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Traumatic neuroma following sagittal split osteotomy of the mandible

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# Abstract

A 16-year-old male underwent bilateral sagittal split [osteotomy](https://www.sciencedirect.com/topics/medicine-and-dentistry/osteotomy) of the [mandible](https://www.sciencedirect.com/topics/medicine-and-dentistry/mandible) to correct a mandibular deficiency. Twenty-one years later, a routine [panoramic radiograph](https://www.sciencedirect.com/topics/medicine-and-dentistry/panoramic-radiograph) revealed a radiolucent [lesion](https://www.sciencedirect.com/topics/medicine-and-dentistry/lesion) on the left side of the mandible. The lesion was biopsied. As the patient did not have [symptoms](https://www.sciencedirect.com/topics/medicine-and-dentistry/symptom) and the lesion was connected to the [inferior alveolar nerve](https://www.sciencedirect.com/topics/medicine-and-dentistry/inferior-alveolar-nerve), the lesion was not totally excised in order to preserve [nerve function](https://www.sciencedirect.com/topics/medicine-and-dentistry/nerve-function). The histological features were consistent with [traumatic neuroma](https://www.sciencedirect.com/topics/medicine-and-dentistry/traumatic-neuroma), and no further [surgical procedure](https://www.sciencedirect.com/topics/medicine-and-dentistry/surgical-technique) was planned.

# Introduction

A traumatic [neuroma](https://www.sciencedirect.com/topics/medicine-and-dentistry/neuroma), which is an overgrowth of [nerve fibres](https://www.sciencedirect.com/topics/medicine-and-dentistry/nerve-fiber) following severance or damage to a nerve, represents an attempt at repair rather than a true neoplasm[5](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub" \l "bib5), [7](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub" \l "bib7). It can be classified as a true neuroma – a [tumour](https://www.sciencedirect.com/topics/medicine-and-dentistry/neoplasm) composed mainly of [nerve tissue](https://www.sciencedirect.com/topics/medicine-and-dentistry/nerve-tissue) – or a false neuroma – a tumour composed of mainly connective tissue derived from the nerve sheath[8](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub" \l "bib8). The nerve [elements](https://www.sciencedirect.com/topics/medicine-and-dentistry/element) can be injured by different factors, including pressure, [ischaemia](https://www.sciencedirect.com/topics/medicine-and-dentistry/ischemia), crushing, cuts, [lacerations](https://www.sciencedirect.com/topics/medicine-and-dentistry/laceration), stretching or bleeding into the surrounding area[8](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub#bib8). Common [signs and symptoms](https://www.sciencedirect.com/topics/medicine-and-dentistry/physical-disease-by-body-function) include [pain](https://www.sciencedirect.com/topics/medicine-and-dentistry/pain), tenderness and paresthesia[2](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub" \l "bib2), [4](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub" \l "bib4), [5](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub#bib5), [6](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub" \l "bib6), [8](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub#bib8). Pressure on a local area may aggravate the pain. Infiltration of [local anaesthesia](https://www.sciencedirect.com/topics/medicine-and-dentistry/local-anesthesia) into the painful region provides relief[2](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub#bib2), [5](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub#bib5), [6](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub#bib6).

The technique of sagittal split [osteotomy](https://www.sciencedirect.com/topics/medicine-and-dentistry/osteotomy) of the [mandible](https://www.sciencedirect.com/topics/medicine-and-dentistry/mandible), first published by Obwegeser in 1955, is one of the most common procedures used to correct mandibular developmental anomalies. [Complications](https://www.sciencedirect.com/topics/medicine-and-dentistry/complication) may occur; for example, skeletal and dental relapse, haemorrhage, disturbance of [inferior alveolar nerve](https://www.sciencedirect.com/topics/medicine-and-dentistry/inferior-alveolar-nerve) function and fragmentation of the ramus with [necrosis](https://www.sciencedirect.com/topics/medicine-and-dentistry/necrosis) and sequestrae formation[1](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub" \l "bib1), [2](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub#bib2), [3](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub" \l "bib3), [6](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub#bib6), [7](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub#bib7). Here is reported a case of an asymptomatic [traumatic neuroma](https://www.sciencedirect.com/topics/medicine-and-dentistry/traumatic-neuroma) that developed following bilateral sagittal split osteotomy to correct a mandibular deficiency.

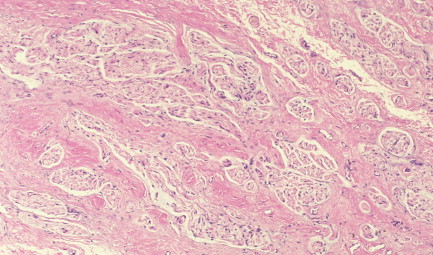
# Report of case

A 16-year-old male underwent bilateral sagittal split [osteotomy](https://www.sciencedirect.com/topics/medicine-and-dentistry/osteotomy) of the [mandible](https://www.sciencedirect.com/topics/medicine-and-dentistry/mandible) with an advancement of 8 mm. During [surgery](https://www.sciencedirect.com/topics/medicine-and-dentistry/surgery) the [inferior alveolar nerve](https://www.sciencedirect.com/topics/medicine-and-dentistry/inferior-alveolar-nerve) was identified in the distal segment. The [third molar](https://www.sciencedirect.com/topics/medicine-and-dentistry/third-molar) was removed during surgery on the left side, but the right side was left in situ because it was still covered by [bone](https://www.sciencedirect.com/topics/medicine-and-dentistry/bone). Bleeding from a branch of the [facial artery](https://www.sciencedirect.com/topics/medicine-and-dentistry/facial-artery) occurred on the left side, and was controlled with pressure and [Surgicel](https://www.sciencedirect.com/topics/medicine-and-dentistry/surgicel). The bone segments were stabilized with bilateral wires. In the [postoperative period](https://www.sciencedirect.com/topics/medicine-and-dentistry/postoperative-period) the patient complained of [numbness](https://www.sciencedirect.com/topics/medicine-and-dentistry/paresthesia) on the left side in both the [lip](https://www.sciencedirect.com/topics/medicine-and-dentistry/lip) and [chin](https://www.sciencedirect.com/topics/medicine-and-dentistry/chin), but feeling had returned by approximately 6 months after surgery. The [postoperative oedema](https://www.sciencedirect.com/topics/medicine-and-dentistry/postoperative-edema) was more pronounced on the left side, and lasted for 3 months.

Even though the patient remained asymptomatic, a radiolucent [lesion](https://www.sciencedirect.com/topics/medicine-and-dentistry/lesion) was observed in the left mandibular ramus, on a routine [panoramic radiograph](https://www.sciencedirect.com/topics/medicine-and-dentistry/panoramic-radiograph), taken 21 years after the [orthognathic surgery](https://www.sciencedirect.com/topics/medicine-and-dentistry/orthognathic-surgery) ([Fig. 1](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub" \l "fig1)). An incisional [biopsy](https://www.sciencedirect.com/topics/medicine-and-dentistry/biopsy) was planned so that a histological analysis of the lesion could be performed. A submandibular approach was used to access the lesion, which had a dumbbell shape and was intimately connected to the inferior alveolar nerve. As the patient did not have [symptoms](https://www.sciencedirect.com/topics/medicine-and-dentistry/symptom), it was decided not to remove the mass in toto, but only to remove two sections for [microscopic examination](https://www.sciencedirect.com/topics/medicine-and-dentistry/microscopy), in order that [nerve function](https://www.sciencedirect.com/topics/medicine-and-dentistry/nerve-function) would be retained. A membrane was placed around the nerve. The histological features of the mass were consistent with a [diagnosis](https://www.sciencedirect.com/topics/medicine-and-dentistry/diagnosis) of [traumatic neuroma](https://www.sciencedirect.com/topics/medicine-and-dentistry/traumatic-neuroma) ([Fig. 2](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub" \l "fig2)). Three years after the biopsy, the lesion had not grown any larger, and the patient retained only a small area of paraesthesia between the lip and chin on the left side.



**Fig. 1**. Radiolucent [lesion](https://www.sciencedirect.com/topics/medicine-and-dentistry/lesion) on the left ramus (arrows).



**Fig. 2.** [Microscopic analysis](https://www.sciencedirect.com/topics/medicine-and-dentistry/microscopy) of [lesion](https://www.sciencedirect.com/topics/medicine-and-dentistry/lesion) (haematoxylin & [eosin](https://www.sciencedirect.com/topics/medicine-and-dentistry/eosin), ×100).

# Discussion

Although disturbance of [sensation](https://www.sciencedirect.com/topics/medicine-and-dentistry/sensation) involving the [inferior alveolar nerve](https://www.sciencedirect.com/topics/medicine-and-dentistry/inferior-alveolar-nerve) is commonly reported after bilateral sagittal split [osteotomy](https://www.sciencedirect.com/topics/medicine-and-dentistry/osteotomy) of the [mandible](https://www.sciencedirect.com/topics/medicine-and-dentistry/mandible), there are only four reported cases in the [English language](https://www.sciencedirect.com/topics/medicine-and-dentistry/english-language) literature of traumatic [neuroma](https://www.sciencedirect.com/topics/medicine-and-dentistry/neuroma) formation following such [surgery](https://www.sciencedirect.com/topics/medicine-and-dentistry/surgery). Two of the cases were symptomatic[2](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub#bib2), [7](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub#bib7) and the other two asymptomatic[1](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub#bib1), [6](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub#bib6). In all four of the previous cases, the mass was totally excised. Chau et al.[2](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub#bib2) have suggested that surgical removal of the neuroma is worth a single attempt if the neuroma can be located and if infiltration of a local anaesthetic provides relief. [Nerve section](https://www.sciencedirect.com/topics/medicine-and-dentistry/nerve-transection) and [alcohol](https://www.sciencedirect.com/topics/medicine-and-dentistry/alcohol) blocks appear to be ineffective, or even harmful[2](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub#bib2), [6](https://www.sciencedirect.com/science/article/pii/S0901502706004802?via%3Dihub#bib6).

In the case presented, the [traumatic neuroma](https://www.sciencedirect.com/topics/medicine-and-dentistry/traumatic-neuroma) was asymptomatic and it was therefore decided not to excise the mass. Instead, the superficial [tissue](https://www.sciencedirect.com/topics/medicine-and-dentistry/tissues) was excised from the mass for histopathologic [examination](https://www.sciencedirect.com/topics/medicine-and-dentistry/examination), but the nerve itself was left intact. Since the [lesion](https://www.sciencedirect.com/topics/medicine-and-dentistry/lesion) had likely been present for over 23 years, there seemed little likelihood of increased [growth](https://www.sciencedirect.com/topics/medicine-and-dentistry/growth) and no concern about permanent damage by leaving it.

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