Physiotherapy and basic headache research: Why using a pre-post design?

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Background

In physiotherapy, headache-research is often limited to instantaneous cross-sectional measurements of e.g. cervical mobility. However, a longitudinal task might affect baseline outcomes. Understanding the influence of the latter on headache features is relevant to develop preventive guidelines.

Methodology

Design. A pre-post design was set up to compare 'Pressure Pain Thresholds (PPT)' and maximal active cervical range of motion (CROM) before (pre-test) and after (post-test) a writing task between 18 females with headache (23.2±1.7 years) and 18 matched controls (23.6±2.2 years).
Criteria. Headache-group inclusion-criteria were: females between 18-30 years, meeting the diagnostic criteria of episodic tension-type headache according to the International Headache Society, headache provoked by posture. Exclusion-criteria: pregnancy, physiotherapy for headache 12 months before the study, serious pathology and a history of neck or head trauma. Control-group inclusion-criteria were: healthy age-matched females. Exclusion-criteria: pregnancy, history of neck or head trauma.
Measurements and outcomes. Bilateral PPT, measured with the Somedic Algometer (slope 30kPa/s/cm²) in the anterior temporal, suboccipital, upper trapezius and anterior tibial muscles and maximal active cervical flexion and extension (°), measured with the Cervical Range of Motion device were primary outcomes. Headache frequency, duration and intensity were secondary outcomes extracted from a headache diary.
Ethics. Approval by the Medical Ethical Committee of the 'Ziekenhuis Oost-Limburg' (B371201423025).

Results

Cervical range of motion

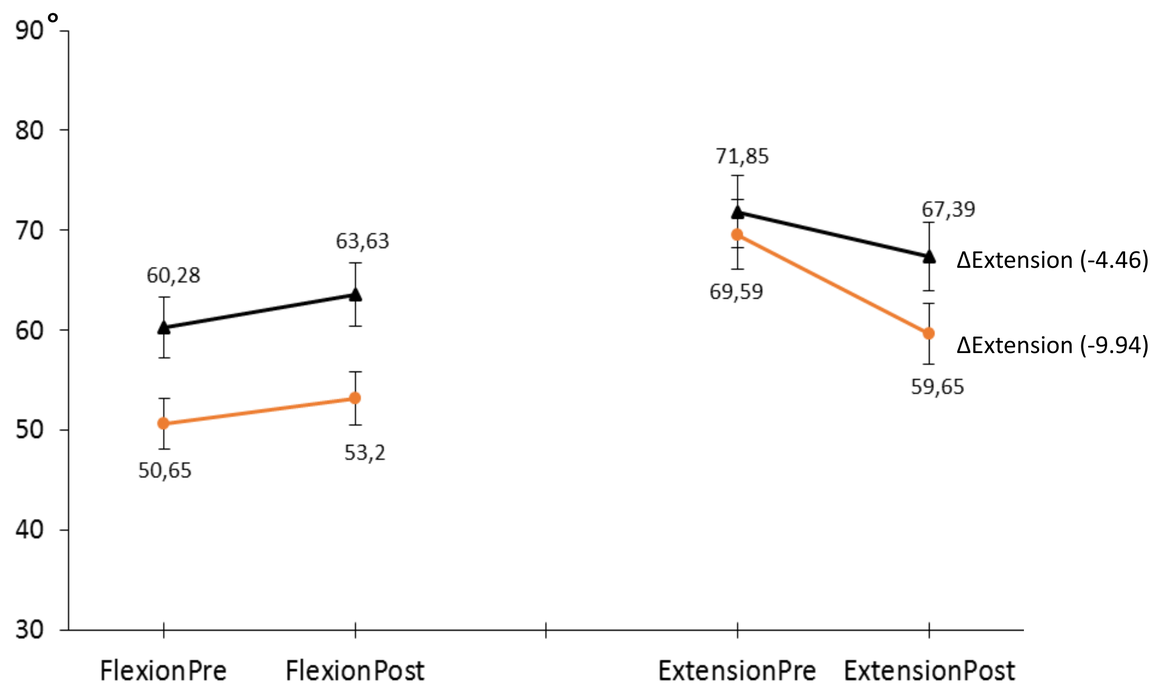

Figure 1. Comparison of the maximal active cervical range of motion from pre-to post-test between the Headache- and Control-group (Headache-group, orange; Control-group, black)

Table 1. Comparison of the maximal active cervical range of motion between the Headache-and Control-group

	Headache (n=18) mean(±SD)	Control (n=18) mean(±SD)	p-value (Mann-Whitney U)
FlexionPre (°)	50.65(13.34)	60.28(7.38)	0.022*
FlexionPost (°)	53.20(9.72)	63.63(6.56)	0.001*
ExtensionPre (°)	69.56(6.28)	71.85(10.85)	0.367
ExtensionPost (°)	59.65(8.19)	67.39(6.96)	0.007*
Δ: FlexionPost-Pre (°)	2.56(10.65)	3.35(4.77)	0.635
Δ: ExtensionPost-ExtensionPre (°)	-9.94(7.11)	-4.46(6.04)	0.012*

(°), degrees; significance p<0.05; n, number of participants; SD, Standard Deviation; *, p<0.05

Pressure pain threshold

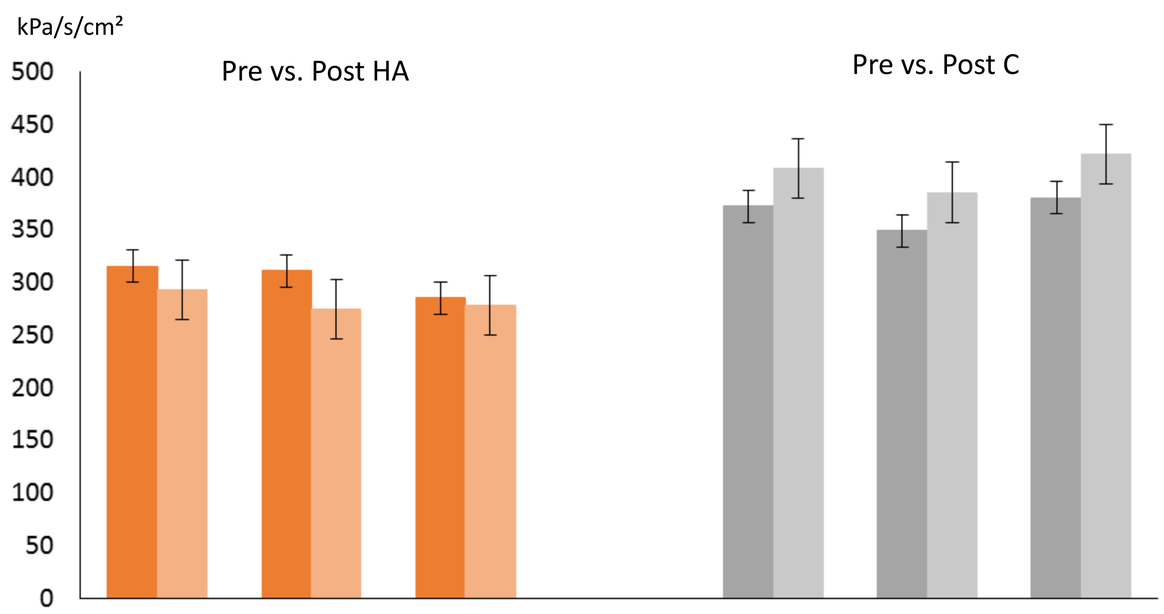

Figure 2. Comparison of significant PPT-differences between the Headache (HA)- and Control-group (C) before and after the writing task (Headache-group, orange; Control-group, grey; L, Left; R, Right; ant temp, anterior temporal; UT, upper trapezius).

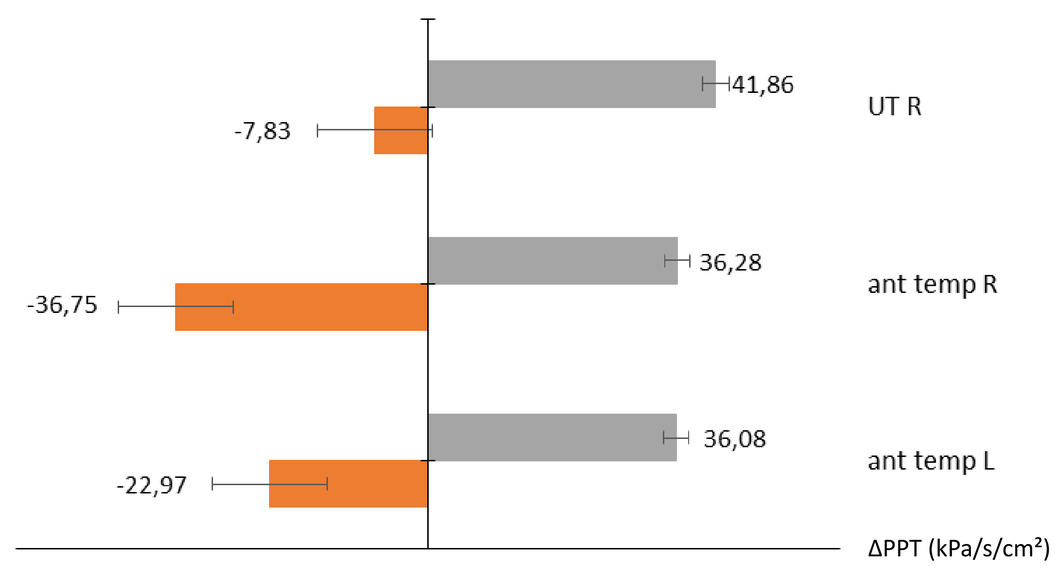

Figure 3. Mean significant PPT-differences between the post-and pre-test (Headache-group, orange; Control-group, grey; L, Left; R, Right; ant temp, anterior temporal; UT, upper trapezius)

Conclusion

At baseline only maximal active cervical flexion differed significantly (p=0.022) between groups with lower values in the Headache-group. From pre-to post-test differences between the Headache- and Control-group were revealed. In the Headache-group the execution of a simple writing assignment decreased PPT and maximal active CROM significantly (p<0.05). These results might be related to sensitization. Future research should consider the influence of sitting activities on headache-characteristics.

Implication

Physiotherapists should be aware that baseline characteristics of patients with headache and healthy controls are comparable. However,
the baseline headache profile can be influenced by a task performance. Longitudinal designs could therefore be relevant to evaluate factors contributing to headache.

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