

**IMPACTED CONNATE SUPPLEMENTAL TOOTH EVALUATED BY  
CONE BEAM COMPUTED TOMOGRAPHY**

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**T**he connate tooth is a rare developmental anomaly that refers to two teeth united together. The connate tooth is more commonly referred to as double teeth. Supernumerary teeth are additional teeth that may not resemble the morphology of teeth and may occur in any region of the dental arch. Cone-beam computed tomography helps diagnose and visualize concrescence. Diagnosing this rare developmental anomaly is challenging since it occurs beneath the gingival margin. Cone-beam computed tomography helps identify and plan treatment for such concrescence of impacted supplementary teeth to prevent postoperative surgical complications such as maxillary tuberosity or oroantral fistula fracture.

**Purpose.** To present and detect a case of a rare developmental tooth anomaly an impacted connate supplemental tooth by CBCT (Cone Beam Computed Tomography) and its treatment.

**Materials and Methods.** The article presents a rare clinical case of a connate tooth in which fusion and concrescence between two impacted supplemental teeth in a 36-year-old male diagnosed using cone-beam computed tomography. CBCT data is presented, which reveals the position of complex anomaly. The clinical significance of CBCT in diagnosing complex supernumerary teeth and its treatment was described.

**Results.** CBCT is essential and helps identify the exact three-dimensional location of rare pathologies such as impacted connate supernumerary teeth.

**Discussion.** CBCT helps precisely locate the position of an impacted connate supplemental tooth. The use of CBCT preoperatively helps to locate complex supernumerary teeth and surgical treatment planning.

**Conclusion.** Cone-beam computed tomography is essential for the identification and exact three-dimensional location of impacted complex supernumerary teeth for surgical treatment planning. Dentists must have a sound knowledge of rare developmental tooth anomalies such as impacted connate teeth with fusion and concrescence.

Keywords: supernumerary teeth, concrescence, fusion, double teeth, connate teeth.

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## РЕТЕНИРОВАННЫЙ СРОСШИЙСЯ СВЕРХКОМПЛЕКТНЫЙ ЗУБ, ВЫЯВЛЕННЫЙ С ПОМОЩЬЮ КОНУСНО-ЛУЧЕВОЙ КОМПЬЮТЕРНОЙ ТОМОГРАФИИ

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**С**росшийся зуб – это редкая аномалия развития, заключающаяся в том, что два зуба соединены вместе. Сросшийся зуб чаще называют сдвоенным зубом. Сверхкомплектные зубы – это дополнительные зубы, которые морфологически могут не иметь сходства с зубами и могут встречаться в любой области зубной дуги. Конусно-лучевая компьютерная томография помогает диагностировать и визуализировать данную патологию. Диагностика этой редкой аномалии развития является сложной задачей, поскольку патология возникает под десной. Конусно-лучевая компьютерная томография помогает выявить и спланировать лечение ретенированных сросшихся сверхкомплектных зубов, чтобы предотвратить такие послеоперационные хирургические осложнения, как перелом бутриности верхней челюсти или ороантральная фистула.

**Цель исследования.** Представить клинический случай редкой аномалии развития зуба – ретенированного сросшегося сверхкомплектного зуба, диагностику с помощью конусно-лучевой компьютерной томографии (КЛКТ) и его лечение.

**Материалы и методы.** В статье представлен редкий клинический случай сращения и конкрекции двух ретенированных сверхкомплектных зубов у мужчины 36 лет, диагностированных с помощью конусно-лучевой компьютерной томографии. Представлены данные КЛКТ, позволяющие выявить локализацию сложной аномалии. Описано клиническое значение КЛКТ в диагностике сложных сверхкомплектных зубов и их лечении.

**Результаты.** КЛКТ имеет важное клиническое значение и помогает определить точное трехмерное расположение таких редких патологий, как ретенированные сросшиеся сверхкомплектные зубы.

**Обсуждение.** КЛКТ помогает точно определить положение ретенированного сверхкомплектного зуба. Использование КЛКТ в предоперационном периоде помогает обнаружить сложные сверхкомплектные зубы и спланировать хирургическое лечение.

**Заключение.** Конусно-лучевая компьютерная томография необходима для идентификации и точной трехмерной визуализации локализации сложных ретенированных сверхкомплектных зубов при планировании хирургического лечения. Стоматологи должны обладать подробными знаниями о таких редких аномалиях развития зубов, как ретенированные сросшиеся зубы со сращением и конкрекцией.

Ключевые слова: ретенированные зубы, сверхкомплектные зубы, слияние, конкрекция, двойные зубы, сросшиеся зубы.

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**Introduction**

The connate, or double teeth, is a developmental anomaly caused by fusion and concrescence. Supplementary teeth are additional teeth that have the same anatomical morphology as natural teeth. Supplementary teeth are redundant teeth with a homologous anatomical arrangement to the rest of the teeth. Supplementary teeth usually appear smaller than normal and resemble the anatomical morphology of adjacent teeth. This article describes a case report of fusion and concrescence between two impacted supplemental teeth diagnosed using cone-beam computed tomography, which offers exact three-dimensional information on connate supplemental teeth and treatment.

**Case Presentation.**

A 36-year-old male reported a chief complaint of pain and frequent food lodgement in the right upper back tooth region for the past two months. Intraoral examination revealed a carious tooth in the maxillary left second premolar (Fig. 1).

So, a further radiological evaluation by cone beam computed tomography was done with the help of the Carestream CS-9600 CBCT machine with the field of volume (FOV) of 5x5

cm about the left maxillary posterior tooth region concerning 25 regions. CBCT panoramic section at 912-micrometre slice thickness revealed two supplementary teeth, one which is conical and smaller fused with another larger sized supplemental teeth resembling morphology of molar teeth situated within the alveolar process of the posterior maxillary alveolar bone concerning carious right maxillary second premolar tooth (Fig 2).

The three-dimensional reconstructed CBCT images are shown (Fig. 3).

The differential diagnosis for concrescence includes fusion, in which crowns of two adjacent teeth fuse to form one. The triple tooth is a type of fusion in which two adjacent teeth are combined with supernumerary teeth. The mucoperiosteal flap was reflected, and a bone window was created on the buccal cortical plate concerning the right maxillary second premolar, exposing the impacted supernumerary teeth (Fig. 4).

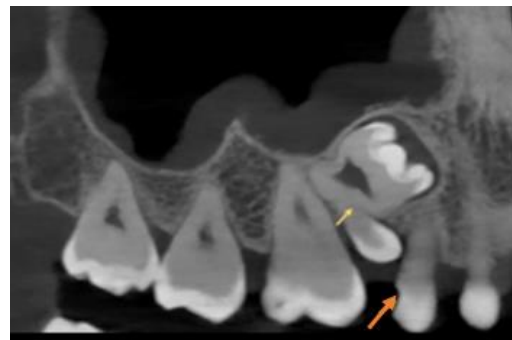
The impacted supernumerary teeth was surgically extracted along with carious maxillary second premolar under local anaesthesia after splitting it with bone-cutting SS bur (Fig. 5).

**Discussion.**

Cone-beam Computed Tomography



**Fig. 1 (Рис. 1)**



**Fig. 2 (Рис. 2)**

**Fig. 1. Photo.**

Intraoral clinical photograph revealed a carious left maxillary second premolar (yellow arrow).

**Рис. 1. Фотография.**

Внутриротовое обследование выявило наличие кариеса во втором премоляре верхней челюсти слева (желтая стрелка).

**Fig. 2. CBCT.**

Panoramic sectional image revealed two impacted supernumerary teeth, one of which is conical in shape and the other resembling the shape of a molar (yellow arrow) and carious in left maxillary second premolar (orange arrow).

**Рис. 2. КЛКТ.**

Панорамная секционная реконструкция выявила два ретенированных сверхкомплектных зуба, один из них конической формы, другой напоминает форму моляра (желтая стрелка); во втором премоляре верхней челюсти слева визуализируется кариес (оранжевая стрелка).

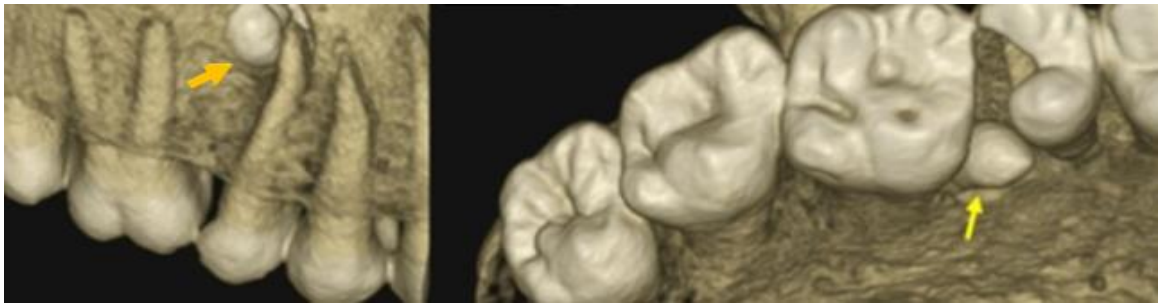


Fig. 3 (Рис. 3)

**Fig. 3. CBCT.**

3D reconstructed CBCT images revealed impacted supernumerary teeth resembling shape of molar on buccal aspect (orange arrow) and impacted small conical supernumerary teeth on the palatal aspect in relation to left maxillary second premolar (yellow arrow).

**Рис. 3. КЛКТ.**

3D-реконструкции выявили ретенированные сверхкомплектные зубы, напоминающие форму моляра со стороны щечной поверхности (оранжевая стрелка) и небольшие ретенированные конические сверхкомплектные зубы на небной поверхности по отношению ко второму премоляру верхней челюсти слева (желтая стрелка).



Fig. 4 (Рис. 4)

**Fig. 4. Intraoperative photo.**

Surgical exploration of impacted supernumerary teeth by creation of bone window.

**Рис. 4. Интраоперационная фотография.**

Хирургическое исследование ретенированных сверхкомплектных зубов путем создания костного доступа.



Fig. 5 (Рис. 5)

**Fig. 5. Photo.**

Extracted carious left maxillary premolar along with impacted supernumerary tooth.

**Рис. 5. Фотографии.**

Удаленный кариозный премоляр верхней челюсти слева вместе с ретенированным сверхкомплектным зубом.

**Table №1. Literature reviews on concrescence and fusion of supernumerary teeth.**

<b>Author &amp; Type of Study</b>	<b>Age of patient/ Gender &amp; Type of Dentition</b>	<b>Type of Anomaly</b>	<b>Tooth involved</b>	<b>Description</b>
Ahuja V et al (2022) Case Report [4]	7 Years/Male Primary Dentition	Synodontia (Fusion)	Deciduous Maxillary Right Central, Lateral, and Supernumerary tooth	Triplication of the Primary Right Central, lateral, and Supernumerary tooth was found in a 7-year-old boy. Evaluation through CBCT revealed three separate pulp chambers at the cervical region unified in the middle and apical levels. Histological sections after extractions revealed the presence of enamel and dentin in the coronal section and dentin and cementum in the middle third of the root.
Su J et al (2022) Case Report [5]	47 years/ Female Permanent Dentition	Concrescence	Maxillary second molar and impacted third molar	Concrescence between the Left distal root of the maxillary second molar and mesial root of the maxillary third molar as seen through CBCT and confirmed through histological examination. The teeth were surgically removed under local anaesthesia, and follow-up revealed no complications.
Yan Xu et al (2022) Case Report [6]	55 years / Female Permanent Dentition	Concrescence	Right maxillary second and third molars	Supra erupted Right Maxillary Second molar was fused with impacted third molar only at cementum which was visualized after extraction.
Wang J (2022) Case Report [7]	21 years/Male Permanent Dentition	Concrescence	Left mandibular third molar and adjacent supernumerary molar	Surgical removal of Mandibular Third Molar and Supernumerary Fourth Molar was done under local anaesthesia, and concrescence was confirmed through histological sections.

Consolaro A (2020) [8] Orthodontic Insights	Not applicable	Concrescence	Not applicable	The mechanism of formation of concrescence at a cellular level, its classification, and its relevance with orthodontic tooth movements have been discussed in this article.
ALHumaid J (2021) [9] Original Study	7-65 years- 1104 subjects	Various dental anomalies	Not Applicable	Retrospective study was done from 2012-19 in eastern Saudi Arabia. The presence of various dental anomalies was noted through Digital OPGs. According to this study, dilaceration was the most common dental anomaly present, and concrescence was found only in two male patients in the maxillary canine and mandibular premolar region. Syed AZ (2016) [10]
Syed AZ (2016) [10] Case Report	18 years/Male Permanent dentition	Concrescence	The distolingual aspect of tooth 38 and supernumerary tooth	Concrescence of the tooth was confirmed through CBCT, and it is inferred this anomaly can complicate the surgical removal of tooth 38 because of its proximity to the Inferior nerve canal. The patient was referred to a higher centre for further management.
Palermo D (2016) [11] Case Report	83 years/ Female Permanent Dentition	Concrescence	Upper left first and Second molar	The upper first molar was extracted along with the second molar due to chronic apical periodontitis, and concrescence was confirmed through OPG.
Juneja. S (2015) [12] Case Report	9 Years/Male Primary Dentition	Fusion	Upper left maxillary central and lateral incisor along with supernumerary teeth	Triple teeth were extracted due to caries. The tooth at the center was a supernumerary tooth with central and lateral incisors on either side of it. Three separate pulp chambers and a root canal were confirmed through CT and histological sections. Classification and sequel of such anomalies were also discussed in this article.

Venugopal (2013)[13] Case Report	30 years/Male Permanent Dentition	Concrescence	Right mandibular second molar and paramolar	Concrescence between the Right mandibular second molar and the supernumerary tooth was confirmed through the Radiograph. Drainage of abscess, Scaling, and Root planning was done. Tooth 47 was subjected to Root canal treatment followed by removal of a supernumerary tooth. Rehabilitation was done with bone grafts and metal crowns.
Dhindsa A (2013)[14]	5 years/ Male Primary Dentition.	Fusion	Fused primary mandibular left first molar and Supernumerary tooth	Tooth 74 had fusion which was confirmed radiographically. Fusion of the supernumerary tooth on the lingual side of tooth 74 was evident in the radiograph, with its root running between the mesial and distal root of tooth 74. Since the tooth was associated with an abscess, it was extracted, and the abnormal morphology was confirmed clinically.
Sharma U (2013)[15] Case Report	7 years /Male Primary Dentition.	Concrescence	Left Maxillary Central incisor and lateral incisor and supernumerary tooth.	Considering the age and status of dentition, the infected teeth 61 and 62 were removed along with the supernumerary tooth. The extracted tooth was sent for histopathological sectioning, which confirmed that the teeth were united by cementum.
Shilpa G (2013) [16] Case Report	5 years/ Male Primary Dentition	Fusion	Maxillary left primary central incisor, lateral incisor, and a supernumerary tooth	The presence of Triple teeth is rare. Fusion of maxillary left primary central incisor, lateral incisor, and a supernumerary tooth was confirmed through occlusal radiograph. The patient was advised to have a periodic follow-up.

Foran D (2012) [17] Case Report	35 years/ Female Permanent Dentition	Concrescence	Maxillary second and third molars	CBCT is important in capturing three-dimensional views of concrescence teeth. Pain in the Maxillary Second region was managed through Root canal treatment, and this article explains the challenges in the conservative management of such teeth.
Guttal KS (2010) [18] Original Study	1 Male and 3 Female patients	Concrescence	Details not given	350 dental anomalies were found out of 20,182 patients screened between December 2004 and November 2005. This study inferred that the presence of concrescence is high in the posterior maxilla. Only four patients (1.4%) had this anomaly which influenced treatment procedures.
Hernandez-Guisado JM (2002) [19] Case Report	19-years/Male	Gemination	Mandibular third molar with supernumerary tooth	Prevalence in adults is rare (0.1%). Due to repeated inflammation with the left mandibular third molar region, an OPG was taken, which revealed tooth 38 to in union with a supernumerary tooth. The extracted tooth had twice the dimensions of a normal tooth.

(CBCT) helps identify the precise location of impacted teeth and plan surgical treatment without complications [1, 2]. Three-dimensional radiological imaging helps in the precise location of impacted teeth, dental anomalies, and their relation with anatomical structures [3]. The connate teeth are double or conjoined teeth formed due to the fusion or concrescence of two adjacent teeth. Synonyms for connate teeth include synodontia, conjoined teeth, joined teeth, fused teeth, and dental twinning. The synodontia is a morphological, developmental dental anomaly characterized by the fusion of teeth. Different terminologies are also used to describe this anomaly, including fusion, gemination, and concrescence [1]. In primary dentition, synodontia with two teeth is sporadic [1]. A double or connate tooth is an anomaly involving two or more teeth [1]. The causes for concrescence include the physical forces between neighbouring tooth germs during development, hereditary,

environmental effects, dental trauma, and systemic disease. The developmental grooves are more prone to caries and periodontal problems when the site of the union of developmental grooves is exposed in fused teeth.

The authors emphasize the importance of a definite preoperative diagnosis of concrescence for better treatment planning and fewer complications. They suggest that cone-beam computed Tomography (CBCT) is useful for diagnosing concrescence. The paper concludes that a better understanding of the various morphological anomalies of teeth, including concrescence, can help clinicians provide more effective and efficient treatment for their patients. Yan Xu et al. highlight the concrescence of maxillary second and third molars, which cause surgical complications [6]. The paper emphasizes the importance of proper diagnosis and treatment planning for such cases. Su J et al. reported a case of concrescence in the posterior



maxilla involving an impacted third molar and the second molar [5]. Wang J. et al. reported a rare case of successful surgical division of 6 of 9 conrescent teeth [7]. A massive bone defect after extraction has been repaired by filling a space-occupying bone defect between a third molar and a supernumerary fourth molar with space-occupying bone-filling materials [7].

Syed A.Z. et al. described conrescence in the mandibular third molar region by CBCT [10]. Our case described a rare case of an impacted connate tooth in relation to the carious left maxillary premolar region evaluated by cone beam computed Tomography. Various authors described connate teeth due to conrescence only by imaging modalities like digital panoramic radiography and computed Tomography [9, 11, 19].

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**Conclusions.**

The connate or double tooth that results from fusion and conrescence also occurs rarely in impacted supplementary teeth. Such developmental anomalies remain silent and are incidentally discovered by cone beam computed tomography. Cone-beam computed tomography helps diagnose and visualize conrescence. Diagnosing this rare developmental anomaly is challenging since it occurs beneath the gingival margin. Cone-beam computed tomography helps identify and plan treatment for the conrescence of impacted supplementary teeth to prevent postoperative surgical complications such as maxillary tuberosity or oroantral fistula fracture. Dentists must have a sound knowledge of such rare developmental anomalies.

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