DENTOMAXILLOFACIAL SEQUELAE RESULTING FROM A CHEMORADIOTHERAPY AGAINST RHABDOMYOSARCOMA: 6-YEAR FOLLOW-UP

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Palavras-chave: Rabdomiossarcoma. Quimioterapia de Manutenção. Protocolos Antineoplásicos.

RESUMO

Introdução: O rabdomiossarcoma é uma neoplasia maligna agressiva de tecido mole de células mesenquimais imaturas tratadas com cirurgia e quimioradioterapia. Os efeitos da quimioradioterapia na cabeça induzem uma série de sequelas na cavidade oral e no desenvolvimento do crescimento. **Objetivo**: Relatar o caso de uma criança em tratamento de rabdomiossarcoma cujos efeitos no desenvolvimento dento-maxilofacial foram cuidados a fim de salvaguardar a qualidade de vida do paciente. **Relato de caso**: Descreve um caso de defeitos dento-maxilo-faciais graves resultante de quimioradioterapia para rabdomiossarcoma embrionário em uma criança, bem como o manejo realizado. Clinicamente, a paciente apresentava gengivite, severa mobilidade dos dentes permanentes, hipossalivação, mucosite e trismo severo. Os exames radiográficos mostraram interrupção da formação radicular de todos os dentes permanentes e retenção dos dentes decíduos. Análises cefalométricas revelaram hipoplasia mandibular e maxilar. **Resultados**: Foi realizada a extração dos dentes decíduos retidos associado a um programa profilático e uso de saliva artificial devido à hipossalivação, a fim de melhorar a qualidade de vida do paciente. Após 6 anos de acompanhamento odontológico e fonoaudiológico, sua abertura bucal aumentou e as dificuldades de mastigação e deglutição diminuíram, não há gengivite ou mucosite e ela permaneceu livre de doenças recorrentes ou metastáticas 11 anos após o diagnóstico inicial. **Conclusão**: Nosso relato enfatiza a importância do tratamento odontológico com um programa de prevenção e acompanhamento para pacientes submetidos a terapias antineoplásicas.

Keywords: Rhabdomyosarcoma. Maintenance Chemotherapy. Antineoplastic Protocols.

ABSTRACT

Introduction: Rhabdomyosarcoma is an aggressive malignant soft tissue neoplasm of immature mesenchymal cells treated with surgery and chemoradiotherapy. The effects of chemoradiotherapy in head induce a series of sequelae on oral cavity and growth development. **Objectives**: Report the case of a child undergoing treatment for rhabdomyosarcoma whose effects on the dento-maxillofacial development were cared for in order to safe guard the patient's quality of life. **Case report**: Describes a case of severe dento-maxillofacial defects resulting from chemoradiation therapy for embryonal rhabdomyosarcoma in a child as well as the dental management performed. Clinically, the patient had gingivitis, severe mobility of permanent teeth, hyposalivation, mucositis and severe trismus. The radiologic exams showed interruption of root formation of all permanent teeth and over-retention of primary teeth. Cephalometric analyses revealed mandibular and maxillary hypoplasia. **Results**: Was made extraction of the over-retained primary teeth associated with a prophylactic program and use of artificial saliva due to hyposalivation in order to improve the quality of life of the patient. After 6 years of dental and phonoaudiologic follow-up her oral opening has increased and chewing and swallowing difficulties have decreased, there is no gingivitis or mucositis and she has remained free of recurrent or metastatic diseases 11 years after the initial diagnosis. **Conclusion**: Our report emphasizes the importance of dental treatment with a program of prevention and follow-up for patients undergoing anticancer therapies.

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INTRODUCTION

Rhabdomyosarcoma (RMS) is an aggressive malignant soft tissue neoplasm of immature mesenchymal cells. [1-3] It is the most common soft-tissue sarcoma of childhood and adolescence involving the head and neck, [1,3] with prevalence of 35–40% of all cases. [3] The signs and symptoms are usually non-specific and depend on both location and size [1,4] [Soule et al., 1968; Chen et al., 1995]. Treatment consists of chemotherapy (CT) and radiotherapy (RT) with or without surgery. [1,5,6] The effects of chemo-radiotherapy induces a series of tong-term side effects on teeth and growth development, as well as other adverse sequelae in the oral cavity.[7-9] The severity of these abnormalities depends on the stage of dental development and the radiation dose delivered.[6,7] This report presents the case of a child undergoing treatment for rhabdomyosarcoma whose effects on the dento-maxillofacial development were cared for in order to safe guard the patient's quality of life.

CASE REPORT

An 8 year-old girl was referred to the Pediatric Dental Clinic at the Universidade Federal do Rio de Janeiro, Brazil, for dental treatment due to hyposalivation and retention of primary teeth. Medical history revealed that the patient was diagnosed for RMS involving the head and neck region when she was 3 years old. On that occasion the patient was submitted to a combined multi-drug chemotherapy and the resection of the tumor mass. Also 14 weeks after the surgery the patient received complementary radiotherapy (4500 cGy) over a 5-week period.

The child had an ischemic stroke during the chemo-radiotherapy treatment and developed left paresthesia. She also developed hypothyroidism and since then receives thyroid hormone supplements and anticonvulsant drugs. Also, she took growth hormone supplements for 4 years but stopped as no positive results were observed.

The extra and intraoral examinations revealed a marked micrognathia, a Class II facial profile with considerable loss of vertical dimension. The face appeared triangular or V-shaped but symmetric, the profile was convex and retrognathic with a pronounced nose (Figure 1a and 1b). The clinical intraoral exam showed that she was in mixed dentition with poor oral hygiene, gingivitis, hyposalivation, mucositis and severe trismus with a constricted oral opening, over-retained primary teeth, severe mobility of permanent teeth and dental crowding (Figure 1c and 1d). The cephalometric analysis confirmed maxillary and mandibular hypoplasia for the patient's age (Figure 2a). Orthopantographic radiograph showed interruption of root formation of all permanent teeth, and absence of tooth germs of the second permanent premolars (Figure 2b).

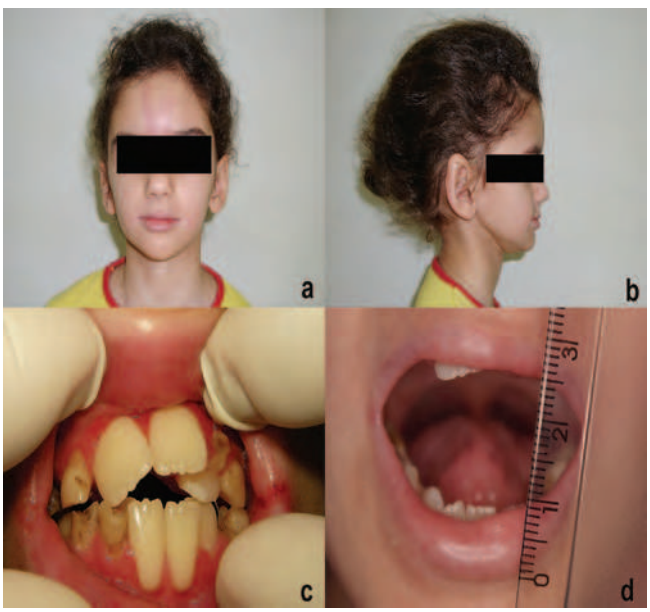


Figure 1: *(a) Frontal view shows triangular aspect of face with a pronounced nose, and a marked micrognathia. (b) Lateral view shows convex profile and retrognathic. (c) Intra-oral view shows poor oral hygiene, gingivitis, primary teeth over-retained and mucositis. (d) Severe trismus with constricted oral opening.*

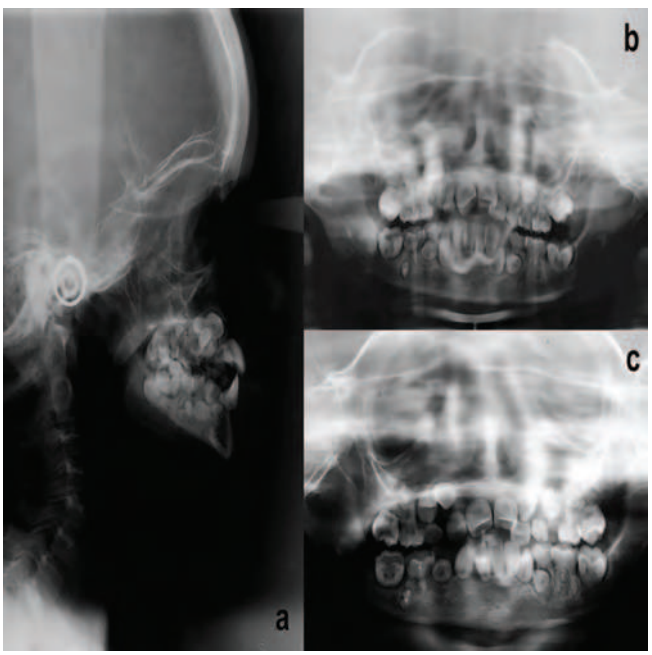


Figure 2: *(a) Orthopantographics radiographs showing over-retention of primary teeth, dental root shortening of all permanent teeth and retarded tooth development. (b) Lateral skull roentgenogram with cephalometric tracing shows mandibular and maxillary hypoplasia when the patient was 8 years old. (c) Present day orthopantomographic radiograph of the patient at 14 years old showing dental root shortening of all permanent teeth, retarded tooth development and tight space for the teeth in the arches.*

The treatment plan called for extractions of over-retained primary teeth after medical approval, and, regular use of artificial saliva due to hyposalivation. The prophylactic program consisted of dental prophylaxis with fluoride gel applications every 6 months, dental hygiene instructions, rinsing with chlorhexidine for 14 days due to gingivitis, nutritional counseling, and six-monthly follow-ups. The patient's doctor gave his medical opinion allowing teeth extractions and other dental procedures. Also, the patient was referred to phonoaudiologic treatment due to severe trismus and deficient communication.

The primary teeth extracted were: 54, 53, 52, 62, 64, 73, 83 and 84. Extraction was necessary as these elements were disabled and many were only root fragments. Extraction was relatively easy as the teeth were only retained in mucosa. Due to the absence of permanent roots and the severe mobility of all permanent teeth, the child's parents were informed about the need for prosthetic rehabilitation treatment in the future.

Now, 6 years after she was first was referred to the UFRJ Pediatric Dental Clinic, she is 14 years old and she has already lost the permanent incisive lower right tooth due to extreme mobility. Orthopantographic radiograph show the absence of tooth (Figure 2c).

After 6 years of dental and phonoaudiologic follow-up her oral opening has increased and chewing and swallowing difficulties have decreased. Her oral hygiene has improved significantly; there is no gingivitis or mucositis. Also she has remained free of recurrent or metastatic diseases 11 years after the initial diagnosis.

DISCUSSION

The clinical form of RMS may vary from a small cutaneous nodule on the face to an extensive fast growing facial swelling [1] associated with pain, trismus, paresthesia, facial palsy, aural or nasal discharge. [8] RMS treatment consists of chemotherapy, radiotherapy and surgery. [1, 6] However multi-modality therapy for tumors in the head and neck region has a significant effect on maxillofacial skeletal growth, dental development, and the whole ecologic system of the oral cavity. [7, 10]

Some of the side effects of chemo-radiation therapy include xerostomia, mucositis, candidiasis, trismus, delayed eruption of teeth, retarded tooth and bone development, partial anodontia, alterations of root development, radiation caries, discoloration of teeth, osteoradionecrosis, loss of taste and soft-tissue necrosis. [8, 9] Many of these side effects were present in our patient.

Growth failure of the facial bones in children due to radiation therapy for head and neck tumors has been reported in the literature. [10] The face of patient appeared triangular but symmetric, the profile was convex and she presented retrognathic. Our cephalometric analysis showed that the maxilla, mandible, and the anterior portion of the skull base were deficient in size.

General body growth of the patient was also affected, probably due to the effect of radiation on the hypothalamus and pituitary glands. Growth disturbances after chemotherapy are often temporary, but radiotherapy of cranial, spinal, and abdominal areas can cause permanent and progressive growth disturbances. [11] Radiotherapy may affect bone growth directly or act secondarily, causing hypothalamic-pituitary axis damage. [10, 11] Growth hormone supplements were prescribed, but no change was observed in facial and general growth, so, after 4 years, the use of these hormones was discontinued by the physicians.

RT in head and neck area can reduce salivary flow rate, pH, and buffering capacity, and saliva turns more viscous. Qualitative and quantitative changes could compromise several protective functions of saliva, impair oral functions such as speech and swallowing, predisposing caries and gingivitis. [9] In some cases, the salivary secretion rate decreases for 3 to 6 months after CRT, but recovers to the normal level within one year; however high doses and time of exposition of RT can cause a long-term reduction in the salivary secretion rate. [12] As our patient presented gingivitis and hyposalivation, artificial saliva was prescribed and a prophylactic program was carried out to prevent caries and gingivitis. Nowadays, she doesn't have any caries or white-spot lesions or gingivitis.

Anticancer therapy can cause a spectrum of side effects from mild to severe tooth alterations such as enamel hypoplasia to tooth agenesis. These alterations may vary depending on when the therapy is given in relation to the tooth developmental stage. [5, 7, 9] Our patient presented permanent root agenesis, retardation of tooth development, impacted primary teeth and absence of tooth germs of the second permanent premolars. Due to the permanent interruption of root formation, there was a severe mobility of the permanent teeth and because of micrognathia severe crowding making hygiene and tooth positioning difficult.

Kanatas *et al.* [13] declared that invasive procedures such as tooth extraction should be avoided even several years after radiation therapy for head and neck because of the high risk of resulting in osteoradionecrosis. However, the extractions of primary teeth were necessary in our case and were performed because the teeth were retained only in mucosa; also the extractions were carried out more than 5 years after the radiotherapy treatment. The child was referred for phonoaudiologic treatment because of severe

trismus and deficient communication. Her oral opening increased significantly after phonoaudiologic treatment. After extractions and a prophylactic program her chewing and swallowing difficulties decreased, and her oral hygiene improved significantly; there were no more signs of gingivitis or mucositis. Monitoring the patient every six months has been important to maintain oral health and maintenance of the teeth in the mouth despite the severe mobility, and overall the patient is in good general and oral health.

The literature has shown that after radiotherapy treatment in children some teeth continue a slow eruption even though root formation has completely ceased. These authors suggest that eruption is not dependent upon development of the root or periodontal ligament. [7,8]

The treatment of our patient was planned after medical approval and prioritized the main difficulties that the child had. Chemo-radiotherapy has increased the survival of patients with head and neck cancer, although it can cause severe oral-health problems.

CONCLUSION

It is important that patients who undergo anticancer therapies are encouraged to carry out dental treatment in order to establish not only treatment, but also a well-defined program of prevention and follow-up for many years. This should be a key element of dental health maintenance after anticancer therapies.

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