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A Four Case Study

by Richard Barwell, D.C.; Annette Long, Ph.D; Alvah Byers, Ph.D; and Craig Schisler, B.A., M.A., D.C.

The effect of the Chiropractic adjustment on the brain wave pattern as measured by QEEG. Summarizing an additional 100 (approximately) cases over a three year period.

Abstract

An initial study was devised by chiropractors and clinical psychologists to test the hypothesis that chiropractic adjustments affect the central nervous system directly. The method of obtaining data was with a 2-lead QEEG device. The device measures brain wave frequencies. A measurement was taken pre-adjustment and a second QEEG measurement was taken post adjustment. A simple criterion was used to make the determination of the effectiveness of the chiropractic adjustment: First -- the right/left balance; second -- the amount of total activity; third -- primary regions of activity; fourth -- the effect of the adjustment on each of the areas listed above. Data was collected at CEO seminars for approximately 3 years with approximately 100 subjects. These four cases are representative of the effects of the study. It was concluded that the chiropractic adjustment does affect the central nervous system directly.

Introduction

Recent attacks by the medical establishment against the chiropractic profession make it clear that despite volumes of research, chiropractic is still viewed as a limited form of health care. As such, it is still vulnerable to the same threats and misconceptions against which it has been fighting for decades. In the 1960's there was a significant and conscious effort within the chiropractic profession to move away from a focus on the nervous system and concentrate solely on the physical structure, particularly the spine. This was done as a response to relentless and seemingly damaging attacks on chiropractic's efficacy and validity as a health care profession.

The profession was at a standstill, as the last major addition to our scientific evidence had been the Neurocalograph and it was in question within the profession, let alone from the medical establishment. In fact, the connection between the autonomic nervous system and the NCM readings was poorly explained, if understood at all. That left the profession with radiograph film studies and structural analysis to define the scientific basis for chiropractic. What resulted was a limiting burden of research relating structural changes relative to back pain.

Today, we live in this chiropractic model. It served its purpose as the attacks on our profession, which were based on not being scientific, stopped. The back pain studies did show the great benefit of chiropractic care and were reproducible. This led us into the medical system and insurance coverage, which was seen as a great victory for Chiropractic and we all believed we had won a great battle. We became even more focused on the physical spinal approach as our identity, and accepted a narrowly defined scope of practice.

New attitudes in chiropractic also appeared: programs to help offices attract patients with physical needs; better insurance billing systems; new methods of how to bill insurance companies for care that augmented chiropractic; and new

concepts of the chiropractic model that focused on the spine and subluxation.

The Riekeman and Flesia "Renaissance" program was a major influence in the profession and held a combination of the original principles of Chiropractic and the new structure based attitudes. It introduced a 5 component model of spinal dysfunction complete with neurological studies. These studies established the sensitivity of the dorsal nerve root and the effects on the neurological messages. It brought the term "Vertebral Subluxation Complex" into the Chiropractic lexicon. The banner cry went forth in the profession "Find and correct VSC". Now we had our territory, "The 5 component VSC" and we could easily relate VSC and back pain, neck pain, even headaches, sciatica, brachial neuralgia with Chiropractic care benefits. Again we had it made. Workman's compensation and motor vehicle accident claims could be cared for under Chiropractic as they could be linked to the physical spinal subluxation model.

There were, however, limitations with the model. Clinical results that went beyond physical/structural problems and entered the realm of mental/emotional imbalances could not be directly explained or measured. Things like changes in patient's perception and quality of life were beyond billing codes and x-ray findings. Kent's elegant refinement of the 5 component VSC model into the 3 component VSC model helped to clarify the link between the VSC and the interruption of nervous system function. Yet, that too, needs a further refinement.

Chiropractic has to move beyond the limitations of the Vertebral Subluxation Complex. Clearly the VSC exists, but there is value in looking beyond the spinal subluxation to define Chiropractic and the power of the adjustment. Measuring the Central Nervous System and the role it plays as the central organizing authority in body function is paramount to truly understanding how an adjustment effects the body. A hypothesis was formed that directly explains mind-body integrity. Neurologically based chiropractic must take into account a measurement of how the brain is affected by a chiropractic adjustment.

A discussion between Dr. Annette Long and Dr. Alvah Byers, two clinical psychologists with decades of work in bio-feedback [1], and Dr. Richard Barwell, chiropractor and founder of Chiropractic Equity Offices, led to 3 years of research collecting data to determine if the chiropractic adjustment effects brain function. In the initial discussion in Dr. Byers is office in Pueblo, Colorado, Dr. Barwell shared his hypothesis that the Chiropractic adjustment directly affected the CNS. A preliminary experiment was designed using electroencephalogram equipment of Dr. Long and Dr. Byers.

Materials and Methods

Four subjects were chosen and measured with either a 19 lead Lexacore QEEG (EEG) or Dr. Long's 2 lead EEG equipment before getting adjusted. Each person was adjusted by Dr. Barwell using manual adjusting procedures and then after 20 minutes another EEG measurement was taken on the subject. Results of the initial findings were inconclusive. Dr. Byers was reluctant to make any conclusions stating that though all four subjects demonstrated a change in brain wave pattern after the adjustment, it could be normal variation.

The following two years were spent gathering EEG scan information. Pre and post QEEG studies were done on approximately 100 subjects during the Chiropractic Equity Office program seminars. Subjects were volunteers who attended the seminars. Dr. Byers conducted the scans using a 2-point EEG system. Contacts measured were in the CZ locations with an ear ground as specified by the EEG equipment. All contacts were checked initially for impedance to insure proper data transfer. The pre adjustment EEG reading was taken during a period of 5 minutes. The subject was instructed to close his eyes and do relaxation breathing as per Dr. Byers instruction.

The subject was then adjusted using one of the following techniques: Activator, Torque Release, manual adjusting. All adjustments were performed by Dr. R. Barwell, Dr. T. Berry, or Dr. P. Christopher. A period of 20 minutes was observed before taking the post EEG reading.

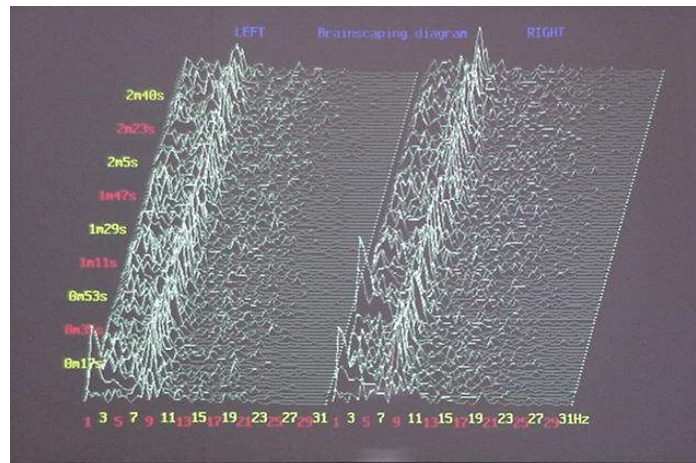
To understand the scans a brief explanation is needed. There are 4 primary frequencies of brain function: Beta, Alpha, Theta and Delta.

Beta -- Highest frequency active brain, busy, high energy consumption 12Hz to 31Hz (20-25 ruminating thoughts; 40 manic) Alpha -- Meditative state, healing mode, earth frequency, learning 7.4Hz low A* - 9-12Hz high A

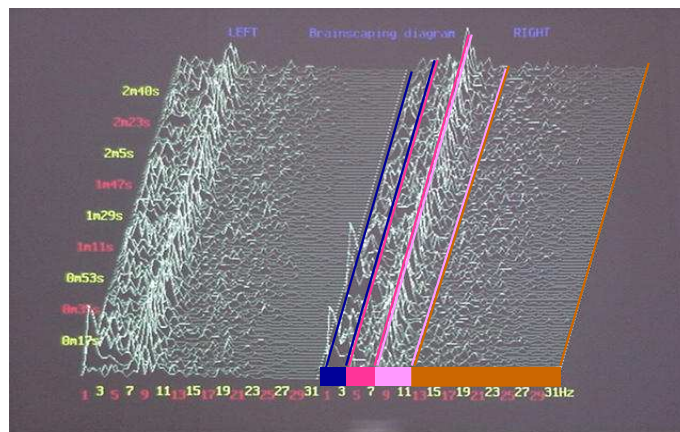
Theta -- Light sleep, deep relaxation, subconscious, conceptual development 3.5Hz -- 7.4Hz

Delta -- deep sleep, energy storage, repair mode, deep subconscious .5Hz - 3.5Hz deep sleep

The graph in Fig. 1 is an EEG scan to demonstrate how the brain frequencies are represented on paper. This graph shows both left and right hemispheres as indicated at the top of the graph. The first important observation is to see if the hemispheres are balanced in activity. The Hertz range (frequency) is located at the bottom, and numbers from 1-31Hz in each hemisphere. The timed recording segments are called epochs, and are noted on the left of the graph.



In Fig. 2 you will note the most distinct findings appear at the Alpha level (Area 3) with the mountain range look. The Beta range (Area 4) on the right side of each hemisphere is much broader as the frequency range runs from 12 to 31Hz vs. 7.4 to 12 for Alpha. Theta (area 2) is the light sleep, REM brain frequency while the deep level of subconscious is the delta (area 1). The large spikes seen to the left of each hemisphere are considered to be artifacts or anomalies.



Results (Based on this four case study)

The first series of scans were done with the approach that we would not note any change in the brain wave patterns when we compared the pre adjustment scan to post adjustment scan. The following scans (Figs. 3-10) are an example of what we found. There are several areas to examine as you look at the scans. First -- the right/left balance; second -- the amount of total activity; third -- primary regions of activity; fourth -- the effect of the adjustment on each of the areas

listed above.

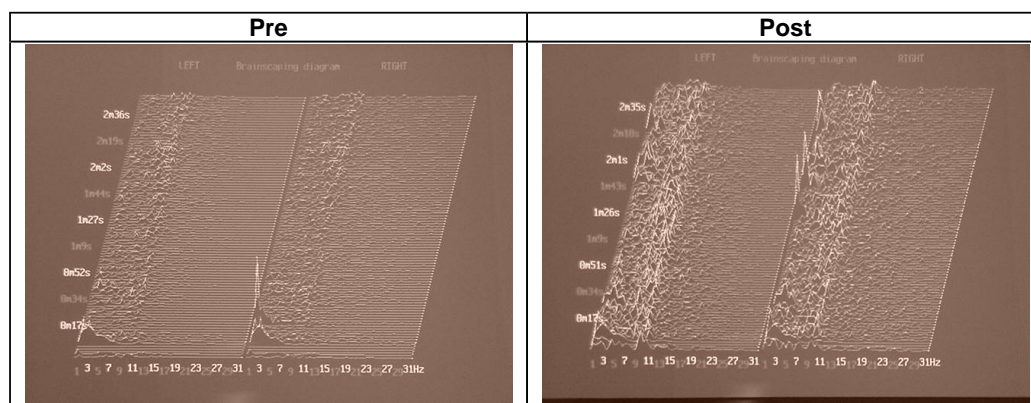


Fig 3

Fig 4

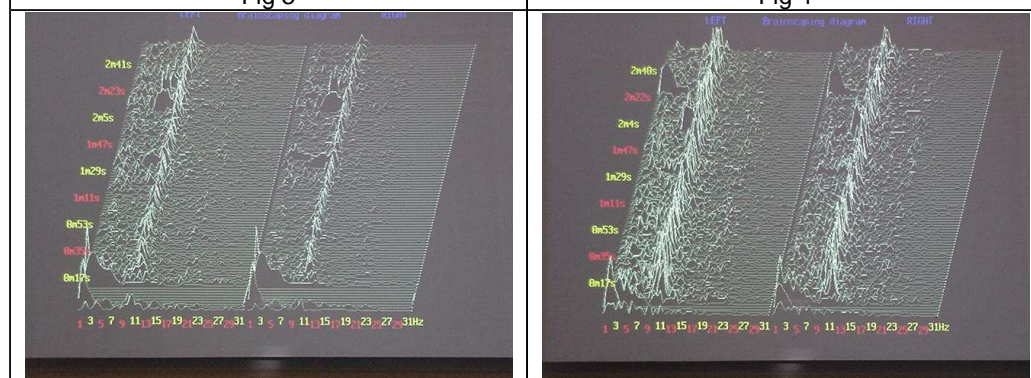


Fig 5

Fig 6

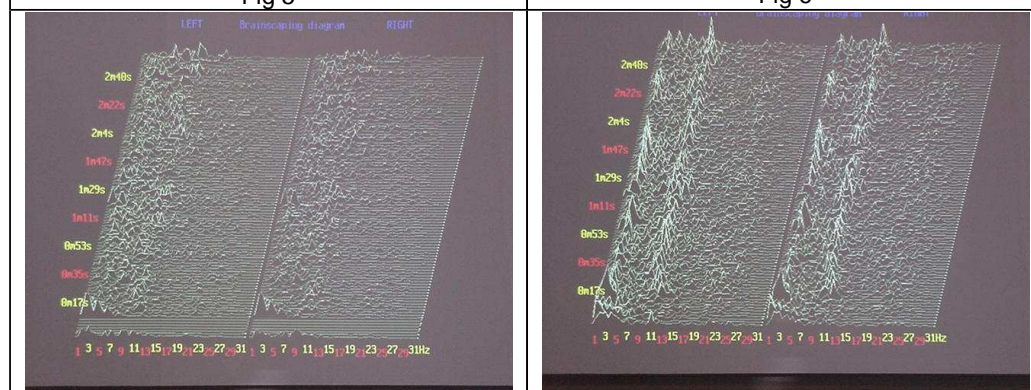


Fig 7

Fig 8

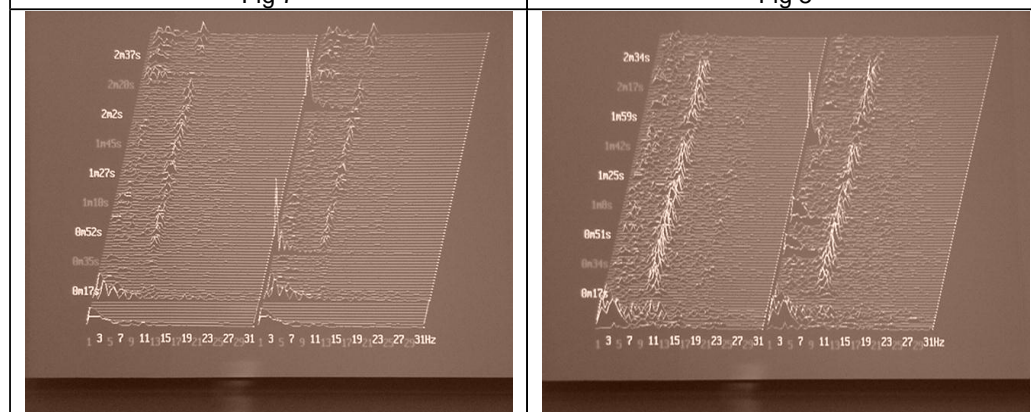


Fig 9

Fig 10

In each of the above 4 examples what clearly can be seen is that all of the four areas listed above show improvement.

Discussion

We also found some beautifully balanced and active brains in the pre-scans and the adjustments showed little, if any change, in the post-scans on each of these individuals, such as the one in Figs. 11-12. This seems to suggest that the chiropractic adjustment does not have a deleterious effect on the CNS. The studies have continued and the findings continue to show significant changes in the CNS pattern after a Chiropractic adjustment on those individuals with less than a balanced active brain.

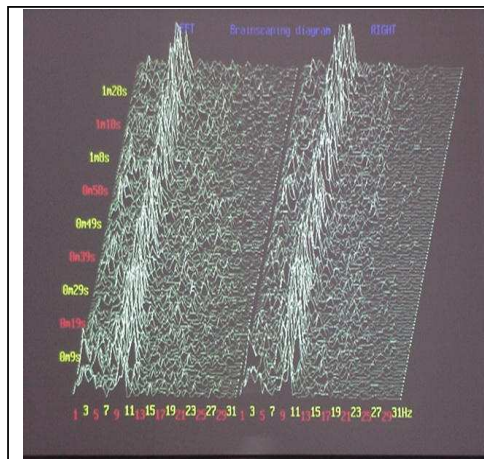


Fig 11

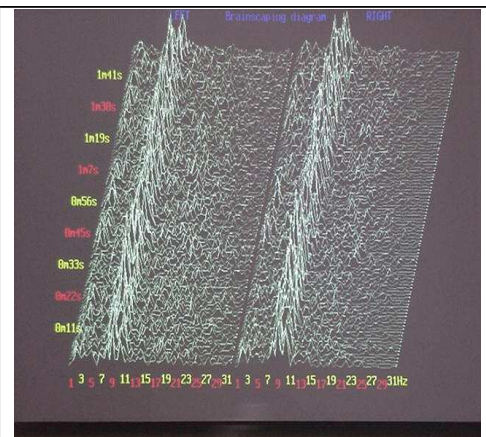


Fig 12

The nature of the study was initially designed to determine solely if the chiropractic adjustment affected the CNS. Collecting and analysis of the data was done with the intention of disproving that the chiropractic adjustment did affect the CNS. During the Toronto CEO seminar on October 23, 2000, Dr. Byers announced to the audience, "I can unequivocally state that the Chiropractic adjustment directly affects the Central Nervous System." Our preliminary studies suggest the adjustment does change the activity level in the CNS.

One of the expected results was that the chiropractic adjustment would place the subjects into a predominantly Alpha brainwave pattern. Alpha is the conscious, meditative state, classically associated with a greater degree of relaxation and health. As that was our intent during the adjustment trials, and that seemed to be the result we got on the scans. We noticed that the alpha activity was also accompanied by an increase in general brain activity.

Obviously, much more research is needed to explore the vast potential of how exactly the chiropractic adjustment affects the CNS. A proper series of studies in a more controlled environment is necessary.

Conclusion

In order to position the chiropractic profession as a legitimately respected health care service, those of us in this profession need to embrace the full extent of what we do. [2] The concept of vertebral subluxation needs to be refined in a broader context: that of neurological based chiropractic care.

An hypothesis was formed that the chiropractic adjustment affected the function of the Central Nervous System. Preliminary research was completed by Chiropractic Equity Offices Inc. showing that the extent of the chiropractic adjustment affects the nervous system beyond the dorsal nerve root and affects the function of the brain itself. The study utilized EEG equipment that showed a definite change in brain wave frequencies following a chiropractic adjustment. Four criterion were looked at: First -- the right/left balance; second -- the amount of total activity; third -- primary regions of activity; fourth -- the effect of the

adjustment on each of the areas listed above. All criterion were satisfied.

Implications of this preliminary project are immense and have the potential to vault the chiropractic profession to the forefront of health care.

Annette Long Ph.D -- Dr. Long's professional experiences include teaching for the University of Utah, The University of Southern Colorado, and Adams State College in Colorado. She has worked for the Center for Creative Leadership, evaluating and providing feedback to business executives from around the world. She has been the owner of several businesses and is co-owner and director, with her husband Dr. Alvah Byers, of Associates for Psychotherapy and High Performance Associates

Alvah Byers, Ph.D -- Dr. Byers completed the B.S. in Natural Science and the M.A. in Counselling Psychology at the University of Minnesota. He earned the doctorate in Counselling Psychology at the University of North Dakota and the Graduate in Theology degree at Luther Theological Seminary in Saint Paul, Minnesota; He was a practicing psychologist from 1959 to his retirement from clinical practice in 1995. He was the first licensed psychologist in North Dakota by examination in 1969 subsequent to the adoption of that state's Psychology Licensing Law. He has been licensed in Colorado by examination since 1973; he has been involved in biofeedback since 1976 and a member of the Association for Applied Psychophysiology and Biofeedback since 1978. In addition he continues his membership in the Society for the Study of Neuronal Regulation (SSNR), and the American Psychological Association. At the time the first edition of the BNLR was being written he was vice-president of SSNR. He was a certified neurotherapist in the Academy of Neurotherapists and was certified in EEG Biofeedback by the Biofeedback Certification Institute of America (BCIA). He was a board-certified diplomat in the American Academy for Pain Management. He was a professional member of the National Academy of Neuropsychology and was a member of the International Neuropsychological Society, as a member of the American Society for Clinical Hypnosis he had been an instructor in that society's hypnosis seminars. He founded the Associates for Psychotherapy and Education in 1976. Together with his wife and partner, Annette Long, Ph.D., they have developed that practice into an integrated, multi-professional mental health center. Some of Byers publications are listed in the BNRL. He continues his interest in Neurotherapy while living in his mountain home in Beulah, Colorado.

Richard Barwell, D.C. -- Dr. Barwell graduated with Clinic honours for the Canadian Memorial Chiropractic College, Toronto Canada in 1964. He was a member of the Canadian and British Columbia Chiropractic Associations from 1964 to 1996. He remained in active practice during those years. He joined Dr. Guy Riekeman and the Quest International organization in 1995 and remained as Executive Director of CLA when it merged with Quest International. In 1999 he founded Chiropractic Equity Office Inc.

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