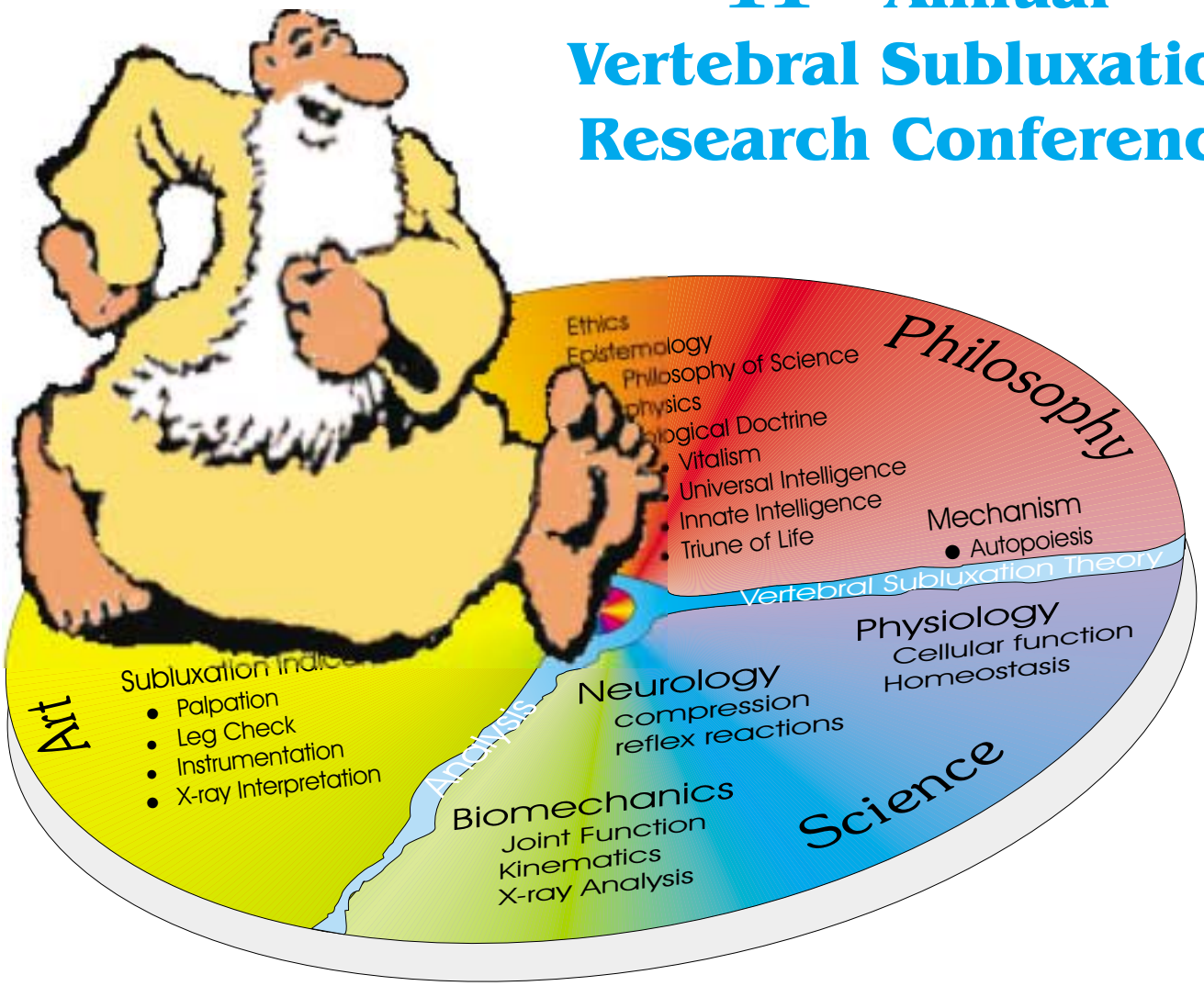
3rd Annual Conference
for
Philosophy in Chiropractic

&

11th Annual Vertebral Subluxation Research Conference



October 11th & 12th, 2003
Spartanburg, SC

SHERMAN COLLEGE of STRAIGHT CHIROPRACTIC

11th Annual Vertebral Subluxation Research Conference
October 11-12, 2003
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Literature Review on the Reliability and Validity of Commonly Used Subluxation Indicators

Edward F. Owens, Jr., MS, DC
Director of Research
Sherman College of Straight Chiropractic

There have been several research-oriented models proposed in recent years that provide for operational definitions of vertebral subluxation. The current models are often component-based where a number of individual assessment methods are combined to create a subluxation detection system. Many of the individual methods have been tested for reliability and some for validity, but few of the systems have been evaluated as a whole.

This presentation will include a critical review of literature on reliability and validity of these subluxation detection methods. Particular emphasis will be placed on reviewing proper methods for doing reliability and validity studies, with published articles as examples.

Validating the association of the supine leg length alignment check with the upper cervical spine and upper cervical subluxation

Gary A. Knutson, DC
Bloomington, IN

The unloaded leg length alignment check is one of the most commonly used indicators for the presence of chiropractic subluxation (1). Inter- and intra-examiner reliability for leg checks has been demonstrated (2), and a correlation has been found between subjects in the general population with supine leg length inequality (LLI) and recurrent (more than 2 episodes per year) back pain, validating the leg check (3). These findings, however, do not establish a cause (or causes) for the functional short leg, either secondary or ultimate. Several authors hypothesize that unloaded leg length inequality may be caused by abnormal contraction or shortening of the quadratus lumborum (QL) muscle, affecting pelvic biomechanics (4,5). Fortuitously, a simple clinical test of the QL for the functional characteristic of fatigue has been developed (6). The combination of the theoretical involvement of the QL in LLI, and the existence of a simple clinical test for QL functioning provided the impetus for a clinical study. This presentation reviews the findings of clinical testing for QL fatigue in subjects with and without supine LLI. Evidence that the QL is associated with the phenomenon of LLI is a secondary finding, an ultimate finding would the cause for the QL involvement. Upper cervical theory hypothesizes a connection between upper cervical (UC) subluxation and LLI (7-9). One mechanism proposed for this connection is activation of postural reflexes related to the UC spine (e.g., the tonic neck reflex) through abnormal muscle spindle input (9). Preliminary research will be outlined demonstrating a connection between abnormal spindle input from muscles in the UC spine and changes in QL fatigue in a normal test subject. Should the findings of this research eventually be verified, a primary connection between the unloaded supine leg check, QL activity, and the UC spine could be established, and a step made towards validating the relationship between upper cervical subluxation and postural distortion resulting in the functional “short leg”.

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Stability of Paraspinal Thermal Patterns During Acclimation

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Abstract

Background: Paraspinal thermography has been used by chiropractors since 1924. One method of its interpretation is with the use of "pattern analysis" - a method that assesses temperature differentials (patterns). This in turn theoretically provides information about nervous system function. When a warm back is exposed to the cooler air in the examining room, the skin temperature in general drops but the differentials could remain fairly constant.

Objective: To determine what changes occur in paraspinal heat patterns when the back is exposed to room temperature.

Study design: Observational; measures repeated at 5-minute intervals for 31 minutes.

Methods: Thirty subjects were scanned with digital infrared thermographic instrumentation every five minutes over a 31-minute period for a total of 7 readings. A computerized calculation of percent similarity between consecutive comparisons of the readings was then performed to determine if and when the pattern stabilized.

Results: Cervical spine temperatures remained constant while lower back temperatures in general decreased for the entire 31-minute recording period. Although the results varied among subjects, on the average the patterns stabilized after 16 minutes.

Conclusions: Once the patient's back is exposed to cooler room temperature, the skin temperature decreases constantly for 31 minutes, however the pattern becomes stable after 16 minutes. Readings taken for the purpose of pattern analysis during this 16-minute period may be unreliable for some patients. Therefore a 16-minute acclimation period is recommended. Further research is needed to not only verify this finding with the same equipment in a separate experiment, but to verify it as well with other types of temperature instrumentation.

Pilot Data: Passive Cervical End Range Stiffness Contralateral to Side of PulStar Measured Compliance in Acute Neck Pain Patients

Robert A. Leach, DC, FICC
Starkville, Mississippi

In a preliminary effort to develop a clinical protocol using the computer assisted PulStar device as a purported mediating variable for subluxation complex, a convenience sample of 25 patients presenting with acute neck pain were evaluated before and after upper cervical diversified adjustments. In blinded assessments end range asymmetries were evaluated using the Nansel (1991) protocol, and compared with PulStar compliance measures taken separately, while the patient actively hyperextended the neck to the right and left while sitting upright. In 18 of 25 subjects, PulStar compliance was significantly increased contralateral to the side of end range motion restriction. Further, in subjects with VAS pain scores >4, 12 of 15 exhibited this contralateral stiffness finding.

Subsequent diversified technique was used only at the side and at the level predicted by the passive end range motion restriction (again after Nansel, 1991: upper right, upper left, lower right, or lower left cervical spine adjustment), in the subjects with contralateral stiffness (PulStar prediction). Of these 18 subjects, 6 of 9 with lateral bending restrictions, and 8 of 9 with rotational restrictions had significant improvement in L/R asymmetry post treatment as measured by PulStar. For all 25 subjects, upper cervical asymmetries improved 77% of the time, and lower cervical asymmetries improved 72% of the time after a single neck adjustment directed to the side and level predicted by passive end range motion assessments.

Data appear to support the findings of Nansel, that there are side and level specific adjustments that will best ameliorate end range motion restrictions. Further blinded research is necessary to correlate these findings with clinical outcomes, and determine whether PulStar measures may serve as a predictor/mediating variable of subluxation complex. Currently planning is underway for a RCT.

Reference:

Nansel D, Peneff A, Quitoriano J. Effectiveness of upper vx. Lower cervical adjustments with respect to the amelioration of passive rotational vs. lateral-flexion end-range asymmetries in otherwise asymptomatic subjects. Proc 1991 International Conference Spinal Manipulation, April 12-13, 1991:21-25.

Examining the Philosophic Tenets of Chiropractic from the Perspective of Cultural Changes from 1895 to the Present
Gerard Clum, D.C.

Research: The Pursuit of Truth
Reed Phillips, D.C., Ph.D.

Assessment of the Cervical Spine using Modified Prill Leg Checks

Michael Burcon

ABSTRACT

I am going to detail how I decide which cervical vertebra to adjust, utilizing leg checks. I then use the x-rays to decide how to adjust that segment. I suggest that you use whatever technique you are comfortable with to use this system in your own practice.

Patient prone on table. Be particular that they are lying straight. Note short leg. Check for cervical syndrome. Hold patients feet while instructing them first to turn their head slowly to the right, then to the left. This is the greatest indicator of an upper cervical subluxation. With practice, you can learn to differentiate an atlas subluxation from an axis subluxation by how it feels when legs change lengths. Note whether they have a right, left or bilateral cervical syndrome.

Next, instruct them to gently and steadily raise both feet, while you rest your hands on their heels. Let me caution you that this is not an AK muscle test. If they lift too hard, they are engaging the wrong set of muscles. You are checking the nerves to the muscles that hold us upright in gravity.

If they have a short leg after this check, it is a positive test for an atlas subluxation. Having the patient rotate their feet inward, while you hold the inside of their heels, tests axis. Having them pull their legs together while you hold them apart tests the third cervical. Having them pull their legs apart, while you hold them together, tests the fourth cervical.

These tests of the top four cervicals are my variation of the modified Prill tests (www.prillchiropractic.twoffice.com) taught by the Blair chiropractic society (www.blairchiropracticsoc.org). We now switch to the arms to test the fifth through seventh cervicals.

Instruct the patient to put their arms out straight at their sides like airplane wings. They often put their arms forward, and I tease them, “No, that’s Superman. I said airplane wings.” Put your hands on top of their biceps and instruct them to raise their arms towards the ceiling. This test for C5 will often cause a leg differential between one and to inches with someone who has suffered a whiplash injury. Remember to note the difference in leg lengths on every positive test.

Moving your hands out to the brachioradialis muscle, again instruct the patient to raise their arms to the ceiling. You have just tested C6. To test C7, put your hands under the triceps, this time instructing the patient to lower their arms towards the floor.

If this were the patient’s first adjustment, you would typically pick the segment that caused the leg to go shortest. In a recent whiplash injury, this would most often be C5. The most common combination you will see is atlas and C5. If C1 and C5 cause approximately the same differential, adjust the upper cervical first, rest the patient, then repeat all of the cervical leg checks.

I find that the atlas adjustment will clear the C5 subluxation about half of the time. When it doesn’t, you will usually see a kink at C5 in the x-ray. I will then adjust C5, rest the patient again, and repeat the checks one final time. This type of C5 subluxation will take an average of six adjustments to get it stabilized. It doesn’t seem to matter what time span the adjustments are administered over, put I usually do them on a weekly basis. When the patient presents balanced, I start spacing the visits out further until I determine how long they usually hold their adjustments.

Interactive Research Presentation

Edward F. Owens, Jr., MS, DC
Michael Burcon, DC

Dr. Burcon will introduce a leg check method that will form the basis of an interactive research project, with participation of conference attendees as examiners and subjects. All the elements of the research design will be illustrated in a hands-on manner, including the consent form, testing protocol, data collection and analysis methods. It is anticipated that the data will be collected in one two-hour session on Saturday. The data will be compiled overnight, with initial analysis results to be presented for discussion at a second 1-hour session on Sunday morning.

A Review of the Peer Reviewed Literature Related to Orthogonally-Based Upper Cervical Chiropractic Care.

by Kirk Eriksen, D.C.
Presented by Julie Mayer-Hunt

A brief review of studies in the published literature related to Grostic-based chiropractic care will be provided. Particular emphasis will be placed on research dealing with validity studies related to this type of care. The strengths and weaknesses of orthogonally-based upper cervical care will be discussed, with recommendations and plans for future studies. Data will also be reviewed for a pilot study on depressive patients undergoing a course of Orthospinology care.

Effects of Lateral Cranial Translation on the Appearance of the Atlanto-Occipital Joint

Patricia Kuhta, BS, DC

Abstract

Over the past seventy years there has been considerable research done and literature written on the subject of cervical biomechanics. The researchers on this topic have been from the medical and chiropractic professions alike. These researchers include such names as White and Panjabi, Kapandji, Dr. Don Harrison, Dr. John F. Grostic, and Dr. A.A. Wernsing to name a few. Each researcher has studied and documented a slightly different aspect or a specific portion of information concerning cervical biomechanics. Some studied cadaveric specimens, determined ranges of motion at the upper cervical joints, discovered information about the biomechanics of the occiput and atlas during lateral flexion of the neck, and so on. However, despite this research there is a lack of information available on how the atlanto-occipital joint is affected by lateral translation of the head.

Interest in this topic developed over a period of several years in the X-ray Department of Sherman College because of a peculiar pattern occurring on patients' APOM and Nasium films. Patients frequently appeared on film to have a list, lean or lateral translation of the head on the cervical spine. Due to the lack of research on the topic of lateral cranial translation it is currently unknown what effect this type of translation has on the appearance of the atlanto-occipital joint. This lack of information is troubling considering the emphasis and importance placed on the atlas vertebra and its proper alignment in subluxation correction.

Objective

The purpose of this study is to investigate the normal biomechanics of lateral translation of the skull and cervical spine and the effect it has on the appearance of atlas laterality on the Anterior-to-Posterior Open Mouth (APOM) x-ray. The presence of lateral translation of the head is expected to affect the positional relationship between the occipital condyles and atlas lateral masses. This will therefore influence the appearance of atlas laterality on the APOM x-ray.

Research Design and Methods

Forty-nine subjects were chosen from Sherman College Health Center’s new patient base. A six view cervical x-ray series was taken of each subject; consisting of a nasium, base posterior, neutral lateral, neutral APOM, APOM with right lateral translation, and APOM with left lateral translation. The neutral APOM and translation APOM views were taken with extra care to make sure that head rotation and tilt are removed. For all three APOM views, the central ray was centered on C1 in the vertical center of the subject’s mouth.

Analysis of Films: The subject’s atlanto-occipital positional relationship on the translation APOM views was compared to that of the neutral APOM using the standard laterality methods taught in the Sherman curriculum. Three examiners blinded to the patients' head position and to each other evaluated the atlas laterality. Hence inter-examiner reliability of the analysis method can be assessed.

Results are not available at the time of this submission but are anticipated to be available for presentation at the conference.

Precision of Palpatory Location of Skeletal Landmarks in Three Dimensions

Eric Potocki, BS
Edward Owens, MS, DC
Sherman College Research Department

Introduction: Surveys of chiropractors have shown that palpation methods are in common use and are relied on for making clinical decisions related to patient care (1). At least three different palpatory methods have been traditionally used by chiropractors as indicators of the need for chiropractic adjustment: static palpation of vertebral alignment and tenderness, motion palpation for passive movement characteristics and muscle palpation to detect muscle tone imbalances. The reliability and validity of motion palpation (MP) has been frequently studied. While MP seems to have good face validity, it is considered to have limited objectivity. Keating performed a meta-analysis of the available literature on MP in 1989 and concluded that no strong claims for the objectivity of lumbar motion palpation could be made at that time (2). Keating showed that studies of MP demonstrated very little reliability, were limited in their number of examiners, and suffered from an over reliance on asymptomatic students as palpatory subjects.

An interesting finding from reliability studies is that while inter-examiner reliability is typically low, intra-examiner agreement is generally good, i.e. assessors often agree with their own measures. Breen suggested that some of the error might be due to examiners simply misnaming the involved segment (3). Panzer came to similar conclusions in a more recent review of the motion palpation literature, and offered the suggestion that improved standardization of palpatory techniques be carried out (4).

One study performed at this institution found poor inter-examiner and intra-examiner reliability for a particular type of muscle palpation that is used in the curriculum as a way to assign vertebral misalignment listings (5). As a follow-up to that study, we are considering the palpation procedure as two separate tasks: locating the structure of interest, and sensing the tissue texture or joint flexibility. In the current pilot study we have developed a way to test examiners' ability to locate skeletal landmarks by palpation.

Methods: Four students were asked to digitize the locations of the left and right mastoid processes and the external occipital protuberance (EOP) on a student volunteer using a three dimensional digitizer, the Microscribe 3D, [Immersion Corporation, San Jose, CA]. The subject was positioned prone on a HI-LO table adjacent to the Microscribe. The students were given instructions into the proper usage and limitations of the arm of the digitizer before the test and were allowed to warm up or practice finding and digitizing points on a variety of objects until they felt comfortable using the equipment while palpating. With the stylus tip of the digitizer placed on the palpation finger, students found and marked what they felt were the desired points, then depressed a footpad to insert a three dimensional coordinate into an excel spreadsheet. These points of interest were found from left to right i.e. left mastoid, EOP, right mastoid. Each student had four

attempts to locate the desired points, two warm-up trials and two test trials. After this simple procedure the collected data were plotted and analyzed for precision of point location between all the students.

Results: Preliminary findings on bony landmark location indicate a good degree of inter-examiner precision. On nearly all the points of interest students were within a five-millimeter range. Table 1 provides the statistical description of the 3D locations for each landmark that was digitized. Figure 1 is a plot of two dimensions (x and y, the horizontal plane) of the digitized locations. In this figure all eight attempts overlaid. Notice the tight clustering of the locations.

Discussion: Preliminary results show that our method of digitizing works well for determining where individual examiners perceive the points in question to be located on a subject. As our data shows, the information can be readily used to cross-examine palpation findings to enhance precision. For prominent bony landmarks our test-palpators, all fourth-quarter students, seemed to be able to recognize the same five mm area.

Our plan is to test examiner precision on consecutively less prominent structures such as points of muscle attachment, transverse processes of cervical vertebrae or even recognition of cervical segmental level (associated with TPs or spinouses).

Conclusion: Based on our test results so far we feel that the Microscribe 3D is a novel and effective tool for more precise understanding of what structures chiropractors are palpating when performing a spinal exam. We feel that this knowledge will better our understanding of the frequent inter-examiner palpation discrepancies so that ultimately improvements can be made in the reliability of palpation as a tool for subluxation analysis.

References:

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The Application of Surface Electromyography for Subluxation Detection

Andrew Ashton
Jeong Pil Park
Edward Owens, MS, DC
Sherman College Research Department

The use of surface electromyography (sEMG) in chiropractic is a matter of some controversy. One the one hand, there are commercial systems available for purchase for clinical use by practitioners, and, on the other, there are more costly research-grade systems in use in the colleges for study of muscle function associated with low back pain.

There have been both critical and supportive articles in the literature over the past 5 years, but no consensus has been reached. Some of the issues of contention are technical: the use of hand-held versus attached electrodes, the use of contact gels, the position in which to perform scans and how to account for the effects of electrode contact or skin thickness on the amplitude of the sEMG output. While there have been reliability studies performed with some systems, neither of the available commercial scanning systems have published studies on the reliability of their protocols.

Other issues revolve around interpretation of sEMG findings: Are asymmetries of amplitude important clinical measures? Is asymmetry a sign of dysfunction? While there have been several studies of the validity of laboratory style sEMG to detect the muscle dysfunction associated with low back pain, the sensitivity and specificity of scanning sEMG in detecting subluxation are unknown. It is generally assumed that any asymmetry is of clinical import, but this assumption has not been tested.

A project is underway to help bridge the gap between the two different styles of sEMG. A protocol has been developed to test some of the assumptions of scanning sEMG, but using the more rigorous techniques of laboratory methods. The protocol involves measuring integrated EMG bilaterally from two paraspinal levels using attached electrodes and a digital lab amplifier (BioPac). Sitting relaxed and sitting erect postures will be assessed, along with the effects of standardized postures and spinal loads. These standardized postures and loads will enable the use of normalization procedures to account for electrode contact and skin resistance differences.

Data is currently being collected on student volunteers. Results will be presented at the conference.