

Extraction of an impacted supernumerary mesiodens tooth in a child: a clinical case report

Exodontia de dente supranumerário tipo mesiodens impactado em paciente infantil: um relato de caso clínico

Extracción de un diente mesiodens supernumerario retenido en un niño: reporte de un caso clínico

DOI:10.34119/bjhrv7n3-072

Submitted: April 10th, 2024

Approved: May 01st, 2024

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ABSTRACT

Mesiodens are supernumerary teeth located between the central incisors, close to the midline; Generally, they have a conical shape, can be impacted, and cause aesthetic-functional imbalance of the stomatognathic system. It is essential to emphasize that early diagnosis, through clinical and complementary exams, provides an optimized therapeutic strategy. The aims of the present study were to report a clinical case on strategies used to delimit the surgical opportunity as well as operative procedures performed in the presence of impacted mesiodens in a child patient. An 11-year-old female patient presented to the dental clinic for evaluation of a mesiodens-type supernumerary tooth. During the clinical examination, no areas of swelling were evident that would indicate the presence of the supernumerary. During the complementary examination, carried out using a panoramic x-ray in semi-open occlusion and ConeBeam® computed tomography, a supernumerary tooth of the mesiodens type can be seen impacted between the roots of the permanent maxillary central incisors. The mesiodens had an intimate relationship with the superior cortex of the nasopalatine canal, promoting luminal stenosis and an intimate relationship with the floor of the nasal fossa. Exodontia was chosen as a therapeutic strategy. Management strategies were reinforced until the surgical procedure session. The patient and legal guardian received post-operative guidance, were monitored for 15 days after the procedure, and were informed of the importance of monitoring until complete rhizogenesis of the permanent maxillary central incisors. In conclusion, it is highlighted that the surgical opportunity needs to be well-defined.

Keywords: tooth, supernumerary, surgery, oral, child.

RESUMO

Os mesiodens são dentes supranumerários localizados entre os incisivos centrais, próximo a linha média; geralmente, possuem formato cônico, podem encontrar-se impactados e ocasionar desequilíbrio estético-funcional do sistema estomatognático. É impreterível ressaltar que o diagnóstico precoce, por meio de exames clínicos e complementares proporciona uma estratégia terapêutica otimizada. O objetivo do presente trabalho foi relatar um caso clínico sobre estratégias utilizadas para delimitação da oportunidade cirúrgica bem como procedimentos operatórios realizados na presença de mesiodens impactado em paciente infantil. Paciente do sexo feminino, 11 anos de idade, apresentou-se à clínica odontológica para avaliação de dente supranumerário tipo mesiodens. Durante o exame clínico, não foi evidenciado regiões de tumefação que indicassem a presença do supranumerário. Durante o exame complementar, realizado por meio de radiografia panorâmica em oclusão semi-aberta e tomografia computadorizada tipo ConeBeam® pode-se evidenciar dente supranumerário tipo mesiodens impactado entre as raízes dos incisivos centrais superiores permanentes. O

mesiodens apresentava íntima relação com a cortical superior do canal nasopalatino, promovendo estenose luminal e íntima relação com o assoalho da fossa nasal. Como estratégia terapêutica optou-se pela exodontia. Estratégias de manejo foram reforçadas até a sessão do procedimento cirúrgico. A paciente e responsável legal receberam orientações pós-operatórias, foram acompanhadas por 15 dias após o procedimento e foram orientadas da importância do acompanhamento até completa rizogênese dos incisivos centrais superiores permanentes. Em conclusão, destaca-se que a oportunidade cirúrgica precisa ser bem delimitada.

Palavras-chave: dente, supranumerário, cirurgia, oral, criança.

RESUMEN

Los mesiodens son dientes supernumerarios ubicados entre los incisivos centrales, cerca de la línea media; Generalmente tienen forma cónica, pueden impactarse y provocar desequilibrio estético-funcional del sistema estomatognático. Es fundamental resaltar que el diagnóstico precoz, a través de exámenes clínicos y complementarios, proporciona una estrategia terapéutica optimizada. El objetivo del presente trabajo fue reportar un caso clínico sobre las estrategias utilizadas para delimitar la oportunidad quirúrgica, así como los procedimientos operatorios realizados en presencia de mesiodens impactados en un paciente infantil. Paciente femenina de 11 años que acudió a la clínica dental para evaluación de un diente supernumerario tipo mesiodens. Durante el examen clínico no se evidenciaron áreas de hinchazón que indicaran la presencia del supernumerario. Durante el examen complementario, realizado mediante radiografía panorámica en oclusión semiabierta y tomografía computarizada ConeBeam®, se observa un diente supernumerario tipo mesiodens impactado entre las raíces de los incisivos centrales superiores permanentes. El mesiodens tenía una relación íntima con la corteza superior del canal nasopalatino, favoreciendo la estenosis luminal y una relación íntima con el suelo de la fosa nasal. Se optó por la exodoncia como estrategia terapéutica. Se reforzaron las estrategias de manejo hasta la sesión del procedimiento quirúrgico. El paciente y su tutor legal recibieron orientación postoperatoria, fueron monitoreados durante 15 días después del procedimiento y fueron informados de la importancia del seguimiento hasta la completa rizogénesis de los incisivos centrales superiores permanentes. En conclusión, se destaca que la oportunidad quirúrgica debe estar bien definida.

Palabras clave: diente, supernumerario, cirugía, bucal, niño.

1 INTRODUCTION

Quantitative dental anomaly characterized by excessive number of teeth in any dentition is known as supernumerary teeth or hyperdontia (Mallineni et al., 2014). Supernumerary teeth can occur unilaterally or bilaterally, be single or multiple (Mallineni et al., 2014). The etiology of the development of supernumerary teeth is unclear. However, it is estimated that environmental and genetic factors contribute to the tooth germ dichotomy and/or tooth lamina hyperactivity (Suda et al., 2010; Mallineni et al., 2014; Lu et al., 2017; Cammarata-Scalisi et al., 2018). The supernumerary teeth can also be classified as morphology in: conical, tuberculate, supplementary and odontomas (Mallineni et al., 2014). According to the location,

supernumerary teeth can also be classified as: mesiodens, parapremolar, paramolar, distomolar and predeciduous (Mallineni et al., 2014). The prevalence of supernumeraries is reported between 0.1% and 3.8% of the population, with the permanent dentition most affected (Syriac et al., 2017; Cammarata-Scalisi et al., 2018; Goksel et al., 2018; Zhao et al., 2021; Barham et al., 2022). The supernumerary mesiodens type is prevalent in 80% of all cases (Patil et al., 2013; Goksel et al., 2018; Zhao et al., 2021; Barham et al., 2022). They are mostly conical and smaller than the normal series incisors (Goksel et al., 2018; Zhao et al., 2021; Barham et al., 2022).

A retrospective study conducted by means of computed conical beam tomography was able to state that most mesioden-type supernumeraries are found mainly between the midlines of the central incisors (both crown and root) in the frontal plane, impacted and in contact with the central incisors in the sagittal plane, anterior to the nasopalatine canal and in contact with the nasopalatine canal in the axial plane (Goksel et al., 2018). Pragmatically, such findings in relation to the positioning of mesiodens-type supernumeraries impacted in children may presuppose unfavorable prognoses such as midline diastema, ectopic eruption of adjacent teeth, delayed eruption of adjacent teeth, cyst formation, root resorption, and impact on patient quality of life (Syriac et al., 2017; Goksel et al., 2018; Park et al., 2020). With the exception of the presence of a tooth cyst, the choice of surgical opportunity should be considered for mesioden-like supernumerary teeth in children and adolescents; the evolutionary stage of the rhizogenesis of the permanent teeth in anatomical adjoining state, awaiting at least two thirds of root formation should be evaluated in addition to the behavior (Park et al., 2020; Barham et al., 2022; Kong et al., 2022). Considering the frequency of mesiodens-type supernumeraries in the clinical practice of dentistry and individual characteristics of the affected patients, the objective of this study was to report a clinical case on strategies used to delimit the surgical opportunity as well as surgical procedures performed in the presence of impacted mesiodens in children.

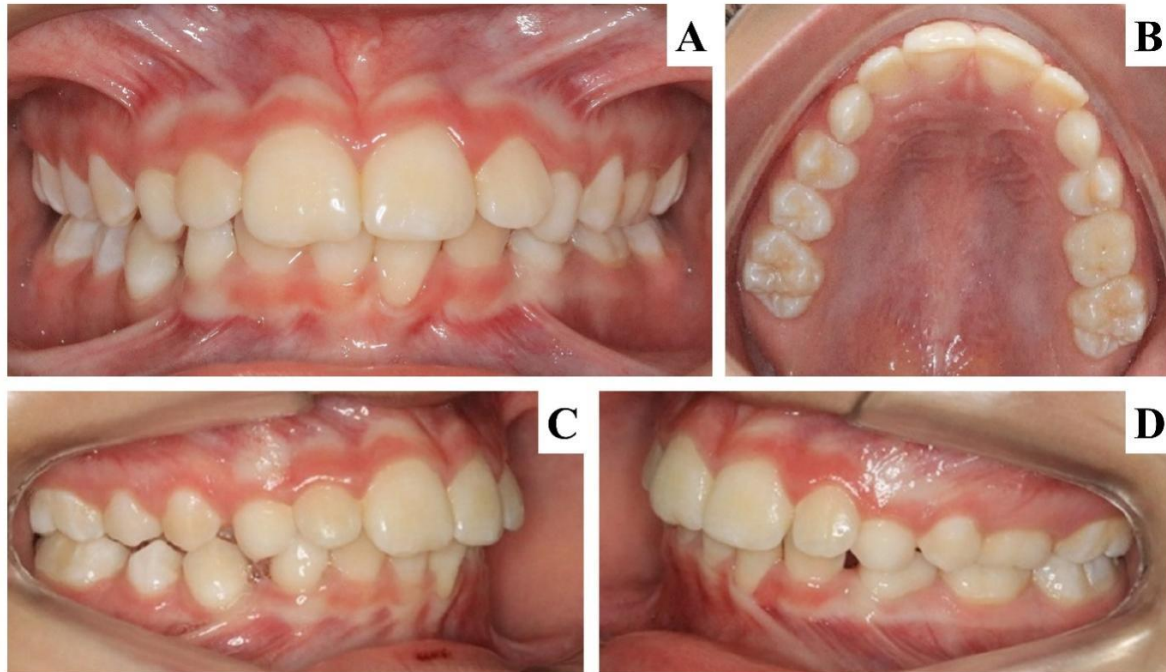
2 CLINICAL CASE REPORT

This case report was submitted to the Ethics and Research Committee of the Centro Universitário Presidente Tancredo de Almeida Neves (UNIPTAN) having been approved number of the opinion 6.273.047 and number of CAAE 73259423.3.0000.9667.

A female patient, 11 years of age, good general health, presented himself with his legal guardian to the Center of Medical and Dental Specialties (CEM) of the Centro Universitário Presidente Tancredo de Almeida Neves (UNIPTAN) referred for evaluation of supernumerary type mesiodens. During clinical examination, no swelling regions were found that could

indicate the presence of mesiodens (Figure 1).

Figure 1. Initial clinical appearance.

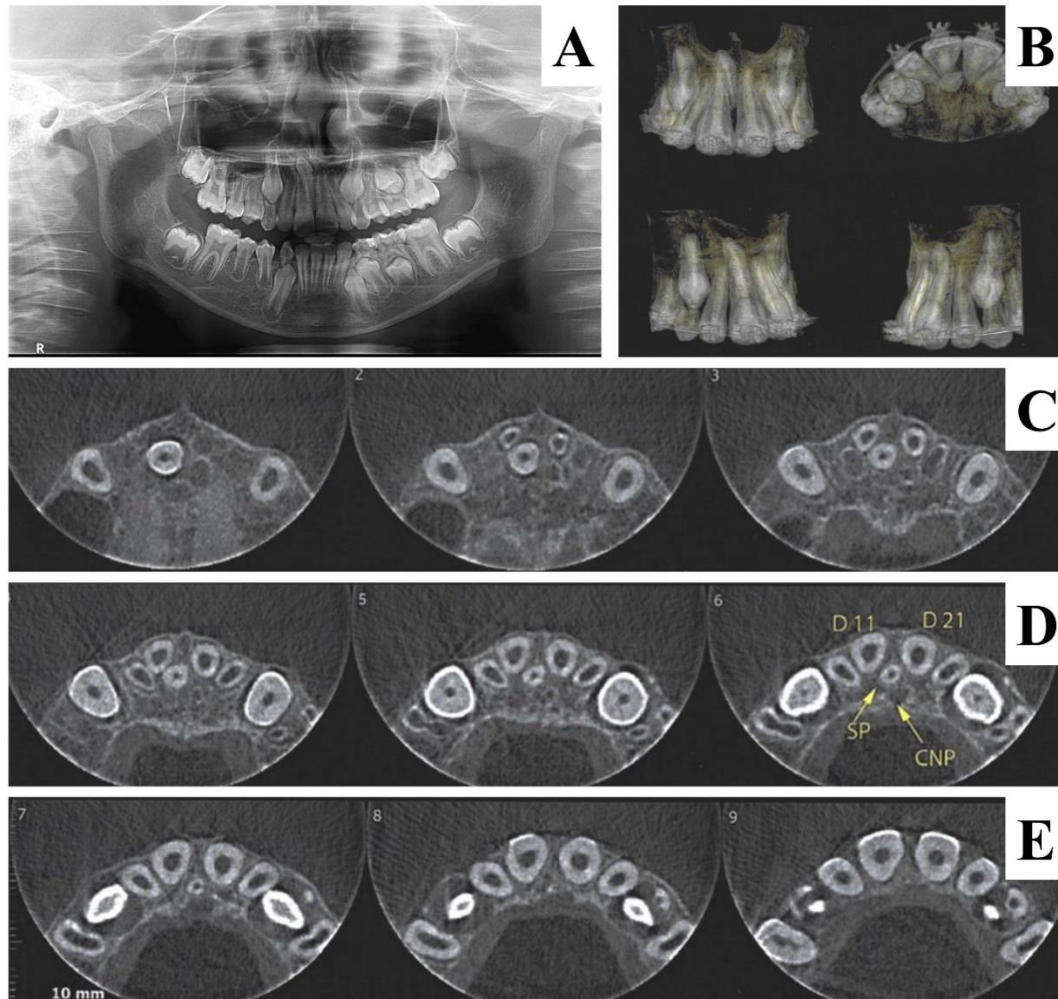


Legend: In A, the image demonstrates the patient's oral cavity in front view. In B, C and D the photographic shots were performed in front of an occlusal and lateral view. In the various images, the absence of swelling is noted, indicating the presence of mesiodens.

Source: The authors.

The patient had radiographic-type complementary tests - panoramic semi-open occlusion and computed tomography type Cone Beam® (Figure 2). The complementary examinations were then evaluated. Using a Cone Beam® computed tomography, it was possible to observe the presence of supernumerary tooth impacted between the roots of the permanent upper central incisors. The mesiodens also showed a close relationship with the superior cortical of the nasopalatine canal, promoting luminal stenosis and a close relationship with the floor of the nasal fossa. As a therapeutic strategy, the choice was made for the exodontics of mesiodens. It is worth noting that the patient demonstrated cooperative behavior during the entire initial visit. Management strategies were reinforced until the session of the surgical procedure.

Figure 2. Complementary two- and three-dimensional examination performed prior to the surgical procedure.



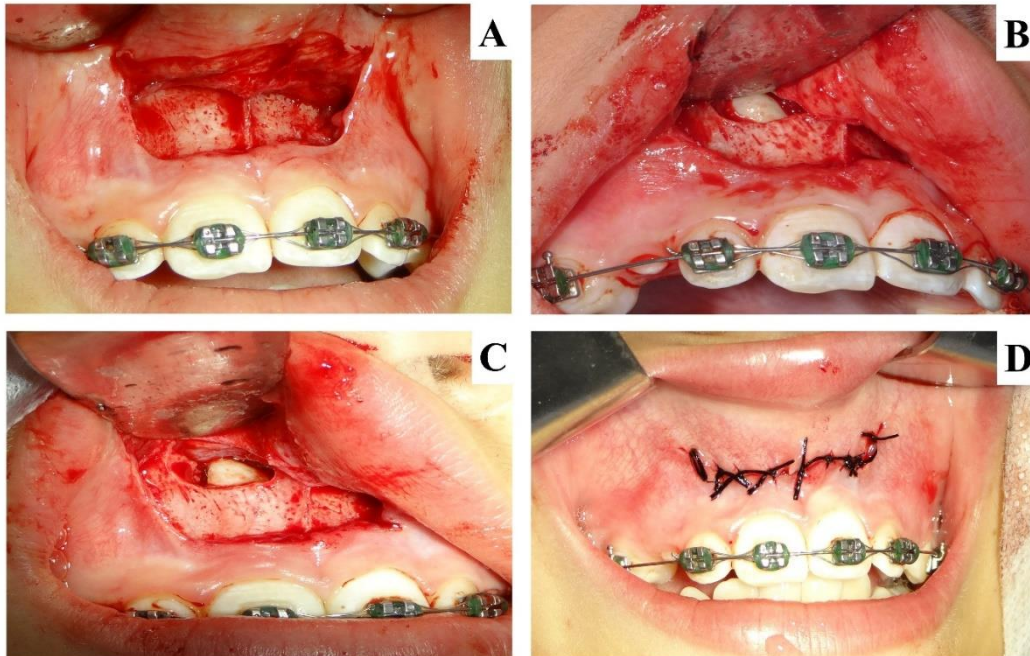
Legend: In A, notes the panoramic radiography in semi-open occlusion; the presence of the supernumerary type mesiodens can already be evidenced. In B-E, three-dimensional images can be observed using the ConeBeam® computerized tomography. In B, cuts are noted in axial view; in C-D, the axial cuts demonstrate the proximity of the mesiodens to the root apex of the right upper central incisor in the final stage of rhizogenesis.

Source: The authors.

The surgical procedure for exodontics of *mesiodens* was initiated by the patient's intra- and extrabuccal antiseptics with the alcohol-based povidone iodine solution. Thus, topical anesthesia was performed with 20% benzocaine (Benzotop 20%®, DFL, Rio de Janeiro, Brazil) and local anesthesia using lidocaine hydrochloride and epinephrine vasoconstrictor 1:100,000 (Alphacaine 2%, DFL, Rio de Janeiro, Brazil) in the anterior superior alveolar nerve³. The access was initially carried out by means of a Wassmund-type flap that has as its characteristic two relief incisions with 45° angulations diverging from the base of the flap per vestibular face. The flap detachment followed until the location of the piriform opening and nasal mucosa. An osteotomy was performed near the piriform opening on the right side with the aid of a low spherical rotation drill number 4 (Prima Dental by Angelus, Paraná, Brazil) (Figure 3). The supernumerary was removed with the aid of a straight apical lever number 304 (Quinelato, São

Paulo, Brazil). During the entire procedure, sterile saline was used to keep the mucosal tissue hydrated, as well as to cool the drill and bone tissue during osteotomy. The synthesis of the flap was carried out by means of simple and isolated sutures.

Figure 3. Surgical procedure for exodontics of mesiodens.



Legend: In A, Wassmund-type flap is noted with 45° angle diverging from the base of the flap by vestibular face; In B and C, osteotomy performed for access to the supernumerary mesiodens is noted. In D, immediate aspect after the exodontal procedure of mesiodens.

Source: The authors.

Post-operative pain control was performed with analgesic/anti-inflammatory medication - Ibuprofen 50 mg/ml, 28 likes, 6/6 hours for 2 days. The patient and legal guardian received postoperative guidance, were followed for 15 days after surgical procedures and were guided as to the importance of follow-up until complete rhizogenesis of the permanent upper central incisors.

3 DISCUSSIONS

The presence of a supernumerary can contribute significantly to aesthetic and functional imbalances in the child's development (Syriac *et al.*, 2017; Goksel *et al.*, 2018; Park *et al.*, 2020; Barham *et al.*, 2022). In view of its high prevalence and *its varied morphological presentations* (Patil *et al.*, 2013; Syriac *et al.*, 2017; Cammarata-Scalisi *et al.*, 2018; Gokselet *et al.*, 2018; ZhaoIntereet *et al.*, 2022), *it can be said that individualized protocols need to be proposed*. In the light of the above, the objective of the present study was to report a clinical case on strategies

used to delimit the surgical opportunity as well as surgical procedures performed in the presence of *mesiodens* impacted in children.

Mesioden-like supernumerary teeth are often found in children (Patil et al., 2013; Syriac et al., 2017; Cammarata-Scalisi et al., 2018; Gokselet al., 2018; ZhaoTempliset al., 2021). In a study conducted on 48,700 outpatient patients, 1.24% of patients presented with supernumerary teeth; patients aged 6 to 12 years were the most frequently diagnosed (Zhao et al., 2021). It may be suggested that such findings may be explained by the increased demand for orthodontic/orthopedic treatment at the age in question that require further imaging. It is also noted that, depending on the skill level of the dentist, it may be difficult to accurately interpret panoramic x-rays due to the overlap of various anatomical structures and the distortion, enlargement and reduction of structures during imaging. It is thus supposed that such a statement could echo in an even higher prevalence than that reported by the specific and related literature. In addition, other scientific evidence also shows a higher incidence in males (Syriac et al., 2017; Cammarata-Scalisi et al., 2018; Goksel et al., 2018; Zhao-Scalisset al., 2021). In particular, *impacted mesiodens* are most often seen in female individuals (Zhao et al., 2021) as also demonstrated by the present study. In addition to the silent imaginological findings in patients requiring orthodontic/orthopedic attention, it is noted that supernumeraries can also expose themselves already influencing displacement, rotation and normal dental eruption until even more serious complications, such as root resorption or abnormal root formation (Syriac et al., 2017; Goksel et al., 2018; Park et al., 2020). The *mesiodens* can affect adjacent vital structures, causing perforation of the nasopalatine canal, nasal floor, or cyst formation (Mossaz et al., 2014; Maddaloneet al., 2018). It is therefore important to understand the groups of risks as well as the signs that may suggest the presence of the supernumerary; it is hoped that the early reception of the patient can corroborate the harmonious development of the stomatognathic system.

Therapeutic strategies proposed for managing supernumerary permeate between surgical follow-up and removal (Wang et al., 2017; Barham et al., 2022; Kong et al., 2022; Liu et al., 2022; Koyamaet al., 2023; Yusa Secretarieset al., 2023). The follow-up decision, if appropriate, should be communicated to those responsible, warning that there may be changes in conduct based on future clinical and imaginological findings. Surgical removal decision is usually associated with preventing the process of permanent tooth eruption, diastema formation, asymmetries, and presence of tooth cyst. With the exception of the presence of a tooth cyst, the choice of the best time of intervention should still be considered in view of the evolutionary stage of rhizogenesis (Wang et al., 2017; Barham et al., 2022; Kong et al., 2022; Liu et al.,

2022; Koyama, et al.,2023; Yusa,et al., 2023). In patients with incomplete rhizogenesis, the periapical region is rich in mesenchymal cells essential to complete development; any trauma in this region can affect these cells impairing complete root development. Some scientific evidence suggests that delayed intervention after root development of adjacent permanent teeth can ensure patient cooperation and avoid iatrogenic damage during extraction (Gupta *et al.*, 2012). On the other hand, scientific evidence also shows that the longer the impaction time, the greater the possibility of cyst development beyond the high probability of developing complications in orthodontic/orthopedic treatment (Asaumi *et al.*, 2004).

Exploring such a theme, moment of intervention in cases of supernumerary teeth types *mesiodens*, Barhan *et al.* (2022) proposed a risk classification of postsurgical complications according to the point of contact between *mesiodens* and permanent tooth and the degree of rhizogenesis of adjacent teeth. The classification followed by dividing the sample into high, medium and low risk and indicates the possibility of safe extraction even at an early age. It is important to note that the evaluation of the patients was performed with the imaginological complementation of the computed tomography type ConeBeam[®]. The use of ConeBeam[®]-type computed tomography overcomes two-dimensional examination limitations, providing an accurate diagnosis. There is a shortage in the literature about the use of computed tomography in children. However, the study by Oenning *et al.* (2018), gathered information, according to DIMITRA (*dentomaxillofacial pediatric imaging: an investigation towards low-dose radiation induced risks*), that optimize and recommend strategies for the use of computed tomography in children. Among the main indications, the hyperdontia - supernumerary - is cited. It is worth pointing out that radiation dose care needs to be observed and calculated. The radiation dose in computerized tomography varies according to the brand name of the apparatus and the technical specifications selected during the procedure, such as field of vision, exposure time, milliamperage (mA) and kilovoltage (kVp). The maxilla region requires a lower dose of radiation (Oenning *et al.*, 2018), intensifying the requests for assessment of *mesiodens*. In our report we can say that the patient presented herself with high risk (Barham et al., 2022), agreeing with other scientific evidence, the well-planned surgical procedure demonstrates a satisfactory prognosis (Wang et al., 2017; Barham et al., 2022; Kong et al., 2022; Liu et al., 2022; Koyama,). It is expected that this report may assist future professionals in surgical planning in cases of *mesiodens*.

4 FINAL CONSIDERATIONS

There is a significant prevalence of *mesiodens* in children; impacts on the stomatognathic system can be described by both the presence of *mesiodens* and by therapeutic intervention. Thus, it is emphasized that the surgical opportunity needs to be well delimited.

ACKNOWLEDGMENTS

The authors thank the Coordination for the Improvement of Higher Level Personnel (CAPES-Brasil).

FUNDING

The research was carried out with financial support from the Coordination for the Improvement of Higher Level Personnel (CAPES-Brasil) - PDPG-POSDOC/Bolsa - nº 88887.755620/2022-00.

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