

Vocalis muscle

Intrinsic muscle of the [larynx](#) formed by several of the finer and most medial fibers of the [thyroarytenoid muscle](#) attached directly to the outer side of the vocal ligament; origin, depression between the two laminae of thyroid cartilage; insertion, portions of vocal ligament and vocal process of arytenoid; action, shortens and relaxes portions of vocal cords; nerve supply, recurrent laryngeal.

Ito et al., used surface electrodes of an [endotracheal tube](#) to record compound electromyographic responses from the vocalis muscle. Motor neurons were stimulated using [corkscrew electrodes](#) placed subdermally on the scalp at C3 and C4. During surgery, the operator received a warning when the amplitude of the vagal motor evoked potential (MEP) decreased to less than 50% of the control level. After surgery, swallowing function was assessed clinically using grading criteria.

In 5 patients, vagal MEP amplitude permanently deteriorated to less than 50% of the control level on the right side when meningiomas were dissected from the [pons](#) or [basilar artery](#), or when a schwannoma was dissected from the vagal rootlets. These 5 patients had postoperative [dysphagia](#). At 4 weeks after surgery, 2 patients still had dysphagia. In 2 patients, vagal MEPs of one side transiently disappeared when the tumors were dissected from the brainstem or the vagal rootlets. After surgery, both patients had dysphagia, which recovered in 4 weeks. In 7 patients, MEP amplitude was consistent, maintaining more than 50% of the control level throughout the operative procedures. After surgery all 7 patients were neurologically intact with normal swallowing function.

Vagal MEP monitoring with transcranial electrical stimulation and endotracheal tube electrode recording was a safe and effective method to provide continuous real-time information on the integrity of both the supranuclear and infranuclear vagal pathway. This method is useful to prevent intraoperative injury of the brainstem corticobulbar tract or the vagal rootlets and to avoid the postoperative dysphagia that is often associated with brainstem or skull base surgeries ¹⁾.

Twenty-four patients with pathologies at the cerebellopontine lesion were studied. [General anesthesia](#) was maintained with [fentanyl](#) and [propofol](#). A [monopolar stimulator](#) was used at amplitudes of 0.05 to 0.1 mA. Both acoustic and visual signals were displayed as [vocalis muscle](#) electromyographic activity using endotracheal tube surface electrodes.

The average number of rootlets was 7.4 (range, 5-10); 75% of patients had 7 or 8 rootlets. As many as 6 rootlets (2-4 in most cases) were responsive in each patient. In 23 of the 24 patients, the responding rootlets congregated on the caudal side. The maximum electromyographic response was predominantly in the most caudal or second most caudal rootlet in 79%.

The majority of motor fibers of the [lower cranial nerves](#) run through the caudal part of the rootlets at the [cerebellomedullary cistern](#), and the maximal electromyographic response was elicited at the most caudal or second most caudal rootlet ²⁾.

¹⁾

Ito E, Ichikawa M, Itakura T, Ando H, Matsumoto Y, Oda K, Sato T, Watanabe T, Sakuma J, Saito K. Motor evoked potential monitoring of the vagus nerve with transcranial electrical stimulation during skull base surgeries. J Neurosurg. 2013 Jan;118(1):195-201. doi: 10.3171/2012.10.JNS12383. Epub 2012 Nov 2. PubMed PMID: 23121435.

²⁾

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Mikuni N. Intraoperative Mapping and Monitoring for Rootlets of the Lower Cranial Nerves Related to Vocal Cord Movement. Neurosurgery. 2016 Jun;78(6):829-34. doi: 10.1227/NEU.0000000000001109. PubMed PMID: 26544957.

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