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CLINICALEVIDENCE

A pocket review of clinical research for chiropractors

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Abstract: The purpose of this paper is to provide an easy-to-read yet comprehensive review of the place of case reports in chiropractic.

Terminology is given and explained to assist an understanding of ways to strengthen the act of a chiropractor recording a particular case in their practice for publication.

Indexing Terms: Chiropractic; case reports; research terminology.

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... 'A primer of basic 'research' terms appropriate for case reports, and selected cases to illustrate points ...'

Introduction

There are various forms of research with some of the most rigorous being in the form of randomized controlled studies, where the doctor and patient are blinded to an intervention, there is a control group, and often a sham comparative intervention is used. These types of studies are very expensive and challenging to perform as well as not conducive to the study of manual therapy interventions such as chiropractic. While our chiropractic academic community struggles with obtaining funds for these types of studies and figuring out the best study designs that can yield the most clinically useful information the case report remains one voice doctors in clinical practice have to share our findings.

Since 2009 the Sacro Occipital Technique Organization – USA has had annual Sacro Occipital Technique Research Conferences and most of the presentations are case reports from doctors who are predominately in clinical practice.

Major Bertrand DeJarnette, DO, DC, the developer of Sacro Occipital Technique, felt research was an essential part of being a chiropractor and essential to the future of the chiropractic profession. As early as July 1935 Major Bertrand DeJarnette was a featured speaker at the 40th Anniversary Convention 1895-1935 of the National Chiropractic Association presenting clinical research. Always research was his passion and in an interview in 1982 DeJarnette reiterated, '*as far back as chiropractic college, I saw the need for a more scientific basis for chiropractic theory. My own personal physical problems had not been solved by medicine, osteopathy, or chiropractic; so I began experimenting on myself. I'm still at it, and I can see no end of the need for continuous research in chiropractic*'. (1)

DeJarnette continued emphasizing that '*research in Chiropractic must go on forever. Someone must do this type of work, for it simply will not take care of itself. A profession cannot stand still. Momentum must constantly be generated. Chiropractic research needs many things it does not now have*'. (2) Dr. DeJarnette concluded that '*We must respect each other's beliefs. We must support our colleges and associations. We must work together and unite as a profession. And we must at all times be proud of chiropractic and proud of our calling as chiropractors*'. (1)

With all of this in mind I wish to share clinical case studies from these conferences so that they may spark an interest in a topic, help a doctor treat a specific clinical presentation, and hopeful encourage a doctor who has treated an interesting case to share this with the whole chiropractic community in the form of a published case report. In this article I will review three studies from the first Sacro Occipital Technique Research Conference in 2009. During the course of sharing these articles there will be also a focus on discussing specific terminology so we can better place case reports in their proper place in the development of evidence based practice for the chiropractic profession.

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Case Report #1

Sacro occipital technique, stability testing, and Tai Chi or yoga: A case report. (3)

Both Yoga and Tai Chi can help patients with specific joint difficulties find ways of performing exercise at their personal limits and still develop improved flexibility and stability. A 65-year-old female presented with generalized back and neck pain that noted when performing Tai Chi and Yoga could not accomplish movements that included flexion at the hip while standing.

Evaluation demonstrated a sacroiliac joint hypermobility syndrome and treatment focused on supine pelvic block placement with functional reassessments. Following the first office visit for this condition the patient immediately demonstrated a well balanced 'tree pose' but could only accomplish the kicking portion of the Tai Chi movement when sacroiliac trochanter belt was applied.

Study Implications: Utilizing yoga and Tai Chi postures may help a patient determine when chiropractic care may be appropriate and sets up a patient driven healthcare interaction, which is preferable to both doctor and patient.

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Case Report #2

Alterations on dyspeptic signs and symptoms on patients presenting with gastroesophageal reflux disease receiving chiropractic treatment (4)

Knowledge on the incidence, prevalence and natural history of gastroesophageal reflux disease (GERD) is limited. The objective of this study was to investigate the alterations of dyspeptic signs and symptoms in patients presenting with GERD following chiropractic treatment.

The study sample composed of 10 individuals sent for chiropractic treatment by a gastroenterologist surgeon. High digestive endoscopy exam was performed on all individuals before and after 8 sessions of chiropractic manipulative reflex technique (CMRT) treatments. A gastroesophageal reflux disease symptom's questionnaire and the results from high digestive endoscopy exams were used to evaluate dyspeptic signs and symptoms.

At the end of chiropractic treatment a statistically significant global reduction of GERD symptoms was observed (p=0.0002) especially on the evaluation of pre and post treatment postprandial pyrosis data (p=0.000004). Through endoscopic examinations on the 10 patients the findings noted a 58% improvement of esophagitis caused by GERD.

Implications: These types of studies help support chiropractic care of non-musculoskeletal conditions and suggests that chiropractic may affect reflex responses of the autonomic nervous system, which in turn may alter visceral functioning.

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Case Report #3

Sacro occipital technique, cranial technique, 'faux' fibromyalgia syndrome and self-reported improvement in vision: A report of four patients. (5)

This case series reviews 4 patients presented previously diagnosed with fibromyalgia syndrome (FMS). Based on the patient's response to care they were later re-diagnosed as having a condition better described as a fibromyalgia mimicry or 'faux fibromyalgia syndrome' (FFMS).

Treatment consisted of category two (sacroiliac joint instability) analysis and treatment, SOT extremity techniques, and cranial sutural analysis and treatment and weeks later as patient's symptoms stabilized, therapeutic rehabilitative exercises were employed utilizing therapeutic bands and a 'rebounder.' Within six weeks of SOT and cranial care these four FFMS patient's had their symptoms resolve to the point that as long as they were within a few days of receiving care they were asymptomatic. Of interest is that as their FFMS symptoms resolved a concurrent improvement in vision occurred that involved improved acuity or colour discernment.

Implications: As further study increases into chiropractic myofascial and neurological relationships, we may better gain a grasp why some patients presenting with musculoskeletal conditions may have simultaneous self reported positive non-musculoskeletal results, such as an improvement of vision.

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The Idea of the Case Report

The case report is a very special way doctors in clinical practice can attempt to communicate with our research communities by sharing what is taking place in the clinical 'trenches.'

Robert W. Ward, DC, past editor of the *Journal of Chiropractic Education* described the importance of a case report in the following way: '*The pointy-headed ivory tower population doesn't get to see the interesting things that happen in clinical practice. They often rely on case reports from the field in deciding what sorts of pilot studies to run, and those often lead to real full-scale clinical trials (the sort of research that field clinicians generally don't have the time, resource or interest to undertake)*'. (1)

But before we tout the wonder of the case report there are all types of limitations with this type of study that need to be understood so that the results described by these studies are not over interpreted. For instance one reason why case reports are considered anecdotal is that there are no control groups or comparative treatments to help mitigate the placebo or ideomotor effect.

Control groups

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Ideally a control group is a group within a comparative study that has had either no intervention or a sham procedure or some studies have both. A sham procedure is supposedly an intervention that has no therapeutic effect. This was a particular issue with chiropractic when a study by Balon et al found no benefit of chiropractic care on asthma, since both the sham (massage) and chiropractic intervention had the same benefit. (2) However just a few months later a study by Fields et al found that parental massage for asthmatic children had a therapeutic effect. (3)

This called into question the sham procedure used in the Balon study and the conclusions drawn by those authors. Generally a study with a control and sham procedure is more effective when both the examiner and subject are not aware (blinded) to a manual healthcare intervention, yet in most clinical studies this is very difficult or virtually impossible. While sham interventions and blinding is relatively easy with inert red and blue pills, it represents a challenge to adequately study chiropractic clinical interventions. (4)

Placebo Effect

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The placebo effect suggests that a subject's response to an inert intervention can be dependent upon their perception and expectation. de Craen et al found that the color and size of the placebo pill makes a difference, with 'hot-colored' pills working better as stimulants while 'cool-colored' pills work better as depressants. (5) The challenge for manual healthcare interventions and ruling out a placebo effect is that most hands-on interventions have some kind of an effect and this makes using placebos in manual healthcare studies problematic.

Bialosky et al even took this concept a bit further by suggesting '*that manual therapists conceptualize placebo not only as a comparative intervention, but also as a potential active mechanism to partially account for treatment effects associated with manual therapy*'. (6) While positive suggestions and attitudes may help stimulate a patient's '*placebo effect*', critics then find it difficult to isolate a patient's therapeutic response to just a specific manual healthcare intervention.

Ideomotor Effect

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The terms '*ideomotor effect,* response, and phenomena' were introduced by William Benjamin Carpenter in 1852 as a means to explain his theory of how muscular movement can be independent of conscious desires or emotions. (7) Hyman described how the ideomotor effect demonstrates that '*honest, intelligent people can unconsciously engage in muscular activity that is consistent with their expectations*'. (8)

Ultimately this effect suggests that research using human subjects, where the examiner and subject are not blinded, can often lead to findings unconsciously directed by the examiner and unconsciously performed by the subject. This is a common critique of case reports and of doctors in clinical practice claiming successes for their interventions.

But how can a doctor in practice be able to run a full scale study incorporating control groups to help rule out the placebo and ideomotor effects? Without research experience and developing a prospective research design for a case report, a doctor in practice is often left with retrospective case reports discussing an interesting intervention or response to treatment. Yet sometimes there are novel case studies that on some level attempt to find ways to address controls or comparative interventions and placebo or ideomotor effects.

Case Report #4 (9)

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History: A 37-year-old female was seen for benign paroxysmal positional vertigo (BPPV) referred by her allopathic physician for chiropractic care. The patient had 2-3 months of constant vertigo, unresponsive to medications and prohibited her from driving or walking without difficulty.

Interventions/Results: She presented with sacroiliac joint hypermobility syndrome (category two), right temporal bone restricted in external rotation, and significant malocclusion with clenching. Sacro occipital technique category two protocols for the pelvis were applied along with cranial and TMJ therapies. Dental co-treatment was necessary to sustain the cranial and TMJ corrections. By the 7th office visit (3-4 weeks of care) the patient's vertigo had resolved, her category two stabilized, and TMJ translation had improved without pain.

Implications: In this case the interesting aspect was that the patient had consistent symptoms for 2-3 months and was unresponsive to medication. In a way the medication became a comparative intervention and the length of symptomatology suggested that the treatments rendered may have been related to the patient's improvement.

Case Report #5 (10)

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History: A 42-year-old female presented with an unsteady Parkinsonian type of gait diagnosed as psychogenically driven. She also was diagnosed with an atypical version of a complex regional pain syndrome (CRPS) called complex pain syndrome (CPS) due to its whole body generalization as well as having a history of migraines.

Methods/Results: The patient was co-treated with a dental night and day time appliance, trochanter belt, and treated with category two protocols for sacroiliac joint hypermobility, sutural cranial temporomandibular joint (TMJ) interventions, T8 chiropractic manipulative reflex technique (CMRT), and nutritional modifications to support liver function and reduce inflammation. At the first office visit with the dental appliance, trochanter belt and category treatment all her shaking stopped when standing and her pain was profoundly reduced.

Implications: What is compelling with this patient is that she had symptoms that had lasted for years and was on multiple medications for various symptoms with no change. Of significance is that at the first office visit with the dental and chiropractic treatment as well as the sacrotrochanter support, her chronic tremor stopped. Further of interest is that the tremors were controlled with care and when she was unable to receive care her symptoms would return. A confounder is that

her condition was presumed to have a psychogenic component which suggests her response to treatment may be due to a placebo or ideomotor effect.

Case Report #6 (11)

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History: A 10-year-old female cattle dog with known chronic symptoms of bloating, mood changes, joint pain, and chronic psoas tension, unresponsive to prior interventions, presented for chiropractic care.

Methods/Results: Occipital fiber analysis (OFT), a part of sacro occipital technique was used to assess the canine and treatment consisted of chiropractic manipulative reflex technique (CMRT). Following the occipital analysis and treatment procedure the reflex pain areas were significantly diminished and the dog was relaxed, with decreased joint pain, and the psoas tension was notably reduced as determined by both the canines owner and treating physicians.

mplications: One reason why researchers use animals for studies is presumably that since animals don't understand (are blinded) to the types of interventions being performed on them. For that reason the canine's response to chiropractic care, when she was unresponsive to veterinary care, suggests that the intervention was the cause for improved function and symptoms. Even so there is some research that suggests animals may still be susceptible to the placebo effect (12)

Ideally the goal of the case report is a way of developing modes of communication between doctors in clinical practice and those in research that are not commonly treating patients. Like all research studies some case reports may yield greater applicability for further study and the hope is that as more information is shared in the evidence based arena improved health care delivery will be the outcome.

The Sacro Occipital Technique Research Conference offers doctors the ability to share various ideas that can improve assessment and treatment applications assisting patient response to care. The welcoming of new ideas and sharing of interdisciplinary relationships makes contributing to and attending this conference a valuable opportunity for the doctor in clinical practice.

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As chiropractic enter the 21st century it is important that chiropractors embrace the advances of what research can offer us. To do this it becomes necessary to be educated clinical practitioners to better discern the value of information yielded from our patient encounters so as to better understand the effects of what we do in practice.

Interestingly what we need to use as guides when reading case reports we also need to use when treating patients in our office setting. This is because on some level every patient we see is a research study in process. We assess what we think is going on with the patient, apply an intervention, and then reassess the patient. But there are ways of looking at our office visits in different ways that may assist us in better grasping what may be actually taking place when we see a patient. Concepts such as regression to the mean, washout periods, and temporal relationships can assist us when assessing the value interventions for our patients.

Regression to the Mean

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The term '*regression to the mean'* is used in statistics to explain that if a patient's first response to an intervention may be highly unusual it may then be commonly closer to their average on the second. Conversely, if the patient's presentation is highly unusual on the second intervention then it was likely closer to the average on the first.

Regression to the mean can compromise any investigation when there is not an appropriate control (group) to assess whether an intervention actually had an affect or if the patient was coincidentally recovering from an unusual physical episode, regardless of the intervention. Since this is a common effect in research it must be considered with our chiropractic interventions and a patient's response in a clinical setting. (1)

Washout Period

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A '*washout period*' is a period in a clinical study during which subjects receive no treatment for their presenting symptoms while under a study and the effects of any previous treatment are eliminated (or assumed to be eliminated). (2) Washout periods happen inadvertently such as when a patient positively responds to care, is unable to receive care for a few weeks and notices his/her symptoms worsening. Then when they return and receive care, again the symptoms improve again. In this instance a patient's vacation becomes one type of washout period.

Temporal Relationship

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A temporal relationship occurs when an intervention occurs and is presumably closely followed by an effect. In clinical research or even in our clinical practices we tend to assume that when a patient has a response shortly after a treatment that their response is related to the treatment.

What ultimately becomes important is determining the difference between cause or coincidence. Just because there is a temporal relationship between a treatment and a patient's response does not always mean the treatment caused the effect. That is why we use multiple tools in research or in our office with patients to help determine what works for a patient and what does not. For that reason we may try to have hesitation before assuming a patient's response to care was not a '*regression to the mean*.' Also before drawing a conclusion about the care rendered we may even want to try a '*wash out period*' to help discern if the patient may have been getting better even without our care.

Case Report #7 (3)

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History: A 34-year-old woman presented for chiropractic care June 2010 with a primary complaint of chronic inner ear congestion of 17-year duration. Of interest is that she had other conditions as

well: Ehlers-Danlos syndrome (HT-EDS), Type II diabetes, migraines, polycystic ovarian syndrome, celiac disease, and general disorientation.

Methods/Results: On examination sacro-occipital technique (SOT) indicators diagnosed a sacroiliac joint hypermobility syndrome with pelvic torsion (category two). Cranial palpation revealed sphenoid, right maxilla, and left occiput imbalance. The treatment consisted of SOT psoas release techniques, trapezius fiber analysis and treatment, and category two block placement. Cranial therapeutic treatment focused on the sphenoid as well as balancing of dural membrane tensions and CSF pulsations. Within 20-minutes following the office visit the patient reported that her 'ear opened up' for the first time in 17 years. The condition was then stable for at least one-week post treatment and the patient was did not return for care for follow up assessments.

Implications: With this complex case what is interesting is that the patient had a chronic condition for 17 years. During this time it would be expected that issues of regression to the mean and washout periods would have occurred to assess cyclical changes or any prior intervention. Also the persistence of the condition and the response, 20 minutes following care, suggests a temporal relationship between the intervention and her symptomatic response. While she was stable for one week following the treatment, further follow up with this patient would be important to discern if the positive response was sustained.

Case Report #8 (4)

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History: Asthma is a multifactorial dysfunction which may need interdisciplinary care for comprehensive treatment. The patient is a 63-year-old active female, 5'3", 112 lb rating her general health level as a 9/10, with her only discomfort being a long history of asthma and shortness of breath.

Methods/Results: Chiropractic interventions involved sacro-occipital technique category one treatment, reduction of costal torsion (T3-6), diaphragm and craniofacial balancing. Acupuncture treatment focused on the lungs, points to 'open the chest', and master empirical points for the head, neck and sinuses were also used. Following treatment the patient could return to her full activities of daily living, eliminated the need of her asthma medication, and was able to respond to stressful situations without asthma flare-ups. With periodic supportive care5 the patient's symptoms were controlled, with flare-ups only occurring when length between treatments exceeded more than 4-6 weeks.

Implications: With regression to the mean we could expect cyclical improvements and worsening of a patient's condition without care, yet if treatment was effective we would expect a relationship of improvement with treatment and worsening as time between treatment increases. On some level a washout period was occurring between office visits and an optimal period of time for when treatment was needed became apparent. Supportive care5 is an important concept for treatment of long term chronic conditions which have been unresponsive to other interventions. Supportive care differs from maintenance care in that it is based on minimal needed care to sustain a patient's activity of daily living and quality of life.

Case Report #9 (6)

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History: A 54-year-old male patient presented with severe pain in the epigastric area worse with deep breathing, eating any food, unremitting persistent upper abdominal aching, fullness, and throbbing pain. The patient was unable to sleep due to pain, and nothing he could do would relieve his pain or discomfort. The condition had persisted for three-days before he sought treatment at this office.

Methods/Results: Treatment involved adjustment of 'anteriorities' in the T11-L2 region, releasing of diaphragmatic tension in the mid and left lower rib region, sacro occipital technique (SOT)

chiropractic manipulative reflex technique (CMRT) hiatal hernia release technique (gently pulling stomach downwards during exhalation) and solar plexus technique. Immediately upon pulling the stomach downward the patient sighed and said he could breathe comfortably for the first time in three days and approximately 2-minutes later the constant tension in the epigastric was also gone. A week following he indicated he was eating and functioning normally without discomfort and at 2-year follow-up indicated the condition had never returned.

Implications: The temporal relationship between the unremitting discomfort the patient experienced for days, the treatment, and immediate response is compelling to suggest that there was a cause and effect to the intervention. Chiropractic care for non-musculoskeletal conditions is a challenging hill to climb from a research standpoint because sometimes non-musculoskeletal conditions are diffuse and chiropractic treatment may have a non-specific but positive effect.

Using concepts of regression to the mean, washout periods, and temporal relationships can help us better assess case reports and their significance as well as what is taking place in our office with our patients. It is always important to question whether what you are doing therapeutically is actually creating the change that you presume is happening. This self questioning strategy may help you discern how often you actually need to see a patient, how to develop ergonomic modifications or rehabilitative exercises for your patient, and if you may need to co-treat with another practitioner. Next I will be discussing chiropractic are of non-musculoskeletal conditions the challenges and the successes.

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To better understand the nature of chiropractic care for nonmusculoskeletal conditions, it is important to become familiar with the concept of '*risk benefit ratios*' and how viscerosomatic and somatovisceral interactions tend to be complex and non-discrete. The lack of a clear understanding of how chiropractic care affects nonmusculoskeletal conditions is a challenge our profession will need to overcome. (1, 2, 3, 4, 5)

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The chiropractic profession has been attempting to study which subset of patients with nonmusculoskeletal conditions might respond to chiropractic care. While there is a paucity of published literature relating to the chiropractic treatment of nonmusculoskeletal conditions, (6) our colleges still seem to find that both student interns (7) and clinicians (8) have an interest in the treatment of these visceral related conditions.

Nonmusculoskeletal conditions may be affected by visceral related referred pain patterns including the: i) convergence of visceral and somatic afferents at or near the spinal cord, (9) ii) dorsal spinal column, (10) and iii) cerebral nuclei and the brain stem. (11) Sato notes that some somatovisceral reflexes '*have propriospinal and segmental characteristics, while others have supraspinal and generalized characteristics in their reflex nature*'. (12) He postulates that '*somatovisceral reflex responses may be functioning during spinal manipulative therapy ...* ' (12) Budgell also suggests that there is a neurophysiologic rationale for the concept that aberrant

stimulation of spinal or paraspinal structures leads to segmentally organized reflex responses of the autonomic nervous system, affecting visceral function. (13)

Risk Benefit Ratio

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The term '*risk benefit ratio*' can be used to help us better understand the complex nature of chiropractic treating nonmusculoskeletal conditions. Simply it means, '*What is the risk of an intervention or no intervention versus its possible benefit?*' As the chiropractic profession participates within the nonmusculoskeletal care arena we would need to show that chiropractic care is a low risk intervention. '*Watching and waiting*' or no care is not an option for some patients. In addition chiropractic care may indeed offer some benefit. Being able to discern when patients with these conditions need to be referred for emergency care or interdisciplinary co-treatment is essential for responsible practitioners treating nonmusculoskeletal cases.

Treatment becomes part of the diagnosis

Evidence based care of nonmusculoskeletal conditions treated by chiropractic is slowly emerging. Due to the complex and diffuse nature of viscerosomatic and somatovisceral referred pain interactions, it is possible that chiropractic care could be seen as a relative low risk intervention particularly if the cost is reasonable. If chiropractors are going to be using treatment and the patient's response to develop a diagnosis, then the treatment should be safe and show some response in at least 2-4 weeks. The challenge for chiropractors in this arena is presenting a rationale for care, utilizing care for a limited period of time, and if the patient's response does not show improvement within that time frame, making the proper referral to an allied healthcare provider.

The following are some studies from the SOT Research Conferences that help illustrate how chiropractic care might play a role in the treatment of patients presenting with nonmusculoskeletal conditions.

Pediatric Nonmusculoskeletal Retrospective Survey (14)

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Introduction: For the purposes of this retrospective survey, all parents of children treated (2000-07) in a clinic by the same clinician (n=127) were sent a questionnaire. The questionnaires were part of a standard practice of this office for follow up, patient control, and management. 65/127 parents responded from our standard follow up outreach and 37/65 were treated for nonmusculoskeletal presentations. In all cases active chiropractic care consisted of sacro occipital technique and cranial pediatric treatments.

Methods/Results: Of the 37 (17 male, 20 female) nonmusculoskeletal pediatric patients, 5 were treated for immune function, 7 for developmental delays/dysfunction, 9 for birth trauma, 1 for seizure activity, 4 for learning problems, 3 for endocrine problems, 3 for migraines, 2 gastrointestinal issues, 2 for fussiness/agitation/anxiety, and 1 for enuresis. 36 of the 37 patients, per their parent, reported improvement of their child's nonmusculoskeletal condition that appeared related to the chiropractic intervention.

Implication: Since it does appear from this patient survey that nonmusculoskeletal conditions may benefit from SOT and cranial adjustive techniques, there is a greater need to investigate whether certain children with nonmusculoskeletal presentations may be candidates for chiropractic care. With its low risk options chiropractic care may help parents who feel the need to do 'something' for their child, allow for the child to receive chiropractic care that may help, and have confidence that they will be properly referred to other practitioners if a condition remains unresponsive.

Adolescent Incontinence Case Study (15)

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Introduction: A 13-year-old female presented with a prior history that included sprained right and left ankles, attention deficit disorder (ADD – inattentive type), rare occasion bed wetting at age 3 and 4 (fully toilet trained at age 2). The patient's major concern was incontinence that had worsened the summer prior to the office visit following a fall from a swing into a lake causing her to land onto her back.

Methods/Results: Examination and patient's presenting symptoms suggested a relationship between her incontinence (urgency) and a sacroiliac joint sprain (category two). Sacro occipital technique treatments, soft tissue balancing and Carver techniques were used. While the patient still had some degree of incontinence during treatment, the incidence of incontinence and frequency of occurrences were significantly lessening. It was apparent to both the patient and her parent that there was a clear relationship between the reduced low back pain, secondary to the patient's category two resolution, and her decrease in incontinence and urgency.

Conclusion: It is of interest to determine if the reduction of joint or body related pains might also have a relationship with improvement of nonmusculoskeletal presentations. What needs to be determined is if this improvement of visceral function is related either balancing of sympathetic/parasympathetic nervous system function, improvement of viscerosomatic/somatovisceral reflex activity, increased nociceptive signals crossing over to adjacent visceral afferents, or mechanical musculoskeletal effect on adjacent visceral structures. Parents of children with difficult conditions, such as incontinence, often consider that doing nothing is not an option and yet are concerned about medications and their side effects. It is possible that chiropractic care might fill a low risk intermediate option between watching and waiting and beginning a medication program.

Insulin Resistance Case Series (16)

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Introduction: High plasma levels of insulin and glucose due to insulin resistance are a major component of the metabolic syndrome. Metabolic syndrome is a group of risk factors that raises the risk for heart disease and other conditions, such as Diabetes Mellitus (DM) type-2 and stroke. Since some low-level evidence has found chiropractic care may demonstrate some influence in nonmusculoskeletal interactions such as in DM individuals this study was performed to analyze any possible influence of chiropractic treatment for patients with DM and insulin resistance.

Methods/Results: Four patients with DM type-2 with insulin resistance were selected by an allopathic diabetes specialist to participate in this study. The treatment consisted of eight chiropractic office visits that incorporated adjustments to the spine and chiropractic manipulative reflex technique (CMRT) to balance viscerosomatic/somatovisceral autonomic reflexes. Laboratory blood tests were taken before and after the chiropractic adjustment on the second and eighth office visits. After the eighth office visit, the levels of insulin resistance, following chiropractic care, decreased significantly when compared to the levels prior to the chiropractic intervention.

Implications: Further research is needed in this arena to determine which subset of patients and type of chiropractic care may achieve optimal results. Since the risk is high for the various types of medications utilized for insulin resistance and not treating this condition may lead to serious sequelae, a low risk trial of chiropractic care could be part of a early treatment regimen to determine if a patient with insulin resistance syndrome might be responsive to chiropractic care.

There is much to learn about nonmusculoskeletal conditions that respond to chiropractic interventions. Which patients with nonmusculoskeletal presentations may respond to chiropractic adjusting, soft tissue visceral manipulative reflex care, nutritional or life style counseling, and/or other low risk chiropractic interventions? What would be a reasonable trial period to determine if chiropractic care may be assisting a nonmusculoskeletal patient? How can

we assess a patient's response to care and know when and whom it is appropriate to refer a patient that is not responding appropriately?

While our chiropractic research community is attempting to answer these questions it may be best for *'patients in need'* to receive a trial period of chiropractic care (2-4 weeks) to determine if chiropractic care might be an option for their nonmusculoskeletal presentation. Since nonmusculoskeletal conditions are multifactorial and complex, chiropractic care may not be an option for some patients and developing proper referral skills will be essential for optimal patient care.

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Discussion

If you are like me, you graduated chiropractic college, passed your licensing examinations, learned different chiropractic techniques to use in practice, and incorporated what you learned in the best way you saw possible to help your patients. As you have practiced you learned different assessment and treatment methods that may work better for your patients than what you have utilized previously, and incorporated them into your therapeutic regimen. I foresaw that I could practice this way within the scope of my practice as long as I was helping my patients. However I have found that things are different than what I had presumed. Practicing chiropractors need to understand how curriculums are developed for our colleges as well as practice guidelines determined by states for scope of practice, insurance agencies for payments, and judicial arenas to determine malpractice.

I recently had the opportunity to participate in a workshop entitled, '*Toward the development of a standardized chiropractic technique program*' at an *Association of Chiropractic Colleges' Research Agenda Joint Conference* (ACC-RAC) March 18-19, 2016 in Orlando, Florida. Part of the process of building a standardized program involves understanding evidence-based practice. Sacket described, '*evidence based practice (EBP) as the conscientious use of current best evidence in making decisions about patient care*'. (1) One aspect of determining best evidence is studying if chiropractic's diagnostic and treatment modalities have validity (will what we claim we are finding be supported by the research) and/or reliability (two or more practitioners will have the same finding).

Guiding this workshop was an exhaustive study performed by Triano et al '*designed to evaluate the literature on the validity and reliability of the more common methods used by doctors of chiropractic to inform the choice of the site at which to apply spinal manipulation*'. (2) The study concluded that '*A considerable range of methods is in use for determining where in the spine to administer spinal manipulation. The currently published evidence falls across a spectrum ranging from strongly favourable to strongly unfavourable in regard to using these methods. In general, the stronger and more favourable evidence is for those procedures which take a direct measure of the presumptive site of care- methods involving pain provocation upon palpation or localized tissue examination*'. (2)

The researchers in this study worked diligently to assess all the data available and a '*total of 2,594 titles were screened from which 201 articles met all inclusion criteria'*. (2) Interestingly some researchers are questioning the role of EBP, particularly if it does not incorporate the clinician. (3) If clinical practitioners are not publishing in the scientific literature, how can these doctors in active practice have an adequate voice in guiding the future of chiropractic education and practice?

There is irony in having the future of chiropractic practice determined by researchers and their published literature because all research has some degree of bias. Research will only be performed if there is an entity to pay for that research or if the researcher has an interest in a particular type of study. This means that what is taking place in a doctor's office may well not be a considered in future practice guidelines or the development of evidence based practice. If published research will be directing what we teach in the colleges, and is used to develop practice guidelines, how can we integrate the wisdom of both the chiropractic researchers and clinic-based factions?

- How is it determined what chiropractic clinical diagnostic and treatment methods are taught in our colleges?
- Who is developing guidelines for chiropractic care and ultimately the future of chiropractic?

Issac and Freceschi lament that the gold standard of the EBP 'movement, the randomized controlled trial, meets failure in the clinical realm in terms of the value of one patient's life'. (3) In certain cases, even the need for validity/reliability arguments that plague qualitative researchers of the generalizability of an '*N of 1*' becomes mute. (3) The concept of dualism may be helpful in that it suggests that in order to understand and quantify something we can best do this by separating and comparing. It can be helpful with research when studying '*things*,' however this may be limiting when studying phenomena such as a healthcare application and a patient's response.

It may well be important for EBP to incorporate a non-dualistic approach for integrating research and clinical experience when developing chiropractic based EBP. (4) '*Evidence to practice and practice to evidence redefines*' EBP '*as a circular integration of best research evidence, clinical expertise, and patient values*'. (3) As Merriam claimed, '*quite a bit can be learned from an N of 1. The impossibility of evidence becomes a matter of practitioner trustworthiness. In this case, a*

patient's reality becomes the priority, and where application of statistically-based generalizations becomes moot. Yet if clinicians are not performing or guiding research or submitting papers to the peer reviewed literature based on their clinical experience, how can they have a voice in this "circular integration?"

- Is it reasonable to presume that researchers have the extensive clinical experience of those working in the chiropractic therapeutic trenches?
- Is it reasonable to presume that chiropractors in clinical practice understand evidence base practice guidelines and use the research literature to improve the care they render?

There have been a few workshops at previous year's ACC RAC conferences that attempted to address the relationship between our chiropractic technique systems and the research community. The exchanges during these workshops are usually quite animated and dynamic. One year I proposed that a good way to study the efficacy or utility of the different chiropractic techniques would be to include a 'hands-on' portion along with discussions and review of the literature. It was fascinating how this suggestion was soundly rejected. Emphasis was solely given to the need of reviewing the published research and chiropractic techniques from that perspective.

From my experience I find that no reading or talking can substitute for what I find through the sense of touch. I wonder if one aspect of the difference between researchers and clinicians may be their preferred learning method. There is an assessment tool entitled the Visual, Auditory, Read/Write, Kinesthetic (VARK) questionnaire, which has been used to study 1st-year chiropractic students. (5)

Similar to a study of 1st year medical students, (6) most students in the chiropractic study preferred a multimodal approach to learning, meaning they preferred a mixture of visual, auditory, read/write, and kinesthetic type learning. Yet while the majority preferred multimodal learning, approximately a third of those studied had a particular preference for just visual, auditory, or kinesthetic learning. (7, 8)

Is it possible that learning preferences influence a chiropractor's choice to become a clinician, an academician or a researcher?

And does this learning preference influence the type of research that is performed by the chiropractic research community?

At the 2016 ACC RAC workshop '*Building chiropractic research capacity: 2016 research agenda update*' there was a section discussing clinical related research. The predominate theme from those present in this section was that the colleges needed to create a culture of research which supports teaching and integrating research concepts in the curriculum. In addition, support should be given to research projects (including those by instructors and students) and the creation of PhD research tracts for chiropractic students and instructors wanting to move in that direction. While I feel all of these suggestions are very important for the future of chiropractic research, my concern is, where does the doctor in clinical practice (9) fit within this solution?

One answer may be to develop a mentorship between research faculty and doctors in clinical practice (10) that have a desire to share their findings in the research arena but are not skilled or are intimidated to do so. Another possible option could be the development of a free online research certification course that could instruct a doctor in clinical practice in the understanding, performing, and publishing of their research. As an example the *National Institute of Health Office of Extramural Research* has a free certification service to guide doctors wanting to learn about '*Protecting Human Research Participants*'. (11) This could represent a beginning step towards something created by an international chiropractic college academic and research consortium.

About SOTO USA

Sacro Occipital Technique Organization (SOTO) – USA is a technique based research and teaching organization that includes an SOT Research Conference as a part of its annual clinical symposium. In this arena doctors in clinical practice have a venue to share their research in a welcoming environment, which follows the guidelines of the ACC RAC platform presentations. The SOT Research Conference is one avenue for doctors in clinical practice to engage in the research arena and help build a future for the chiropractic profession that integrates both research and clinical practice in a non-dualistic manner.

Conclusion

Who determines how you will practice chiropractic? By default the researchers will determine the guidelines of how to practice, what future students learn, and thus the future of chiropractic. However, it is hoped that doctors in clinical practice can help direct the future of chiropractic. This can be a reality if programs can be developed to help them to step up and become more involved in the chiropractic research process. Also, the college based research programs should be encouraged to involve and incorporate field doctors' thoughts and experiences in the development and direction of future chiropractic research.

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