Relative Warps and PCA for Side Bend Left Treatment Subjects
- If Bony or Semi-landmarks shifted vertically, then height was being determined on the PC.
- If landmarks 1-8 appeared to move to the side, ROM was determined.
- If landmarks shifted horizontally, width was determined on the PC.
- When the relative warp videos were analyzed, it found that PCA described height and PCA described side-bending. They were plotted against one another in Figure 2.

Comparison of Individual patients pre- and post- treatment: As one moves down the Y-axis, ROM appears to increase.
- Shams with a shape change were the result of outlier landmarks, not OMT.

Materials and Methods

Organisation: Subjects who completed 6, 9, and 12 sessions were placed into groups: pre- treatment, sham treatment, side-bending, and right side-right. For example: Subjects 20-30 (figure 1) completed 10 treatments. 10 dots per side: first bony landmark pre-treatment, first side bent left side-right pre-treatment.

Morphometric Shape Analysis: Shape analysis is a way to quantify variation and morphological transformation (Zelditch et al., 2004). This technique is used to observe the effects of a certain OMT protocol on subjects with documented lateral postural asymmetries, which demonstrates significant changes in patients treated with OMT vs Sham or Control (Bone 2014). I sought to further quantify through morphometric analyses, the potential changes in range of motion as a result of the same OMT protocol.

Hypothesis: I hypothesized that OMT would increase range of motion (ROM) in patients with lateral asymmetry. I further hypothesized that treatment would not increase ROM. It is expected to see increased ROM reflected in the morphometric shape analyses.

Results

Table 1: Observed trends of individuals for side bend left treatment. * indicates shape change

Conclusions

- Subjects (predominantly OMT subjects) with correctly palpated bony landmarks showed increase in ROM according to the relative warp analysis, PCA principle component analysis, and CVA canonical variates analysis.
- Principal Component Analysis results show shape changes indicating lateral OMT increased for individual subjects treated with OMT, but not in sham control.
- Moving down the Y-axis (Figures 2 and 3), warp shapes showed increased side-bending left.
- Therefore observers would expect a drop along the Y-axis as one moves to the right.
- ROM appears to increase most in subjects who received OMT.
- Canonical Variates Analysis showed a larger morphospace change, indicating lateral OMT increased, for groups of subjects treated with OMT but not in sham or control subjects.
- Groups formed predictable clusters in Bony Landmarks CVA.
- More overlap for groups in Semi-Landmark CVA, may indicate a need for different semi-landmark and standardization of active.

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References


Background: According to the osteopathic philosophy, medicine is asymmetry is often found in asymmetrical posture. It is the body’s ability to adapt to external forces and maintain balance. A poorly positioned back, sitting, sitting, and causing factors that contribute to poor postural modification posture and joint (Collatino & Greer, 2000). The modification of spinal shape creates poor posture and can improve as a postural asymmetry. Although postural asymmetries and lateral spinal curvatures, posture, can be noticed to the eye, many cases go undetected unless the subject undergoes a radiograph or complains of pain (Goldberg, 2008).

The Cobb angle, established in 1948, is the gold standard for measuring lateral curvature on digital images (Goldstein, 2007). However, exposure to numerous radiographs can cause undue exposure to radiation. Studies have found thatmotion in adolescent girls diagnosed with scoliosis is often caused by radiation, and for those who are radiation-free intervention and thereby modifying the spinal curvature for patients who underwent a lumbar posterior curvature (Cote, 1998). Use of radiographs when assessing for spinal lateral curvatures may be eliminated by using such techniques as 2D morphometrics. 2D morphometrics has recently been shown to be of benefit when describing the posture (Bone et al., 2014). It can be used to further quantify through morphometric transformations, the potential changes in range of motion as a result of the same OMT protocol.

Purpose: For my thesis, I expanded upon the work initiated by Michael Bone and his team's collaboration with the Philadelphia College of Osteopathic Medicine. That initial research was designed to discover the effects of a specific OMT protocol on subjects with documented lateral postural asymmetries, which demonstrates significant changes in patients treated with OMT vs Sham or Control (Bone 2014). I sought to further quantify through morphometric transformations, the potential changes in range of motion as a result of the same OMT protocol.

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References