INTERNATIONAL JOURNAL OF PAEDIATRIC DENTISTRY

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Editor-in-Chief
Göran Dahllöf

Abstracts of the 22nd Congress of the
International Association of Paediatric Dentistry
Munich, Germany, 17–20 June 2009

Volume 19 – Suppl. 1
June 2009

WILEY-BLACKWELL

The official journal of
The International Association of Paediatric Dentistry
The British Society of Paediatric Dentistry

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PAEDIATRIC DENTISTRY

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Poster Session P19 – Orthodontics

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Poster Session P19/Orthodontics

P18–285

Odontoma associated with impacted teeth: three case reports

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Introduction: The occurrence of odontoma is uncommon, especially in the primary dentition. The most frequent cause of discovery is the retention or impaction of the tooth. The article describes three cases in different dentition stage with impacted teeth caused by the presence of the odontomas. Their clinical features and treatment are discussed.
Clinical management:
Case 1: A 4-year-old girl presented with an impacted mandibular right primary canine due to the presence of an odontoma. Treatment included the surgical removal of lesion and the follow up of the spontaneous eruption. The impacted primary canine erupted in 2 weeks.
Case 2: An eight-year-old girl presented with the chief complaint of the permanent tooth unerupted. Radiographs revealed that an odontoma was present with an impacted maxillary right central incisor. Treatment included the surgical removal of lesion, simultaneously bonding the fixed orthodontic appliance for closed traction. Seven months later, the impacted incisor was located in the dental arch.
Case 3: A 17-year-old boy presented with an impacted upper right canine because of an odontoma. The primary canine was retained. The operation removed the lesion, and orthodontic appliance was applied for arch expansion and traction. 10 months later, the impacted canine was moved to the dental arch.
Conclusion: All cases achieved good clinical result. Odontomas can occur in any dentition stage. It more often are located above the crown of the impacted tooth usually incisor and canine. For Impacted permanent teeth, a combined surgical and orthodontic treatment is necessary.

P19–286

Rapid palatal expansion for the treatment of an ectopically erupting maxillary canine

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Introduction: After third molars, the most frequently impacted tooth is the maxillary permanent canine. In the early stage of impaction, the eruption path of the permanent canine is angulated more mesially than normal. Untreated, such an ectopically erupting maxillary canine becomes permanently impacted. If an ectopic maxillary canine is identified soon enough, it can be treated by extracting the corresponding primary canine. When the lesion has progressed further, however, extraction of the primary canine is not sufficient for treatment. A good treatment option for an ectopic permanent canine that has progressed involves modifying the root angulation of the maxillary lateral incisor combined with rapid palatal expansion.
Clinical management: The clinical cases described here include cases that were followed for 6 months after the primary canine was extracted to treat an ectopically erupting maxillary canine using panoramic radiographs. In these cases, the eruption path did not improve. Therefore, rapid palatal expansion was performed using a hyrax expander and the root angulation of the permanent lateral incisors was changed mesially. With this procedure, the normal eruption path of the ectopic maxillary canine was restored. These cases were followed up more than 6 months, and the treatment results were well-maintained.
Conclusions: In properly selected cases, modification of the root angulation of the maxillary lateral incisor combined with rapid palatal expansion is effective for preventing impaction of an ectopic maxillary canine without resorting to surgical methods.

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Autotransplantation: using cone beam CT and computer-aided rapid prototyping–two case reports

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Introduction: Auto-transplanted teeth can preserve the alveolar ridge and erupt normally in contrast to ossointegrated implants which are unsuitable for children. Spiral CT and rapid computer-aided prototyping has been used previously to aid autotransplantation of adult molar teeth. In this case report we combine cone beam CT (CBCT) and computer-aided prototyping to produce a surgical template for the immature donor tooth in a child.
Clinical management: One patient had a combination of hypodontia affecting the upper lateral incisors and a severely ectopic maxillary canine. The other had an upper central incisor with a poor prognosis. Both were assessed using CBCT. Data from the CBCT was used to produce a copy of an unerupted lower premolar tooth using a 3D printer. This 3D model was copied in wax, adding 1.5 mm was to the apex to allowing for root development between the scan and auto-transplantation procedure, and then cast in cobalt chrome. The surgical template was used as a guide intra-operatively to prepare the new socket before extraction of the donor tooth. As a consequence extra-oral time for the donor teeth was under 1 min. Follow-up over twelve months showed the teeth were positive to sensibility tests and no signs of root resorption.
Conclusion: Autotransplantation is a useful for dealing with missing units in children. We demonstrate a technique to aid autotransplantation of immature teeth, which makes the surgical procedure easier, reducing time from extraction to transplantation. The increased availability of CBCT should result in this method being applicable to more cases.

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The early treatment of ectopically erupting bilateral maxillary canines: a case report

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Introduction: The purpose of this report was to describe an unusually severe ectopic eruption of bilateral maxillary canines in a young patient aged 7 years 8 months, and to discuss the effects of early intervention such as extraction of the predecessors and fenestration of the affected canines.
Clinical management: The patient was referred to the author's clinic for a consultation regarding bilateral ectopically erupting maxillary canines with an ectopic eruption of the maxillary right first molar. After improvement of the first molar, the affected canines were fully erupted and aligned in occlusion 3 years 7 months after the extraction of the primary canines. Before treatment, the findings on the orthopantomogram were as follows: there was no direct cause, both canine tooth germs were situated in very high positions, and the cusp tips of neither canine overlapped with the roots of the adjacent lateral incisor (Sector 1).
Conclusion: The maxillary left canine impacted horizontally in a mesio-distal direction (axial angulation: 90 degrees) could be successfully guided to eruption by early intervention such as the extraction of predecessors and three fenestrations. Even in severely ectopic cases, therefore, it is considered that traction may be postponed until no effect of fenestration can be detected in cases of early discovery and intervention when the crown top is situated in Sector 1.

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Orthodontic traction of an impacted tooth using a modified removable appliance: a case

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Introduction: Forced orthodontic eruption of an impacted tooth can be performed with either fixed or removable appliances. Fixed appliances do not require special patient cooperation and can produce precise tooth movements. On the other hand, the wire attached to the impacted tooth may be more easily deflected than with removable appliances, causing undesirable movements of adjacent teeth. Such movements are minimized with removable appliances because the force is dissipated through the acrylic, which is anchored not only by the teeth, but also by the mucosa and palate. Removable appliances require less chair time, promote better oral hygiene, and are more aesthetic, and the forced eruption can start as soon as the appliance is installed.
Clinical management: In the case here, to assist the eruption of impacted upper tooth, an appliance which vacuum forming polyvinyl acetate-polyethylene embedded lingual buttons was designed. In the first phase of treatment the tooth was erupted with a removable appliance with a hook for elastic attachment. In the second phase the impacted tooth was exposed, aligned with modified removable appliance. Although final precise alignment can not be maintained in every case by removable appliances, in the whole process of the extrusion and alignment of impacted tooth, the modified removable appliance was simple, aesthetic, and effective in force control than the ordinary removable appliance.
Conclusion: Forced eruption of impacted upper tooth can be carried out successfully with the modified removable appliance.

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Management of ectopically erupting lower second primary molar by modified Halterman appliance: a case report

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Introduction: Ectopic eruption, abnormal eruption path, can occasionally cause root resorption and dislocation of adjacent teeth. Impaction of primary second molar caused by ectopic eruption path occurs rarely but relatively more in the mandible. Untreated ectopically erupting primary molars can cause severe malocclusion, root resorption of adjacent tooth and periodontal disease. Therefore, early diagnosis and treatment of ectopically erupting primary molar is very important. Among various kinds of orthodontic appliances to treat ectopic eruption, Halterman appliance is preferred by clinicians because it is relatively comfortable and easy to fabricate.
Clinical management: A 4 year-old patient with a chief complaint of ectopically erupting primary molar visited the clinic. Lower left second primary molar was locked behind and under the first primary molar and ankylosis was suspected in the furcation area. Before choosing extraction as a treatment option, in attempt to improve the axis of the impacted tooth, Lingual arch type – modified Halterman appliance was used. Band was fabricated on lower right second primary molar and lower left first primary molar, and button was placed on the left second primary molar. Spring was added on the distal surface of the band to apply force distally. 5 months later, ectopically positioned tooth reached to normal occlusal plane level and the succeeding tooth follicle, the second premolar, also moved successfully with no unusual root resorption or inflammation.
Conclusion: Modified Halterman appliance is very efficient in treating ectopic eruption. A Patient with an ectopically erupting primary molar was successfully treated with modified Halterman appliance and direct button bonding system.

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Correction of anterior cross bite using different techniques

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Introduction: Localized anterior cross bite warrants early intervention to avoid unfavourable changes to the developing or existing dentition. Several methods have been proposed to correct anterior cross bite and they use either tipping or bodily movement. This report presents few of those methods such as lower acrylic inclined plane, removable appliances with finger springs, screws which involves tipping movement and the fixed 2x4 appliance which uses bodily movement.
Clinical management: Lower acrylic inclined plane is an effective treatment method for correction of anterior cross bite and this technique was selected in a 7 year old girl. The patient's anterior cross bite involving the permanent maxillary central incisors was resolved in two weeks with no damage to teeth or marginal gingival tissues. Other common method for correcting anterior cross bite is using removable acrylic appliance with posterior bite plane and finger springs/screw to tip the maxillary teeth labially. This appliance was chosen for the correction of a single tooth cross bite on a co-operative 8 year old boy and the anterior cross bite was corrected in ten weeks. A 13 year old boy presented with a single tooth cross bite which required bodily movement for

correction, hence a fixed 2x4 appliance was preferred. The patients were followed up for a minimum 6 months and none of the patients showed any relapse.
Conclusion: Anterior cross bite requires early and immediate treatment and decision on the choice of the technique is based on patient's compliance, cost, time, type of tooth movement required and clinician's judgement.

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Autotransplantation of maxillary canine using the stereolithographic model: report of 2 cases

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Introduction: Autogenous tooth transplantation, or autotransplantation, is the surgical movement in one individual of a vital or endodontically treated tooth from its original location in the mouth to another site. This procedure involves extraction of the donor tooth, measurement of the root form and amount of periodontal ligament, preservation of donor tooth, preparation of recipient socket, positioning of donor tooth, suturing, and temporary splinting. Transplant success depends primarily on the specified requirements from the client, donor tooth, and recipient site. Especially, healthy periodontal ligament cell of donor tooth is the most important factor for high degree of success. It can be obtained by minimizing the extra-alveolar time and mechanical damage during surgery. The 3-dimentional computed tomography (CT) data of the donor tooth were used to generate accurate solid plastic replica of biological structures (stereolithographic models). The replica can replace the donor tooth during the procedure of recipient socket preparation. Replica inserted in prepared socket allows checking the articulation and occlusion. After this procedure, the donor tooth can be positioned quickly on the recipient site.
Clinical management: 2 cases of autotransplantation of a maxillary canine are presented. Clinical and radiographic examination showed that one had an impaction of the right maxillary canine blocked by lateral incisor. The other showed an ectopic erupted canine with ankylosis.
Conclusion: Clinical results indicate that by means of rapid prototyping technique, we can shorten the extra-alveolar time of autotransplantation, and minimize mechanical injuries to periodontal ligament cells.

P19–293

Aesthetic fixed appliance using a natural tooth: a case report

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Introduction: One of the most important and valid reasons for replacing missing incisors is to restore a natural appearance and thus provide an opportunity for normal psychological development. The premature loss of a solitary primary maxillary anterior tooth usually is due to a direct trauma or its consequence, although the anterior teeth may be lost due early childhood caries. Some of the factors for placing an anterior aesthetic appliance are: preservation of space, masticatory function, speech development, tongue habits and self-image. Suitable restoration of these teeth improves aesthetics and contributes to space preservation and function. The use of human enamel is an alternative technique that allows a harmonious oral rehabilitation in very young children. The purpose of this report is to describe the oral rehabilitation of primary anterior teeth in a 3-year-old female patient following failure of replantation.
Clinical management: Dental treatment consisted of an anterior aesthetic fixed appliance made with the crown of the patient's natural tooth. Due to severe root resorption and excessive mobility, the traumatized incisor was extracted. The tooth was transferred into sterile saline solution until one day before laboratory procedures. Appliance design included an orthodontic wire with adjustment loops soldered to maxillary molar bands. Thus, the loops allow making necessary adjustments to allow maxillary growth. This case offers an effective treatment option for the replacement of a missing tooth, providing an ideal pontic with same colour, shape and size of the adjacent teeth.
Conclusion: It can be considered as a non invasive alternative for children that allow them to tolerate the effects of tooth loss better.

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Functional appliance with raising tongue trainer

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Introduction: An anterior crossbite in a serious case causes an inhibition of a normal maxillary growth. As a lower tongue position is related to the mandibular position, the improvement of a lower tongue position might be effective for an anterior crossbite correction. In this case report, we describe the treatment of two patients with anterior crossbite with a lower tongue position using a functional appliance with raising tongue trainer.
Clinical management: We had two cases of an anterior crossbite with a lower tongue position. The first patient was referred at 7 years of age; the second patient was 8 years old. Both patients had an anterior crossbite with a lower tongue position. The treatment consisted of a protocol where the Functional appliance with raising tongue trainer was used for 10 h a day. The first case showed an improvement of the anterior crossbite after 2 months. The second case showed an improvement after 3 months. In addition, there was also an improvement of the lower tongue position in both cases.
Conclusion: Functional appliance with raising tongue trainer in patients with good compliance can improve the severity of an anterior crossbite and a lower tongue position. It is important to assure a normal growth and function of oral health at an early age. Because an anterior crossbite may cause an abnormal maxillary growth and a lower tongue position may cause an abnormal mandibular position.

P19–295

Orthodonic treatment possibilities of allergic patients

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Introduction: During the past two decades there is an increased incidence of oral allergic diseases in orthodontics, mainly because of the frequent use of dental appliances containing nickel or polymers. The inflammatory response often manifests in allergic contact stomatitis, which makes wearing of the appliance impossible for the patients.
Clinical management: In our poster we present two cases with nickel-allergy, where we used epoxy resin coated wires. We demonstrate that the use of these coated wires makes the treatment period uneventful, without any objective or subjective sign or symptom.

Conclusion: Nickel containing metal alloys is widely used in dentistry because of the favourable physical properties of the metal. The corrosion releases nickel ion which are responsible for the local allergic reactions in the oral cavity. Coated wires where there is less corrosion to be found are not only safe to use but more aesthetic. They can be alternative therapeutic appliances in orthodontics in case of nickel allergy.

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Orthodontic treatment needs of children: comparison of three indices

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Introduction: Orthodontic indices used for measuring of the malocclusion prevalence and assessment of the treatment need are of utmost importance for the treatment planning. The aim of this study was to evaluate the orthodontic treatment needs of children using IOTN (Index for Orthodontic Treatment Need), DAI (Dental Aesthetic Index) and ICON (Index of Complexity, Outcome and Need) and to evaluate the relationship among the three indices.

Patients and methods: 100 children (aged 10–12 years) were examined for age, gender, malocclusion, over-jet, overbite, open-bite and crossbite. The study models of subjects were used to compare the DAI, the Dental Health Component (DHC) and the Aesthetic Component (AC) of IOTN and ICON. Ethical approval and informed consent were obtained. Statistical analysis was performed by using NCSS 2007 software and regression analysis was performed between the results.

Results: Overbite, overjet, open bite and crossbite were observed in 66%, 70.7%, 72% and 71% of the subject. The mean average scores of DAI, IOTN-DHC, IOTN-AC and ICON indices were 25.44, 2.46, 4.17 and 38.67. Statistically significant differences were found between the crossbite and DAI, IOTN-DHC, IOTN-AC and ICON scores ($P = 0.022$, $P = 0.009$, $P = 0.002$, $P = 0.016$). There was a statistically positive relationship between DAI and IOTN-DHC, IOTN-AC and ICON scores ($P = 0.0001$). Positive relationships were determined between ICON and IOTN-AC, IOTN-AC and IOTN-DHC scores ($P = 0.0001$). DAI, IOTN and ICON were highly associated statistically ($P = 0.0001$).

Conclusion: DAI, IOTN and ICON were found to be significantly correlated with each other regarding the prevalence of malocclusion and orthodontic treatment need.

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The true three-dimensional craniofacial anatomy: 3-D versus 2-D cephalometric analysis

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Introduction: The aim of this study was to combine the huge amount of information of low dose Cone Beam CT with a cephalometric simplified protocol thanks to the latest informatics aids. Lateral cephalograms are two-dimensional (2-D) radiographs that are used to represent three-dimensional (3-D) structures. Cephalograms have inherent limitations as a result of distortion, super imposition and differential magnification of the craniofacial complex. This may lead to errors of identification and reduced measurement accuracy. The advantages of CBCT over conventional CT include low radiation exposure, imaging quality improvement, potentially better access, high spatial resolution and lower cost.

Patients and methods: This study assessed cephalometric 2D and 3D measurements and the analysis of CBCT cephalograms of the volume and centroid of the maxilla and mandible, in 20 clinical cases.

Results: With a few exceptions the linear and angular cephalometric measurements obtained from CBCT and from conventional cephalograms did not differ statistically ($P > 0.01$). There was a correlation between the variation in the skeletal malocclusion and growth direction of the jaws, and the variation in the spatial position (x, y, and z) of the centroids and their volumes ($P < 0.01$).

Conclusion: The 3D cephalometric analysis is easier to interpret than 2D cephalometric analysis. In contrast to those made on projective radiographies, the angular and linear measurements detected on 3D become real, moreover the fewest points to select and the automatic measurements made by the computer drastically reduced human error, for a much more reliable reproducible and repeatable diagnosis.

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Prevalence of hypodontia in some children attended in Mashhad School of Dentistry

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Introduction: Congenital absence of one or a few teeth, known as hypodontia is one of the most common anomalies in dental development. This condition occurs either individually or as an accompanying symptom of a syndrome. The prevalence for permanent teeth is common, namely between 1.6–9.6%. The objective of this study was investigating the prevalence of hypodontia in 9–14 years old children attending Mashhad School of Dentistry in 2007.

Patients and Materials: In this descriptive cross-sectional study, a total of 600 panoramic radiographs of 9–14-year-old children (351 girls and 249 boys) were available for examination. Ethical committee of Mashhad University of Medical Sciences has approved this research (#286252). All related findings were recorded in related forms. The data were processed using Exact and Chi-square tests.

Results: The prevalence of hypodontia in the girls was 9.2%, in the boys 8.8%, and in both sexes combined 9%. The most and the least frequent absent teeth were the mandibular second premolars and the maxillary central incisor (observed in only 1 child), respectively. The most commonly absent teeth were the mandibular second premolars, the maxillary lateral incisors, the mandibular central incisor, and the maxillary second premolars, in that order.

Conclusions: This study showed the high frequency of hypodontia among the examined population. Thus, due to the complicated treatment, accurate examination of children for on-time diagnosis of this developmental anomaly is crucial. This study was supported by a grant from Mashhad University of Medical Sciences Research Council.

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Three-dimensional space changes after premature loss of a primary first molar

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Introduction: It is generally accepted that a space maintainer is required when a primary first molar is lost before complete eruption of the first permanent molar. However, the space loss after a permanent first molar is fully erupted is controversial. This study examined the spatial changes subsequent to premature loss of a maxillary primary first molar after the permanent first molar is fully erupted.
Materials and methods: Thirteen children, 5 girls and 8 boys, scheduled to undergo premature extraction of a maxillary primary first molar owing to caries or failed pulp therapy were selected. Spatial changes were investigated using a three-dimensional digital model by comparing the primary molar space and arch width, length, and perimeter before and after extracting the maxillary primary first molar. The inclination and angulation changes in the maxillary primary canines, primary second molars, and permanent first molars adjacent to the extraction site were also investigated. This study was reviewed and approved by the Institutional Review Board of Samsung Medical Centre. Statistical analysis consisted of paired *t*-tests, Student's *t*-test, two-way ANOVA and Wilcoxon's two-sample test.
Results: The mean D + E space changes between the initial and final examinations of the extraction and control side were 0.57 ± 0.83 mm and 0.31 ± 0.38 mm respectively. There was no significant space loss at the extraction side compared to the control side. No consistent findings were seen regarding the inclination or angulation changes at the extraction side.
Conclusion: The premature loss of a maxillary primary first molar has limited influence on the space in permanent dentition.

P19–300

Orthodontic treatment need in 4th and 5th grade students in Al-Mabrur, Bandung (Indonesia)

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Introduction: Period of preadolescence is a period of great changes in a child's life. The child is starting to pay attention to him/her and begins to realize if there is something wrong, especially in the face. This is as a part of an identity seeking. Good and interesting performance will improve his/her self esteem. Tooth alignment is a part that supports facial performance. Many parents do not realize that their children have an abnormality in tooth alignment which makes orthodontic treatment necessary. The aim of the study was to evaluate orthodontic treatment need in 4th and 5th grade students of Al-Mabrur Primary School.
Patients and methods: This is a descriptive study with survey technique. All of the 4th and 5th grade students who came to school on the day of the study were included. The total sample comprised 115 students.
Results: Six (5.2%) of them did not need orthodontic intervention, while 109 (94.8%) students required orthodontic treatment. Three students exhibited anterior open bites and 2 students anterior cross bites. In 80 students an Angle class II malocclusion was found and in 2 students an Angle class III malocclusion. 15 students had deep bites.
Conclusion: It was concluded that the majority of 4th and 5th grade students of Al-Mabrur Primary School need orthodontic treatment.

P19–301

Ultrasound bone measurement age changes in cerebral palsy children before orthodontic treatment

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Introduction: Orthodontic rehabilitation in cerebral palsy (CP) children is performed mostly with the use of functional orthodontic appliances. To increase their efficiency it is important to determine the appropriate age for therapy. The aim of this study was to determine the dynamic changes of different UBM-parameters and to reveal age groups with the maximum and minimum values.
Patients and methods: 25 CP-patients (16 boys and 9 girls) were examined before orthodontic treatment. The permission was obtained from the institutional ethical committee and directly from the parents of each patient. The mean age was 5 years (SD = 2.4 year) The UBM of os calcaneus was carried out on the Sonost 2000 (Osteosys, Korea). The following parameters were assessed: bone quality index (BQ), the velocity of the ultrasound wave transmission through the bone tissue (SOS) and the broad-band ultrasound wave attenuation (BUA). Sex-related differences of all UBM-parameters were assessed. All patients were age-matched and divided into 8 age groups. Age groups with the maximum and minimum values were compared.
Results: Sex-related differences of all 3 UBM-parameters were statistically significant ($P < 0.001$). In the age span of 1–11 years there are 2 maximum-value age groups (4 and 8 years) and 1 minimum-value age group (6 years). Comparison of all UBM-parameters in the age groups of 4 (BQ = 78.5 ± 0.6; SOS = 1622.2 ± 2.7; BUA = 23.2 ± 0.1) and 6 (BQ = 66.3 ± 0.5; SOS = 1534.5 ± 1.3; BUA = 19.5 ± 0.2) years revealed statistically significant ($P < 0.001$) differences between all UBM-parameters.
Conclusion: The results of this study show differences in values in UBM in different age groups. Further studies should examine the potential of UBM as a diagnostic method in orthodontic treatment of children with CP.