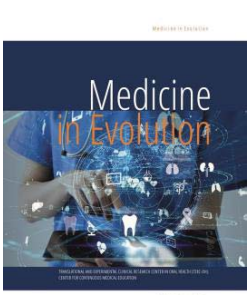
Comparative Histological Analysis of Normal and Supernumerary Teeth: Clinical and Morphological Implications



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Abstract

This study aims to highlight the histological differences between normal (temporary and permanent) teeth and supernumerary teeth by analyzing enamel, the pulpo-dentin complex, and cementum. Through comparative microscopy of prepared histological slides, the research identifies microstructural peculiarities that may support a better understanding of the development, diagnosis, and management of dental number anomalies. This study involved histological analysis of 12 permanent preparations obtained from supernumerary, temporary, and permanent teeth, aiming to highlight the microstructural differences between normal and supernumerary dentition. Clinical cases and laboratory protocols, including decalcification, paraffin embedding, microtomy, and

hematoxylin-eosin staining, allowed detailed observation of enamel prism organization, dentin tubule arrangement, and cementum characteristics. Histological comparison revealed that supernumerary teeth exhibit significant structural deviations, including atypical enamel prism orientation, reduced dentinal tubule density with frequent interglobular spaces, and a poorly differentiated cementum. These anomalies suggest incomplete mineralization and altered tissue development, potentially linked to the frequent impaction and limited functional integration of supernumerary teeth. Supernumerary teeth, although not pathological entities per se, can disrupt the harmony of the dento-maxillary system, affecting eruption, bone development, and dental aesthetics. Histologically, they exhibit morpho-structural hypodifferentiation, with disorganized enamel, reduced dentinal tubules, and imprecise cementum stratification, indicating a lower functional potential. These findings support the importance of histological evaluation in treatment planning and justify a conservative, individualized therapeutic approach based on both structural integrity and functional prognosis.

Keywords: Supernumerary teeth, Mesiodens, Histological analysis, Mineralization defects, Dento-maxillary anomalies

INTRODUCTION

Dental number variations, either in the form of agenesis or by the presence of supernumerary teeth, are abnormalities with a relative impact on general health, but which can provide valuable information to those who study them carefully [1]. The literature reflects a constant interest, marked by an ebb and flow determined by factors such as the novelty of the findings, the frequency of cases, the social implications, the etiopathogenic perspectives and the changes in therapeutic approaches. Thus, this segment of dento-maxillary pathology remains a current topic and open to continuous research [2]. Given the frequent association of supernumerary teeth with numerous genetic syndromes, research has focused on identifying the genes involved and the transmission mechanisms, both from a genotypic and phenotypic point of view. Family studies have demonstrated in numerous cases the existence of a simple, Mendelian type heredity. In contrast, sporadic forms of isolated supernumeraries appear to be multifactorial, as a result of de novo mutations or the action of teratogenic agents during critical periods of dental tissue differentiation. The genetic predisposition for the appearance of these abnormalities is the result of gene interactions, but its expression is influenced by environmental factors in particular the timing (prenatal or postnatal), duration and intensity of exposure. However, to date, no specific genetic mutations associated with non-syndromic supernumerary teeth have been identified [3]. The current approach to dental number anomalies is mainly guided by their orthodontic relevance, but the interest in these anomalies also extends to the anthropological, genetic-phylogenetic and evolutionary spheres, justifying the need for in-depth studies. The observation that these anomalies no longer follow the classical patterns requires further research, especially in the context of the phylogenetic trend of reducing the dental formula.

Hyperdontia is defined as a dental anomaly characterized by the presence of a greater number of teeth than normal, affecting both temporary and permanent dentition. In the literature, the terms most commonly used for this anomaly are "supernumerary teeth" (Agrestini and Sfasciotti, Benagiano, Boboc, Cadenat, Chaput, Chateau, Dechaume, Firu, Gysel, Orlando) and "hyperdontia" (Broglia, Cadoni, Lundstrom, Rocia). Other names encountered include: extra teeth, hyperodontogenesis, poliodontics or pleiodontics. Of these, the terms "supernumerary teeth" and "hyperdontia" are the most expressive and widely accepted [1]. The classification of supernumerary teeth varies according to several criteria: topography, morphology, chronology, etiology, clinical aspects and therapeutic objectives. According to the topographic criterion, supernumerary teeth can be located in various regions: mesiodens (between the upper central incisors), paramolar (between the 2nd and 3rd upper molars), dystomolar (distal to the last molar), parapremolar (in the premolar area), but also in atypical forms, such as paramolar roots or additional tubercles [1]. Morphologically, Mitchell [4] proposes four forms: conical, tuberculate, additional, and odontoma. The frequency of hyperdontation varies: in the temporary dentition it is between 0.2-2%, and in the permanent one between 0.1-5%.

The majority of cases (90-98%) occur in the jaw, of which 75% are mesiodentic. In temporary dentition, it occurs more often in boys, unilaterally and in the incisor-canine area, with a shape and size similar to normal teeth. In permanent dentition, hyperdontation is significantly more common in men, predominantly in the jaw, especially in the incisor and molar regions. It can occur unilaterally or bilaterally and with variable morphological forms, being located on the arch, ectopic or included [5]. From the perspective of therapeutic objectives, Boboc (1971) distinguishes between supernumerary teeth that do not influence the eruption of normal teeth and those that determine their inclusion [6]. Depending on the association with genetic pathologies, hyperdontia can be classified into syndromic and non-

syndromic forms [7]. Although each classification criterion reflects a specific organizational logic, none manages to fully encompass the complexity and variability of this dental anomaly. As for the etiology of hyperdontia, most authors adhere to the atavistic or descent theory, according to which supernumerary teeth represent a return to ancestral dental formulas. This theory explains their appearance either as a reactivation of ancestral dental patterns (Magitot, Thompson, Rosenberg, Agrestini, Sfaciotti) or as the reappearance of elements that disappeared during phylogenesis (Orlando). According to this perspective, the dental formula of primates - 3 incisors, 1 canine, 4 premolars and 3 molars per hemiarch would be the reference point for assessing the atavistic character of hyperdontia.

Thus, the presence of Mesiodians is considered a phylogenetic echo of evolutionarily reduced incisors. On the other hand, the appearance of teeth outside the known areas of reduction or of atypical forms, such as the supernumerary canine, raises questions about the complete validity of this theory, since the canine does not normally appear multiplied even in primitive dental formulas. In this context, some authors support the theory of dental blade overproduction as an alternative mechanism, based on the model of reptilian polyphyodontism [8]. At the same time, a series of morphological peculiarities of supernumerary teeth are noted. Although they may resemble normal teeth, dysmetabolic changes often occur that affect their eruption, positioning, vascularization, innervation and masticatory functionality. Depending on the time of appearance in relation to the normal dentition, three categories are distinguished: Before the normal dentition the teeth form a predeciduous or preprimary dentition, being attached to the gums without a root. Neonatal teeth rarely appear, usually in the area of the lower incisors, in the first months of life. After normal dentition they appear as part of a post-permanent dentition. They can be teeth formed after the completion of the permanent dentition or formed with it, but with delayed eruption. Some cases of late mineralization can only be observed radiologically. Concomitant with normal dentition they are the most common, especially in the jaw (90%), being rarer in the mandible (10%). Most of the time, these teeth remain included, and the diagnosis is based on clinical signs such as: persistent diastemas, dental dystopias, bulging of the alveolar ridge or prolonged maintenance of temporary teeth. Radiography is essential in confirming the diagnosis [9,10]. Supernumerary teeth are often smaller, atypical, with ectopic or inverted positions (with the crown towards the base of the jaw and the root towards the occlusal plane), called anaastrophic. The most common supernumerary tooth is the mesiodens, whose correct name reflects its mesial positioning in relation to the central incisors [10,11].

Aim and objectives

The main purpose of this study is to highlight the histological differences between the teeth belonging to the normal dental series (temporary and permanent) and the supernumerary ones. Through the comparative analysis of the main dental hard tissues enamel, pulpo-dentin complex and cementum the aim is to identify the structural peculiarities that can contribute to the understanding of the atypical development of supernumerary teeth. In order to achieve this objective, teeth from the three mentioned morphological categories were selected and analyzed. Each specimen was prepared in the form of histological slides and examined under an optical microscope in order to highlight: prismatic organization of enamel; arrangement of dentin canalicules and predentin characteristics; the structure of the cement (acellular or cellular) and the degree of mineralization. Through this approach, the study aims to provide an integrated perspective on the microstructural differences between normal and supernumerary teeth, thus contributing to the substantiation of the etiology, diagnosis and therapeutic planning in the case of dental number anomalies.

MATERIAL AND METHODS

In order to carry out this comparative study, permanent histological preparations obtained from three categories of teeth were analyzed: supernumerary, temporary and permanent, aiming to highlight the structural differences between the teeth of the normal series and the supernumerary ones. Informed consent was obtained from all participants prior to inclusion in the study. Vital preparations have not been used, as their scope is limited to cells that can be easily dissociated, such as muscle cells. A total of 12 histological slides were examined, which included sections of the three main types of dental tissue: enamel, pulpo-dentine complex, and cementum. For each blade, a comparative analysis was performed between the supernumerary teeth and those of the normal series (temporary or permanent).

Case 1 - Supplemental (eutopic) supernumerary tooth in the upper lateral region

Patient C.E., aged 8, presented to the Pediatric Dentistry Clinic of University of Medicine and Pharmacy "Victor Babeș" from Timisoara for dental care. Clinical examination highlighted: mixed dentition, persistence of the temporary lateral incisor 6.2; vestibularization of the central incisors 1.1. 2.1 and absence of the lateral incisor 1.2; 3-4 mm interincisive diastema. Paraclinical investigations (Figure1, Figure2): Orthopantomography and occlusal radiography: highlighting a supplemental (eutopic) supernumerary tooth (2.2-bis), located palatally; Study model: U-shaped, discontinuous and asymmetrical upper arch.

Figure 1. Initial orthopantomography of the patient C. E.

Figure 2. X-ray from occlusal incidence what detects a eutopic supernumerary tooth

The examination of the study model highlights an upper arch in the shape of the letter "U", discontinuous and asymmetrical. In the sagittal direction, a distalized ratio of class 2 Angle is observed at the molar level, and in the frontal area there is an overjet of about 10 mm. In the vertical direction, an overbite of 1/1 is observed in the frontal area, which denotes a deep occlusion.

Diagnosis: Class II dento-maxillary anomaly, subdivision 1 Angle; The presence of a eutopic supernumerary tooth.

Treatment: Surgical stage: extraction of teeth 6.2 and 2.2-bis (Figure 3; Figure4); Orthodontic stage: use of a myofunctional silicone appliance (Multi T-Rocky Mountain).

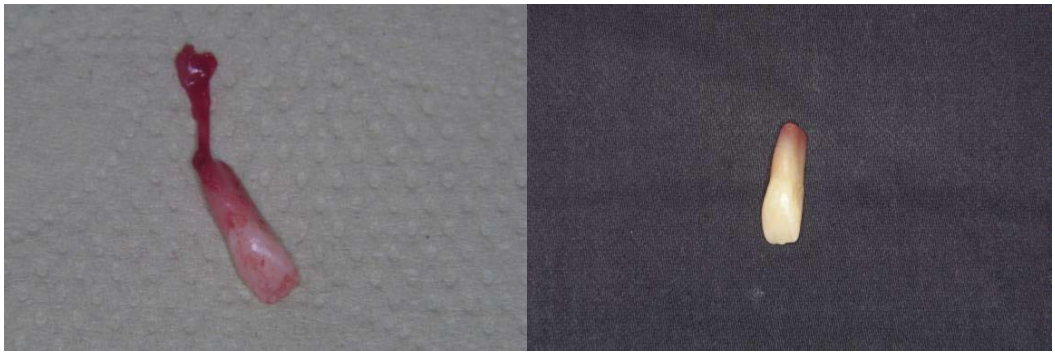

Figure 3. Extracted supernumerary tooth tooth together with its follicular sac 2.2 bis

Figure 4. Extracted temporary tooth 6.2

Case 2 - Tuberculate mesiodens with rotation of central incisors

Patient S.A., 11 years old, presented at Pediatric Dentistry Clinic of University of Medicine and Pharmacy "Victor Babeş" from Timisoara for orthodontic treatment.

Clinical examination: Meziodens on the midline; Mesiorotation of the incisor 2.1, dystorotation 1.1; 6 mm interincisive diastema.

Paraclinical investigations: Orthopantomography: tuberculous positioning of the mesiodense between 1.1 and 2.1 (Figure 5); Study model: U-shaped arches, dento-alveolar disharmony.

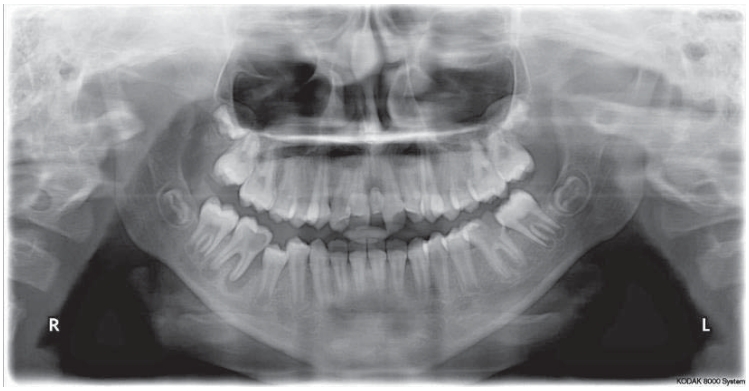

Figure 5. Initial orthopantomography of patient S. A.

Diagnosis: Overjet: 6–7 mm; overbite: 1/3; Absence of 6-year-old molars (unidentifiable Angle Class). Treatment: Surgical stage: mesiodens extraction. Orthodontic stage: Multi P (Rocky Mountain) appliance (Figure 6).

Figure 6. Extracted supernumerary tooth

Case3 - Conical mesiodens associated with hypodontia

Patient P.A., 7 years old, presented for dental treatments at Family Dental Clinic for orthodontic treatment.

Clinical examination: Mixed dentition, absence 2.1, presence of a mesiodens in the frontal region. Paraclinical investigations: X-ray: conical mesiodens, inclusion 2.1, absence of bud 3.5 (hypodontia) (Figure 7); Study design: 6 mm interincisor diastem, class I molar Angle

Figure 7. Initial orthopantomography of patient P. A.

Treatment: Surgical stage: mesiodens extraction (Figure 8); Orthodontic stage: Multi T (Rocky Mountain) appliance → 2.1 rash; Subsequently: upper and lower fixed orthodontic appliance for occlusal alignment and stabilization.

Figure 8. Extracted supernumerary tooth

After 8 months of the completion of the surgical stage and the beginning of orthodontic treatment, the alignment of the permanent incisor 2.1 on the arch was observed, which had been held in inclusion by the persistence of the supernumerary tooth (Figure 9). Subsequently, a fixed upper and lower orthodontic appliance was applied, in order to align

and level the dental arches, and to stabilize the occlusal relationships, the patient being still in treatment.

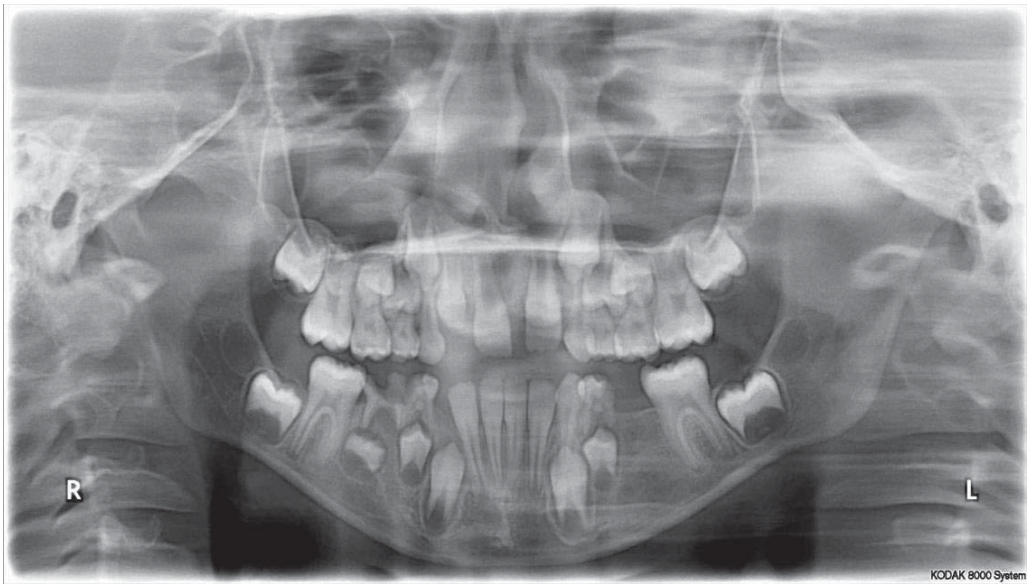

Figure 9. Radiological appearance after extraction of the supernumerary tooth

Histological analyses

Descaling

In order to obtain fine sections of hard tissues, it was necessary to pre-decalcify the teeth. 10% trichloroacetic acid combined with concentrated formalin has been used as a decalcifying agent, as it ensures good preservation of cellular structures. Descaling was carried out in containers with a volume of 100–200 times larger than the volume of the part. The parts were suspended in solution with the help of a nylon thread to speed up the process. The completion of the decalcification was evaluated by physical methods (palpation, needle pricking, sectioning) and chemical methods (methyl orange and ammonia test). Subsequently, the parts were washed with 96% alcohol, avoiding additional sulfate treatments due to the compatibility of the descaling agent used.

Inclusion in paraffin

The steps included in the inclusion protocol were:

Dehydration – progressively performed in alcohol baths, paying attention to the volume and fragility of the pieces, to prevent structural deformations.

Clarification - benzene was used as a clarifying agent due to the effective penetrability and increased transparency of the parts. The clarification was carried out in glass containers, with successive reagent exchanges.

Paraffin – consisted of impregnating the pieces with molten paraffin (55-56°C), in 3 successive baths, each lasting 1-2 hours, depending on the size of the pieces.

The actual inclusion - was achieved by pouring the paraffin into a Leuckart shape, with the careful orientation of the piece in relation to the sectioning plane.

Sectioning

After the complete hardening of the paraffin blocks, the paraffin microtome was sectioned**.** The thin sections (5-7 µm) were obtained in continuous ribbons and then mounted on object slides, pre-degreased, using Mayer albumin-glycerin as a fastening agent. The sections were spread by hydration and heat application on a thermally adjustable plate,

aiming to remove the creases and distribute the section evenly. The slides were later dried and prepared for coloring.

Coloring

The staining of the histological sections was performed using the standard **hematoxylin**-eosin technique, according to the following protocol: Dewaxing in three successive benzene/toluene baths; Gradual hydration by switching from alcohol to distilled water; Hematoxylin impregnation for nucleus highlighting and eosin for cytoplasmic structures and extracellular matrix. In some cases, collodination has been applied to improve the adhesion of thick or dense tissue sections, except in situations involving metallic or immunohistochemical impregnation techniques.

RESULTS

On histological preparations obtained by decalcification, the enamel is completely removed from the surface of the dental crown, which causes the appearance of a clearly delineated, chromophobic space, called the enamel space. For this reason, for the detailed examination of the enamel structure, microscopic analysis of dry and polished dental preparations, without decalcification, was used, which allow the structural integrity of this tissue to be preserved. In the normal series teeth, microscopic examination revealed the typical, wavy path of enamel prisms in the direction of the enamel-dentin junction (JSD). On cross-section, the prisms exhibit the characteristic morphology of "keyhole" or "fishtail". In the peripheral areas, between the prisms, aprismatic enamel was identified, lacking a defined prismatic orientation. In the case of supernumerary teeth, there were obvious atypologies and asymmetries in the orientation of the enamel prisms.

The head of the prism is no longer clearly directed towards the tip of the cusps or the incisive area, presenting a pronounced obliquity, probably influenced by variations in the amount of adjacent interprismatic substance. Also, a marked extension of the enamel lamina was observed, some structure rich in organic material suggesting a possible mineralization deficit in the formative period of the enamel of supernumerary teeth. As for the interprismatic substance, it retains its classic arrangement pattern, especially in the cervical area, both in permanent and decidual teeth (Figure 10; Figure 11).

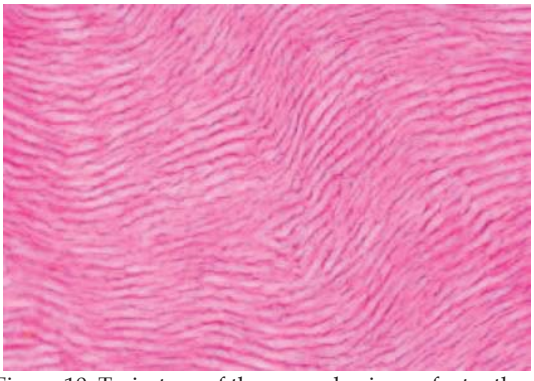

Figure 10. Trajectory of the enamel prisms of a tooth of the normal series

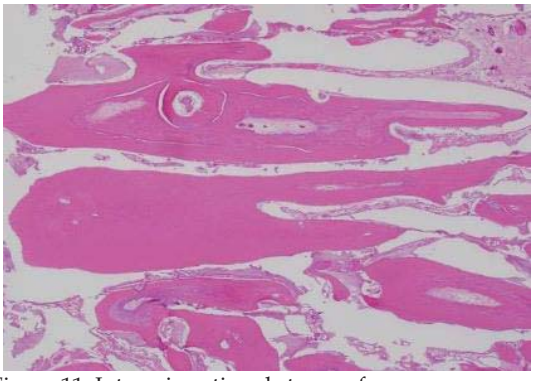

Figure 11. Interprismatic substance of a supernumerary tooth

In the structure of the teeth of the normal series, the primary dentin constitutes the largest part of the dental mass, surrounding the pulp chamber and presenting an external layer organized in the form of the dentin mantle. The dentinal tubules are arranged radially with respect to the pulp chamber, having a sinuous trajectory, especially in the crown region, where they form "S" curves, less pronounced in the root region. At the level of the terminal

portion, near the enamel-dentin (JSD) or cement-dentin (JCD) junction, the tubules have terminal and lateral branches, sometimes with cytoplasmic extensions, sometimes without (Figure 12; Figure 13). The intertubular dentin, located between the tubules, is made up of a network of type I collagen fibrils, on which hydroxyapatite crystals are deposited. It is the primary secretion product of odontoblasts and gives structural strength to the dentin matrix. In supernumerary teeth, a significant reduction in the number of dentin tubules has been observed, although their overall trajectory remains comparable to that of the normal series. This change causes an increase in the amount of intertubular dentin, giving a denser histological appearance, but with a reduction in the active mineralized content. In the circumpulparous area, immediately below the dentin mantle, the frequent presence of hypomineralized interglobular dentin was highlighted, characterized by the accumulation of chalcospheres and the absence of intratubular dentin. A relevant peculiarity for supernumerary teeth is the marked presence of Czermack interglobular spaces, observed in increased numbers, especially in the circumpulparous area. These spaces reflect an incomplete mineralization process, being associated with an uneven distribution of the hydroxyapatite crystal, without altering the general architecture of the dentin tubules.

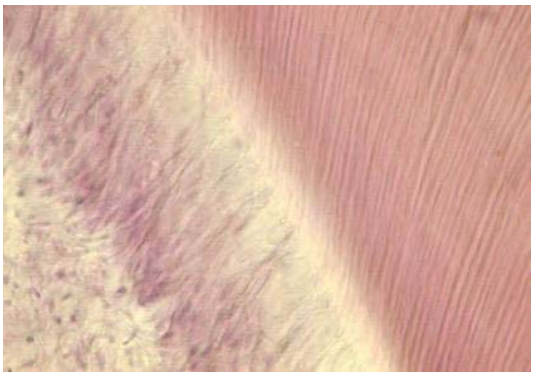

Figure 12. Odontoblastic palisade from periphery of the dental pulp

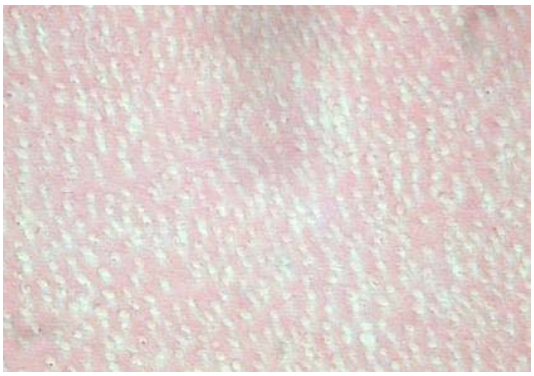

Figure 13. Irregular dentine tubules of a supernumerary tooth (cross-section)

The cementum and periodontal ligament are part of the periodontal complex, along with the alveolar bone and gum, having an essential role in the fixation and functionality of the tooth.

In the teeth of the normal series, a clear distribution of the two types of cement was observed:

The acellular, fibrillar (primary) cementum uniformly covers the root surface, being devoid of cells and presenting numerous perpendicular striations on the external surface. They correspond to the insertion paths of the Sharpey fibers, which anchor the tooth in the alveolar bone. The cellular cementum (secondary) is located especially in the apical area of the root and at the level of the root bifurcations, containing gaps that harbor cementocytes, involved in the synthesis and remodeling of the cementary matrix. In the case of supernumerary teeth, histological analysis revealed a lack of clear demarcation between the two types of cement. The areas of interpenetration of the cellular and acellular cementum suggest a mixed, functionally undifferentiated structure, indicating an incomplete or altered development of this tissue. The periodontal ligament, also present in supernumerary teeth, maintains the insertion of collagen fibers (especially type I and III collagen) in the cementum, but their organization is deficient. The fibers do not always show the typical orientation seen during tooth eruption. This can be explained by the fact that supernumerary teeth are often in inclusion, which prevents the normal development of the ligament and limits its supporting function. The interstitial tissue in the periodontal ligament is of the lax connective type,

containing blood vessels, lymphatics and nerve endings, but in the case of supernumerary teeth, these structures appear to be more poorly represented, supporting the hypothesis of reduced or absent functionality (Figure 14).

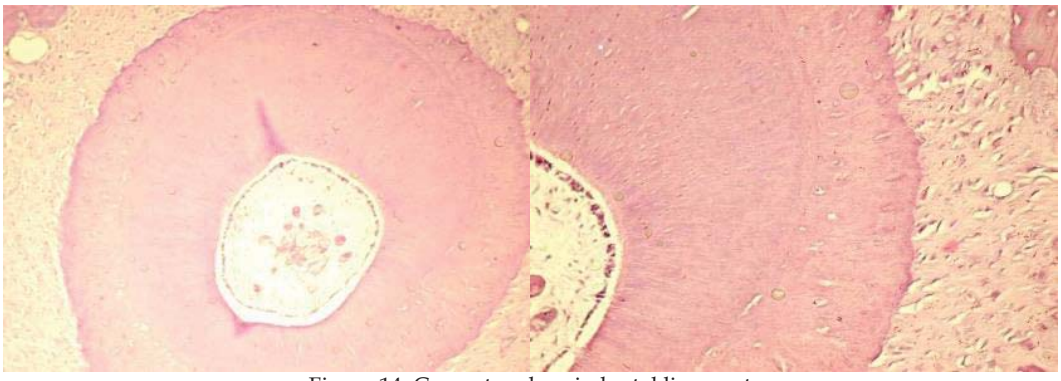

Figure 14. Cement and periodontal ligament

DISCUSSIONS

The results obtained from the comparative histological analyses of the teeth of the normal series (temporary and permanent) and of the supernumerary teeth show significant differences in the structure of dental hard tissues - enamel, dentin and cementum as well as in the organization of the periodontal ligament.

In the case of enamel**,** the organized structure of the prisms, with a wavy path towards the enamel-dentin junction and the characteristic morphology of "keyhole", was evident in normal teeth. In contrast, the supernumerary teeth exhibited atypia of prismatic orientation**,** a marked obliquity of the prism head, and an enlargement of the enamel lamella, suggesting a mineralization deficit during the developmental period. These findings are consistent with the literature, which indicates an increased variability in enamel organization in teeth formed outside the usual genetic pattern [12, 13].

At the dentin level, the supernumerary teeth had a reduced number of dentine tubules, compared to normal teeth, despite a similar "S" shaped trajectory. This change has led to an abundance of intertubular dentin, but also to an increased presence of interglobular dentin, especially in the circumpulparous area. The Czermack interglobular spaces, more numerous in the case of supernumerary teeth, reflect an incomplete or discontinuous mineralization process, being a possible cause of structural fragility and functional limitation of these teeth. As far as the cementum is concerned, the teeth of the normal series have a clear delimitation between the acellular cementum (fibrillary), involved in the insertion of the periodontal ligament, and the cellular cement, with a regenerative role. Supernumerary teeth, however, are characterized by an imprecise topography of the two types of cement, with interpenetration areas and mixed structures, not functionally differentiated, an aspect that can negatively influence the ability to integrate into the periodontal system [14,15]. The periodontal ligament associated with the supernumerary teeth also showed organizational abnormalities, with an incorrect or poorly expressed orientation of the collagen fibers. Probably, the frequent inclusion of these teeth prevents the mechanical stimulation necessary for the normal development of the ligament and causes a functional deficit in terms of anchoring and dental support**.** The comparative histological analysis of the normal and supernumerary teeth highlights structural differences that can influence their functionality within the dento-maxillary apparatus. Studies have shown that although supernumerary teeth may appear morphologically similar to normal ones, they often exhibit developmental

abnormalities and structural differentiation [12, 15]. The enamel of supernumerary teeth exhibits changes in the orientation and organization of prisms, as well as an increased extension of organic areas, such as the enamel lamina, suggesting a deficit of mineralization and differentiation during the developmental period [16]. At the level of dentin, significant differences were observed between normal and supernumerary teeth. In the case of the latter, the dentine tubules are fewer and more irregularly distributed, and the presence of interglobular dentin with the predominance of chalcopherites indicates an increased degree of hypomineralization [18,19]. This type of organization is frequently associated with a decrease in structural strength and can affect the functional integrity of the tooth. As far as cement is concerned, the presence of an imprecise delimitation between cellular and acellular cementum in the case of supernumerary teeth, as well as the interpenetration of the two types, suggests an atypical development of this tissue [20,21].

This mixed, functionally undifferentiated structure can affect the stability and functionality of the periodontal ligament. The periodontal ligament, in fact, has a low degree of adaptation in the case of supernumerary teeth. Its functional deficit is probably determined by the fact that many of these teeth remain included, without benefiting from normal functional stimuli [3]. The ligament structure, rich in type I and III collagen, is essential for keeping the tooth in the alveolus, and its alterations can compromise the stability of the tooth [3]. The presence of supernumerary teeth is frequently associated with the appearance of clinical complications such as delayed eruption, malpositions or retention of permanent teeth. In these cases, the therapeutic intervention must be decided individually, depending on the location and morphology of the supernumerary teeth, and extraction is often recommended [8, 2]. The literature emphasizes the importance of an early diagnosis and a personalized therapeutic plan, as supernumerary teeth can contribute to the appearance of complex dento-maxillary anomalies that require subsequent orthodontic treatments [22]. These findings suggest that supernumerary teeth, although they may appear morphologically similar to those of the normal series, present significant histological differences, especially in terms of mineralization, structural organization and periodontal functionality[22,23]**.** These aspects must be taken into account in the clinical evaluation and therapeutic decision, especially in the orthodontic or surgical context.

CONCLUSIONS

Based on the national and international literature, corroborated with the data obtained from the comparative histological analysis performed in this study, the following conclusions can be drawn:

Although the phylogenetic evolution of man is oriented towards simplifying and reducing the dental formula, in contemporary dental practice supernumerary teeth with various locations, shapes and sizes continue to be found. This clinical reality requires the careful study of these structures as expressions of atypical dental development and not as simple evolutionary accidents. Supernumerary teeth are not pathological entities in themselves, but their presence can disrupt the balance of the dento-maxillary apparatus. Thus, they can negatively influence the growth and development of maxillary bones, the eruption of normal series teeth and, indirectly, they can have psychological repercussions on the child, by affecting dental aesthetics or the appearance of oral dysfunctions. The therapeutic indication of supernumerary teeth is determined by the position, number and impact on the eruption. In most cases, extraction is the preferred solution for preventing orthodontic complications. There are, however, particular situations in which the supernumerary tooth can be maintained and integrated into the arch, replacing a tooth of the normal series, depending on its functional and aesthetic potential.

The concomitant appearance of supernumerary teeth with dento-maxillary skeletal anomalies requires a complex therapeutic approach. In such cases, treatment often begins with the surgical extraction of extra teeth, followed by orthodontic therapy to correct occlusion and dental alignment abnormalities. Histologically, supernumerary teeth have a structure generally similar to that of normal teeth, but microscopic analyses reveal a discrete morpho-structural hypodifferentiation. It is manifested by asymmetries in the organization of the enamel, a reduced number of dentinal tubules and imprecise distribution of cellular and acellular cementum. Microscopically highlighted structural changes – especially areas with incomplete or deficient mineralization (chalcospheres, interglobular spaces, extended enamel blades) – suggest a reduced functional potential of supernumerary teeth compared to those of the normal series. This aspect justifies the conservative and individualized approach in the therapeutic plan, since maintaining a tooth with a poorly mineralized structure can compromise the general functionality of the dento-maxillary apparatus. Overall, the results obtained emphasize the importance of histological evaluation in understanding the morphological differences between supernumerary and normal teeth. They support the need for a nuanced clinical decision, based both on radiological and functional criteria, as well as on the potential for biological integration of the teeth in question.

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