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CASE REPORT

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Germectomy (Therapeutic Enucleation) of First Bicuspids and Eruption Guide to Treat Dental Crowding without Using Orthodontic Treatment. Case Report

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Abstract

Germectomy (enucleation) of the first bicuspids has shown to be an effective treatment in the management of dental crowding in mixed dentition because it produces intraosseous decongestion of the dental mass between permanent canines and second bicuspids. This provides early available space for the autonomic eruption without interference from the first bicuspid to the permanent canine which erupts into a highly stable position within the dental arch, facilitating and accelerating orthodontic treatment (if required) which would be terminating before the difficult adolescent age. This procedure differs from the orthodontic treatment of extracting the first bicuspids after they erupt when they are already facing a frank crowding, mature periodontal ligament, and deformity of the alveolar process. In our opinion, Germectomy of first bicuspids will replace serial extractions during which time the treating specialist will concentrate on preventive eruption guidance and the management of habits in general such as tongue, thumb, lips, and mouth breathing, in addition to performing Functional orthopedics of the jaws as in deep bites, deficiency or maxillary protrusion among others.

Keywords: Crowding; Germectomy; Orthodontic treatment; Leveling; Alignment; End arches; Recurrence

Introduction

Dental extractions of primary and/or permanent dentition in what refers to dental crowding were a controversial topic a few years ago, having both detractors and supporters [1-8].

Currently, serial extraction culminating in the removal of permanent bicuspids for the treatment of dental crowding is considered standard procedure [1-8].

Charles Tweed was a great precursor in serial extraction as these improved the alignment of teeth as they erupt into the oral cavity [9-14].

First bicuspid germectomy (therapeutic enucleation) eliminates early-on intraosseous crowding, alleviating intraosseous pressure and making the canine autonomously erupt backward into the position of the first bicuspid [10-16].

According to Charles Tweed the more we know about growth and its potential; we acquire a better comprehension of the "how" and "when" to intervene in the process of eruption guidance so that the knowledge gradually will replace the orthodontics treatment [6,13,14].

Jack Dale questioned himself: why to allow the existence of an unfavorable dental, skeletal, and soft tissue relation for a number of years when it can be corrected early in mixed dentition before adolescence. In this manner, there is no need for rigid orthodontic treatment. Instead, orthodontic treatment can be reduced in time and severity [9].

Germectomies are a safe surgical procedure. Enucleation of the first bicuspid is done easily since it's a tooth in active eruption and it's not fixed to the bone, located between the roots of the primary first molar. It ensures a satisfying post-op [10,11,15,17,18].

When the other permanent teeth erupt without crowding, if it is not necessary to use orthodontic appliances, in many cases it has avoided the stage of leveling and alignment and then the distalization of canines and closing loops for space closure, a tedious procedure for both the Orthodontist and the patient. With the therapeutic enucleation of the first bicuspids and after the eruption of the successor's teeth (if necessary) fixed orthodontic appliances are immediately placed with rectangular arches, which are left at the discretion of the orthodontist to culminate the treatment having more time for the "artistic finish" or the use of dental aligners as well as excellent retention with no recurrence. With this procedure, the patient would be removing the orthodontic appliances at approximately 13 years old; otherwise at that age, the patient would have to crowd with deformation of the alveolar process and start the rigid orthodontic treatment in the difficult stage of adolescence.

Case Report

A 7-year-old white female patient from the Torrijos-Carter area was brought to our consult with the primary complaint of anterior crowding and open bite. Medical and familiar histories were unremarkable. The patient's guardian signed the informed consent for surgery and treatment (Figures 1-3).

The patient presented a balanced facial profile, symmetrical and in good shape. She presented Angle class 1 molar and canine occlusion, slight anterior dental crowding, and open bite from a thumb-sucking and tongue-thrusting habit in mixed dentition.

Pretreatment radiography showed the presence of slight anterior crowding in the upper maxillary arch and also slight posterior crowding, which is evident in the maxillary arch with the permanent canines and bicuspids in a "cluster shape" with the upper canines pressing the roots of the lateral incisors (Figure 4).

As the first step of treatment, the primary canines were extracted to alleviate the anterior crowding to allow the eruption of the incisors without crowding and an adequate overbite and overjet followed by the placement of a modified palatal crib with tongue spurs to work on the thumb and tongue habit. The correct allocation of the incisors can be appreciated. It can be noted in the upper jaw that the canines have more root formation than the first bicuspids and in the case of the upper canines these are pressing against the root of the lateral incisors (this is called the "ugly duckling" stage). Notice that the first bicuspids are in frank interposition and block the canines and possess less root formation, which is why the canine must try to move to the area of less resistance and starts to deviate towards the buccal area. In the case of the lower jaw, a similar pattern occurs in the active eruption process, but since the jaw has a more compact bone, the canine starts to rotate mesially and deviate towards the buccal area. This pattern of crowding in these stages can be seen in most panoramic radiography with moderate to severe crowding. It's not difficult to notice that the three successor teeth (permanent canine, first, and the second bicuspid) don't have enough space between the first permanent molar and the permanent lateral incisor to erupt; this is what I call dental successor "overcrowding" in mixed dentition (Figure 5).

After this, treatment continued with the extraction of the deciduous first molars and therapeutic enucleation of the first bicuspids. Following this the patient came in for periodic checkups.

It can be observed that there is intraosseous "decongestion", there is lateral incisor root parallelism without the characteristic fan shape, and a drastic change of direction and position of the permanent canines. This means that in the case of the upper maxillary the paradigm that the roots of the lateral incisors guide the eruption of the canines disappears as well as the stage of the "ugly duckling" disappears. It can also be appreciated that there is a solid formation of canine root emerging into the oral cavity "autonomously" without the interference of a first bicuspid in a stable position. We can also see the eruption of the second bicuspid (Figure 6).

The eruption guidance continues as seen in the "autologous" positioning of the successor's teeth. In this case, it gives the impression that, when the eruption occurs, there will be remnant gaps. If so, they can be rapidly treated by an orthodontist (Figure 7).

The last panoramic radiography taken was after the eruption of the second bicuspid and second molars. There are closing gaps and autologous accommodation of all the teeth (Figure 8).

In this case, it wasn't necessary to place any additional orthodontic appliances, not even retainers: the patient didn't merit it. The dental accommodation was done autonomously with the neuromuscular proprioceptive balance between the lip, tongue, and cheeks.

Figure 1: Dental crowding that needs rigid orthodontic treatment.

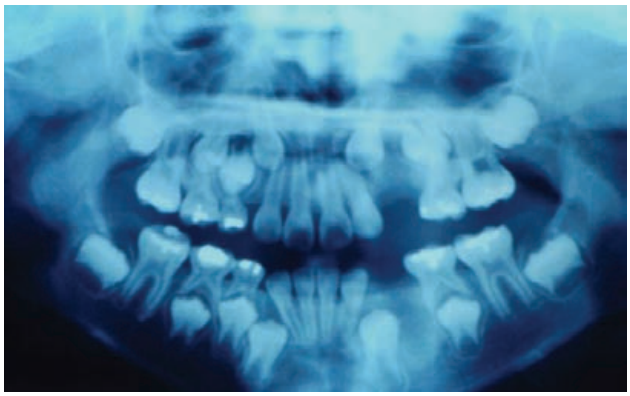

Figure 2: Bone decongestion for the autologous and stable eruption of canines (right side of the x-ray).

Figure 3: Elimination of dental crowding without the need for orthodontic treatment.

The following images (Figure 9) present the final aspect of the clinical case in which there was no need for the placement of fixed appliances or the use of retainers.

Observe the middle line, molar and canine relation, overbite, overjet, and shape of the alveolar process.

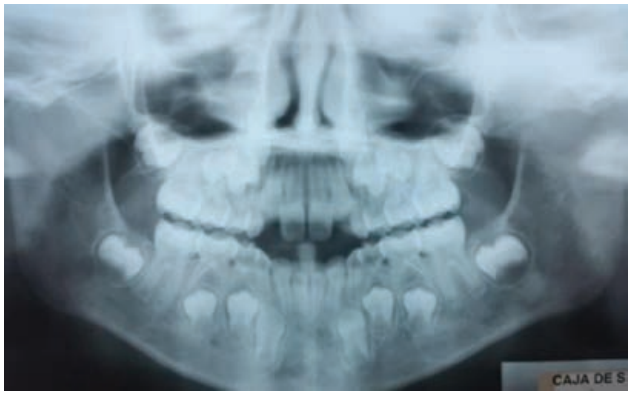

Figure 4: X-ray in which generalized crowding is observed.

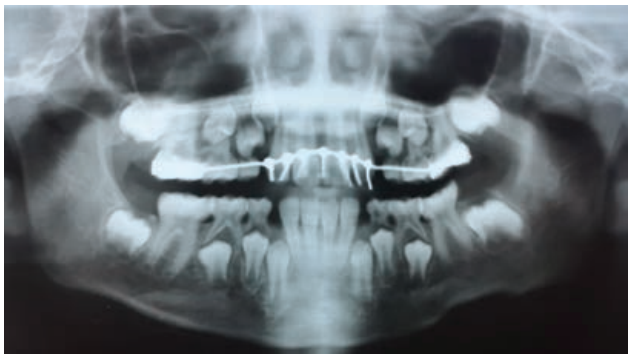

Figure 5: Rear successor dental congestion.

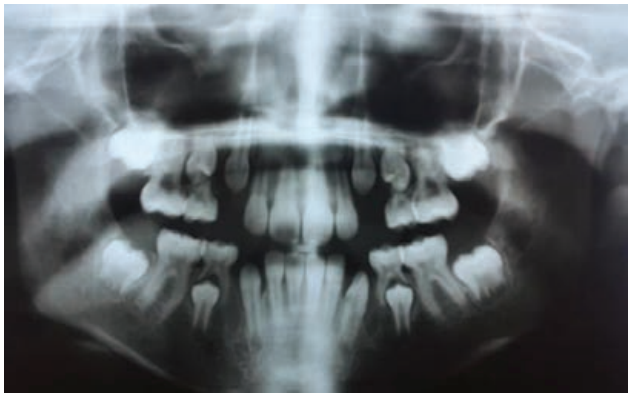

Figure 6: Therapeutic removal of first premolars and autologous eruption of canines to a stable position in the space of the first premolar.

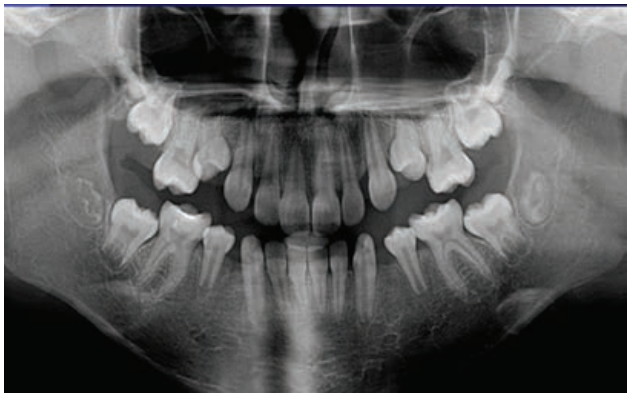

Figure 7: Eruption and autologous accommodation of canine and second premolar.

Figure 8: Termination of active canine eruption and second premolar.

Discussion and Conclusion

Therapeutic enucleation of the first bicuspids (Germectomy) is an effective treatment option for the early management of mixed dentition of moderate to severe dental crowding because it provides the necessary space to allow the accommodation, alignment, and autonomous eruption of the permanent canines in a stable position inside the dental arch. This is a favorable option to offer pediatric patients and avoid dental extractions in different occasions, a waste of supplies and waste of time for the parents and patient during mixed dentition, as it happens during the treatment of guided eruption. First bicuspid germectomy is beneficial for individuals with low income that don't have access to an onerous orthodontic treatment in developing and third-world countries.

The only inconvenience of this procedure might be that it should preferably be done under general anesthesia or conscious intravenous sedation for better management of the patient.

Additionally, when this interceptive procedure is performed at the earliest possible age, the general dentist, the pediatric dentist, the functional orthopedist of the jaws as well as the orthodontist can concentrate their efforts on the patient's facial growth and development period as well as the management of habits, skeletal malocclusions, and facial deformities.

According to Charles Tweed, the more we know about the potential growth, and the functional influences on the developing dentition and the more we learn about the normal mesiodistal position of the developing dentition in relation to the maxillary bone bases and cranial structures, we will achieve a better understanding about the when and the how to intervene in the growth guidance process, in a way that nature can better approximate its growth plan for each individual. In other words, the knowledge will gradually replace the treatment mechanics and in the near future, most orthodontic treatments will be performed during mixed dentition before the patient's adolescence. Following this philosophy, the logical choice is to intercept a malocclusion as early as possible.

Figure 9: The final aspect of the clinical case in which there was no need for placement of fixed appliances or use of retainers. Observe the middle line, molar and canine relation, overbite, overjet and the shape of the alveolar process.

Jack G. Dale asked himself: why to allow the existence of an unfavorable dental, skeletal, and soft tissue relation for a number of years if they can be corrected early on and after some time with minimal orthodontic treatment? and I would add, or without orthodontic treatment.

With this method, great stability of the teeth takes place since they erupt in the oral cavity in a harmonic and functional way. If it were necessary to make minor movements when dental pieces erupt, fixed orthodontic appliances can be placed immediately with rectangular wires or dental aligners. Ending treatment before the difficult stage of adolescence gives the orthodontist time to perform an excellent artistic finishing of treatment. In other words, following this technique, the orthodontist is finishing a case when others are starting with a mature histological periodontal condition and a deformation of the alveolar process, which requires a rigorous orthodontic mechanic and a long treatment time, with all its contingencies and consequences.

By adding the time dimension to this technique, it is easy to understand that intercepting therapeutically with the enucleation of the first bicuspid germs at an early age for this autonomous accommodation is the appropriate route. Otherwise, once we have a formed periodontal ligament and deformed alveolar process the orthodontic treatment is compromised with scarring, recurrence, and extensive treatment time.

This case report could not be compared with results from other similar cases because, in the reviewed literature, this technique, treatment, or procedure has not been found. We rely on our experience of 25 years of our own cases.

The search for truth and research for excellence in diagnosis and treatment is characterized by honesty with us, with our colleagues, and especially with our patients. It is the sincerity of purpose and action, with the conviction that the service rendered is infinitely more important than the reward received.

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