

It is not uncommon when reviewing chiropractic literature to come across information identifying improvement or enhancement of athletic performance through chiropractic treatment.¹⁻⁹ Such references typically represent the opinion or personal observation of an individual chiropractor treating an individual athlete or group of athletes.¹⁻⁸ According to standards of evidence-based health care, it is imperative that claims of “athletic performance enhancement” by chiropractic treatment be substantiated or at the very least, clearly delineated.

To date, no investigations have been published in the peer reviewed literature to solidly support the idea that treatment provided by chiropractors can singularly enhance or improve an individual athlete’s sport performance.¹⁰ Attempts have been made, but such studies were of questionable methodology and resulted in dubious conclusions.⁹⁻¹⁵

A major difficulty inherent with the investigation of the effects of chiropractic treatment on athletic performance arises directly from the apparent confusion surrounding the definition of what constitutes a “chiropractic treatment.”¹⁰ There is very little information compiled to clearly express what interventions chiropractors utilize to potentially influence an athlete’s performance, what aspects of performance they may or may not be intending to affect, or if for the majority of chiropractors, “performance enhancement” is an intended outcome of treatment at all.¹⁰ Research on chiropractic and sports performance enhancement should perhaps begin by defining “how” rather than “that” chiropractors affect performance.

In Canada, fellows of the College of Chiropractic Sports Sciences, or FCCSS(C)’s, represent the expert standard for the chiropractic treatment of athletes.¹⁶ The College of Chiropractic Sports Sciences (Canada), or CCSS(C), is a recognized specialty college under the regulation of the Canadian Federation of Chiropractic Regulatory and Educational Accrediting Boards (CFCREAB), and is the governing and organizing body that coordinates the involvement of the chiropractic profession with amateur and professional athletic and sport organizations.¹⁶ The CCSS(C) “maintains and encourages the highest standards and morals of practice within sports chiropractic, and strives to standardize the chiropractic approach in the evaluation, treatment and rehabilitation of sports re-

lated conditions.”¹⁶ Even though fellows of the CCSS(C) equate to the expert standard, very little is known about this specialized subset of chiropractors in Canada. Do fellows of the CCSS(C) believe chiropractic treatment enhances athletic performance? Before designing quantitative studies in the attempt to prove that chiropractic treatment enhances athletic performance, the chiropractic profession needs to answer two basic questions. What are the intended outcomes when chiropractors treat athletes, and what interventions do they use to affect those outcomes? It was therefore the purpose of this study to compile such data from fellows of the College of Chiropractic Sports Sciences (Canada).

Methods

Study design

This research was approved by the Canadian Memorial Chiropractic College Research Ethics Board. The design consisted of a cross-sectional self-report mail out survey of registered CCSS(C) fellows. The questionnaire format was determined by the research team and following several content expert draft reviews the final questionnaire was produced. Eligible participants consisted of Canadian chiropractors who were active in practice and who were current registered fellows of the CCSS(C), as determined by the College of Chiropractic Sports Sciences (Canada) for the year 2006/2007. Permission was obtained from the CCSS(C) to include the research questionnaire in the CCSS(C) annual membership mail out. Fellows were given an introduction cover letter describing the investigations concept and purpose. No deception was used. Fellows voluntarily completing and anonymously returning the survey were considered to have provided passive consent to participate. Following conclusion of the study all completed surveys were destroyed.

Results

Response rate

Of the 54 sport fellows receiving the research questionnaire, 37 returned fully completed questionnaires. Thus, 68.5% of fellows who received the research questionnaire participated as respondents.

For the purposes of this investigation an athlete was defined as one who is trained to compete in sport or games

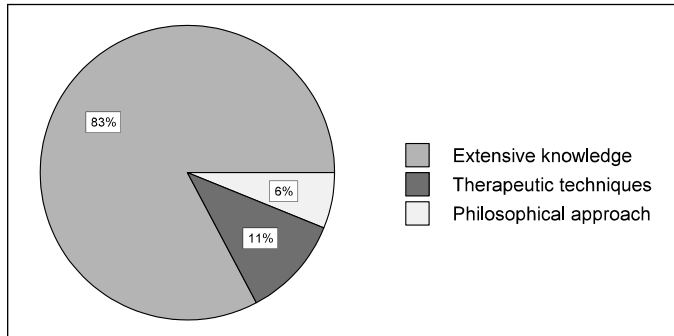


Figure 1 *Defining Features of Sports Specialist Chiropractors (n = 37)*

requiring physical strength, agility, or stamina. The sport specialists questioned for this investigation most commonly reported treating athletes on a daily basis (49%) to at least 2 to 6 athletes per week (41%). Only 5% of fellows reported that they treated athletes exclusively or alternatively, less than once a week, and none of the respondent fellows reported that they never treat athletes. When asked, “What percentage of your practice is composed of treating athletes?” the majority of fellows (60%) reported that a range of 0–25% of their practice was composed of treating athletes. As a group, the respondent fellows reported that they treat or have treated all levels of athletes; however the calibre of athlete that they treated was most commonly a recreational or “weekend warrior” level of athlete (55%). Twenty two percent of respondents stated that they most commonly treated high level amateur (provincial or national) or professional athletes.

All of the respondent fellows reported that they feel that inter-health professional relationships are important in the treatment of athletes, and all stated that they strive to practice evidence based care (EBC). All of the questioned fellows endeavour to keep up-to-date on current medical and chiropractic literature, and 95% subscribe to, or have access to peer reviewed sports medicine journals (online or hard copy). Figure 1 highlights the respondent’s opinion regarding the definition of sports specialist chiropractors. Seventy percent of questioned fellows felt that “a chiropractor must be a fellow of the CCSS(C) to be considered fully qualified to work with a professional sports team, or at a major sporting event;” whereas 22% “disagreed” and 8% were “unsure.”

Opinions regarding chiropractic care and athletes

Table 1 summarizes the respondents’ answers to questions on chiropractic care and athletes in general. One hundred percent of sports sciences fellows felt that “chiropractic care can be very effective for athletes with musculoskeletal type injuries,” and that “chiropractic care should always be included in the core medical team of major sporting events.” To the statement, “maintenance chiropractic care can reduce sport related injuries,” when “maintenance care” is defined as a pre-determined interval of spinal manipulative and/or adjunctive therapy for an asymptomatic or near asymptomatic patient,” 73% “agreed,” 3% “disagreed,” and 24% responded that they were “unsure.” Asymptomatic was defined as a patient having no overt symptoms/indications of a diagnosable disease, condition, or injury (i.e. apparently healthy).

Opinions regarding the treatment of athletes

When prompted with the statement, “I only treat athletes when they have a self-reported physical complaint (pain and/or dysfunction) or injury,” only 24% stated “yes” or that they “agreed,” but 76% stated “no” or that they “disagreed.” Likewise, 30% “agreed” to the statement “I only adjust athletes when they have a self-reported physical complaint (pain and/or dysfunction) or injury,” and 70% “disagreed.” Seventy three percent of fellows said that “yes” they do “treat asymptomatic athletes with the specific goal of enhancing sport performance,” and 27% said that “no” they do not. Additionally, 97% of respondent fellows felt that “by utilizing specific treatment techniques they could affect specific treatment outcomes that may *indirectly* enhance athletic performance”; whereas 76% felt that “by utilizing specific treatment techniques they could cause *direct and specific* improvements in an athlete’s sports performance.” In relation to the above statements, 84% of respondents stated that they “have witnessed an apparently asymptomatic athlete experience performance enhancement immediately after spinal manipulative therapy (SMT) and/or adjunctive therapy.”

Opinions regarding what constitutes a chiropractic treatment

The opinions of respondent fellows on what they consider to be an acceptable component of a chiropractic treatment is summarized in Table 2. Of the 37 respondent fellows, 95% felt that “chiropractic treatment involves more than

Table 1 *Opinions Regarding Chiropractic Care and Athletes (n = 37)*

Statement	Agreed	Disagreed	Unsure
Chiropractic care is important for all athletes	81%	8%	11%
Maintenance chiropractic care can reduce sport related injuries	73%	3%	24%
Chiropractic consultation when athlete's performance is suffering	81%	3%	13%

Table 2 *Opinions Regarding What Constitutes a Chiropractic Treatment (n = 37)*

Question	Response Option	Frequency Count (%)
Which of the following do you consider an acceptable component of a chiropractic treatment? Mark all that apply.	Spinal joint manipulation / mobilization	37 (100)
	Extremity joint manipulation / mobilization	37 (100)
	Specific soft tissue therapy	37 (100)
	Acupuncture	22 (59)
	Nutritional advice or prescription	33 (89)
	Exercise prescription (general health improvement)	36 (97)
	Rehab prescription (injury recovery)	36 (97)
	Physical modalities (Ultrasound, IFC, etc.)	32 (86)
	Sport specific training advice (exercise designed to enhance sport performance)	32 (86)
	Lifestyle counselling	36 (97)
	Additional care, health professional referral	37 (100)

a chiropractic adjustment"; therefore 5% felt that a chiropractic treatment only involves a chiropractic adjustment.

It was hypothesized that a large number of respondents would consider "soft tissue therapy" to be an acceptable component of a chiropractic treatment. Consequently, fellows were asked to comment on which, if any, of the popular named or specific protocol soft tissue or myoneural treatment techniques they were certified to utilize. One hundred percent of the respondent fellows considered "specific soft tissue therapy" to be an acceptable component of a chiropractic treatment (Table 2) and of the named or specific protocol soft tissue or myoneural treatment techniques, Active Release Tech-

niques® (ART®) and acupuncture were the most popular as depicted in Figure 2.

Interventions utilized to affect athletic performance (directly or indirectly)

Table 3 and Table 4 summarize the respondents' answers to questions on the treatment interventions utilized when treating athletes for the (direct or indirect) goal of affecting performance. The most popular intervention utilized to affect performance was spinal joint manipulation/mobilization (92%) followed closely by extremity joint manipulation/mobilization (89%). These two interventions were also perceived to be the most effective for affecting

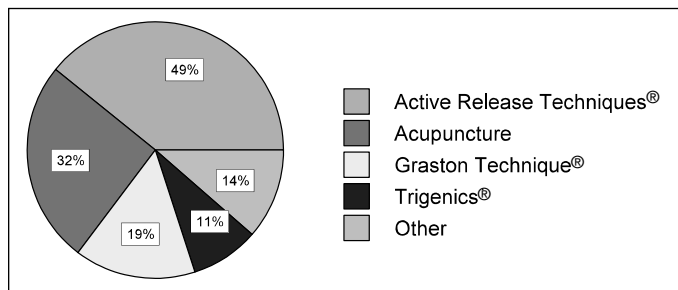


Figure 2 Utilization of Named Soft Tissue Treatment Techniques (n = 37)

athlete sport and performance (directly or indirectly) see Table 4.

Anticipated treatment outcomes

Table 5 summarizes the opinions of sport fellows in regards to their intended/anticipated outcomes following the treatment of athletes with the (direct or indirect) goal of affecting performance. For the purposes of the questionnaire, the term subluxation was defined as a complex of functional and/or structural and/or pathological articular changes that compromise neural integrity and may influence organ system function and general health.

The sports fellows were also asked to comment on what they utilized to evaluate their intended treatment outcomes. The results indicated that they all typically use a variety of methods to assess treatment outcomes as shown in Table 6.

Discussion

This study sought to gain insights into the intervention practices and therapeutic outcomes fellows of the College of Chiropractic Sports Sciences (Canada) strive for when treating athletes. Pursuant to this objective, approximately 68.5% of the contacted registered fellows of the CCSS(C) provided their thoughts and opinions on the chiropractic treatment of athletes. As such, it can be reasonably stated that the results of this qualitative investigation accurately reflect the collective opinions of the respondent chiropractic sports specialists in Canada.

The consensus (81%) in regards to chiropractic care and athletes was that chiropractic care is important for all athletes. There was complete agreement (100%) that chiropractic is very effective for athletes with musculo-

skeletal type injuries and that chiropractic care should always be included in the core medical team at major sporting events. Of interest, is the fact that the majority of respondent fellows stated that maintenance chiropractic care can reduce sport related injuries (73% agreement) and that a chiropractor should be consulted if an uninjured (apparently healthy) athlete's physical performance is suffering (81% agreement). The perspective that a chiropractor can facilitate an athlete's performance by the early determination and prompt treatment of injury, and by working with coaches and other sport health professionals to identify and correct an athlete's performance deficits when present is not new.^{17,18} Kelsick (2004) offers the example of a pre-participation examination, and comments that "by correcting the deficiencies discovered in the examination, athletic performance can be improved and the frustration level (of an athlete) decreased when the etiology of poor performance is unclear."¹⁷ This view of detecting and correcting impediments to performance is also offered in comments from Nook and Nook (1997), who state that in their opinion "the basis and definition of chiropractic emphasizes the correction of pathomechanics of the spinal and extremity joints restoring normal neurology and biomechanics."⁸ They comment further that "restoration of these pathomechanical faults in an athlete will reduce pain, decrease the severity of injury, and possibly enhance athletic performance."⁸ Although several studies have sought to prove the performance enhancing effects of chiropractic treatment, the evidence to date would be considered inconclusive at best.⁹⁻¹⁵

The two most recent studies dealing directly with the concept of chiropractic treatment and the enhancement of sport performance are by Shrier et al., (2006) and Costa et al., (2009).^{14,15} Shrier et al., (2006) utilized a crossover study design with 19 elite sprint sport athletes to compare changes in jump height and running velocity with and without pre-event high-velocity, low-amplitude (HVLA) manipulations applied as indicated from the thoracolumbar region to the mid-tarsal region.¹⁴ Results indicated a decrease in jump height for both the control and HVLA interventions, with qualitatively less decrease after manipulation, and sprint times improved with manipulation and worsened with the control, however the results were not statistically significant.¹⁴ Costa et al., (2009) investigated the effect of spinal manipulative therapy with stretching compared to stretching alone on full-swing per-

Table 3 *Opinions Regarding the Treatment Interventions Utilized to Affect Performance (n = 37)*

Question	Response Option	Frequency Count (%)
When treating athletes with the (direct or indirect) goal of affecting performance, what treatment interventions would you potentially utilize? Mark all that apply.	None. I do not treat athletes with the intent to specifically affect performance.	3 (8)
	Spinal joint manipulation / mobilization	34 (92)
	Extremity joint manipulation / mobilization	33 (89)
	Manual soft tissue therapy (myofascial release, trigger point, cross friction, etc.)	31 (84)
	Active Release Techniques®	20 (54)
	Trigenics®	4 (11)
	Graston Technique®	7 (19)
	Acupuncture	12 (32)
	Nutritional advice or prescription	24 (65)
	Exercise prescription	32 (86)
	Rehab prescription	30 (81)
	Physical modalities (Ultrasound, IFC, etc.)	27 (73)
	Sport specific training advice	32 (86)
	Lifestyle counselling	26 (70)
Additional care, health professional referral	26 (70)	

formance in golfers.¹⁵ An improvement in full swing performance for the SMT group was observed however not for the non-SMT group.¹⁵ Costa et al., (2009) concluded that “SMT in association with muscle stretching seems to be associated with an improvement in golf players’ full-swing performance when compared to muscle stretching alone.”^{15(p.169)}

It seems that the majority (76%) of questioned sports fellows do in fact believe that by utilizing specific treatment techniques they can cause direct and specific improvements in an athlete’s sport performance. This suggests that a majority of Canadian sport injury specialists believe that by performing some form of specific treatment on an athlete, they can cause an immediate improvement in that athlete’s level of sport performance. In fact, 73% of questioned fellows stated that they treat asymptomatic athletes with the specific goal of enhancing sport performance, and that many of the respondent fellows treat and adjust athletes without a self-reported physical complaint (pain and/or dysfunction) or injury. A

good example of this premise lies within the previously mentioned work by Costa et al., (2009).¹⁵

There was almost complete agreement (97%) that by utilizing specific treatment techniques chiropractors could affect treatment outcomes that may indirectly enhance athletic performance. This suggests that most sports specialist chiropractors believe that they can perhaps affect performance indirectly by striving for specific treatment outcomes which may include (as this study has identified); changing or improving aberrant body mechanics, restoring or improving aberrant muscle function, and improving joint function or reducing joint dysfunction. In addition to this, 84% of the respondent fellows stated that they had witnessed an apparently asymptomatic athlete experience performance enhancement immediately after spinal manipulative therapy and/or an adjunctive chiropractic therapy.

In terms of specific treatment interventions utilized by sports fellows to affect athlete sport performance either directly or indirectly, the results of this study indicate that

Table 4 Opinions Regarding the Perceived Effectiveness of Treatment Interventions Utilized to Affect Performance (n = 29*)

Question	Response Option	Ranking 1 to 3 Frequency Count (%)		
		#1	#2	#3
When treating athletes with the (direct or indirect) goal of affecting performance, what 3 treatment interventions do you most commonly utilize? Rate each of your 3 responses from 1 to 3 in terms of their perceived effectiveness. 1 = Most effective 2 = Second most effective 3 = Third most effective	I do not treat athletes with the intent to specifically affect performance.	3 (10)	0 (0)	0 (0)
	Spinal joint manipulation / mobilization	15 (52)	7 (24)	2 (7)
	Extremity joint manipulation / mobilization	2 (7)	5 (17)	5 (17)
	Manual soft tissue therapy (myofascial release, trigger point, cross friction, etc.)	1 (3)	6 (21)	4 (14)
	Active Release Techniques®	5 (17)	3 (10)	4 (14)
	Trigenics®	1 (3)	1 (3)	1 (3)
	Graston Technique®	0 (0)	0 (0)	0 (0)
	Acupuncture	0 (0)	0 (0)	1 (3)
	Nutritional advice or prescription	0 (0)	0 (0)	0 (0)
	Exercise prescription	1 (3)	2 (7)	7 (24)
	Rehab prescription	1 (3)	0 (0)	1 (3)
	Physical modalities (Ultrasound, IFC, etc.)	0 (0)	1 (3)	2 (7)
	Sport specific training advice	0 (0)	0 (0)	1 (3)
	Lifestyle counselling	0 (0)	0 (0)	0 (0)
Additional care, health professional referral	0 (0)	0 (0)	0 (0)	

* Note: Eight respondents of the 37 returned questionnaires did not respond to the question according to instructions. Therefore percentage calculations represent n = 29.

the most commonly utilized interventions are spinal joint manipulation/mobilization (92% utilization), followed closely by extremity joint manipulation/mobilization (89% utilization), exercise prescription (86% utilization), sport specific training advice (86% utilization), manual soft tissue therapies (non-specified) (84% utilization), and rehab prescription (81% utilization). Questioned fellows perceived that spinal joint manipulation/mobilization was the most effective (52% selected) intervention to produce an effect on athlete sport performance. However, they also considered spinal joint manipulation/mobilization to be the second most effective intervention (24% selected), meaning that some of the respondent fel-

lows selected one of the other intervention options as the most effective intervention. When this occurred, Active Release Techniques® or ART® was chosen as the second most selected preference for the number one most effective intervention to affect athlete sport performance. The third most effective intervention to affect sport performance was considered to be exercise prescription (24% selected). The most common specific interventions selected by the respondent fellows as never or hardly ever utilized to affect sport performance were Trigenics® (69% selected), Graston Technique® (69% selected), and acupuncture (58% selected). However, just as the opinions regarding the perceived most effective interventions

Table 5 *Opinions Regarding Anticipated Treatment Outcomes (n = 37)*

Treatment Outcomes	Popularity
Changing or improving aberrant body mechanics	89%
Restoring or improving aberrant muscle function	89%
Improving joint function or reducing joint dysfunction	89%
Restoring an injured tissue or area efficiently and effectively	84%
Improving spinal health and neural function	59%
Removing Subluxations	49%

Table 6 *Outcome Measures Utilized to Evaluate Intended Treatment Outcomes (n = 37)*

Outcome Measures	Frequency Count (%)
Observation	36 (97)
Soft tissue palpation	32 (86)
Range of motion	34 (92)
Muscle testing	32 (86)
Diagnostic testing (neurological exam, orthopaedic tests, imaging, etc.)	28 (76)
Subjective improvement	31 (84)
Pain scale	24 (65)
Before / after comparison	27 (73)
Site specific function/pain scale/questionnaire (i.e. NDI, ODI, Shoulder disability index, etc.)	23 (62)
Other*	7 (19)

* Other Methods Offered: Competition outcomes (i.e. higher, stronger, faster, etc.), Performance Indicators (i.e. time, distance, skill performance, etc.), Motion palpation, Surface EMG and thermography

should not be interpreted as proof of their clinical efficacy, the opinions regarding never or hardly ever utilized interventions should not be interpreted as an indication

of their lack of efficacy. Indeed, Trigenics[®] and Graston Technique[®] are the two least utilized named or specific protocol soft tissue/myoneural treatment techniques used by sports fellows. It is possible that their lack of use to affect performance may simply be a reflection of their less common utilization in general or limited exposure to practicing sports fellows. On the other hand, the high utilization and perceived effectiveness of ART[®] in the treatment of athletes with the goal of affecting performance is common place for fellows of CCSS(C). Interestingly, and as with most techniques, research on the effectiveness of ART[®] for enhancing sport performance remains untested.

When fellows of the CCSS(C) treat athletes with the goal of affecting sport performance, they most commonly anticipate that their specific treatment interventions (likely those described above) will produce a “change in or an improvement in aberrant body mechanics” (53% selected), or a “restoration or improvement in aberrant muscle function” (53% selected); which may include the removal of adhesions, the removal of scar tissue, and/or the facilitation of relative movement between muscles or muscle groups. Alternatively they may be anticipating the ‘improvement of joint function’ or conversely the “reduction of joint dysfunction” (53% selected). Other outcomes that CCSS(C) fellows commonly anticipate included; “restoring an injured tissue or area efficiently and effectively” and “restoring or improving aberrant muscle firing patterns,” which included the improvement of neural muscular control and the reduction/removal of neural inhibition. The least commonly anticipated chiropractic treatment outcomes when treating athletes with the goal of affecting sport performance were “removing subluxations” (6% selected), “improving spinal health and neural function” (3% selected), and “reducing the risk of injury” (3% selected). Perhaps the reason that “removing subluxations” and “improving spinal health and neural function” are not the more popular intended outcomes of chiropractic treatment is a reflection of the movement away from the traditional subluxation model of chiropractic and the movement towards an evidence based health care model. The evidence based model of chiropractic is the model that is currently being taught in Canadian chiropractic educational institutions.¹⁹ It is interesting to note that all of the above mentioned chiropractic treatment outcomes, and others, have been investigated and/or discussed with-

in the chiropractic literature.²⁰⁻⁵⁰ However, discussion of the evidence behind each of these anticipated treatment outcomes is beyond the scope of this paper.

Limitations

Despite the fact that the study successfully contacted 68.5% of the currently registered fellows of the CCSS(C) for the year 2006/2007, it is possible that it may have failed to accurately capture the collective opinions of chiropractic sport injury specialists in Canada. The 31.5% of fellows either not contacted, or who opted not to participate in the study, may have possessed significantly different opinions than those captured in this investigation. However, we hypothesize that this is unlikely. Canadian sports fellows are required to complete very specific education and training requirements, and homogeneous training most typically leads to homogenous behaviours and attitudes.¹⁶

In addition, the length of time necessary to properly respond to our questionnaire may have been a factor which limited our response rate.

Recommendations

Clearly, more research on chiropractic treatment and sport performance enhancement is required. This inventory of the opinions of fellows of the College of Chiropractic Sports Sciences (Canada) on the intended outcomes when chiropractors treat athletes, and what interventions they utilize to affect those outcomes, can be used as a starting point for focusing further research in this area, including: 1) Quantifying the dosage of treatment interventions to affect performance; 2) Quantifying the efficacy of the proposed treatment interventions to affect athlete performance; 3) Determine the relationship of anticipated treatment outcomes to sport performance enhancement; and, 4) Develop quality performance diagnostics and tests of performance that correlate with the anticipated outcomes of the chiropractic treatment of athletes. Müller et al. (2000) supports this view by commenting that the quality of performance intervention research depends on the quality of the “performance diagnostics” or tests of performance.⁵² In other words, before analysis of performance is undertaken, “performance indicators” or “performance parameters” need to be determined and defined, and then diagnostic tests of performance must be developed and validated.^{51,52}

Conclusion

It seems that the majority of respondent sports fellows do in fact believe that by utilizing specific treatment techniques they can cause direct and specific improvements in an athlete’s sport performance. In fact, 73% of questioned fellows stated that they treat asymptomatic athletes with the specific goal of enhancing sport performance. According to Canadian chiropractic sports specialists, a “chiropractic treatment” would appropriately consist of some combination of spinal or extremity joint manipulation/mobilization, specific soft tissue therapy, exercise/rehabilitation/sport specific training prescription, and when necessary, a referral to an additional health professional. Questioned fellows perceived that spinal joint manipulation/mobilization was the most effective intervention to produce an affect on athlete sport performance. The most anticipated outcomes following the specific treatment of athletes with the goal of affecting athletic performance were “changing or improving aberrant body mechanics,” “restoring or improving aberrant muscle function,” and “improving joint function or reducing joint dysfunction.” It is recognized that the above findings do not represent proof of chiropractic treatment improving athlete sport performance; they only represent the consensus opinion of the respondent fellows of the College of Chiropractic Sports Sciences (Canada).

Acknowledgements

The authors would like to thank Dr. Jairus Quesnele for his help in preparing this paper for publication, and Dr. Brian Gieberzon and Christine Miners for editing the manuscript.

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