The association between the static posture of the cervical spine and cervicogenic headache

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Declarations

I hereby certify that the work embodied in this thesis is the result of original research and has not been submitted for a higher degree to any other University or institution.

Signed

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Abbreviations and list of terms

C2	Axis (second cervical vertebra)
CEH	Cervicogenic headache
CI	Confidence intervals
DevL	Deviated left
DevR	Deviated right
GCL	General cervical lordosis
ICC	Intraclass correlation coefficient
RotL	Rotated left
RotR	Rotated right
SPD	Spinous process deviation
UCL	Upper cervical lordosis

Abstract

Research previously investigating cervical posture reports an association between cervical spinal posture and tension type headaches and migraines but no association between cervicogenic headache (CEH) and cervical spinal posture. These reports lead to the competing conclusions that there is either no association between CEH and abnormal posture or that the methods used to assess posture in the previous studies did not isolate the specific postural variables that are associated with CEH.

The present study used a single blind, age and gender matched, comparative measurement design to evaluate the differences in cervical spinal posture, measured on cervical radiographs, between asymptomatic participants (control group) and participants who had cervicogenic headache (CEH). There were two main objectives of the present study. The first was to determine if radiographic assessment can identify differences in sagittal plane posture and C2 spinous process alignment in the horizontal plane in individuals with CEH compared to controls. The second was to determine whether physiotherapist examiners could determine the presenting posture of the cervical spine using a palpation assessment.

The association between CEH and measures of cervical spinal posture using cervical radiographs were studied in 30 CEH participants and 30 age and gender matched control participants. The cervical spine postural variables assessed were general cervical lordosis (GCL), upper cervical lordosis (UCL) and C2 spinous process alignment. Differences between postural variables between the two groups were determined using paired t-tests

(matching participants by age and gender) or the non-parametric equivalent where appropriate. Logistic regression determined the postural variables which increased the likelihood of experiencing CEH. The same postural variables of these same participants were also assessed by two experienced physiotherapy examiners using palpation. Kappa was used to determine reliability of physiotherapist palpation assessment.

The results of the present study did not identify any postural variables that could differentiate the CEH from the control participants using radiographs (GCL $p = 0.06$, UCL $p = 0.10$, C2 deviation $p = 0.77$). The logistic regression analysis did, however, demonstrate that there was a statistically significant association between increased general cervical lordosis, as measured on radiographs, and an increased likelihood of experiencing CEH ($p = 0.042$). This association was not found for UCL ($p = 0.09$) or C2 deviation ($p = 0.74$). The present study also found that experienced physiotherapy examiners were unreliable at determining the postural presentation of the cervical spine (Kappa GCL = 0.15, UCL = 0.19, C2 = 0.04, 95% CI GCL = -0.07 - 0.37, UCL = -0.02 - 0.42, C2 = -0.10 - 0.18).

These results suggest that GCL may be an important clinical characteristic to identify in the assessment or management of CEH. However, physiotherapist palpation alone is not recommended to assess GCL, as therapists were unreliable in this study. These results suggest that increased GCL increases the likelihood of experiencing CEH. Therefore, future assessment and management strategies for this condition should consider including assessment of cervical lordosis.