

CORRELATION BETWEEN TEMPOROMANDIBULAR DISORDERS AND NECK PAIN IN PATIENTS WITH PRIMARY HEA

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Aim: to assess the correlation underpinning different clinical conditions as painful temporomandibular disorders (TMD) and neck pain in patients affected by primary headaches.

Methods: the present retrospective study analyzed data from medical records of patients with diagnosis of migraine, tension-type headache (TTH), or and other primary headaches, referring to a University Hospital over a 10-year period. Visual analogue scale (VAS) was used to evaluate the intensity of the TMD and neck pain. A machine learning approach was used for automated classification of TMDs and headache using all the VAS scale of TMD and cervical neck pain.

Results: a total of 300 patients (72 male, 228 female), mean aged 37.78±5.11 years, was included. The 72.22% of patients with migraine showed to have a diagnosis of TMD higher than patients with TTH (63.37%) and significantly higher than those with other primary headaches (55.17%; $p = 0.030$). Patients with migraine had a TMD VAS (6.03±2.11) significantly higher than TTH patients (4.39±1.68; $p = 0.002$) and other primary he-

adaches patients (5.54±1.59; $p = 0.003$). Furthermore, migraine patients showed a neck pain VAS (6.65±3.01) significantly higher than TTH patients (6.19±1.52; $p = 0.030$) and other primary headaches patients (5.21±1.44; $p = 0.001$). The machine learning analysis focused on type of primary headache demonstrated that a higher TMD VAS was correlated to migraine, whereas a higher neck pain VAS was correlated to TTH or migraine. Nevertheless, arthrogenous and mixed TMD showed to be correlated to mild-moderate TMD pain (depending on neck pain intensity), whereas myogenic TMD was correlated to moderate-severe TMD pain.

Conclusions: taken together, findings of this machine learning study focused on patients with primary headache, reporting that a higher TMD VAS could be more correlated to migraine and a higher neck pain VAS could be more correlated to TTH or migraine. Further prospective studies could investigate the effects of an adequate treatment of TMD in improving outcomes in terms of headache and neck pain.

TEMPORAL SEQUENCE BETWEEN SLEEP BRUXISM EVENT AND CORTICAL AROUSAL: A PRELIMINARY STUDY

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Aim: Sleep bruxism (SB) episodes and masticatory muscle activity have been thought to be secondary to a sequence of events, including increased brain electroencephalographic activity and heart rate.

This study investigates the temporal intervals between these arousal related events and SB-related masseter muscle activity (MMA) in patients with sleep disorders.

Methods: patients presenting at least 30 SB episodes recorded through the signal of electrode on masseter muscle and laboratory polysomnography audio-video registration were included. The time intervals in seconds (s) between SB-related MMA and the following variables were computed: increased brain electroencephalographic activity, heart rate, mylohyoid and tibialis anterior muscles activity. Events were also catego-

rized according to their temporal distribution with respect to MMA as contextual, antecedent (<5 s before), subsequent (<5 s after) or isolated (5 s earlier or later) ones.

Results: increased electroencephalographic activity was mainly contextual to MMA (64.5%), followed by antecedent (20.5%), subsequent (14%) and isolated events (1%). Increased heart rate was mainly subsequent to MMA (49%), followed by antecedent (29%), contextual (22%) and isolated events (0.20%). A statistically significant difference emerged for all the time intervals as duration in s and, also, according to their temporal distribution ($p < 0.0001$).

Conclusions: these preliminary data do not support the hypothesis of a uniform sequence of arousal-related events in relation to MMA during SB events in patients with sleep disorders.

BRUXISM ASSESSMENT IN OROFACIAL PAIN PATIENTS *VERSUS* CONTROLS: A PILOT STUDY

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Aim: Temporomandibular disorders (TMD) are a biopsychosocial condition, with a multifactorial etiology. Muscle overloading due to tooth clenching is associated with local ischemia, related to muscle pain sensitization. Sleep bruxism (SB) and awake bruxism (AB) are masticatory muscle activities characterized by clenching or teeth grinding and/or bracing the mandible that have been associated to orofacial pain and tooth wear. Despite several methods have been proposed for the assessment of SB and AB, their validity have not been proven and the relationship between bruxism and TMD is still controversial. The aim of this pilot study was to evaluate a possible correlation between the electromyographic activity of the masseter muscle and the presence of orofacial pain in patients with muscle TMD and controls.

Methods: 12 patients diagnosed with muscle TMD with DC/TMD and 12 healthy controls were registered for 24h with the

dia-BRUXO device (Biotechnovations S.R.L.), a wearable single-channel electromyogram system located in a standardized position on the left masseter. The number of the masseter muscle activities were scored by the dia-BRUXO software.

Results: no significant differences were found between the two groups for all the parameters analyzed. The number of SB events per hour resulted lower in the TMD group (TMD group $n = 3.9 \pm 2.5/h$; C group $n = 6.4 \pm 8.6/h$), although not significantly. TMD group showed a trend of higher number of AB event per hour than controls (TMD group $n = 8.9 \pm 10.2/h$; C group $n = 6.1 \pm 3.9/h$) that do not reach the statistical significance.

Conclusions: no differences emerged between the two groups in the number of events. Preliminary results seem to suggest that subjects with muscle TMD may present a higher frequency of AB events than healthy controls. Larger samples and further studies are needed.

FUNCTIONAL CHONDROCYTES FROM HMSCS: COMPARISON OF DIFFERENT FACTOR ELUTING MATRICES

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Aim: disc removal is often the treatment of choice in cases of debilitating temporomandibular disorders. To date, there are no reconstructive techniques that can replace tissues that are ablated. The aim of this study is to evaluate the *in vitro* proliferation and maturation of human mesenchymal stem cells.

Methods: culturing on three-dimensional arrays composed of electrospun self-assembling peptides (SAPs), this material is impregnated with vascular endothelial growth factor and mitogenic factors that are gradually released from the degrading SAPs and combinations of supporting cells of stromal nature and endothelial cells. The best conditions that emerged in this

screening will then be reproduced to prepare more mature and active cell preparations that will be tested, *in vivo*, on degenerating cartilage.

Results: in our study, the use of human mesenchymal stem cells *in vitro* is described, in which the 'activity regarding proliferation, migration, and differentiation into chondrogenic cells is evaluated under different experimental conditions.

Conclusions: the use of biomimetic nanomaterials with factor eluting qualities is perhaps the most ideal system to grow mature and stable chondrocytes with the goal of creating an implantable cartilage tissue.

EVALUATION OF MASTICATORY MUSCLE ACTIVITY IN PATIENTS WITH JUVENILE IDIOPATHIC ARTHRITIS

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Aim: to assess any differences in muscular activity in children with juvenile idiopathic arthritis (JIA) compared to children without JIA.

Methods: 50 patients affected by JIA (10 M, 40 F, mean age \pm SD = 11.12 \pm 2.85 years) and 69 healthy subjects (30 M, 39 F, mean age \pm SD = 10.0 \pm 1.7 years) were recruited. Patients in JIA group were further divided in two subgroups according to the presence of skeletal asymmetry (Symmetric JIA = 28; Asymmetric JIA = 22). The healthy group was divided according to the presence of dental unilateral posterior crossbite UPCB (healthy = 40; UPCB n = 29). The activity of the left and right anterior temporalis (AT) and masseter muscles (MM) was recorded during maximum voluntary clenching and chewing tasks. Electromyographic indices comparing the activity of

paired muscle were computed via software to estimate the extent of asymmetric activity AT and MM. Between-group differences in standardised EMG indices were tested by means of an unpaired t test and one-way analysis of variance (one-way ANOVA). A Chi squared test was performed to examine whether the association between EMG indices and presence of JIA.

Results: no significant differences were found for analysed static (POC, TQ, BAR, ATTIV, ASIM, IMPACT) and dynamic (SMI) indices in all the comparisons, between JIA and CTR group and among the four subgroups. The Chi-squared test did not show any association between the assessed variables.

Conclusions: JIA does not contribute to an asymmetric activation of AT and MM during functional tasks.

SCORING OF TOOTH WEAR USING TWES2.0 ON DIGITAL COLOURED INTRA-ORAL SCAN

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Objectives: this study aimed to assess the reliability of the tooth wear scoring with Tooth Wear Evaluation System (TWES) 2.0 on digital coloured intra-oral scan records as compared to clinical assessment.

Methods: forty (40) participants (18 males and 22 females, mean age: 25.5 years) with no restriction on the amount of dental wear were included. TWES was used to grade the wearing of the occlusal/incisal, buccal and palatal/lingual surfaces. One operator (OP1) performed the assessment at chairside (clinical examination), which was considered as the “gold standard” assessment for the validity testing. Afterwards, to measure the interobserver agreement, two operators (OP1 and OP2) independently scored the degree of dental wear on the

digital coloured intra-oral scans. Both OP1 and OP2 repeated the same assessments after 10 days to measure the intra-observer agreement.

Results: regarding the overall validity of the method, O1 showed slight to fair agreement, while O2 reported substantial agreement. Regarding the intra-observer reliability, O1 reported a slight agreement while O2 showed almost perfect agreement. Inter-observer reliability supported slight or fair agreement between operators.

Conclusions: the validity and reliability in the use of TWES 2.0 on digital coloured intra-oral scan was extremely dependent on the ability of the operator. A dedicated training seems to be necessary before using this method.

EFFICACY OF A FORCE-SENSING ORAL APPLIANCE IN THE DETECTION OF BRUXISM EVENTS

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Aim: due to the necessity of a more objective diagnosis of bruxism, this study aims to evaluate the efficacy of a force-sensing oral appliance in a home environment, that is more practical, comfortable and low-cost.

Methods: 23 subjects were evaluated in a single session and simulated bruxism events were measured simultaneously with the oral appliance and an electromyograph (EMG). The device used (AesyBite Discover, manufactured by Aesyra SA) is a nightguard endowed with four pressure sensors, customized by low-temperature thermoforming directly on the upper dental arch of the user. Four EMG electrodes recording the temporalis and masseter mu-

scles were placed bilaterally. The subjects were instructed to execute a sequence of 20 bruxism-related and 20 bruxism-unrelated events; the data were recorded in order to compare the two techniques.

Results: in the sample studied, a strong correlation was found between the two methods in detecting events ($r = 0.89$) and measuring their duration ($r = 0.88$) and intensity ($r = 0.83$).

Conclusions: the force-sensing oral appliance has the potential to detect teeth clenching and grinding events and could be more comfortable and easier to use than polysomnography with EMG, which is, to date, the gold standard for the diagnosis of bruxism.

OCCLUSAL TACTILE ACUITY AND ELECTROMYOGRAPHIC ACTIVITY OF THE MASTICATORY MUSCLES

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Aim: to compare occlusal tactile acuity (OTA) and electromyographic activity of the masticatory muscles in healthy subjects, and whether there are differences between the right and left sides of the face.

Methods: twenty healthy subjects (16 females and 4 males) were recruited. The OTA was tested with 10 different thicknesses: 9 aluminium foils ranging from 8 μm to 72 μm with a constant increment of 8 μm , and 1 sham test (without foil). The participants were instructed to close their mouth once and to report whether they felt the foil between their molar teeth. The occlusal sensitivity was tested for two times, before (T0) and after the temporal and masseterin electromyography (T1).

Asymmetry index (ASIM) is used to compare differences between the right muscle pair with the left. Difference was evaluated for each foil thickness and ASIM and, after Bonferroni correction, statistical significance was set at ($p < 0.005$).

Results: significantly increased OTA was observed in subjects for the thicknesses 16 μm , while no significant differences were found for the larger thicknesses tested (from 8 μm to 72 μm) ($p > 0.005$), no statistically significant differences were found between right and left side.

Conclusions: the results of the present subjects have an increased occlusal sensitivity for thickness 16 μm after performing electromyography (T1).

CORRELATION BETWEEN TEMPOROMANDIBULAR DISORDERS AND VITAMIN D DEFICIENCY. REVIEW

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Aim: the aim of this study was to analyze the correlation between vitamin D (VD) insufficiency and temporomandibular disorders (TMD) and possible therapeutic implications.

Methods: the search was performed within the “PubMed” database using the MeSH terms “Temporomandibular Joint Disorders” [Majr] and “Vitamin D” and produced 11 results. Subsequently, after a careful reading of the abstracts, 8 articles relating to the goal of this work were selected.

Results: most of the studies found a correlation between TMD and VD. Vitamin D may play a role in TMD etiology. Serious VD deficiency resulted to be more prevalent in the patients with disc displacement with reduction when compared to healthy controls. TMJ radiographic changes and teeth loss seems to

be related to the VD level. VD affects masticatory muscle activity by improving its thickness and boosting its tonicity and VD supplementation provided faster relief in TMD patients with centric stabilization splint. Only one study showed that serum concentrations of VD are not associated with TMD.

Conclusions: in patients with TMD, VD deficiency should be evaluated and corrected. Vitamin D therapy might be indicated for deficient patients with TMD for improving masticatory muscle activity and efficiency or to reduce pain. Further studies are needed to confirm the relationship between vitamin D levels and different types of temporomandibular disorders and for making general recommendations for VD supplementation in TMD patients with VD deficiency.

EFFICACY OF THERMORHIZOTOMY IN THE TREATMENT OF TRIGEMINAL NEURALGIA. A COHORT STUDY

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Aim: the Headache Classification Committee describes a Trigeminal neuralgia (TN) like a disorder characterized by recurrent unilateral brief electric shock-like pains, abrupt in onset and termination, limited to the distribution of one or more divisions of the trigeminal nerve and triggered by innocuous stimuli. It may develop without apparent cause or be a result of another diagnosed disorder. The antiepileptics carbamazepine and oxcarbazepine are the first choice drugs for long-term treatment of TN. By contrast, the Percutaneous Radiofrequency Thermorhizotomy (PRT) is a surgical procedure offered to patients who are refractory or intolerant to drugs.

Methods: this retrospective cohort study consisted of 29 Italian adults aged 18 years or older with refractory TN. All the patients

underwent PRT from January 2010 to June 2021 at the Pain Therapy Unit of the Businco Hospital, Cagliari, Italy. In all cases using a 22-gage radiofrequency needle to kill nerve fibers responsible for sending pain signals to the higher centers. The χ^2 test was carried out to quantify the effect of PRT. The ANOVA test was carried out to establish prognosis to the effect's duration of PRT.

Results: the average duration of the PRT was approximately 2 years. Carbamazepine is the pre-surgical drug correlated with the most favorable outcome of PRT. Only in 5% of cases there was no improvement while 65% of cases stopped taking drugs.

Conclusions: PRT mini-invasive surgical treatment represent a valid alternative to treat efficacy patient with refractory TN.

FULL-DIGITAL FORKFLOW FOR TDMS MANAGEMENT: A CASE REPORT

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Aim: the aim of this study is to show the San Raffaele Hospital's "Gnathology" full digital protocol applied to a case of a patient with Temporomandibular Disorders.

Methods: a 22-year-old patient affected by TMD came to visit at San Raffaele Hospital. The patient presented a chewing discomfort, joint clicking, and headache, because of a facial trauma happened 2 years earlier (to the right TMJ) during a dance session. As the protocol state, electromyography, MRI, cervical mobility test, and facial scan were done with digital devices. Mandibular repositioning was digitally planned after assessing its movements through the ModJaw® (Tech in Motion) device. In this case, the mandible was repositioned forward of 2 mm and downward of 1 mm. The position was planned to increase the intra-articular space and to maintain a straight open dynamic

tracing of the jaw. The splints were digitally printed using the therapeutic position. The treatment with occlusal appliances consisted of repositioning appliances in the upper and lower arches, to be alternatively worn night and day for about 6 months. Mandibular stabilization exercises were also recommended.

Results: in the present case reports the patient achieved a significant improvement in their symptoms in about 6-8 months.

Conclusions: the digital workflow has many advantages: The possibility of making a more "aware" diagnosis, faster realization and execution of the intraoral appliance, the possibility of digitally memorizing the therapeutic position and virtually checking the device, the exchangeability of the planned mandibular position and its kinematics with other colleagues in the dental team.

MANAGEMENT OF TDMS WITH DIGITALLY PLANNED APPLIANCES

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Aim: Temporomandibular joint disorders (TMD) have always been the subject of studies due to the difficult management of symptoms and the complex stabilization of the so-called therapeutic position. In this effort, digital technologies open-up new opportunities for such planning, allowing the clinician to digitally assess the situation and verify the stability of the new position from a functional point of view. The aim of this work is to show a Full digital protocol for the treatment of patient affected by TMD.

Methods: three clinical cases were analyzed with full digital techniques and workflow. A personalized treatment for each case was digitally planned on the base of proper kinematic tracings recorded for each patient, and intraoral appliances were digitally customized through a full-digital or semi-digital

workflow. There was a full-digital planning of treatment in TMDs patients made with the preliminary evaluation of the kinematic activity of the mandible through a digital device (Tech in motion™, ModJaw, Villeurbanne, France). A personalized treatment for each case was digitally planned on the base of proper kinematic tracings recorded for each patient, and intraoral appliances were digitally customized through a digital workflow.

Results: in this study all patients achieved a significant improvement in their symptoms in about 6-8 months.

Conclusions: the digitalization of mandibular kinematic gave us the possibility of making a more "aware" diagnosis, especially in a dynamic key, and then it allowed a faster realization and execution of the intraoral appliance through a digital workflow.

EVALUATION OF OCCLUSAL TACTILE ACUITY IN INDIVIDUALS WITH BURNING MOUTH SYNDROME

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Aim: Occlusal Tactile Acuity (OTA) is the ability to detect small thicknesses between occluding teeth. Here, the aim was to compare the OTA of Burning Mouth Syndrome (BMS) patients with that of control (CTR) individuals.

Methods: twenty-five (25) BMS patients (19 women, mean age 55.9 ± 12.7 years) and 25 age- and gender-matched CTR were enrolled. The OTA was tested with 10 thicknesses: 9 aluminum foils (from 8 to 72 μm) and 1 sham test (without foil), each being tested 10 times in random order. Participants were instructed to close their mouth once and to report whether they felt the foil between their teeth. Mean percentage of cor-

rect answers was measured for each thickness and the ANOVA for repeated measurements, with Bonferroni multiple correction, was used for the between-group comparison. Statistically significant level was set at $p < 0.005$.

Results: significantly increased OTA was observed in the BMS group for the thicknesses between 8 and 48 μm . No differences were found for the larger thicknesses tested. Also, BMS patients showed impairment in the detection of the sham test, even if this result did not reach significance ($p > 0.005$).

Conclusions: BMS patients showed increased ability to detect small thicknesses between antagonist teeth.

THE TOP 100 MOST-CITED ARTICLES IN DENTISTRY BY AUTHORS WITH ITALIAN AFFILIATION

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Aim: the purpose of this research was to perform a bibliometric analysis on the top 100 most-cited articles in dentistry, authored by researchers with an Italian affiliation. This analysis can provide valuable insights into the evolution of research and aid in predicting future developments.

Methods: in September 2022, a search was conducted for all articles published in journals indexed under the Scopus category "Dentistry" that had at least one author affiliated with an Italian institution. From the results, the top 100 most-cited articles were selected, and relevant data was extracted and summarized. Additionally, a co-authorship analysis at the country level and a co-occurrence analysis of keywords were performed.

Results: the selected 100 most-cited articles in dentistry were published over a span of 44 years, from 1976 to 2020. The number of citations ranged from 235 to 1683, with an average of 361. Out of the 100 articles, 25 were considered citation classics, having more than 400 citations. The majority of the

articles were categorized as expert opinion or narrative reviews. The three most common disciplines referred to in the articles were implantology, periodontology, and restorative dentistry, which accounted for nearly half of all the articles. Only two of the articles had a single author, while 30 had authors affiliated solely with Italian institutions. The United States was the most frequent country of non-Italian authors. All but one of the articles were published in journals held by non-Italian publishers.

Conclusions: the collection of highly-cited articles in this study serves to validate the significant contribution of Italy to the field of dental research. The results showed that there was no correlation between the level of evidence presented in an article and the number of citations it received, and that highly-cited papers were not evenly distributed across different dental disciplines. Most of the articles analyzed in this study had international co-authorship and were published in highly influential journals.

EXPERIMENTAL EVALUATION OF CRANIAL EMG USAGE IN ATHLETES AND CLINICAL IMPLICATIONS

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Aim: the experimental analysis of the data, provided by the cranial electromyographic surface recording, is supposed to examine the correlation between the stomatognathic apparatus and the muscular tonic system, focusing attention on the implications that this relation has on the physical status of the professional athlete.

Methods: 25 athletes (average age 23 years, 20 men and 5 women) underwent electromyographic registration, of which 13 reported being in a condition of sports injury (symptomatic athletes) and 12 in perfect physical condition (asymptomatic athletes), while at the level gnato - orthodontic, 7 presented

occlusal dysfunction (afunctional athletes), while 18 showed a well compensated occlusion (functional athletes).

Results: the statistical analysis of the data shows that the therapeutic choice implemented following the use of the electromyographic method in question had an overall efficacy in 72% of cases against 28% who did not respond to therapy ($p = 0.028$).

Conclusions: the use of cranial semg in competitive athletes is clinically indicated in the therapeutic choice aimed at balancing occlusal loads and at improving the overall tonic-postural attitude of the individual, with consequent positive feedback in the qualitative assessment of sports performance.

CORRELATION BETWEEN BRUXISM EPISODE INDEX AND HEART RATE VARIABILITY (HRV)

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Aim: a good management of sleep bruxism has not been achieved yet, although some etiological agents have been verified: stress, for instance, has been found to be closely related to autonomic nervous system (ANS) activity and sleep bruxism (SB). For this reason, the effects of a technique of abdominal breathing on Heart Rate Variability (HRV), activity of muscles of mastication and electrodermal activity (EDA), and a possible correlation between HRV and SB have been examined. Both HRV and EDA are indicators of sympathetic system activity.

Methods: using a Bruxoff device and Empatica E4, two recordings have been conducted in a sample of 8 adults, the second one 14 days after the first one. Between the two recordings, the

individuals performed an autogenic training (AT) to acquire an autonomous deep and diaphragmatic breathing. It consists of the repetition of Schulz' protocol exercises which were performed for 14 days, twice a day for about 20 minutes each time, initially guided.

Results: a reduction in all 3 physiologic parameters has been observed, in accordance with the effects of AT on ANS: EDA has reduced 75%, and HRV by 20%. A 75% reduction in bruxism index in bruxist individuals (evaluated at T_0) was found.

Conclusions: the study is the first to have investigated the possible association between SB and HRV and shows a reduction of the measured parameters, in particular in bruxism index.

T-SCAN AND SEMG EVALUATION IN TEMPORO-MANDIBULAR JOINT INTRACAPSULAR DISEASE PATIENTS

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Aim: in this work authors show a diagnostic criterion of TMID: neuro occlusal clinical evaluation (NOE), T-Scan 2 system and surface electromyography (sEMG).

Methods: 18 patients (mean age 26.7) with TMID and 18 healthy group control have been selected and examined, T-Scan and sEMG test have been performed. NOE was calculated through functional masticatory angle (AFM) on the patient's lateral photos. T-Scan System was a digital occlusion analysis system providing a comprehensive occlusal balance measurement. Finally, sEMG recorded muscle force contraction. T-Scan and sEMG tests have been performed in resting position and in maximum clench.

Results: the findings of the study are the following:

- in healthy control there were no AFM difference; instead in TMID group there were differences between the two AFMs greater than 6 degrees.

- T scan detected that in the healthy control group there was never a COF difference greater than 5%, while in TMID patients the difference was greater than 5% ($p < 0.05$).
- T-scan detected the higher MIFT (time force of maximum intercuspitation) in healthy patients compared to TMID patients ($p < 0.05$).
- The sEMG test showed large asymmetric masseter (MM) activation in the TMID group. MM activation was greater on the affected articulatory sound side than on the balance side ($p < 0.001$).
- The sEMG found lower maximal masseter activation in TMID patients than in healthy subjects ($p < 0.001$).

Conclusions: in patients with TMID, neuro occlusal clinical evaluation (NOE), T-Scan and sEMG test showed functional neuromuscular changes compared to healthy subjects.

MODIFIED SPLINT THERAPY FOR DISC DISPLACEMENT WITH REDUCTION OF TEMPOROMANDIBULAR JOINT

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Aim: Disc displacement with reduction (DDwR) is one of the most common TMJ arthropathy and is typified by clinical dysfunction and structural impairment involving the disc-condyle complex. The study aimed at assessing the effectiveness of modified occlusal splint in the management of temporomandibular joint disc displacement with reduction (DDwR) in comparison with conventional physical therapy.

Methods: the effects of modified occlusal splint were investigated in a one-blind, randomised controlled clinical trial involving 86 individuals diagnosed with DDwR. Patients were randomly assigned (1:1) by computer-generated allocation sequence to receive rehabilitation by using conventional physical therapy approaches or modified occlusal splint therapy. The first follow-up visit has taken place after one month of therapy and after 3 months. MRI examinations were performed using a 1.5 T MRI scanner. T1- and T2-weighted ima-

ges with para-sagittal and para-coronal images were obtained. According to the MRI findings, temporomandibular joint (TMJ) discpositions were divided into 3 subgroups: normal, anterior disc displacement with reduction (DWR), and anterior disc displacement without reduction (DWOR). The cases of effusion were divided into 4 groups: normal, mild (E1), moderate (E2), and marked effusion (E3). Image analysis involved the evaluation of morphology and function of intra-articular structures.

The outcome was defined as leading to the disappearance of the joint sounds of temporomandibular joint (TMJ). Existence of disc displacement in joint (with reduction, without reduction), existence of effusion in joint gap, arthritis, degenerative changes in joints, limitation of movement of joint and anatomic evaluations were made using a set of morphological parameters.

Results: between March 2021 and November 2022, 176 patients were identified, and 86 participants were recruited: 43 were randomly assigned to receive the modified mandibular splint technique. We observed significant differences between

en groups in the success rate (74.4%) of patients with clicking of the TMJ at mouth opening of 1.5 cm.

Conclusions: the modified mandibular splint could be considered as the effective alternative for treatment of DDwR.

GNATHOLOGICAL AND PERFORMANCE ASSESSMENT OF BASKETBALL PLAYERS: MOUTHGUARD FUNCTION

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Aim: the purpose is to analyze oral, gnathological, and postural health status and performance levels before and after the use of a sports mouthguard in a homogeneous group of basketball players.

Methods: 34 basketball players from 3 sports clubs of Perugia aged 18-30 years were included (CER NO.: 4381/22). The multidisciplinary team (dentists, podiatrist and athletic trainer) conducted analysis on each athlete: dental and gnathological visit with surface electromyography and band accelerometer, podiatric and performance sports examinations with baropodometric platform and infrared sensors. A 3 mm splint was made for each athlete by thermoforming. The examination protocol was performed at time zero (T0), after three months of training without splint (T1) and after three months of wearing the mouthguard (T2), provided at the second visit (T1).

Results: at T0 it was found how 54% of subjects had gnathological alterations, the other data defined the baseline condition of the sample.

These values were confirmed at T1. At T2, 43% of the subjects experienced changes in gnathological parameters. Variations in cervical, baropodometric and performance parameters were also observed.

Conclusions: the use of a mouthguard generates gnathological, postural, and performance changes in athletes. The application of devices such as splints following careful multidisciplinary evaluation could be part of the strategies for monitoring the sports activity of various categories of athletes. Subsequent studies will analyze possible correlations between the selected parameters.

SURFACE ELECTROMYOGRAPHY: INSTRUMENTAL EXAMINATION TO SUPPORT GNATHOLOGICAL DIAGNOSIS

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Aim: the study aims to evaluate the benefit of adopting a surface electromyograph (EMG) as a diagnostic confirmation tool during gnathological examination.

Methods: 34 basketball players from 3 basketball teams of Perugia were enrolled. (CER NO.: 4381/22). Gnathological examination was performed according to the "Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) Clinical Examination Protocol, version: January 6, 2014" on each subject. Based on the data obtained 3 groups were identified: subjects without TMD, with muscle TMD, and with joint TMD, in accordance with the criteria of the American Academy of Orofacial Pain (AAOP). Surface EMG providing quantitative information on muscle behavior in relation to occlusion was then used. Clinical data collected were subjected to

statistical analysis in order to evaluate the associations between the different parameters under investigation.

Results: there is a correlation between electromyographic parameters in each of the groups. There is a linear correlation with the variables TORS ($r = -0.917$) and SCORE ($r = -0.914$), referring to mandibular torsion and general electromyographic score, the two main discriminatory parameters between healthy subjects or those with muscle or joint TMD, and the best predictors of TMD. Additional variables related to the individual diagnostic groups were identified.

Conclusions: there are promising results for future investigations considering this preliminary study. EMG appears an effective tool in the diagnosis of TMD. Future researches will implement the sample size to confirm the results.