

Supernumerary as An Etiological Factor in The Alteration of The Sequence and Dental Eruption

Laura Mendoza Oropeza^{1*}, Ricardo Ortiz Sánchez¹ and Antonio Fernández López²

¹Department of Orthodontics. Facultad de Odontología. Universidad Nacional Autónoma de México (UNAM).

²Department of Orthodontics. Facultad de Odontología. División de estudios de posgrado e investigación (Depei) Universidad Nacional Autónoma de México (UNAM).

*Correspondence:

Dr. Laura Mendoza Oropeza, Department of Orthodontics, Facultad de Odontología. Universidad Nacional Autónoma de México (UNAM), Tel: (55) 56232215.

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ABSTRACT

Background: The anomalies of number are those in which the number of teeth is higher or lower than that normally presented by each individual. Supernumerary teeth appear more frequently in the maxilla than in the mandible, with a greater predisposition for the male gender in a ratio of 2: 1. It has been observed that the presence of supernumerary teeth can cause alteration in the sequence and eruption of the teeth resulting in delayed eruption and consequently an alteration in the eruption and eruption sequence.

The objective of this study is the early diagnosis, elimination of Supernumerary teeth and control the tooth eruption space as the etiological factors that produces the alteration in the sequence and dental eruption.

Clinic Case: A 13-year-old patient presented to the UNAM Dental Clinic because she wanted to undergo orthodontic treatment. In the clinical examination, are observed generally thin teeth in the jaws, molars with talon cusps, low insertion of the braces causing diastema, late mixed dentition, prolonged retention of the mandibular left lower 1st molar, with no apparent mobility.

For the diagnosis, study models, clinical photographs (intraoral and extraoral) and panoramic radiography were taken. The radiographic analysis revealed presence of a diffusely “extra” tooth and the first molar of the first dentition with atypical resorption. In order to accurately visualize the supernumerary tooth, a Cone Beam volumetric tomography was taken. Treatment consisted of performing removable appliances to avoid loss of space (in which the first premolar erupts). the surgical extraction of the supernumerary and the first molar of the first dentition. The results obtained in this study were favorable and orthodontic traction placement was avoided while the retained tooth erupted.

Conclusion: The use of Cone Beam tomography allows to be made a more accurate diagnosis, locating the supernumerary tooth accurately, facilitating surgical treatment and reducing surgical time.

It is important to maintain the space so that the retained tooth can erupt by eliminating the risk factor and the eruption of the retained tooth was allowed, avoiding future complications.

Keywords

Supernumerary, Sequence, Tooth eruption, Diagnosis, Treatment.

Introduction

Supernumerary teeth are number abnormalities (extra teeth from the normal series) during dental development, most supernumerary teeth are idiopathic, some may be associated with various Mendelian syndromes. However, this may also be a casual finding, as supernumerary teeth occur in 2 to 3 % other authors mention 6% or more of the normal population [1-3].

Supernumeraries have a multifactorial origin due to polygenetic factors that are influenced during development. There are different theories of the formation of supernumerary teeth such as the theory of hyperactivity of the dental lamina [4-6] that causes certain pressure within the jaw bone, this process results in a division of the lamina dental combined with hereditary factors affecting a supernumerary tooth and the dichotomy theory [7], where the dental germ divides and as a result causes the formation of a supernumerary.

Supernumerary teeth can be dysmorphic (abnormal shape and size) or conical, eumorphic or supplementary (same size and shape), and molariform (they usually have an irregular molar shape) [8].

The prevalence of supernumerary teeth in the primary dentition is rare with an incidence of 0.3 to 1.7%. In the Caucasian population of 0.3 to 3.8%, in Japan and Hong Kong it is between 2.7 and 3.4% (9) Shaw recorded that of 248 black race patients in South Africa 4.8% had supernumerary teeth, while Stafne mentioned that 80% of supernumerary teeth do not erupt [10-12].

The prevalence in terms of its location is 0.15 to 1.9% mesiodens. Other authors report 0.09 to 2.05% in the general population, 0.01 to 1% in premolars, and less than 1% in molars. The mesiodens is the tooth that is in the midline with a 48.6% frequency, secondly, the premolars with 26.4%, third the lateral incisors with 11.1% and finally the molars with 9.7% of the total of prevalence. Regarding gender, there is a 2:1 ratio in men [4,6,12,13].

The most frequent problems that arise from supernumerary teeth are those that cause the delay of the dental eruption causing alterations such as space loss (the bone-tooth discrepancy hinders the eruption process) [12]. The premature loss of a temporary tooth due to caries in which the bone and mucosa heal after the loss of it, causing the second dentition tooth the eruption fail.

Supernumerary teeth are an important reason that cause alteration in the eruption sequence; they are generally found more in the upper incisal area and can occasionally erupt ectopically, producing mal positions and transpositions of the germ in the maxillary bone. Sometimes they can cause displacement of the permanent tooth germ and /or modify its morphology, resulting in an alteration in the dental eruption and finally, dental tumors, the most frequent are odontomas and are considered by some authors to be as a supernumerary tooth [114,15].

The anomaly of number (supernumerary teeth) is a cause that produce the delay in the dental eruption and therefore the prolonged retention of the teeth of the first dentition altering the dental sequence of the individual, this retention can form cysts and reabsorption of the root of adjoining teeth [16].

Some authors mention that the alteration in the eruption refers to the eruptive moment in which the tooth breaks the oral mucosa and appears in the oral cavity. This varies in each individual, population and nutritional factors with variations during growth and development influenced by genetic and environmental factors. However, others mention that age, gender and race affect the appearance of supernumerary teeth. While Baccetti, considers that genetic factors, inheritance, nutritional status, skeletal development, premature extraction of primary teeth influence the dental eruption together with alterations of number [12,17].

The delayed eruption consists of the delay of one or some teeth of the arches to erupt in the mouth according to the dental chronology of the individual, sometimes the eruption sequence may also be altered. It can affect the entire chronology, but this depends on syndromic genetic, nutritional, and chromosomal factors. Occasionally one, two or three teeth may appear in the mandible as in the maxilla and will depend on the etiology of the mandible [15].

When a delayed eruption of one or more teeth appears, a number anomaly should be suspected, this is usually diagnosed by means of a panoramic or dentoalveolar radiography of the area and more specifically with a Cone Beam tomography and thus the formation of more severe malocclusions [14,17].

In 2011, Antronappa et al. reported that panoramic radiography is the most used for the diagnosis of this anomaly, although supernumerary teeth are located by chance, which is generally found in patients who are going to undergo orthodontic treatment. They conclude in their study that panoramic radiographs are not very reliable to identify supernumerary teeth that would depend on the level of dental training to identify them due to the difficulty of being able to visualize them due to the location and the superimposition of bone and dental structures [2,18].

Currently, the Cone Beam Tomography (CBT) is generally very useful for the more accurate location of supernumerary teeth. The magnification of the images in the CBT must be considered. Demiriz et al., carried out a study to determine the precision in the size of supernumerary teeth on panoramic radiography, measured the tooth along the length and width of the crown (supernumerary), comparing it with that of the CBT tomography found that it measured 0.28 in width and 0.13mm in length, while in the panoramic it measured 1.1mm, these measurements suggest that the tomography is more accurate [18].

On the other hand, in 2010 Omer et al., observed that patients who presented supernumeraries at 7 years, caused delay or ectopic eruption of adjacent teeth, for this reason the importance of early treatment, suggesting that the age of the patient in which extraction

of the supernumerary tooth should be carried out between 6 and 7 years to avoid possible complications in the sequence of dental eruption, avoiding the formation of a malocclusion [19].

Regarding the treatment of number anomalies, it is generally dental extraction, it will depend on the age of the patient, proximity of the supernumerary with the germ and formation of the root of the adjacent tooth, in addition, the teeth involved and whether the supernumerary tooth has erupted or not. Likewise, it should be considered that when the supernumerary tooth is retained and cannot erupt, surgical extraction is the option [20].

The objective of this study is the early diagnosis, elimination of deciduous and supernumerary teeth by controlling the tooth eruption space as the etiological factors that produces alteration in the sequence and dental eruption for avoid possible complications.

Clinical Case

A 13-year-old male patient for the diagnosis, a clinical history, study models, photographs and radiographs were made with interdental spaces, large arches of good size, hypertrophic frenulum, insertion of high low braces, causing diastemas in the upper and lower anterior part with almost all teeth erupted from the second dentition, prolonged retention of the mandibular lower left 1st molar of the first dentition, with no apparent mobility. The

upper molars have talon cusps, diastemas in the midline both in the superior and inferior (Figure 1).

The patient is sent to take a routine conventional panoramic x-ray because is going to undergo orthodontic treatment. A supernumerary tooth is observed in the lower area of the premolars and is subsequently sent to take a Cone Beam tomography.

In the analysis of the tomography, the presence of an "extra" tooth was observed in a diffuse way and more than 2/3 of the root was reabsorbed in an atypical way of the first molar of the first dentition. In the tomography it is observed in the frontal view; presence of a supernumerary tooth, in the lateral view we can see the premolar of the second dentition with the formation of 2/3 parts of the root (Figure 2).

In an occlusal cut, the exact location of the supernumerary is observed, in this case, we find it by lingual, observing two fused crowns close to the apex of the first retained premolar (Figure 3).

The definitive diagnosis was, alteration in the sequence and chronology of the eruption of the first premolar of the second dentition, as a retention factor was the presence of a supernumerary in that area.



Figure 1: Clinic Photographs.

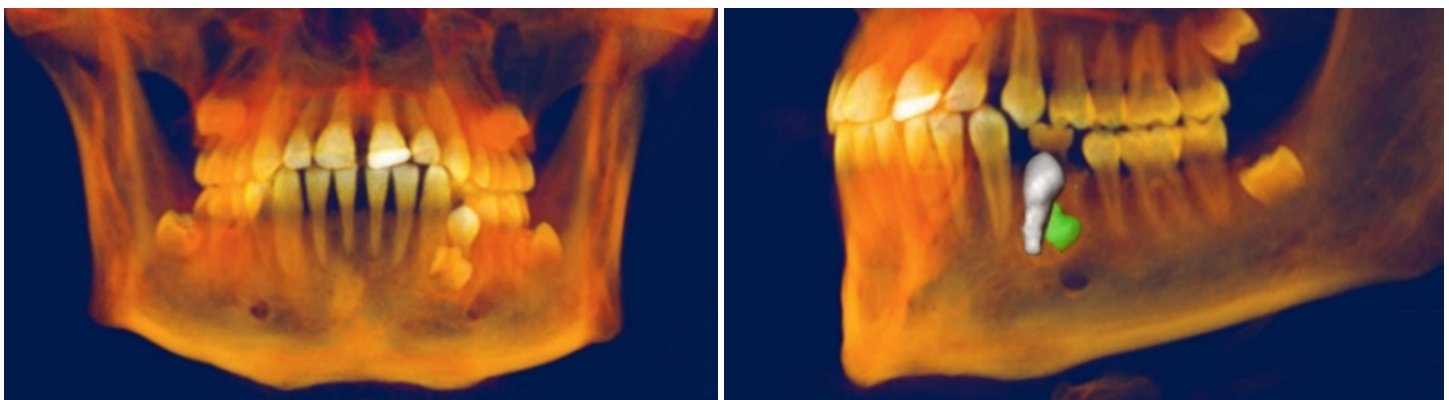


Figure 2: Volumetric Tomography, frontal and lateral.

Different cuts and approaches were made to observe how close the supernumerary was to the premolar and thus avoid damaging the root of the premolar at the time of surgical extraction, also if they were fused and what was the size of the supernumerary (Figure 4).

The treatment was multidisciplinary with Surgical-Orthodontics. It first consisted of performing the removable appliances to avoid the loss of space, preventing the mesialization of the second premolar and first molar of the second already erupted dentition and thus preventing crowding. Subsequently, was anesthetized regionally and the flap was debrided, with a carbide drill, and an osteotomy was performed to locate the supernumerary tooth. With an elevator,

the tooth was dislocated so that it could be extracted. At the same surgical moment, the deciduous first molar was extracted, then gel foam was placed in the place where the supernumerary was. It was decided not to place traction on the included tooth and let it erupt on its own. Finally, it was sutured with Vrilcryn 000 and the space maintainer was immediately placed to press creating homeostasis at the extraction site (Figures 5 and 6).

The patient was cited for weekly revision and suture removal. After one month for follow-up, a dentoalveolar radiography was taken, in it, the cavity where the supernumerary was located and the premolar in position to erupt can be seen. In addition, a small

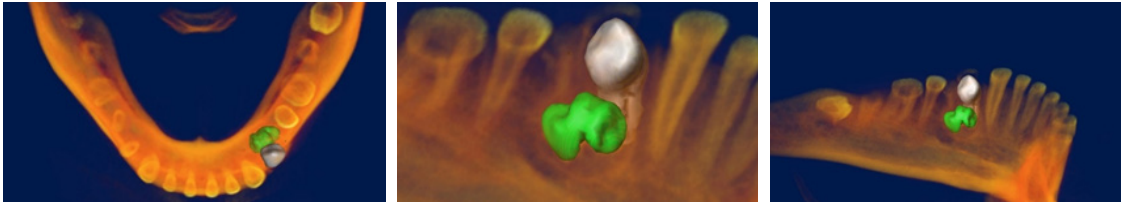


Figure 3: Occlusal cut of the mandible, by lingual and close-up.

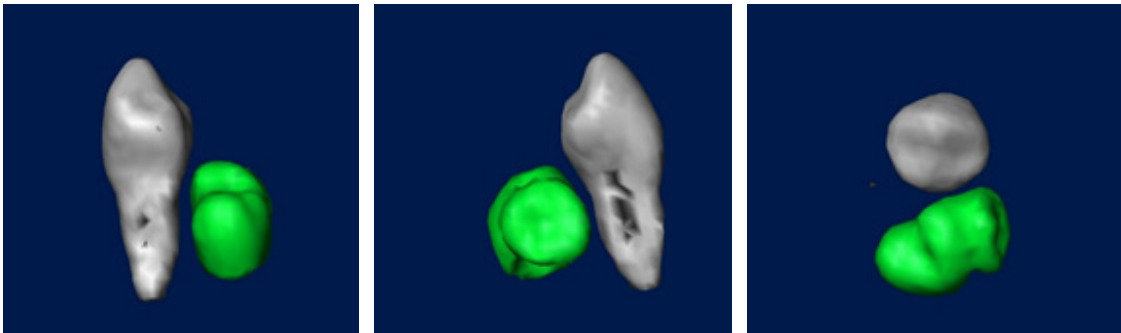


Figure 4: Transverse and occlusal cut.

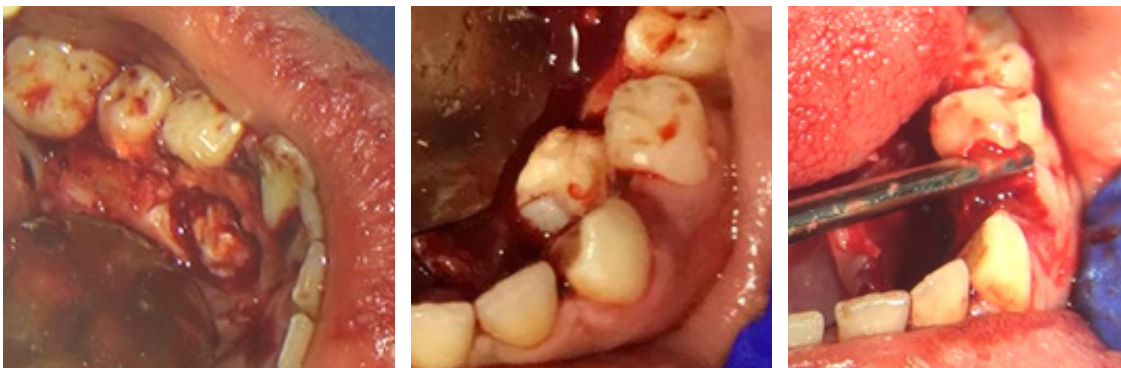


Figure 5: Location, extraction of the supernumerary and first molar.



Figure 6: Removable appliances in the mouth.

radiopaque area is observed that could be a small part of the root of the first deciduous molar. In the clinical part, the cusp of the premolar that is about to erupt is observed. Two and a half months later, a clinical control photograph was taken, showing a third of the premolar crown and enough space for the eruption (Figure 7).

After extracting the tooth, it was placed in a bottle with 10% diluted formalin (1-part formalin and 9 parts water) to be analyzed using an Olympus microscope. Different close-ups were taken to see the size in mm and if it really was a fusion of the enamel or if they were two dental germs linked by connective tissue. The photos were taken with a 10x and 200x close-up. With the approach, it is observed that there are two crowns in the same supernumerary tooth, which suggests that it may have been formed by the dichotomy theory which mentions that it is formed through a

dental germ. Furthermore, it can be observed that it was not fusion because the crowns were not joined by enamel but by connective tissue. In the vertical part, the two crowns are observed, which had a size of 7.5 mm in length (Figures 8 and 9).

Conclusion

An early diagnosis is important since this allows to act in time and thus avoid alterations in the occlusion. It is transcendental to eliminate the risk factor that produced the retention during the mixed dentition, in addition to maintaining the space for the retained tooth to erupt. Therefore, the use of removable appliances allows to control the space available for the eruption of the premolar, managing to restore the occlusion avoiding crowding. At the same time, the interdisciplinary management of the patient is of most importance since these are children or adolescents.



Figure 7: Radiographic and clinical follow-up: after one month and two and a half months.

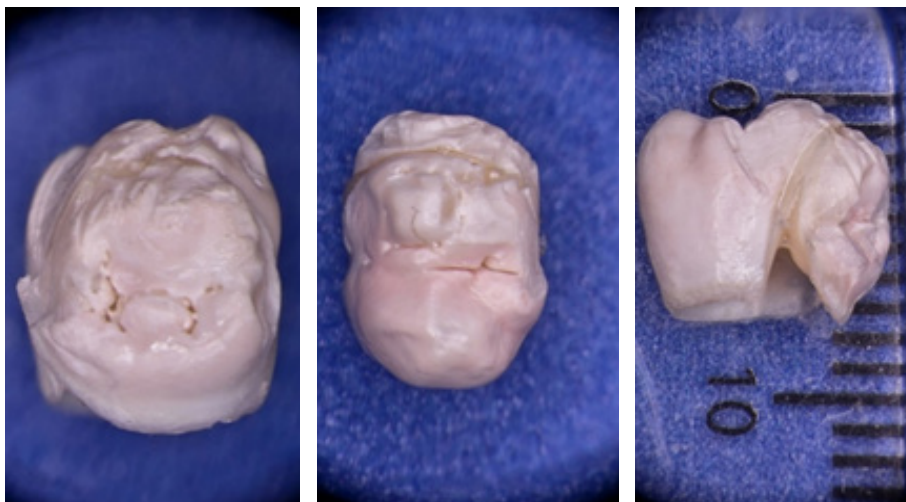


Figure 8: Side of the crown and vertical (10x)..

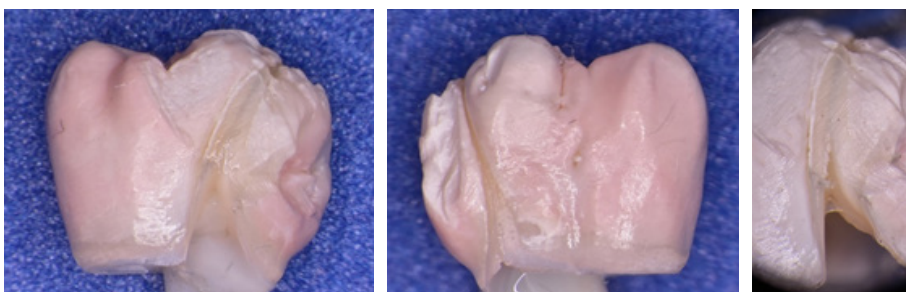


Figure 9: Right and left side view. 10x and 20x

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