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Case report

Peripheral facial palsy after bilateral sagittal split ramus osteotomy: case report

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Abstract

Bilateral sagittal split ramus osteotomy (BSSRO) is commonly used in orthognathic surgery. Although abnormal sensation in areas that are innervated by the inferior alveolar nerve is a well-known neurological complication of mandibular osteotomy, facial palsy is rare postoperatively. We present a case of peripheral facial palsy that developed the day after BSSRO to correct a mandibular protrusion in a 42-year-old man. Oral prednisolone was begun on the second day postoperatively, and was gradually tapered off over time. One month after operation, he had gradually recovered all movements in his right facial muscle and, after two months, had completely recovered without residual asymmetry. Possible causes of the palsy were compression of the facial nerve as a result of the insertion of a retractor around the posterior border of the ramus, and postoperative oedema. Peripheral facial palsy after BSSRO should be considered a rare, but possible, complication and as such, should be mentioned in consent forms.

Keywords: mandibular protrusion; orthognathic surgery; bilateral sagittal split ramus osteotomy; peripheral facial palsy

Introduction

Bilateral sagittal split ramus osteotomy (BSSRO) is used commonly in orthognathic surgery for mandibular advancement and setback.[1,2] Damage to the inferior alveolar nerve is a neurological complication, and because peripheral facial palsy is so rare postoperatively,[3] no definite cause has yet been found. We describe a case after BSSRO for the correction of mandibular protrusion, and discuss relevant publications, possible aetiology, and prognosis.

Case report

A healthy 42-year-old man with mandibular protrusion had BSSRO with bilateral short lingual osteotomy. We used a reciprocating saw and Lindemann burr to make the cut, and chisels and a bone separator to split the mandible. After osteotomy, we pushed the segment back according to the predetermined distance (right: 6 mm, left: 2 mm), and applied intermaxillary fixation (IMF). We fixed the segments in place using the MatrixORTHOGNATHIC^{TM} system (DePuy Synthes) with 1 mm thick titanium plates and 6 mm screws. After we released the IMF, the resulting occlusion was acceptable, so we established temporary suction drainage to prevent haematomas, and the operation was completed uneventfully.

The next evening, the patient developed facial oedema and a complete right-sided peripheral facial palsy that was char-

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Fig. 1. Photograph one week after bilateral sagittal split ramus osteotomy that clearly shows the asymmetrical smile secondary to right facial palsy (published with the patient's permission).

Fig. 2. Photograph two months after bilateral sagittal split ramus osteotomy showing that the peripheral facial palsy complete resolution (published with the patient's permission).

acterised by impaired wrinkling of the forehead and closure of the eye, and an asymmetrical smile (Fig. 1). Taste, hearing, and the secretion of saliva and tears were all normal. There were no signs of viral infection or unfavourable bony fractures. We started him on prednisolone, 5 mg, orally, from the second day postoperatively and gradually tapered it off over time (six times daily for five days, four times daily for two, twice a day for one day, and a single dose for the last three days). We also prescribed drops to protect the cornea of his right eye. One month after operation, all movements of the facial muscles on the right had gradually improved, with complete recovery and no residual asymmetry after two months (Fig. 2).

Discussion

In total, 245 patients had had BSSRO in our department between July 2007 and June 2018, and peripheral facial palsy occurred postoperatively in this patient alone (0.41%). Reports of this particular complication that were published in English (excluding double-jaw surgery), are shown in Table 1. To our knowledge, only 14 cases, including ours, have been reported and 13 of these developed facial palsy within three days postoperatively. All cases were unilateral, with complete neuropathy that involved the temporal, zygomatic, buccal, and marginal mandibular branches. Most patients had had setback procedures (n = 10), and there were no predilections for sex, age, or side.

Several factors can cause facial nerve damage during or after BSSRO, which include the compression of nerves by retractors;[4–6] excessive posterior movement of the distal segment;[4] postoperative oedema or haematoma;[2,5–8] pressure packing in the retromandibular region;[8] and unusual fractures of the mandible or styloid process.[4,6,8] When the distance between the posterior border of the ramus and the facial nerve is less than 1 cm when the mouth is open, the nerve can be compressed against the mastoid process.[3,9] Interestingly, full function was regained spontaneously within 10 months in all but three patients, who had retained a slight residual palsy with no direct neurotmesis.[3,8,10] Although the aetiology remains unclear, an unusually high number of subcondylar fractures may have had an important role.[8] Our patient had no unusual bony fractures after operation, and we concluded that the palsy had been brought on by compression of the facial nerve caused by the insertion of a retractor around the posterior border of the ramus, and postoperative oedema.

Conclusion

Peripheral facial palsy is an uncommon complication after BSSRO, but surgeons should be aware of it, and possibly advise patients about it, although they can be reassured that it is likely to be temporary.

Table 1
Published reports on peripheral facial palsy after bilateral sagittal split ramus osteotomy.

First author, year, and reference	Country of origin	Age (years)	Sex	Setback of the mandible (mm) (right: left)	Peripheral facial palsy Side	Clearly-confirmed initial symptoms	Time of onset after primary operation (days)	Causal hypothesis of facial palsy	Complete healing	Follow-up period until complete healing or last consultation (months)
Dendy, 1973[4]	United Kingdom	23	M	ND (setback)	R	Motility disturbance of lower face	1	Compression of the nerve by the bone split or retractor, or unusual styloid process fracture	Yes	4
Piecuch, 1982[1]	United States of America	27	M	ND (advancement)	R	Difficulty in closing the eye	1	Unclear	Yes	2.5
Karabouta-Voulgaropoulou, 1984[9]	Greece	24	M	ND (setback)	L	Motility disturbance of lower face	0	Unclear	Yes	5
		19	F	ND (setback)	R	Complete loss of conduction of the facial nerve	1	Compression of the nerve by excessive force application with the chisel during bone splitting	Yes	8
de Vries, 1993[3]	Nether- lands	26	F	ND (advancement)	R	Neuropathy of the frontal branch of the facial nerve	1	Unclear	No	24
		20	M	10:10	L	Complete paralysis of all facial nerve branches	1	Unclear	Yes	7
Sakashita, 1996[7]	Japan	21	M	1:2.5	R	Difficulty in closing the eye and weakness of the frontal region	2	Postoperative oedema	Yes	3
Lanigan, 2004[8]	Canada	43	M	ND (advancement)	L	Difficulty in forehead wrinkling, eye closing, and smiling symmetrically	0	Unusual mandibular high subcondylar fracture	No	36
		21	M	ND (advancement)	L	Difficulty in eye closing and smiling symmetrically	3	Compression of the nerve by pressure pack in the retromandibular region to control bleeding,or formation of haematoma postoperatively	Yes	2.5

Rai, 2008[5]	India	21	F	4.5:5	L	Difficulty in forehead wrinkling, eye closing, and smiling symmetrically	3	Compression of the nerve by retractors or postoperative oedema, nerve ischaemia by injection of vasoconstricting agents deep in the perimandibular region	Yes	3
Choi, 2010[10]	Taiwan	26	F	7:10	L	Difficulty in forehead wrinkling; lesion affects the buccal and marginal mandibular branches	12	Unclear	No	72
Ruiz, 2011[2]	Mexico	22	M	6:6	R	Difficulty in forehead wrinkling, eye closing, lip protrusion, and smiling symmetrically	3	Postoperative oedema	Yes	6
Surpure, 2014[6]	United States of America	20	M	ND (setback)	R	Lesion affects all facial nerve branches	0	Compression of the nerve by retractors or postoperative edema, unusual mandibular buccal plate fracture	Yes	10
Shimada, 2018 (present paper)	Japan	42	M	6:2	R	Difficulty in forehead wrinkling, eye closing, lip protrusion, and smiling symmetrically	1	Compression of the nerve by retractors or postoperative oedema	Yes	2

L = left; R = right; ND = not described.

Conflict of interest

We have no conflicts of interest.

Ethics statement/confirmation of patient's permission

This paper was reviewed and approved by the ethics committee of National Center for Global Health and Medicine (NCGM-G-003008-00). Written consent was obtained from the patient.

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