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Short Case Report

Low-grade myofibroblastic sarcoma: a case report of a child

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Abstract – Introduction: Myofibroblastic sarcomas are malignant tumors characterized by the increased proliferation of myofibroblasts; they are rare and have been recently discovered. **Observation:** A 14-year-old adolescent had a large lesion in the inside of her right mandible. The diagnosis, after a difficult histological analysis, was low-grade myofibrosarcoma. The patient was treated with non-interruptive hemimandibulectomy. **Discussion:** Low-grade myofibroblastic sarcoma is one of four types of myofibroblastic sarcomas recognized by the WHO in the 2001 classification. This classification allows us to determine a prognosis based on histological characteristics of the lesion. **Conclusion:** In all cases of low-grade myofibroblastic sarcoma, the preferred treatment is curative surgical resection; but still poses a problem in the prosthetic rehabilitation of oral lesion.

Introduction

Low-grade myofibroblastic sarcoma is a rare and recently discovered tumor characterized by malignant proliferation of myofibroblasts. It involves high-level infiltration and is characterized by high recurrence potential, but the tumor rarely metastasizes [1]. Further, it is most commonly found on the head and neck, although it can affect any connective tissue in the body. Sarcomas of the oral cavity represent 0.16% of cervicofacial tumors and are diversified into several types according to their histological characteristics [2]. As a result, low-grade myofibroblastic sarcoma is a tumor that is not well-known to clinicians and histologists, making its diagnosis difficult.

Here, we present a case of a 14-year-old girl with low-grade myofibroblastic sarcoma affecting the mandibular gingiva and describe the treatment used.

Observation

A 14-year-old adolescent, with no relevant medical history, had been experiencing dental pain for 1 month in the right mandibular area near tooth 46. Owing to voluminous lingual gingival swelling in relation to this tooth, she was administered antibiotic treatment. Because this treatment proved ineffective, the removal of an orthodontic appliance that was suspected to be an irritating factor was performed. However, gingival swelling persisted after 2 weeks; therefore, complete radiographic examination and broad biopsy were performed.

Swelling of a firm and rapidly growing mucous membrane was located on the inner surface of the right mandible opposite teeth 45–47 (Fig. 1). Further, infiltration of the internal gingival mucosa extending to the distal surface of the 2nd molar was observed, but the mucosa appeared healthy. Similarly, the teeth seemed healthy and non-mobile. However, there was a pathological periodontal pocket around teeth 45–47 and furcation defect. Notably, oral floor infiltration or adenopathy was not observed on palpation, and there were no systemic symptoms.

Retroalveolar radiography revealed thickening of the ligament around tooth 46 and a decrease in the size of the trabecular bone (Fig. 2). 3D imaging confirmed substantial bone damage extending into the vestibular and lingual regions of teeth 45–47 (Figs. 3 and 4).

After a broad biopsy, the lesion continued to grow, reaching its initial volume within a few days. Histopathological analysis of a lesion sample revealed proliferation of spindle-shaped cells arranged in a relatively entangled array. Medium-sized cells with basophilic cytoplasm showed slight atypical nuclear structure and low mitotic activity. Immunohistochemically, proliferation was positive for anti-alpha smooth muscle actin (SMA), which is commonly found in myofibroblasts. In addition, the sample was negative for anti-desmin, caldesmon, S100 proteins, and CD (cluster of differentiation) 34 markers. The difficult interpretation subsequently led to the diagnosis of

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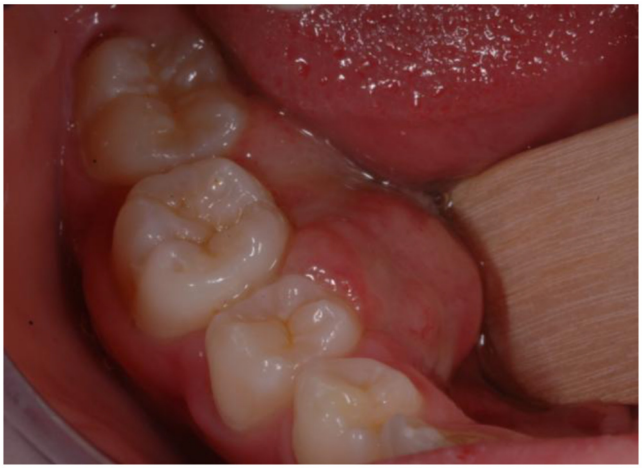

Fig. 1. Endo-buccal view.

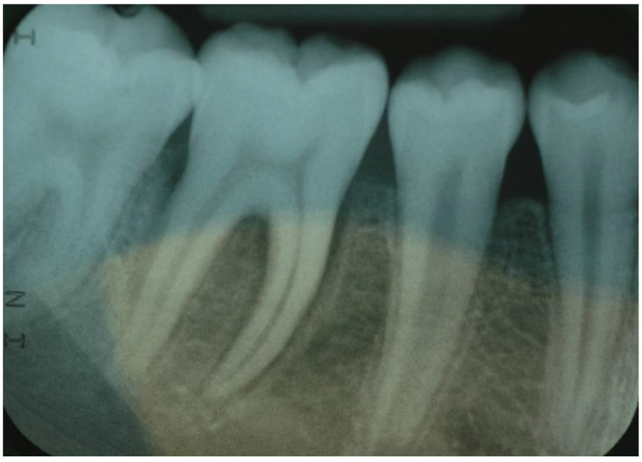

Fig. 2. Initial radiographic exam of the affected sector.

atypical myofibroblastic proliferation corresponding more to low-grade myofibroblastic sarcoma than to a lesion caused by environmental factors (Fig. 5).

Accordingly, the patient underwent total surgical excision by non-interruptive hemimandibulectomy. The surgical team found swelling on the inner surface of the right mandible opposite teeth 44–47, which was also removed during the surgery (Fig. 6).

The patient had a 28-mm nodular lesion along the major axis. Histological examination revealed proliferation of fusiform elements arranged in fascicles and separated by collagen; the mitosis rate of the tumor cells was low. Immunohistochemical analysis showed that the tumor cells were positive for SMA but negative for desmin (the protein found between muscle cells), caldesmon (the protein found in the cytoskeleton that interacts with the actin/myosin complex), S100 proteins, and CD34 markers.

Specimen analysis showed results consistent with those obtained on biopsy, confirming the diagnosis of low-grade myofibroblastic sarcoma. The healing process was uneventful, and recurrence was not observed up to 5 years of follow-up.

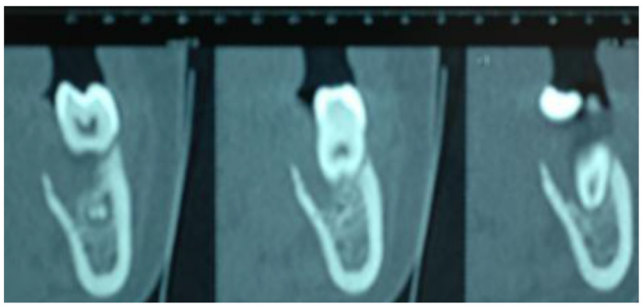

Fig. 3. CT frontal incidence focused on the lower right first molar.

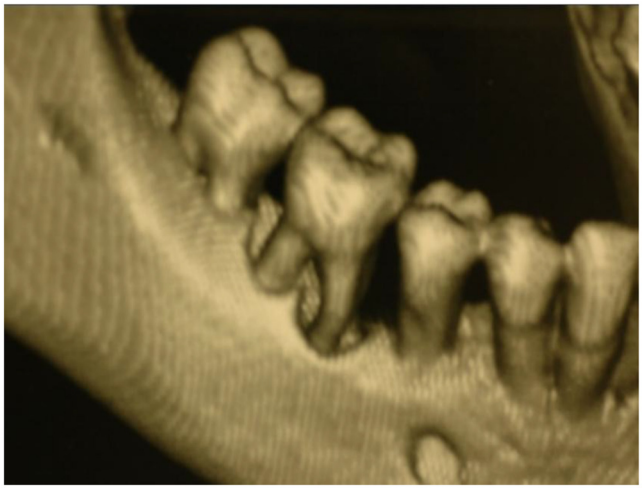

Fig. 4. CT 3D reconstruction of the right mandible.

Discussion

Myofibroblasts are differentiated fibroblast cells discovered in the early 1970s [3]. These cells are found in all connective tissues in the human body. They differ from standard fibroblasts by a cytoskeleton comprising actin and myosin microfilaments [4]. This ultra-structural characteristic of myofibroblasts shared with smooth muscle cells gives them the ability to contract. Therefore, they play an essential role in healing by bringing the edges of a wound closer.

Myofibroblastic sarcomas involve tumor proliferation of myofibroblasts. They are extremely rare malignant tumors, with most cases involving damage of the soft tissues of the head and neck, although these tumors can develop within any connective tissue with myofibroblasts. In a retrospective study (1998) on >11,000 cervicofacial lesions, Gorsky *et al.* found 139 sarcomas, 16 of which were in the soft tissues of the oral cavity, representing 0.14% of head and neck cancers [2]. The rarity of this type of tumor is the reason behind its recent discovery and description. In 2001, Mentzel established a classification of myofibroblastic sarcomas according to their histological characteristics [1]. According to this classification, these lesions are classified into four main types: congenital myofibrosarcoma, inflammatory myofibrosarcoma,

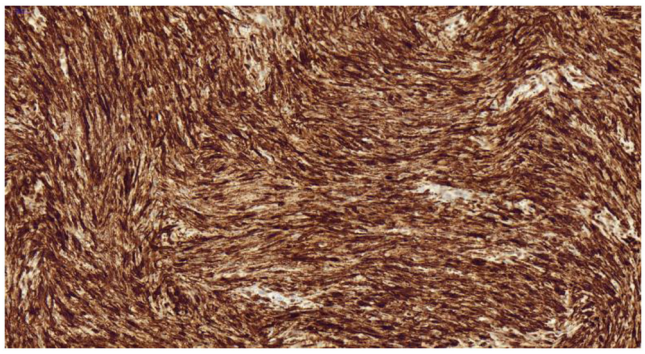

Fig. 5. Expression of the smooth muscle actin by the tumor (zoom ×20).

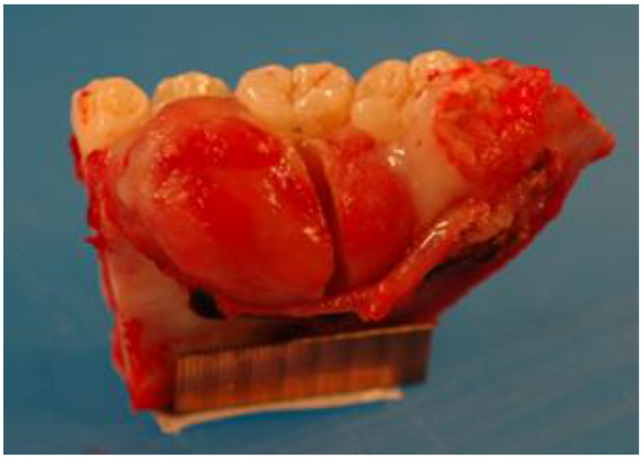

Fig. 6. Excised tissue after surgery.

low-grade myofibroblastic sarcoma, and high-grade myofibroblastic sarcoma. This classification was later adopted by the WHO. Each type of myofibroblastic sarcoma has specific characteristics. In this study, we focused only on low-grade myofibroblastic sarcoma.

Low-grade myofibroblastic sarcoma generally affects adult males (average age: 40 years), but cases of all age groups have been reported to date [5–7]. This tumor can develop throughout the body, but the most common location is the cervicofacial region. Even if cases of sinus, pharyngeal, or intra-orbital lesions have been described [8], this tumor is mainly found in the soft tissues of the oral cavity and, more often, on the tongue [9]. These large-sized tumors (up to 17 cm) are generally painless [10].

Patients often consult physicians for the appearance of a mass, often firm, with a fibrous and pale surface. The limits of the invasion are macroscopically indistinguishable, and radiological examination is needed to detect infiltration and bone damage with respect to the lesion [11]. This tumor is a highly infiltrating and slowly developing tumor with a low metastatic potential and is usually revealed after a long period of indolence [6,12]. In a study (2012) on 38 cases of low-grade myofibroblastic sarcoma, Yamada *et al.* reported a recurrence rate of approximately 38%, which correlated to the tumor size [7].

Histologically, this tumor is characterized by proliferation of spindle-shaped cells arranged in bundles and held in place by collagen. The mitotic activity of the tumor cells is low, and their nuclei are spindle shaped with variable pleomorphism. Cell cytoplasm is often filled with eosinophilic granules. In immunohistochemical analysis, the tumors are generally positive for SMA and vimentin. Desmin is an irregular marker for this type of tumor. However, they show negative results for S-100 proteins, CD34 markers, and AE1/AE3 cytokeratins [1,6,7,8,13].

Due to the invasive nature and high recurrence potential of this tumor, extended surgical excision involving healthy margins is the most effective treatment [8,14,15]. Other treatments such as radiotherapy and chemotherapy have also been attempted. It has been shown that this tumor responds poorly to radiotherapy, and its response to chemotherapy is unpredictable [6,8,16,17]. Therefore, the risk–benefit ratio supports surgical excision, with which combined regular clinical and radiological monitoring helps prevent the risk of recurrence.

Conclusion

Histological and immunohistochemical analyses must be systematic for any conjunctive tumor. Indeed, all sarcomas have specific characteristics, facilitating their classification. Precise diagnosis is important to assess prognosis and propose the optimal treatment.

In cases of low-grade myofibroblastic sarcoma, the reference treatment is surgical excision. Other treatments have been considered and some are under study, but no other treatment has a higher efficacy than surgery. Close monitoring should also be used to prevent recurrence.

In this study, the patient underwent extensive surgical excision. The absence of recurrence at postoperative 5 years indicates that the selected treatment had therapeutic success. In this case, it was not easy to consider rehabilitation due to the significant tissue loss. However, there is currently no consensus on the ideal size of the safety margins to be adopted when excising these types of lesions, and the absence of macroscopic delimitation makes the choice of complex margins intraoperatively possible.

Conflicts of interest: The authors declare that they have no conflicts of interest in relation to this article.

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