

## Application of electrodiagnostic Methods to differential diagnosis of HFS and Meige's syndrome

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### Introduction

Bilateral hemifacial spasm (HFS) and Meige's syndrome are very confusing because they have similar clinical symptoms. HFS occurs mostly unilaterally but rarely bilaterally. The pathogenesis of HFS is not clear, but may be caused by tumors and vascular compression that stimulate the facial nerve. The cause of Meige's syndrome is thought to be an abnormality of upper brain stem and basal ganglia, or overactivation of midbrain and basal ganglia. Bilateral HFS is characterized by contraction of involuntary facial muscles that are sequential but not simultaneously, and Meige's syndrome is characterized by contraction of both facial muscles in synchronization. Both disorders have no abnormality on facial nerve conduction and blink reflex, but lateral spread response (LSR) can be observed in HFS. It is important to distinguish between the two disorders because of the different pathogenesis and treatment Methods.

### Case report

A 62-year-old man was admitted to the hospital due to involuntary contraction of bilateral facial muscles including orbicularis oculi and oris about 3 years ago. He was diagnosed with blepharospasm in the ophthalmology department and received medication and several botulinum toxin injections, but the symptoms did not improve. He visited neurosurgery for surgical treatment and was referred to the rehabilitation department for differential diagnosis of HFS and Meige's syndrome. The following tests were performed for the accurate diagnosis of the patient. First, brain MRI was performed to identify other abnormalities including CPA tumor. Facial nerve conduction and blink reflex, LSR were performed to confirm the abnormality of the facial nerve. During LSR, stimulation was performed in the zygomatic and mandibular branches of the facial nerve, respectively, and then recorded in the orbicularis oculi and mentalis muscles. Multichannel sEMG was applied to confirm synchronization of contractions in both orbicularis oculi and oris (Fig 1). There was no abnormality on brain MRI. Both facial nerve conduction and blink reflex were normal, and LSR was not observed on both sides (Fig 2). In the sEMG performed in the resting state, synchronization of contraction was confirmed in both sides, and the same Result was confirmed in repeated trial (Fig 3). Based on these findings, the patient was diagnosed with Meige's syndrome rather than HFS.

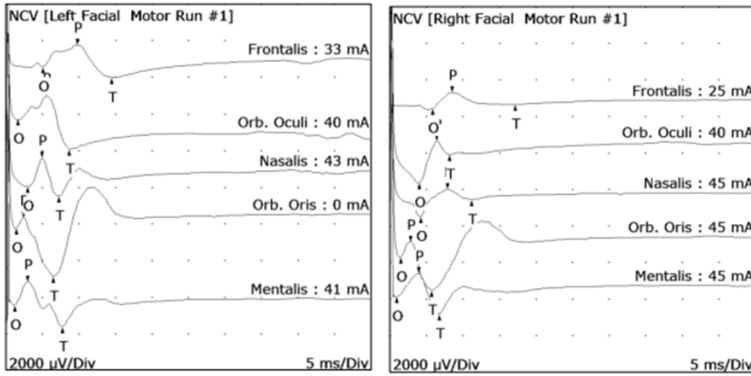
## Conclusion

HFS can be treated through surgical treatment of microvascular decompression (MVD), but Meige's syndrome is not an indication for MVD. sEMG and LSR are effective Methods to differentiate between two disorders, and an accurate differential diagnosis prevents unnecessary surgery.

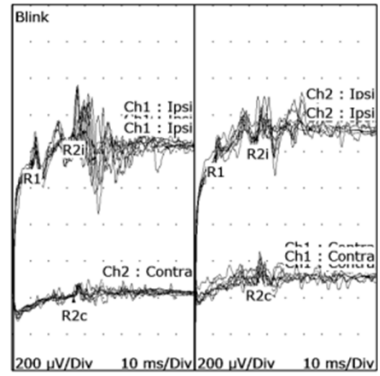


Fig 1. Recording sites of surface electromyography (BTS FREEMG 1000, BTS Bioengineering, Milano, Italy). Four electrodes were attached bilaterally over bilateral orbicularis oculi and orbicularis oris muscles.

A. Nerve conduction study



B. Blink reflex



C. Lateral spread response

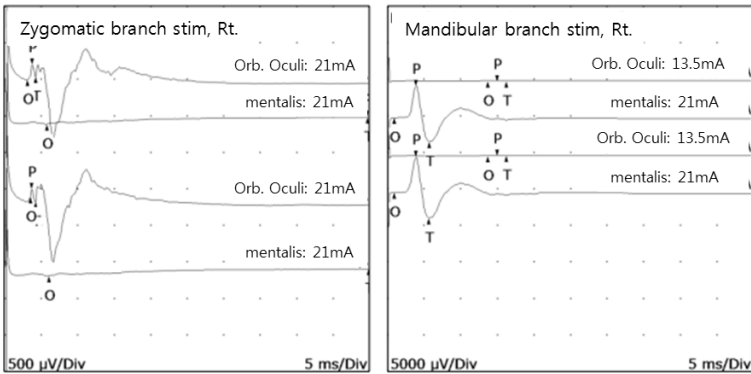


Fig 2. Results of electrodiagnostic studies. Nerve conduction studies (A) of facial nerve and blink reflex (B) were normal. Lateral spread response (C) was not observed on both side.

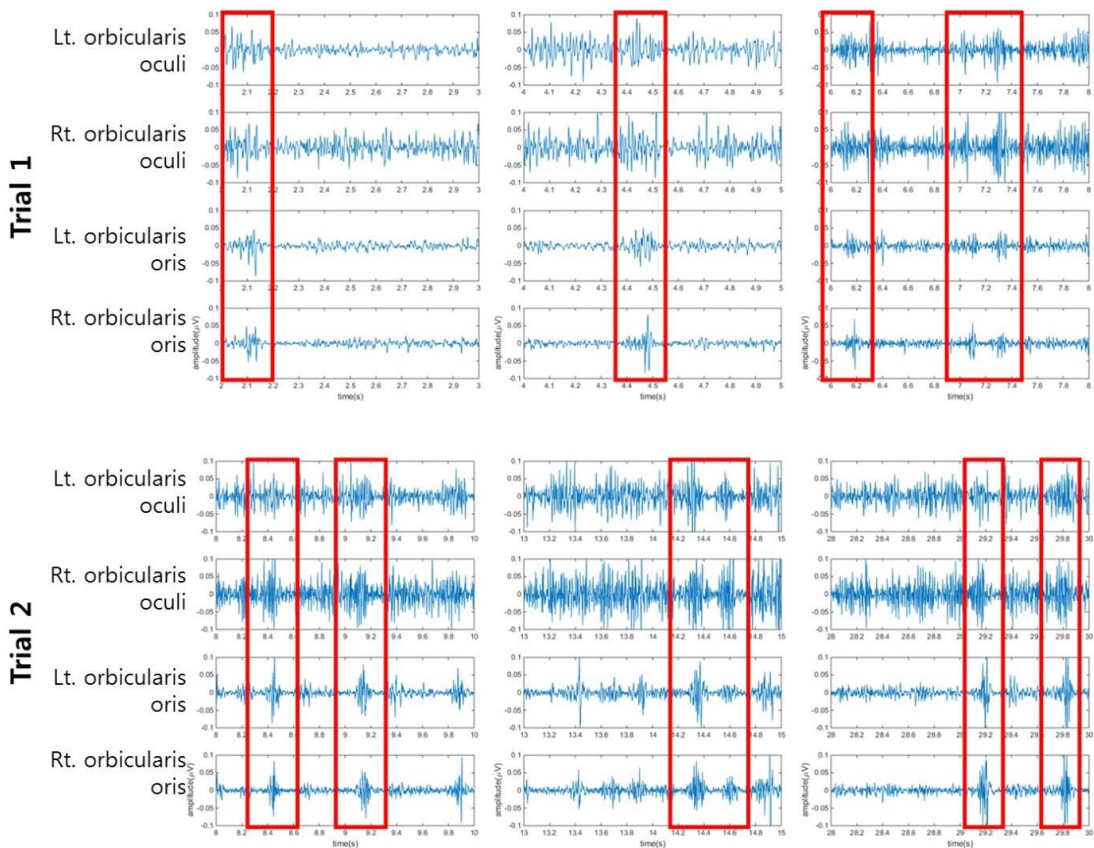


Fig 3. Surface electromyography (sEMG) manifestations in patient with Meige syndrome. sEMG signals showed synchronous contraction of bilateral orbicularis oculi and orbicularis oris muscles.