

Sports chiropractors in Australia: a cross-sectional survey

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Background: *Whilst half of all Australian chiropractors report often treating athletes, there is insufficient evidence to characterise the sports chiropractor in Australia.*

Objective: *To perform a workforce survey of Sports Chiropractic Australia (SCA) members.*

Methods: *A 74-item web-based questionnaire collected information about practitioner and practice characteristics. Descriptive statistics summarised practitioner and patient characteristics, caseload and management approaches.*

Results: *SCA members were predominantly male (74%) with 11.3 (± 8.4) years of clinical experience. Amateur or semi-professional sportspeople comprised 67% of SCA members' caseload. Athletes were most likely to present with a lower limb musculoskeletal condition (44%), followed by low back pain (34%). Nearly half (43%) of musculoskeletal conditions were*

Contexte : *Bien que la moitié des chiropraticiens australiens affirment soigner souvent des athlètes, on ne dispose pas de données suffisantes pour caractériser les chiropraticiens du sport australiens.*

Objectif : *Mener une enquête sur l'effectif auprès des membres de la Sports Chiropractic Australia (SCA).*

Méthodologie : *Un questionnaire en ligne comprenant 74 questions a servi à recueillir des données sur les caractéristiques du praticien et de sa clientèle. Des données statistiques descriptives ont résumé les caractéristiques du praticien et celles du patient, le nombre de cas et les méthodes thérapeutiques.*

Résultats : *Les membres de la SCA étaient majoritairement des hommes (74 %) possédant 11,3 ($\pm 8,4$) années d'expérience en clinique. Les sportifs amateurs et les sportifs semi-professionnels constituaient 67 % des membres de la SCA. Les athlètes présentaient le plus souvent un trouble musculosquelettique à un membre inférieur (44 %) et des lombalgies*

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co-managed with another healthcare practitioner.

Conclusions: SCA members provided care for people of all sporting abilities, ranging from recreational to elite athletes, but most typically at the non-elite level. SCA members almost exclusively treat musculoskeletal conditions and apply various modalities in the management of athletes and sportspeople.

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KEY WORDS : chiropractic, cross-sectional survey, exercise, sports chiropractic, Sports Chiropractic Australia, sports medicine, survey

Introduction

Sporting injuries are a common cause of disability for individuals and create a substantial health burden in the community.¹ In Australia, an annual estimate of 1.65-2 billion dollars is spent on sports-related injuries, to which over 30,000 people sought hospital treatment in Victoria alone.¹⁻³ Sporting injuries are treated by a variety of healthcare practitioners including physiotherapists, chiropractors, sports physicians, osteopaths, exercise physiologists, massage therapists and sports trainers.⁴ A survey of the chiropractic profession found 49.5% of Australian Chiropractors report often treating athletes, which potentially represents a large proportion of a chiropractor's clinical workload.⁴

In Canada, more than a quarter of chiropractors manage sporting injuries as a focal point of clinical practice.⁵ Canadian chiropractors that treat sporting injuries incorporate rehabilitation and report a high number of referrals from medical doctors.⁵ Elsewhere, chiropractic care for athletes has been documented in various sporting events using injury surveillance study designs.⁶ However, there is insufficient research to generally characterise chiropractors who focus their interest on athletes or sportspeople.^{6,7}

In the United States of America (USA) and Canada, sports chiropractic has been granted a sports specialisation stature via the American Chiropractic Board of Sports Physicians (ACBSP) and the Royal College of Chiroprac-

(34 %). Presque la moitié (43 %) des troubles musculosquelettiques étaient aussi traités par un autre professionnel de la santé.

Conclusions : Les membres de la SCA traitent des gens ayant toutes sortes de capacités sportives, à partir de sportifs amateurs jusqu'à des athlètes d'élite, mais le plus souvent à des sportifs de niveau non compétitif. Les membres de la SCA traitent presque exclusivement des troubles musculosquelettiques et utilisent diverses modalités en traitant des athlètes et des sportifs.

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MOTS CLÉS : chiropratique, enquête transversale, exercice physique, Sports Chiropractic Australia, médecine sportive, enquête

tic Sports Sciences (Canada) (RCCSS (C))⁸, establishing a minimum standard for sports specialist chiropractors in USA and Canada^{9,10}. Chiropractors in Australia who have a particular interest in treating sports people can undertake further education in post-graduate courses through the International Federation of Sports Chiropractic (FICS).¹¹ In Australia, Sports Chiropractic is a rapidly growing semi-formalised (not recognised by the regulator) branch of chiropractic for clinicians with an interest and expertise in treating athletes. The national special interest group, Sports Chiropractic Australia (SCA), reports that sports chiropractors commonly focus on the conservative management, rehabilitation and optimization of the neuro-musculoskeletal system of athletes in clinical practice.¹¹ Despite having training pathways (FICS qualification) and an organised national group (SCA), Australian chiropractors are yet to establish clinical practice standards, a code of practice, or gain regulatory body recognition (formalised specialisation) for sports chiropractic.⁸ Additionally, there is insufficient research evidence that characterises the work of sports chiropractors in Australia.

Workforce studies aim to ensure that an industry has a supply of people with the appropriate skills, knowledge, and experience to meet the needs of the community. While several chiropractic workforce studies exist^{4,12}, there is limited research in the field of sports chiropractic.

Knowledge gaps exist in the literature around the utilisation of sports chiropractic and the outcomes of chiropractic treatment for athletes. This area is broad and includes a lack of understanding in the chiropractic management and prevention of sporting injuries, and the optimisation of sports performance for athletes. As a result, there is insufficient evidence to differentiate chiropractic care for the athlete specifically, which results in sports chiropractors currently lacking recognition and acceptance within the traditional sports medicine team.^{4,8}

The survey's specific objectives are to describe the characteristics of sports chiropractors in Australia and to summarise the cases that present for care. In response to the research gaps, this project aims to perform a workforce survey of SCA members. Defining the profile (highlighting key roles and qualities) of sports chiropractors will raise awareness of sports chiropractors and help gain professional recognition in Australia.^{13,14}

Methods

Ethical approval was granted from the Faculty of Science and Engineering Human Research Ethics Sub-Committee at Macquarie University on the 6th of July 2018 (Reference number: 5201800441).

Design and setting

We conducted a cross-sectional study of SCA members between the dates of the 20/08/2018 until the 24/09/2018. SCA members were invited, via two emails to participate in the study. The workforce survey was administered using an online survey formatted in Qualtrics software. This research consulted with national board members from SCA and the Australia Chiropractors Association as stakeholders, with permission granted to contact all active members through the SCA membership base.

Recruitment and sample

All eligible participants were current financial members of SCA and chiropractors currently registered with the Australian Health Practitioner Regulation Agency (AHPRA). Participants were excluded from the study if they were not SCA members, student members of SCA or if they were a financial member of SCA but not in clinical practice. The study sourced subjects through the SCA membership email database.

Workforce survey

The current study reports on 24 items relating to practitioner and patient characteristics including practitioner demographics (8 items), clinical work (5 items) and field-work (4 items) and their patients' athletic level (1 item) as well as most recent case characteristics (6 items). Remaining items on sports chiropractors' 'typical approach to care' and 'professional identity' will be presented in a future analysis. Five sports chiropractors with over 15 years of clinical experience levels piloted the workforce study, all of whom fit into the study's inclusion criteria. These five chiropractors affirmed the survey's face validity, but content validity was not assessed. A small number of corrections were made focusing on the duration of the survey, the wording of specific questions, and the overall number of questions. The final workforce survey had three sections and a total of 74 questions. The first four items of the survey obtained participant registration information for eligibility along with an online informed consent response. Section 1 asked about demographic characteristics of sports chiropractors such as age, sex, location of practice (state, regional, remote, rural), education/qualification/s, the population of athletes treated, co-management with other health professionals/referral (sending and/or receiving referrals and co-management), diagnostic imaging and community/volunteer work. Section 2 asked surface-level questions about case presentations (patient demographics, sporting history and common chief complaints/regions treated). Section 3 specifically asked about the last athlete the sports chiropractor treated (provisional diagnosis list, triage category, patient demographics, primary sport, level of athlete, treatment duration, examination procedure, preferred imaging, whether the patient required General Practitioner (GP) or specialist referral, passive and active (rehabilitation) care modalities and take-home advice). We have included a copy of our Sports Chiropractors Workforce Survey as supplementary material (Supplementary File 1).

Statistical methods

Data were initially collated, cleaned and inspected. Descriptive analyses for each item were reported as frequency distributions (counts and proportions) or summary statistics (means and standard deviations). All statistical analyses were conducted using The Statistical Package

for Social Sciences software (IBM SPSS Statistics for Windows, release 22.0. Armonk, NY: IBM Corp).

Results

A total of 73 participants, out of 213 eligible SCA members completed the survey (34% response rate and a 16% attrition rate), taking approximately 40 minutes on average. Characteristics of the sample of SCA members who completed the workforce survey are shown in Table 1.

Table 1.

Sociodemographic characteristics of Sports Chiropractic Australia members who completed the workforce survey.

ACT= Australian Capital Territory, NSW= New South Wales, NT = Northern Territory, QLD = Queensland, RMIT/PIT= Royal Melbourne Institute of Technology, SA= South Australia, TAS = Tasmania, VIC= Victoria, WA = Western Australia.

Sociodemographic characteristics	(n=73)
Age in years (mean \pm sd)	35.9 \pm 9.0
Gender (n (%))	
Male	54 (74%)
Female	19 (26%)
Clinical experience in years (mean \pm sd)	11.3 \pm 8.4
Location (n (%))	(n=73)
NSW	25 (34.2%)
VIC	22 (30.1%)
QLD	10 (13.7%)
WA	3 (4.1%)
SA	7 (9.6%)
TAS	2 (2.7%)
NT	1 (1.4%)
ACT	3 (4.1%)
Qualification (n (%))	(n=73)
Bachelors (or Double Bachelor's) degree	16 (22.2%)
Masters degree	53 (73.6%)
Doctoral degree	1 (1.4%)
Post-graduate Honours, certificate, diploma, degree	2 (2.8%)
Institution (n (%))	(n=73)
Macquarie University/ Sydney College of Chiropractic	35 (51.5%)
RMIT/PIT	26 (38.2%)
Murdoch University	7 (10.3%)
Qualification within Australia (n (%))	(n=73)
Yes	69 (94.5%)
No	4 (5.5%)

The average age of the participants was 35.9 \pm 9.0 years of age. A total of 54 (74%) participants were male, and most sports chiropractors practised in New South Wales (34.2%). The average years of clinical experience were 11.3 \pm 8.4 years. Over two-thirds of participants had a Masters level qualification and more than half (51.5%) graduated from Macquarie University in New South Wales, Australia.

With regards to post-graduate courses (Table 2), more

Table 2.

Post-graduate courses undertaken by Sports Chiropractic Australia members. ASCA= Australian Strength and Conditioning Association, ICCSP= The International Certified Chiropractic Sport Science Practitioner

Post-graduate course (n (%))	(n=73)
ICCSP Program	40 (54.8%)
Acupuncture / Dry needling course	44 (60.3%)
Rocktape/Kinesio Taping course	44 (60.3%)
Sports Medicine Australia sports trainer levels	34 (46.6%)
ASCA Strength and Conditioning course	23 (31.5%)
Selective Functional Movement Assessment	22 (30.1%)
Functional Movement Screen	17 (23.3%)
Functional Neuro-Orthopaedic Rehabilitation	13 (17.8%)
Functional and Kinetic Treatment with Rehabilitation course	12 (16.4%)
Dynamic Neuromuscular Stabilisation	10 (13.7%)
Functional Capacity Screen	2 (2.7%)

Table 3. *Clinical characteristics of Sports Chiropractic Australia members.*

Clinical characteristic	(n=73)
Patient care hours per week (mean \pm sd (n))	30.8 \pm 11.1 (72)
Patient visits per week (mean \pm sd (n))	78.9 \pm 44.3 (70)
Practice alongside other health professionals within the same practice location (n(%))	62 (86.1%) (72)
Types of practitioners working with within practice (n(%))	(n=73)
General Practitioner	4 (5.5%)
Medical Specialist	6 (8.2%)
Exercise Physiologist	13 (17.8%)
Psychologist/Counsellor	15 (20.5%)
Podiatrist	16 (21.9%)
Physiotherapist	20 (27.4%)
Another Chiropractor	27 (60.3%)
Massage Therapist	44 (60.3%)
Other	44 (37.0%)

than half of the study group (54.8%) completed the Internationally Certified Chiropractic Sports Practitioner (ICCSP) program through FICS. SCA members undertook a wide range of certifications, notably almost two thirds (60.3%) had a completed acupuncture/dry needling or a Rocktape/Kinesio Taping certification. The least common post-graduate courses reported were Functional and Kinetic Treatment with rehab (16.4%), Dynamic Neuromuscular Stabilisation (13.7%) and Functional Capacity

Screen (2.7%). Clinical and fieldwork characteristics of SCA members are shown in Tables 3 and 4, respectively. SCA members worked 30.8 ± 11.1 patient care hours per week and had, on average, approximately 79 patient visits. A total of 62 (86.1%) sports chiropractors practised alongside another health care practitioner, with over 60% of these being a massage therapist or another chiropractor. Of SCA members, 5.5% worked alongside a GP, and approximately 8% worked with a medical specialist within their practice. SCA members spent an additional 3.8 ± 11.7 hours per week out of their chiropractic clinics, performing, on average, fieldwork to approximately 12 patients per week. In our study, half of Australian sports chiropractors travelled with athletes or sports teams (51%) and had provided sideline emergency care for athletes or sportspeople (54%). With regards to their role as a sports chiropractor over the last 12 months, 81% attended continuing professional development courses or conferences and 71% had volunteered at sports events in the last year. Over 57% had intra-professional relations (SCA); however, only 11% had inter-professional relations (i.e. a relationship with Sports Medicine Australia), and only 5% undertook higher degree research.

Table 5 reports the frequency of care for various athletes and sportspeople. Approximately 9% of SCA members often provide treatment to elite athletes, 32 % often treat semi-professional athletes, 69% often treat amateur athletes, and 88% often treat weekend warriors. The characteristics of the most recent case presentation are reported in Table 6. A total of 27 (44.3%) cases were patients aged 25-44 years, with the majority (70.5%) of patients being male. The level of sporting competitiveness of patients ranged from the weekend warrior to an elite athlete, most frequently amateur to semi-professional. The most frequent region of the complaint was a lower limb muscu-

Table 4.

Fieldwork characteristics of Sports Chiropractic Australia members.

Field Work characteristics	
Fieldwork hours per week (mean \pm sd (n))	3.8 ± 11.7 (34)
Fieldwork patient visits per week (mean \pm sd (n))	11.7 ± 7.9 (43)
Travel with sports teams/athletes (n (%) (n=43))	22 (51.2%) (43)
Emergency assessment of athletes (n (%) (n=43))	23 (53.5%) (43)
Self-reported role as a sports chiropractor in the last 12 months (n (%))	(n=73)
Private sports chiropractic Practice	67 (91.8%)
Professional development (attending courses or conferences)	59 (80.8%)
Sports Chiropractic volunteer work	52 (71.2%)
Intra-professional organisations i.e Sports Chiropractic Australia	42 (57.5%)
Inter-profesional organisations i.e Sports Medicine Australia	8 (11.0%)
Undergraduate student clinical supervision	19 (26.0%)
University teaching or tutoring	6 (8.2%)
Undertook higher research degree	4 (5.5%)

Table 5.

Frequency of care for different types of athletes/sportspeople by Sports Chiropractic Australia members in Australia (n=65).

Type of athlete/sports people (n(%))	Never	Rarely	Sometimes	Often
Weekend warrior	0 (0%)	1 (1.4%)	7 (10.8%)	57 (87.7%)
Amateur	0 (0%)	1 (1.4%)	19 (29.2%)	45 (69.2%)
Semi-professional	4 (6.2%)	11 (16.9%)	29 (44.6%)	21 (32.3%)
Elite	13 (20.3%)	24 (37.5)	21 (32.8%)	6 (9.4%)

Table 6.

A description of the most recent case presenting to Sports Chiropractic Australia members.

Most recent case characteristics	
Age of patient (n (%))	(n=61)
>6	0 (0)
7-12 years	2 (3.3%)
13-18 years	8 (13.1%)
19-24 years	16 (26.2%)
25-44 years	27 (44.3%)
45-65 years	8 (13.1%)
Gender (n (%))	
Male n (%)	43 (70.5%)
Female n (%)	18 (29.5%)
Level of sports participation (n (%))	
Weekend warrior	4 (6.7%)
Amateur	20 (33.3%)
Semi-professional	20 (33.3%)
Elite	16 (26.7%)
Region(s) of complaint (n (%))	
Neck pain axial	9 (12.3%)
Neck pain referred / radicular	2 (2.7%)
Thoracic pain	13 (17.8%)
Chest pain	1 (1.4%)
Low back pain – axial	25 (34.2%)
Low back pain – referred / radicular	7 (9.6%)
Lower limb musculoskeletal disorder (Hip, Knee, Ankle, Foot)	32 (43.8%)
Upper limb musculoskeletal disorder (Shoulder, elbow, wrist, hand)	21 (28.8%)
Postural disorders (lordosis, kyphosis, scoliosis)	2 (2.7%)
Headache disorders (cervicogenic, migraine, tension)	7 (9.6%)
Spinal health maintenance/management	12 (16.4%)
Non-musculoskeletal disorders	1 (1.4%)
Sporting/performance enhancement	18 (24.7%)
Co-management with another health practitioner (n (%))	
Yes	26 (42.6%)
No	35 (57.4%)
Modalities that were utilised for treatment (n (%))	
Soft-tissue, trigger point, massage	57 (78.1%)
Spinal manipulation/mobilisation	51 (69.9%)
Specific exercise therapy/rehabilitation	49 (67.1%)
Extremity manipulation/mobilisation	46 (63%)
Taping technique	23 (31.5%)
Dry needling/acupuncture	15 (20.5%)
Electro-modalities (Transcutaneous electrical nerve stimulation, laser, interferential, ultrasound, shock-wave)	10 (13.7%)
Heat/cryotherapy	10 (13.7%)
Orthotics (foot care)	2 (2.7%)

loskeletal disorder (43.8%), followed by axial low back pain (34.2%), and an upper limb musculoskeletal disorder (28.8%). A total of 26 of the 61 cases (42.6%) were co-managed with another allied health practitioner, while the majority of cases (57.4%) were managed by sports chiropractic care alone. The most common intervention modalities used inpatient care were soft-tissue, trigger point, and massage therapy (78.1%), spinal manipulation/mobilisation (69.9%), specific exercise therapy and rehabilitation (67.1%) and extremity manipulation/mobilisation (63%).

Discussion

This cross-sectional survey reports the practitioner and practice characteristics of SCA members, a special interest group of the Australian Chiropractor's Association. The predominant profile from the study sample of the Australian sports chiropractor was male, from New South Wales and had an average of 11 years of clinical experience. Just over half of the respondents had completed the Internationally Certified Chiropractic Sport Science Practitioner (ICCSPP) program with just less than half completing the Sports Medicine Australia sports trainer courses. Nearly all Australian sports chiropractors engaged with in post-tertiary educational courses such as dry needling and taping, which suggests they incorporate additional modalities in their clinical toolbox. Previous studies on sports chiropractic have found that chiropractors apply multi-modal treatments in their care of athletes⁸, and the findings in our study supported this. The most commonly used interventions in the treatment of athletes were soft-tissue therapy, spinal manipulation/mobilisation and specific exercise therapy/rehabilitation. Nearly half of SCA members co-managed their most recent patient (case) with another health professional, potentially reflecting the practice of Australian sports chiropractors to work in multidisciplinary primary care teams. Multidisciplinary care has long been supported as an integral pathway to the improvement of patient outcomes, particularly those that are complex.²

One in 10 Australian sports chiropractors self-reported often treating elite athletes, with a further one-third self-reporting sometimes treating elite athletes. This study suggests that elite athletes commonly sought treatment from SCA chiropractors, and that elite athletes are common in the sports chiropractic setting. Commen-

taries and anecdotal reports¹² have previously speculated chiropractic care to offering performance enhancement benefits to elite athletes. Given that Australian sports chiropractors report treating high-level athletes, the benefits and harms of care must be clearly understood. Future research is warranted, both quantitative (the effectiveness of chiropractic on sports performance, management and injury prevention) and qualitative (the theoretical frameworks of why elite athletes seek treatment by sports chiropractors). We do not know the context of the treatment of elite athletes in our study; that is, whether this is as part of, or external to, the provision of care from their sports medicine team. Importantly, future research must determine the acceptance of sports chiropractors into sports medicine teams and their delineated role from existing team members. Unfortunately, in Australia chiropractors are still lacking formal specialisation or further accreditation for a protected title “Sports Chiropractor”. A recent tiered institute of chiropractic education by the Australian Chiropractors Association promotes sports chiropractic specialisation, however, whether this provides integration into sports medicine is yet to be seen.

We found Australian sports chiropractors worked with sports and recreational teams on top of their usual clinical load. The majority of respondents volunteered professionally to provide care, with half of the respondents reporting travelling with sports teams/athletes in an official medical role. In addition to caring for sporting teams/athletes, Australian sports chiropractors provided emergency assessment of athletes, suggesting they often serve as the first point of contact for athletes. In amateur and community sport settings chiropractors appear to provide on-field sports injury triage with escalation to off-field injury management, as well as clinic-based care. The interest of sports medicine stakeholders is the role of sports chiropractors in the sports medicine team.

In an attempt to profile the clinical case management of Australian sports chiropractors, respondents were asked to retrospectively describe their most recent sports chiropractic case (that is the treatment of an athlete or sports person). These athletes sought care for both axial and peripheral musculoskeletal presentations, with the most cases being lower limb musculoskeletal disorders, axial low back pain and upper limb musculoskeletal disorders. A 2012 systematic review on manipulative therapy for lower limb extremity conditions found ‘fair’ (short-term)

and ‘limited’ (long-term) evidence of effectiveness for ankle inversion sprains, and fair (short-term) evidence of the effectiveness of manipulative therapy for plantar fasciitis.¹⁵ Similarly, fair evidence supports manipulative therapy for upper limb extremity conditions.¹⁶ In the current study, one-third of Australian sports chiropractic respondents reported providing treatment for sporting/performance enhancement in their most recent case; however, the research evidence to support this supposition (i.e. enhance sports performance through chiropractic care) is unknown. Australian sports chiropractors need to develop a research agenda to understand better the effects of care on extremity injuries, including outcomes beyond pain and disability, for example in the prevention of injury (prehabilitation), time to return-to-play after injury, and in enhancing sporting performance.

Several limitations need to be considered when interpreting the findings of this cross-sectional survey. One-third (73) of invited SCA members answered the survey, and after attrition of 16%, only 61 respondents completed all questions. The length and duration of the survey may have impacted the attrition rate, with the survey taking respondents an average of nearly 40 minutes to complete. The data collected is based on self-reporting and is therefore potentially susceptible to practitioner recall bias and possibly an over or under-estimation of the reported outcomes. User-defined missing values were treated as missing and all statistical methods were based on all cases with valid data, with denominators being reported in the Results tables. In this study, there was a higher proportion of male versus female sports chiropractors (74.3% to 25.7%), which is not representative of the general Australian chiropractic profession.^{4,17} It is unclear if our study sample is equal to the expected sex ratio among sports chiropractors. Our case audits were retrospectively captured, and future study should focus on collecting information about sports chiropractors’ practice characteristics prospectively, ideally via a practice-based research network. Using a consecutive-series design, where the base unit of measure is the patient encounter, would provide a more robust estimate for care-seeking and practise characteristics. In addition, this approach would ensure a more comprehensive assessment of sports chiropractic. A practice-based model could further be used to assess the treatment effects of care on patients in pre-post observational study designs in the future (i.e. effectiveness of care).

Conclusions

In our study, Australian sports chiropractors were more likely to be male, from NSW and have an average of 11 years of clinical experience. Approximately two-thirds of Australian sports chiropractors who responded to this survey indicated they treat athletes, which were generally comprised of non-elite levels. Respondents also work alongside another health care practitioner in a clinical setting, or a multidisciplinary team. This study had a low response rate, and further research is needed to clarify the findings. Our findings assist the chiropractic profession in delineating the role of sports chiropractors and the nature of the athlete population that seeks care.

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