

Dentoalveolar development in subjects with normal occlusion. A longitudinal study between the ages of 5 and 31 years

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The aim of the present study was to examine dentoalveolar development in subjects with an 'ideal' (normal) occlusion. The material comprised 436 study casts of 189 male and 247 female subjects of Swedish origin between the ages of 5 and 31 years with no history of orthodontic treatment. Tooth width, and arch length, width, and depth, as well as palatal height were measured. The data were analysed with a Student's *t*-test.

The results verified that continuous changes of the dental arches occur from the primary until the adult period, with individual variations. This change could be interpreted as a biological migration of the dentition, resulting in anterior crowding especially in the mandible, even in subjects with congenitally missing third molars.

The occlusion should be regarded as a dynamic rather than a stable interrelationship between facial structures. This natural development has to be considered in orthodontic treatment planning as well as in assessment of stability following orthodontic treatment. A continuous increase of palatal height up to adulthood seems to be an effect of a slow continuous eruption of the teeth. This finding is also of significance in explaining the infraposition of implant-supported crowns.

-> In dieser Publikation werden Bilder gezeigt, wo bei einem 15 Jährigen Zahn 12 mit einem Implantat ersetzt wurde, 10 Jahre später stand es ca. 1,2mm in Infraposition. Ein ähnlicher Fall wird bei einer 34 jährigen Frau gezeigt, die vor 12 Jahren mit einem Implantat versorgt wurde

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Implant Failure in Young Children with Ectodermal Dysplasia: A Retrospective Evaluation of Use and Outcome of Dental Implant Treatment in Children in Sweden

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Purpose: This study surveyed dental implant treatment in children up to age 16 years in Sweden between 1985 and 2005, with special reference to young children with ectodermal dysplasia (ED) and anodontia in the lower jaw. **Materials and Methods:** A questionnaire was sent to Swedish specialist clinics in oral and maxillofacial surgery and prosthetic dentistry. Also, the teams who had treated children with ED were asked to submit their records for these children for a discussion on reasons for implant failure. **Results:** Six out of 30 specialist centers (20%) in Sweden had treated 26 children with dental implants between 1985 and 2005. Twenty-one patients had received 33 implants to replace teeth missing from nonsyndromic agenesis or trauma at ages 14 or 15 years; 2 (6.1%) of these implants were lost. Five children with ED received 14 implants at 5 to 12 years of age; 9 (64.3%) of these

implants were lost before loading. Conclusions: Dental implant placement has been a rarely used treatment modality in Swedish children less than 16 years old in the last 20 years. The failure rate in children treated because of tooth agenesis was only slightly higher than that reported for adult individuals, whereas in young children with ED and anodontia in the mandible, implants seemed to present special challenges, and the failure rate was very high. The small jaw size and peroperative conditions, rather than ED per se, were thought to be the main risk factors. Centralizing implant operations in young children with ED and monitoring outcomes in implant registers are strongly advocated. *Int J Oral Maxillofacial Implants* 2008;23:520–524

➔ *Sehr interessanter Artikel, der die Problematik gut darstellt, anhand von Zahlen belegt und letztendlich die Behandlung von Kindern mit Implantaten, wenn nötig, von Spezialisten in dafür vorgesehenen nationalen Zentren befürwortet.*

[Oral Maxillofac Surg.](#) 2008 Jul;12(2):49-60.

Concepts for the treatment of adolescent patients with missing permanent teeth.

[Behr M](#), [Driemel O](#), [Mertins V](#), [Gerlach T](#), [Kolbeck C](#), [Rohr N](#), [Reichert TE](#), [Handel G](#).

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INTRODUCTION: Missing permanent teeth is observed with syndromes or is frequently hereditarily propagated in families. The treatment of these patients is a multi-task of specialists of oral surgery, orthodontics and prosthodontics. DISCUSSION: Despite functional and aesthetic considerations, the main problem of all treatment is that it had to be performed in a growing child. This article discusses the conventional and implant-driven concepts to treat patients from childhood to adolescence with selective or multiple missing permanent teeth.

[J Oral Rehabil.](#) 2008 Jan;35 Suppl 1:55-63.

When should we extract deciduous teeth and place implants in young individuals with tooth agenesis?

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The aim was to systematically review and find evidence to determine when to extract deciduous teeth and place implants in young individuals with tooth agenesis. A search was made in MEDLINE on combinations of the terms 'tooth agenesis', 'deciduous teeth' and 'dental implants'. Publications with an abstract and written in the English language only were included. To give a background to the clinical management of young individuals with agenesis of teeth, publications on epidemiology of tooth agenesis, persistence of deciduous teeth, treatment outcomes after multi-disciplinary treatment planning and experiences of treatment with dental implants in young individuals were also

reviewed. A search on the terms 'tooth agenesis', 'deciduous teeth' and 'dental implants' resulted in nine references and a search on 'dental implants' and 'tooth agenesis' gave 132 references; 46 met the inclusion criteria. Only two were prospective studies on treatment with implants in young individuals. A vast majority of publications on the clinical management of young individuals with tooth agenesis are reflections of clinical experiences and single case reports. Deciduous teeth are extracted for different reasons and at different ages in an optimal plan for a good treatment result from aesthetic and functional point of view. For ethical reasons, randomized clinical trials on when to extract deciduous teeth and place implants cannot be made in young individuals. There was only limited, low level evidence on when to extract deciduous teeth and place implants. Recommendations on treatment are based mainly on clinical experience.

➔ *Dieser Artikel hat weniger mit der Fragestellung zu tun, aber er geht auch in die Problematik*

[Oral Maxillofac Surg Clin North Am.](#) 2005 Nov;17(4):375-81.

Dental implants in children.

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Some children and adolescents have anodontia, partial anodontia, congenitally missing teeth, and lost teeth as a result of trauma, and they may benefit from early placement of dental implants. Clinicians should have an understanding of the potential risks involved in placing implants in jaws that are still growing and developing and consider the effect that implants have on craniofacial growth. Implants may act as ankylotic teeth and fail to move together with the surrounding structures, which produces an infraocclusion that leads to difficulties with prosthetics. Young patients may require general anesthesia for the procedure and there may be limited cooperation in maintaining good oral hygiene.

[N Y State Dent J.](#) 2007 Mar;73(2):20-2.

Management of a congenitally missing maxillary central incisor. A case study.

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When a maxillary lateral incisor is missing, often the treatment options can be clearly defined, that is, substitute an adjacent tooth for the missing one; open the space for an implant, a bonded bridge or fixed bridge. When a maxillary central incisor is missing and the space for the tooth is absent, the treatment choices become complicated, especially in a growing child. There must be multi-disciplinary coordination among the restorative dentist, the oral surgeon or periodontist, and the orthodontist to obtain the optimum result. At the initiation of treatment, this information must be relayed and the treatment plan agreed upon by the patient or the parents of the patient.

➔ *Dieser Fallbericht ist etwas ungenau mit dem Zeitpunkt der Implantation, es dreht sich etwa um einen 16 Jährigen.*

[Am J Orthod Dentofacial Orthop.](#) 2007 Apr;131(4 Suppl):S59-67.

Determining the cessation of vertical growth of the craniofacial structures to facilitate placement of single-tooth implants.

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INTRODUCTION: Single-tooth implants are commonly used to replace congenitally missing teeth in adolescent orthodontic patients. However, if implants are placed before cessation of facial growth, they will submerge relative to the adjacent erupting teeth. Therefore, it is important to know when facial growth is complete in postpubertal orthodontic patients. The purposes of this study were to determine and quantify the amount of vertical growth of the facial skeleton and the amount of eruption of the central incisors and the maxillary first molars after puberty. METHODS: Two or 3 lateral cephalograms taken at pretreatment, posttreatment, and 10 years postretention of 142 males and 159 females were evaluated. Linear regression models were used to determine changes in the parameters with increasing age. RESULTS: The findings indicate that (1) the growth of the facial skeleton continues after puberty; (2) there is a difference in the amount of growth between the sexes during the second decade of life, and after age 20 the intergender difference is substantially diminished; and (3) the rate of eruption of the maxillary central incisors in females seems to be greater than in males. Prediction tables are provided to help the clinician determine when to take cephalometric radiographs to assess the cessation of facial growth. CONCLUSIONS: The growth of the facial skeleton continues after puberty, but the amount of growth decreases steadily and after the second decade of life seems to be clinically insignificant.

➔ *In diesem Artikel wird das Gesichtswachstum untersucht, wobei angegeben ist, dass man nach dem 15 Lj. schwer einschätzen kann wie sich die vertikalen Positionen der Inzisiven im Zuge des Wachstums ergeben werden*

[Int J Oral Maxillofac Implants.](#) 2006 Nov-Dec;21(6):867-78.

Facial development, continuous tooth eruption, and mesial drift as compromising factors for implant placement.

[Heij DG](#), [Opdebeeck H](#), [van Steenberghe D](#), [Kokich VG](#), [Belser U](#), [Quirynen M](#).

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The replacement of teeth lost by children because of trauma can be an important indication for early implant therapy. Osseointegrated dental implants, like ankylosed teeth, alter position as growth-related changes occur within the jawbones (displacement, remodeling, mesial drift). Facial growth of the child and even of the adolescent, as well as the continuous eruption of the adjacent anterior

teeth, create significant risk of a less favorable esthetic and/or functional outcome. For patients with a normal facial profile, the placement of an implant should be postponed until growth is complete. For patients with a short or long face type, further growth, especially the continuous eruption of adjacent teeth, creates a serious risk even after the age of 20 years, as illustrated by some recent clinical studies. This review aims to explain these phenomena and provides some recommendations for implant placement.

➔ *Dieser Artikel trifft die Problematik sehr gut und wäre auch Wert dem Kunden zur Verfügung zu stellen. Es werden Empfehlungen gegeben wie bei geplanten Implantationen vorzugehen ist. (FRS ohne Wachstum im Abstand von einem Jahr, etc.)*

[J Calif Dent Assoc.](#) 2006 Sep;34(9):719-24.

Using implants for the growing child.

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The use of implants for the growing child is not routinely recommended. The concerns about placing implants for patients in this age group are related to jaw growth. However, not all children with missing teeth need to wait for growth to be completed prior to implant placement. In this paper, the authors will discuss the indications for implant placement in the growing child. The decision for implant placement is based not only on growth, but also the number and location of the missing teeth.

http://www.cda.org/page/Library/cda_member/pubs/journal/jour0906/index.html

➔ *Interessanter frei verfügbarer Artikel, s. Link, der praktisch und anschaulich das Vorgehen anhand mehrerer Beispiele erklärt.*

[Ned Tijdschr Tandheelkd.](#) 1995 Oct;102(10):383-5.

[Osseointegrated implants in adolescents. A three year study]

[Article in Dutch]

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In 15 adolescents (age 13.2 to 19.4 years) in the late dental stage implants (n = 27) were chosen to replace missing teeth due to congenital absence or trauma. The patients were followed for at least 3 years. No fixture losses occurred. Only minor loss of bone support at the fixture was observed, while adjacent tooth surfaces showed some loss. Infra-occlusion of the implant restorations was noticed in patients with residual craniofacial growth. Thus, the dental and skeletal maturation, and not the chronological age, must be taken into account to avoid infra-occlusion. Furthermore it is important to gain enough space for the fixture in the mesio-distal direction in order to avoid the risk of marginal bone loss at teeth adjacent to the implants

[Eur J Orthod.](#) 1994 Apr;16(2):84-95.

Osseointegrated implants in adolescents. An alternative in replacing missing teeth?

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In 15 adolescents (13 years 2 months-19 years 4 months) in the late dental stage, Brånemark implants (n = 27) were chosen to replace missing teeth due to congenital absence or trauma. The patients were followed for at least 3 years, at yearly intervals, biometrically and radiographically. No fixture losses occurred. Only minor loss of bone support at the fixtures was observed, while adjacent tooth surfaces showed some loss in some cases. Infra-occlusion of the implant restorations was noticed in patients with residual craniofacial growth. Thus, the dental and skeletal maturation, and not the chronological age of the patient, must be taken into consideration to avoid infra-occlusion of the fixture crown. Furthermore, it is important to gain enough space for the fixture in the mesio-distal direction, to avoid the risk of marginal bone loss at teeth that are adjacent to it.

➔ *In diesem Artikel wird auch das Abwarten auf das Ende des skelettalem und dentalem Wachstums vor Implantation hingewiesen. Unter anderem seien besonders bei jungen Patienten die mesio-distalen Distanzen wichtig um Knochendefekte zu vermeiden.*

[Clin Oral Implants Res.](#) 1993 Jun;4(2):65-75.

Tissue reactions towards titanium implants inserted in growing jaws. A histological study in the pig.

[Sennerby L](#), [Odman J](#), [Lekholm U](#), [Thilander B](#).

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In this investigation, the tissue reactions towards titanium implants inserted in growing jaws of pigs were studied by means of histology. At the age of 12 weeks, 5 test pigs each received 4 Brånemark System titanium implants (fixtures). The fixtures were inserted immediately after extraction of the mesial root of the second deciduous premolar (P2) and the deciduous canine (C) on one side of the mandible and the mesial root of the first deciduous premolar (P1) on the other side. The fourth implant was placed after extraction of the deciduous lateral incisor (L) on one side in the upper jaw. Furthermore, 1 pig in which no extractions or fixture installations were performed served as a control. All pigs were followed for 165 days with clinical, radiographic and biometric examinations, the results of which have been previously presented. In this study, 10-microns-thick ground sections were produced for histology after the jaws had been fixed by immersion in formalin and further processed and embedded in plastic resin. Six of the fixtures originally inserted were lost during the experimental period, and the remaining implants were found to be involved with mineralized bone to varying degrees. Regarding the fixture-to-teeth relationship, it was found that, in the premolar region of the lower jaw, the teeth were positioned superior to and buccally angulated in relation to the fixtures. In the upper jaw, the implants were positioned below the adjacent teeth but centrally in the alveolar process. Tooth germs adjacent to the fixture had a displaced eruption path, buccally or lingually to the fixture. If the bud developed in close contact with the fixture, a changed morphology of the germ could be observed.

→ *Dies ist eine Grundlagenarbeit.*

[Eur J Orthod.](#) 1992 Apr;14(2):99-109.

Aspects on osseointegrated implants inserted in growing jaws. A biometric and radiographic study in the young pig.

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The aim was to study if osseointegrated implants behave like teeth in the growing jaw. Six young pigs were used, one of them randomly selected as a control. The test pigs received four fixtures each in regions with various dento-alveolar development. The biometric and radiographic findings, after an experimental period of 165 days, showed that the osseointegrated implants do not become secondarily displaced in sagittal and transversal dimensions and, thus, do not behave like normal teeth. Consequently, the osseointegration technique is not to be recommended in the lateral regions in young children.

→ *Eine viel zitierte Grundlagenarbeit, welche zeigt, dass Implantate sich nicht wie Zähne im wachsenden Kiefer verhalten, sondern ihre Position beibehalten.*

[Eur J Orthod.](#) 1991 Aug;13(4):279-86.

The effect of osseointegrated implants on the dento-alveolar development. A clinical and radiographic study in growing pigs.

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In an attempt to study the effect of osseointegrated implants on vertical dentoalveolar development, six growing pigs of the Pigham strain were used, one of them randomly selected as a control. The test pigs received four fixtures each, three in the lower jaw and one in the upper. The fixtures were placed in areas where different patterns of the dento-alveolar development were expected. The clinical and radiographic findings have clearly shown that the implants do not behave like normal erupting teeth during the development of the dentition. Neither do the fixtures move together with the adjacent teeth, but behave more like ankylosed teeth.

→ *Dies ist auch eine viel zitierte Grundlagenarbeit, in der angegeben wird, dass sich Implantate im wachsenden Kiefer ähnlich wie ankylosierte Zähne verhalten.*