Case Report

A rare case report of neurofibromatosis type 1 in a 12-year-old child: A 15-month follow-up

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Abstract

Neurofibromatosis type 1 (NF-1) or von Recklinghausen's disease is a rare genetic disorder characterized by the development of multiple noncancerous (benign) tumors of nerves and skin (neurofibromas). Head-and-neck neurofibroma is generally located in the soft tissue. Here, we present a case of a 12-year-old girl with NF-1. The disease started in childhood with the appearance of multiple hyperpigmented skin macules. The girl presents generalized freckling and café au lait spots throughout the body and a diffused swelling measuring about 4 cm × 3 cm, extending from the right maxillary hard palate region to the midpalate. The diagnosis of NF-1 was made according to the presence of two or more diagnostic criteria of the National Institute of Health Consensus Development Conference. No recurrence was observed in a 15-month follow-up after extensive surgical ablation.

Keywords: Café au lait spots, neurofibroma type 1, S-100 protein, von Recklinghausen disease

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INTRODUCTION

Neurofibroma is a benign neural tumor which derives from the peripheral nerve sheath, and it consists of the variable mixture of Schwann cells, perineurial-like cells and fibroblasts.[1] Although it is the most common skin lesion, neurofibromas present within the oral cavity are not uncommon.[2] Neurofibromatosis (NF) often involves 5th cranial nerve and upper cervical nerves, with common sites being tongue, gingiva, major salivary glands and jaw bones.[3] It has also been noticed on lips and mucosa.[4]

Clinically, neurofibromas in the oral cavity are present as submucosal, nontender, discrete mass.[5] In rare conditions, it can also arise within the bone. In these cases, neurofibroma presents with a varied radiographic appearance ranging from well to poorly demarcated margins with either unilocular to multilocular appearance.[4]

Neurofibromas are classified into two types: neurofibromatosis type 1 or von Recklinghausen disease and neurofibromatosis type 2.

Neurofibromatosis type 1 was first described by Frederich von Recklinghausen in 1882.[6] Neurofibromatosis type 1 (NF-1) or von Recklinghausen disease is an autosomal dominant disorder with a basic defect in the embryonic neural crest cells which give rise to ectodermal and mesodermal derivatives that affect one in 3000 live births.[2] Oral manifestations of NF have been reported

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in only 4%–7% of the affected persons.[7] Palatal swellings may occur from a variety of etiological factors and can originate from the structures within the palate or beyond it. They may be painful when secondarily infected. The mean age of occurrence is 27.5 years with a slight predilection toward females.[8] Treatment for both NF-1 and NF-2 is directed toward controlling symptoms and managing the complications. In dental literature to date, there is one case report of neurofibroma in the palate diagnosed at the age of 18 years with a chief complaint of the lump in the maxillary right palate, and 4–5 café au lait macules were seen in his thoracic region.[9]

We report an unusual case of a palatal neurofibroma with well-demarcated radiolucency diagnosed using cone-beam computed tomography (CBCT) and other findings like several café au lait macules on extremities.

CASE REPORT

A 12-year-old female child reported to the Department of Pedodontics and Preventive Dentistry, with a painless swelling on the right side of the hard palate and displaced tooth on the same side. It had become noticeable for the past 6 years which gradually increased over a period of time. There was a positive family history and no relevant medical history. On physical examination, several café au lait macules and freckling spots on the patient's legs and palms were evident [Figure 1b and c]. The patient was referred to dermatologic evaluation.

A comprehensive clinical examination was performed in our department, which revealed diffused swelling measuring about 4 cm × 2 cm approximately, extending from the right maxillary hard palate region to the midpalate. The palatal tissue of the upper right sextant was described as boggy or fluctuant when palpated, no tenderness was present. The lesion was extending from the right first permanent central incisors to the second premolar. Tooth in the anterior region was completely displaced and nonmobile [Figure 1a]. The pulp vitality test of the teeth in that region was positive and vital. Probing depth on the displaced tooth was normal. Hard tissue examination16 was grossly decayed for which the patient got it extracted in a private clinic.

Radiographic investigations such as CBCT scan (HDX WILL, On demand 3D, North Korea), axial and coronal sections, which showed a solitary, intraosseous, well-defined, homogenous isodense to hypodense mass arising from within the right maxilla [Figure 1d].

Fine-needle aspiration cytology of the lesion was carried out, which was nondiagnostic [Figure 2a], considering the patient's age and site of the swelling, the differential diagnosis of pleomorphic adenoma, mucoepidermoid carcinoma, polymorphous low-grade adenocarcinoma, Non-Hodgkin lymphoma and neurofibroma was given. A decision was taken to carry out an incisional biopsy under general anesthesia followed by the primary closure [Figure 2b].

Under general anesthesia, the lesion was incised, mucoperiosteal flaps were reflected from teeth #11–15,

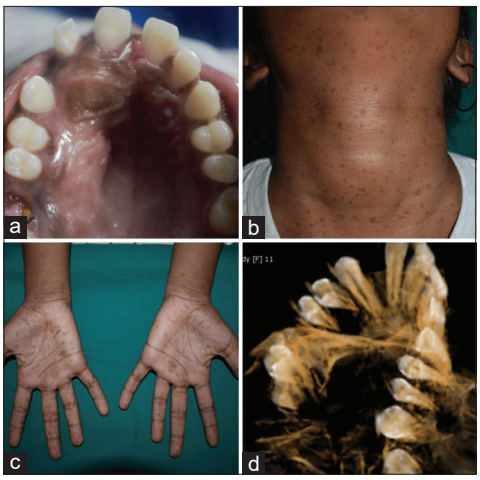

Figure 1: (a) Intraoral view showing the swelling involving the right side of the hard palate and extending to mid palate. (b and c) Several café au lait macules and freckling spots on the patient's neck and palms. (d) Cone-beam computed tomography showing the signs of intrabony defects

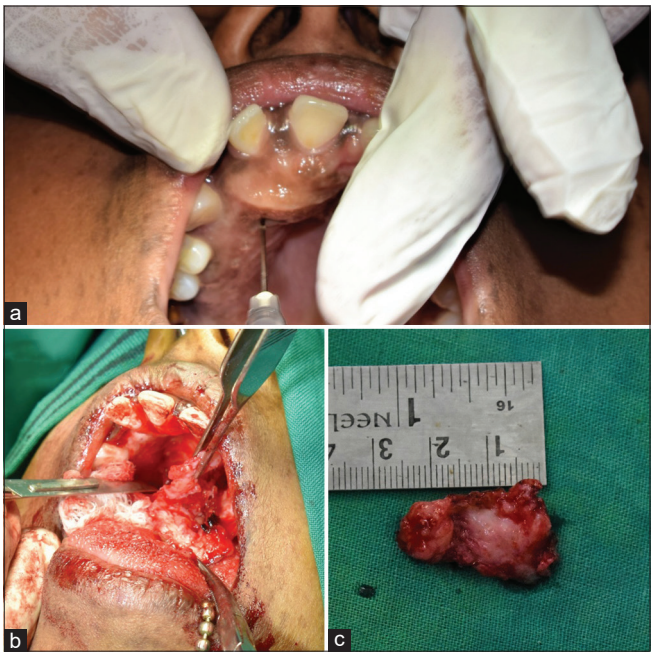

Figure 2: (a) Fine-needle aspiration cytology. (b) Excisional biopsy under general anesthesia. (c) Excised tissue for biopsy

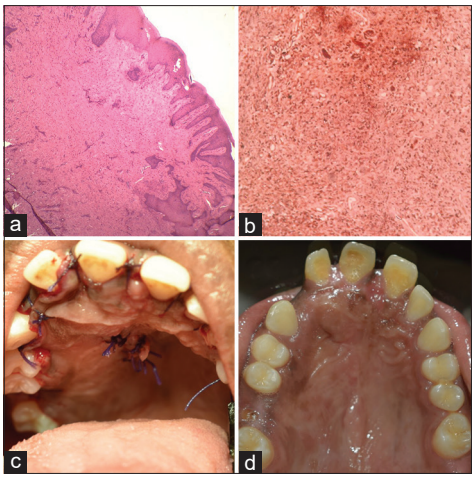

Figure 3: (a) Low-power view showing a nonencapsulated cellular proliferation within the lamina propria. (b) Medium-power photomicrograph showing scattered S-100 protein immunoreactivity. (c) Postoperative closure. (d) Photograph after 15-month follow-up

with a palatal releasing incision distal to #11 and linear incision from the distal marginal ridge of #15. Flaps reflected more accurately as if there is no attachment of soft tissue to the palatal bone. Following the flap reflection, 2–5 mm bony defect was present on the palatal aspect extending from distal to #11 to the tuberosity due to the extensive nature of the lesion and its close proximity to the greater palatine foramen 2 × 1.5 × 1 incisional biopsy was taken [Figure 2c], and the surgical site was irrigated with saline and sutures were placed using resorbable sutures [Figure 3c]. The biopsy revealed densely packed collagen bundles interspersed with wavy bundles of nerve tissue having spindle nuclei. The fibroblasts were plump and multiple, and spindle-shaped fibrocytes were evident. No dysplastic features were reported in the specimen given [Figure 3a].

An immunohistochemical test for the S-100 protein was positive (detection system used was the horseradish peroxidase polymer) confirming the neural origin of the tumor [Figure 3b]. The epithelial membrane antigen, however, was negative, hence ruling out von Recklinghausen's disease. The histological findings were consistent with the diagnosis of neurofibroma.

Following the identification of the lesion, the patient was further handled by the oral and maxillofacial surgery department. A complete excision of the lesion was planned after 6 weeks of the initial procedure. A palatal flap was reflected, and greater palatine artery was identified, ligated and cauterized. The lesion was completely removed by the aggressive thinning of the palatal flap. The palatal bony defect was inspected, but no additional treatment was planned. All the tissue collected was sent to the department of oral pathology. The second biopsy confirmed the original diagnosis.

The patient healed uneventfully following both the surgical procedures. At the 6th- and 15th-month follow-up, there had not been a return of the swelling, and displaced teeth were vital [Figure 3d].

DISCUSSION

Oral and maxillofacial lesions of the neural origin are rare. Neurofibroma is a benign peripheral nerve sheath tumor which arises from Schwann cells and peripheral fibroblasts.[10] Fawcet and Dahlin reported seven such tumors in their review of 3987 primary jaw bone tumors, the most common site is the mandible. Intraosseous neurofibroma is rarer still in the maxillae.[11] Most solitary neurofibromas in the oral cavity appear in the soft tissues, and an intraosseous neurofibroma is a rare entity.

The National Institute of Health Consensus Development Conference in 1988 proposed diagnostic criteria for neurofibromatosis type 1, if a patient has two or more of the following findings:

1. Six or more café au lait macules
2. Two or more neurofibromas of any type or one plexiform neurofibroma
3. Freckling in the axillary or inguinal regions
4. Optic glioma
5. Lisch nodules
6. Distinctive osseous lesion such as sphenoid dysplasia
7. Family history of the first-degree relative with neurofibromatosis.[12]

In the present case, the patient reported with a positive family history along with palatal neurofibroma, café au lait spots and with generalized freckling.

Neurofibromas in the oral cavity often involve the trigeminal and upper cervical nerves.[13] In the oral cavity, neurofibroma is reported to occur on tongue, lip, palate, gingiva, major salivary glands and maxillary bones. Majority of intraosseous forms are reported in the posterior area of the mandible and few in maxilla due to the thick bundles of the inferior alveolar nerve.[14] On microscopic examination, neurofibromas have a loose myxoid background with a low cellularity. They consist of a poorly organized mixture of nerve fibrils with extensive interlacing of the nerve tissue. Small axons may be seen among the proliferating Schwann cells and perineural cells. These distorted masses of myxomatous

peripheral nerves are still contained within perineurium and surrounded by neurofibroma.[15] NF-1 is important because of its difference in clinical presentation, treatment and prognosis. The current treatment of neurofibroma is complete resection. These tumors are nonradiosensitive and have limited benefit with chemotherapy.[16] Although the recurrence rate is low, there have been reports of a malignant transformation of these tumors, with the possibility that the presumed lesion may have been the first manifestation of von Recklinghausen's disease.[17] Thus, a close follow-up is warranted.

The present case revealed a well-defined, unilateral neurofibroma with displaced anterior teeth and other signs of neurofibroma like café au lait spots and with generalized freckling on extremities with a positive family history. Surgical excision was performed, and it did not reoccur after 15 months of follow-up.

CONCLUSION

NF is a multisystem disorder requiring management by multiple disciplines, often coordinated through a primary care physician, dentist and a dermatologist. Considering other advanced investigations such as CBCT, immunohistochemical (S-100 protein test) is often beneficial for an accurate diagnosis. Hence, early detection with advanced techniques and investigations with complete resection minimizes the reoccurrence of such tumors.

Pediatric dentists should be aware of the characteristics of the disease in children, in particular about the malocclusions caused, because the lesion and the radiological findings to prevent further complications and to manage the therapies in a more systematic way. Moreover, they should monitor the patients with a long-term follow-up to screen the possible development of other lesions in the hard and soft tissue.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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