Craniofacial Changes after Combined Atlas-Orthogonal and Biomimetic Oral Appliance Therapy

G. Dave Singh, DDSc, PhD, BDS, Chris Chapman, DC, BCAO, Myles Preble, DMD

Objective: There are several chiropractic techniques available to improve head and neck alignment but none use a combined approached in conjunction with an oral appliance. A previous study demonstrated synergistic effects of biomimetic oral appliance therapy (BOAT) and transdermal atlas positioning procedures (TAPP) on leg length discrepancies in adults. Therefore, this current study investigates changes in head and neck alignment using Cartesian analysis, to test the hypothesis that combined TAPP and BOAT improves craniofacial alignment in adults.

Subjects and Methods: A consecutive series of 11 adults (mean age 39.5yrs; 4 female, 7 male) were included in this study. Each subject was evaluated for the presence of malocclusion by a dentist, and also for the presence of an atlas subluxation by an atlas-orthogonal (AO) chiropractor. Pre-management cranio-cervical relationships were evaluated from frontal, horizontal and axial radiography, using strict positioning and analysis protocols. Following pre-management assessment, each subject was treated for atlas subluxation by an AO chiropractor, and the radiographic procedure was repeated. Next, the subject inserted the oral appliance (a DNA appliance®) and the radiographic procedure was repeated. For radiographic assessment, craniofacial parameters were calculated: pre-care (T0); after AO adjustment (T1), and finally after oral appliance insertion (T2).

Results: Of the following individual parameters: Atlas cephalic displacement; Un-leveling/atlas frontal plane line; Cephalic tilt; Cervical spine-atlas angle; Cervical spine angular rotation; Axis (C2) rotation, and Atlas-foramen magnum angular rotation, showed improvements at both T1 and T2. The initial, total Z- and Y-axis discrepancy for the sample had a mean value of 22.70 ± 7.4. After AO adjustment (T1), the mean change in craniofacial alignment improved to 9.70 ± 6.3 ($p < 0.001$) but combining AO adjustment with the oral appliance (T2), the mean change in craniofacial alignment improved further to 6.00 ± 4.1 ($p < 0.001$). The total, mean decompensation was found to be 68.2%.

Conclusions: When a biomimetic oral appliance is used in combination with AO adjustment, there appears to be a synergistic effect that significantly improves craniofacial alignment in adults. However, further studies are required to corroborate these preliminary findings.

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