

with uni- or bi-lateral posterior crossbite involving at least deciduous canines and permanent first molars. Of the selected subjects, 30 were enrolled in the study because 3 didn't show up after initial records and 1 had the RME removed prematurely. Of these 30 patients, 12 were males and 18 females (mean age 8.7 years with a standard deviation of 0.9). They were enrolled in the prospective study and submitted to orthodontic, ear, nose and throat examinations. A specialist did the rhinomanometric examination before (T0) and after rapid palatal expansion (T1). For this analysis Atmos Rhinomanometer 300® and a face-mask were used. The rate of airflow and the pressure gradient between nasopharynx and nostrils were measured. Nasal resistance was recorded in Pa/cm³/s on the right and the left nostril. Measurements of both sides were then combined. Rapid maxillary expansion was realized by a Hyrax-type rapid expander with a palatal split screw, cemented on first permanent molars. The activation protocol provided 2 activation a day for the first 2 weeks, then 1 activation a day until the upper molar palatal cusps were in contact with the lower molar buccal cusps. The differences in nasal resistance between T0 and T1 were statistically evaluated with the Paired Samples 't' Test to assess the significance of T0-T1 and with Kolmogorov-Smirnov test and Levene test to check homogeneity and normal distribution.

Results: Total nasal inspiration and expiration resistance significantly decreased at T1 ($p < 0.001$). The reduction ranged between 0.23 and 0.66 Pa/cm³/s for inspiration and between 0.20 and 0.58 Pa/cm³/s for expiration. A statistically significant positive correlation existed between the T1-T0 differences in expiration nasal airway resistance (Spearman's correlation coefficient $\rho = 0.38$; $p = 0.03$).

Conclusions: Nasal resistance can be improved by rapid maxillary expansion in patients with minor or moderate breathing problems caused by the presence of nasal obstruction. Despite this the maxillary expansion cannot replace medical or surgical treatment when needed.

The importance of the evaluation of available space in the jaws as a variable that can be modified by treatment for the solution of cases of space deficiency or excess

Gumirato E.*, Bazzanella S.*, Brun V.*, Faccioni P.**

University of Verona, Department of Maternal-Infant and Surgical Odontostomatologic Sciences, Director Prof. P.F. Nocini

*Student

**DDS

Aim: The aim of this work is to provide a critical view

of space analysis, that is traditionally focused on the measurement of the mesio-distal diameter of teeth. However, in most cases, mesio-distal dental diameter is normal (see reference tables) and the etiology of space-related problems has to be ascribed to the amount of available space in the jaws, that can be in excess, clinically appearing with the presence of diastemata, or in deficiency, clinically appearing with crowding.

Methods: Presentation of clinical cases of crowding or presence of diastemata for space excess solved by the modification of the length of osseous basis (palatal expansion, osseous distraction, median ostectomy) and review of literature to point out the more significant indexes that must be included in the space analysis to evaluate the amount of available space.

Results: In cases of severe crowding, orthodontic and surgical combined methods represent a valid alternative to extractions in order to correct the problem at the origin of the dento-basal disorder, that is a transversal deficit of basal bone. This therapy can lead to excellent esthetic outcomes, improving the facial profile. Extraction therapy, in contrary, results in a flattening of the profile and biretrusion. Osseous distraction provides new bone generation by an osteotomy and a gradual separation of the two bone surfaces, stimulating the natural biological tissue repair processes. This technique can be applied both to the maxilla and mandible. In the upper jaw distraction force is applied to the palatal suture (rapid palatal expansion or skeletal anchorage devices) and in the mandible to the symphysis. Vice versa, in cases of severe space excess and presence of diastemata, mandibular or maxillary median ostectomy, reverse palatal distraction for the maxilla in growing patients for the treatment of scissor bite in patients affected by Brodie's syndrome represent a valid treatment option.

Conclusions: In conclusion it is recommended to evaluate the severity and etiology of crowding or presence of diastemata during the procedure of space analysis and take in consideration orthodontic and surgical combined methods in cases of severe lack or excess of available space to obtain satisfying esthetic and functional results.

Relationship between periodontal biotype and dental malocclusion: a longitudinal cohort study

Isola Gaetano**, Perillo Letizia***, Lucchese Alessandra****, Matarese Marco*, Picciolo Giacomo*, Ramaglia Luca**, Matarese Giovanni*

*Department of Biomedical, Odontostomatological Sciences and of Morphological and Functional Images, University of Messina, Messina, Italy

**Department of Neurosciences, Reproductive and Odontostomatological Sciences School of Medicine University "Federico II", Naples, Italy

***Associate Professor, Head of Orthodontic Unit and Chair of the Orthodontic Postgraduate Program, Multidisciplinary Department of Medical-Surgical and Dental Specialties, Second University of Naples, Naples, Italy

****Division of Orthodontics, Research Area in Dentofacial Orthopedics and Orthodontics, IRCCS San Raffaele Scientific Institute, Milan, Italy

Aim: In clinical practice, a proper diagnosis of the periodontal biotype is considered important with respect to the decision-making. Periodontal biotype and the gingival thickness is considered as an important factor, which affects the success of periodontal and orthodontic treatment results. Long-term studies that evaluated the association between the gingival recession and orthodontic treatment were concluded that gingival recession was more frequent in individuals who have been treated orthodontically and mandibular incisors were more prone to gingival recession than the other teeth. The aim of this study was to assess the prevalence of the gingival biotypes in a group of patients and to evaluate if the gingival biotypes were related with the different types of Angle's classification of malocclusion.

Methods: This a longitudinal cohort study was conducted on 74 patients (35 males, 38 females, mean age 14.7 years old). Gingival thickness was assessed clinically, on each patient by a single calibrated examiner. Intra-examiner agreement was verified by calculating Cohen's k coefficient. The kappa coefficients were calculated for the measurements obtained at each different examination. Gingival biotypes were assessed with the evaluation on the translucence of a periodontal probe through the gingival margin of the tooth during the probing, at the mid facial aspect of both maxillary central, lateral incisors and canine on each patient, Angle's classification of malocclusion was also recorded. Dental occlusion was clinically assessed using Angle's classification of malocclusion. In order to assess the association between gender, gingival biotype and Angle's classification of malocclusion (categorical variables) χ^2 (Chi square) test was used. For continuous variables, Student's t-test was performed in order to compare male and female subjects and, therefore, thin and thick gingival biotype.

Results: The prevalence in the whole sample of thin gingival biotype was 42.3% and thick gingival biotype was 52.4%. The frequency of female gender with thin gingival biotype was significantly less respect to male patients (41.2% and 52.4%, respectively) while the frequency of thick gingival biotype was higher in the female respect to male patients (54.5% and 46.3%, respectively) ($\chi^2=1.337$, $p=0.245$). The mean age of patients with thin gingival type (14.6 ± 0.5 ye-

ars) was statistically, but not clinically, significantly higher respect to the patients with thick gingival type (14.1 ± 0.7 years), $p=0.026$. There was not a significant association between type of malocclusion and gingival biotype ($p=0.143$) and there was a prevalence of thick gingival biotype in patient with class II malocclusion and a slight prevalence of thin gingival biotype in patient with class I malocclusion.

Conclusion: Patient age, health status of periodontal tissues, duration of treatment, the amount and type of tooth movement, the width of keratinized gingiva and gingival thickness are considered risk factors of gingival recession that can be seen especially in mandibular incisors area depending on orthodontic treatment. The present longitudinal cohort study showed that that female subjects presented a higher prevalence of thin gingival biotype respect to male subjects and that no relationship was found between gingival biotypes and malocclusion, based on Angle's classification. Further studies are needed, in a large scale, to confirm this important relationship between gingival biotype, skeletal profile and facial type.

Asymmetric molars' mesial rotation and mesialization in unilateral functional posterior crossbite and implications for interceptive treatment in the mixed dentition

Laffranchi Laura*, Tonni Ingrid*, Iannazzi Alessandra*, Piancino MariaGrazia**, Costantinides Fulvia***, Sangalli Linda*, Bindi Marino*, Dalessandri Domenico*

*Medical and Surgical Specialties, Radiological Sciences, and Public Health, Dental School, University of Brescia, Italy

**Orthodontic Division, Department of Surgical Sciences, Dental School, University of Turin, Italy

***Department of Medical Sciences, Surgery and Health, Dental School, University of Trieste Italy

Aim: Symmetric transverse expansion is the main outcome of the early treatment in subjects with unilateral functional posterior crossbite. The aim of this study was to analyse mesial rotation and mesialization of upper first molars as sagittal parameters to be corrected in the treatment of these patients during the mixed dentition.

Methods: Digital dental cast measurements (rotation and mesialization) were performed in a sample of 48 subjects with unilateral posterior crossbite (UPXB; 19 males and 29 females, mean age 10.2 ± 1.2 years) and in a control group of 35 subjects with normal Class I occlusion (17 males and 18 females, mean age 9.9 ± 1.3 years). An independent sample t-test, the Mann-Whitney test, Fisher's exact test, and Pearson correlation were used for statistical comparison.

Results: The amount of upper molar rotation was signi-