Treatment of Primary Crowding in the Mixed Dentition with Interproximal Wear: Case Report


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Abstract

The primary crowding manifests at the beginning of the mixed dentition, during eruption of the permanent incisors. It presents with high prevalence among children and foreshadows the need for an early intervention, to minimize possible occlusal adverse effects. Mandibular anterior dental crowding is considered as the discrepancy between the mesiodistal widths of the four permanent incisors and the space available in the alveolar process. Among the alternatives of treatment in the correction of light or moderate crowds are considered stripplings, with reduction of the mesiodistal dimensions, which require the knowledge of several clinical aspects of the infant patient for its accomplishment. The objective of this work was to describe the case of a seven year old female patient, who sought care in a dental school clinic, accompanied by her grandmother, with a major complaint of misaligned teeth. It reported the option for gridding the interdental enamel and the follow-up from diagnosis to control for 45 days.

Keywords

Malocclusion; Mixed Dentition; Interceptive Orthodontics

Introduction

Dental crowding is present in most malocclusions and occurs when there is a discrepancy between the required space and the space present in the arch. It is more common in the anterior teeth, especially in the permanent mandibular incisors and its cause is still not well defined, involving several genetic and environmental factors [1]. The primary crowding is located in the anterior region of the arch, particularly related to eruption of permanent incisors, in the first transitional period of the mixed dentition. He is considered by many dental surgeons as one of the most challenging clinical irregularities in defining the time and how to treat the problem. In this sense, a differential diagnosis between temporary primary crowding, corrected by the transversal growth associated with the physiological development of the occlusion and the definitive primary crowding, with an abnormality character, where the eruption of the permanent incisors occurs outside the alveolar ridge, is an indispensable factor for the determination of adequate therapeutic conduct [1, 2].
According to their severity there are different modes of treatment such as distalization of the molars, expansions of the arches, dental extractions and interproximal wear; these, usually associated with a negative discrepancy equal to or greater than 3mm, with a crowding from the moderate degree. This is considered because it is recognized that the presence of permanent incisors erupting in the alveolar ridge line functions as a functional matrix, stimulating the increase of anterior tooth arch width, intercanine distance [1, 2, 3].

The clinical decision about the type of treatment to be adopted should be taken individually, taking into account the behavioral and comprehension characteristics of the patient, the severity of the crowding, the analysis of the discrepancy between the size of the teeth, the type of malocclusion associated and facial profile among others [4].

Dental wear refers to the reduction of its mesiodistal dimensions in order to correct soft or moderate crowding, as well as to eliminate the natural disproportion of dental size between the arches, and require the knowledge of several clinical aspects to be performed. Since 1944, with the study of Ballard, there have been investigations on the applicability of this procedure. From 1985, with the studies of Sheridan, the interproximal dental wearings began to represent a more popular alternative among dentistry professionals, with different possible techniques [5].

The early approach of primary crowding in the mixed dentition can lead to improvement in the self-esteem, chewing and oral hygiene of the infantile patient, besides providing a reduction in corrective orthodontic treatment time [6].

The objective of this study was to describe a case of a child with definitive primary crowding of environmental etiology, treated with interproximal dental wear in deciduous canine’s teeth.

**Case report**

An 7-year-old female white patient was admitted to the Dental School Clinic of our institution, in the city of Recife, northeast of Brazil, referred by a dentist. The maternal grandmother who accompanied her related the main complaint of tooth misalignment and the need for periodic revision of the oral health condition. The same person signed a consent form before the treatment carried out and authorized the disclosure for scientific purposes. Regarding the medical history and the previous dental history, there was oral breathing associated with an unspecified allergic rhinitis. Also the information on gingival bleeding, after brushing the teeth and on the lips, with discomfort in these regions. This child had a previous dental experience with non-cooperative behavior.

After the anamnesis and the physical examination of the patient, with some radiographic techniques requested and molding to evaluate the discrepancy of models, the diagnosis and the treatment plan were established. This child patient was also referred for the evaluation by pediatrician (otolaryngology) and speech therapist.

Figure 1 shows the patient with open mouth and parched lips, after she had concluded the clinical interventions related to oral hygiene orientation, prophylaxis, and topical application of fluoride and restorative procedures. This shows crowding in the anteroinferior region, with a negative discrepancy of 3.8 mm, but without deviation from the median line. In the upper arch, bilateral dentoalveolar posterior crossbite and Angle Class 1 molar relationship, with mesofacial type of face.

**Figure 1:** Patient with Open Mouth, before Interproximal Wear in Mandibular Deciduous Canine Teeth

In this patient, breadth of interproximal wear facets, mesiodistal crown diameters, performed in the lower right and left deciduous canine teeth (73 and 83) with high rotation and the use of carbide tungsten drills, followed by strips of sandpaper and topical application with fluoride. Estimated wear at 0.5mm for each surface. There was an interval of 15 days between the four sessions established for this purpose. Figure 2 shows the patient’s image, 90 days after the initial consultation and 45 days after interproximal tooth wear.
As there was improvement in the collaboration of this child patient and the necessity of expansion of the upper arch, this also used a removable plate in acrylic, with vestibular arch of Hawley type, central screw and retaining clips.

The patient used the upper removable appliance for four months, with activations of 1/4 turn per week. During this period there were no reports of gingival bleeding or on the lip. The use of this device succeeded in the reduction of lip sensitivity, and the patient was released for occlusal development control consultations after the mentioned period.

The occlusal development of this child patient was followed up 24 months after the procedure (Figure 3).

Results

Chart: Diagnosis and summary treatment of the infant patient, regarding the definitive anterior inferior crowding

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Summary treatment</th>
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<tbody>
<tr>
<td>An 7-year-old female White patient, oral breathing, bleeding in the mouth (gums and lips)</td>
<td>Interproximal tooth wear (73 and 83 = 4 sessions with two weeks interval). Time to finish the alignment = 45 days</td>
</tr>
<tr>
<td>Mesofacial, Angle Class I (bilateral) Definitive anterior primary crowding, of environmental origin (outside the alveolar ridge and associated with dentoalveolar posterior crossbite). Negative discrepancy of 3.8mm.</td>
<td>Features: Carbide tungsten drills, followed by sandpaper strips (resin finish) and topical application with fluoride gel. Steel strip inserted between teeth 73 and 83 and teeth 32 and 42, for protection during dental wear.</td>
</tr>
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</table>

Discussion

Crowding has been reported as one of the most frequent causes of malocclusions that occur in the mixed dentition and the understanding of its etiology has not yet been clarified. The dentist should always be aware of the lack of space in the deciduous dentition to evaluate a great possibility of negative discrepancy at the beginning of the mixed dentition. Anterior crowding is more common [6].

Orthodontic interventions for treatment crowded teeth involved sagittal and / or transverse expansion, when it is desired to increase the perimeter of the arch, or by means of dental extraction or wear, when it is desired to increase the length of the arch. Stripping is a space creation technique for crowding correction by the reduction of interproximal enamel.

Although interproximal tooth wear represents a simple procedure, the reports about it in the mixed dentition are scarce, as well as the follow-up of the subsequent occlusal development. Experimental and clinical research has been focused on the investigation of instrumentation efficacy and potential iatrogenic sequelae related to interproximal stripping. They also describe this technique to achieve excellence in orthodontic treatment finishing in permanent dentition. For Sharma, Shrivastav and Hazarev [7], wear procedures should preferably be performed with metal abrasive tape, carborundum disk with a secure face,
or with long, fine tapered drills with air rotor. The use of rotary cutting instrument. Greater care should be taken for high-rotation drills and pens, because of the possibility of excessive cutting.

In the conduction of the present clinical case the use of high rotation was achieved, followed by abrasive sandpaper strips and topical application of fluoride. There were no reports of pain or bleeding in the gums or lips reported in the previous dental history.

The results obtained in this clinical case are similar to those highlighted in the work of Nakhjavani, Nakhjavani and Jafari [8]. However, these authors considered wear of the interproximal surface of the deciduous canines as an effective technique to remove primary crowding of permanent lateral incisors with lingual eruption, in relation to their correct position in the dental arch. This, in cases of crowding less than 3 mm. In the current clinical case there was a negative discrepancy with the value of 3.8 mm.

Crowding and irregularity remain a consistent problem for children. Management of space issues continues to play an important role in a dental practice. It also represents an area of great interaction between the general practitioner or the primary care professionals of the Brazilian Unified Health System and the specialists.

Buczkowska-Radlinska, Szweczka-Sommerfeld and Wozniak [9] established a relationship between anteroinferior crowding of permanent incisors and an increased risk of dental caries; a fact not observed in the infantile patient with the report of 24 months of follow-up. Gorucu-Coskuner, Atik and Kocarereli [10] evaluated three treatment modalities for anterior crowding situations regarding post-treatment occlusal stability. This was done in 44 patients with Class I malocclusion and moderate crowding, distributed in groups treated with extraction, with interproximal wear of the primary canines and with orthodontic appliances but without extractions of deciduous teeth. These authors concluded that, three years after treatment, the intercanine width would be reduced in all groups, but changes in permanent incisor inclination and reduction in arch length and depth were significantly greater in tooth extraction.

Conclusion

Through the interproximal wear of the lower deciduous canines the alignment of the lower permanent central incisors was achieved in a period 45 days after the treatment of 3.8 mm primary crowding in the lower arch during the mixed dentition.

Because it is a relatively simple procedure and reduces the need or complexity of posterior orthodontic treatment, when indicated, these procedures represent a good alternative. The selection of the best resource for the procedure and the control of the patient’s occlusal development and possible sequelae still represent a challenge, due to the particularities of each individual.

References


Citation: Luciana de Barros Correia Fontes (2018) Treatment of Primary Crowding in the Mixed Dentition with Interproximal Wear: Case Report. SF J Case Reports 1:3.