

Gnathology

Analysis with postural rasterstereography in gnathologic dysfunctional patients with add W/R or WO/R treated with mandibular bite

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Aim: The correlation between occlusion and body posture has always been a very much debated issue in dentistry. In the field of diagnosis and monitoring of orthopedic and postural problems, the rasterstereography based on computerized photogrammetry has received an increasing consideration in the last years. The rasterstereography allows to obtain a 3D - representation of the dorsal profile without the use of ionizing radiation, as it is based on the technique of photometry. Studies using the rasterstereography to investigate the influence of the craniofacial morphology on different postural indices have been published by Lippold et al. Some correlations have been identified, for example, in the studies conducted in 2006 and 2009, regarding the vertical craniofacial pattern and some of the postural angles analyzed. However, all patients selected from them were analyzed without testing different occlusal situations in the same patient. Based on the results obtained from Lippold et al., the aim of our clinical study is to investigate the correlation between postural indices in gnathologic patients with ADD w/R or ADD wo/R, in which were induced different occlusal situations.

Methods: 28 female patients, afferent to the Department of Gnathology 'Dental School-University of Turin', Italy, aged between 25 and 60 years with ADD w/R or ADD wo/R were selected. The subjects were divided into two groups of 14 patients each: The patients of the first group were treated with mandibular bite while the patients of the other group (control group) were left untreated. To test

the possible effects of the mandibular and dental occlusion position on body posture, were performed, in the treated group, four scans with Formetric at different times T0, T1 (1 month), T2 (3 months) in these positions: 1)Mandible at rest; 2)Maximum voluntary clench in intercuspitation; 3)Maximum voluntary clench on cotton rolls placed between the arches; 4)Maximum voluntary clench on bite. While in the control group were performed 3 scans with formetric at different times T0, T1 (1 month), T2 (3 months) in the positions 1), 2) and 3) only.

Results: The results of this study are in line with those reported in the literature and confirm the claims of some systematic reviews that believe the existence of a correlation between body posture and occlusion. In this study, the formetric 4D equipment's reliability and repeatability as a screening and interception tool for postural problems has been confirmed. However, a diagnosis supported also by radiological examinations and orthopedic/physiatrist's advices is needed.

Conclusion: Formetric 4D is a reliable, repeatable and effective tool for the noninvasive investigation of the postural parameters. There were no significant differences between the postural parameters and the different occlusal conditions (rest, the window frame and the window frame on cotton rolls).

Short-term effects of oral devices on sleep bruxism: a placebo-controlled RCT

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Aim: Sleep bruxism (SB) is a stereotyped movement

characterized by grinding or clenching of teeth during sleep, usually associated with an intense (excessive) arousal activity. It is the sleep-related motor disorder of primary interest for dental practitioners, considering several detrimental consequences on the stomatognathic system, including tooth wear, masticatory muscle tenderness and pain, headache and temporomandibular disorders. Based on that, a need emerged to define the best strategies to manage bruxism in the clinical settings. The aim of the study was to evaluate the variation in SB episodes and orofacial pain in four groups of subjects: a control group, a placebo group (using an acrylic appliance covering just the palate) and two groups treated with different oral appliances (OAs) (occlusal splint and functional orthopedic appliance).

Methods: An expert clinician assessed the presence of SB based on the presence of one or more signs/symptoms (i.e. transient jaw muscle pain in the morning, muscle fatigue at awakening, presence of tooth wear, masseter hypertrophy), among patients referring to the Gnathology Unit of the Dental School (University of Turin). First screening recording with Bruxoff® device selected 58 SB patients. Patients were assigned to four groups: control group (14 subjects: mean age 32.7 ± 12.75); placebo group (15 subjects: mean age 32.9 ± 13.83); occlusal-splint group (15 subjects: mean age 33.5 ± 13.76); functional orthopedic appliance group (14 subjects: mean age 33 ± 13.34). Five (N=14) patients dropped out the study (two patients assigned to control group, three to placebo group, three to occlusal-splint group and two patients to group with functional orthopedic appliance) because of the complexity of the study, especially for Bruxoff recording. Consequently forty-four subjects with an effective diagnosis for sleep bruxism (12 for every groups) were selected for the study. Each subject was observed for three months consecutively (T0: screening, T1: 1 week, T2 : 1 month, T3 : 3 months) and monitored with a visual analogue scale in order to evaluate the variation of facial pain. Furthermore, all participants underwent an instrumental recording at home with a portable device (Bruxoff®, OTBioelettronica, Torino, Italy) allowing a simultaneous recording of EMG signals from both the masseter muscles as well as heart frequency to evaluate variation on SB activity. Data were analyzed using Shapiro-Wilk test (for checking the normality), two-way Anova test (for analysis of variance) and test of multiple comparisons of Tukey-Siegel. All statistical procedures were performed with the software Statistical Package for the Social Science v. 23.0 (SPSS 23.0®, IBM, Milan, Italy). For each analysis a p-value < 0.05 was set.

Results: Pain sensation significantly reduced both for stabilization splint and functional orthopedic appliance groups after three months follow-up, with

no differences between the two groups. SB episodes significantly reduced after three months only in functional orthopedic appliance group; no variations were observed in placebo and control groups.

Conclusion: This study showed that two particular kind of OAs could reduce orofacial pain referred by the patients, but only the functional orthopedic appliance showed a statistical significant effect in reducing SB episodes. Further studies on larger and more representative samples, followed for a longer period are needed to obtain major information on SB management.

Periodontal mechanoreceptors: a systematic review

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Aim: Functional movements of the stomatognathic system and their relative forces depend on signals arising from various sensory organs in the orofacial structures. A special role is played by periodontal mechanoreceptors and their sensory innervation, located in the periodontal ligament, that is the optimal location for detecting the functional forces on the teeth. They are involved in mechanotransduction and chewing motor control, but there are important limitations of knowledge in the field. For example, even though mastication is a dynamic process, studies regarding periodontal mechanoreceptors are usually conducted in static conditions and mostly in animals, that are characterized by different teeth and occlusion with respect to the humans, often disregarding the functional differences of teeth. This work aims to review the progress in the field, especially during the last three years, with a special attention to the functional significance of experimental results. There have been a number of molecular reports; however, to understand the impact of these reports on the mechanisms of motor control we need to go back to the earliest physiological studies and these have been integrated with recent molecular data. The main results of basic research have been summarized, dividing the animal from the human studies and the signal pathways arising from mechanotransduction have been described.

Methods: A systematic review of the literature was conducted. Original articles were searched through Pubmed, Cochrane Central database and Embase until

January 2016.

Results: 1466 articles were identified through database searching and screened by reviewing the abstracts. 160 full-text were assessed for eligibility, and after 109 exclusion, 51 articles were included in the review process. Studies selected by the review process were mainly divided in studies on animal and studies on humans. Morphological, histological, molecular and electrophysiological studies investigating the periodontal mechanoreceptors in animals and in humans were included and subdivided in the following subheadings: Histological and electrophysiological studies in animals: are the results in agreement? - Changes during development; - Load response; - periodontal ligament as a source of mesenchymal-like stem cells. Molecular and electrophysiological studies in humans: what do we really know? - adaptation to implant-supported prosthesis; Central connections of the trigeminal primary afferent neurons: is there a bias in the basic research? From mechanotransduction to signal pathways: the role of periodontal mechanoreceptors on the chewing pattern motor control.

Conclusions: Our knowledge of the periodontal mechanoreceptors let us conclude that they are very refined neural receptors, deeply involved in the activation and coordination of the masticatory muscles during function. Strictly linked to the rigid structure of the teeth, they determine all the functional physiological and pathological processes of the stomatognathic system. The knowledge of their complex features is fundamental for all dental professionals. Further investigations are of utmost importance for guiding the technological advances in the respect of the neural control in the dental field.

Reliability of the Italian version of the Oral Behaviors Checklist

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Aim: The aim of this study is to examine the reliability of the Italian version of the Oral Behaviors Checklist Questionnaire (OBC-it), a tool which is widely used in studies concerning TMD compliant and oral parafunctions in the international scientific literature and that has already been subjected to the standard procedures of forward and back translation, committee review and cultural adaptation from RDC-TMD Consortium.

Methods: 282 Students at University Federico II, without temporomandibular pain, according to a validated TMD-pain screening, were recruited and divided into

two groups: Group A (139 subjects, mean age 22.6 ± 5.48) and group B (143 subjects, mean age 23.7 ± 4.21). Participants belonging to group A were asked to fill in the OBC-it twice, with a two weeks interval between the two assessments. Differently from Group A, Group B received additional standardized instructions about the constructs included in the checklist by means of a power point presentation and a verbal explanation from one of the authors. After two weeks, subjects of Group B were asked to fill in the OBC-it again. However, at this stage, half of them (group B1) received again the same instructions, while the other half (group B2) no instructions. The test-retest reliability of OBC-it was assessed by calculating the Intra-class correlation coefficients (ICC) for each of the 21 single constructs and for the total OBC-it score in all groups. The ICC was interpreted as follows: $ICC < .4$ poor reliability, $ICC \geq .4$ but $\leq .75$ fair to good reliability, and $ICC > .75$ excellent reliability. Data were analyzed with SPSS (IBM) Ver. 20. The Statistical Significance was set at $p < .05$.

Results: OBC-it (total score) in group A showed excellent reliability results ($ICC = .87$). The reliability of OBC-it in groups B1 and B2 was excellent and slightly greater than group A. (B1: $ICC = .94$; B2: $ICC = .95$). Generally, all ICC data suggested a good or excellent reliability of the single constructs with the exception of the item 11 ("Hold jaw in rigid or tense position, such as to brace or protect the jaw") which showed fair to good reliability in all groups (Group A: $ICC = .65$; Group B1: $ICC = .61$; Group B2: $ICC = .70$). On the contrary, item 19 ("singing") displayed excellent ICC results in all groups (Group A: $ICC = .90$; Group B1: $ICC = .90$; Group B2: $ICC = .94$).

Conclusions: This study has shown that the Italian version of the OBC, namely OBC-it, is highly reliable and may be used for both research and clinical purposes. The higher ICC values in group B1 and B2 suggest that reliability increases when instructing subjects about the meaning of each item and so that an explanation from the clinician before the compilation could be helpful for a better comprehension of the questionnaire.

Use of aligners for the resolution of extra-articular temporomandibular joint disorder: case report

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Aim: The aim of this work is to provide a guidance about the use of aligners in the resolutions of extra-articular temporomandibular joint disorders in patients with middle malocclusions.

Methods: It is presented a 47-years-old male with extra-articular temporomandibular joint disorders: mild dental class III, deep bite, severe myofascial pain syndrome and mild soreness external pterigoideus

RL, Upper Tapezius RL. The goal of treatment is the resolution of extra-articular temporomandibular joint disorder by the treatment of dental malocclusion of the patient through the use of aligners. The therapeutic protocol chosen, provide for the use of passive aligners Vivera for 2 months, and for the use of active aligners Invisalign for 16 months. At each follow-up appointment the patient reports a decrease in pain.

Results: At the end of the treatment it is observed the resolution of the dental class III and the opening of the bite associated with the reduction of pain of initially sore muscles and improving of myofascial syndrome symptoms.

Conclusion: In this case report is clear that the use of only the aligners, with which the malocclusion of the patient were treated, it was sufficient for the improving of extra-articular temporomandibular joint disorder.

LIMFA® Therapy in the treatment of TMDs correlated pain: a pilot study

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Aim: The aim of this clinical trial is to assess the effects of LIMFA® Therapy (Low Intensity Magnetic Field Appliance) in the treatment of TMDs related chronic pain and to detect any problematic aspects about application of this technology. LIMFA® Therapy is an electromedical device that uses Low Intensity and Extremely Low Frequency Magnetic Fields in multifrequency sequences with variable wave geometry (1-100 Hz, 1-80 mT).

Methods: For the study seven adult patients, from 30 to 78 years old, were selected from a sample of 160 patients visited in a period of 1 month in the Unit of Gnatology of Policlinico Umberto I. Patients with TMDs correlated chronic pain with value ≥ 5 in Verbal Numerical Scale (VNS from 0 to 10) were included; subjects under 18 and over 80 years old, with pacemaker, in pregnancy, with positive anamnesis of tuberculosis, tumors or epilepsy were excluded. LIMFA® Therapy was used as an "add-on" to existing treatment, twice a week, from 1 to 4 weeks. Evaluations were made by subjective measures (Pain Disorders Screening and Perceived Functional Difficulties) and objective measures (Functional Disorders). Results: In T1 (one week) all the patients declared lower VNS value about treated TMJ. After T1 five patients continued the Protocol. A Patient with Degenerative Joint Disease had a little reduction in pain e no improvement in

function, while the others declared less pain and better function. A Patient with Disc Displacement with reduction, showed no more Click on left side and occasionally on the right one. A Patient with Disc Displacement without reduction with limited opening improved both in pain and in function and was able to start gnatology therapy with splint. Two Patients with limited opening (one with Osteoarthritis, the other with Disc Displacement without reduction) declared high VNS value in T°, despite Gnatology Therapy, Physiotherapy, Acupuncture and drug therapy by Neurologist. After treatment with LIMFA® Therapy they declared lower value of pain (Actual, Several and Worst), fewer pain crises and lower dosage of drugs. Two Patients with Hashimoto Thyroiditis had adverse reactions and we decided to break in the protocol (one after T1, the other one after T2).

Conclusion: LIMFA® Therapy showed positive effects in the treatment of high-intensity chronic pain (Arthralgia, Myalgia, Myofascial-pain, Headache) associated with gnatology therapy, or to help starting treatment with Splint. It showed less effectiveness in very important degenerative joint diseases with limited opening. Further studies are essential to investigate the possibility of treating TMD with LIMFA® Therapy's on patients with Hashimoto Thyroiditis.

Association between dental cervical lesions and obstructive sleep apnea syndrome

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Aim: Obstructive sleep apnea syndrome (OSAS) is the most common type of sleep apnea and is caused by complete or partial obstructions of the upper airways. It is characterized by recurring episodes of shallow or paused breathing during sleep and is usually associated with a reduction in blood oxygen saturation. Others signs and symptoms of sleep apnea include: morning headaches, memory or learning problems and not being able to concentrate, feeling irritable, depressed, or having mood swings or personality changes, waking up frequently to urinate, dry mouth or sore throat when you wake up. The aim of this study was to evaluate the association between dental cervical lesions and obstructive sleep apnea syndrome (OSAS).

Methods: 76 patients (42 females and 34 males) were consecutively selected from the Neurologic clinic of the

University hospital Azienda Ospedaliera Universitaria (AOU) "G. Martino" in Messina according to the following inclusion criteria: Caucasian, age between 30 and 60 y.o., absence of craniofacial dysmorphism and craniofacial syndromes. Every enrolled patient signed an informed consent and performed the following exam: neurologic visit, polysomnography (PSG) exam, clinical oral examination and acquisition of high resolution intra-oral and facial photographs. For every patient a clinical chart was drawn up and the presence of dental cervical lesions was evaluated, documented and carefully reported. The odds ratio (OR) was calculated and used to evaluate association between dental cervical lesions and obstructive sleep apnea syndrome (OSAS). An odds ratio (OR) is a measure of association between an exposure and an

outcome. The OR denotes the odds that an outcome will occur given a particular exposure, compared to the odds of the outcome happening in the absence of that exposure.

Results: 41 patients were diagnosed as affected by obstructive sleep apnea syndrome (OSAS), 27 of those patients showed dental cervical lesions 14 patients did not show cervical lesions. 35 patients were diagnosed as non-OSAS patients, 12 of those patients showed cervical lesions, 23 patients did not show cervical lesions. The calculated ratio odds was 3.6.

Conclusions: The results of our study indicate a moderate association between dental cervical lesions and obstructive sleep apnea syndrome (OSAS). These lesions are localized on both the anterior and posterior regions of both arches.