

# SUMMER SCHOOL 2024

## POSTER PRESENTATIONS



UNIVERSITY CLINIC OF DENTISTRY  
MEDICAL UNIVERSITY OF VIENNA

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Education in Occlusion Medicine

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Wasserzeile 35  
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# POSTER PROGRAM

## SUMMER SCHOOL 2024

International Conference on Occlusion and Function in Dentistry

**'Mandibular Repositioning: Indications and Limitations'**

**24 – 28 July 2024**



UNIVERSITY CLINIC OF DENTISTRY  
MEDICAL UNIVERSITY OF VIENNA

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## POSTER PRESENTATION PROGRAM

The poster program is subject to any changes without prior notice.



Karen Homs et al. / USA

### *Accuracy of Dental Remote Monitoring Tooth Tracking Technology in Orthodontics*

#### **Abstract**

**Introduction:** An in-vivo evaluation of the Dental Monitoring (DM; Paris, France) Artificial Intelligence Driven Remote Monitoring technology was conducted in an active clinical setting. Our objectives were to compare the accuracy and validity of the 3-dimensional (3D) digital models remotely generated from the DM application to 3D Digital Models generated from the iTero Element 5D intraoral scanner (Align Technologies, San Jose, Calif) of patients' dentition during in-vivo fixed orthodontic treatment.

**Methods:** The orthodontic treatment of 24 patients (aged 14-55 years) was tracked across an average of 13.4 months. Scans of the maxillary and mandibular arches of each patient were taken by an iTero intraoral scanner and with the DM application before treatment initiation without (T0) and with (T1) the fixed orthodontic appliances and at every in-person adjustment appointment (T2-T10). The global deviation between the reconstructed digital models from the DM and iTero scans was compared at each time point using Geomagic Control-X 2020 (3D Systems, Rock Hill, SC). Descriptive analysis was conducted to determine the mean deviation at each time point for the maxillary and mandibular arches, to compare the maxilla and mandible mean deviations at each time point to the null hypothesis mean of 0 mm and the paired mean of the average at each time point between the maxilla and mandible.

**Results:** The findings revealed no clinically significant difference between the reconstructed digital models generated by the iTero IOS and the remotely reconstructed digital dental models generated by the DM application.

**Conclusion:** DM artificial intelligence tracking algorithm can track tooth movement and reconstruct 3D digital models to a clinically acceptable degree for orthodontic application.

#### **CV**

Dr. Karen Homs is an Illinois native and proud Chicagoan. Her love of education and life-long learning led her to earn two different bachelor's degrees from two different universities: a BA from Loyola University Chicago and a BS from the University of Illinois at Chicago (UIC). In 2019, she earned a Doctor of Dental Medicine degree (DMD) from the UIC College of Dentistry, graduated with honors and received the American Association of Orthodontists (AAO) Dental Student Award. Dr. Homs has a special interest in dental education, AI technology, patients with special needs and craniofacial anomalies. Dr. Homs received her master in oral sciences and certificate in orthodontics from University of Illinois Chicago in 2022. She also obtained American Board of Orthodontists certification in 2023.



Sara Kahng et al. / USA

### *Accuracy of Digital Indirect Bonding Using Different Bracket Transfer Methods*

#### **Abstract**

Accurate and efficient bracket placement is essential for successful orthodontic treatment. To resolve errors in bracket positioning, the indirect bonding (IDB) technique was developed. Current IDB practices utilize intra-oral scanning, digital bracket placement, and 3D printing. The aim of this study was to compare the transfer accuracy of three digital IDB techniques: silicone, 3D printed bars, and novel shape-memory polymer shell (SMP). Our hypothesis predicted increased

transfer accuracy with the SMP shell. The study utilized 15 pre-treatment patient scans imported into the OrthoAnalyzer software for digital bracket placement and Appliance Designer for the construction of the transfer trays. IDB bracketed models were superimposed on to reference models using the Geomagic software to determine transfer accuracy for each technique. A one-sample t-test was conducted to assess for any significant error in bracket placement in the three materials. A repeated measures ANOVA, with Greenhouse-Geisser correction, was conducted to assess whether there were mean differences between the three techniques in the linear and angular dimension. The results of our study showed that the SMP material had the lowest bracket failure and the greatest accuracy in linear and angular dimensions when compared to the bar and silicone method.

#### CV

Dr. Sara Kahng earned her Bachelor's Degree from the University of California, Los Angeles and received her Doctor of Dental Surgery Degree from the University of Southern California. She continued her education at the University of Illinois Chicago and earned her Advanced Certificate in Orthodontics and Master of Science in Oral Sciences. Dr. Kahng is a strong advocate for her patients and loves to create confident smiles! During her free time Dr. Kahng enjoys spending time with her rescue dog, going to farmers markets, and biking. Dr. Kahng received her master in oral sciences and certificate in orthodontics in 2023 and now practicing in private practice. She also received her American Board of Orthodontists Certification in 2024.



**Vivian Snider et al. / USA**

### *Clinical Assessment of Dental Monitoring Oral Hygiene Protocol: A Prospective Study*

#### Abstract

**Objective:** This study aimed to evaluate the effectiveness of Dental Monitoring™ (DM™) Artificial Intelligence Driven Remote Monitoring Technology (AIDRM) technology in improving the patient's oral hygiene during orthodontic treatment through AI-based personalized active notifications.

**Methods:** A prospective clinical study was conducted on two groups of orthodontic patients. DM Group: (n = 24) monitored by DM weekly scans and received personalized notifications on the DM smartphone application regarding their oral hygiene status. Control Group (n = 25) not monitored by DM. Both groups were clinically assessed using Plaque Index (OPI) and the Modified Gingival Index (MGI). DM Group was followed for 13 months and the Control Group was followed for 5 months. Student-independent t-test and paired t tests were used to investigate the mean differences between study groups and between time points for each group respectively.

**Results:** At all time points, the mean differences indicated that the DM group had lower OPI and MGI values than the control group. The mean value for OPI and MGI were statistically significantly lower in the DM group (OPI = 1.96, MGI = 1.56) than in the control group (OPI = 2.41, MGI = 2.17) after 5 months. A rapid increase in mean OPI and MGI values was found between T0 and T1 for both study groups. A plateau effect for OPI scores appeared to occur from T1 to T5 for both study groups, but the plateau effect seemed to be more pronounced for the DM group than the study group. The MGI values for both study groups also increased dramatically from baseline to T5, however, a plateau effect was not observed.

**Conclusions:** The oral hygiene of orthodontic patients rapidly worsens over the first 3 months and plateaus after about 5 months of treatment. AIDRM by weekly DM scans and personalized active notifications may improve oral hygiene over time in orthodontic patients.

#### CV

Dr. Vivian Snider was born in Minneapolis, MN and raised in Colorado Springs, CO. She attended Dartmouth College where she played Division 1 volleyball and earned her Bachelor of Arts in Human Biology. Dr. Snider then moved to New York City to attend Columbia University College of Dentistry and received her DDS degree in 2019. Dr. Snider received her master in oral sciences as well as certificate in orthodontics from University of Illinois Chicago in 2022 and her American Board of Orthodontists certification soon thereafter. She is currently practice in private practice.



**Samim Taraji et al. / USA**

***Novel Machine Learning Algorithms for Prediction of Treatment Decisions in Adult Patients with Class III Malocclusion***

**Abstract**

**Introduction / Background:** Class III dentoskeletal phenotype management is often expert-driven, leading to subjectivity in treatment decisions. This study aimed to identify critical morphological features and evaluate the predictive ability of machine learning (ML) algorithms for treatment planning in adult Class III malocclusion. **Objectives / Aims:** The objectives were to compile a dataset of treated adult Class III cases, train various ML models, validate their predictions, compare their accuracies, and identify the most critical phenotypic characteristics affecting treatment decisions.

**Methods / Approach:** This retrospective cross-sectional study analyzed 182 Class III malocclusion cases treated at the University of Illinois Chicago between 2003 and 2020. Forty features were extracted from pre-treatment records and used as inputs to train seven state-of-the-art ML models, including Logistic Regression, Support Vector Machine, Multilayer Perceptron, k-Nearest Neighbor, Random Forest, Convolutional Neural Network, and Extreme Gradient Boosting (XGBoost).

**Results / Findings:** The XGBoost model achieved the highest accuracy of 93% after recursive feature elimination (RFE) optimization. Significant cephalometric differences between camouflage and surgical groups were observed. The top contributing features for treatment decisions were Wits Appraisal, overjet, and Mx/Md ratio.

**Conclusions / Implications:** This research not only identified significant cephalometric differences between adult Class III patients requiring camouflage or surgery, but also formulated a highly accurate AI model (93%). These findings underscore the potential role of ML as an adjunct tool in orthodontic diagnosis and treatment planning, offering a promising solution to minimize clinician subjectivity in borderline cases.

**CV**

Dr. Samim Taraji hails from Skokie, Illinois. He earned his bachelor's degree with honors at the University of Illinois at Chicago (UIC). He then attended dental school at UIC and completed his DMD degree with Summa Cum Laude honors in 2018. Dr. Taraji received the ADA Award for Academic Excellence and Leadership, the Chancellor Service Award, Frances Best Watkins Award, and the DMD Orthodontics Interest Award. After practicing general dentistry for one year and completing additional courses in cosmetic dentistry and smile design, he returned to UIC College of Dentistry to pursue his Orthodontics training. Dr. Taraji loves traveling and architecture. He is a self-proclaimed food and film critic. Strangely, he fears dolphins. He obtained his master in oral sciences as well as certificate in orthodontics from University of Illinois Chicago Class of 2022. Dr. Taraji also hold American Board of Orthodontists Certification. Dr. Taraji currently practicing as craniofacial orthodontist at the Northwestern Lurie Children' Hospital.



**Matthew Rhee et al. / USA**

***Evaluation of Anterior Open Bite Treatment Strategies and Outcomes Using Artificial Intelligence***

**Abstract**

**Introduction:** Anterior open bite (AOB) poses significant challenges in orthodontic treatment due to its multifactorial etiology and varied treatment modalities. Traditional treatment planning relies heavily on clinical judgment, often resulting in subjective decisions. This paper explores the integration of machine learning (ML) algorithms to aid in treatment planning and extraction decisions for AOB cases, leveraging demographic, clinical, and radiographic data to predict treatment outcomes and inform decision-making.

**Materials and Methods:** A retrospective study was conducted using patient data from the University of Illinois Chicago (UIC)

Department of Orthodontics. Data included demographic, clinical, and radiographic information from 115 AOB patients who successfully completed their treatment. ML algorithms, including Random Forest, Support Vector Machine, k-Nearest Neighbor, and Convolutional Neural Networks (CNN), were trained on a subset of the data to predict treatment outcomes. Results: Significant differences were observed in the percentages of males and females between the extraction and non-extraction groups and cephalometric variables between the two groups. Additionally, this patient population is 93% non-white, making this one of the largest open-bite studies conducted on historically marginalized populations. The ML algorithms examined consisted of CNN2, CNN1, and Random Forest, which demonstrated the highest accuracy rates (~83%), while k-Nearest Neighbor had the lowest (~73%). Key features influencing accuracy included crowding, SN-Palatal Plane, SNA, FMA, molar relation, and facial height measurements.

Discussion: ML algorithms offer promising potential in treatment planning for AOB cases by identifying hidden relationships in complex datasets. However, limitations such as sample size and demographic bias must be considered. Further research is needed to validate ML models and assess long-term treatment outcomes.

Conclusion: ML algorithms provide valuable insights into treatment planning for AOB cases, achieving accuracy rates comparable to traditional methods. While these tools serve as adjuncts to clinical decision-making, they should be used alongside orthodontic expertise and comprehensive patient evaluation.

**CV**

Dr. Matthew Rhee was born in Berkeley, CA and raised in Sartell, MN. He later would attend the University of Illinois at Urbana-Champaign obtaining a degree in Molecular and Cellular Biology with a minor in Chemistry in 2017. For his dental training, Dr. Rhee completed his Doctorate at the University of Illinois at Chicago in 2021. In dental school Dr. Rhee participated in multiple student organizations serving in roles involving peer development as well as executive functions in groups such as the student chapter of the American Academy of Pediatric Dentistry and the Student Research Group. His research interests during his pre-doctorate years included A.I. enhanced Orthodontic treatment planning, the oral health impacts of anxiety and depression, and socioeconomic disparities relating to the COVID-19 pandemic. Dr. Rhee was the recipient of the American Association of Orthodontics Award, John W. Davis Orthodontic Scholarship Award and the Society for Color and Appearance in Dentistry Student Award of Merit. Dr. Rhee received his master in oral sciences as well as certificate in orthodontics from University of Illinois Chicago.



**Youngjae Sung / USA / Flavio Jose Castelli Sanchez / USA**

***The Use of a Constrictor Twin Block for Treatment of a Class II Skeletal and Vertical Deficiency***

**Abstract**

Treatments of severe antero-posterior and transverse discrepancies in a Class II skeletal and dental pattern are very often executed in stages with distinctly different methods and appliances. This report describes a unique treatment approach of a 12 years 1-month male patient with severe antero-posterior and transverse maxillary excess, and Class II dental and skeletal pattern, with bilateral posterior Brodie, 9.2mm of overjet and 100% overbite. Initial orthopedic changes after 1 year of treatment using a constrictor twin-block appliance showed significant improvement on mandible growth direction, leading to Class I skeletal and dental pattern, and improvement of the posterior Brodie bite to normal transverse occlusion concurrently. There was also a dramatic improvement of the soft tissue profile / chin projection and overall maxillary protrusion. Standard straight wire fixed appliance orthodontics was conducted for finishing and detailing. Such results demonstrates that the constrictor twin-block appliance can be a valuable treatment for Phase I patients who show a large maxillary excess in both transverse, vertical and AP dimensions, as well as a facilitator for Phase II finishing mechanics.

**CV - Youngjae Sung**

Experience:

**-Diamond Braces - Premiere Orthodontics and Invisalign**

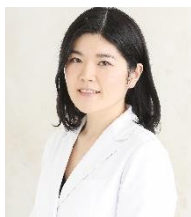
Orthodontist  
 July 2023 - Present (1 year)  
 New York, New York, United States  
**-University of Illinois at Chicago College of Dentistry**  
 Orthodontic Resident  
 June 2020 - May 2023 (3 years)  
 Chicago, Illinois, United States  
**-UCLA School of Dentistry**  
 Doctor of Dental Surgery  
 September 2016 - June 2020 (3 years 10 months)  
**-New York University**  
 Undergraduate Research Intern  
 December 2014 - May 2016 (1 year 6 months)  
 New York, NY  
**-St. Joseph's Hospital and Medical Center**  
 Research Intern  
 June 2013 - August 2013 (3 months)  
 Phoenix, Arizona  
**-Mass General Hospital**  
 fMRI Research Laboratory Assistant  
 June 2012 - August 2012 (3 months)  
 Boston, MA  
**-Beth Israel Deaconess Medical Center**  
 Office Assistant  
 September 2011 - December 2011 (4 months)  
 Boston, MA

Education:

**-University of Illinois at Chicago**  
 Master of Science - MS, Orthodontics Residency Program · (2020 - 2023)  
**-UCLA School of Dentistry**  
 DDS, Dentistry · (2016 - 2020)  
**-New York University**  
 Bachelor's Degree, Biochemistry · (2012 - 2016)

Certifications:

**-American Board of Orthodontics**  
 Diplomate, Orthodontics



Yu Kaneko et al. / Japan

*Comparative assessment of guidance patterns recorded on occlusal splints using Arti-BruX® and BruX Checker®*

**Abstract**

Recording bruxism and checking the occlusal contact condition is one of the most important examination items in occlusal diagnosis. Popular products for evaluating bruxism directly on the occlusal surfaces include indicator paint, which can be applied to the surface of restorations or occlusal splints, as well as vacuum-formed plastic foils with one-sided abradable color coating, which can be fitted to natural teeth too. Currently, Arti-BruX® by Bausch and BruX Checker® by JM Ortho are

widely known as the main products used for these purposes, respectively. Our aim is to verify the accuracy of these products in detecting bruxism patterns on occlusal splints and evaluate the possible differences between the patterns of abrasion. In this in vivo pilot study, the occlusal contact patterns recorded by Arti-BruX<sup>®</sup> and BruX Checker<sup>®</sup> were collected and evaluated for a group of 10 subjects (adult, complete dentition) at Kyowa Dental Laboratory in Chiba, Japan. The occlusal splints were designed with individualized molar contact and canine guidance. The subjects were instructed to close to intercuspation and to carry out protrusion, mediotrusion right, and mediotrusion left movements under occlusal contact while wearing the splint. Arti-BruX<sup>®</sup> and BruX Checker<sup>®</sup> were applied consecutively during the same data sampling session. Centric and excentric mandibular movements were carried out by the subjects. After intraoral removal, the occlusal side of the splints was photographed for documentation and further data collection. In total, 20 photographs of occlusal contact patterns were obtained for Arti-BruX<sup>®</sup> and BruX Checker<sup>®</sup>. The locations and sizes of contact points recorded by Arti-BruX<sup>®</sup> and BruX Checker<sup>®</sup> were measured on the photographs and analyzed with Fiji software measuring tool. The bruxism patterns recorded with Arti-BruX<sup>®</sup> and BruX Checker<sup>®</sup> did not match as revealed by our analysis. Our poster discusses the advantages and limitations of these two products and the implication of our analysis results for future applications.

#### CV

##### Work Experience:

- 2012-present: Kamonomiya Dental Clinic in Kanagawa, Japan
- 2012-2022: Kanagawa Dental University in Kanagawa, Japan
- 2016-present: Forensic Medicine Tokai University in Kanagawa, Japan

##### Education:

- 2023-present: Postgraduate Course in Prosthodontics (MDS) Medical University of Vienna, Austria
- 2013-2016: PhD in Forensic Dentistry Kanagawa Dental University in Kanagawa, Japan
- 2006-2012: Tsurumi Dental University in Kanagawa, Japan

##### License:

Periodontal disease certified doctor

Doctor of Dentistry

##### Teaching:

2020-2023: Anatomy Physiology in Sekizen Nursing School



**Taketo Miwa et al. / Japan**

### *Innovating Digital Dentistry: Testing the Accuracy of the New GAMMA Digital Workflow*

#### Abstract

The increasing use of intraoral scanners has significantly influenced dental practices, leading to digital innovations like GAMMA software and hardware tailored for modern workflows. This shift from traditional analog methods to digital techniques necessitates precise accuracy to ensure effective outcomes. Thus, our research focused on evaluating the precision of digital model transfers against traditional analog transfers.

Our experimental approach involved using traditional Reference SL articulators to create analog wax-ups. These models were transferred into a digital environment using intraoral scanners to assess the fidelity of digital articulators in replicating the original physical models. Specifically, we mounted upper and lower dental models with occlusal contacts onto an SL articulator. We then trimmed the occlusal surfaces to half the crown height and placed wax cones on the teeth's functional cusps using toothpicks and scanning wax.

The wax-up model underwent mediotrusion as well as protrusion on the SL articulator. Adjustments were made to the wax cones to ensure the toothpicks touched the movement paths correctly. Following this, the model was digitized using an intraoral scanner, and a facebow transfer was executed using a bite fork. A silicone bite, capturing the occlusal surface of the upper jaw post-facebow transfer, was bonded to a digital transfer block set using silicone putty and integrated into Exocad software.

In verifying the movement paths between the traditional SL articulator and the digital version, we found that errors could occasionally exceed 100 microns. These discrepancies are likely due to the limitations of intraoral scanners and the challenges of data alignment in multiple instances. The involvement of analog processes like facebow usage underscores

the necessity for meticulous precision in clinical applications. Our findings highlight the critical need to maintain accuracy in transitioning from analog to digital modalities and the importance of merging traditional and contemporary dental practices for optimal patient care.

#### CV

##### Work Experience:

- Since 2022: Kyowa Dental Laboratory Co., Ltd., in Chiba Japan President and CEO,
- 1998-present: Kyowa Dental Laboratory Co., Ltd., in Chiba Japan

##### Education:

- 1996-1998: Saitama Dental Technician School in Saitama, Japan

##### License:

- Dental technician
- Implant Specialist Dental Technician, Japanese Society of Oral Implantology, since 2008

##### Teaching:

- 2011-present: Clinical Dental Technology in Saitama Dental Technician School



**Cinzia Fornai / Austria**

### *The Best of the VieSID Literature Study Club 2023-24: The Top Articles Dentists Should Read*

#### Abstract

VieSID firmly believes in continued education.

Being well-informed is instrumental to medical practice. Studying is indissolubly linked to both teaching and research. Thus, VieSID continues Professor Slavicek's Study Club by organizing monthly online meetings which can be joined freely on Zoom. During the VieSID Literature Study Club, coordinated by Cinzia Fornai and Kim Parlett and supported by a panel of reviewers, a summary of the dentistry literature published in the previous month (VieSID Press Release) is provided. The three most relevant papers are presented in more detail and are discussed in the Q&A session. The VieSID Press Release is regularly published on the VieSID YouTube channel and is thus freely available to all at any time. The most informative, influential, and intriguing articles discussed during the last year's VieSID Literature Study Club are summarized in this presentation.

#### CV

As VieSID scientific coordinator and active researcher within the Center for Clinical Research, University Clinic of Dentistry Vienna, Department of Evolutionary Anthropology, University of Vienna, and Institute of Evolutionary Medicine, University of Zurich, Cinzia Fornai is in the unique position of orchestrating interdisciplinary research at the cross-road between dentistry, oral medicine and anthropology.

Cinzia Fornai is a trained evolutionary anthropologist with main research interest in the evolution and function of the masticatory system. During the course of her postgraduate studies, concluded with a PhD through the Department of Evolutionary Anthropology, University of Vienna in 2015, she has practiced the tools and methods of Virtual Anthropology, becoming acquainted to the use of 3D imaging techniques and geometric morphometric methods for the analysis of biological forms.

Cinzia Fornai has published over 30 articles in international, peer-reviewed journals including, Nature, Science and PNAS and has contributed to numerous scientific congresses in the field of physical anthropology, paleontological sciences, and evolutionary medicine. She has consolidated teaching experience and has organized scientific events, such as workshop and congresses.



**Petros Kokkinos et al. / Cyprus**

*Effective approach for stable resolution of locked joints*

**Abstract**

**Introduction:** Locked joints have always been one of the most challenging conditions in dentistry. As a result, different treatment approaches have been recommended to confront this issue in the last century. In most cases, a resolution of the locking is attempted based on empirical knowledge or using approaches guided by simple diagnostic tools.

**Method:** A series of cases collectively presenting all possible types of locked joints (i.e., acute, closed, reciprocal clicking with intermittent lock, ligamentous lock) were differentially diagnosed by clinical examination and condylography (using CADIAX 4, Gammadental, Austria). The therapeutic position (ThP) of the condyle was identified and transferred to the mounted models of the patient on the variator. Occlusal composite repositioning overlays were fabricated in this position with the appropriate anatomy which guided the condyles in the ThP. The overlays and the brackets were bonded at the same appointment, and anterior vertical elastics were initiated in order to produce a class A lever to decompress and reposition the condyles within the joints. Initial, progress and final condylography were performed to assess the effectiveness of this treatment.

**Results:** Immediately or soon after the initiation of the treatment, all cases showed a dramatic improvement of the condyle translation within the joints. Stability of the improvement was demonstrated on follow up examination.

**Conclusions:** Clinical evidence shows that patients with locked joints can benefit from a treatment approach using condylar reposition informed by condylography, a monitoring tool aiding diagnostics by accurately estimating the ThP of the condyles in the joints and in combination with orthodontic treatment with occlusal composite repositioning overlays on the posterior teeth and anterior vertical elastics.

**CV**

Dr Petros Kokkinos received his DDS degree from the dental school of Athens university in 1989.

He specialized in Orthodontics in the Louisiana State University (LSU), New Orleans, 1991-1994.

He worked in the research centre of the LSU and his research project 11 «Dietary modification of the PGE2 level in rats and rate of teeth movement» was chosen for the 20 best in the world among 6500 research projects and competed for the Hatton award at the International Association of Dental Research Congress, Chicago, 1992. In 1994 he was honoured by the state of Louisiana for the best research among all postgraduate students of all specialties at LSU. In the same year he was honoured by the LSU department of orthodontics with the James P. Bordelon award for the best clinical performance among all the postgraduate students in orthodontics. He has published scientific articles in international scientific journals such as the American Journal of Orthodontics and Dentofacial Orthopaedics. He presents lectures in Europe, USA and the Middle East. He is a member in many scientific organisations in Cyprus and abroad. The last few years, he has taken numerous courses with Professor Sadao Sato and Dr Heike Kramer. His new field of expertise is the joint related orthodontics where treatment planning is based on the condylar inclination and the modification of the occlusal plane inclination. He is a visiting lecturer at the postgraduate program of the department of orthodontics at LSUMC in the USA. He is the founder of Viesid Cyprus.



**Hiro Shimasaki / Japan**

*Diagnosis and Treatment of Skeletal Class III-Open Bite with MLD and Crowding*

**Abstract**

It is generally said that open bite and MLD are difficult to treat. However, treatment is possible if a proper diagnosis and treatment plan are made. We performed diagnosis and treatment for a case of skeletal Class III open bite with MLD and crowding.

A 26-year-old woman presented to the clinic with the main complaints of esthetic disturbance and inability to bite through her front teeth. The patient was treated with an orthodontic treatment plan to improve her chief complaint. The treatment used a multi-bracket technique and Australian Wire and MEAW wires. The patient had already had the upper and lower wisdom teeth extracted.

Even cases of Class III skeletal open bite crowding can be treated without extraction of any teeth other than wisdom teeth if the posterior discrepancy is strategically improved.

#### CV

-2016: Nihon University School of Dentistry at Matsudo

-2016: Worked in Nihon University School of Dentistry at Matsudo Dental Hospital

-2018: Worked in Kobayashi Dental Clinic



**Ryoichi Ozawa / Japan**

### *A Case on the Treatment of Severe Low Vertical Malocclusion Using Overlays to Increase the Occlusal Vertical Dimension.*

#### Abstract

The patient is a 17-year-old female who visited our clinic with the main complaint of wanting to correct her teeth alignment. Upon diagnosis, she was found to have severe low-angle malocclusion. We decided on a treatment plan to raise the occlusal vertical dimension but were uncertain about how much to raise it. Using a bite jig on an articulator, we observed the changes in the patient's facial appearance and cephalometric measurements with the incisal pin raised by 5mm and 10mm, and then set the THP. The occlusal raising was carried out using overlays on the molar area during orthodontic treatment.

#### CV

Graduated from Kanagawa Dental University in 2008.

Opened Ozawa Dental Clinic in 2015.

Affiliated with SOM



**Klara Janjić et al. / Austria**

### *The Impact of Print Orientation and Graphene Nanoplatelets on Biaxial Strength and Cytotoxicity in a 3D-Printable Resin for Occlusal Splints*

#### Abstract

Occlusal splints represent a key factor in treatment of various temporomandibular disorders. Manufacturing of occlusal splints by 3D printing would be time- and cost-efficient compared to gold-standard manufacturing by milling. Currently available materials for 3D printing of occlusal splints do not reach the mechanical properties of polymethyl methacrylate (PMMA), which is used for milling. Previously, it was reported that print orientation and graphene nanoplatelets (GNP) can increase biaxial strength in a variety of materials. Therefore, the aim of this study was to assess if adjustment of print orientation and addition of GNP improve biaxial strength of a 3D-printable resin for occlusal splints and if they affect cytotoxicity. A stereolithography (SLA) 3D printer was used to print specimens vertically and horizontally. Specimens were printed with 0%, 0.025%, 0.1%, 0.5% and 1% GNP while milled PMMA specimens served as control. Raman spectroscopy, optical profilometer analysis and scanning electron microscopy were used to characterize specimens. Biaxial strength was evaluated by biaxial flexural testing. A toxdent test, a resazurin-based toxicity assay and live-dead staining were used to assess the cytotoxicity of specimens on L929 and gingival stromal cells (GSC). Significantly higher biaxial strength was observed in horizontally printed specimens. GNP did not improve biaxial strength of printed specimens. All specimens were cytocompatible with L929 cells and GSC. Print orientation has a significant impact on biaxial strength in SLA printing. 3D-printable materials can reach comparable or even higher biaxial strength

compared to PMMA when using the optimal print orientation while GNP has no beneficial effects on the biaxial strength of resins for 3D printing of occlusal splints.

#### CV

Klara Janjic has a background in biomedicine and biotechnology. She completed her doctoral work in 2020, which focused on the development of 3D cell culture systems for the in vitro testing of cellular responses to bioactive components, treatments and dental materials. Since then, she continued her research work as principal investigator, focusing on different aspects of oral pathology. Her current work is dedicated to the development of 3D equivalents for healthy and diseased oral mucosa and to the revelation of molecular mechanisms behind various oral pathologies.



**Alazhar Adel et al. / Damascus**

### ***Does Steepness of Canine Guidance Facet Interfere with Dynamic TMJ-Function - A 3D Condylographic Study***

#### Abstract

Wear facets are signs of tooth erosion, abrasion or attrition, easy to detect during diagnostic procedures.

Visible in the mouth, on the casts, on occlusogram wax plates and Brux-Checker foils.

Ortho-balancing facets seems not to disturb the condyle's pathway, because they are equal or flatter than SCI.

Hyper-balancing facets are steeper than SCI, the guiding muscles may be disturbed or have learned an avoidance pattern to hurdle the obstacles. The aim of this study is to evaluate, if the steepness of Canine Facets in excentric movement in TMD patients are inducing avoidance mechanism in masticatory muscle-system and finding a correlation between steepness of Canine Facets and clinical indicators of clinical signs of TMD such as "positive" findings in muscles palpation, temporomandibular joint comparative palpation and differences in condylographic tracings during chewing patterns and mediotrusive movements.

#### CV

-2018 -2020: assistant dentist at Dr. Martin Drath

-2016 - 2017: internship as assistant dentist, orthodontist Dr. Greven

-2015: employee at the Alhusien dental practice

-2013 - 2015: assistant dentist Syrian private university faculty of dentist

-Dept. of Prosthodontics, University Dental Clinic, Medical University of Vienna, Vienna, Austria



**Zokaris Nikolaos et al. / Greece**

### ***Headaches and Occlusion (1) - A Quantitative Neurological and Condylographic Study.***

#### Abstract

Headaches are a common health issue affecting millions of sufferers worldwide. According to the World Health Organization (WHO), two to three quarters of adults in the age range of 18-65 years have had headache in the previous year<sup>1</sup>. Migraine affects around 15% of adult subjects<sup>2</sup> and is among the most disabling diseases globally<sup>3</sup>. Migraine is considered a neurovascular reaction to external and internal stimuli that involves the trigeminovascular system. When activated, this system is thought to account for the headache and associated features of migraine<sup>4</sup>. The aim of the present study is to investigate functional occlusal variables in a population of diagnosed migraine patients as well as in a matched by gender comparison group by using state of the art instrumentation and software. Functional occlusal variables chosen were condylar displacement from reference position (RP) to Maximum intercuspation (ICP) both clinical and mechanical, angular difference between the steepness of the articular eminence and the contra-lateral canine guidance, angular difference between the steepness of the articular eminence and the ipsilateral central incisor guidance, mediotrusive and

laterotrusive molar involvement during nocturnal grinding and occlusal plane inclination. Thus, the null hypothesis formed is that **Functional Occlusal variables do not differ between migraineurs and non-headache sufferers.**

#### CV

He entered the Military Dental School in 1996. He was named an officer of Hellenic Air Force in 2002 after earning his DDS from Aristotle University of Thessaloniki. From 2004 to 2007 he completed a full-time postgraduate MSc in Dentistry in the direction of Dental and Advanced Prosthetics at the same university. From 2014 to 2016 he completed the postgraduate MSc in Prosthodontics offered by the Medical University of Vienna. In October 2015 he completed a training and calibration course in DC/TMD and in January 2019 a Diploma course in Orofacial Pain and Jaw Function in Sweden. He is a certified Prosthodontist from the European Prosthodontic Association. He works as a consultant in the Prosthodontics Department of 251 Hellenic Air Force Hospital and retains a private practice limited to Prosthodontics in Athens.



**Zokaris Nikolaos et al. / Greece**

#### *Headaches and Occlusion (2) - A Qualitative Neurological and Condylographic Study.*

#### Abstract

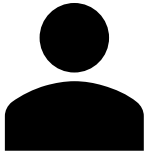
Migraine is one of the most disabling disorders worldwide. It is ranked 2nd among headaches and 5th among all disorders. Around 15 % of the population suffer from Migraine<sup>1</sup>. The trigeminovascular system is widely accepted as having a fundamental role in this highly complex neurological disorder<sup>1,2</sup>. Migraine is considered a neurovascular reaction to external and internal stimuli involving the trigeminovascular system. When activated, this system is thought to account for the pain and associated features of migraine<sup>3</sup>. In the last decades the interaction between the nervous system and the stomatognathic system has become increasingly evident<sup>4</sup>. The anatomy of the trigeminal nerve, the proximal innervation of the joint and the mandible and its central connections to other portions of the Central Nervous System (CNS) explain the physiology that lies beneath this interaction. Noxious stimuli from the stomatognathic system may start a chain of events due to the afferent signal conducted through the trigeminal network system into the CNS<sup>5</sup>.

The aim of the present study is to investigate potential differences in mandibular and condylar Kinematics between migraineurs and a control group through computerized axiography. If the recorded movement patterns do differ indicating a susceptibility of stomatognathic dysfunction in migraineurs then probably the migraine sufferer could benefit if a dental professional was also present in an interdisciplinary approach. Alternatively, if no relationship is established the findings are also beneficial since they can prevent headache sufferers from seeking unnecessary dental treatments in an attempt to improve their headaches.

Thus the null hypothesis formed is that **Motion analysis of the mandible does not differ between migraineurs and non-headache sufferers.**

#### CV

He entered the Military Dental School in 1996. He was named an officer of Hellenic Air Force in 2002 after earning his DDS from Aristotle University of Thessaloniki. From 2004 to 2007 he completed a full-time postgraduate MSc in Dentistry in the direction of Dental and Advanced Prosthetics at the same university. From 2014 to 2016 he completed the postgraduate MSc in Prosthodontics offered by the Medical University of Vienna. In October 2015 he completed a training and calibration course in DC/TMD and in January 2019 a Diploma course in Orofacial Pain and Jaw Function in Sweden. He is a certified Prosthodontist from the European Prosthodontic Association. He works as a consultant in the Prosthodontics Department of 251 Hellenic Air Force Hospital and retains a private practice limited to Prosthodontics in Athens.



**Lukyanov Alexandr et al. / Russia**

***Static and Dynamic Occlusion Influences TMJ Function – A Clinical Pilot Study.***

**Abstract**

The Masticatory Organ plays a significant role in the human body. The major function of Masticatory Organ in Homo sapiens sapiens is speech - it allows about 7.7 billion people to communicate. A new born baby shows a very small viscerocranium (that includes the Masticatory Organ) in comparison to the neuro-cranium with a minimal set of functions (breathing, weaning, swallowing, yelling/crying). The size of the Masticatory Organ and the range of functions are growing very rapidly during the growth and development of the child. To recognize and correct a developing dysfunction of the Masticatory Organ is one of the main tasks of dentists. It is also very important to avoid over diagnosis and unnecessary treatment.

The aim of this pilot study is to identify early functional disturbances/pathologies on the level of the TMJ" caused" by of static and dynamic occlusion and the position of the mandible to make a treatment decision (treatment 'yes' vs. 'no').

What examination(s) are necessary and sufficient to assess the status of the patient?

How "dangerous" - how high is the risk - of disturbances of compromised static and dynamic occlusion in terms of causing structural damage to the tissues of the Masticatory Organ (TMJ, ligaments, capsule, muscles, teeth).

**CV**

- c/o University Dental Clinic Medical University of Vienna Department of Prosthodontics

-Private Office, Kurgan, Russia



**Reichardt Gerd et al. / Germany**

***Functional Positioning Overlays (FPO) - Revisited and Patented***

**Abstract**

Several dental orthodontic treatments have been suggested to correct Class II malocclusions. Some treatments aim to move the upper front teeth backwards (with or without extraction of the teeth) whilst others aim to modify the growth of the upper or lower jaw or both to reduce the prominence of the upper front teeth. Treatment can involve the use of one or more types of orthodontic brace. Some braces apply a force directly to the teeth and can either be removed from the mouth or fixed to the teeth during treatment. Other types of braces are attached, via the teeth, to devices (headgear) that allow a force to be applied to the teeth and jaws from the back of the head. Treatment is usually carried out either early (early treatment), when a mixture of baby and adult teeth are present (around seven to 11 years of age) or later (adolescent treatment) when all the adult teeth have come into the mouth (around 12 to 16 years of age). In severe cases and some adults, orthodontic treatment may suggest to be combined with jaw surgery to correct the position of one or both jaws. Our clinical practice, according to prof. Slavicek and prof. Sato, is based on the idea that the correction of malocclusion necessarily passes through mandibular forward advancement (articular compensation). In the period of maturation of the masticatory organ and adolescents, articular compensation is the most essential factor in the final development of the occluso-articular relationship. To a minimal and individual variable extent, the mandible joint is capable of adapting to altered conditions during whole life. In the first period the mandible is stabilized by the bilaminar zone (retro-articular pillow) which, being rich in vessels, swells and maintains the condyle and of course the mandible forward. Nature adapts and compensates to achieve optimum function. Currently, a wide variety of functional devices is available in order to achieve forward growth of the jaw. Cozza et al. in 2006 published a systematic review of literature to evaluate the scientific evidence on the efficiency of functional devices in stimulating mandibular growth in patients with Class II malocclusion. It turned out that different functional devices require different treatment times to obtain the Class II correction result at the occlusal level. The average displacement for functional orthopedics of the jaws is 0.16 mm per month, with an average treatment duration of 17 months. Moreover, attention is drawn to the difficulty of obtaining a

precise correction of malocclusion and, above all, the review highlighted the strict need to obtain good compliance by the patient. A non-adherent patient is indeed a guarantee of therapeutic failure. In order to solve the question about precision and patient's compliance, we decided to apply an idea consisting in the creation of overlays to be applied on milk teeth in order to modify the occlusion and obtaining an immediate mandibular adaptation.

#### CV

1985-1990: Eberhard-Karls-University Tübingen as a student of dentistry

1991-1993: Training assistant at Dr. Klein in Ilsfeld

1993-2004: Independent dentist in partnership with ZA Axel Schröder in Esslingen/Neckar

2004-2013: Independent dentist in partnership with Dr. Wolfgang Wünsche in Stuttgart

2014-2019: Independent dentist in partnership with Dr. Yukimitsu Miyakawa in Stuttgart

2019-2022: Independent dentist and sole owner of the IZL practice in Stuttgart

10/2022- ~: Medical director of the IZL MVZ GmbH in Stuttgart

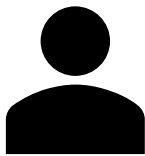
1997-2000: Postgraduate studies/Master's degree (MSc.) at the Danube University Krems with Prof. Slavicek (diagnostics and therapy of the dysfunctional masticatory organ).

2000-2003: Postgraduate course/Master (MSc.) at the Danube University Krems with Prof. Sato

2004: Award of the Master of Science (MSc.) by the Danube University Krems (title of the master thesis: "early treatment of class II malocclusion with functional positioning overlays")

2004-2013: Research assistant and PhD student at Kanagawa Dental University/Japan in the Department of Craniofacial Growth and Development Dentistry under Prof. Sadao Sato.

2013: Award of the Doctor of Philosophy (PhD) by the Kanagawa Dental University/ Japan



**Carmignani A. et al. / Italy**

*Correlation between the Occurrence of Mandibular Lateral Translation in Symmetric Mandibular Movements and Different Skeletal Classes. A Cephalometric and Condylographic Study*

#### Abstract

Null hypothesis: is there any probability that a lateral condylar shifting observed during symmetric movements (protrusion-retrusion and open-close) is more frequently related to one of the three possible static intermaxillary relationships (Skeletal class I, II, III)?

The aim of this investigation is to demonstrate if there is a correlation between the mandibular lateral translation during symmetric movements ( $\Delta Y$  MLT) in mandibular dynamics and the different skeletal classes in human beings. The main goal is to evaluate the relationship between the occurrence of max  $\Delta Y$  in P/R or O/C movements at different levels of severity and the subjects' skeletal classes. The second goal is to test the concordance between the max  $\Delta Y$  values, measured in P/R and O/C movements, referring to four different cut-offs (0.65; 0.70; 0.75; 0.80 mm).

#### CV

-Private Office, Pontedera Italy



**Uğur Özcan et al. / Germany**

*Evaluation of the Impact of Occlusal Variables on the Level of Temporomandibular Dysfunction Using Indirect Condylar Position Measurement (CPM) - A Retrospective Study.*

#### Abstract

The term TMD is a descriptive diagnosis with a range of symptoms. The causes of TMD are considered to be multifactorial and multicausal. In the literature opinions sometimes differ as to the extent to which occlusal influences play a role in its development or the severity of the temporomandibular dysfunction. Some hold the opinion that occlusion is no longer the

focus of therapy. As part of this clinical study, a retrospective case-control study will be carried out (n=150). The aim of this retrospective data analysis is to examine the influence of occlusion and to take a closer look at the manifestation of a TMD and to investigate the question of whether a correlation between occlusal conditions, condylar displacement and the occurrence of functional disorders can be demonstrated. In order to do justice to falsificationism (Popper), the following "null hypothesis" is set up: "A condylar displacement caused by occlusal conditions is not significant Influence in the development of a TMD".

#### CV

2001: Studied dentistry at the University of Regensburg  
 2002-2004: Dental and orthodontic training in Nuremberg and Augsburg  
 2005: Co-founder of the dental surgery Team Dentalis in Augsburg  
 2005-2006: Orthodontic curriculum with Prof. Dr. Sander  
 Since 2006: annual meeting of the Sander Group  
 2013-2016: Master of Science in orthodontics at the DPU  
 2019-2021: Curriculum "function" in Mainz - basic curriculum VieSID  
 Since 2021: Study club "function" in Mainz  
 Current: doctorate supervised by Prof. Dr. Greven and Prof. Dr. Dr. Dr. Ziebart



**Betzl Christian et al. / Germany**

### *Do Symptomatic Patients with Occlusal Wear Facets in Molars Suggest to Have a Risk of Alterations in Condyle Pathway Tracings of the Temporo-Mandibular Joints?*

#### Abstract

Loose ligaments are a precursor of a deranged TMJ status.

With condylography the attempt was made to find alterations to normal translation and open rotation. As a sign of an occlusion dictated avoidance pattern.

This bears a great advantage for dentists and their patients, if they can reduce the necessity to adapt to a compromising occlusal scheme and mandibular position after intense prosthodontics to an absolute minimum.

Deviation and Deflexion in all directions beyond an unclear threshold seems to be devastating for the TMJ's anatomy.

This can lead to multiple medical problems if the position of the mandible leading to an activation of avoidance patterns.

Facets are signs of tooth wear, easy to detect during diagnostic procedures. Visible in the mouth, on the casts, on occlusiogram wax plates and Brux-checker foils.

Ortho-balancing facets seems not to disturb the condyle's pathway, because they are equal or flatter than SCI.

Hyper-balancing facets are steeper than SCI, the guiding muscles may be disturbed or have learned an avoidance pattern to hurdle the obstacles.

Though the anatomical joint spaces are limited in medial, dorsal, cranial and lateral aspects, we were expecting to see increased transversal mobility. Christiansen is reporting of a supposedly pathological amount of lateral mobility in the lower compartment of more than 0.6 - 0.8 mm.

#### CV

He studied Dentistry at Ludwigs Maximilians University in Munich from 1993-1999; He became an Assistant Dentist in a recommended private dental Office from 1999 - 7/2003. He became a partner in that private office in 2003 and emphasized the multidisciplinary treatment approach.

He is a member of the gnathological Society of Stuttgart (GAK), German Association of Periodontology ( DGParo) and German Society of functional Diagnostics and Therapy ( DGFDt). Meeting the Concept first in 2005, in order to have a full training from Basic Curriculum, Sato course and Master course in Vienna.

His focus in daily doing and local teaching is the team approach in functional cases. Communication between Dentist and dental Technologist, as well as Colleagues from the orthopedic field and their Team is one of his daily challenges.



**Espinheira Francisco José et al. / Portugal**

***Correlation between Visual Perception, Body Posture and Occlusion - A Juvenile Case Study***

**Abstract**

Visual perception shows a close correlation with the balance of body posture. The interaction in the coordination of the external eye-ball muscles, cerebral trunk and the cerebellum as the mediator of balance are well researched. This case study is supposed to show the correction of visual perception by the use of prismatic lenses and its effect to correct body posture. Furthermore the „fine-tuning „influence of occlusion is to be emphasized in an interdisciplinary treatment approach.

**CV**

1983: Orthoptist; Escola Superior de Tecnologias de Saúde de Lisboa

1999: Degree on Education Sciences, Escola Superior de Educação Almeida Garrett, Lisboa (Portugal)

2002: Post Graduation in Education Special Needs, Instituto Superior de Educação e Ciência, Lisboa (Portugal)

1991-2012: Visual Perception Consultant, Instituto Português de Reumatologia, Lisbon (Portugal)

1984-2012: Orthoptist ,SAMS /SBSI, Lisboa (Portugal)



**Greven Markus et al. / Germany**

***The “Critical” Dimensions of the Masticatory System***

**Abstract**

The indications for administering invasive dental treatments to patients with temporomandibular disorders have been controversial since the second half of the last century.<sup>1,2</sup> The need to implement reproducible dynamic measurement devices and clinical and instrumental functional analysis throughout dental diagnosis and treatment is equally mandatory.<sup>3</sup> Patients are increasingly aware of high-quality dentistry and demand better longevity from their dental therapies. Due to the increase in functional occlusion-related diseases in the last few decades<sup>4</sup> and rapid improvements in dental materials and technology that have created new options, the dental community needs to take a fresh look at the appropriate diagnostic and planning techniques that should be used prior to administering invasive dental treatment. This will ensure the delivery of the optimal therapeutic benefits to patients.

The temporomandibular joints (TMJs) and their spatial position within the glenoid fossae are the key parameters for undisturbed function, not only of the masticatory system but also as a receptor and mediator of body posture.<sup>5-10</sup>

**CV**

1992-1994: Military Dentist/Secretary of Defense/Bonn/Germany

1995-1996: Post Graduate Education/Dental School University of Vienna - Department of Prosthodontics/Prof.Slavicek

since 1996: Private Office/Bonn/Germany

**Additional Education:**

1996-2000: Post Graduate in Periodontology Prof.Dragoo/Study Group/Karl-Häupl-Institute/German Board of Dentistry/Division Nordrhein

1997-2001: Post Graduate in Function/Dysfunction of Masticatory Organ “and „Therapy of the functionally disturbed Masticatory Organ“ Danube-University Krems/Prof.Slavicek - MSc (Master of Science/Dental Sciences)

1997-2000: Post Graduate in „Orthodontics“- Prof. Sato/Danube-Universität Krems - MDSc (Master Dental Science/Orthodontics)

2002-2006: Post Graduate in „Orthodontics “- Kanagawa Dental University/Yokusuka/Japan; Dept.Craniofacial Growth and Development Dentistry; Prof.Sato

until 2010: PhD - Education/Scientific Visiting Researcher Kanagawa Dental University/Yokusuka/Japan; Dept.Craniofacial Growth and Development Dentistry; Prof.Sato  
 „Visiting Researcher“- LIFE&BRAIN-Insitute /Dept.Neurology- Med.Faculty - Medical University, Bonn/Germany (Chair: Prof.Elger; Prof.Weber)

Teaching/lecturing experience:

Frequent lecturer at annual meeting of "German Society of Functional Analysis and Functional Therapy" since 1992  
 Awarded Best Scientific Lecture by "German Society of Functional Analysis and Functional Therapy" Frankfurt/Germany, 2010 -> "Influence of condylar position to the limbic system"  
 Awarded Best International Scientific Poster Presentation for "Early treatment in mixed dentition with bonded overlays" by Italian Society of Gnathology and Int.Academy of Advanced Interdisciplinary Dentistry, Torino/Italy, 2008  
 Awarded Best International Lecture for "The significance of condylar position" by Int.Academy of Advanced Interdisciplinary Dentistry/Division Asia, Tokyo/Japan, 2008  
 Co-lecturer of Prof.R.Slavicek at Master Course "Functions and Dysfunctions of the Masticatory Organ" and "Therapies of the functionally disturbed Masticatory Organ", Dept.of Intersdisciplinary Denstistry, Danube University, Austria from 2006 until present  
 Co-teacher of Prof.Schopf at Post Graduate Orthodontic Education, Dept.of Orthodontics, Dental School, Medical University of Frankfurt/Germany from 2008 until present  
 Acc.Director and Acc.Scientific Director of Postgraduate Master Course "Prosthetics with focus on interdisciplinary concepts", Dept.of Prosthodontics, Dental School, Medical University of Vienna/Austria (Chair: Prof.E.Piehslinger) - present



**Greven Markus et al. / Germany**

***Correlation of Mandibular Lateral Translation (MLT) in Symmetrical Mandibular Movements in Condylography and MRI Tracing.***

**Abstract**

Hypothesis is formed as: „The occurrence of Mandibular Lateral Translation (delta YMLT) in symmetrical mandibular movements is an (early-) indicator of an „Internal Derangement of the TMJ “.

The aims of this study were to examine a) The occurrence of Mandibular Lateral Translation (delta YMLT) in symmetrical mandibular movements is an (early-) indicator of an „Internal Derangement of the TMJ “and b) The definition of a threshold value of delta Y condylar deviation as an indicator for a pathological intra-articular finding.

The occurrence of transversal, condylar displacement in symmetrical mandibular movements (O/C and (P/R) is a strong indicator of temporo-mandibular disorder (TMD) by the definition of articular "Internal Derangement". At minimum a loosening of the capsular and condylar ligaments is existing. The deviation of condylar movement in a quantity of 0,6 - 0,75 mm indicates limitation of the functional joint space and an „Internal Derangement “of the TMJ(s) and is in concordance with the values found in the recent literature.

**CV**

See before

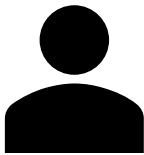


**Ivchev Manol et al. / Bulgaria**

***A Clinical Comparative Study of Analogue and Digital Jaw Tracking Devices***

**Abstract**

This study presents a clinical comparative analysis of analogue and digital jaw tracking devices, aiming to compare their movement curves, of CADIAX 4 AND MODJAW RECORDING with and without hinge axis location before Modjaw recording. A sample of 30 patients underwent jaw movement assessments using both analogue and digital tracking systems. Parameters measured included jaw opening, lateral excursions, and protrusive movements. These measurements were recorded by skilled clinician to ensure precision. The study will show differences in curves in same patient using hinge axis location and without hinge axis location. Also differences in SCI number in both ways.



**Erhardt Julia et al. / Germany**

***Digital Versus Virtual, Real-Dynamic Articulator Method – A Preliminary Study***

**Abstract**

Articulators are used to simulate the movement of the mandible to grant for adequate occlusal surface design when manufacturing dentures or splints. Since exclusively statically designed restorations often require time-consuming intraoral grinding and may lead to material fractures as well as dysfunction. This study's aim is to customize the mechanical articulators (horizontal condylar inclination angle (HCN), Bennett angle (Bennett) immediate side shift (ISS)) to increased precision of the occlusal access areas and contact points. The total 3D distance of each movement was also evaluated

As part of the digital workflow, models can be transferred to a digital articulator, which are basically "virtual" copies of mechanical articulators.

In contrast, the virtual, real-dynamic articulator enables by coupling digital models to an electronic measuring system for jaw tracking the simulation of individual mandibular and occlusal movement patterns.

In the recent literature, good agreement of static clinical and digital occlusal contact points has been shown. However, the agreement of static and dynamic occlusion determined clinically, and with the digital or virtual articulator method is still unclear.

**CV**

-Dentist, PhD student, Department of Prosthodontics; Preclinical Education and Dental Material Science, University Hospital Bonn, Welschnonnenstr. 17, 53111 Bonn, Germany



**Marcel Nigg et al. / Austria**

***Relationship between Dens Axis of the Atlanto-Occipital-Joint and the Skeletal Class- A 3D-Pilot Study***

**Abstract**

In the Functional Unit of the Masticatory organ are involved the cervical spine and their muscles, the atlantooccipital joint and also the musculoskeletal system of the Craniomandibular system. Concomitant findings between mandibular and head movements during the functional jaw functions have got a close relationship between the masticatory organ and the atlantooccipital joint that cannot be ignored. The connection between the atlantooccipital joint and the skeletal classes in 3D imagine are not well examined. The aim of the study is to evaluate the relationship between the atlantooccipital joint - especially the odontoid process - to the skeletal classification in low dose CT.

**CV**

\*1977 in Austria

1996- 2003 Dental Technican in Liechtenstein and Switzerland

2003- 2011 Medical University of Vienna/ University Dental Clinic

2012- 2015 Oralsurgery Department of Maxilla-Facialsurgery Feldkirch/ Austria

2012- Private Practice in Dornbirn/ Austria

2018- VieSID and Mastercourse in Prosthodontic Medical University Vienna



**Yang A. et al. / Germany**

***Examination of the Occlusal Index in Relation to Results of the Palpation of the Masticatory Muscle System and Cephalometric Findings. A Retrospective Study***

**Abstract**

Findings in the initial clinical functional diagnostics contain valid information for initiation of additional necessary examinations and for future treatment decisions. A high value found in the Occlusal Index and a high palpation sensitivity of the masticatory muscles have been commonly associated with temporomandibular joint dysfunction (TMJD) or temporomandibular disorder (TMD). Furthermore, findings of past research have found significant associations between high muscle activity and interference in the molar region. One reason for interferences in the molar region especially during the dynamic movement of the mandible can be a steep occlusal plane. Particularly dental class II division 1 malocclusion occurs with a steep posterior occlusal plane with retruded and backward rotated mandible. The purpose of this study is to determine the correlation of the grade of Occlusal Index to results of the muscle palpation and cephalometric findings to make a, if occlusal scheme (or pattern) of the patient is "at risk" of having or developing dysfunctional problems. A total of 202 untreated patients were chosen randomly for this investigation. The initial examination contains patients medical and dental history, Occlusal index and the findings of comparative muscle and TMJ-palpation.

**CV**

Anni Yang received her degree in general dentistry from Ludwig Maximilian University of Munich, Germany in 2009.

After the graduation, she started working in a dental office with treatment methods based on the philosophy of Prof. Rudolf Slavicek and Prof. Sadao Sato.

She attended several postgraduate courses with Prof. Rudolf Slavicek and Prof. Sadao Sato from 2011 on.

In 2012 she learned the "Controlled Mandibular Repositioning" method from Dr. Alain Landry.

Since then, she has had the tools to treat complex TMJ cases orthodontically and prosthodontically.



**Johannes Peus. et al. / Germany**

***Jaw motion tracing system in comparison to the gold standard  
- A comparative pilot study***

**Abstract**

Condylographic tracing is used in dental offices since decades. Diagnosing potential disorders of the jaw joint, providing splints for therapy, or collecting data to do full-mouth rehabilitation, the purpose of condylographic tracing is variable. But in times where everything is going digital the progress of digitality in dental medicine should be one of great interest. The aim of this study is to find out if digital jaw motion tracing systems are as accurate as the gold standard of "ancient" condylography. On the one hand the Cadias System (GAMMA Dental) and on the other hand the ModJaw system was used. 20 patients with and without TMJ problems such as bruxism or functional problems had been diagnosed. After measurement with both systems the values of SCI and TCI were compared in Protrusion/Laterotrusion/Open-Close movements. To exclude any difference due to the reference axis (AOP in Gamma/CP in ModJaw) patients first were measured with the Cadias system to provide the hinge axis. This was implemented in ModJaw system to evaluate all data in the same system. The values have been different wherefore further studies about digital jaw motion tracing systems are necessary to find out any potential source of errors.

**CV**

June 2011 - October 2011: Internship In Dental Lab Schmidtke In Alfter-Witterschlick  
 01.02.2012 - 31.07.2012: Education For Dental Technician  
 01.09.2013 - 20.05.2015 (exam): Education For Dental Assistance  
 October 2016 - July 2021: Study Of Dental Medicine At The University Of Aachen  
 27.01.2022-31.03.2023: Assistant Dental Doctor In Mvz R(H)Einzahn Bonn  
 since 01.04.2023: Assistant Dental Doctor In Mvz Dental Soul  
 currently: Doctor thesis at university of Aachen, Master thesis at university of Vienna



**Thomas Haberl / Austria / Dominik Wilfing / Austria**

***In-vitro Accuracy of the Digital Model Transfer Using GAMMA's New Digital Workflow***

**Abstract**

An accurate determination of the spatial relationship between dental models and condylar structures is a prerequisite for reliable functional diagnosis and therapy. Failing to transfer this relationship to the articulator may result in incorrectly positioned jaw models with respect to the hinge axis and therefore false occlusal contacts. This applies to digital impressions obtained using an intraoral scanner no less than it does to conventional plaster models. This important step is however often omitted in typical direct digital workflows, as intraoral scanners alone are incapable of capturing the relationship of the jaws to a hinge-axis-related reference plane.

With the Digital Transfer Block Set, GAMMA recently introduced an easy-to-use accessory for the existing Reference articulator system that specifically addresses this problem. After capturing the hinge-axis-related position of the upper jaw by means of a facebow, a digital transfer block can be mounted in the transfer stand to be scanned together with the upper jaw impressions using an intraoral scanner. The digital transfer block then serves as a reference object for aligning the 3D data and positioning the digital models correctly in the virtual articulator. Compared to other systems on the market, the procedure is unique in that it allows the accurate digital model transfer also according to the patient's exact kinematic hinge axis.

The aim of this study was to assess the in-vitro accuracy of the new digital workflow enabled by the Digital Transfer Block Set. For this purpose, upper jaw impressions were taken of three already articulated plaster models. These impressions were then scanned together with a suitable digital transfer block by two operators, each using the two intraoral scanners Medit i700 and 3shape TRIOS 5, for a total of 12 digital model transfers. The precision and trueness of the positions of the

digitally transferred models was analysed. Basis of comparison were scans of the plaster models obtained using a CADstar CS. Neo2 Pro lab scanner.

In the context of this study, the digital workflow using the Digital Transfer Block Set showed excellent precision and trueness in transferring the model position to the virtual articulator. It can therefore help fulfil the requirements for reliable and high-quality digital data, which are essential for virtual functional diagnosis and therapy.

### CV

Thomas Haberl is a senior research and development engineer at GAMMA Medizinisch-wissenschaftliche Fortbildungs-GmbH, the first point of contact for instrumental support in function and occlusion. He attained his MSc degree in Software Engineering in 2023 at the University of Applied Sciences Technikum Wien and is currently pursuing an MBA degree in Health Tech Management at Technikum Wien Academy. He can look back on more than a decade of experience working with dental professionals, researchers, and partners in the dental industry.

In his role, Thomas Haberl is actively involved in the product development, regulatory affairs, and system integration for GAMMA's wide range of hardware and software products for instrumental analysis and virtual occlusion design. By managing the continuous development of GAMMA's products from conception through to development and market launch, Thomas Haberl aids the advancement of digital dental technologies with particular consideration for the requirements of occlusion and function. He regularly participates and contributes to scientific congresses and VieSID education courses and lends his technical expertise to support scientific publications in dental medicine. His current main professional interest is the seamless integration of GAMMA's tools for virtual occlusion analysis and design in the digital dental workflow.



**Dominik Wilfing / Austria / Thomas Haberl / Austria**

### *Concept and Accuracy of a Novel Mounting System for 3D-printed Models*

### Abstract

The shift to digital dentistry has brought with it countless methods and tools for capturing digital impressions, analyzing occlusal function virtually, and manufacturing digitally designed dental restorations. However, specific applications still require the use of physical models, such as the chairside creation of test bites for controlled mandibular repositioning, or the verification of restorations before they are placed in the patient.

To address this issue, a concept for a new mounting system is proposed by GAMMA, which allows manufacturing correctly articulated physical models from digital impressions using state-of-the-art 3D-printing technology. This mounting system is fully compatible to the current line of Reference articulators and comprises two parts. First, a set of highly precise distance blocks of varying heights, which serve as a mounting platform for the 3D-printed models. These distance blocks are milled from solid aluminium and therefore practically infinitely reusable. Second, the 3D-printed models themselves, which can be designed in any available Model Creator software, such as Exocad, 3shape, or Medit. These models are subsequently imported in GAMMA's CADIAS 3D software, where they are connected to a mounting plate that mechanically interfaces with the distance blocks. The 3D models with mounting plate attached can then be manufactured via 3D printing, which will allow correct positioning of the printed models in the physical articulator. A major advantage of this procedure is that, besides basic 3D printing materials, it does not require any additional consumable items.

This study illustrates the concept of the new mounting system for 3D-printed models and provides an initial assessment of its positional accuracy. For this purpose, a pair of plaster models was scanned as reference using a CS. Neo2 Pro lab scanner. These scans were used to create correctly articulated 3D-printable models, which were printed using an Ackuretta SOL 3D printer. The 3D-printed models were subsequently mounted to the corresponding distance blocks and scanned again using the lab scanner. The discrepancy between the scans of the plaster models and of the 3D-printed models was analysed and potential sources of error and opportunities for future improvements were identified.

### CV

Dominik Wilfing is a junior development engineer at GAMMA Medizinisch-wissenschaftliche Fortbildungs-GmbH. He is responsible for the Hardware development and supports the software development Team since 2023 after finishing the higher technical institute for biomedicine and health engineering.

In the Past he was mainly involved in the development of the digital Transfer Blocks and is now working on future projects.



**Teymur Mammadov / Azerbaijan**

*Orthodontic treatment of a complex Class III malocclusion.*

**Abstract**

In the presented case, the patient reported esthetics and asymmetry as main complaint before treatment. Due to serious occlusal problems consisting in anterior crossbite, Class III first molar relationship, and unwanted over-rotation of the mandible during open-close movements, the patient was strongly recommended by a prosthodontist to get orthodontic treatment. This presentation aims to describe a step-by-step treatment protocol to get optimal aesthetic and functional occlusion for the patient. Treatment goals included a good intermaxillary relationship of the teeth with static and dynamic stability of the TMJ. These were achieved through overlays in TRP, strategic leveling and TADs.

**CV**

Education:

- Faculty of Dentistry of Azerbaijan Medical University
- Tashkent Branch of Korean Orthodontic Research Institute
- Postgraduate Orthodontic Program in the Department of Orthodontics, Kyung Hee University, Seoul, Korea
- Vienna School of Interdisciplinary Dentistry, Education in Occlusion Medicine

Work History:

- Public Health Center of Ministry of Health of the Azerbaijan Republic, General Dentist
- “Implant-dent” Dental clinic, Orthodontist
- “SKS-Med” Dental clinic, Orthodontist
- “SB Megadent” Dental clinic, Orthodontist



**Bassem Al-Waedh et al. / Iraq**

*Development of an individualized 3D-printed guide for electromyography electrode placement in the heads of the lateral pterygoid muscle.*

**Abstract**

The lateral pterygoid muscle (LPM) possesses two distinct heads. The superior head helps stabilize the jaw joint disc, while the larger inferior head contributes to mandibular depression, protrusion, and lateral movements. However, its deep location within the skull and its bi-headed structure pose challenges for electromyography (EMG), a diagnostic tool measuring muscle electrical activity useful for the assessment of temporomandibular disorders (TMD). Using traditional needle EMG one may struggle to access the LPM and differentiate between its heads activity, potentially leading to inaccurate recordings and, eventually, misdiagnosis. This pilot study addressed these limitations by developing a 3D-printed, individualized surgical guide for precise EMG electrode placement into each LPM head. A cadaver head (from the Center for Anatomy and Cell Biology, Medical University of Vienna) underwent CT scan, MRI, and intraoral impressions for model fabrication. 3D object alignment allowed visualization of the LPM relative to the skull. A surgical guide was designed based on this alignment to ensure accurate electrode insertion into each LPM head. After guided placement and electrode insertion, a verification CT scan confirmed successful targeting of each LPM head. The individualized surgical guide achieved precise electrode placement, demonstrating promising outcomes for more reliable and detailed LPM EMG data. This approach has the potential to significantly improve TMD diagnosis by facilitating head-specific evaluation of LPM activity, and further developments could support research on masticatory muscles in general. By providing accurate data on LPM function during normal and dysfunctional states, this method can lead to a deeper understanding of the role of LPM in TMD, paving the way for more targeted treatment strategies.

**CV**

2009 – Current: Bassem’s Smile Studio Dental clinic, Baghdad, Iraq  
 2017 – Current: United Nation Assistant Mission Support in Iraq UNAMI Medical Section, Baghdad, Iraq  
 2010 – 2016: Al-Kadhmyea Teaching Hospital, Maxillofacial Department, Head of Prosthetic lab., Baghdad,  
 2007 – 2009: Al-Hussaini Teaching Hospital, Maxillofacial Department, Karbala, Iraq  
 2004 – 2007: Al-Kadhmyea Specialized Dental Center, Baghdad, Iraq



**AlQirimli Ali et al. / Yemen**

***The impact of face scanning facebow techniques on occlusal plane discrepancy compared to CBCT***

**Abstract**

The virtual patient, a simulation created by superimposing various 3D images from an actual patient, is becoming a progressively popular tool in the field of digital dentistry. Accurately replicating the patient's jaw position and movements in the digital environment is crucial for successful dental treatments. While intraoral scans represent a user and patient-friendly alternative to analog models, there is currently a lack of a solution to replicate the spatial relationship between the digital models and the patient's hinge axis. Recent advancements in digital facebow transfer techniques show promise but need to be tested for accuracy. In this project, we test a digital workflow for registering intraoral scans onto the virtual articulator using 3D facial representations for alignment, applying 3 different technologies: a handheld scanner (EinStar, Shining 3D, China), smartphone LiDAR technology app (Scaniverse), and photogrammetry (P-Art software, SDIMatrix, Switzerland). The occlusal plane will be measured to test for the accuracy of these approaches compared to the occlusal plane resulting from true-hinge axis mounting of CBCT. This pilot study is based on two patients, for each patient intraoral Scans were obtained using Trios3 and axis orbital plane was defined using axiography. Additionally, thirty different facial scans were obtained for each of the above-mentioned technologies, thus the virtual mounting was performed. Furthermore, CBCT for the patient was performed to be considered as the reference. The angle between the axis orbital plane and the occlusal plane angle was calculated and the results were graphically displayed. The differences between the digital and CBCT occlusal plane angles ranged between 0.15 and 2.81. Additional patients are currently being included in the study and the clinical interpretation of these results is ongoing.

**CV**

Dr. Ali AlQirimli Achieved his BDS degree from UST in Sanaa-Yemen, 2010 and his MSc degree in 2016 from the university of Baghdad department of conservative and restorative dentistry. A student at the medical university of Vienna-department of prosthetic and interdisciplinary dentistry. In 2015 joined and become one of the founders of the largest clinics and training center “AlGhadeer DentalCare”.

The Passion for minimally invasive and perfect dentistry guided him to the path of the Digital Dentistry in 2014. Since then, he devotes himself exclusively to aesthetic and digital dentistry and has been an international speaker at numerous conferences and has conducted many workshops concerned with the same subject. In addition to that he was able to establish one of the most famous Digital laboratories in Iraq under the name of Digital IDEA. Finally, in 2024 IDEA Dental Care was established.

**We are looking forward  
seeing you next year in  
Vienna at  
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