

INTER- AND INTRA-EXAMINER RELIABILITY OF THE TYTRON C-3000

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Objective: This study was designed to test the inter- and intra-examiner reliability of doctors scanning subjects using the TyTron C-3000.

Methods: Patient Selection: We selected 5 healthy subjects aged between 20 and 45 years.

Protocol: Subjects were asked not to use procedures that can cause vasculature changes as described in standard operating procedures in the TyTron manual. One subject at a time entered the examining room, which had been partitioned for privacy. Each subject was set up for a full spine graph in a posture-constant chair. Each doctor performed three scans on each of the subjects, for a total of 15 scans per doctor; 45 scans in all. No marks were made on subjects because the study was designed to determine the doctors' ability to successfully reproduce the start and end points of the scan.

Discussion: We will complete the analysis of this study's data by the middle of August. This study will assess the ability of doctors to reproduce results from single samples by comparing the graphic output for each subject's scans. The study will also compare reproducibility between doctors for each patient.

Analysis: We plan to compare delta *t* values, performing a (1) slope comparison, (2) slope correlation, and (3) a comparison using the Stewart/Boone method of analysis.

ACUTE EFFECT OF NUCCA UPPER CERVICAL ADJUSTMENT ON PATIENTS WITH DIABETES TYPE II

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Background: Type II diabetes is characterized by elevated post-prandial plasma glucose levels and recurrent fasting hypoglycemia. Progression of cardiovascular and renal disease has been demonstrated to correlate with hypertension and hyperglycemia in patients with type II diabetes.

Objectives: The purpose of this project is to evaluate the acute effects of chiropractic reduction of upper cervical subluxation using the technique established by the National Upper Cervical

Chiropractic Association (NUCCA) on blood pressure, plasma glucose, and the activity of the autonomic nervous system in patients with type II diabetes.

Methods: Six patients with type II diabetes underwent a standard examination including upper cervical x-rays. Baseline measurements of systolic and diastolic blood pressures, pulse rates, electrocardiogram, and plasma glucose levels were obtained. The relative activity of the parasympathetic and sympathetic nervous systems was determined by power spectral analysis of heart rate variability. The acute effects of upper cervical chiropractic adjustment were assessed 60, 120, and 180 minutes following the adjustment and compared with those measurements obtained on the week before adjustment.

Results: Among the six patients, on the week before chiropractic adjustment, plasma glucose levels progressively decreased during the three-hour study (delta $31.5 \pm \text{SEM } 2.8$), whereas no significant changes were observed in mean arterial pressure, heart rate, or standard deviation of heart rates. Following NUCCA chiropractic adjustment, the decreases in plasma glucose levels were reduced over this time (delta 16.7 ± 3.9 , $p < 0.05$). Again, no significant changes were observed in mean arterial pressure, heart rate, or standard deviation of heart rate. Power spectral analysis of heart rate variability was performed during each of these time points (Acknowledge software, Biopac Systems, Inc, Santa Barbara, CA). The ratio of low and mid frequency (0.04 to 0.15 Hz) to total power (0.04 to 0.4 Hz) is an estimate of the relative activity of the sympathetic and parasympathetic nervous systems. The ratio of high frequency (0.15 to 0.4 Hz) to total power is an estimate of relative activity of the parasympathetic nervous system alone to total variation. There was a small decrease in combined sympathetic and parasympathetic activity compared with total autonomic activity (from $57.6 \pm 9.3\%$ to $53.5 \pm 7.8\%$, ns) and an increase in parasympathetic activity alone compared with total autonomic activity (from 42.4 ± 9.3 to $46.4 \pm 7.8\%$, ns).

Conclusions: These results demonstrate that reduction of upper-cervical subluxations by NUCCA adjustment resulted in a stabilization of plasma glucose levels during the three-hour fasting period. Further characterization of these patients, as well as additional patients, will be necessary to assess the mechanisms through which this stabilization occurs. Long-term monitoring of these variables in these patients will determine if the beneficial effects of this type of chiropractic care on plasma glucose level are maintained for extended periods of time.

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