Measurement of cranial palpation pressures used by professional osteopaths

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1. Introduction

Osteopathic cranial manipulation, also referred to as osteopathy in the cranial field (OCF) or craniosacral therapy (CST), is practiced widely by osteopaths, chiropractors, physical therapists and massage therapists. 1-11. The current scientific evidence does not support the commonly accepted theoretical models of osteopathic cranial manipulation and evidence of the effectiveness of cranial manipulative treatment is yet to be established. 11-14. Nevertheless, for many practitioners the treatment is yet to be established not support the commonly accepted

2. Methods

2.1. Participants

Participants for the study were recruited from members of the Registar des Ostéopathes de France (ROF) attending their annual general meeting in Paris, France. Following verbal notification of the study procedure, 43 participants (32 men and 11 women; aged 25-65 years) were enrolled after written consent was obtained. Each of the participants acted once as a practitioner and once as a subject. The study procedure was approved by the Conseil Scientifique (Scientific Council) of the Centre Européen d’Enseignement Supérieur de l’Ostéopathie (CEESO).

2.2. Measuring equipment

Data on palpation pressures employed during the study were obtained using a FlexiForce® force sensor device (Tekscan Inc. Massachusetts, USA). FlexiForce® consists of an ultrathin, flexible force sensor bonded to force measurement software installed on a standard PC (Figure 1). The sensor used in this study had a maximum pressure range from 0 N/cm² to 1.81 N/cm², occurring in gradations of 0.008 N/cm². The surface area was 0.71 cm² and had a thickness of 0.2 mm. The manufacturer evaluated error margin was less than +/-5%.

2.3. Procedure

The FlexiForce® sensor was placed on the subject’s head, with the practitioner’s left hand placed on the forehead, and the right hand placed on the occiput. The practitioner’s left hand contacted the frontal bone at the superolateral portion of the orbit, with the thumb positioned over the occipital bone as sensor. The thumb tips of the practitioners hand contacted the inferolateral portion of the orbit.

When the practitioner signalled that “engagement” with Primary Respiratory Mechanism (PRM) movements at the sutures had been achieved, a 3-second pressure measurement was recorded via the FlexiForce® system (Figure 3). Practitioners’ yop and percentage of daily practice employing CST were also recorded.

2.4. Data extraction and analysis

FlexiForce® records one pressure measurement every 0.125 seconds, thus giving a total 26 pressure measurements for each test recording from 0 to 3 seconds (Figure 1). The raw data were exported to Microsoft Excel software (version 2007, Microsoft, Washington, USA) and then converted from grams-force to Newtons in accordance with the International System of Units (SI). The mean pressures from each 3-second test were used for statistical analyses. Practitioners were categorized according to yop and the percentile of pressure used from each category.

3. Results

Acceptable data was recorded for all 43 test performances. Practitioners were categorized as 0-5 yop (n=13), 5-10 yop (n=14), 10-20 yop (n=10), and >20 yop (n=6) (Table 1). Of the 43 practitioners using OCF more than 50% of their practice is cranial.

The mean palpation pressure used by each practitioner over the 3-seconds test is represented graphically in Figure 1. The absolute palpation pressures measured throughout the study procedure ranged from 0 to 1.81 N/cm², with the mean pressure of the 43 tests being 0.28 N/cm² and the overall mean pressure was 0.42 N/cm².

Table 1: Mean pressure of 3 seconds tests (N/cm²)

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<thead>
<tr>
<th>Practitioner yop</th>
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<tbody>
<tr>
<td>0-5 yop (n=13)</td>
<td>0.58 ± 0.04</td>
</tr>
<tr>
<td>5-10 yop (n=14)</td>
<td>0.53 ± 0.02</td>
</tr>
<tr>
<td>10-20 yop (n=10)</td>
<td>0.42 ± 0.01</td>
</tr>
<tr>
<td>&gt;20 yop (n=6)</td>
<td>0.44 ± 0.02</td>
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Comparison among treatment groups was carried out using non-parametric analysis of variance with the Kruskal-Wallis test, followed by Dunn’s test for multiple group comparisons. The results suggested that practitioners with >20 yop use significantly less pressure than practitioners with less than 20 yop (p=0.024) (Figure 2). No difference was found between the 0-5 yop and 10-20 yop groups (Table 2).

Table 2: Comparison of mean pressure among treatment groups

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4.1. Palpation pressures used in OCF

This study provides the first quantitative measurement of palpation pressures used by osteopathic cranial practitioners of OCF. It is commonly recommended that cranial palpation be applied in the 5–10gf range. In our study, this pressure range converges to 0.7–0.14N/cm². Considering that 67% of practitioners in this study used pressures above the recommended maximum, with a mean palpation pressure 3 times this value, it is likely that cranial palpation pressures have been underestimated. Since it is unknown whether clinical outcomes are dependent on the pressure of palpation, an optimal pressure range cannot yet be proposed.

4.2. Variation in pressures

The results of this study indicate that osteopaths vary considerably (CV = 0.529) in their application of palpation pressure during cranial manipulation. Several explanations may be hypothesized.

- It is possible that the variation in palpation pressures reflects the poor inter-rater reliability demonstrated in several studies on palpation of the cranial rhythmic impulse (CRI). 13, 15, 16.

- The variation may also reflect disparate levels of skill among professional osteopaths, different interpretations of cranial palpation practice, or different semantic usage to conceptualize cranial palpation.

5. Conclusion

This study is the first to provide data on the palpation pressures used during osteopathic cranial treatment. The results suggest that the application of cranial palpation is extremely variable. Highly experienced practitioners may employ less pressure and demonstrate less variation; however, a significant proportion of less experienced practitioners use comparable pressure. Cranial manipulation training using quantitative feedback of palpation pressures may be useful in conveying precise information regarding technique application and reducing practitioner variation. Further research has been planned in order to test this hypothesis and to confirm palpation pressures and variability employed by highly experienced OCP practitioners.

References


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