Electrophysiological investigations in cranial hyperkinetic syndromes
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Summary

In this thesis, the term cranial hyperkinetic syndrome is used to indicate those disorders which are characterized by involuntary contractions of the muscles innervated by the cranial nerves. The subject of the thesis is electrodiagnostic investigations in terms of reflex studies in patients with blepharospasm, torticollis spasmodica, hemifacial spasm and patients who developed synkinesia of facial muscles following Bell's palsy (post Bell's palsy synkinesia).

Chapter 1. This chapter gives an overview of the blink reflex, its anatomical pathways and suprasegmental control of the reflex. This chapter also contains information about the blink reflex recovery curve, and finally studies on lateral spreading in patients with hemifacial spasm.

Chapter 2. We examined some methodological aspects of the study of blink reflex recovery curves. We compared two intensities of stimulation and two ways of computerized measurements of reflex responses. The curves were based on measurements at six interstimulus intervals. Maximal stimulation, at three times R.2 threshold value, and peak amplitude measurement of responses showed the least variability in control subjects.

We constructed a blink reflex recovery index for R1 and R2 as a single variable, and set its cut-off point, in order to be able to distinguish individual patients from healthy subjects.

R1 and R2 recovery curves and their indices were studied in patients with blepharospasm, hemifacial spasm and torticollis spasmodica and compared to values in control subjects. Significant differences were demonstrated in all patient groups, but even in blepharospasm indices were not abnormal in all patients.

Finally, we studied peak amplitudes of single R1 and R2 responses in controls and patients. No significant differences were found.

Chapter 3. In this study, the blink reflex recovery indices in controls and patients with blepharospasm were examined and compared to the results of needle EMG recording from the orbicularis oculi and the levator palpebrae muscles. We could identify three
subgroups of patients, and concluded that blepharospasm is not a homogenous disease entity and that different pathophysiological mechanisms are involved.

Chapter 4. Blink reflexes in the orbicularis oculi and orbicularis oris muscles were studied in patients with blepharospasm and torticollis spasmodica and compared to results in control subjects. No significant differences were found. It is evident from this study that with supraorbital nerve stimulation, responses can be found in the orbicularis oris in patients as well as in controls. The latter finding has been largely ignored until now and may be relevant in investigations of cranial hyperkinetic syndromes, particularly in patients with hyperactivity of oromandibular muscles.

Chapter 5. Patients with hemifacial spasm (HFS) and those patients who developed synkinesia of facial muscles after Bell's palsy (PBS) were studied. Blink reflexes in the orbicularis oculi and orbicularis oris muscles were compared to controls and facial nerve compound muscle action potential (CMAP), lateral spreading and spontaneous muscle activity were compared in patient groups. Facial nerve damage was apparent in patients with PBS. Differences and similarities between patient groups suggest that different pathophysiological mechanisms are involved.

Chapter 6. In the first part of the general discussion, the results of our studies are reviewed in the light of recent studies and hypotheses are offered concerning pathophysiological mechanisms of the examined cranial hyperkinetic syndromes. In the second part of the general discussion, recommendations are given for future research.