PRACTICING GNATHOLOGICAL DENTISTRY:
100Y ANNIVERSARY OF GNATHOLOGY CONGRESS

The 100th Gnathology Anniversary Congress occurred in Istanbul from 29th to 30th June 2024. Here is a summary and a review of the lecturer's conclusions. The congress was organized by Orehab Minds Academy, attracting an international audience, both on-site and online.
*The Congress slogan **Who We Are and What We Can Do!** expresses the intention to demonstrate contemporary possibilities by following gnathological principles in daily dentistry. The speakers at the congress are:*
• All dentists.
• Applying gnathology in their daily work.
• Interpreting gnathology is modern, future-oriented, and forward-thinking.

Gregor Slavicek, Stuttgart, Germany, opened the congress, highlighting **the Past, the Present, and the Future of Gnathology.** The term Gnathology has already been established for 100 years. Searching and finding geometrical-mathematical principles of occlusion and the stomatognathic organ starts much earlier as a pre-gnathological area. In the 1970's, there was a breakthrough due to the hinge axis recording (instead of pantographic tracings) and the introduction of a cranial reference plane. Gnathology is often called a particular discipline for a dysfunctional patient. This does not seem right. Gnathology is, in the spirit of its fathers and pioneers, the discipline dealing with occlusal functions and occlusal parameters, serving as a fundament for all dental disciplines. Gnathology is an a-disciplinary discipline, and contemporary gnathology integrates gnathological instruments and geometrical principles in oral rehabilitation. Today, practicing gnathologists focus on maintaining and optimizing oral functions (chewing, speech, bruxing) by occlusal measures in all aspects of oral rehabilitation (orthodontics, prosthodontics, restorative dentistry …).
The visualization as well as the quantitative and qualitative evaluation of chewing efficiency and bruxing activity were demonstrated by **Florian Slavicek, Vienna, Austria** in his lecture: **Objective testing of occlusal functions.** The impressive lecture delighted the audience and answered fundamental questions: How and why to visualize Occlusal Functions? Why 9 Chewing Sequences are necessary to judge Chewing Efficiency? Why are elastic Standardized Chewing Test Units required to assess the ability to chew well? How do understand Bruxing activity by analyzing the BruxChecker? How do you explain occlusal functions to the patients/parents?
A real highlight of the congress was the lecture by **Sergey Grishin, Kirov, Russian Federation,** titled **Handling the complexity of gnathological parameters in Oral Rehabilitation.** The functional parameters of occlusion and the craniomandibular system require fundamental knowledge and excellent planning and transferring skills for each patient. The vertical dimension, the therapeutic position, occlusal plane, spheric arrangement of the teeth (sagittal and transversal), and a clear sequential occlusal guidance concept with canine dominance are a matter of the consequent application of gnathological principles. The harmonization of muscles, including mimic muscles, is one of the treatment goals and a vital parameter for judging treatment efficiency. Sergey Grishin reported that patients who require oral rehabilitation are getting younger. This places a heavy burden on the responsibility of the dental team. Minimal invasive strategies are needed. Gnathological parameters such as the vertical dimension, occlusal plane, and chewing surface morphology help to be as minimal as possible. Minimal invasive dentistry is often misinterpreted if the number of teeth involved in the restorative procedures is the criterion. Minimal invasive means staying in the enamel window, removing only minimal tooth substance, and avoiding opening the dentin window. In addition, based on long-term follow-ups of clinical cases, Dr. Grishin demonstrated the practicability and usefulness of the sequential occlusal concept with canine dominance by R. Slavicek. A key message of this lecture is that thorough knowledge of all biological aspects and the ability to use the instruments properly are mandatory and require well-trained skills.
The participants gained perfect insights into TMJ Imaging, both in interpreting and integrating these data in the gnathological workflow. **Giulia Tanteri, Torino, IT, and Anastasia Slavicek, Podolsk, RF presented The temporo-mandibular joint - imaging, tracking, considering.** Dealing with the structures and functions of healthy and disturbed TMJs is part of contemporary oral rehabilitation. The use of imaging techniques (CT-Scan, MRI) is mandatory. The clinical application of the hinge axis recording techniques is crucial to understanding the impact of pathologies on mandibular dynamics and establishing a proper treatment strategy. Considering the temporo-mandibular joints is not only a task for so-called gnathologists but for all dental disciplines. Giulia Tanteri pointed out that imaging techniques have to be clearly indicated. Such techniques are to be applied, but the less, the better, considering the overall patient loads. Asking straightforward questions before the patient is sent helps radiologists to provide detailed answers. Dental practitioners should be able to recognize general medical conditions that may significantly influence TMJ conditions. **Anastasia Slavicek, Podolsk, RF**, gave a detailed synopsis of the possibility of merging Condylographic Data with Imaging techniques, especially MRI. Both techniques provide data that need to be understood: condylographic trajectories and MRI findings do not always show the same, e.g., joint effusion or ligamental status potentially mimics condylographic signals. Condylographic analysis starts with a systematic description as an integrated part of the systematic functional analysis. Advanced options

provide detailed insights regarding the coordination of the movements, the proprioceptive impairment, the rotational capacity, and the effects in occlusal dynamics, individual Posselt schemes, and individual occlusal compass. Especially in growing children and adolescents, monitoring tooth eruption and functional status is required. Especially in cases with an alteration of the regular tooth eruption in the late mixed dentition (canine before premolars), possible adverse effects on the TMJ have to be excluded.

The next lecturer from Bucharest, Romania, impressed the audience by showing the consequences of implementing knowledge, constant education, and improvement. **Marian Constantinescu, Bucharest, Romania**, can be regarded as a contemporary witness to the development of dentistry, especially Gnathology and functional-oriented Dentistry, over decades. He has seen many technologies coming and going, some still present, others not anymore. He met many opinion leaders in dentistry and is constantly exchanging ideas with experts in dentistry worldwide. He constantly strives to improve and encourage dental education in all fields and aspects. Starting with the history of dentistry in Romania, participants learned about the early international collaboration of Romanian dentistry with Fédération Dentaire Internationale (FDI), the International Prosthodontic and Gnathological Societies. He initially integrated gnathological instruments and merged muscle-oriented techniques with jaw-tracking systems. He demonstrated to the audience that professional curiosity is not a matter of age and not something for younger colleagues only, and it results in constant improvement of Gnathology. To demonstrate this, he and his son presented the lecture: **4D Digital Workflow and Planning for Personalized Prosthetic Treatment - the Practical Perspective for Daily Application in the Dental Clinic.** In recent years, there have been significant advancements in functional and digital dentistry, with the availability of multiple acquisition systems that provide more detailed information than ever before. During his lecture 4D Digital Workflow and Planning for Personalized Prosthetic Treatment - the Practical Perspective for Daily Application in the Dental Clinic, **Florin Constantinescu, Bucharest, Romania,** pointed out the incredible possibilities of digital technologies in dentistry, including the laboratory part. With the intraoral scan, facial scan, dynamic CBCT, and registration of free mandibular movements, dentists can gather the quality and quantity patient data, allowing for more precise diagnoses and treatment planning.

Integrating patients' anatomical and functional details in CAD design software has improved dramatically and brought communication between clinicians, dental laboratories, and patients to a new level. 4D technology has allowed for more predictable treatments, especially in multidisciplinary cases where a significant increase in the occlusal vertical dimension (OVD) is required to restore functional occlusion. The neuromuscular approach, which considers physiologic measurements and patient needs and requests, can be combined with this technology to provide even more precise treatment planning and deliver optimal and personalized patient care. Today, laboratory Robots can be called the descendants of the Replicator of Gibbs/Lundeen (1970 - 1980ies). Lessons learned message from **Marian and Florin Constantinescu**: Failing to Plan = Planning to Fail.

Grigory Popov from Tallinn, Estonia, provided a fascinating view of his country. His lecture **Who we are and what we can do! The clinical application of contemporary gnathology dentistry** highlighted the importance of understanding the specific situation of a country and the impact of these factors on dentistry. Estonia is a fully digitized country; patients and medical doctors accept digital dentistry quickly and easily. However, the thrust in digital processes and workflow increases the possibility of mistakes without recognition during dental processes – the uncritical application is based on the assumption that it is digital, so without failures, which may lead to a bounce-back effect. Scandinavian approaches in Estonia influence dentistry: evidence-based, holistic, and minimally invasive. Gnathology and functionally oriented dentistry have been relegated to a subordinate department at most universities. On the other hand, many dental practitioners are very strongly oriented in this direction. On the one hand, it is necessary to have certainty in diagnosis and treatment based on comprehensible parameters, and on the other hand, it is necessary because the demands and expectations of patients require it. These presentations are held under the motto of the entire meeting: WWAAWWCD! (Who We Are and What We Can Do) – and a growing group of dentists are interested in Gnathological thinking. It is still a small group, but constantly growing.

Minimal invasive restorative approaches are desirable for the patient. The prevention of dental structures is a motivator for choosing or declining a particular treatment strategy the dentist offers. **Sergey Grishin, Kirov, Russian Federation,** clarified substantial misunderstandings and misinterpretation of minimal invasiveness. Labeling an oral restoration as minimally invasive is often a fraudulent labelling. His lecture **Minimal Invasive Tooth Preparation – Occlusal Planning to Save Dental Structure** encouraged the participants to accept the increasing confrontation with the challenge of restoring caries-free teeth in young adults. The indication is often severe wear of the teeth and chewing surfaces due to bruxing. The preservation of the tooth structure requires the correct preparation techniques and knowledge of which occlusion should be implemented (backward planning). Minimally invasive techniques are a decisive factor in the attractiveness of the dental practice for patients. Key messages of his lecture: Bonding Systems: every year new products, but no real breakthrough since the 1990s; we have to know the dental anatomy; understand the difference between Minimally invasive vs. As minimal as possible; be able to work correctly with the Vertical Dimension of Occlusion to preserve tooth substance; the articulator is a tool for the Dentists! Patients start to trust the dentist due to the systematic approach: what is convincing are the treatment results, not the sales process.

The following session encompasses a wide range of oral rehabilitation, challenging for both, the dental laboratory and the dental clinic. **Massimiliano Veronese, Trento, Italy,** started with his lecture, focusing on

the edentulous and partially edentulous mouth: **The challenge Oral rehabilitation: Edentulous mouth – partially edentulous mouth.** These aspects are brought together and discussed in this lecture. The dentists are in charge of delivering the treatment parameters and strategy, and the dental technician is in charge of transferring the plan to prosthodontic occlusion. Technicians follow the fundamental geometrics of the stomatognathic system and use the parameters: Lower Facial Height (LFH), Relative Condylar Inclination, Occlusal Plane inclination, Radius Curve of Spee, Sequential Occlusal Concept. The second part of this session: The challenge Oral rehabilitation: **Edentulous mouth – partially edentulous mouth – dental abrasion** by **Alexey Lyan, Almaty, Kazakhstan** focused on the caries free teeth and occlusion. For 40 years now, modern gnathology has been transforming into a practice-oriented, fundamental discipline. The focus of clinical gnathology is by no means only on dysfunctional patients. Prosthodontics, especially in the case of severely reduced residual dentition or an edentulous mouth, benefits from gnathological thinking and workflows. Collaboration between the practice and laboratory is of particular importance. These aspects are brought together and discussed in this lecture.

Without full integration of orthodontics, contemporary oral rehabilitation appears incomplete. A shared treatment plan, based on mutual understanding and support, and aligned to the same occlusal goals, is the mandatory fundament of such collaborations. **Andrey Zhuk, Moscow, Podolsk Region** discussed: **Do Orthodontists need to think gnathological? In the adult? In the child? In the adolescent?** The role of orthodontics is of great importance in many stages of a patient's life. The focus here is on harmonizing the dental parameters with the individual skeletal structure. This requires knowledge of all developmental stages of the craniomandibular system, early diagnosis of deviations from normal development, and targeted intervention. Precise coordination of the occlusion with the temporomandibular joint is also necessary when treating adults. Modern orthodontics is more than just shaping dental arches. Gnathological principles can be implemented with today's orthodontic concepts if the orthodontic technique is adjusted to the functional parameters and not vice versa. Orthodontic Clinics need algorithms for the desired goals of orthodontic treatments. It applies to all groups of patients: pediatric, adolescents, adults, and elderly. All aspects must be included, besides from the dental-occlusal the skeletal parameters, as well as progressive and bio-esthetic factors. Orthodontists are often in charge of making decisions regarding ortho-gnathic surgical approaches. The patient's chief complaint needs to be respected, but the final decision should be made only after providing complete information on all pros and cons, including the alternatives. As an orthodontist, it is crucial to understand craniofacial growth and to be familiar with the long history of growth studies, at least starting with the implant studies from Björk. As an orthodontist, ignoring the effect on the TMJ structures during the mandibular advancement strategy is not acceptable. This applies not only to sleep apnea devices, but also to skeletal class II treatment strategies. **Giorgio Fiorelli, Arezzo, Italy,** completed this session with his lecture: **Not the orthodontic method matters, but the orthodontic force system to achieve the desired tooth position.** The desired teeth positions lead to the selection of the best fitting orthodontic technique, and not a particular orthodontic method with unknown force systems should be applied. This approach, although from completely different aspects, merges strongly orthodontic and gnathological-occlusal concepts of oral rehabilitation: the desired occlusion determines the best therapeutic strategy and only then are the best fitting tools applied (orthodontics, prosthodontics, implants …). Although starting from different ways of therapeutical thinking, the audience understood that the treatment tool (here: the orthodontic force system) is chosen because of the tooth position that has to be achieved.

Last but not least, **Ksenia Nafigina, Moscow, RF, Anastasia Novitskaya, Vienna, Austria, and Florian Slavicek, Vienna, Austria,** completed the second day of the conference with their lecture: The importance of occlusal functions during diagnostics, treatment, and follow up. A valid measurement procedure has been developed to measure, visualize, and understand the occlusal processes. The visualization helps the patient and relatives to recognize the need for detailed diagnostics. The tests are easy to implement clinically and do not involve a high financial or technical outlay. The use of the Brux Checker Analysis and the chewing function test is an effective tool for monitoring the course of treatment. An excellent functional treatment result, visualized with these tests, increases the value of the treatment enormously. Using the tests as screening, a diagnostic procedure at the start and during treatment, and subsequently, to measure long-term functional stability is a modern tool for a patient-oriented dental practice. The key messages of the engaged and competent lecturers are: Understanding occlusal Functions to motivate the patient to document the starting point; the use of Chewing Test and BruxChecker during treatment – the follow up; visualization of chewing and bruxing is an exceptional service for the patients in a dental clinic.

The participants also gained insights into the importance of a proper masticatory function: Mastication for the mind – the reduced chewing ability and increased risk of cognitive decline/dementia. **Anastasia Slavicek,** based on a systematic, comprehensive literature overview, highlighted the crucial role of maintaining a good chewing ability in the elderly population. The rhythmic muscle activity during chewing is key to understanding this causal correlation. She proposed that oral rehabilitation, based on gnathological principles, could be a strategic approach to delay the onset of cognitive decline. This underscores the significant positive impact that gnathologists can have on the patients' well-being (physical and psychical), leading to an improved quality of life for patients and relatives, reduced costs for comprehensive care, and, to some extent, relieving the burden on the health care system.

The conference went by too fast; just after the opening remarks, it was time to conclude with **Closing remarks – 100y Anniversary of Gnathology. Gregor Slavicek, Stuttgart, Germany,** completes the

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meeting. Gnathology has a long history. On the one hand, a constant improvement of our knowledge results from research, science, and development. New technologies are boosting the instruments and making clinical applications easier and simpler.
On the other hand, fundamental principles have been established for over 100 years and have yet to be discarded. However, modern technologies and the search for simplified processes must not lead to the sacrifice and negation of fundamental knowledge. If a fundamental gnathological parameter is declared invalid, then a robust alternative must be presented - and this must be scientifically proven. Pure technical feasibility in the digital world is not yet proof of coherence. The manufacturers of these systems must provide this proof. If this proof is not provided, the responsibility lies with the user. Technical developments and the improvement of knowledge are the tasks of the entire dental community. However, blind faith in technological progress is very risky and carried out on the backs or in the patients' mouths. In 2024, it is time to look both back and forward. Traditional gnathology, in its purely technical approach, needs to be updated. Limiting gnathology to dysfunction has proven to be ineffective. Modern gnathology is an interdisciplinary approach with prophylactic, diagnostic, therapeutic, and communicative tasks between the disciplines. Modern gnathology is a medical discipline that advances the term occlusal medicine.
The progress made in gnathology, especially the extraordinary exchange of gnathological thoughts during the two days, has left a sense of optimism and hope for the future of the field. All have been inspired by the possibility to apply gnathological principles merged with modern technologies and treatment strategies, interpreted with the knowledge of 2024. Looking back to the long history of Gnathology allows progress towards the future. Applied Gnathology does not require a yes or no decision, it supports all aspects of dentistry as an a-disciplinary discipline
We are thrilled to announce the next edition of the conference, which will take place on **5th – 6th December 2025. The topic, "It's the occlusion, stupid!"** promises to be another engaging and enlightening event. We look forward to your participation in the 2nd International Meeting of Clinical Expert Consortium Gnathology and Occlusal Functions.
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