CORTICAL PROCESSING OF ELECTROCUtANEous STIMULI IN CHRONIC STROKE PATIENTS: A RELATIONSHIP WITH POST-STROKE SHOULDER PAIN.

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1 Background and purpose
Cerebral stroke is often associated with changes in cognitive-evaluative and somatosensory functions which may play a role in the development and maintenance of post-stroke pain [1,2]. However, the precise mechanisms underlying post-stroke pain remain largely unclear [3,4,5]. Knowledge of these mechanisms may be used to optimize prevention and treatment of post-stroke pain and may be obtained by neurophysiological assessment of cognitive and somatosensory functions using cortical evoked potentials (EPs). Latencies and amplitudes of EP components are regarded as a reflection of the function of spino-cortical tracts (N90 component) and of cognitive-evaluative processes (N150, P200, P300 components).

2 Methods
In this study, the sensory-discriminative and cognitive-evaluative processing of somatosensory stimuli was investigated in stroke patients with chronic post-stroke shoulder pain (PSSP, n=6), in pain-free stroke patients (PF, n=14) and in healthy controls (HC, n=20). Cortical potentials were evoked using intracutaneous electrostimulation at the affected and unaffected hand and were recorded using electro-encephalography. The amplitudes and latencies of the evoked potential components (N90, N150, P200, the N150-P200 peak-to-peak difference and P300) were evaluated. In addition, somatosensory functions were assessed using clinical examination and quantitative sensory testing (QST).

3 Results
In both stroke patient groups, reduced N150 and P300 amplitudes and increased N90, N150 and P300 latencies were observed compared to controls. Moreover, stroke patients with PSSP had increased N90 latency and increased electrical sensation thresholds at the affected side and increased P200 and N150-P200 peak-to-peak latencies at both the affected and unaffected side as compared to PF and HC.

4 Conclusion
PSSP was associated with a reduced function of cortical sensory-discriminative (N90, sensation thresholds) as well as by alterations in cognitive-evaluative (N150, P200, N150-P200 peak-to-peak difference) processes. These results underscore the notion that PSSP is more than ‘simply’ nociceptive shoulder pain and necessitate further investigations of central pain mechanisms in PSSP.

References