

# Routine Dental Procedure Induced Hemifacial Paralysis— Case Report

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## Abstract

Hemifacial paralysis, characterized by unilateral facial weakness, poses diagnostic challenges due to its potential overlap with various conditions. This case report explores the differential diagnosis of hemifacial paralysis and distinguishing between underlying causes. Facial paralysis as a complication from routine dental procedures is rare but significant. This case report details the incidence of unilateral facial paralysis following a right-sided posterior superior alveolar nerve block during the restoration of tooth #1 in a 51-year-old male. The patient experienced immediate numbness and facial asymmetry, persisting over four weeks despite initial reassurance from the dentist. Differential diagnoses considered included Bell's palsy, stroke, Ramsay Hunt Syndrome, space-occupying lesions, Lyme disease, and nerve injury. Comprehensive testing ruled out these conditions, and Bell's palsy was suspected. Treatment with methylprednisolone led to significant improvement, with complete recovery noted within two weeks. This case highlights the importance of timely diagnosis and treatment of facial paralysis, emphasizing the potential benefits of early steroid intervention even when the exact cause is uncertain.

**Keywords:** Hemifacial Paralysis; Bell Palsy; Facial Nerve Injury; Orofacial Pain.

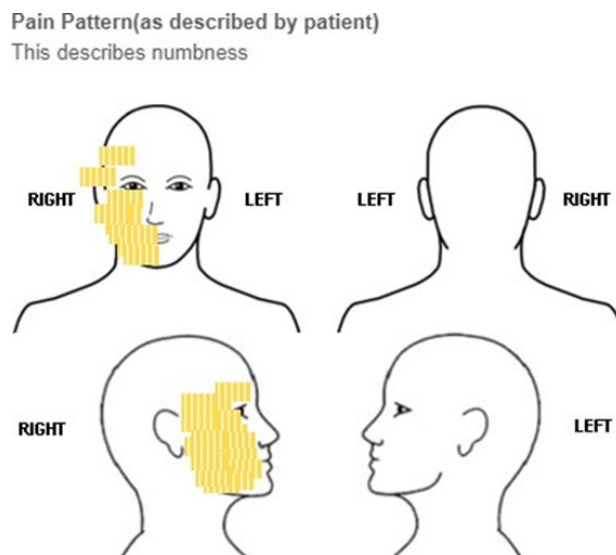
## Introduction

Most routine dental procedures are performed daily without major complications. Often, dentists overlook the possibility of nerve block side effects due to their low associated risk. Although rare, unilateral facial palsy has been reported in the literature as a potential side effect of local anesthetics or their techniques (1). Bell's palsy (BP), also known as Idiopathic facial nerve palsy is considered the most common type of spontaneous peripheral facial paralysis. Given the facial nerve's role in controlling muscles of facial expression, its paralysis leads to an inability to regulate expressions (2). Typically affecting only one side of the face, this condition has been proposed to be related to various factors, although its precise cause remains unclear (2). Possible etiologies include viral activation/infection, vascular ischemia, autoimmune inflammatory conditions, and genetic predisposition. From the dental perspective, there is limited information regarding the potential connection between intraoral anesthesia techniques or local anesthetics and the onset of Bell's palsy (2). In this case report, we aim to describe an incident of facial paralysis as a rare side effect of a routine dental procedure. Proper clinical history, examination, differential diagnosis, and evidence-based management will be reviewed.

## Case Presentation

A 51-year-old Caucasian male was referred to the clinic by his dentist for an initial consultation of unilateral facial paralysis. The patient's chief complaint included “numbness” and unilateral facial paralysis immediately after a right-sided posterior superior alveolar nerve block and restoration of tooth #1. He claimed, “the right side of the face, lips and tongue were numb, with loss of some taste, right eye irritation, and having a lopsided smile” (Fig. 1). The patient described having the restorative procedure completed on the maxillary right 3<sup>rd</sup> molar 4 weeks before he visited the clinic. He described feeling an exaggerated amount of pain during the local infiltration procedure, which disappeared after the local anesthetic began to take effect. Numbness and unilateral facial paralysis were reportedly noted immediately after infiltration. Facial paralysis persisted with no changes after 4 weeks. The patient presented with the inability to wrinkle the forehead, with asymmetry present on the right side of the face. The patient described a loss of taste however denied having a dry mouth.

After completing the dental procedure (restoration of #1), the dentist reassured him that numbness and muscular function would return to normal within a few hours. Two days later, he presented to the Hospital Emergency Department due to persisting symptoms. The patient stated that the medical staff at the emergency room ruled out stroke, intracranial space-occupying lesions, and Lyme Disease after thorough imaging and serologic testing. The emergency department dismissed him and recommended following up with the dentist.



**Fig. 1.** Representation created by the patient on the intake questionnaire.

## Examination

During the initial examination, it was noted that the facial expression muscles were affected only on the right side of the patient's face, and symptoms did not cross the midline. The patient was unable to close his right eye voluntarily, while the blinking and pupillary reflexes remained intact. However, dry eye was subjectively reported.

Proceeding with the assessment, mesial occlusal restoration of tooth #1 (right wisdom tooth) was observed intact while thermal tests, palpation, and percussion tests were negative for pathologies. No ear symptoms such as pain, tinnitus, hyperacusis or hearing loss were reported and no lesions around the ear were noted. No oral pathologies were observed. Corneal reflex (CN V) and eye movements (CN III, IV, VI) were observed within normal limits (WNL). Bilateral light touch of all 3 trigeminal dermatomes of the face were sensitive uniformly. The mandibular range of motion measurements were within normal limits. Manual palpation revealed muscles of mastication and temporomandibular joints (TMJ's) were non-painful with normal function. No pathological abnormalities were noted within the TMJs. No salivary gland mass was detected and salivary function presented with adequate salivary flow, while soft palate and uvula were raised at the midline. Absence of lymphadenopathy confirmed after palpation. A review of systems only revealed a neurological deficit of the facial cranial nerve (CN VII) on the right side.

Past and current medical history revealed acid reflux and finger amputation surgery due to a work-related injury. STOP-BANG tool revealed a score of 6 which is used to screen for possible existence of OSA. Family History includes stroke and obstructive sleep apnea. Social history revealed he is a self-employed carpenter/painter, who quit smoking 7-8 years prior. The patient reported 10 alcoholic drinks per week and 2 caffeinated beverages a day.

Panoramic X-ray revealed the mandibular condyles to be normal in size, and shape and are reasonably symmetrical without signs of erosion, sclerosis, or osteophytes. No evidence of any gross abnormalities, osseous pathology, or obvious detectable odontogenic lesions.

When considering possible differential diagnosis and/or common causes for hemifacial paralysis, including stroke, space-occupying lesions/tumors, nerve injury/trauma, Bell's palsy, Lyme disease, and Ramsay Hunt Syndrome. Discussion of the differential diagnosis and process of elimination of them will be held in the discussion section of this paper.

The following intervention was planned based on clinical findings and history to improve the patient's symptoms. A prescription for methylprednisolone 4mg (Medrol Dosepak) was provided. A follow-up at the clinic in 3 weeks was advised.

The follow-up visit was completed 4 weeks later (8 weeks after initial onset). The patient was very satisfied with the result. He described that about 10 days after initiating medication, he recuperated almost full control over muscles of facial expression along with normal eye tearing. Symptoms fully resolved around 14 days after initiating medication. The patient reported being satisfied with intervention and follow up as needed was advised.

## Discussion

### Bell's Palsy

Patients who suffer from Bell's Palsy often present with an abrupt onset of idiopathic, unilateral facial weakness or paralysis, which may progress rapidly over hours to days. Accompanying symptoms may include difficulty closing one eye, drooping of the mouth, altered taste sensation, and increased sensitivity to sound due to paralysis of the stapedius muscle. It's vital to first differentiate an idiopathic form of facial paralysis (Bell's palsy) from other causes of facial paralysis, such as Ramsay Hunt Syndrome, stroke, space-occupying lesions, Lyme disease, and nerve injuries/trauma. (3)The primary pharmacological treatment for Bell's palsy is the early administration of short-term oral glucocorticoids. In severe acute cases, combining antiviral medications with glucocorticoids may enhance recovery. (4) Because evidence suggests a possible role for a viral infection in the etiology of Bell's palsy, antiviral agents have been used in conjunction with steroids. But the results of this combination have been mixed and there is increasing evidence that using both drugs may not be any more effective than using a steroid alone. (5) In this clinical case, a prescription of methylprednisolone without an antiviral was provided.

### Ramsay Hunt Syndrome

Ramsay Hunt Syndrome, caused by the varicella-zoster virus, presents with additional features like vesicular rash in the external ear canal and may involve the auditory nerve (cranial nerve VIII), leading to sensorineural hearing loss. Pain is often severe and prolonged in Ramsay Hunt Syndrome as compared to Bell's Palsy where pain is not present (6).

### Stroke

Facial weakness caused by an ischemic stroke that affects motor pathways typically results in drooping of the mouth but does not affect the forehead and eyelid muscles. Unlike Bell's palsy, stroke-induced facial weakness generally appears suddenly and may accompany other neurological symptoms. (3)

### Space occupying lesion

There are several types of space-occupying lesions that compress the facial nerve resulting in unilateral facial paralysis. These include tumors and/or cysts such as acoustic neuromas, meningiomas, parotid gland tumors, metastatic lesions, arachnoid cysts, and dermoid cysts. On the other hand, vascular and inflammatory lesions including aneurysms, hemangiomas, and granulomas can also compress cranial nerve VII, also mimicking Bell's palsy. In this case, the ER was able to rule out any space-occupying lesions with imaging.

## Lyme disease

The most frequent cranial nerve disorder linked to Lyme disease includes facial nerve palsy. When related to the infection, this nerve paralysis can affect one or both sides of the face. Other symptoms that may suggest Lyme disease include erythema migraines, general fatigue, headaches, joint pain, and swollen lymph nodes. These symptoms may present with or without accompanying meningitis. Serologic testing is recommended to rule out Lyme disease which was also completed at the ER despite any other accompanying features suggestive of the disease (7).

## Nerve Injuries

Nerve injuries or trauma, are classified according to Seddon's classification, which may result in temporary or permanent nerve damage depending on the severity of the injury. However, unlike Bell's Palsy, traumatic nerve injuries typically involve a history of trauma or injury to the affected nerve(8). In this reported case, although the initiation of paralytic symptoms seems to be temporally related to the dental anesthetic procedure, we have not been able to fully prove the relation or even fully understand an anatomical explanation between the nerve block of #1 and injury to the facial nerve. We were unable to precisely confirm the injection technique used. It is assumed that local infiltration techniques were used correctly. Literature suggest that to aid in the recovery process and control inflammatory reactions in the injured nerve, the clinician should start an aggressive course of corticosteroids starting with a Medrol Dosepak (methylprednisolone) or high doses of dexamethasone immediately following the detection of the nerve injury (8). In nerve injury if steroids are contraindicated, a large dose of NSAIDs should be prescribed for a minimum of three weeks (8).

When it comes to facial nerve issues, such as Bell's palsy or nerve injury, one thing we know is that early treatment can significantly impact recovery. Regardless of the exact cause—whether it's Idiopathic Bell's palsy or a direct injury to the nerve—starting steroid treatment promptly can be beneficial. So, even if a definitive diagnosis is not available or appropriate, initiating steroid treatment immediately can help improve outcomes. It's a proactive step that supports nerve healing and can lead to better overall recovery.

## Conclusions

Providing the best odds for the patient's complete recovery should be the aim of any treatment. Following the best standards of practice, in turn, helps the prognosis of the patient. Timely assessment and management are crucial to optimize outcomes and alleviate patient distress associated with facial paralysis.

In summary, regardless of whether a facial nerve issue is diagnosed as Bell's palsy or a direct nerve injury, initiating steroid treatment as early as possible is a key factor in improving recovery. Steroids, such as prednisone or methylprednisolone, work by reducing inflammation and swelling around the affected nerve. This anti-inflammatory action helps to alleviate pressure on the nerve, thereby minimizing potential damage and promoting a more favorable environment for nerve healing.

By starting steroid treatment promptly, it can enhance the chances of the nerve recovering its function more completely and quickly. This proactive approach is beneficial even when the exact cause of the nerve dysfunction is not yet fully confirmed. Early intervention with steroids can significantly impact the overall outcome and quality of recovery, making it a critical step in managing this facial nerve condition effectively.

## Acknowledgment

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## Conflict of interest

The authors declare no conflict of interest.

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