

ORIGINAL ARTICLE**SURGICAL, PEDIATRIC AND ORTHODONTIC MANAGEMENT OF MESIODENS WITH VARIABLE IMPACT ON THE ERUPTION AND POSITION OF PERMANENT INCISORS**

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Abstract: *Background:* Mesiodens is the most common type of supernumerary tooth located in the anterior maxillary region and may have a variable clinical impact on the development of the permanent dentition. Depending on its position, orientation, morphology and relationship with the permanent incisors, it may remain asymptomatic or may cause delayed eruption, ectopic eruption, dental displacement, midline diastema, esthetic and functional disturbances, or local pathological complications. The management of mesiodens in pediatric patients requires correlation between clinical findings and imaging investigations, particularly panoramic radiography and, in cases with complex anatomical relationships, cone-beam computed tomography. *Methods.* This paper presents a case series of several male patients diagnosed with mesiodens, each with different clinical manifestations and therapeutic approaches. *Results.* The first case illustrates an impacted, conical and inverted mesiodens associated with delayed eruption of the maxillary right permanent central incisor, for which initial observation was followed by surgical extraction. The second case presents a palatally positioned submucosal mesiodens with a closed apex, associated with vestibular displacement of tooth 1.1 and speech disturbances, treated by surgical extraction. The third case describes an erupted mesiodens located on the midline, temporarily integrated into a fixed orthodontic appliance as a passive element, followed by extraction and orthodontic closure of the diastema. *Conclusion.* This case series highlights the importance of early diagnosis and individualized treatment planning, established through pediatric, surgical and orthodontic collaboration.

Keywords: mesiodens; supernumerary teeth; pediatric dentistry; pediatric oral surgery; tooth eruption; midline diastema; CBCT; interceptive orthodontics.

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1. Introduction

Mesiodens is defined as a supernumerary tooth located in the maxillary midline region, between or in the immediate vicinity of the maxillary central incisors. It represents the most common type of supernumerary tooth found in the anterior maxillary region and may be present in the primary, mixed or permanent dentition [1,2]. From a clinical and radiological point of view, mesiodens may be erupted or impacted, single or multiple, vertical, oblique or inverted, while its morphology may be conical, tuberculate or, less frequently, similar to that of a normal tooth [2,3].

The reported prevalence of mesiodens varies between studies, depending on the population analyzed, patient age and the diagnostic method used. Approximate values between 0.09% and 2.05% have been reported in the literature, while pediatric population studies frequently indicate a male predominance [3,4]. In a study conducted on a pediatric population, the prevalence of mesiodens was 1.4%, with a male-to-female ratio of 1.8:1, and most cases were identified in the 6–9-year age group [4]. This period corresponds to early mixed dentition, a stage in which eruption of the permanent maxillary incisors allows clinical signs such as asymmetric eruption, delayed eruption or persistence of primary incisors to be observed.

The etiology of mesiodens has not been fully elucidated. Several mechanisms have been proposed, including division of the tooth bud, the atavism theory and local hyperactivity of the dental lamina [2,3]. Among these, hyperactivity of dental lamina is frequently accepted as a plausible explanation for the development of

supernumerary teeth. Although mesiodens often occurs as an isolated finding, the presence of familial cases also suggests a genetic component [2,3]. However, the presence of multiple supernumerary teeth requires assessment for possible syndromic associations, such as cleidocranial dysplasia or Gardner syndrome [2].

The clinical importance of mesiodens derives from the variable impact it may have on the development and position of permanent incisors. In early mixed dentition, a significant proportion of anterior permanent supernumerary teeth are unerupted, and only some mesiodentes erupt spontaneously [1]. Therefore, diagnosis cannot rely exclusively on intraoral inspection. Mesiodens should be suspected in the presence of an asymmetric eruption pattern of the maxillary incisors, delayed or ectopic eruption of a permanent incisor, or persistence of a primary incisor [1]. Clinical manifestations may include midline diastema, rotations or inclinations of the central incisors, vestibular displacement of an incisor, esthetic disturbances, hygiene difficulties, functional disturbances or bulging of the palatal fibromucosa in cases of submucosal positioning [1,5].

Complications associated with mesiodens depend on its position, orientation and relationship with adjacent permanent teeth. It may prevent or alter the normal eruption of the central incisors, cause ectopic eruption, dental malpositions, persistence of a midline diastema or, more rarely, dilaceration or root resorption of the permanent incisor [1,5]. Pathological complications have also been described, such as dentigerous cyst formation

or eruption into the nasal cavity, although these are less frequent [1].

Diagnosis of mesiodens requires correlation between clinical examination and imaging investigations. Panoramic radiography, periapical radiographs and occlusal radiography may reveal the presence of a supernumerary tooth in the anterior maxillary region [1]. However, two-dimensional radiographs have limitations in assessing the buccopalatal position and the exact relationship with the roots of the permanent incisors. In cases where three-dimensional localization influences the therapeutic decision or surgical planning, CBCT examination or the use of the parallax technique may be indicated to determine the position of the supernumerary tooth [1,6]. In pediatric patients, the indication for CBCT must be established individually, by weighing the diagnostic and therapeutic benefit against the principle of reducing radiation exposure [6].

The therapeutic approach to mesiodens is not uniform and must be adapted to each case. The decision depends on the patient's age, dentition stage, stage of root development of the permanent incisors, position and orientation of the mesiodens, symptomatology, relationship with adjacent teeth and the need for orthodontic treatment [1,2,5]. Monitoring may be justified in selected cases, when the supernumerary tooth is asymptomatic, does not influence the eruption or position of the permanent incisors and shows no radiological signs of associated pathology. In contrast, extraction is indicated when the mesiodens causes delayed eruption, ectopic eruption, malposition of the incisors, pathological diastema, functional symptoms,

risk to the roots of adjacent teeth or when it interferes with the orthodontic treatment plan [1,5].

The timing of extraction is an important aspect of pediatric management. Removal of an erupted mesiodens or of an anterior supernumerary tooth in the mixed dentition may favor eruption of the adjacent permanent incisor and reduce the risk of persistent eruption disturbances [1]. In the case of impacted mesiodentes, overly early intervention may increase the risk of iatrogenic injury to the developing permanent tooth buds, whereas excessive delay may reduce the chances of spontaneous eruption of the affected incisor, especially when its apex is completely formed [1,5]. After removal of the eruptive obstacle, clinical and radiological follow-up is required to assess spontaneous eruption. If eruption does not occur within an appropriate interval and sufficient space is available on the arch, surgical exposure and orthodontic traction may be necessary [1,7].

An erupted mesiodens located on the midline raises an additional issue, as it may be associated with midline diastema and esthetic disturbances. Interincisal diastema may be physiological in the mixed dentition and may decrease spontaneously as eruption of the lateral incisors and permanent canines progresses [8]. However, when the space is maintained by a local etiological factor, such as a mesiodens, treatment should be directed toward removal of the cause and, when necessary, orthodontic treatment for space closure and incisor alignment [8,9]. In carefully selected cases, when the mesiodens is erupted, clinically stable and accessible for orthodontic bonding, it may be temporarily integrated into a fixed appliance as a passive

element, with the aim of controlling the anterior segment and reducing the period with an esthetically unfavorable space; this approach does not replace the indication for extraction, but represents an individualized orthodontic-surgical staging.

The aim of this paper is to present three clinical cases of mesiodens with variable impact on the eruption and position of permanent maxillary incisors. These cases illustrate different therapeutic approaches: initial observation followed by surgical extraction, surgical extraction indicated by functional symptomatology and risk to the adjacent permanent tooth, and a staged orthodontic-surgical approach in the case of an erupted mesiodens located on the midline. The paper emphasizes the importance of early diagnosis, appropriate imaging assessment and pediatric dental, surgical and orthodontic collaboration in the management of this dental anomaly of number.

2. Materials and method

This paper presents a case series of several mesiodens cases diagnosed in male pediatric patients, who were evaluated and treated through an individualized pediatric dental, surgical and orthodontic approach. The cases were selected due to the different clinical manifestations of the same dental anomaly of number and due to their variable impact on the permanent maxillary incisors.

The initial evaluation included anamnesis, intraoral clinical examination and imaging analysis. The anamnesis aimed to identify relevant medical history, trauma in the anterior maxillary region and possible familial history of supernumerary teeth. The clinical examination assessed the stage of dentition, the presence or absence of primary

incisors/root remnants, the degree of eruption of the permanent incisors, the presence of diastemas, vestibular displacements, rotations, palatal mucosal bulging or an erupted supernumerary tooth on the arch.

Imaging investigations were indicated according to the clinical situation. Panoramic radiography was used as an initial assessment method to identify the supernumerary tooth and to obtain a general evaluation of the dental relationships. Cone-beam computed tomography was used in cases where three-dimensional localization of the mesiodens and its relationship with the permanent incisors or cortical bone plates were necessary for establishing the therapeutic approach and planning the surgical intervention.

The therapeutic approach was established individually, taking into account the patient's age, dentition stage, morphology and orientation of the mesiodens, relationship with the permanent incisors, presence of symptoms, esthetic or functional impact and the need for orthodontic treatment. In the first case, the approach included initial postponement and monitoring of the possibility of spontaneous eruption of the permanent incisor, followed by CBCT examination and surgical extraction. In the second case, the palatal submucosal position, the close relationship with tooth 1.1 and the speech disturbances justified surgical extraction. In the third case, the erupted mesiodens was temporarily integrated into the fixed orthodontic appliance as a passive element, followed by simple extraction and continuation of orthodontic treatment for diastema closure.

Clinical and imaging data were anonymized. The images used in the paper

include panoramic radiographs, CBCT sections, intraoral photographs, and intraoperative or postoperative images, depending on the available documentation for each case. For the use of clinical and radiological images for scientific purposes, patient-identifying data were removed, and the cases were presented in accordance with the principles of confidentiality and informed consent.

3. Results

Case 1

A male patient, approximately 6 years and 4 months old at the time of the initial examination, presented for evaluation of an eruption disturbance in the anterior maxillary region. The main reason for presentation was the asymmetric eruption of the maxillary permanent central incisors, as tooth 2.1 had already erupted on the dental arch, while tooth 1.1 was not clinically present. The intraoral examination also revealed root remnants corresponding to the primary teeth 5.1 and 5.2. Tooth 6.1 was no longer present, which corresponded to the eruption of its permanent successor, tooth 2.1.

The patient had no known relevant medical history, associated syndromes, trauma in the anterior maxillary region or known familial history of supernumerary teeth. The clinical context, characterized by persistence of tooth 1.1 in an unerupted position in relation to the already erupted contralateral central incisor, raised the suspicion of a local eruptive obstacle in the anterior maxillary region.

The initial panoramic radiograph, taken in October 2022, revealed the presence of an impacted mesiodens in the anterior maxillary

region, in relation to tooth 1.1. The supernumerary tooth had a conical morphology and was positioned in an inverted orientation, with the crown directed superiorly toward the floor of the nasal cavity and the apex directed toward the alveolar crest. The mesiodens was located palatally, in relation to the mesial half of tooth 1.1. Due to its position, it was associated with alteration of the eruptive path of the maxillary right permanent central incisor, which showed a tendency toward labial displacement (Fig.1).

From the point of view of root development, the mesiodens showed a reduced degree of root formation. Tooth 1.1 had absent or incipient root development, while tooth 2.1 showed partial root development, with an open apex. Widening of the follicular space was observed around the crown of tooth 1.1. On the two-dimensional radiographic examination, the follicular space of tooth 1.1 and that of the mesiodens showed an intimate relationship, with difficult delimitation; therefore, three-dimensional evaluation was considered necessary in the next stage. Considering the patient's age and the early stage of development of permanent tooth 1.1, immediate surgical intervention was not chosen. Initially, the treatment approach consisted of postponing the intervention and monitoring the eruptive evolution, in order to assess the possibility of spontaneous eruption of tooth 1.1. Persistence of the unerupted position justified further investigation by cone-beam computed tomography, performed on February 14, 2023. The CBCT examination allowed three-dimensional evaluation of the position of the mesiodens, its relationship with tooth 1.1 and the palatal localization of the supernumerary tooth. Fig2.

In February 2023, surgical intervention was performed. During the same appointment, the root remnants of teeth 5.1 and 5.2, as well as the mesiodens, were extracted. Access to the supernumerary tooth required minimal bone removal. Intraoperatively, after extraction of the root remnants, the post-extraction sockets corresponding to teeth 5.1 and 5.2 were identified. Palatally, the radicular portion of the inverted mesiodens was observed, with its apex directed toward

the alveolar crest. The extracted supernumerary tooth was photographed and presented a conical morphology (Fig.3,4,5).

The postoperative evolution was favorable, with no intraoperative or postoperative complications. The patient was maintained under clinical and radiological follow-up to assess the possibility of spontaneous eruption of tooth 1.1 after removal of the eruptive obstacle.

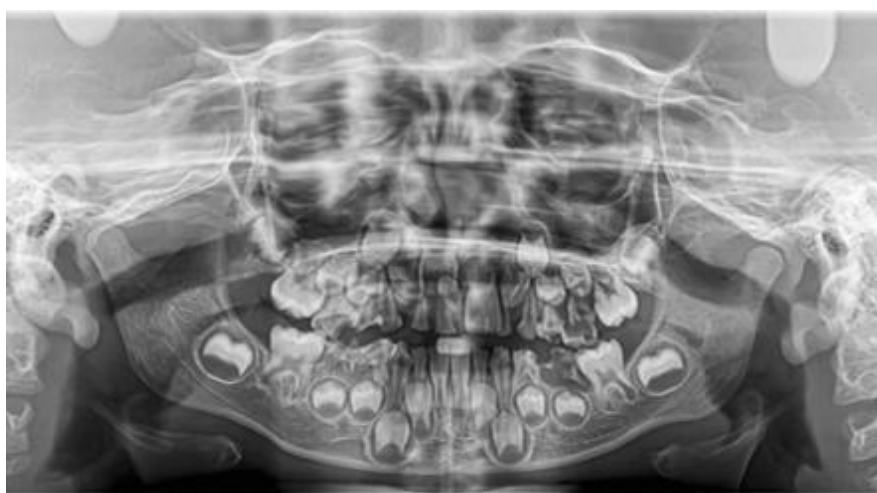


Figure 1. Initial panoramic radiograph, October 2022, showing the impacted, inverted mesiodens in relation to the unerupted tooth 1.1 and the root remnants of teeth 5.1 and 5.2.

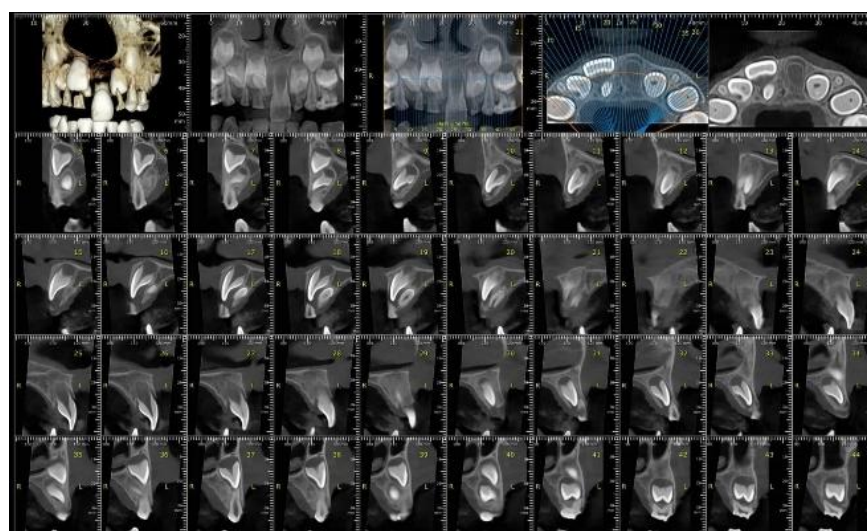


Figure 2. CBCT examination, February 2023, for three-dimensional evaluation of the position of the mesiodens and its relationship with tooth 1.1.



Figure 3. Intraoperative aspect after extraction of the root remnants of teeth 5.1 and 5.2, showing intraoral exposure of the radicular portion of the mesiodens and its inverted position.

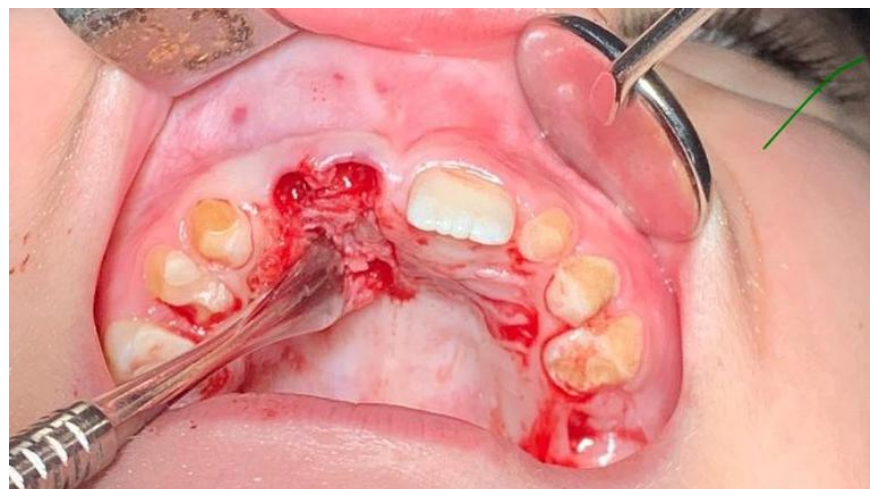


Figure 4. Intraoperative aspect showing the post-extraction sockets corresponding to the root remnants of teeth 5.1 and 5.2 and the palatal access toward the mesiodens.



Figure 5. Extracted mesiodens, with conical morphology.

Case 2

A male patient, approximately 7 years and 6 months old at the time of the first presentation, was referred for evaluation of an esthetic disturbance caused by the abnormal position of tooth 1.1. Intraoral clinical examination revealed that both maxillary permanent central incisors had erupted; however, tooth 1.1 showed labial displacement. A localized bulging was detected in the palatal fibromucosa, in the palatal region corresponding to tooth 1.1. The supernumerary tooth was not clinically visible in the oral cavity, being located submucosally.

The patient had no relevant medical history, no known trauma in the anterior maxillary region and no family history of supernumerary teeth. The palatal fibromucosal bulging, associated with the abnormal position of tooth 1.1, raised the suspicion of a supernumerary dental structure in the anterior maxillary region. The patient showed no signs of local trauma caused by the mesiodens; however, its palatal submucosal position was associated with speech disturbances.

The panoramic radiograph taken in May 2025 revealed the presence of a mesiodens in the anterior maxillary region. In order to clarify its three-dimensional position and relationship with tooth 1.1, CBCT examination was indicated and performed in July 2025. The three-dimensional examination confirmed the presence of a conical mesiodens positioned palatally to tooth 1.1, very close to the palatal cortical plate. The supernumerary tooth was located submucosally, a finding that correlated

clinically with the bulging of the palatal fibromucosa (Fig.6,7,8).

The mesiodens was obliquely oriented, forming an acute angle with the long axis of tooth 1.1 in the sagittal plane. Its crown was directed toward the alveolar crest. The supernumerary tooth had a fully formed root, with a closed apex. The relationship between the root of the mesiodens and the root of tooth 1.1 was very close, raising the suspicion of a risk of root resorption or persistence of the malposition of the maxillary right permanent central incisor.

Considering the palatal submucosal position, the bulging of the fibromucosa, the speech disturbances, the intimate relationship with the root of tooth 1.1 and the subsequent need for orthodontic treatment to align the incisors, surgical extraction of the mesiodens was indicated. In this case, simple monitoring was not considered the optimal approach, as the supernumerary tooth was not an asymptomatic structure without clinical impact, but was associated with functional manifestations and an unfavorable relationship with the adjacent permanent incisor.

The surgical intervention was performed in July 2025. No intraoperative photographs or images of the extracted tooth were available; therefore, case documentation was based on the clinical examination, panoramic radiograph and preoperative CBCT examination. The postoperative evolution was favorable. After removal of the mesiodens, improvement of the functional component was observed, particularly of the speech disturbance caused by the palatal prominence. The esthetic component, represented by the

labial displacement of tooth 1.1 and the disharmony of the anterior maxillary segment,

requires subsequent orthodontic treatment for alignment of the permanent incisors.



Figure 6. Panoramic radiograph, May 2025, showing the presence of the mesiodens in the anterior maxillary region.

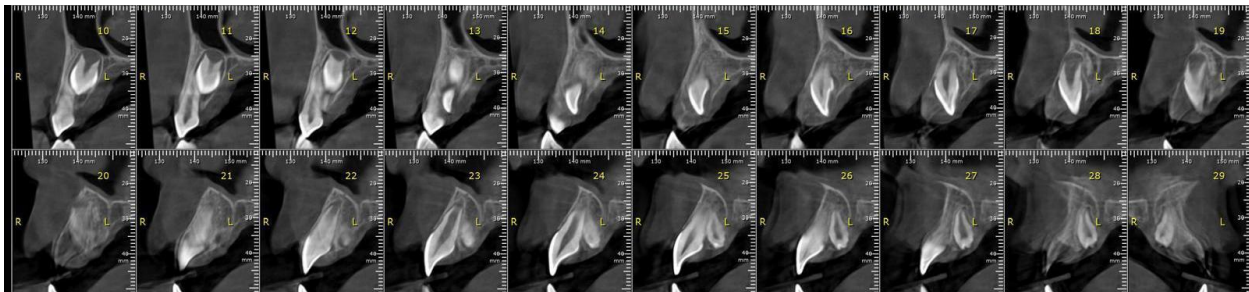


Figure 7. CBCT examination, July 2025, showing the palatal submucosal position of the mesiodens.

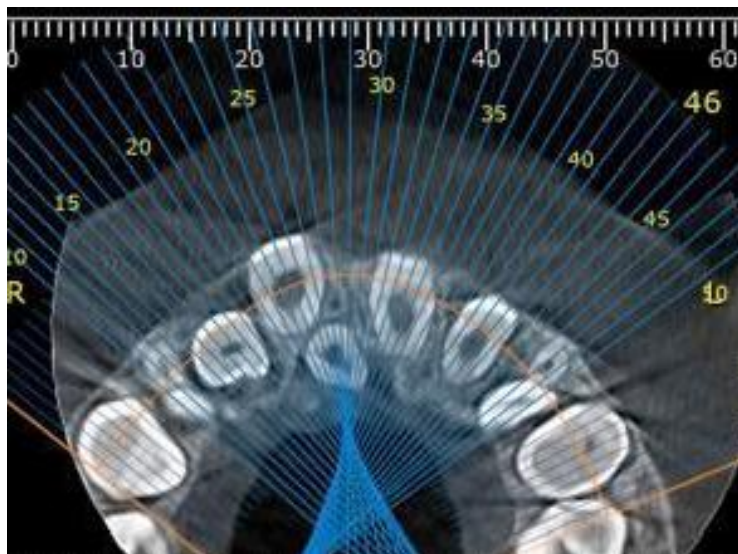


Figure 8. CBCT examination, axial section, showing the palatal position of the mesiodens and its relationship with tooth 1.1.

Case 3

A male patient, approximately 11 years and 6 months old at the time of orthodontic treatment initiation, presented with an erupted mesiodens on the dental arch, located on the midline between the maxillary permanent central incisors. The supernumerary tooth had a morphology similar to that of an incisor and was not conical. Its presence was associated with spaces between the mesiodens and teeth 1.1 and 2.1, resulting in an unaesthetic appearance of the anterior maxillary segment.

Unlike cases in which the mesiodens is impacted or submucosal and requires direct surgical removal, in this case the supernumerary tooth was fully erupted, clinically stable and accessible for orthodontic bonding. For this reason, a staged orthodontic-surgical approach was chosen. The initial objective was not the long-term preservation of the supernumerary tooth, but its temporary integration into the fixed orthodontic appliance as a passive element, in order to control the incisor segment and gradually reduce the adjacent interdental spaces.

Segmental orthodontic treatment was initiated in November 2017. Brackets were bonded on teeth 1.2, 1.1, the mesiodens, 2.1 and 2.2. The mesiodens was temporarily included in the fixed appliance together with the four maxillary permanent incisors. This staging allowed control of the anterior segment position and reduction of the spaces between the mesiodens and the central incisors. At the same time, the aim was to limit the period during which the patient would have presented with a visible and esthetically

unfavorable anterior space after extraction of the supernumerary tooth (Fig.9).

After approximately one month of segmental orthodontic treatment, reduction of the spaces adjacent to the mesiodens and a more favorable initial alignment of the incisor group were achieved. Temporary integration of the supernumerary tooth into the fixed appliance also produced initial orthodontic mobilization of the tooth, with the development of clinical mobility that facilitated the subsequent extraction.

The mesiodens was extracted by simple extraction, under local anesthesia, without intraoperative or postoperative complications. After extraction, the brackets were maintained on the four maxillary permanent incisors, and orthodontic treatment continued for closure of the remaining space and correction of the midline diastema. Approximately four months after extraction, a control radiograph was taken in April 2018, showing the post-extraction status after closure of the diastema between the central incisors and completion of the active treatment stage in the anterior maxillary segment (Fig.10,11,12).

This case illustrates a particular clinical situation in which an erupted mesiodens was temporarily used as a passive element in segmental orthodontic treatment before extraction. This approach allowed reduction of the initial spaces, facilitated extraction and shortened the period with a visible anterior post-extraction space, while treatment was subsequently continued to obtain esthetic alignment of the maxillary permanent incisors.



Figure 9. Intraoral aspect with brackets bonded on teeth 1.2, 1.1, the mesiodens, 2.1 and 2.2.



Figure 10. Intraoral aspect after extraction of the mesiodens, with brackets maintained on the four maxillary permanent incisors.



Figure 11. Extracted mesiodens.



Figure 12. Radiograph from April 2018, after closure of the diastema.

4. Discussion

The presented cases highlight the clinical variability of mesiodens and the need to adapt the therapeutic approach to the particularities of each patient. Although all three cases shared the presence of a supernumerary tooth in the anterior maxillary region, the clinical presentation, relationship with the permanent incisors and therapeutic implications were different. Thus, the first case was characterized by the presence of an impacted, conical and inverted mesiodens associated with delayed eruption of tooth 1.1; the second case presented a palatally positioned submucosal mesiodens, with functional impact and an intimate relationship with the root of the permanent incisor; while the third case illustrated an erupted form located on the midline, associated with interdental spacing and diastema, treated through a staged orthodontic-surgical approach.

The management of mesiodens cannot be standardized through a single approach applicable to all cases. The therapeutic decision must consider the position of the supernumerary tooth, its orientation, its relationship with the permanent incisors, the

patient's age, dentition stage, degree of root development, symptomatology and esthetic or functional impact. The literature describes mesiodens as a dental anomaly of number with variable manifestations, which may remain asymptomatic or may cause delayed eruption, ectopic eruption, midline diastema, rotations, inclinations, displacement of permanent incisors or local pathological complications [1,2,4,5]. For this reason, the mere radiological identification of a mesiodens does not automatically establish the indication for immediate extraction, but neither does it justify passive monitoring when signs of eruptive interference, functional impairment or risk to adjacent teeth are present.

In the first case, the young age of the patient and the early stage of development of tooth 1.1 justified the initial postponement of intervention and monitoring of the possibility of spontaneous eruption. This was an active approach, not a simple therapeutic delay, as the patient was followed clinically and radiologically, and persistence of the unerupted position led to further investigation by CBCT and subsequently to surgical

extraction of the mesiodens. The inverted position of the supernumerary tooth, its palatal localization and its relationship with the mesial half of tooth 1.1 represented important elements in establishing the surgical indication. In this context, CBCT had the role of clarifying the three-dimensional relationships and facilitating surgical planning.

Case 1 supports the idea that, in early mixed dentition, monitoring may be justified when there is eruptive potential of the permanent tooth and when immediate intervention may be postponed to avoid unnecessary risks. However, persistence of impaction, alteration of the eruptive path and the unfavorable relationship with the mesiodens shift the therapeutic balance in favor of extraction. The literature shows that removal of the eruptive obstacle may favor spontaneous eruption of permanent incisors, especially when adequate space is available on the dental arch and when the apex of the affected tooth is not completely formed [9,10]. Therefore, postponement must be accompanied by periodic reassessment, and the absence of eruptive progression requires reconsideration of the therapeutic approach.

The second case illustrates a different situation. In this case, the permanent central incisors had already erupted; therefore, the surgical indication was not related to allowing eruption, but rather to the local effects of the mesiodens on the position, function and biological risk of the adjacent permanent tooth. The mesiodens was palatal, submucosal, very close to the palatal cortical plate and caused bulging of the fibromucosa. In addition, the patient presented speech disturbances, and CBCT revealed a very close

relationship between the root of the mesiodens and the root of tooth 1.1. The presence of a closed apex at the level of the mesiodens and its proximity to the root of the permanent tooth supported the indication for surgical extraction.

This case emphasizes that a mesiodens may require removal even when it no longer produces an actual eruption disturbance. In such situations, the indication is supported by symptomatology, the risk to adjacent structures and interference with the orthodontic treatment plan. Monitoring would have been more difficult to justify, as the supernumerary tooth was not completely asymptomatic and was not without clinical impact. Furthermore, the palatal submucosal position and the speech disturbance added a functional component to the case, demonstrating that the management of mesiodens should not be related exclusively to incisor eruption, but also to patient comfort, function and harmonious development of the anterior segment.

The role of CBCT examination is evident in both the first and the second case. Panoramic radiography remains a useful screening method, but it has limitations in assessing the buccopalatal position and the exact relationships with the roots of permanent incisors. In cases where the supernumerary tooth is impacted, inverted, submucosal or in close relationship with permanent teeth, three-dimensional evaluation may provide essential information for choosing the surgical approach and reducing the risk of complications [3,6]. However, in pediatric patients, the indication for CBCT must be established individually,

by weighing the diagnostic benefit against the principle of reducing radiation exposure [6].

Case 3 brings into discussion a less common therapeutic particularity: temporary integration of an erupted mesiodens into a fixed orthodontic appliance. Usually, an erupted mesiodens located on the midline and associated with diastema is considered a local etiological factor that should be removed, followed by monitoring or orthodontic treatment for space closure [7,8]. In the presented case, the supernumerary tooth was fully erupted, clinically stable, accessible for orthodontic bonding and had a morphology similar to that of an incisor. These characteristics allowed its temporary inclusion as a passive element in the fixed appliance applied to the maxillary incisor segment.

The justification for this approach was not the preservation of the mesiodens as a definitive element on the dental arch, but the staging of treatment. By bonding brackets on teeth 1.2, 1.1, the mesiodens, 2.1 and 2.2, the aim was to reduce the spaces between the supernumerary tooth and the central incisors, control the anterior segment and limit the period with a visible anterior space after extraction. After approximately one month, reduction of the adjacent spaces and initial orthodontic mobilization facilitated the simple extraction of the mesiodens. Subsequently, the fixed appliance was maintained on the four permanent incisors for closure of the remaining diastema and stabilization of the esthetic result.

This approach should be interpreted as an individualized solution, not as a routine therapeutic protocol. Bonding a bracket on a mesiodens is not indicated in cases of

impacted, submucosal, unstable or symptomatic teeth, teeth in intimate relationship with incisor roots, or teeth associated with a risk of complications. In contrast, in carefully selected cases, when the mesiodens is erupted, accessible, stable and can be temporarily integrated without obvious biological risk, it may be used as a passive element in a preliminary orthodontic stage. Case 3 therefore highlights the importance of collaboration between the orthodontist and the surgeon, with the timing of extraction being chosen not only according to the presence of the supernumerary tooth, but also according to the biomechanical and esthetic objectives of treatment.

Comparison of the three cases shows that the management of mesiodens lies on a therapeutic spectrum. At one end are postponement and active monitoring, indicated in selected cases with eruptive potential and without acute symptomatology. At the other end is surgical extraction, indicated by eruptive interference, symptomatology, radicular risk or functional impact. Between these approaches, orthodontic stages may be integrated either after removal of the obstacle or, in particular situations, before extraction, for control of the space and of the anterior segment. The common element of all these approaches is the need for individualized treatment planning.

From a pediatric dental perspective, early diagnosis of mesiodens is essential, because signs such as asymmetric eruption, persistence of a primary tooth, midline diastema or palatal bulging may indicate the presence of a local obstacle. From a surgical perspective, planning must aim to remove the supernumerary tooth while protecting the

permanent incisors and adjacent anatomical structures. From an orthodontic perspective, removal of the mesiodens does not always guarantee complete spontaneous correction of incisor position, making it necessary to monitor eruption, maintain or create space and, in some cases, actively align the anterior segment.

Therefore, the three cases confirm that treatment of mesiodens must be guided by the real clinical impact of the supernumerary tooth, not only by its radiographic presence. Position, relationship with the permanent incisors, patient age, root development and orthodontic context represent decisive criteria for choosing between monitoring, surgical extraction and interdisciplinary treatment.

5. Conclusions

Mesiodens may present highly variable clinical manifestations, ranging from impacted forms associated with delayed eruption of permanent incisors to symptomatic submucosal forms or erupted forms associated with midline diastema. For this reason, its management must be individualized, based on clinical examination, radiological assessment and its relationship with the adjacent permanent teeth.

Early diagnosis is of major importance in pediatric dentistry, as it allows eruption disturbances to be identified before stable dental malpositions or local complications develop. Panoramic radiography is useful as an initial assessment method, while CBCT

becomes indicated in cases where three-dimensional localization of the mesiodens influences the therapeutic decision or surgical planning.

Active monitoring may be justified in selected cases, especially in young patients, when there is eruptive potential of the permanent tooth and when anatomical relationships do not require immediate intervention. However, persistence of impaction, alteration of the eruptive path, functional symptomatology, risk to the roots of permanent teeth or interference with orthodontic treatment represent indications for extraction of the supernumerary tooth.

Surgical treatment of mesiodens should not be considered in isolation. After extraction, monitoring of the evolution of the permanent incisors is necessary, and in cases where spontaneous alignment is insufficient, orthodontic treatment becomes essential. In particular situations, an erupted, stable and accessible mesiodens may be temporarily integrated into the orthodontic appliance as a passive element before extraction, in order to control space and reduce the period with an esthetically unfavorable diastema.

Dental pediatric, surgical and orthodontic collaboration represents the central element in the management of mesiodens. Choosing the optimal timing of intervention and adapting the treatment approach to each case may reduce the risk of complications, favor eruption or alignment of the permanent incisors and contribute to a favorable functional and esthetic outcome [11].

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No potential conflicts of interest concerning this study.

Data availability statement

Will be provided on request.

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