

# Pearls & Oy-sters: Facial nerve marginal mandibular branch lesion

## A complication of carotid surgery

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### Pearls

- Iatrogenic injury of the marginal mandibular branch of the facial nerve is a rare complication of carotid endarterectomy and causes paresis of the ipsilateral lower lip.
- The weakness may be detected by a full denture-type smile or by opening the mouth wide, showing that a person cannot expose his or her lower teeth on the paretic side.
- Paresis of the marginal mandibular branch has minor to no clinical consequences but can have cosmetic consequences.

### Oy-sters

- A marginal mandibular branch lesion may give the false appearance of a central facial nerve palsy.
- Misinterpretation leads to overtesting and incorrect therapeutic strategy.

### Case 1

A 78-year-old woman underwent a left-sided carotid endarterectomy (CEA) because of significant carotid stenosis of 90%, after having had a minor ischemic stroke in the left hemisphere, from which she recovered completely. Before surgery, there was no facial asymmetry. On day 1 after surgery, the vascular surgeon contacted the neurologist for an urgent consult. The surgeon believed the patient had a left-sided facial paresis with a drooped mouth corner, fearing a new ischemic event in the contralateral, nonoperated right hemisphere. On neurologic examination, the resident in neurology noticed facial asymmetry (figure). The patient could not move her left lower lip; movements of the left upper lip and the other facial muscles were intact. The resident in neurology diagnosed a left-sided peripheral lesion of the marginal mandibular branch and reassured the surgeon and patient there was no stroke, but an iatrogenic complication of the surgery.

### Case 2

A 68-year-old man who had a right hemisphere TIA underwent a right-sided CEA because of a high-grade stenosis of 80% in the right internal carotid artery. After surgery, the surgeon noticed a left-sided drooped mouth and asked the neurologist whether a perioperative ischemic stroke in the right hemisphere had occurred. The resident in neurology noticed that the patient could not move his right lower lip, which gave the impression that his mouth deviated and drooped to the left (figure). The functions of the other facial muscles were intact. The resident concluded that there was an iatrogenic right-sided marginal mandibular branch paresis. One year later, it had not resolved.

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(A, B) Case 1: Left-sided carotid endarterectomy. (A) No asymmetry in neutral nonsmiling position. (B) Full-denture smile shows a left flattened lower lip. (C, D) Case 2: Right-sided carotid endarterectomy. (C) No asymmetry in neutral nonsmiling position. (D) Full-denture smile shows a right flattened lower lip appearing as lip deviation to the left. (E, F) Central facial nerve palsy. (E) Neutral position shows asymmetry with left drooped mouth corner and flattened nasolabial fold. (F) Full-denture smile shows paresis of the left side of the mouth: both upper and lower lip.

## Discussion

The marginal mandibular branch is one of the terminal branches of the mandibular division of the facial nerve. It leaves the anterior–inferior border of the parotid gland, makes a curve down to the submandibular gland, and runs along the angle and inferior border of the mandible. It innervates the muscles of the lower lip, especially the lip depressors.<sup>1,2</sup> Loss of innervation of the lower lip depressors results in mouth asymmetry during smiling, due to unopposed action of the mouth elevators.

Injury to this branch is often iatrogenic and the result of ipsilateral surgery in the mandibular or parotid regions.<sup>1</sup> The nerve is particularly prone to damage in the area of the parotid gland, mandibular angle, and superior lateral neck, among others, because of its long course and superficial position.<sup>2,3</sup> An often unrecognized cause, relevant for the neurologist, is compression by a retractor used during carotid surgery.<sup>4</sup>

A common mistake is to confuse a marginal mandibular branch paresis with a central facial nerve palsy (figure). Patients with a lesion of this nerve branch have symmetrical nasolabial folds and a symmetrical static position of the face, but in a full denture-smile or when opening the mouth wide, one can see that there is a paresis of the muscles of the lower lip.<sup>2</sup> The patient cannot move the lower lip down or laterally and cannot show his or her lower teeth. At the affected side, the lower lip appears flattened and inwardly rotated.<sup>3</sup> Sometimes, the lip appears distorted towards the healthy side. It may give the false appearance of a central facial nerve palsy, on either side, because the ipsilateral corner of the mouth does not move (case 1, resembling an ipsilateral central facial palsy indicating a contralateral cerebral event) or because the opposite lower lip moves down (case 2, resembling a contralateral central facial nerve palsy indicating an ipsilateral cerebral event).

Kakisis et al.<sup>5</sup> found in a large systematic review of 20,860 patients who underwent CEA that fewer than 2% had cranial

nerve injury after the procedure, and fewer than 1 in 7 of these injuries was permanent. The vagus nerve was most frequently injured, leading to hoarseness and loss of effective cough, with a pooled injury rate of 3.99% (95% confidence interval [CI], 2.56–5.70). The pooled nerve injury rate for the facial nerve was 1.97% (95% CI, 1.37–2.66); 11.68% of these were permanent (0.23%; 95% CI, 0.05–0.50). The marginal mandibular branch was reported to have an injury rate of 1.58% (95% CI, 0.82–2.54). The percentage of permanent injury was not mentioned. Other possible injuries are injury to the ascending sympathetic fibers causing Horner syndrome, the hypoglossal nerve, the glossopharyngeal nerve, and the spinal accessory nerve.<sup>5</sup>

In contrast, Cunningham et al.<sup>6</sup> found motor cranial nerve injury in 5.1% (95% CI, 4.1–6.2) of patients who underwent CEA; of these, 29% involved injury of the marginal mandibular branch and more than half of the patients recovered before leaving the hospital. The differences in nerve injury rate between studies probably can be explained by whether there was a routine examination by a neurologist after surgery, time point after surgery, differences in surgery techniques that changed over time, increased awareness, and preventive measures for these nerve injuries.<sup>5,6</sup>

A paresis of the marginal mandibular branch has minor to no functional consequences, although the facial asymmetry can lead to cosmetic embarrassment in patients.<sup>5</sup> Treatment options consist of temporary relief through botulinum toxin injection into the contralateral depressors and platysma, reconstructive surgery consisting of anterior belly of digastric muscle transfer or extensor digitorum brevis transfer, or depressor labii inferioris resection.<sup>3,7</sup>

This is in great contrast to the clinical consequences of a central facial palsy due to ischemic stroke. Therefore, it is of great clinical importance to differentiate this relatively benign post-surgery injury from a central facial palsy.<sup>6</sup>

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## Appendix Authors

Name	Location	Contribution
Kimberley Fleuren, MD	MUMC+	Draft and revision of manuscript
Julie Staals, MD, PhD	MUMC+	Revision and supervision of manuscript

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