THE CHIROPRACTIC REPORT

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Spinal Adjustment – Principles, and Proven Effects

A. Introduction

1. The research of interest to the general public is clinical study of the effectiveness of treatments in preventing or relieving specific health problems. When, as recently, the New England Journal of Medicine reports that men over age 40 who take a certain dosage of aspirin regularly cut their risk of heart attack by 50% there are world headlines.

This Report has looked previously at chiropractic clinical trials and studies of effectiveness of this nature. There is now evidence that specific chiropractic adjustment techniques and/or chiropractic management generally are effective for the treatment of conditions such as migraine, headache, acute back pain, chronic back pain and referred pain to the legs.[1] Four further major trials of chiropractic management of acute and chronic low-back pain are currently underway – one in Canada, one in England and two in the United States.[2]

2. Basic science research, which seeks to understand the precise mechanisms of health and disease, and the manner in which health care treatments or interventions actually work, are of less public interest. The average person is not concerned to know exactly why taking aspirin may have a beneficial result – which is just as well because no one knows.

However basic science research is as exciting for health professionals because it tests their fundamental hypotheses and explains what is valid and exactly how they achieve their results. The last point is particularly important in chiropractic because there has been the suggestion by critics that the benefits of chiropractic adjustment arise from the laying on of hands rather than measurable objective effects.

3. In this Report we look at:

i) Some hypotheses basic to chiropractic practice, and experiments by the noted physiologist Korr and others that support these.

ii) Some recent chiropractic research of these hypotheses establishing objectively measurable results of the chiropractic adjustment.

B. Basic Hypotheses

4. All experienced chiropractors have a wealth of clinical evidence showing that their correction of spinal dysfunction or subluxation may have wide ranging health effects. The woman who sought cervical adjustment for tension headaches finds to her surprise that she has lost her vertigo or bouts of dizziness, or that her mild hypertension has abated. The infant boy, his parents attest, has increased his resistance to colds, earache, conjunctivitis, and now sleeps peacefully at night.

The man relieved from stiffness and pain by adjustment of subluxation in the lower thoracic or upper lumbar spine reports something of much greater moment to him. For years his enjoyment of life has been greatly hampered by functional disorders of the bowel, diagnosed medically as irritable bowel syndrome or colitis. Medical advice and treatment and a bland diet have never solved the problem. Following correction of his spinal problem the bowel disorder has wondrously disappeared or become much less significant.

Other professionals with experience in spinal manipulation, such as Gutmann MD[3] in West Germany and Greenman DO[4] in the United States, report similar clinical experiences. All admit that results are inconsistent, and much of the workings of the human nervous system – currently subject to burgeoning research because of recent advances in technology – remains in the dark uncharted area of the unknown.

5. 90 years ago the first chiropractors made these assumptions to explain their clinical results:

a) The body has innate wisdom, expressed through the nervous system, by which it is generally able to respond naturally to external stress and maintain health relying on its own resources.

b) When the position and/or range of movement of a spinal vertebra becomes disturbed – a lesion that was called vertebral subluxation – this not only causes pain and discomfort, but disturbs the capacity of the nervous system to maintain health generally. This is because the spinal nerve roots, which exit the spinal cord between the vertebrae and transmit central nervous system commands to the rest of the body, are obstructed.

Thus, for example, the patient with wrist pain should have his neck or cervical spine examined for subluxation compromising peripheral nerve supply to the arm. The patient with symptoms of gall bladder

Professional Notes:

Quiropractica in Mexico

The Mexican government has previously granted individual licences to chiropractors trained at accredited colleges in the United States, but on November 30, 1988 new law was enacted giving first formal recognition and regulation of the chiropractic profession in Mexico. Central features are:

• Creation of the Cuerpo Colegiado de Quiropractica de Mexico under the office of the Director-General of Professions, Department of Education. This is a self-regulatory college conferring the same status as medicine and dentistry. It is described by Dr. Enrique Benet-Canut, President of the Mexican Association, as "a body with both the functions of the U.S. National Board and Council on Chiropractic Education".

• Protection of title. This is of major importance since there are only 45 DCs in Mexico, but a large number of informally trained bone-setters using the title 'quiropractica'.

The Mexican profession, though small in numbers, is exceptionally strong and has some lessons in organization for chiropractors worldwide. All chiropractors belong to and are highly active in their national association, La Sociedad Cientifico Quiropractica de Mexico (SCQM). The SCQM's recent International Interdisciplinary Seminar held in Mexico City February 16 to 18, 1989 was in many ways a model for a contemporary chiropractic

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disease should be examined in the lower thoracic spine, since this is the level of sympathetic nerve supply to the gall bladder. (The science of anatomy had already determined that both the peripheral and sympathetic nervous systems were arranged segmentally or according to vertebral level, and the early chiropractors knew this. Many had been medical physicians first).

c) Skilled adjustment or manipulation to correct the subluxation would accordingly not only relieve pain but also remove interference with the nervous system thereby making the body more resistant to stress and disease. Current symptoms of disease could be influenced or even cured if the target organ was strengthened by full uninterrupted regulation by the nervous system.

The general health effects of chiropractic care, as opposed to restoration of spinal movement and reduction of pain, were always unreliable and understood to be dependent on other factors such as nutrition and psychological status. For this reason most early chiropractors – and this remains true in the profession today – claimed to treat vertebral subluxation rather than any symptoms or disease states that might be caused by it.

6. This was bold conjecture on a comparatively narrow base of clinical experience. However 90 years later a large volume of research in the fields of anatomy, neurophysiology and spinal manipulation is consistent with these hypotheses of David Daniel Palmer and his school of colleagues.

The most noted researcher worldwide has been neither a chiropractor nor any other health professional, but a neuro-physiologist from the United States, Dr. Irvin Korr. Korr, who entered Princeton University on a scholarship and graduated with a Ph.D. in physiology in 1935, turns 80 this year and has over 40 years of basic science research in a distinguished career. All researchers working in fields relevant to spinal manipulation acknowledge his seminal contribution, and Korr was chairman of the noted interdisciplinary conference at Michigan State University in October 1977, entitled 'The Neurobiologic Mechanisms in Manipulative Therapy' which drew leading researchers from around the world. He subsequently edited the text reporting the proceedings of the conference,[5] which was sponsored by the U.S. government, National Institutes of Health, and is often known as the Second NINCDS Workshop.[6]

7. Korr's interest was sparked by the research of John Denslow, an osteopath, in the late 1930s. From 1945 he engaged in detailed experimental study of the mechanisms and pathways of exchange between the somatic and autonomic divisions of the nervous system and their response to spinal subluxation/ dysfunction.[7-14] By 1955 he had fully developed the concept of 'chronic segmental facilitation' which he summarized as follows:

a) Aberrant segments of the spinal column occur in most individuals, including apparently healthy persons.

b) These segments are abnormal in their tonic activity and in their response to various stimuli.

c) In these segments at least some of the neurons mediating sensory, motor, and autonomic functions are maintained in a state of hyper-excitability, which they manifest by easier, exaggerated, and prolonged response to impulses arriving from many sources.

d) They are therefore susceptible to sustained and exaggerated activity under conditions of daily life.

e) The influence normally exerted by these neurons on the tissues which they innervate may thereby be exaggerated.

f) This facilitation means that the tissues innervated from the lesioned segment, and therefore the individual as a whole, are sensitized to all the influences operating within and without the individual.[15]

Most of us, in our youths, have used a magnifying glass to focus sunlight on paper. First the paper darkens, then a hole is burnt, and the body of the page can then catch fire. Under Korr's principle of facilitation, the vertebral subluxation/ dysfunction is the magnifying glass, focusing stress on the structures innervated from that spinal level.

8. Because of the importance of Korr's work it is worth pausing to comment briefly on his early experiments:

a) On the principle of chronic segmental facilitation vertebral subluxation, with or without pain, may cause sustained impulses into the central nervous system which modulate and upset the balance of those parts of the nervous system influenced by that joint or segmental level in the spine. At each level there are three functions of the nervous system (a fourth – trophic function, which has formed a large part of Korr's more recent work – is dealth with in para 9).

i) **Motor function**– nerves firing muscles to contract and allow bodily movement.

ii) **Sensory function**– detecting position, pressure, pain.

iii) **Sympathetic function**– the sympathetic division of the autonomic nervous system regulates visceral or internal function, such as vasomotor (blood circulation) and sudomotor (perspiration) activity, and heart and respiratory function.

b) Korr's first studies measured **motor function.** Pressure was applied to the spinous process of each vertebra to compare the point at each spinal level at which there was a reflex contraction of paravertebral muscles. Muscular contractions were detected and recorded by electromyographs (EMGs).

The first discovery was that where there was a spinal lesion/subluxation there was invariably less pressure required for muscle contraction – i.e. a lower motor reflex threshold. Next it was shown that the more serious the joint dysfunction, the lower the threshold.

Then came the important finding that a variety of normal stimuli entering the nervous system at different spinal levels excited the paravertebral muscle reflex at the level of subluxation but nowhere else. Finally, if all the paravertebral muscles reacted, there was an evident exaggerated response at the level of subluxation. Korr concluded that the paravertebral muscles at the level of the subluxation were in a permanent state of hyperirritability.

c) Impairment of **sensory function** was measured through mapping pain tolerance levels, and cutaneous and deep hyperesthesia over areas of the skin. It was found that production of pain was facilitated at levels of subluxation – i.e. the pain threshold was lower. (See para 14 for recent chiropractic research confirming this).

d) Facilitation or hyperirritability of **sympathetic function** was now considered. Korr measured this at each spinal level by investigation of the sweat glands and skin blood vessels.

Electrical resistance of the skin (ESR) increases when it is dry, lowers with sweat secretion. ESR was mapped and

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photographed and a significant correlation was found between persistent low resistance areas (i.e. hyperactive sweat glands) and clinically diagnosed vertebral subluxation.

Similarly sustained spasm of the blood vessels ("high vascular tone") giving cool skin temperature readings had significant correlation to levels of subluxation.

It was this preliminary evidence of facilitated *sympathetic* pathways that excited Korr most for he saw that it had "very rich fundamental and clinical implications". A large percentage of patients revealed the relationship between areas of low ESR and pathology in organs or structures innervated from that level. "Even more exciting implications", to quote Korr, emerged after several years following large numbers of apparently healthy persons with spinal subluxation and prominent areas of low ESR. A growing number of these subjects developed signs and symptoms of visceral disease in viscera related to the dermatome with low ESR.[16]

9. Korr continued this research in the 1960s then in the 1970s moved to a related new field of interest, the trophic function of the nerve.[17] He and others produced exciting work revealing that nerves not only conduct electrical impulses to muscles, but also supply nourishment – through continuous transfer of proteins and other substances – without which the muscle degenerates. This research demonstrated that nerve compression may interrupt or reduce the axoplasmic flow of material from nerve to muscle, influencing muscle structure, excitability, contractile properties and metabolism. Korr postulates that one mechanism by which spinal manipulation achieves its affects may be removing this obstruction to trophic function in compromised nerves.

10. However Korr's main interest remained the effects of the chronically facilitated spinal segment on the autonomic nervous system and general health – i.e. somatoautonomic relations in the nervous system. This was the express emphasis at his Michigan conference in 1977.

Summarizing his research in this area he uses the image of the iceberg. Spinal subluxation and the obvious muscle changes and pain associated with it represent the tip of the iceberg. However this visible portion is only 10% – of greater interest is the submerged 90%, which represents the reactions of the body to prolonged abnormal stimulation through the sympathetic nervous system – which Korr names 'sympatheticotonia'. Spinal manipulation applied to the tip, says Korr, can move the whole iceberg into warm water.

11. Korr's work and a large volume of recent research are still only scratching the surface of our understanding of the great complexities of the nervous system, and the many levels at which it works simultaneously to devise net responses to each challenge. But the research to date provides corroboration for and elaboration of the fundamental hypotheses of Palmer and the chiropractic profession.

12. Scott Haldeman DC MD Ph.D., a Los Angeles chiropractor and neurologist, has led the chiropractic research effort into the organization and physiology of the nervous system, and how this may be influenced by spinal manipulation. His 1980 text 'Modern Developments in the Principles and Practice of Chiropractic'[18] followed a 1979 conference in Anaheim, California sponsored by the International Chiropractors' Association which brought together the world's leading researchers from all disciplines (e.g. Sir Sidney Sunderland MD, Professor of Experimental Neurology, Melbourne, Australia – on mechanisms of compression and stretch of nerve roots; Aiko Sato, MD Ph.D., Tokyo, Japan – on somatoautonomic reflexes; John Coote, Ph.D. of Birmingham, England – on the central organization of somatosympathetic reflexes). This text, soon to appear in second edition, contains most of the known details of neuroanatomy and neurophysiology relevant to modern chiropractic practice.

A recent review of chiropractic research in North America, Europe and Australia relevant to autonomic nervous system disturbances of cervical origin, such as disequilibrium and vertigo, is that of Brunarski DC in the text 'Upper Cervical Syndrome: Chiropractic Diagnosis and Treatment'.[19]

C. Recent Research – Objective results of chiropractic adjustment

13. Korr and other basic science researchers have sought to explain the results of spinal subluxation. They have not investigated the effects of the chiropractic adjustment or other forms of spinal manipulation on this spinal problem. During the past 20 years chiropractic researchers, influenced in part by Korr's work, have sought to document specific treatment effects of chiropractic adjustment. This work is now reviewed under two headings – sensory and motor functions, and autonomic function.

Sensory and Motor Functions

14. Increased Skin Pain Tolerance Levels

Terrett DC and Vernon DC[20] tested the hypothesis that local paraspinal pain tolerance will increase following a single chiropractic adjustment.

a) 50 subjects without spinal pain, but found by electrical stimulus to the skin over the T1- T10 spinal segments to have identifiable zones of increased pain, were admitted to the trial. All were found to have movement restriction in an adjacent motion segment and were told they would receive a manipulation.

b) Half, chosen randomly, were given one chiropractic adjustment (direct thrust/pisiform contact/to hypo-mobile aspect) at the level of increased pain. The other half received a P/A joint springing manoeuver as a control procedure, to screen for any effect from simple laying on of hands.

c) Pain tolerance to repeat electrical stimulus was assessed at 30 seconds, 2 minutes, 5 minutes and 10 minutes. The control group had unchanged pain tolerance/sensitivity. However the group receiving an adjustment experienced a statistically significant elevation of pain tolerance (140%).

d) The researchers concluded that chiropractic adjustment, as performed, increases skin pain tolerance levels. Their findings suggested "an underlying sub-clinical facilitation of cutaneous sensory reflex pathways coupled with a biomechanical fault in an adjacent motion segment".

15. Increased Range of Movement

Meeker DC has demonstrated an increase in coronal motion in the lumbar spine following chiropractic adjustment.[21]

a) This was a prospective study of 26 consecutive eligible patients presenting to a chiropractic clinic with a chief complaint of low-back pain – both acute (7) and chronic (19). The aim was to see if a clinical course of spinal adjustment produced an increased range of motion measurable on pre and post-treatment AP radiographs taken in lateral bending positions.

b) Treatment involved adjustment at L4 and L5 by one experienced clinician. Precise technique was dependent upon the individual circumstances of each patient following history and full diagnostic work-up. Listings, according to Gonstead, are recorded for all adjustments used. The mean number of treatments was 9 at which point the clinical outcome was total recovery or much improved (24 cases), or some/slight improvement (2). Mean number of days between pre and post radiographs was 36.

c) Following statistical analysis there was no significant improvement of motion for the chronic cases. However there was a significant mean increase in coronal motion at L4 for acute low-back pain patients.

16. Cassidy DC, Quon Ph.D., and LaFrance DC have an important new study[22], accepted for presentation to the North American Spine Society's next annual meeting in June, which documents increased ranges of movement in the cervical spine following a single adjustment.

a) The study involved 51 patients with unilateral neck pain, some acute some chronic, 40 (80%) of whom had "substantial limitation of activity" on account of pain.

b) The subjects were given a single rotational cervical adjustment on the side of pain. Pre and post ranges of movement were measured by cervical goniometer, a measuring device worn on the head which is standard equipment for range of movement measurement in health science.

c) There was marked increased range of movement in various planes – on the same and opposite sides of restricted rotation, flexion and extension, and ipsilateral and contralateral lateral bending. Most noticeable improvement was in rotation.

The investigators also report a significant decrease in pain. Using refined methods of statistical analysis they have been able to show a most important connection – the decrease in pain is positively linked to the increased range of movement.

In a related study LaFrance DC and Cassidy DC[23] have found significant increase in rotational range of motion of the cervical spine following a single adjustment with **asymptomatic** subjects also. Treatment comprised a single rotary cervical adjustment with contact on C2, and pre and post ranges of movement were again measured by goniometer.

17. Raising Plasma Beta-endorphin Levels

Vernon DC, Dhami Ph.D., and fellow researchers,[24] building upon earlier research by chiropractors in Europe and the United States, looked at the effect of adjustment on neurotransmitters that play an important role in central and spinal segmental reflex phenomena. They looked specifically at production of beta-endorphin in blood plasma, since elevated levels modify pain and have been found following transcutaneous electrical nerve stimulation (TENS) and acupuncture.

a) 27 healthy subjects were randomly allocated to one of three groups – a control group (no intervention), a sham or placebo group (receiving joint play maneuvers and rotation of the upper cervical spine to maximal passive range of movement but not through the elastic barrier) and an experimental group (same procedure as placebo group, but with additional pressure on the segment to introduce a high-velocity, low-amplitude rotary manipulation taking the joint through the elastic barrier).

b) Blood samples were taken at 15 and 5 minutes before intervention, and at 5.15 and 30 minutes after intervention.

c) Plasma beta-endorphin levels were assessed (by radio-immune assay technique) and showed a statistically significant increased level in the experimental group 5 minutes after the spinal adjustment. Beta-endorphin levels in the placebo and control groups, by contrast, demonstrated a steady decrease.

d) The investigators concluded that one effect of spinal adjustment, providing part of the explanation for pain relief, is a short term increase in plasma beta-endorphin levels. As there was no increase in the placebo group, this improvement could not be explained simply by the laying on of hands.

18. Increased Pressure Pain Threshold

Vernon's most recent work on the objectively measurable effects of spinal adjustment involves measurement of pain relief with a Pressure Pain Threshold (PPT) meter.[25] This meter has a calibrated dial, similar to a clock face, attached to a plunger. It was initially developed for other research purposes but is attractive to chiropractic practice and research because it measures tenderness to pressure in the deeper myofascial structures (as opposed to, for example, skin rolling techniques and electrical pain-stimulation).

a) In a recent case report a patient with a 5 year history of chronic neck and arm pain indicated mid-cervical and trapezius muscle pain. Motion palpation revealed joint dysfunction at T2-T3 and in the right scapula.

b) 7 tender points (TPs) were recorded on examination with the TPP meter, performed by placing the meter over the contact area then applying pressure gradually and evenly until the patient indicated the point where the sensation of pressure turned to tenderness and pain.

c) The patient received chiropractic adjustment of the T2-T3 segment (anterior thoracic, on the right) and a scapula stretch technique with audible release on the right.

d) After 5 minutes relaxation PPT meter readings were re-taken for the 7 TPs. There was an average increase in pressure pain threshold at all 7 TPs of 46%. (There was also noted improvement of joint mobility, and the patient reported feeling better).

e) This report is of interest because it is typical of complaints seen daily by chiropractors and shows the importance of identifying both muscle and joint dysfunction. While it is simply a case report Vernon has recently completed an extended study to be published in JMPT which confirms this result.

Autonomic Function

19. Altered Blood Pressure

Because this is an area of clinical success, as with related effects on cardiac function (see 'Professional Notes' for recent medical and osteopathic research of note in this area), there has been a significant amount of chiropractic research.

However, as with all neurophysiological research, much of this is now unsophisticated following recent advances in technology, research techniques and understanding. A cross-section is presented.

Hood DC[26] performed a prospective clinical study with 75 consecutive patients in his chiropractic practice who had a

chief presenting complaint of back pain but displayed significant abnormal blood pressure – being either hypertensive (67) or hypotensive (8).

a) All subjects received a clinical course of chiropractic adjustment "until joint function was greatly improved". Adjustment was by Gonstead technique, at all levels where subluxation was found, and subjects received an average of 9.8 treatments over approximately two months.

b) Hood reported large mean reductions in hypertensive levels of blood pressure (76% systolic, 86% diastolic), and similar increases (70% systolic, 73% diastolic) with hypotensive levels. He concludes that "abnormal blood pressures either rise or fall towards the optimum as vertebral subluxation is reduced".

20. Tran Ph.D., and Kirby DC[27] studied 20 random normal subjects without subluxation, two of whom proved to be hypertensive, one hypotensive. The aim was to determine the effect of cervical adjustment on a number of parameters including blood pressures, heart rates and pulse pressures.

a) Treatment consisted of a single adjustment to C1/C2 (rotary technique and/or "occipital lift technique when necessary"). ECG recordings were traced before, during and after the adjustment.

b) There were significant pre and post adjustment changes, including decrease in pulse pressure and increase in diastolic pressure. Overall, however, pressures remained within normal physiological range.

Two of the three subjects with abnormal blood pressures "tended to normalize" but, because of insufficient numbers, this was of interest rather than conclusive.

c) The authors conclude that their results "clearly demonstrated a hypertensive effect of C1-C2 adjustment" in a normally healthy population.

There is now good evidence that spinal adjustment decreases pain, increases range of movement, increases pain tolerance in the skin and deeper muscle structures, raises beta-endorphin levels in the blood plasma and . . . has potent impact on a variety of nerve pathways between the soma and viscera that regulate general health.

21. Sato MD Ph.D. (see para 12 above) has been a leading investigator into somatosympathetic reflexes since the 1960s, using animal experiments to measure the effect of autonomic nervous system reflexes on the function of various organs.

In a recent experiment[28] funded by the Foundation for Chiropractic Education and Research and the Ministry of Health and Welfare, Japan, Sato and Swenson DC Ph.D. studied the effects of mechanical stimulation of the spine in rats on heart rate, blood pressure, adrenal nerve activity and renal nerve activity.

a) T10-T13 (in 13 animals) and L2-L5 (8) were exposed, as were the left kidney, adrenal gland and sympathetic nerve supply. Upper and lower spinal segments were fixed with clamps and stimuli up to 3 kgs in force were applied to the mobile segments. Nerve activity was recorded, then analyzed and displayed by means of computer.

b) The study demonstrated "clear and potent decreases in blood pressure and renal nerve activity in response to the mechanical stimulation" caused by "potent somato-visceral reflexes".

c) The researchers add these results to the work of other "eminent neurophysiologists who have suggested that long-term changes in autonomic nervous system (ANS) activity may be a factor in many disorders" and suggest "the cardiovascular system represents the most likely place where the ANS will be shown to be involved in pathophysiological processes". However the role of aberrant sympathetic response in disease remains unproven.

22. Change of pupillary diameter

Briggs DC and Boone Ph.D. studied the effects of chiropractic adjustment on changes in pupillary diameter.[29] This measure was chosen because it was non-invasive and related to a relatively well defined autonomic pathway.

a) 15 subjects, chosen following screening by an optometrist, were evaluated for four days pre-treatment to determine a base line of pupillary diameter under controlled conditions, and to determine which subjects had clinically diagnosed cervical subluxation.

b) Prior to treatment subjects were dark adapted for 15 minutes to neutralize the predominant parasympathetic control of the pupil present under normal light conditions. Pupillary diameter (PD) was then measured from sophisticated photographic studies.

c) Subjects with subluxation (8) were given a single adjustment (toggle recoil or modified cervical break) at the compromised level – C1, C2 or C5. Those without subluxation (7) formed a control group and were given a sham adjustment comprising a slight muscle massage to the upper cervical spine. There was then repeat photographic procedures and measurement.

d) There were a number of interesting results. Firstly, in the 4-day observation period pre-treatment those with subluxation exhibited significant variations in PD day to day, whereas those without subluxation did not. Secondly those without subluxation experienced no PD change following sham adjustment whereas those in the treatment group elicited clear changes. However these were variable – following adjustment to C2 and C5 there was a sympathetic response (dilation), following adjustment of C1 a parasympathetic response (constriction).

e) Subluxation and adjustment effect a response in PD mediated by the autonomic nervous system. Following an analysis of recent neurological research they "suggest that the observed autonomic responses seen in this investigation ... may be reflections of neural summation of segmental afferents and supra spinal descending fibers on sympathetic pre-ganglionic neurons".

23. Increased Secretion of Melatonin

Dhami Ph.D., Coyle Ph.D., and colleagues[30] in research from Palmer College of Chiropractic-West, California, investigated the effect of upper cervical adjustment on the secretion of melatonin since current research indicates this function is mediated by sympathetic neurons. The hypothesis was that upper cervical adjustment might stimulate the sympathetic neurons which innervate the pineal gland, increasing secretion.

a) 30 healthy male subjects were divided into 3 groups – Group A (control group), Group B (receiving manipulation for the first time – each received 2 high-velocity, low-amplitude rotational thrust adjustments to the upper cervical spine) and Group C (received the same adjustments, but had prior experience of manipulation).

b) Measurement of plasma and urinary melatonin content one hour after treatment confirmed a statistically significant increase in secretion rate in Groups B and C – those subjects receiving chiropractic adjustment. The investigators conclude that upper cervical adjustment may stimulate the sympathetic innervation to the pineal gland and then proceed to discuss the precise mechanisms involved.

D. Conclusion

24. The first chiropractors last century, and their successors early this century such as Loban (1920)[31] and Janse (1947),[32] saw widespread health responses to correction of vertebral subluxation and suggested three major reasons:

- Restoration of normal function.
- Removal of nerve impingement.
- Stimulation of the nervous system.

25. Current research by basic scientists and by chiropractic medicine and osteopathy provides growing evidence in support of these hypotheses. There is now good evidence that spinal adjustment decreases pain, increases range of movement, increases pain tolerance in the skin and deeper muscle structures, raises beta-endorphin levels in the blood plasma and, – and this is the 90% of Korr's iceberg – has potent impact on a variety of nerve pathways between the soma and viscera that regulate general health.

On one hand there is need to await more research before making definite claims. (One recalls the impressively humble recent comment of a North American medical professor – "only half of what I teach is correct. The problem is that I don't know which half").

On the other hand there is now a credible research basis for what the founders of chiropractic surmised, and chiropractors can share with others their unique contribution to health care with more detailed explanations and confidence than ever before.

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THE CERVICAL FACETS – A POTENT SOURCE OF PAIN

'The Cervical Zygapophysial Joints as a Source of Neck Pain', Bogduk, N. and Marshland, A. (1988), Spine 13(6)610-617.

This is another learned discussion from Bogduk in Australia, which reports a study using injections of anaesthetic as a nerve block in the cervical facets to see if patients with neck pain and headache (C2-C3 joints) and neck pain and shoulder pain (C5-C6 joints) would gain pain relief – i.e. whether or not the source of pain was the cervical facets.

There was complete temporary relief of all symptoms in 17 out of 24 consecutive patients and the researchers conclude from this high yield that the cervical facets were the pain source, and a potent one. Bogduk notes that the lumbar facet joints are acknowledged by medicine to be a rich source of low-back pain and referred pain in the lower limb, but then makes these comments of interest:

- "In contrast the cervical zygapophysial joints have attracted relatively little attention as possible sources of neck pain and referred pain in the upper limbs ... cervical zygapophysial disorders are poorly understood, or even not considered in conventional (medical) practice ... we suggest that zygapophysial joint pain be added to the differential diagnosis of neck pain in conventional practice".
- Cervical facet surgical denervation, in contrast to injection techniques, draws criticism. Bogduk reviews the research which shows "success rates of 40% or so" and observes that these offer little support for the rationale behind cervical denervation.

congress (see below). Many of the U.S. chiropractors present were contemplating moving their practices to Mexico following the new legal recognition of the profession.

The Mexican profession, which enjoys close relations and mutual respect with other health disciplines and health authorities, has an agenda for establishing the world's first Spanish-speaking chiropractic college within 5 years. This would serve the profession throughout Latin America and in Spain. It is anticipated that the college will be part of, or closely affiliated with, either of the two major universities in Mexico City. Both have expressed firm interest.

Congress in Mexico City

This international seminar February 16-18, 1989 was jointly sponsored by the SCQM and the Los Angeles College of Chiropractic. Keynote chiropractic speakers included Dr. Scott Haldeman, chiropractor and neurologist, Los Angeles, Dr. Maylon Drake, President, Los Angeles College of Chiropractic, Dr. Jim Parker, President, Parker College of Chiropractic, and Dr. Len Savage, chiropractic orthopedist, California. Other invited speakers included Dr. Ken Luedtke, President, ACA, Dr. Shelby Elliott, Chairman of the Board, ACA, Dr. Gary Auerbach, Director ICA (all 3 of whom have been influential in establishing chiropractic in Mexico in recent years) and Mr. David Chapman-Smith, Secretary-General, World Federation of Chiropractic. Medical presentations were given by distinguished specialists in orthopaedics, radiology, psychiatry, and pediatrics – including Dr. Octaviano Gomez of Mexico City, a prominent radiologist just returned from presenting a paper on 'Radiology in the Bullfights Ring' to the annual meeting of the International Society of Bullfights Surgery in Biarritz, France.

Highlights from Haldeman

DC – MD Relations

Haldeman addressed the Saturday night banquet on medical – chiropractic professional relations and drew sustained applause for a frank address in which he emphasized the benefits for all through cooperation and the unique contribution that chiropractic had to offer. Commenting on the U.S. situation he noted:

• The 1960s were dominated by confrontation between chiropractic and medicine. There was a lack of understanding and communication both ways, and this prejudiced patients.

• The 1970s saw increased understanding, but still little professional cooperation. Patients were left to sort out best treatment approaches for themselves. In the management of spinal pain medicine and chiropractic tended to try one approach then shunt the patient on. The patient proceeded round a circle of specialists often ending up where he/she had started.

• The 1980s have featured substantial cooperation between chiropractic and medicine and a radically altered approach to the management of spinal pain. "No one can understand everything in spine pathology anymore – there is too much happening, there are too many treatment protocols. All professionals realize there is no shame in not knowing, the shame is not to ask and cooperate".

Management increasingly involves multidisciplinary clinics, and this serves both the interests of patients and professionals. Haldeman's Los Angeles clinic has, beside himself doing largely electrodiagnosis, two neurologists, a psychiatrist, a clinical psychologist (responsible for stress management and biofeedback), two chiropractors and a physical therapist.

Electrodiagnosis

Haldeman's main subject at the scientific sessions was the current status of electrodiagnosis, a field in which he is one

POINTS

• Merger of the ACA and ICA is off for the foreseeable future. There was an insufficient vote for merger at the ICA's annual convention last year (56% for, but 66-2/3% required to accomplish merger). The ICA Board of Directors subsequently ordered a general membership vote, then each individual director addressed the arguments for and against merger in the January/ February 1989 issue of the ICA Review. The membership vote, counted on February 18, 1989, showed only 50.5% in favour of merger, well short of the two-thirds majority required (82% of the ICA membership participated in the vote).

• 'Upper Cervical Syndrome: Chiropractic Diagnosis and Treatment' (1988), edited by Vernon H, Williams and Wilkins, Baltimore (253 pages Canadian $71.50) is a further excellent new chiropractic text. Editor Dr. Howard Vernon is Director of Research, Canadian Memorial Chiropractic College, Toronto and the book arises from an upper cervical spine conference held at CMCC in 1986. Chapters on all aspects of the cervical spine are divided into three main sections – normal anatomy and physiology, applied chiropractic, and clinical.

• 'Chiropractic Technique' edited by Thomas Bergemann DC and published by Williams and Wilkins, Baltimore is the latest in a large number of new chiropractic periodicals that have surfaced during the past five years. There will be a summary of available journals in the next issue of this Report.

One of the reasons chiropractic research has been inadaquately recognized is that chiropractic journals have not been indexed in the main bio-medical research bases such as Index Medicus. That is changing and now four journals are indexed, The Journal of Manipulative and Physiological Therapeutics (JMPT), The Journal of the Australian Chiropractors' Association, Chiropractic Sports Medicine, and most recently Chiropractic History.

Russell Gibbons, editor, Chiropractic History, which is the official journal of the Association for the History of Chiropractic, has done an exemplary job that should be recognized by all chiropractors. You could acknowledge this recognition by joining the AHC, 4920 Frankford Avenue, Baltimore, MD 21206, USA, Tel: (301) 488-6604. (Current membership dues: US and Canada – US$35.00. Elsewhere – US$42.00).

• Another new book of interest is 'Other Healers: Unorthodox Medicine in America' edited by Gevitz N, John Hopkins University Press, Baltimore (368 pages $37.50 hard cover, $15.00 paperback). Walter Wardwell Ph.D. has a chapter on chiropractic, a fine summary of the history, evolution and modern development of the profession from a medical sociological viewpoint. An opportunity to see how you are viewed by others.

• All treatments have their risk, as is confirmed by a recent coroner's file received. Cervical facet joint injections of anaesthetic agents for neck pain are routine and regarded as safe in medical practice.

In this case a 38 year old male who had experienced three days of neck and right arm pain after trimming some trees at his home immediately lost consciousness then died following an injection. Both pathologist and coroner confirmed "local anaesthetic agents in the cerebro spinal fluid following injection at the back of the neck" as the probable cause of death.

• A live issue everywhere is the establishment of comprehensive, current chiropractic treatment standards. These are important for consensus within the profession, and equally important for third parties legislating or paying for chiropractic services.

The best document we have seen is that recently prepared by the Chiropractic Advisory Committee, Department of Labour and Industries, State of Washington, U.S.A. The report is titled 'Chiropractic Standards of Practice and Utilization Guidelines in the Care and Treatment of Injured Workers' and is available at a cost of US$50.00 from Daniel T. Hansen DC. DABCO. Chiropractic Advisory Committee, Department of Labour and Industries, 1115 Black Lake Blvd. S.W., Suite A, Olympia, WA 98502, USA. Dr. Hansen is editor of the publication, which arose from a cooperative effort from all organizations within the chiropractic profession in Washington.

of the world's leading researchers. This is a complex topic but:

• He gave clinical examples of how the four principal methods of measuring nerve conduction speeds and patterns (electromyelography (EMG), F Response, H Reflex and somatosensory evoked response (SER)) can now often document the precise level of the structural or functional lesion interrupting the normal functioning of the nervous system.

• This is done by measuring and comparing nerve function from various regions of the body. Take, for example, the worker disabled by foot numbness and leg pain. A few years ago CT scanning and other available investigations would have produced no objective evidence of a lesion, and medical science would have assigned him a psychological problem.

Now using electrodes placed on the head, different levels of the spine, and different levels of the extremities, electrodiagnosis can pinpoint the site of the lesion, documenting the true cause and allowing rational management.

Expert Witness and Spinal Pain

Who should the court accept as the true expert in a case involving back pain? It depends upon the circumstances, says Haldeman. Where there is:

• Disc herniation – orthopaedic specialist.

• Functional disturbance confirmed on electromyelograph – physiatrist.

• Spinal functional problem in absence of positive herniation or EMG evidence – chiropractor. The chiropractor is trained to recognize and treat a spinal functional entity that other specialists have not looked for and have insufficient training to recognize.

HEARTS AND BACKS

The main article in this issue looks at chiropractic research into the effect of spinal manipulation on blood pressure. Many chiropractic, medical and osteopathic investigators have examined the inter-relationship of impaired cardiac and spinal function. Here are two recent contributions, the first medical, the second osteopathic.

'Effective Prevention of Coronary Heart Attacks', Sherwood P (1985) Digest Chiro Econ (November/December) 54-57 and 122-123. (Reprinted from American J Acupuncture, Dec. 1984). **PN1**

Sherwood, a general medical practitioner from London, England, presents the theory that many coronary attacks are caused by a spasm of the coronary artery, triggered by malfunction of the sympathetic stellate ganglion. This malfunction arises from a state of congestion brought about by upper thoracic spinal dysfunction which sensitizes the ganglion either to an increase of congestion around it or a sudden change in its activity. The paper has a detailed discussion of mechanisms, including original compromise of the sympathetic nervous system and compensatory central nervous system activity.

Sherwood gives a number of case studies in describing his "long term treatment results of cardiac patients (which) have been very good". The basic aim of treatment is to bring about repair of damage to the facet joints in the upper cervical spine. "This requires two things – that the intense pressure of the muscle spasm is relaxed and that the muscle pump is evoked to gain the maximum tissue circulation, especially to the facet joints and the sympathetic chain". To achieve this Sherwood uses manipulation, massage, faradism, and ultrasound.

'A Somatic Component to Myocardial Infarction', Nicholas A S, DeBias D A et al (1985) Br Med J 291:13-17. **PN2**

This was a controlled blind study "to explore the somatic component associated with acute myocardial infarction". 47 patients were divided into a test group of those with clinically confirmed myocardial infarction (25) and a control group without any cardiovascular disease (22). The subjects were examined by palpation of the thoracic paravertebral soft tissues (T1-T8).

The control group was found to have a low incidence of palpable changes, and these were evenly distributed from T1-T8. The group with infarction disclosed a significantly higher incidence of soft tissue changes (increased firmness, warmth, ropiness, oedematous changes, heavy musculature) and this was confined almost entirely to the upper 4 thoracic levels.

The authors conclude that myocardial infarction is accompanied by characteristic changes readily detected by palpation and suggest a somatic influence on the cardiac disease process. They acknowledge further investigation is necessary "to define the anatomy of the sympathetic reflex arc (involved) and to delineate palpable changes found in (other) cardiovascular diseases".