CHIROPRACTIC AUSTRALIA

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SPINE HEALTH AND MUSCULOSKELETAL CARE EXPERTS

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Professor E. Wallace AM
Chief Executive Officer
Safer Care Victoria
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Dear Professor Wallace,

Chiropractic Australia thanks Safer Care Victoria for the opportunity to make this submission on the matter of chiropractic and paediatrics.

To assist the review panel we have refrained from making an excessively lengthy submission and have chosen to limit our referencing to higher quality and more recent references in favour of being unnecessarily exhaustive.

Yours sincerely,

Rod Bonello
President, Chiropractic Australia
Adjunct Associate Professor
Murdoch University

Preamble

Name of organisation
Chiropractic Australia

Membership criteria
Members must be chiropractors eligible for AHPRA registration. Applicants have their web page and other public electronic footprint screened for adherence and compliance with AHPRA and Chiropractic Australia regulations and policies. Student members are also accepted if they are registered as students with AHPRA.

Does this organisation represent practitioners who provide spinal care for children under 12 years of age?
Yes.

Outline of regulations or guidelines that are relevant to the provision of spinal care for children under 12.
Please see our relevant policies, most of which were published in 2015. An additional policy on Manual Therapy for Infants was published in March of this year -

Paediatric Care
https://chiropracticaustralia.org.au/wp-content/uploads/2019/03/Paediatric-Care-Policy.docx.pdf

Addendum on Manual Therapy for infants
https://chiropracticaustralia.org.au/wp-content/uploads/2019/03/Manual-Therapy-Care-For-Infants.pdf

Vaccination and Immunisation
https://chiropracticaustralia.org.au/wp-content/uploads/2019/03/Vaccination-Policy.docx.pdf

Evidence Based Practice (EBP)
https://chiropracticaustralia.org.au/wp-content/uploads/2019/03/EBP-Policy.docx.pdf

Inter-professional Practice
https://chiropracticaustralia.org.au/wp-content/uploads/2019/03/Interprofessional-Practice-Policy.docx.pdf

Has this organisation been made aware of any benefits or adverse effects relating to the provision of spinal care to children under 12?
Chiropractic Australia monitors a wide range of developments associated with the chiropractic profession locally and internationally. We are not aware of any serious adverse events to children and infants following chiropractic care in the recent past. Reports on benefits of chiropractic care to children and infants vary in quality of evidence from low to high. They show various levels of benefit from none to substantial. Our view is that the prime benefits from chiropractic care for patients of all ages relate to alleviation of pain and rehabilitation of the musculoskeletal system.

Why is this review important to your organisation and please provide evidence to justify?
As a membership organisation of almost 900 members we have a primary interest in this review. Many Chiropractic Australia members regularly provide care to infants and children. The submission below gives a detailed examination of the salient issues for our members and their patients.

1. Introduction to Chiropractic Australia and chiropractic

1.1 Chiropractic Australia is a not for profit professional association advocating evidence based treatment and inter-professional cooperation in order to foster community health through high quality, patient-focused care. Established in 2015, Chiropractic Australia has followed a reform agenda to improve chiropractic care quality and availability through education and advocacy. It is important to note that chiropractic is not a specific technique or intervention. Chiropractors are healthcare providers and like other registered health professionals, chiropractors use patient health information to make clinical decisions and deliver tailored care plans to patients. Chiropractors typically deliver multimodal treatments that may include a range of interventions, as well as referral to other healthcare providers. Chiropractors are trusted health providers in the Australian community and have long been a popular adjunct to medical and other care. Details on Chiropractic Australia and our policies, including our paediatrics policies, can be found at the following web address - https://chiropracticaustralia.org.au/

2. Outline of the problem

2.1 In February this year, a video depicting chiropractor Andrew Arnold treating an infant triggered a media furore. Although the baby was not harmed and there was no complaint from the parents, the video highlighted a number of concerns which were addressed by the regulatory Board and then taken up by the Victorian Health Minister and some of the public. In contrast, the community at large has shown an acceptance of chiropractic as a treatment option for children and infants. While chiropractor Andrew Arnold is under investigation by the Chiropractic Board of Australia, and his fate lies outside of the remit of the Safer Care Victoria review committee, we respectfully submit to this enquiry our perspective on the wider issues now under consideration by the committee.

3. Definition of terms

3.1 It is important to define terms used in relation to this matter to facilitate clarity in debate and decision-making.

3.2 Manual therapy
Manual therapy is treatment rendered by a clinician which primarily involves the application of force or pressure by the hands and/or may be instrument assisted. It ranges from light

massage to mobilisation and manipulation, to muscle and ligament stretching and physical rehabilitation intervention. In Australia, manual therapy is most commonly delivered by registered professionals such as chiropractors, osteopaths, physiotherapists and some medical practitioners, as well as non-registered therapists such as masseurs, sports therapists and naturopaths.

3.3 Chiropractic care

Chiropractic care is the range of treatments and support interventions provided by registered chiropractors. It follows an assessment of a patient which normally includes clinical history taking, physical examination, observations and sometimes incorporates the results of other investigations such as pathology, medical imaging or other assessment. Chiropractic care may be rendered independently without a referral from another practitioner, or may be delivered as part of an interprofessional strategy, where the chiropractor collaborates with other health practitioners in caring for the patient.

Chiropractic care includes, but is not limited to, the following interventions - counselling, massage, other soft tissue therapies, joint mobilisation, joint manipulation, musculoskeletal rehabilitation, wellness coaching, electrophysical therapeutics (such as ultrasound and shock wave therapy), exercise therapy, strapping and bracing, and postural training.

3.4 Joint Manipulation

The World Health Organisation defines joint manipulation as follows - “A manual procedure involving directed thrust to move a joint past the physiological range of motion, without exceeding the anatomical limit.” (WHO Guidelines on Basic Training and Safety in Chiropractic 2005 https://www.who.int/medicines/areas/traditional/Chiro-Guidelines.pdf). Joints of the spine as well as joints of the upper and lower limbs and the jaw can be treated with joint manipulation.

Joint manipulation involves a practitioner causing a passive movement of a skeletal joint, that is, the movement is unassisted by the patient. It differs to mobilisation in that the intention is to momentarily stretch the joint past its usual physiological range of motion. It is usually performed by the delivery of a rapid movement over a very short distance (also known as a high velocity, low amplitude thrust), and is generally comfortably tolerated by the patient. It often results in a momentary cracking noise occurring at the manipulated joint (cavitation) which is identical to the effect of ‘cracking’ one’s knuckles. Its use is intended to re-establish normal joint movement.

Spinal joint manipulation is the therapeutic tool often used by chiropractors in the care of adult patients. When suitably modified it can also be used in the care of children and adolescents but rarely used on infants. Joint manipulation is used by a range of registered health care practitioners in Australia including osteopaths, physiotherapists, manual medicine practitioners, and chiropractors.

3.5 Joint Mobilisation

Similar to joint manipulation, mobilisation involves providing passive movement treatment but keeping within the normal physiological range of motion of the joint. Typically it is delivered more slowly and is often applied with repetition. Although unsupported by literature, mobilisation is generally believed to be a potentially safer therapy. In the use of

manual therapy for children and infants, chiropractors strongly favour soft tissue procedures and joint mobilisation over manipulation [1-3].

4. Chiropractic and paediatric care

4.1 Managing paediatric cases

Manual therapy has an important place in the management of infants and children with musculoskeletal complaints. Manual therapy techniques must be modified to limit the amount of force used in the procedures due to the immaturity of the osseous and soft tissue elements of a child's bodily structures. Chiropractors are trained to take into consideration the biomechanical properties of tissue in their application of manual therapy interventions in infants and children; just as they are trained to make such modifications in the management of aged, more frail patients.

4.2 Best practice in paediatric care

Regarding best practice, Hawk 2016 et al. provided detail on aspects of education, general clinical principles, clinical history, and examination, which highlights when chiropractors should immediately refer young patients with emergency conditions [3]. In terms of best practice in manual therapy in infants and children, chiropractors must:

i) modify their manual therapy techniques and application of force relative to the age, size and stage of development of the child,
ii) accommodate the greater flexibility and lower muscle mass of children and use gentler and lighter forces, and
iii) only use techniques that support the needs and comfort of the child.

4.3 Therapy modification

Just as a medical practitioner will prescribe medication which is appropriate for a patient's age and weight, a chiropractor will modify manual therapy procedures to be age and patient size appropriate [2-4]. Age and size are continuous variables and patients do not reliably grow in well-defined, discrete steps. Therefore, any call to arbitrarily select a specific age or size or even weight to determine whether or not a particular therapy is appropriate is neither valid nor defensible. The development of the human anatomy from birth to 12 years of age represents and enormous range for the purposes of considering placing limitations to treatment. To be more precise regarding forces used in the application of manual therapy techniques chiropractic researchers have defined recommended maximum forces to be employed across different age groups within the paediatric population [2].

4.4 Quantifying manual therapy modifications

These age groups and grades of therapeutic input are as follows;

Grade 1: neonates and infants aged 0 to 2 months
(low force, low speed) up to 10% of estimated force for adults
(equivalent to 11.2 N)

Grade 2: infants and toddlers aged 3 to 23 months
(low force, low speed) up to 30% of estimated force for adults
(equivalent to 33.6 N)

Grade 3: young children aged 2 years to 8 years or younger
(moderate force, moderate speed) up to 50% of estimated adult force

(equivalent to 56 N)

Grade 4: older children and young adults aged 8 to 18 years
(moderate force, high speed) up to 80% of estimated adult force
(equivalent to 89.6 N)

4.5 Preference to use non-manipulative techniques

It must be borne in mind that the recommendations cited above are specified as maxima when spinal manipulation is to be used. Far more commonly, chiropractors choose not to employ spinal manipulation but rely on other approaches such as soft tissue techniques, massage or counselling.

4.6 Working with children

Tens of thousands of Australians take their children to see a chiropractor each week. This is believed to represent approximately 7% of chiropractic consultations; of these a very small proportion would be infants. The vast majority of parents are very satisfied with the care delivered and the safety record is exceptionally high [5, 6]. It goes against community expectations and desires to deny parents and children this chiropractic care. Chiropractic Australia advocates that chiropractors are *not* alternative medicine practitioners working in isolation but are members of the healthcare team. We champion interprofessional relationships, particularly in the management of vulnerable members of society. It is an unfortunate fact that in many areas of healthcare, and in paediatrics more than some other areas, the evidence base for treatments in general is poor. In such circumstances clinical experience and patient preferences play an important role in clinical decision making. Despite this a number of papers have been published over the last five years clarifying the role of manual therapy in the care of infants and children [1, 7-12]. The efficacy of many medical treatments for a range of childhood disorders is often lacking and in circumstances where patients have exhausted other options, a trial of treatment by a chiropractor may be entirely reasonable if genuine indicators for treatment can be found, such as muscle or joint restriction and or tenderness.

4.7 Scope of treatment

The rightful role of the chiropractor in paediatric care is to assess and treat *physical* ailments where it is determined that manual therapy is indicated. Some paediatric disorders have musculoskeletal components either as a primary cause of discomfort or as a consequence of the disorder. So-called 'infantile colic' refers to healthy but unsettled, distressed and excessively crying babies. While not conclusive the evidence suggests that chiropractic care can be a useful adjunct in the care of such infants. Headache in children is another arguably validated example of useful intervention provided by chiropractors using manual therapy [13].

4.8 Chiropractic adjunctive treatment

Asthma is an example of a condition where chiropractors can play a secondary but important role in the treatment of the physical effects of chronic asthmatic attacks, such as rib muscle spasm and thoracic joint stiffness following paroxysmal coughing fits.

4.9 Trauma and sporting injuries

It is well accepted that the normal course of a growing child involves many micro and macro trauma events, such as falls and for some children sporting trauma. These patients many

require manual therapy to alleviate pain and incapacity for which chiropractors are well trained and positioned to provide.

4.10 Postural strain

In the current society of sedentary behaviour and poor postural habits from electronic devices, there has been a recognized and significant increase in the global burden of musculoskeletal pain [14]. The current and future generations of children are suffering increasing amounts of musculoskeletal pain and incapacity [15].
Chiropractors can and should be part of the service to the community to provide care and guidance in this area, where public health and active care are paramount.

5. Evidence on chiropractic for children

5.1 Evidence on safety and harm

Genuine reports of serious harm being caused by manual therapy is exceptionally rare in the literature [12]. This is especially significant considering the number of treatments delivered each year. With over 100,000 visits per annum in Australia and over 30 million visits per annum in USA, no deaths have been reported in chiropractic treatment of children.

5.2 Reports on harm

A literature review published in 2015 found that since the 1960s in total fifteen cases of serious adverse events have been reported in the health literature following the use of manual therapy intervention. Less than half of those cases involved a chiropractor; providers linked to major adverse events were chiropractors (7), medical doctor (1), osteopaths (2), physical therapists (2) and others (3) [6]. The finding of only 15 serious cases of adverse reaction over the last 50 years is a remarkable safety record for the practice of paediatric manual therapy in general and for chiropractic paediatric therapy specifically.

5.3 Unreported harms

In any review of harm incidence there is an additional component of ‘unreported’ harm which must be acknowledged. In the case of paediatric care, because of our society’s acute intolerance of harm to children, it is reasonable to say that unreported serious harm to a child following chiropractic treatment would be negligible. Importantly, Chiropractic Australia and its antecedent organisations have never had a report of medicolegal notification from our professional indemnity insurers regarding infant or child treatment.

5.4 Evidence on the use of chiropractic care in the treatment of children

Manual therapy is suitable for the treatment of some types of pains, typically associated with muscle and joint problems. Of course, infants cannot self-report pain and express pain differently to adults. Infants express pain via vocal (crying), facial (grimace) and bodily (various movements and behaviours) indicators of discomfort. These cues are used by chiropractors in the same way as other practitioners use in the management of infant pain. Generally speaking, chiropractic manual therapy care is only indicated where a patient displays signs of mechanically derived joint or muscle pain, movement deficit not due to serious pathology, or some cases of soft tissue discomfort not related to serious pathology.

5.5 Psychosocial approach

Regarding the evidence base for clinical indicators, it is well established that infants express pain through multidimensional cues, and that parents may often provide a reliable indicators of children’s pain . Chiropractors like other manual therapists use clinical indicators such as joint motion and specific orthopaedic, paediatric and neurological physical examination tests

which are generally well established. A dual focus on the primary cause and secondary or contributing factors is necessary in the management of children's musculoskeletal pain. This includes not only managing pain and distress, but also factors associated with the child (and parents') pain experience. In doing so, chiropractors typically adopt a biopsychosocial approach in treating musculoskeletal problems in children.

5.6 Competing bases of evidence

By the terms of reference of the Safer Care Victoria review the panel will collect evidence gained from the results of a systematic review of the available literature as well as submissions from the public. Our view is that while both are important, they contribute to the decision-making process in different ways. Chiropractic Australia has always championed the fundamental importance of clinicians being strongly guided by the availability of high quality evidence. Where clear evidence is not available, good clinicians must fall back on principles of safety, their experience and best judgment and patient preference [16]. All of this must be weighed alongside the explicit requirement of informed consent.

5.7 The judgment of appropriateness

It is appropriate that the Australian community receives the quality and rigor it expects of the health care delivery system and its providers. In matters of professional judgment, public opinion should set the standard of care but not the limits. The specific appropriateness of any therapy is best judged by experts drawn from that field.

5.8 The level of evidence available

The level of evidence for medical, chiropractic and other health care procedures is far from complete. It has been variously estimated that of all health care practices in use in Australia probably less than 20% have been sufficiently validated [17, 18]. Every day practitioners face a lack of evidence for treatments that they wish to prescribe or deliver. This level of clinical uncertainty is inherent in musculoskeletal care and should not be a barrier to treatment delivery. It is important to note that a lack of evidence for any procedure does not equate to an indication of inappropriateness for that procedure. Instead it describes the common situation where there is a vacuum of sufficient evidence. Such procedures may be highly valuable or otherwise; their status is not yet known. For instance, this is the case for many new procedures which are introduced prior to validation. Historically CT and MRI scanning were introduced long before their clinical predictive values and limitations were known, and many surgical procedures are developed and introduced prior to reasonably sufficient validation.

6. The processing of complaints against chiropractors and other health professionals

6.1 Processing of notifications and complaints

Chiropractic Australia was established as a professional association promoting a reform agenda in the chiropractic profession, especially advocating evidence-based and patient-centred care. Chiropractic Australia supports the timely, rigorous and fair investigation of chiropractors against whom a complaint or notification has been made. In the recent past, a number of paediatric concerns have been investigated by the Chiropractors Board of Australia. In response to this the vast majority of Chiropractic Australia members have made it clear to our Board that where a chiropractor has transgressed, they wish the person be dealt with fairly but very firmly.

6.2 Scope for reform

Chiropractic Australia recognises that there is scope for reform in all the Australian registered health care professions. Because our remit is the continued growth and development of a responsible chiropractic profession in the community interest, we make no comment on the needs of the other health care professions.

7. Potential restrictions

7.1 A focus on the treatment, not the therapist

The Terms of Reference for the review specify a "review of chiropractic spinal manipulation on children under 12". However if the primary purpose of the review is to evaluate spinal manipulation to determine the safety of the intervention then the treatment itself should be reviewed irrespective of the type of practitioner who performs the intervention. Protection of the public and its most vulnerable members is the principal concern and Chiropractic Australia recommends that all providers of spinal manipulation should be included in any review recommendations. Other AHPRA registered healthcare practitioners who may undertake spinal manipulation on paediatric patients include osteopaths, physiotherapists and medical practitioners. Of the practitioners who are not registered under AHPRA, naturopaths, myotherapists and massage therapists also perform spinal manipulation in one form or another, and without the guidance of regulation.

We do acknowledge that chiropractors would perform the majority of the treatments involving spinal manipulation in the paediatric population, but we would advocate that chiropractors have the highest level of training in this area.

8. Recommendations

8.1 With respect we submit to the review panel the following recommendations for your consideration.

8.2 On the potential establishment of an age-based blanket ban on the use of spinal manipulation for infants or children

We oppose any call for a 'blanket ban' on the use of spinal manipulation for infants or children. Scientific evidence does not support the existence of frank harm associated with the chiropractic care of infants. Determining an arbitrary age is not physiologically valid and is scientifically unsustainable. If implemented this strategy would appear to be a 'quick fix' but in fact would only deny tens of thousands of Australian parents and their children a valid health care option.

8.3 On endorsed paediatric practice

We believe there is a place for recognised, endorsed practice of paediatric chiropractic with clear frameworks, standards and guidelines. The universities training chiropractors in Australia adhere to international standards of paediatric care education. Such an education well prepares graduates for general chiropractic practice which may include paediatric consultations. For those chiropractors who wish to offer a more focused paediatric practice, that is for those who wish to practice paediatric chiropractic as a special interest, we believe that additional accreditation and training standards should be in place and that training for endorsed paediatric practice must be undertaken under the auspices of universities.

8.4 On professional development and continuing education in paediatrics for all chiropractors

Australian society rightly expects quality health care and this is especially so in the area of paediatrics. Infants and children are a potentially vulnerable population and it behoves a responsible health care profession that standards of care in this population remain high. Therefore, we respectfully submit that paediatric care and safety should be a priority area of continuing professional development in the chiropractic profession to maintain its high safety standards. To achieve this incentives should be provided to Australian universities who should be called on to provide continuing education in paediatric care for chiropractors. Completion of such education should be a compulsory component of risk management education for chiropractors in the same way that ongoing education in first aid is required of chiropractors and other registered health professionals each year. Ideally, this activity would generate a modest income stream for university chiropractic departments.

8.5 On the use of online internet videos for practice promotion

AHPRA guidelines for all health care registrants forbid the use of testimonials in advertising a health care practitioner or service. Although AHPRA's boards also provide guidance on the appropriate use of social media, such guidelines fail to ban the use of online videos showing specific patient treatment as an advertising strategy. In many instances online videos of patient interactions are *de facto* testimonials. As such, promotional use of online or similar videos of interactions with patients should be proscribed clearly in the respective codes of conduct of all registered health professionals.

8.6 Of course genuinely educational videos should be distinguished from their promotional counterparts and their continued use should be unaffected. However, we see no need for any practitioner to electronically post a treatment of any individual patient, irrespective of that patient's consent.

8.7 On dealing with complaints against chiropractors

As stated above, Chiropractic Australia believes that professions should monitor and ensure their own standards. The investigation of potential wrong-doing should be to a level that gives the community confidence that fair and appropriate decisions are being made. Also, that they are being made in a timely manner. Any penalties applied following investigation must be just and reflect our society's expectations of professionalism and safety in our health care professionals.

8.8 On the penalties for breaches under AHPRA regulations

A review of the Chiropractic Board of Australia's investigations over the last few years shows that non-advertising complaints are few, and tend to emanate from the actions of repeat offenders [19]. If penalties are a disincentive then consideration should be given to have those penalties increased.

8.9 Overwhelmingly, feedback to the Chiropractic Australia Board indicates that our member chiropractors feel that penalties should be increased in dealing with the few individuals who bring the chiropractic profession into disrepute. It should be remembered that the call for the present review is due to the action of one miscreant chiropractor, not the behaviour of the profession at large.

8.10 On the need for research into manual therapy for children

The availability of appropriate care for those in need is a hallmark of the Australian healthcare system for which our citizens can be proud. The care of sick children is of acute

importance to Australians. While all fields of healthcare can benefit from increased research, we feel there is a specific need for more research in manual therapy for adolescents, children and infants. We believe that Federal, State and Territory governments through their various funding agencies, should consider making clinically relevant research into paediatric manual therapy a research priority area in the ensuing funding period. Such research could be coordinated specifically through established centres of great quality such as the Cabrini Institute in Victoria or through the Australian New Zealand Musculoskeletal Clinical Trials Network Initiative (ANZMUSC).

Conclusion

As offered in telephone discussions, we remain very willing to assist the Review Panel by interview or in other manner you deem desirable. A number of points outlined above have been dealt with in a succinct manner and could benefit from being fleshed out as part of a discussion or in further correspondence.

We wish the Review Panel every success in its task.

Rod Bonello
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References

1. Marchand AM: **A Literature Review of Pediatric Spinal Manipulation and Chiropractic Manipulative Therapy: Evaluation of Consistent Use of Safety Terminology**. *Journal of manipulative and physiological therapeutics* 2015, **38**(9):692-698.
2. Todd AJ, Carroll MT, Mitchell EK: **Forces of Commonly Used Chiropractic Techniques for Children: A Review of the Literature**. *Journal of manipulative and physiological therapeutics* 2016, **39**(6):401-410.
3. Hawk C, Schneider MJ, Vallone S, Hewitt EG: **Best practices for chiropractic care of children: a consensus update**. *J Manipulative Physiol Ther* 2016, **39**(3):158-168.
4. Marchand AM: **Chiropractic care of children from birth to adolescence and classification of reported conditions: an internet cross-sectional survey of 956 European chiropractors**. *Journal of manipulative and physiological therapeutics* 2012, **35**(5):372-380.
5. Carnes D, Plunkett A, Ellwood J, Miles C: **Manual therapy for unsettled, distressed and excessively crying infants: a systematic review and meta-analyses**. *BMJ Open* 2018, **8**(1):e019040.
6. Todd AJ, Carroll MT, Robinson A, Mitchell EK: **Adverse Events Due to Chiropractic and Other Manual Therapies for Infants and Children: A Review of the Literature**. *Journal of manipulative and physiological therapeutics* 2015, **38**(9):699-712.
7. Alcantara J, Davis J: **The chiropractic care of children with attention-deficit/hyperactivity disorder: a retrospective case series**. *Explore* 2010, **6**(3):173-182.
8. Alcantara J, Ohm J, Kunz D: **The chiropractic care of children**. *Journal of alternative and complementary medicine* 2010, **16**(6):621-626.
9. Karpouzis F, Bonello R, Pollard H: **Chiropractic care for paediatric and adolescent Attention-Deficit/Hyperactivity Disorder: A systematic review**. *Chiropractic & osteopathy* 2010, **18**:13.
10. Pohlman KA, Carroll L, Hartling L, Tsuyuki R, Vohra S: **Attitudes and Opinions of Doctors of Chiropractic Specializing in Pediatric Care Toward Patient Safety: A Cross-sectional Survey**. *Journal of manipulative and physiological therapeutics* 2016, **39**(7):487-493.
11. Pohlman KA, Holton-Brown MS: **Otitis media and spinal manipulative therapy: a literature review**. *Journal of chiropractic medicine* 2012, **11**(3):160-169.
12. Prevost CP, Gleberzon B, Carleo B, Anderson K, Cark M, Pohlman KA: **Manual therapy for the pediatric population: a systematic review**. *BMC Complement Altern Med* 2019, **19**.
13. Schetzek S, Heinen F, Kruse S, Borggraefe I, Bonfert M, Gaul C, Gottschling S, Ebinger F: **Headache in children: update on complementary treatments**. *Neuropediatrics* 2013, **44**(1):25-33.
14. Straker L, O'Sullivan P, Kendall G, Sloan N, Pollock C, Smith A, Perry M: **IT kids: exposure to computers and adolescents' neck posture and pain**. In: *Proceedings from: International ergonomics association 16th annual meeting: 2006*; 2006.
15. Global Burden of Disease Cancer C, Fitzmaurice C, Allen C, Barber RM, Barregard L, Bhutta ZA, Brenner H, Dicker DJ, Chimed-Orchir O, Dandona R *et al*: **Global, Regional, and National Cancer Incidence, Mortality, Years of Life Lost, Years Lived With Disability, and Disability-Adjusted Life-years for 32 Cancer Groups, 1990 to 2015: A**

Systematic Analysis for the Global Burden of Disease Study. *JAMA oncology* 2017, **3**(4):524-548.
16. Leboeuf-Yde C, Lanlo O, Walker BF: **How to proceed when evidence-based practice is required but very little evidence available?** *Chiropr Man Therap* 2013, **21**(1):24.
17. Garrow JS: **How much of orthodox medicine is evidence based?** *Bmj* 2007, **335**(7627):951-951.
18. Ebell MH, Sokol R, Lee A, Simons C, Early J: **How good is the evidence to support primary care practice?** *BMJ Evidence-Based Medicine* 2017, **22**(3):88-92.
19. Ryan AT, Too LS, Bismark MM: **Complaints about chiropractors, osteopaths, and physiotherapists: a retrospective cohort study of health, performance, and conduct concerns**. *Chiropr Man Therap* 2018, **26**:12.