

# CLINICAL CASES

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## Epidemiology and Etiological Factors which Influence the Occurrence of Rare Cases of Double Teeth in Primary and Permanent Dentition and Presentation of Two Individual Clinical Cases

### Epidemiologia oraz czynniki etiologiczne wpływające na występowanie rzadkiego zjawiska zębów dwoistych w uzębieniu mlecznym i stałym oraz prezentacja dwóch przypadków klinicznych

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#### Abstract

Dental anomalies appear as a result of disorders (partial or excessive development) which occur during different stages of tooth development. Among them, the following disorders can be distinguished: concerning anatomical structure (size and shape), position, structure of tissues and number of teeth. The occurrence of double teeth in primary dentition may precede dental abnormalities in permanent dentition. Fused as well as conrescent teeth are the cause of occlusion disorder. They can be the cause of protrusion and rotation of teeth. A fused permanent central incisor brings about the development of a diastema. Conrescent, fused or giant teeth in the maxilla can contribute to the occurrence of class III defect within the canines as well as tooth eruption outside the dental arch. Furthermore, dental anomalies might cause periodontal problems as well as more frequent occurrence of carries and difficulties in endodontic treatment, but above all they disturb the harmony of the dental arch. Therefore, a plan to orthodontically remodel the dental arch as an integral part of the complex treatment of patients with these types of dental anomalies is very important.

The aim of the paper is the introduction of the current state of knowledge concerning the epidemiology and etiological factors which influence the development of dental abnormalities in primary and permanent dentition, with particular attention to double teeth, as well as the presentation of two individual clinical cases (*Dent. Med. Probl.* 2014, 51, 4, 531–536).

**Key words:** fused teeth, double teeth, tooth abnormalities.

#### Streszczenie

Nieprawidłowości zębowe powstają w następstwie zaburzeń (niecałkowity lub nadmierny rozwój) występujących w różnych stadiach rozwoju zęba. Wśród nich wyróżnia się zaburzenia dotyczące budowy anatomicznej (wielkości i kształtu), położenia, struktury tkanek oraz liczby zębów. Występowanie zębów podwójnych w uzębieniu mlecznym może poprzedzać nieprawidłowości zębowe w uzębieniu stałym. Zarówno zęby złane, jak i zrosnięte są przyczyną zaburzeń zgryzowych. Mogą także być przyczyną wychylenia i obrotów zębów. Zęby zrosnięte, złane czy olbrzymie w szczęce mogą powodować występowanie wady klasy III w obrębie kłów, wyrzynania się zębów poza łukiem zębowym, problemy periodontologiczne, a także częstsze występowanie próchnicy oraz trudności w leczeniu endodontycznym. Przede wszystkim jednak zaburzają harmonię łuku zębowego. W związku z tym jest ważny plan ortodontycznej przebudowy łuków zębowych jako integralnej części kompleksowego leczenia pacjentów z tego rodzaju anomaliami uzębienia.

Celem pracy było przedstawienie aktualnego stanu wiedzy dotyczącej epidemiologii oraz czynników etiologicznych powstawania nieprawidłowości zębowych w uzębieniu mlecznym i stałym, ze szczególnym uwzględnieniem zębów dwoistych oraz prezentacja 2 własnych przypadków klinicznych (*Dent. Med. Probl.* 2014, 51, 4, 531–536).

**Słowa kluczowe:** zęby złane, zęby dwoiste, nieprawidłowości zębowe.

An increased number of teeth (hyperdontia) is an after-effect of dental lamina hyperfunction. It is supposed that stresses in the maxillary and premaxillary bone which cause the splitting of dental lamina might be the factors stimulating the lamina to action. However, a decreased number of teeth (hypodontia) is an expression of the comprised activities of dental lamina, probably due to developmental disorders within an ectoderm, systemic disorders, local damaging factors (injuries, osteitis) or heredity [1–3].

Jansen advanced a hypothesis about the possibility of survival concerning the dental lamina which is not resorbed and that brings about an extended time of the ability to create new teeth. In proper conditions, the division of dental lamina and development of primary teeth germs fall in the 14–19 week of fetal life. Permanent teeth germs are formed between 3 and 27 months after birth: the first permanent molar teeth in the 32<sup>nd</sup> week of fetal life whereas the third permanent molar teeth form during the 8<sup>th</sup>–9<sup>th</sup> year of life [4, 5]. A detailed and explicit classification of some anomalies is problematic because of the origin and types of damaging factors as well as the nature of the induced anatomopathological changes.

## Structure Disorders

Double teeth are a dysfunction related to an increase in tooth size. Fused, concrescent and geminate teeth are included in this group. Such disorders might be genetically conditioned. It is assumed that genetic inheritance is conditioned by an autosomal recessive gene or a dominant gene of very little penetration. Moreover, the following reasons for this abnormality are provided: parents' Rh factor incompatibility, contagious diseases or mental illnesses, vitamin deficiency, severe mechanical injuries, hypervitaminosis A, systemic diseases, endocrine diseases or disease syndromes. A disorder might occur in any segment of dental arches but it refers most frequently to anterior teeth, mainly in the mandible [6]. Bilateral occurrence of double teeth is observed in 0.02% of the population [6, 7]. They are tripled much more rarely than doubled and it affects 0.02% of children [8, 9]. Double teeth appear more often in primary than permanent dentition and it is estimated that they appear in 0.5–0.8% of the population. A double milk tooth can be connected with aplasia of its permanent successor. It happens that the double teeth roots indicate a delayed physiological resorption which consequently recesses an eruption of a permanent tooth. Double teeth develop mainly within incisors, therefore if this disorder

refers to permanent teeth, it generates severe esthetic problems.

According to Schuurs [10], double teeth can accompany some disease syndromes:

- in achondrodysplasia – incisors are fused with supplemental teeth,
- in chondroectodermal dysplasia – within primary teeth,
- in Cornelia de Lange syndrome – fused inferior incisors,
- in Ekman-Westborg-Julin dysplasia – geminated central maxillary incisors,
- in Gorlin-Goltz syndrome – fused milk teeth and geminated teeth,
- in Albers-Schonberg disease – fused milk incisors,
- in Russell-Silver syndrome – double primary molars,
- in Wolf syndrome – fused primary incisors,
- in VECTERL syndrome – fused primary anterior teeth.

Concrescent, geminate and fused teeth (*dentes concreti*) concern primary as well as permanent teeth. Concrescent teeth are characterized as permanent and primary teeth which have separately developed crowns connected within enamel with preserved distinct pulp chambers but conjoined through their roots. The frequency of concrescent teeth occurrence in primary dentition amounts to 1%, while in permanent dentition it is 0.1% [11]. The condition belongs to the group of developmental defects which occur as a result of disorders of odontogenesis. As a result of bony septum destruction, a migration and crowding of adjacent tooth germs occurs. During formation of the roots, they undergo concrescence by cementum. The union of the two teeth follows the shaping of tooth crowns or occurs later, during or after root formation. In an X-ray picture, the concrescent teeth have two separate pulp chambers and distinct root canals. The union of typically shaped teeth with supplemental teeth of similar to proper structure or with deformed supplemental residual teeth might occur [12]. Concrescent teeth may coexist with other birth defects such as syndactylism, squint, fingernail deformation and systemic diseases, e.g. primary syphilis. In some syndromes of birth defects, concrescent teeth are considered a permanent syndrome, in dysostosis among other things. The union of dental roots may occur in the course of hypercementosis [13, 14], i.e. an excessive buildup of cementum on the tooth surface which is caused by inflammatory disorders and occlusion disorders as well as Paget's disease or hyperpituitarism.

Fused teeth (*dentes confusi*), are formed as a result of the union of two or more tooth germs. Initially they develop separately but in the final

stage they become joined together by the same layer of enamel or enamel and root dentin [11]. They have a joint, wide pulp chamber and the same root canal. The fused teeth take as much space in the dental arch as two teeth. In such cases, a radiograph reveals one wide pulp chamber, sometimes with the protrusion of the dentin into the lumen of the chamber in the place of tooth germ fusion, as well as one wide root canal. The fused teeth resemble a giant tooth with a disproportionately large crown. On the basis of the research carried out, the presence of a double gingival garland around both parts of the fused tooth has been reported [15]. In research considering primary dentition, Ravn [16] has found the occurrence of fused teeth in 0.9% of examined cases.

Connate teeth (*dentes geminate*) develop as the result of one tooth germ division or the union of proper with supernumerary tooth germs. They have two crowns and one root but occur in the dental arch as one tooth. It is a developmental defect consisting of splitting off a tooth germ in the early stage of development, during the shaping of the crown [17]. According to Szpringer-Nodzak [18], a tooth with a wide crown which is split by a vertical groove on the labial surface is formed as a result of this disorder. Radiological examination shows the same pulp chamber. The enamel and dentin of the geminate teeth may not be fully developed or might be less calcified. The presence of connate teeth in primary dentition indicates greater probability of its occurrence, which is also in permanent dentition. Permanent double teeth create esthetic as well as functional problems which require specialist treatment. It is difficult to distinguish between a geminate tooth and a clinically fused tooth, especially in the case of fusion of a proper and supplemental tooth [18].

## Consequences of Double Tooth Presence

The occurrence of double teeth in primary dentition may precede dental abnormalities in permanent dentition [17, 19]. Fused as well as conrescent teeth are a cause of occlusion disorder. They result in tooth crowding, mainly when conrescence or fusion occurs in the case of a supplemental with a proper permanent tooth. They can be the cause of a protrusion and rotation of teeth. A fused permanent central incisor brings about the development of a diastema. Conrescent, fused or giant teeth in the maxilla can contribute to the occurrence of class III defect within the canines as well as tooth eruption outside the dental arch. Furthermore, these dental anomalies might cause

periodontal problems as well as more frequent occurrence of carries and difficulties in endodontic treatment, but above all, they disturb the harmony of the dental arch. Therefore, a plan for orthodontic remodeling of dental arches as an integral part of a complex treatment of patients with these types of dental anomalies is very important [12]. Conrescence of teeth within the root cementum brings the risk of breakage in the *lamina dura* during their extraction. If double teeth are not diagnosed before an extraction, some complications may occur in the form of maxillary tumor or the development of a junction between the oral cavity and maxillary sinus.

## Radiological Assessment

In numerous cases, a diagnosis of conrescent teeth is based on a radiological examination. The dental roots thickening and the lack of periodontal space within an area of cementum union is then noted. According to Whaites et al. [19], the differences between fused and conrescent teeth can be affirmed only through radiological examination, which can reveal the presence of two separate chambers and two root canals. The authors draw attention to the fact that it cannot be stated merely on the basis of a radiological picture if conrescent teeth are connected solely by cementum.

Differential diagnosis of double teeth still causes severe difficulties. According to Mitrega and Krzycka [20], it is not possible to classify double teeth into one of the groups of dental anomalies (fused, conrescent or geminate teeth) solely on the basis of clinical image. The radiological picture as well does not always provide a full and final answer as far as the type of anomaly is concerned.

## Treatment Procedure

The medical procedure in the case of these types of dental anomalies is individual and it depends on the occlusal conditions and the state of the patient's dentition as well as aesthetic predispositions.

In a paper concerning methods of procedure with conrescent teeth, Czarnecka et al. [12] presented three routes of procedure:

- 1) extraction of the conrescent tooth and migration of adjacent teeth in its place;
- 2) extraction of unfavorably situated adjacent teeth and leaving the fused tooth in the dental arch;
- 3) filing of the conrescent tooth in order to make the shape of its crown like a typical tooth.

Badełek-Mirek [21] proposed somewhat different methods of procedure in the case of maxillary conrescent incisors i.e. dilatation of the superior dental arch in order to insert upper incisors and drifting and tipping of atypical teeth as well as an extension of the anterior maxillary segment. However, in the aftermath of applying this method, a diastema in the mandible appeared and the aesthetic result was questionable. Another method consisted of extraction of the upper lateral incisors. That method turned out to be not worth recommending because of the necessity of proper tooth extraction and leaving out disfiguring atypical teeth. The third variant recommended by the author consisted of an extraction of fused central incisors before the eruption of teeth 12 and 22. In such a procedure, the necessity of balancing extractions in the inferior dental arch needs to be taken into consideration. In some cases, it can be decided to extract atypical teeth and to have a mobile prosthetic restoration until the final occlusive conditions develop as well as subsequent permanent restoration. In the therapeutic process, a tendency dominates to apply surgical methods associated with the orthodontic procedure [11, 12]. In about 50% of patients with double primary teeth, different kinds of developmental disturbances of permanent teeth are also observed: hypodontia, hyperdontia, giant and pegged teeth as well as dens invaginatus. Brook et al. [3] as well as Gazit et al. [22] affirmed a difficult eruption of permanent successors of double teeth due to the asymmetric resorption of their roots. Apart from the extraction of double teeth, attempts to separate and treat them by a formocresol amputation method has been made [23].

## Case Reports

### Patient 1

The patient, 23 years old, came to the Chair and Department of Oral Surgery in Lublin due to painful ailments in the area of the third molar tooth on the left side of the mandible. The pain, radiating towards the neck, nape and left ear, persisted for 3 days. In the medical inquiry, the patient did not report any systemic diseases. During an extraoral examination, a painless enlargement of the submandibular lymph nodes on the left was noted. During an intraoral examination, some flushing and swelling of the gingiva which covers the mastificating surface of the partly-erupted tooth 38 were noted, as well as purulent discharge from its gingival pouch. On the basis of the clinical symptoms and results from the survey, an initial diagnosis was made: syndrome of the difficult eruption of tooth 38. The patient was scheduled for a panoramic X-ray (Fig. 1). The radiological image showed the presence of a double tooth in the place of the third inferior molar on the left and the presence of a supernumerary tooth in the maxilla – 29. The decision of tooth extraction was made because of persistent pain. The incision was performed under the conduction and infiltration anesthesia Ubistesine Forte as well as exfoliation of the angular mucoperiosteal flap in the area of tooth 37–38. The tooth extraction was performed with the use of elevators and drills. Knotted sutures were put on the post-operative wound. The patient was advised antibiotic therapy, Clindamycin MIP® 600 twice a day. The healing of the wound proceeded without complications and the stitches were removed after 7 days.



Fig. 1. A panoramic X-ray of a 23-year-old patient

Ryc. 1. Zdjęcie pantomograficzne 23-letniego pacjenta

## Patient 2

The patient, (female) 28 years old, reported to the Chair and Department of Oral Surgery in Lublin due to painful ailments which intensified periodically, most probably concerning difficult eruption of the left inferior wisdom tooth. On the survey, the patient reported some pain persisting for a few days and radiating towards the left ear as well as the absence of systemic diseases. During an extraoral examination, a small swelling of the submandibular area and trismus II° were noted. Intraorally, the visible crown part of the part-

ly unerupted tooth 38 was affirmed. A panoramic radiogram proved the presence of a tooth with clearly enlarged crown and horizontal impaction, which may suggest the presence of a fused or geminate tooth (Fig. 2). The decision was made to extract tooth 38. The surgical extraction of tooth 38 was performed under infiltration and conduction anesthesia 2% Lignocaine with 0.00125% noradrenaline through an angular incision in the area of teeth 37–38. Knotted sutures were put on the postoperative wounds and antibiotic therapy – Clindamycin MIP 600 twice a day – was advised. The healing proceeded without complica-



Fig. 2. The panoramic radiogram which may suggest the presence of a fused or geminate tooth

Ryc. 2. Zdjęcie pantomograficzne sugerujące obecność zęba zlanego lub bliźniaczego

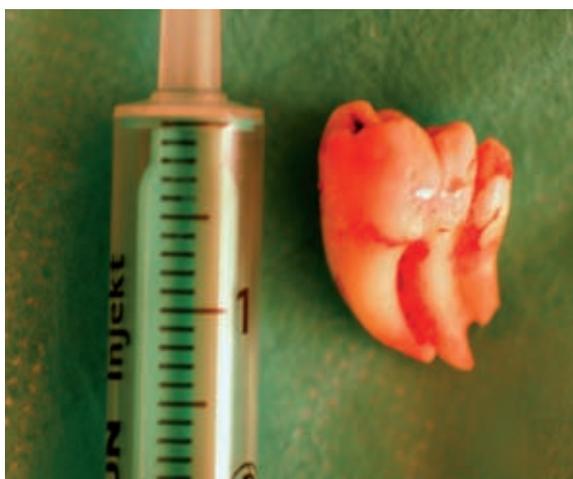


Fig. 3. The removed tooth suggests a diagnosis – a geminate or fused tooth

Ryc. 3. Usunięty ząb sugerujący diagnozę – ząb zlaný lub bliźniaczy

tions. The stitches were removed after 7 days. The analysis of the removed tooth suggests a diagnosis: a geminate or fused tooth (Fig. 3).

## Conclusion

Dental abnormalities concerning the structure and number of teeth require early diagnosis in order to plan the suitable, specialist procedure which is optimal for each case. The disturbances are diagnosed on the basis of clinical evaluation of dental arches and radiological diagnosis. Sometimes the clinical image is questionable as to the classification of a case into the appropriate group of dental anomalies. Some authors state that clear-cut diagnosis can be made only after the analysis of tooth cuts under an electron microscope [20, 21].

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