

REVIEWS

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Mesiodens as the Most Common Supernumerary Tooth – Literature Review

Meziodens jako najczęściej występujący ząb nadliczbowy – przegląd piśmiennictwa

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Abstract

Numerical anomalies in tooth development can manifest themselves either as a reduced (*hypodontio*) or increased number of teeth (*hiperdontio*). The most common anomaly concerning an increased number of teeth is the midline supernumerary tooth (mesiodens). Such an abnormality usually occurs in permanent dentition. It is located in the area between the central incisors of the maxilla and less frequently in the mandible. Mesiodens is diagnosed twice as frequently in boys than in girls. It is usually single; however, there are some cases of multiple mesiodens. A supernumerary midline tooth (*dens supernumerarius*) is characterized by an abnormal structure, shape and position. Mesiodens is a frequent cause of dental anomalies and malocclusion (proclination, retroclination and rotation of the central incisors, esthetic problems (diastema), delayed eruption of the incisors. This may cause pulp necrosis or root resorption. Treatment mainly calls for the extraction of the discussed teeth (**Dent. Med. Probl. 2013, 50, 4, 476–479**).

Key words: mesiodens, supernumerary tooth.

Streszczenie

Zaburzenia liczby zębów mogą dotyczyć zmniejszenia liczby zębów (*hypodontio*) oraz jej zwiększenia (*hiperdontio*). Najczęściej występującą nieprawidłowością dotyczącą zwiększonej liczby zębów jest ząb środkowy (*mesiodens*). Jest to anomalia, która występuje głównie w uzębieniu stałym. Dotyczy okolicy między siekaczami przyśrodkowymi szczęki, rzadziej żuchwy. Meziodens dwukrotnie częściej jest wykrywany u chłopców niż dziewczynek. Najczęściej występuje pojedynczo, ale zdarzają się przypadki z kilkoma meziodensami. Ząb środkowy jako ząb nadliczbowy (*dens supernumerarius*) charakteryzuje się nieprawidłową budową, kształtem oraz położeniem. Meziodens jest częstą przyczyną nieprawidłowości zębowych i okluzyjnych (wychylenia, przechylenia i rotacje siekaczy przyśrodkowych), zaburzeń estetycznych (diastema), zatrzymania wyrzynania zębów siecznych. Powoduje martwicę miazgi lub resorpcję korzeni. Leczenie opiera się głównie na ekstrakcji omawianego zęba (**Dent. Med. Probl. 2013, 50, 4, 476–479**).

Słowa kluczowe: meziodens, ząb nadliczbowy.

In their everyday practice, orthodontists frequently encounter a reduced number (*hypodontio*) or increased number of teeth (*hiperdontio*) causing malocclusion. Mesiodens is the most common supernumerary tooth. It is also called the midline supernumerary tooth or the conical tooth [1–4]. The frequency of mesiodens prevalence in various publications is slightly different. According to Janas et al. [5], it occurs in 0.5–0.7% of the population, whereas Janas [6] and Janas et al. [7] report the frequency in 0.1–3.5% of the population. Oth-

er authors state that the prevalence of mesiodens oscillates between 0.15% and 2.2% of the population [1, 2, 8–10]. An interesting fact is that mesiodens in Eskimo and Asian populations is very frequent – 0.77% and 7.8%, respectively [2]. Midline supernumerary tooth constitutes, according to various studies, from 21.1% to 67% of all supernumerary teeth [1, 3, 8]. Midline supernumerary teeth are located in the incisive bone between the central maxillary incisors. It is rarely found in the mandible [1, 2, 4, 5, 8, 10–14]. According to Polish

and foreign authors, such a location is found in 89–96% of the cases [5, 15–17]. Mesiodens occurs more frequently in males [1, 3, 4, 6–8, 11–13, 18–20]. The prevalence ratio in males in comparison with females is from 1.36 : 1 to 2.6 : 1 depending on geographical region [1, 8, 21]. The highest male-female prevalence ratio has been found in Eskimo people living in Alaska (4.00 : 1, respectively) and Chinese people (7.75 : 1, respectively) [8, 21]. A midline supernumerary tooth occurs mainly in permanent dentition [1–3, 5–8, 11, 12, 19, 20]. The presence of midline supernumerary teeth may coexist with such anomalies as: Apert, Marfan, Gardner, Franceschetti, Hallerman-Streiff, Crouzon or Down syndrome, cleidocranial dysostosis, as well as cleft lip and palate [1–3, 8, 11, 22, 23].

The etiology of midline supernumerary teeth still remains unknown. The available literature presents five theories on the origin of mesiodens:

1) Atavistic theory – mesiodens is a relic of primitive placental mammals having six incisors. The most frequent occurrence of mesiodens as a single tooth and in a shape other than a normal incisor makes some authors discard this theory. However, some of the researchers claim that the ancestors of placental mammals had three central incisors and mesiodens is a relic of the central incisor [1–3, 8];

2) Vascular theory – it says that the formation of the teeth in the anterior region can be caused by a persistent sphenopalatal artery, which should disappear during embryonic development [1, 2, 8];

3) Dychotomy theory – it states that mesiodens is created by splitting of the germ of the central incisor [1–3];

4) Polygenic inheritance theory – it is related to the genetic background, which suggests the prevalence of supernumerary teeth within a given family [1–3, 8, 24];

5) Local theory – hyperactivity of dental lamina. According to this theory, mesiodens is created from the residue of dental lamina or its active branches that could be caused by local factors such as: inflammation, scarring, pressure, injury or homeostasis disorders between dental lamina cells [1, 3, 8].

The long axis of mesiodentes can be horizontal, vertical or oblique. Inverted teeth erupting into the nasal cavity are often diagnosed [1, 5, 8, 11, 18, 20]. Usually, mesiodentes are positioned vertically and palatally in relation to the dental arch [1–5, 8, 9].

Midline supernumerary teeth can be divided into ones with shape and size similar to normal teeth (eumorphic form) and different in terms of shape and size (dysmorphic form). There are three main dysmorphic forms: conical, tuberculate and supplemental [1–3, 5, 8, 9, 18]. Conical forms are

characterized by a full root, palatal location and small size. They usually erupt into the oral cavity. Tuberculate forms rarely erupt into the oral cavity, have a tuberculate shape and, unlike supplemental midline supernumerary teeth, which come in forms similar to premolars, they have no developed roots [1, 2, 8, 18]. All of the above forms can cause impaction of permanent dentition [1, 2, 8]. Most of the authors state that the most common form is conical, then tuberculate and supplementary [9, 15, 25]. Studies conducted between 2007 and 2009 in 53 patients of the Faculty of Dental Surgery of the Medical University of Lodz showed that the most common form is conical, then the eumorphic [9].

In deciduous dentition, supernumerary teeth located in the anterior part of the maxilla, less prevalent than in permanent teeth, usually erupt. They are diagnosed during clinical examination. Their shape is similar to normal teeth and they have enough space in the dental arch. The presence of a mesiodens in deciduous dentition can be followed by the occurrence of a mesiodens in the later stages [15].

Mesiodens can affect the eruption of permanent central incisors of the maxilla. It causes such dental problems as proclination, retroclination, mesial and distal inclination, or rotation of the incisors. Pathological diastema may suggest an impacted midline supernumerary tooth. An impacted mesiodens can cause dentigerous cysts and the resorption of neighbouring roots as well as the destruction of surrounding tissues [1, 2]. An erupted midline supernumerary tooth causes crowding of the incisors, displacement of the midline, asymmetry of the dental arch and malocclusion. It can also cause dental caries, inflammation and esthetic issues [11].

A thorough clinical examination followed by x-ray examination plays a key role in the diagnosis of mesiodens in permanent dentition. Only 25% of mesiodentes erupt into the oral cavity. They appear in 6–7 year old children before the development of the central maxillary incisors [1, 2, 4, 5, 15, 26]. Apart from traditional panoramic radiographs, occlusal and dental radiographs, a CT scan may prove helpful in determining the treatment plan [4, 5, 8, 18, 27, 28]. Computer tomography can help the dental surgeons and orthodontists to determine the exact position of a mesiodens with regard to neighboring anatomical structures and the structure of the mesiodens itself, as well as to choose the best recommendations for surgical and orthodontic treatment [15]. The problem of high doses of ionizing radiation and CT scan costs was solved in 1997, when the first cone beam computed tomography (CBTC) was introduced [29].

Treatment of patients with supernumerary teeth (mesiodentes) depends on the development of the patients' teeth. Supernumerary teeth in primary dentition that do not cause any problems are rarely extracted due to the risk of damaging permanent tooth germs and a lack of negative effects on further tooth development. Surgical treatment of mesiodentes that prevent the eruption of permanent incisors is undisputable. Other indications for extraction include dentigerous cysts and resorption of the incisor roots. According to Kuroł, affected midline teeth, that cause no developmental problems or resorption of central incisor roots and have enough space in the midline, can be left without surgical intervention. Their spontaneous resorption is quite common. There are cases of eruptions of impacted mesiodentes, making ex-

traction easier [26]. If an impacted mesiodens is left in place, it needs a radiological follow-up. In exceptional cases, supernumerary teeth may be used to replace missing teeth after their orthodontic guiding into the dental arch with a fixed appliance [10].

The presented data show that mesiodens is the most common form of the supernumerary tooth. The treatment plan for patients with supernumerary teeth requires thorough clinical and x-ray examination, as well as close cooperation between dental surgeons and orthodontists. Due to the varied structure and location of supernumerary teeth and their vague etiology, each case should be approached individually. Thanks to constant development of science and technology, results of mesiodens treatment continue to improve.

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