

Traumatic Neuroma of Tongue in a 10-Year-Old Child: A Case Report

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ABSTRACT

Traumatic neuroma is a non-neoplastic proliferation of peripheral nerve tissue. It represents a hyperplastic, reparative response of a nerve following injury, including trauma or surgical interventions. Its occurrence in the oral cavity is usually rare. When present in the oral cavity, traumatic neuroma most commonly involves lip, mandible, tongue and very rarely hard palate. A 10-year-old child presented with a history of multiple swellings on the tongue that had persisted for 3-4 years, indicating a need for thorough diagnostic evaluation and appropriate management. The patient underwent a thorough clinical examination and a Computed Tomography (CT) scan for pre-surgical assessment, followed by surgical excision of the tongue lesions. The excised tissue was subjected to histopathological examination. Histopathological examination revealed the lesions to be traumatic neuromas, characterised by disorganised proliferation of nerve tissue that typically occurs as a reparative response to nerve injury or trauma. Surgical excision was the treatment modality employed, serving both diagnostic confirmation and therapeutic purposes aiming to alleviate symptoms and improve oral function. Postoperative follow-up revealed that the patient was clinically doing well with a notable improvement in quality of life. The removal of the lesions contributed to enhanced comfort and restoration of normal tongue function. Traumatic neuroma, an uncommon entity, particularly in paediatric patients, was effectively managed with surgical intervention in this case. The diagnosis underscores the importance of considering traumatic neuroma in differential diagnoses of tongue swellings with a plausible history of trauma. Favourable clinical outcomes highlight the benefits of appropriate diagnostic work-up and surgical treatment in improving patient outcomes.

Keywords: Histopathology, Paediatric case, Quality of life, Surgical excision, Tongue swelling

CASE REPORT

A 10-year-old child was referred to a tertiary clinic with a chief complaint of a chronic growth on the tongue. The patient first noticed a small growth on the right-side of his tongue at the age of six. Over the subsequent years, the lesion gradually increased in size due to repeated occlusal trauma but did not exhibit rapid growth. During the history-taking, the patient reported frequent tongue biting accompanied by an occasional burning sensation. Based on the findings, the growth was attributed to occlusal trauma.

Parents of the child did not seek any expert opinion or treatment in the preceding years for this pathology.

Informed consent was obtained from the parent for clinical examination, treatment, and the publication of photographic material.

Clinical examination revealed multiple nodules on the right lateral border of the tongue that were tender on palpation, with irregular margins and enlarged papillae [Table/Fig-1]. The largest dimension of the nodule noted was 2.5 cm. Mucous membrane surrounding the nodule was hyperaemic. On palpation, the lesions were hard, tender and non-fluctuant, suggesting a solid mass. Mobility was limited, indicating possible adherence to deeper structures.

He experienced burning sensation occasionally, especially when consuming acidic or spicy foods. Difficulty in chewing and incidences of bleeding from trauma was associated signs and symptoms. At home, bleeding was managed by intermittent application of ice pack.

Oral hygiene was found to be satisfactory. No other palpable masses or lymph nodes were found in the oral cavity, head or neck.

The differential diagnosis included benign lesions such as fibroma, schwannoma, and neurofibroma, as well as vascular lesions such as haemangioma. Although less likely in this age group, malignancy was also considered due to the clinical characteristics of the lesion. Clinical features of the various lesions are presented in [Table/Fig-2] for ease of differential diagnosis.



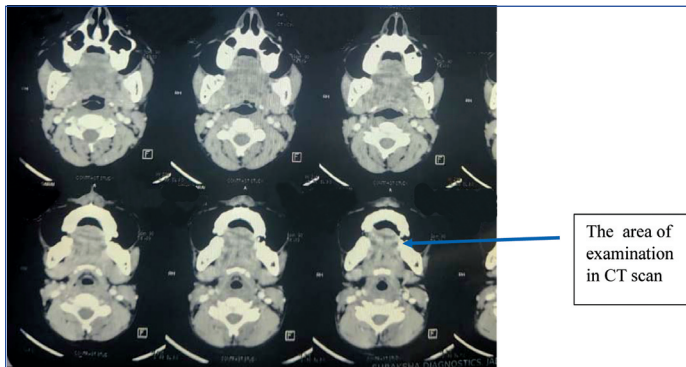
[Table/Fig-1]: Multiple nodules noted over the right lateral border of the tongue with irregular margins and enlarged papillae.

Diagnostic investigations: Imaging studies like Contrast-enhanced computed tomography (CECT) were performed to assess the extent of the lesion and evaluate any involvement of the deeper tissues [Table/Fig-3].

Contrast enhanced CT scan of the face and neck was performed using 2.5 mm thin contiguous slices. The scan was obtained for evaluation of the swelling on the right-side of the tongue adjacent to the foliate papillae. No significant Space Occupying Lesion (SOL) or focal asymmetry was identified on the CECT scan. However,

Lesion	Appearance	Symptoms	Consistency	Growth pattern	Other characteristics
Fibroma	Firm/smooth nodule	Painless	Firm, rubbery	Slow growing	Often associated with trauma
Traumatic neuroma	Firm nodule/ nodules	Painless/Painful/Tender	Firm, Hard	Slow growing	History of trauma
Schwannoma	Smooth nodule	Painless	Firm, rubbery	Slow growing	Rare, encapsulated
Neurofibroma	Smooth nodule or diffuse enlargement	Painless	Soft to firm	Slow growing	Associated with neurofibromatosis type 1
Haemangioma	Red/Purple Flat or Raised	Painless / May bleed	Soft, compressible	Variable growth	Blanches on pressure

[Table/Fig-2]: Clinical presentation of the lesions considered for differential diagnosis.



[Table/Fig-3]: The axial view of the CT scan shows no SOL or any focal asymmetry.

multiple bilateral enlarged subcentric lymph nodes with preserved normal morphology were noted at level III.

Based on the physical examination, which revealed a firm, multinodular mass on the right lateral border of the tongue, the initial clinical provisional diagnosis was an irritation fibroma or giant cell fibroma, given the site's susceptibility to occlusal trauma. Considering the nodular morphology and firm consistency, neoplasms of neural origin, such as schwannoma or neurofibroma, was also strongly considered. Radiographically, the CT scan findings helped to exclude more aggressive paediatric myofibroblastic tumours or vascular malformations, however, the imaging findings were not pathognomonic for a neuroma.

Treatment

An excisional biopsy was subsequently planned to establish the histopathological diagnosis of the lesion. Informed consent was obtained from the child's parents for the surgical procedure. The parents were informed about the potential risks and benefits of the treatment.

Local infiltration anaesthesia was achieved using 2% lidocaine with epinephrine (1:200,000). Infiltration was done in the submucosal space around the nodule. The tongue was typically grasped with gauze and extended to facilitate surgical access. The lesion was excised with a small margin of healthy tissue, using a #15 scalpel blade [Table/Fig-4]. Bleeding was controlled with the help of haemostatic agents. Synthetic, absorbable, braided suture was placed with the help of vicryl plus 3-0 [Table/Fig-5].

Postoperative Instructions

Amoxicillin and clavulanic acid were prescribed for five days post operatively. Non-Steroidal Anti-Inflammatory Drug (NSAID) acetaminophen was prescribed for three days for pain management. Gentle rinsing with 0.12% Chlorhexidine gluconate mouthwash was recommended twice daily for two weeks to maintain oral hygiene and provide antimicrobial action. Soft diet was recommended for the first 3-5 days postoperatively. Patient was also advised to avoid hot, spicy and any sharp food. Additionally, the patient was advised to minimise tongue movement and avoid inadvertent tongue biting during the healing period.

Histopathological Examination

The excised tissue was processed and subjected to histopathological examination. Haematoxylin and Eosin staining (H&E) of the specimen at 4x magnification showed haphazardly arranged nerve bundles

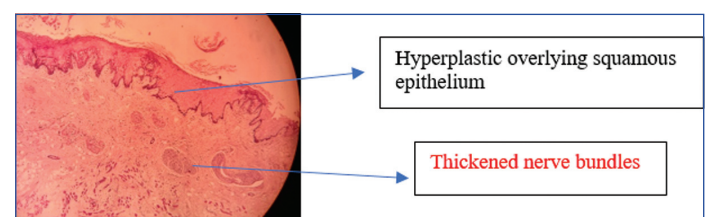


[Table/Fig-4]: Surgical excision is being done with scalpel.



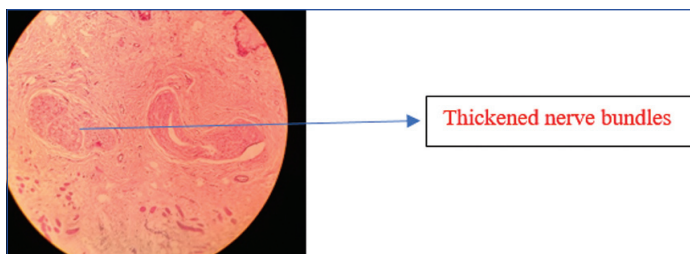
[Table/Fig-5]: Suture placed.

that were swollen and lack the orderly structure of normal peripheral nerves. There was a marked proliferation of Schwann cells, and axonal growth, which appeared spindle-shaped and contributed to the thickening of nerve bundles. The tumour is supported by a fibrovascular stroma that contains blood vessels and collagen fibres, which exhibit focal areas of hypercellularity. Overlying epithelium revealed mild hyperplastic changes [Table/Fig-6]. H&E staining at 10x magnification view demonstrated thickened nerve bundles in the stroma [Table/Fig-7]. [Table/Fig-8] shows 40x view of nerve bundles with H&E staining.



[Table/Fig-6]: H&E staining at 4x magnification showing overlying epithelium and underlying stroma showing multiple thickened nerve bundles.

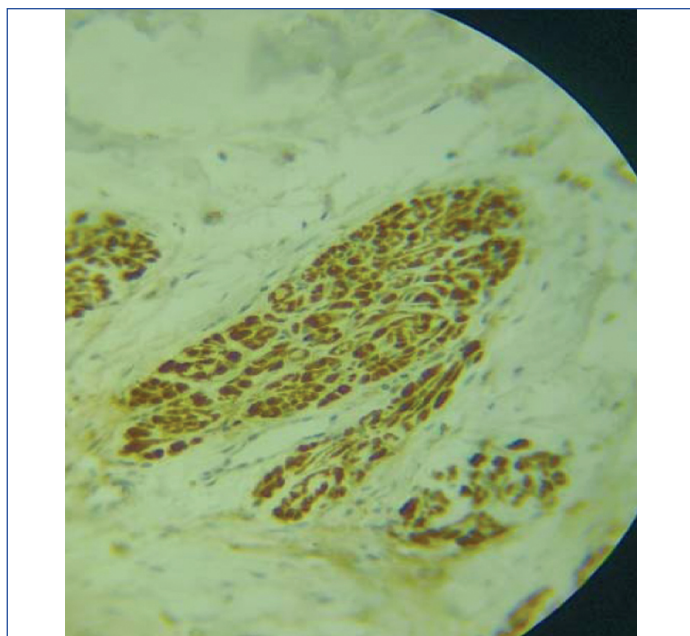
Immunohistochemical staining demonstrated diffuse S100 positivity, confirming neural tissue proliferation within the stroma [Table/Fig-9]. Based on the histopathological and immunohistochemical findings, the diagnosis of traumatic neuroma was confirmed.



[Table/Fig-7]: H&E staining at 10x magnification view shows thickened nerve bundles in the stroma.



[Table/Fig-8]: A 40x view of nerve bundles.



[Table/Fig-9]: S100 immunohistochemical positivity showing neural tissue proliferation in the stroma.

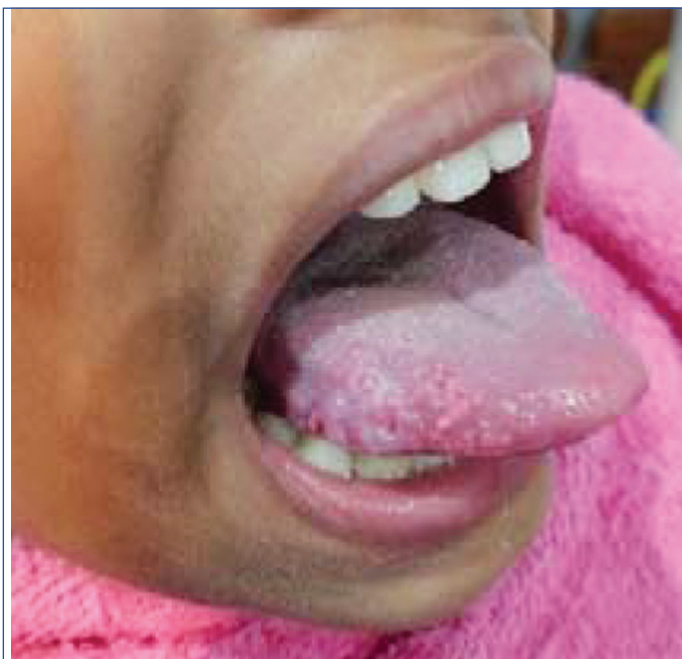
Differential diagnosis were excluded based on the following histopathological features. The presence of wavy nuclei, parallel array of collagenous matrix and the absence of fibrosis ruled out classical fibromas. Schwannoma was excluded because it typically exhibits Antoni A and Antoni B areas with characteristic nuclear palisading (Verocay bodies), features that were not identified in the present case. The absence of myofibroblasts excludes the presence of myofibroblastic tumours. Neurofibromas were excluded due to the absence of spindle cells, any endoneurial fibroblast and mucopolysaccharide ground substance.

Outcome

The postoperative period was uneventful, and the child demonstrated significant symptomatic improvement.

Follow-up: The patient was reviewed 10 days after surgery to assess wound healing, monitor for postoperative complications, and determine the need for any further intervention.

At the six-month follow-up visit, the patient reported to the clinic for evaluation. On examination healing was satisfactory and patient was clinically asymptomatic. No signs of recurrence were observed [Table/Fig-10].



[Table/Fig-10]: Six months follow-up showed uneventful healing with no recurrence.

Follow-up was continued for one year, and during which healing remained satisfactory without evidence of recurrence.

DISCUSSION

“Traumatic neuroma is a well-known entity involving peripheral nerves, that develops following trauma or surgical injury” [1]. It represents a reactive, non-neoplastic process rather than a true neoplasm [2].

Neuromas can originate from various types of nerve tissues and are associated with different aetiologies, clinical manifestations, and anatomical locations [3]. The occurrence of neuromas in the oral cavity is rare, and especially in the absence of pathogenic factors. Occasionally, traumatic neuromas may develop following relatively minor injuries or dental surgical procedures. However, other contributing factors, such as pressure, ischemia, crushing injuries, lacerations, stretching, cuts, bleeding to the surrounding tissues also have been considered. If present in the oral cavity, usually they appear as small, firm and often painful nodules [1,4]. This condition usually involves peripheral nerves. In present case, the traumatic neuroma was located on the right lateral border of the tongue, which is relatively uncommon site for this condition.

A traumatic neuroma of the tongue is a benign, non-neoplastic lesion characterised by the proliferation of nerve tissue at the site of injury as part of an attempted regenerative process. While not a true tumour, it can still cause pain and discomfort, which can be described as burning or shooting in nature [5]. Painful and symptomatic neuromas often require surgical intervention, as conservative management has demonstrated limited success [6]. On the other hand some cases may remain asymptomatic and may be identified incidentally.

In 2020, the World Health Organization (WHO) proposed a classification system for soft tissue and bone tumours. It incorporated Peripheral Nerve Sheath Tumours into the soft tissue category [7].

Peripheral Nerve Sheath Tumours

Benign

Schwannoma
Neurofibroma
Perineurioma
Granular cell tumour
Nerve sheath myxoma
Solitary circumscribed neuroma
Meningioma
Hybrid nerve sheath tumour

Malignant

Malignant peripheral nerve sheath tumour
Melanotic malignant nerve sheath tumour
Granular cell tumour, malignant
Perineurioma, malignant

Although traumatic neuromas can occur at any age, they are infrequently reported in the paediatric populations. Women tend to be more affected than men, with an estimated female: male - 1:0.9 [8]. Clinically, these lesions typically present as a nodules with a smooth surface, generally measuring less than 2 cm in diameter [9]. Neuromas most commonly develop when normal nerve conduction is damaged by injury, inadequate surgical repair, or, in some cases, chronic fibro-inflammatory irritation [9]. Neuromas can arise from different types of nervous tissue, including the nerve fibres and their myelin sheath [10].

Oral lesions in children pose unique diagnostic challenges due to diverse array of potential causes, ranging from benign to more serious conditions. This case highlights the importance of a systematic approach to diagnosis and management of oral lesions in paediatric patients. In the context of tongue lesions, it is essential to differentiate traumatic neuromas from other conditions such as focal fibrous hyperplasia, neurofibroma or schwannoma.

Over a 30-year period, Jones and Franklin analysed and reviewed 44,007 oral and maxillofacial tumours and identified only 151 cases of traumatic neuroma [8]. The principal features of oral traumatic neuroma are similar to the traumatic neuromas elsewhere in the body. In both locations, these lesions typically present as firm, smooth-surfaced, non-ulcerated nodules which develop after injury or surgery (e.g., tooth extraction, limb amputation, biopsy) as a result of attempted nerve fibre regeneration. They are frequently associated with pain, burning sensations, paresthesia, or numbness.

Clinically, traumatic neuromas may be classified as two types: painful (symptomatic) type and painless (asymptomatic) type. The pain associated with traumatic neuromas can be usually intense and debilitating. It is thought to result from compression of the affected nerve by the lesion, although studies have reported pain in only 25-30% of the cases [10]. Over a 44-year period, researchers analysed 157 cases of oral neural tumours, of which only 12 were diagnosed as traumatic neuromas of the tongue. Among these, seven cases involved the dorsal surface of the tongue, four involved the lateral border, and only one occurred at the tip of the tongue [11].

In the present case, painful traumatic neuroma in the right lateral border of the tongue was diagnosed in a 10-year-old child and successfully treated by complete surgical excision. This case also highlights the importance of considering this condition in the differential diagnosis of tongue lesions.

The present case may contribute to a better understanding of the pathogenesis of the neuroma. The diagnosis of traumatic neuroma can be challenging, and in this case the diagnosis was based on a combination of clinical, radiological and histopathological findings. The CT scan was useful in assessing the extent of the lesion and

ruling out any deep tissue involvement. Once a traumatic neuroma has developed, complete surgical excision is the treatment of choice, particularly when the lesion is symptomatic.

While Magnetic Resonance Imaging (MRI) is generally preferred modality for soft-tissue imaging, Computed Tomography (CT) is sometimes preferred over MRI for neuromas of the tongue for technical reasons related to preoperative evaluation. CT scans are significantly faster than MRI, making them less sensitive to patient movement (e.g., swallowing or tongue movement), resulting in clearer images of the lesion, whereas MRI can suffer from image distortion due to such movements. As patient was only 10-year-old CT was preferred over MRI to avoid any artifacts due to unintentional movement.

Postoperative histopathological examination confirmed the diagnosis of traumatic neuroma, thereby definitively excluding all other differential diagnoses.

Jinno Y et al., reported a case of traumatic neuroma on the tongue tip in a 79-year-old man who presented with a painful solitary nodule. After the surgical removal of the lesion patient's symptoms resolved completely [12].

Fershina JJ et al., also reported a case of traumatic neuroma in a 54-year-old female patient who presented with a chief complaint of a non-tender nodular swelling in the left upper lip for eleven years. Surgical removal of the lesion followed by histopathologic examination confirmed the diagnosis of traumatic neuroma [13].

Although recurrence is possible, most lesions do not recur after complete excision. Touchette D and Gessler GM postoperatively followed up a case of traumatic neuroma of the tongue. Eighteen months after the initial surgery, the patient developed a second traumatic neuroma at the same site, measuring approximately 8 mm in diameter [14]. The aetiology of the recurrent lesion could be attributed to a previous surgical procedure, crushing injuries or lacerations. Bleeding into the surrounding tissues was also taken into consideration. However, the exact triggering mechanisms and development pathways involved in the formation of the second lesion remains poorly understood.

The treatment of traumatic neuroma typically involves surgical excision of the lesion. In the present case, excisional biopsy was performed and the specimen was sent for histopathological examination. The surgical procedure was effective in relieving the child's symptoms, with no recurrence of the lesion observed at the six-month follow-up. Accordingly, present case of painful traumatic neuroma on the right lateral border of the tongue may be valuable for understanding of the pathogenesis of traumatic neuroma.

CONCLUSION(S)

Traumatic neuroma on the tongue is a rare proliferative lesion of the oral cavity. This case report provided a comprehensive overview of the diagnosis and management of traumatic neuroma in a 10-year-old child. It also emphasises the importance of considering traumatic neuroma in the differential diagnosis of tongue lesions in paediatric patients. Surgical excision can provide effective treatment.

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