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CASE REPORT

Minimally Aggressive Orthodontic/Prosthetic Treatment in Patient with Falciform Anemia

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ABSTRACT

The aim of the present article was to describe interdisciplinary orthodontic/prosthetic treatment performed in a patient with falciform anemia. The patient presented with the loss of several teeth and required prosthetic rehabilitation after tooth position correction with the use of an orthodontic appliance. After having orthodontic treatment performed with the application of forces as close as possible to the intensity of physiologic forces, rehabilitation was performed with removable partial dentures in the maxillary and mandibular arches. The results achieved were an improvement in tooth positioning, re-establishment of masticatory function and dental esthetics.

Keywords: Anemia, Sickle cell, Malocclusion, Angle class II, Orthodontics.

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INTRODUCTION

Falciform anemia is a type of hereditary chronic hemolytic anemia, caused by a genetic mutation of the hemoglobin A molecule, which is then denominated hemoglobin S,[1] being predominant among Afro-descendants and mulattos, but also occurs in whites.[2] Its diagnosis is based on clinical findings and observation of the cellular aspect by means of peripheral blood smears that reveal the morphologic changes in the hemocytes,[3] and may also be performed by means of electrophoresis.[4]

The consequence of the falciformation process of hemocytes is a lower capacity for transporting oxygen to the tissues, circulatory difficulties, and diminishment of their useful life, which falls from 120 to approximately 20 days, when they are removed from circulation by the spleen.[4]

The most frequent oral manifestations of sickle cell anemia (SCA) include paleness of the oral mucosa, delays in tooth eruption, atrophy of the tongue papillae, impaired dentin mineralization, mandibular osteomyelitis and orofacial pain.[5] Craniofacial alterations in SCA patients occur as the result of hyperplasia and compensatory expansion of the bone marrow, resulting in exaggerated growth/ protrusion of the midface, maxillary expansion, a predominance of vertical growth, mandibular retrusion, a convex profile and maxillary protrusion.[6]

An infinite number of clinical case reports are found in the literature of patients with falciform anemia with complications resulting from this pathology;[2,7-10] however little has been related about dental treatment in these patients. The aim of this study was to report on the orthodontic/prosthetic treatment of an adult patient with the loss of several teeth with pathological migration, in whom orthodontic treatment was performed followed by prosthetic rehabilitation.

CASE REPORT

Diagnosis and Etiology

The patient, a 36-year-old woman, xanthoderma, was referred by her prosthetist and came to the orthodontic consulting room with the complaint of space between her teeth after the loss of her posterior teeth. When anamnesis was performed, the patient reported that she had falciform anemia, and was under the care of a hematologist. Furthermore, the patient reported that she used folic acid associated with vitamin B_{12}, prescribed by her hematologist. Clinically, the patient presented a good general state of health, without any complication arising from this pathology (Fig. 1).

It should be remembered that for adequate dental treatment, it is imperative to know the present and previous family medical history of the patient with falciform anemia, in order to know the degree of the patient's systemic compromise.

On performing intraoral clinical examination, a class I dental relationship, 4 mm overjet, exaggerated overbite and pathologic migration of the maxillary and mandibular anterior teeth were noted. The absence of several teeth and discrete pallor of the gingiva were also noted (Figs 1 and 2).

Cephalometrically, the patient had a class I skeletal relationship (ANB = 0°) with maxillary and mandibular protrusion (SNA = 85° and SNB = 85°); A trend toward vertical facial growth (Sn-Go-Gn = 38°), vestibularized and projected maxillary and mandibular incisors (1.NA = 31°, 1-NA = 10 mm, 1.NB = 32° and 1-NB = 8 mm) and a convex facial profile (LS-S = 3 mm and LI-S = 4 mm) (Figs 3 and 4).

TREATMENT OBJECTIVES

To close the spaces between the maxillary and mandibular anterior teeth, correct the exaggerated overbite and verticalization of the molars inclined toward the mesial direction.

Fig. 1: Pretreatment photographs

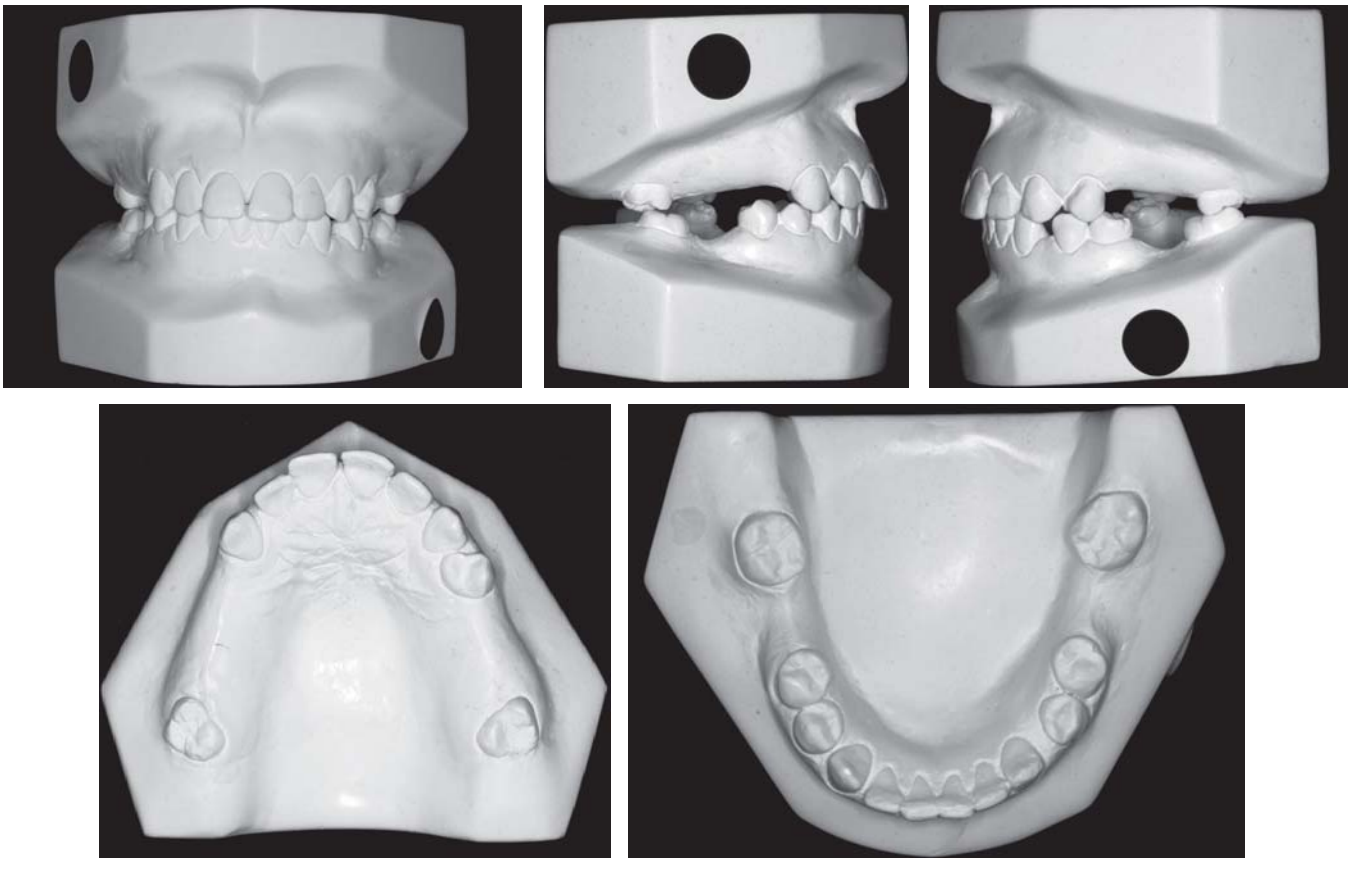

Fig. 2: Pretreatment dental models

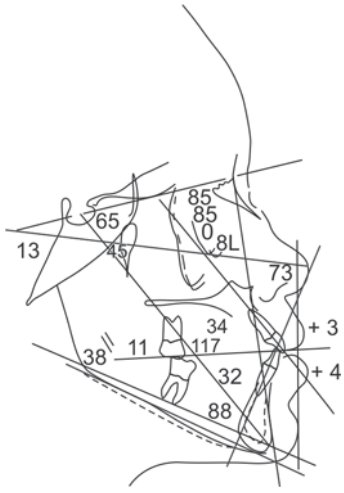

Fig. 3: Pretreatment cephalometric tracing

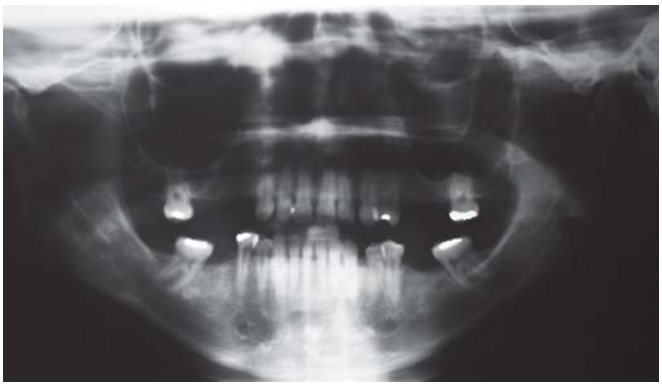

Fig. 4: Pretreatment radiographs

TREATMENT ALTERNATIVES

- Orthodontic treatment associated with the insertion of posterior osseointegrated implants
- Orthodontic treatment associated with the fabrication of fixed dentures
- Orthodontic treatment associated with the fabrication of partial removable dentures.

TREATMENT PROGRESS

The treatment plan chosen was to perform orthodontic treatment before inserting the partial removable dentures. Initially the fixed orthodontic appliance was mounted according to the edgewise technique with slot 0.022" × 0.030" brackets (Morelli, Sorocaba, Brazil). All the teeth were bonded, to avoid the need for the adaptation of orthodontic rings.

After the appliance was mounted, the stage of tooth alignment and leveling began, with the use of a sequence of stainless steel arches, with thicknesses of 0.014", 0.016", 0.018" and 0.020". Closing the spaces between the incisors began with arch 0.020" with the aid of chain elastics.

Once the spaces between the incisors had been closed, 0.019" × 0.026" arches were made with inverted drop-shaped loops to perform retraction of the maxillary and mandibular anterior teeth.

After retraction, ideal arches of 0.019" × 0.026" were fabricated to conclude the case. One it was concluded, the orthodontic appliance was removed, with all the necessary taken to control bacteremia (antibiotic prophylaxis). Next the retention bar measuring 3 × 3 was inserted in the mandibular arch. After this, the patient was referred to the prosthetist who fabricated the maxillary and mandibular partial removable dentures.

TREATMENT RESULTS

The results obtained with orthodontic treatment were closure of the spaces between the incisors, correction of the overbite and verticalization of the inclined molars. The facial profile was improved with the reduction in labial protrusion (LS-S = +3 mm and LI-S = +3 mm) and passive lip sealing when at rest (Figs 5 to 7).

The maxillary and mandibular incisors were shown to be better implanted in the maxillary and mandibular bony bases (1.NA = 22 mm, 1-NA = 5 mm, 1.NB = 26 mm and 1-NB = 4 mm). The vertical position of the mandible was maintained (Sn-Go-Gn = 38°) (Figs 7 to 9).

DISCUSSION

SCA is one of the most common hereditary hematologic diseases worldwide, affecting a significant portion of the Brazilian population, and is commonly pointed out as a question of public health. In this context, the orthodontic/ prosthetic treatment of this patient is a reality. Thus the objective of the present article was to describe the first case of orthodontic/ prosthetic treatment in a patient with SCA.

The oral manifestations found in patients with falciform anemia are not pathognomonic of the disease, but may point out this condition to the dentist. Pallor of the oral mucosa results from the chronic anemia or icterus resulting from the hemolysis of hemocytes.[7] In the present case discrete pallor of the mucosa was noted, in spite of the patient being under the care of a hematologist.

Bone alterations are common in patients with falciform anemia. The maxillary projection and consequent accentuated overjet revealed a profile of maxillary prognathism that is mainly owing to the compensatory expansion of the medulla,[11] as was seen in the case here described.

Cephalometrically the patient presented with maxillary protrusion (SNA = 85°), a situation compatible with the findings of Maia et al[11] (SNA = 84.56°). As an adult patient

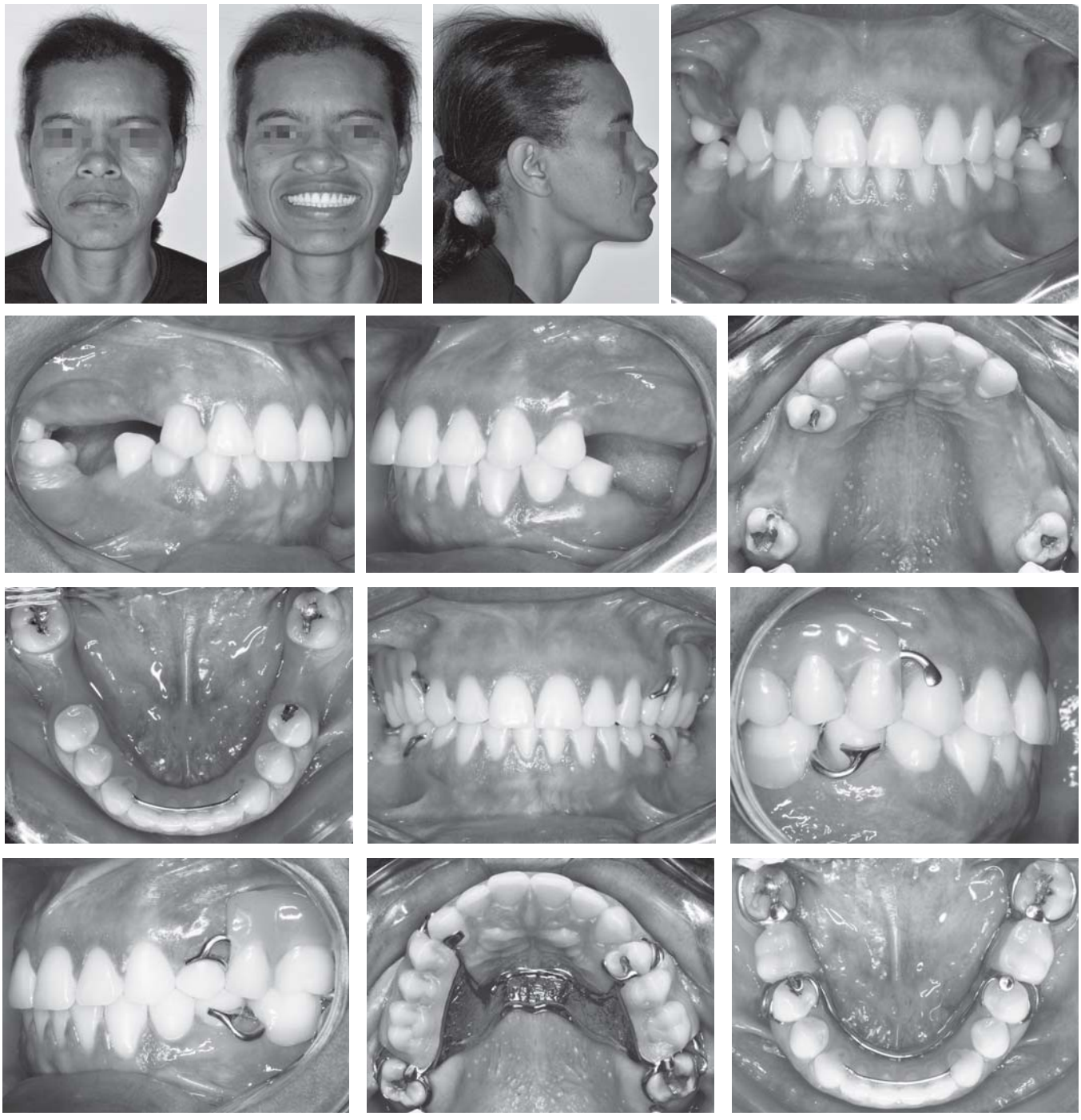

Fig. 5: Post-treatment photographs

with skeletal class I (ANB = 0°) was involved, this protrusion was not taken into consideration, and only orthodontic treatment was performed in order to achieve an improvement in dental positioning.

According to Franco[7] there are certain particularities when one evaluates periapical radiographs of patients with SCA, which generally consist of the formation of a thick trabeculated pattern, attributed to the erythroblastic hyperplasia and medullary hypertrophy that results in loss of the thin trabeculated bone and formation of wide medullary spaces. There is greater alteration in alveolar bone trabeculation and the stepladder trabecular pattern is found more frequently in the posterior teeth. These characteristics of thick trabeculated bone could be seen in the present case, particularly in the mandibular molar region. The evident bone alterations of SCA alert one to the importance of the radiographic exam as an aid in diagnosis of the disease.

It is worth emphasizing that the particularities when dealing with these patients are concentrated on avoiding

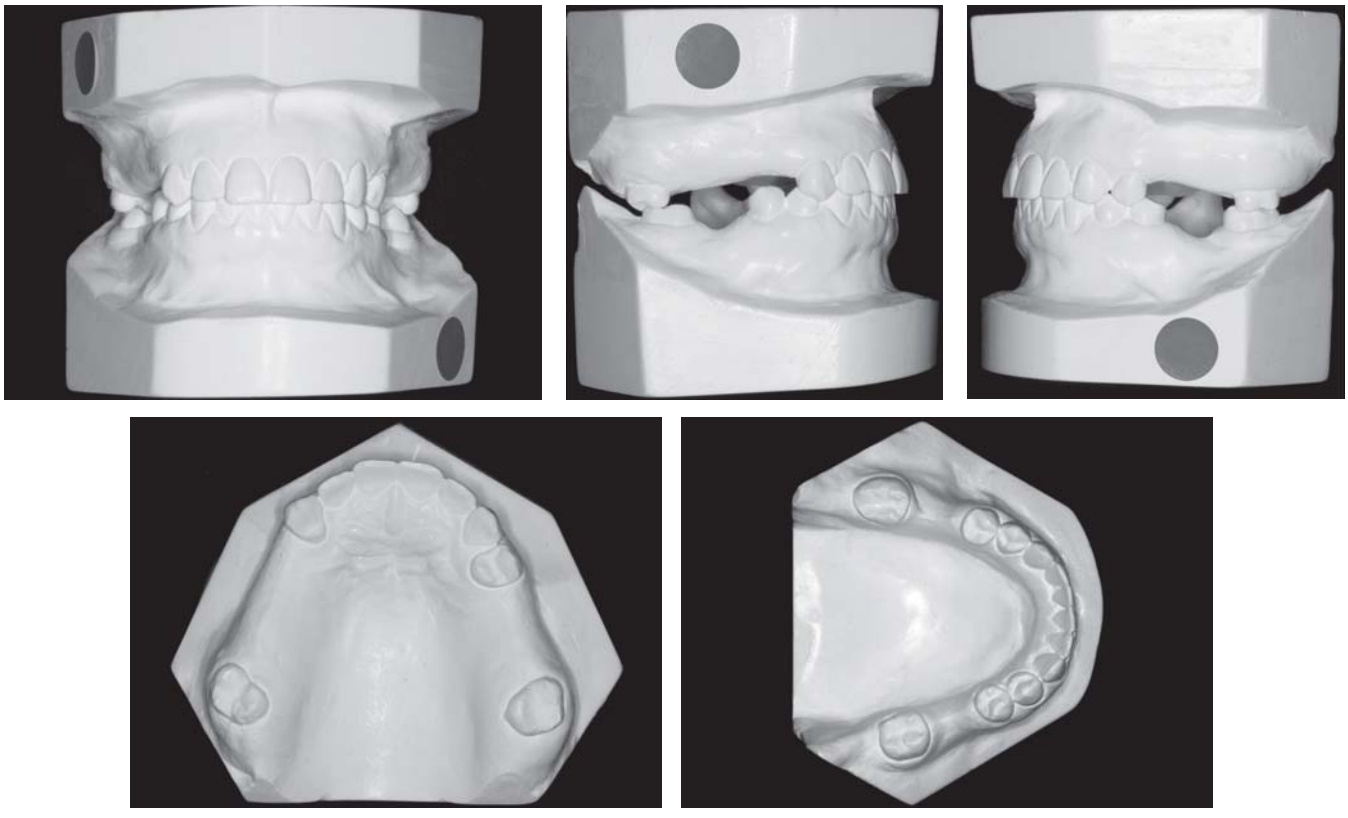

Fig. 6: Post-treatment dental models

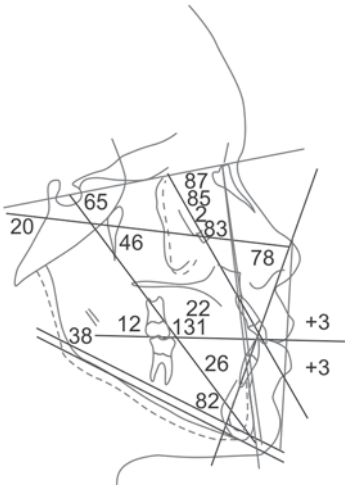

Fig. 7: Post-treatment cephalometric tracing

Fig. 9: Superimposed cephalometric tracing

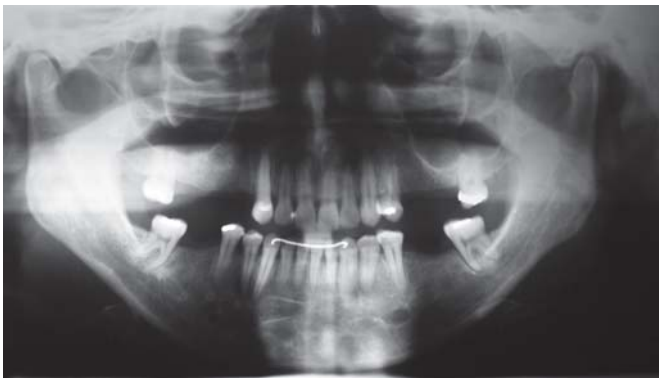

Fig. 8: Post-treatment radiograph

procedures involving bleeding, which may favor transitory bacteremia. In orthodontics the procedure that leads to this type of situation is the adaptation of orthodontic rings. When this procedure is unavoidable, it should always be preceded by antibiotic prophylaxis. In the present clinical case rings were not adapted precisely to avoid bacteremia. All the teeth had brackets bonded to their surfaces.

Due to the reduced capacity of the patient with falciform anemia to respond to inflammations, orthodontic forces with values as close as possible to the physiologic forces were used throughout the entire treatment performed.

After having orthodontic treatment performed, the patient was referred to the prosthetist for rehabilitative treatment. It is worth remembering that implants are contraindicated in patients with falciform anemia, by virtue of possible bone complications.[12] For osseointegration to occur, tissue oxygenation is indispensible. The deformation of hemocytes present in falciform anemia triggers vaso-occlusive crises that lead to tissue hypoxia, and can affect bone neoformation. With the possibility of this complication, the use of implants was discarded. Another possibility would be the insertion of fixed dentures, however, due to the need for tooth wear, which may generate the need for endodontic treatment, this alternative was also discarded. Rehabilitation was thus performed with the insertion of removable partial dentures, with their advantage in these patients being that they are easy to clean and do not require extensive dental wear performed in order to fit them.

In addition to knowledge of the alteration in oral tissues, the dentist must be alert to the differences in attendance and clinical management of these patients. Dental treatment must be performed during the chronic phase of the disease, and attendance during algic crises should be avoided, except in cases of emergencies. Throughout the entire period of attendance, the hematologist was contacted so that he would have a report on the patient's hematologic situation.

Ambulatory follow-up 2 to 4 times a year and educating the family and patient about the disease are helpful for achieving social and metal wellbeing.[12] Advancements in the prevention of infections and falciformation crises have provided longer survival of patients and must be the goal of the professions involved in their follow-up.

CONCLUSION

By attending this clinical case, it could be concluded that with greater access to information by the population, patients who previously did not have access to dental treatment, today do have this. Among this range of patients there are those with falciform anemia, and their treatment is a reality, requiring that the professionals who attend them, have the knowledge to do so correctly. There are peculiarities in the orthodontic/prosthetic treatment of these patients that must be known in order to avoid operative and postoperative complications.

REFERENCES

1. Takahashi CRI, Santosh D Jr, Nunes FD, Araújo NS. Atendimento odontológico ao paciente com anemia falciforme. Revista de Odontopediatria. Revista de Odontopediatria 1993;4:215-18.
2. Kavadia-Tsatala S, Kolokytha O, Kaklamanos EG, Antoniades K, Chasapopoulou E. Mandibular lesions of vasoocclusive origin in sickle cell hemoglobinopathy. Odontology 2004;92:68-72.
3. Alves PV, Alves DK, de Souza MM, Torres SR. Orthodontic treatment of patients with sickle cell anemia. Angle Orthod 2006;76:269-73.
4. Souza PHG, Oliveira RSF, Rocha JM, Gravina MA, Vitral RWF. Craniofacial skeletal alterations in sickle cell anemia patients of Juiz de Fora. HU Revista 2008;34:85-91.
5. Mourshed F, Tuckson CR. A study of the radiographic features of the jaws in sickle-cell anemia. Oral Surg Oral Med Oral Pathol 1974;37:812-19.
6. Brown DL, Sebes JI. Sickle cell gnathopathy: Radiologic assessment. Oral Surg Oral Med Oral Pathol 1986;61:653-56.
7. Franco BM, Gonçalves JCH, dos Santos CRR. Buccal manifestations of sickle cell anemia and their implications in the dentistry services. Arquivos em Odontologia 2007;43: 92-96.
8. Kelleher M, Bishop K, Briggs P. Oral complications associated with sickle cell anemia: A review and case report. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1996;82:225-28.
9. Lanzkron S, Haywood C Jr, Segal JB, Dover GJ. Hospitalization rates and costs of care of patients with sickle-cell anemia in the state of Maryland in the era of hydroxyurea. Am J Hematol 2006;81:927-32.
10. Michaelson J, Bhola M. Oral lesions of sickle cell anemia: Case report and review of the literature. J Mich Dent Assoc 2004;86:32-35.
11. Maia NG, dos Santos LA, Coletta RD, Mendes PH, Bonan PR, Maia LB, et al. Facial features of patients with sickle cell anemia. Angle Orthod 2011;81:117-22.
12. Brasil MDS. Manual de Saúde Bucal na Doença Falciforme. In: Saúde MD, (Ed). Brasília: Secretaria de Atenção à Saúde, Departamento de Atenção Especializada; 2007.

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