Solitary neurofibroma: a rare occurrence on gingiva

Joann Pauline George, MDS ▪ Sai Jyothsna N., BDS

Neurofibromas—benign, slow-growing nerve sheath neoplasms composed of Schwann cells, perineural cells, and fibroblasts—are common neurogenic tumors on skin but uncommon intraorally. A diagnosis of neurofibroma can be established by clinical and histologic examinations. This case report describes an unusual presentation of solitary neurofibroma on the lingual gingiva of the mandibular posterior region of a 22-year-old woman. The patient exhibited no systemic manifestations of neurofibromatosis. Excisional biopsy of the intraoral neurofibroma was performed. Histologically, the neoplasm showed lesional cells arranged in the form of interlacing fascicles. The cells were elongated and had dark-staining, wavy nuclei, ample cytoplasm, and distinct cell borders, all characteristic of Schwann cells. Based on the histopathologic findings, a final diagnosis of neurofibroma was made. The patient returned for periodic reexamination after excision of the tumor, and there was no recurrence after 15 months.

Received: November 26, 2014
Accepted: March 31, 2015

Key words: benign tumor, intraoral neurofibroma, nerve sheath neoplasm, Schwann cells, solitary neurofibroma

Neurofibromas—benign, slow-growing nerve sheath neoplasms of heterogenous origin—are composed of Schwann cells, perineural cells, and fibroblasts and usually originate from peripheral nerves.[1,2] Shklar & Meyer classified neurofibromas as solitary or multiple and solid or plexiform.[3] Multiple neurofibromas are observed as a part of von Recklinghausen neurofibromatosis, a disease with an autosomal-dominant pattern of inheritance, and as a component of the polyglandular syndrome known as *multiple endocrine neoplasia type 3* (also known as *type 2B*).[3,4] Neurofibromas are also sorted into major and minor variants based on their morphologic features. Major variants include plexiform, diffuse, and pacinian neurofibromas, while minor variants include epithelioid, cellular, myxoid, glandular, xanthomatized, and other neurofibromas.[5] Solitary tumors are most commonly seen in young adults.[6]

Neurofibromas are considered to be among the most common types of peripheral neoplasm seen on the skin but are an uncommon intraoral neoplasm.[7] Intraorally, neurofibromas most commonly develop on the tongue but may occur at any site, including the palate (soft or hard), buccal mucosa, floor of the mouth, and posterior mandible (intraosseous location), where they may produce a well-demarcated or poorly defined unilocular or multilocular radiolucency.[1,4] However, occurrence on the gingiva is rare.[1,4] Intraoral neurofibromas may present as sessile or pedunculated nodules. They generally are superficially located, painless, and progressive but slow-growing lesions that vary in size from small nodules to large masses. Large lesions can interfere with mastication, speech, and oral hygiene.[5,8,9]

The present case report describes an unusual presentation of solitary neurofibroma on the lingual gingiva of the mandibular posterior region. The patient exhibited no systemic manifestations of neurofibromatosis.

Case report

A 22-year-old woman reported to the Department of Periodontology, Krishnadevaraya College of Dental Sciences and Hospital, Rajiv Gandhi University of Health Sciences, Bangalore, India, with a chief complaint of a swelling in the region of her mandibular right posterior teeth. The swelling was first noticed by the patient during the first trimester of a pregnancy, 2.5 years previously. The lesion was initially pea sized and then gradually developed to its present size. No history of pain, discharge, or bleeding was associated with the swelling. Difficulty during mastication, toothbrushing, and speech had been noticed for the previous 6 months. No history of trauma was reported.

On physical examination, the patient appeared healthy. No relevant medical or dental history and no pertinent family history of similar growths were reported.

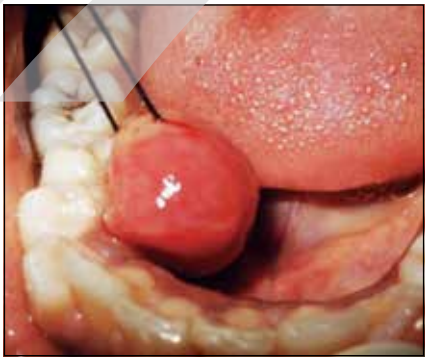

Fig 1. Solitary, elliptical gingival overgrowth (GO) located on the lingual surface of the mandibular right teeth from the central incisor to the first molar.

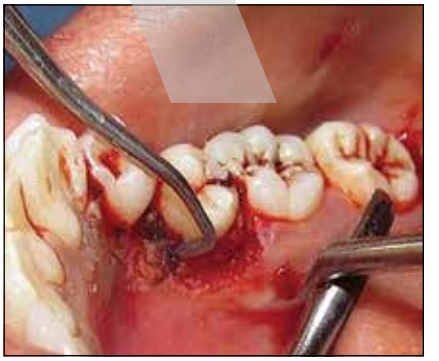

Fig 2. Use of scalers to remove residual tissue and debris after excision of the GO.

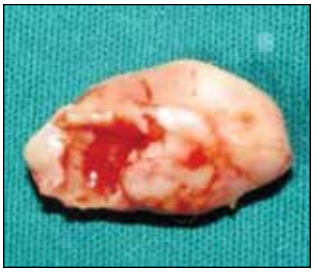

Fig 3. Excised GO. The elliptical, pink mass has a lobulated surface and measures 10 × 25 mm.

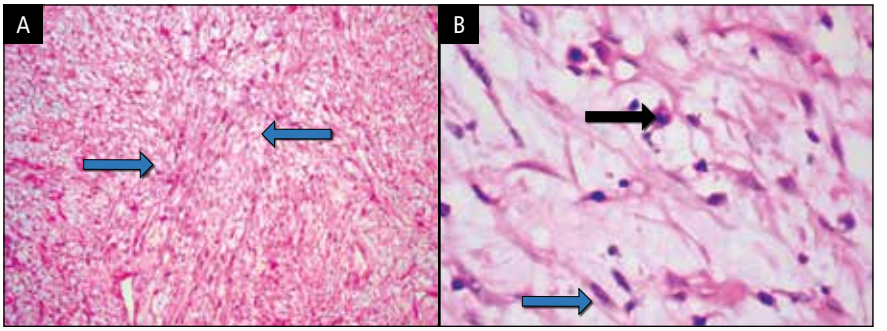

Fig 4. Photomicrographs of the histopathologic specimen. A. At 10× magnification, spindle cells are arranged in short and long fascicles (blue arrows) (hematoxylin and eosin [H&E] stain). Spindle cells arranged in both horizontal and vertical sections are seen. B. At 20× magnification, spindle cells with wavy nuclei (blue arrow) and mast cells (black arrow) are clearly noted (H&E stain).

Intraoral inspection revealed a solitary, elliptical gingival overgrowth (GO) on the mandibular lingual surface (Fig 1). The GO extended mesiodistally from the mesial surface of the right central incisor (tooth 25) to the mesial surface of the right first molar (tooth 30) and occlusocervically from the level of the occlusal plane to the depth of the vestibule with respect to the first premolar (tooth 28) and second premolar (tooth 29) and 2 mm apical to marginal gingiva with respect to tooth 25, the lateral incisor (tooth 26), and canine (tooth 27). The GO was pink, had an erythematous patch on its dorsal aspect posteriorly, and had smooth and regular margins.

Palpation revealed that the GO was well circumscribed, had a smooth surface, and measured about 15 × 20 mm. The GO was pedunculated at the interdental gingiva between teeth 28 and 29 and between teeth 29 and 30. Anterior to tooth 28, it was freely movable, was not fixed to the underlying hard and soft tissues, and was firm and noncompressible (Fig 1). Exudation, bleeding, and pain were absent. The oral hygiene of the patient was good (simplified Oral Hygiene Index score of 1).[10] Extraoral examination revealed no such growth in any other part of the body.

A panoramic radiograph revealed alveolar crestal resorption at teeth 29 and 30, furcation radiolucency and thinning of bony trabeculae with respect to tooth 30, and a widened periodontal ligament space associated with the mesial aspect of the mesial root at the cervical third of tooth 30. Intraoral periapical radiographs were not taken during the initial examination because the size of the GO obstructed placement of the film.

On the basis of the clinical examination and the history given by the patient, a provisional diagnosis was made. Because the patient presented with a painless GO that had a history of development during pregnancy, was pink, and was slow growing, a provisional diagnosis of pyogenic granuloma was made. The differential diagnoses included peripheral giant cell granuloma (which is more commonly found in female patients, occurs at any age, and is mostly located on the lingual aspect of the mandibular posterior region) and irritation fibroma (which is characterized by the presence of plaque, calculus, and inflammation).

The singular mass was surgically excised under local anesthesia obtained with 2% lignocaine hydrochloride with 1:80,000 adrenaline (Lignox 2% A, Indoco Remedies, Ltd). The GO was held by a suture to facilitate access and retraction from the base, and the GO was removed from the base with the use of No. 15 and 12 blades (Surgeon, Kehr Surgical Private, Ltd). In addition, 2 mm of healthy tissue surrounding the attachment site of the GO was removed. Residual tissue and debris were removed with scalers (Fig 2). During removal of the GO, profuse bleeding was encountered. The bleeding was controlled with the help of digital pressure, electrosurgery (coagulating current, 70 W, 250 V, RF type No. 2, 1.4-1.7 MHz, shaving motion; Sensimatic Electrosurge 600 SE, Parkell, Inc), and a local hemostatic agent (AbGel gelatin-based sponge, Shri Gopal Krishna Labs, Pvt Ltd). No postoperative complications were observed. Postoperative instructions were given to the patient, and analgesics (combined ibuprofen [400 mg] plus acetaminophen [333 mg]) were prescribed for 3 days.

The excised mass was washed with 0.9% normal saline, stored in 10% formalin, and sent to the laboratory for routine histopathologic evaluation. The excised GO was elliptical and pink, had a lobulated surface, and measured 10 × 25 mm in diameter (Fig 3).

Hematoxylin and eosin staining was used for light microscopic examination (Olympus) to evaluate epithelial and mesenchymal changes. Microscopic examination revealed discontinuous, hyperplastic, and nonkeratinized stratified squamous epithelium with intercellular edema. Areas of ulceration covered with fibrinopurulent membrane were observed. The underlying lesional connective tissue was moderately cellular with predominant myxoid stroma. The lesional cells were arranged in the form of interlacing fascicles (Fig 4). The cells were elongated and had dark-staining, wavy nuclei, ample cytoplasm, and distinct cell borders characteristic of Schwann cells. Plump fibroblasts were interspersed with collagen, which was arranged in the form of bundles. A moderate amount of chronic inflammatory cell infiltrate

(predominantly plasma cells, lymphocytes, and eosinophils) was evident. Russell bodies and Mott cells were visible. Numerous mast cells and few neurites were observed. Moderate amounts of endothelium-lined blood capillaries and arterioles were also present. The histopathologic features were suggestive of neurofibroma.

An intraoral radiograph taken 1 week after excision of the GO confirmed the findings of the previously described initial panoramic radiograph (Fig 5). A final diagnosis of neurofibroma was made. The patient was kept under observation, and no recurrence was observed at the examination 15 months after excision of the mass.

Discussion

Neurofibroma (single [solitary] or multiple) is one of a group of benign neurogenic tumors that affect the jaws. The other types in this group are schwannoma (also known as *neurinoma* or *neurilemoma*) and neuroma (amputation neuroma or traumatic neuroma).[1] In 1967, Oberman & Sullenger reported on 41 patients with neurogenic tumors of the head and neck.[11] Thirty-one of these tumors were benign neurofibromas and neurilemomas, but only 16 were confined to the oral cavity.[11] Docherty et al analyzed 695 patients with benign tumors of the mouth (including cysts) and found only 16 neurofibromas and neurilemomas (approximately 2%).[12] Maruyama et al reviewed the literature and detailed the following distribution of 66 neurofibromas reported in the facial region: tongue, 12; palate, 12; mandibular ridge/vestibule, 15; maxillary ridge/vestibule, 9; buccal mucosa, 10; lip, 4; mandibular intraosseous, 2; floor of the mouth, 1; and gingiva, 1.[13] In 2012, Campos et al reported that the frequency of solitary neurofibromas in the oral cavity remains 6.5%, especially solitary lesions not associated with neurofibromatosis type 1 (NF1).[14] In a review, Ellis et al mentioned 22 intraosseous cases, of which 19 could be classified as solitary.[15]

Neurofibromas, which are composed of Schwann cells, perineural cells, and fibroblasts, are benign, slow-growing, relatively circumscribed but nonencapsulated nerve sheath neoplasms of heterogenous origin, usually originating from peripheral nerves.[1] The World Health Organization has subdivided neurofibromas into 2 broad categories: dermal and plexiform.[16] Dermal neurofibromas arise from a single peripheral nerve, while plexiform neurofibromas are associated with multiple nerve bundles. Plexiform neurofibromas are also an oral manifestation of multiple endocrine neoplasia syndrome type 3.[15] The exact cause of solitary neurofibroma remains unknown. It has been postulated that the solitary neurofibroma is a hyperplastic hamartomatous malformation rather than a neoplastic disease. Solitary tumors are most commonly observed in young adults. The peak age of presentation is said to be in the third decade of life, and the sex predilection is still debatable.[7]

The treatment of choice is complete excision. Recurrence is rare, although the neoplasms may exhibit sarcomatous alteration in 5%-15% of cases, especially in multiple neurofibromas.[8,17] Solitary neurofibromas seldom change into a malignant form. However, Steward & Bailey have drawn attention to the fact that it is important to know whether the tumor is benign or malignant before excision.[18] In the present case, the tumor appeared as a well-defined, small mass that was mobile and showed no features of invasion. Therefore, an excisional biopsy was performed.[5]

A similar unilateral neurofibroma, associated with NF1, has been reported on the attached gingiva of the lingual aspect of the mandibular central incisors.[19] Another case of a solitary submucous neurofibroma on the lingual aspect of the mandibular left side also has been reported.[4] To the best of the authors' knowledge, very few cases of isolated gingival neurofibromas not associated with systemic disease have been reported.

The present case was unique because the lesion was isolated and occurred on the gingiva, which remains a less common site. The mass presented as a painless, pedunculated, exophytic tumor with slow growth. The localization of the tumor on the lingual gingiva of the mandibular right quadrant supported the lingual nerve as origin for the neurofibroma.[4] No associated family history was reported. A thorough examination of the patient for the various manifestations of NF1 (such as café-au-lait spots, Lisch nodules, and axillary freckling) was performed.[20] The disease was ruled out due to the absence of those indicators. Preoperative panoramic radiographs showed no serious abnormalities. This neoplasm—confirmed as neurofibroma by specific histopathologic findings observed under a microscope—showed interlacing fascicles, Schwann cells, Mott cells, mast cells, and neurites.

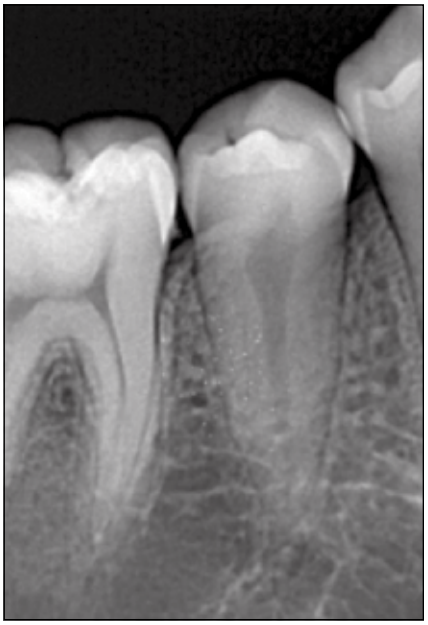

Fig 5. Alveolar crestal resorption of the mandibular right second premolar and first molar 1 week postoperatively. The first molar also exhibits furcation radiolucency, thinning of bony trabeculae, and a widened periodontal ligament space associated with the cervical third of the mesial root on the mesial aspect.

Recurrence is seen in as many as 20% of patients after complete resection, and the rate of recurrence increases to 44% with subtotal resection.[2] A treatment protocol for complete excision was followed for the unusual growth in the present case, and there was no recurrence after 15 months.

The occurrence of this GO during pregnancy was misleading and led to an incorrect provisional diagnosis. The assumption that any gingival overgrowth must be a commonly occurring benign tumor, such as pyogenic granuloma, fibroma, peripheral ossifying fibroma, and peripheral giant cell granuloma, can misdirect the diagnosis. Dentists should keep in mind that other benign

tumors, such as solitary neurofibroma, also can affect the periodontium and may have sarcomatous alterations. When sarcomatous alterations do occur, bony involvement, invasion, nerve paresthesia, and localized lymphadenopathy may be some of the presenting features. All innocuous-looking GOs should be checked for such attributes.

Conclusion

A case of neurofibroma of the mandibular posterior gingiva, which is a relatively rare benign tumor of the oral cavity, is reported. The diagnosis of the lesion was based on histopathologic findings. After excisional biopsy of the intraoral neurofibroma, there was no recurrence after 15 months. A longer period of follow-up is needed to evaluate recurrence.

Author information

Dr George is a professor, and Dr Sai Jyothsna N is a third-year postgraduate student, Department of Periodontology, Krishnadevaraya College of Dental Sciences and Hospital, Rajiv Gandhi University of Health Sciences, Bangalore, India.

References

1. Richards D. Neurofibroma of the oral cavity. *Br J Oral Surg.* 1983;21(1):36-43.
2. Bharath TS, Krishna YR, Nalabolu GR, Pasupuleti S, Surapaneni S, Ganta SB. Neurofibroma of the palate. *Case Rep Dent.* 2014;2014:898505.
3. Shklar G, Meyer I. Neurogenic tumors of the mouth and jaws. *Oral Surg Oral Med Oral Pathol.* 1963;16(9): 1075-1093.
4. Depprich R, Singh DD, Reinecke P, Kübler NR, Handschel J. Solitary submucous neurofibroma of the mandible: review of the literature and report of a rare case. *Head Face Med.* 2009;5:24.
5. Suramya S, Shashikumar P, Shreeshyla HS, Kumar GS. Solitary plexiform neurofibroma of the gingiva: unique presentation in the oral cavity. *J Clin Diagn Res.* 2013; 7(9):2090-2092.
6. Ohno J, Iwahashi T, Ozasa R, Okamura K, Taniguchi K. Solitary neurofibroma of the gingiva with prominent differentiation of Meissner bodies: a case report. *Diagn Pathol.* 2010;5:61.
7. Kodiya AM, Ngamdu YB, Sandabe MB, Isa A, Garandawa HI. Solitary isolated neurofibroma of the soft palate. *J Surg Case Rep.* 2013;2013(1).
8. Rajendran R, Sivapathasundharam B, eds. *Shafer's Textbook of Oral Pathology.* 7th ed. New Delhi: Elsevier; 2012:202-203.
9. Neville BW, Damm DD, Allen CM, Chi AC JE. *Oral and Maxillofacial Pathology.* 4th ed. St Louis: Elsevier; 2016:494-495.
10. Greene JC, Vermillion JR. The simplified Oral Hygiene Index. *J Am Dent Assoc.* 1964;68:7-13.
11. Oberman HA, Sullenger G. Neurogenous tumors of the head and neck. *Cancer.* 1967;20(11):1992-2001.
12. Docherty MB, Parkhill EM, Dahlin DC, Woolner LB, Soule EH, Harrison EG Jr. *Tumors of the Oral Cavity and Pharynx.* Washington, DC: Armed Forces Institute of Pathology, 1968:35, 83, 155, 193, 263. *Atlas of Tumor Pathology;* section IV, fascicle 10B.
13. Maruyama M, Fushiki H, Watanabe Y. Solitary neurofibroma of the floor of the mouth: a case report. *Case Rep Otolaryngol.* 2011;2011:967896.
14. Campos MS, Fontes A, Marocchio LS, Nunes FD, de Sousa SC. Clinicopathologic and immunohistochemical features of oral neurofibroma. *Acta Odontol Scand.* 2012;70(6):577-582.
15. Ellis GL, Abrams AM, Melrose RJ. Intraosseous benign neural sheath neoplasms of the jaws. Report of seven new cases and review of the literature. *Oral Surg Oral Med Oral Pathol.* 1977;44(5):731-743.
16. von Deimling A, Foster R, Krone W. Neurofibromatosis type 1. In: Kleihues P, Cavenee WK, eds. *World Health Organization Classification of Tumours. Pathology and Genetics of Tumours of the Nervous System.* Lyon, France: IARC Press; 2000:216-218.
17. Bhattacharya I, Cohen D. Oral neurofibroma follow-up. Updated September 4, 2015. *Medscape.* http://emedicine.medscape.com/article/1079193-followup#showall. Accessed March 22, 2016.
18. Steward A, Bailey BMW. Neurofibroma of the inferior alveolar nerve: diagnostic and management difficulties. *Br J Oral Maxillofac Surg.* 1992;30(1):56-58.
19. Vivek N, Manikandhan R, James PC, Rajeev R. Solitary intraosseous neurofibroma of mandible. *Indian J Dent Res.* 2006;17(3):135-138.
20. Alatli C, Oner B, Unür M, Erseven G. Solitary plexiform neurofibroma of the oral cavity: a case report. *Int J Oral Maxillofac Surg.* 1996;25(3):379-380.