

Computer Aided Implantology Academy
CAI

2023, ISSUE 1

CONE BEAM COMPUTED TOMOGRAPHY
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MAGAZINE

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DUBAI

2023

Editor-in-Chief **Dr. Prashant Jaju**

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BDS, MDS, Oral Maxillofacial Radiologist



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Contents

From the Editor's Desk	1
Craniocatch: A New AI Tool in Dentistry Dr. Rohan Jagtap DDS, MHA, OMFR, FPFA, FADI, FACD	2
Interview with Eng. Anas Al Madani - AEEDC	6
Digital Orthodontics Dr. Anchen Goyall BDS, MDS	8
Dynamic Navigation in Implantology Dr. Gernot Obermair Medical Director, Expert In Implantology	11
Interview of Guest of Honour of AEEDC 2023- KOREAN TEAM	15
Glimpse of CAI Annual Congress in Florence 2022	18



Editor-in-Chief
Dr. Prashant Jaju MDS
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From the Editor's Desk

Hello CBCT magazine readers,
New year greetings to one and all.

As we embark on a new journey in the year 2023 with positive outlook and improve our knowledge regarding digital dentistry, CBCT magazine pledges to play a pivotal role in making this mission a successful one .

AEEDC 2023 Dubai is one of the best platform in dental world and CBCT magazine is honored to share same views and ideas with the team of AEEDC DUBAI. With fourth consecutive year we are one the exclusive media partners for this grand event on the planet and we hope to do so in near future alike.

This issue is having special mention of all the digital tools to be used in the world of digital dentistry and will provide immense knowledge and information to our viewers .

From this year onwards CBCT magazine will be published thrice a year and our second and third issue will be on specific topics - TMJ and Guided Implant surgery .Host of new team members are joining our team to make efforts to bring best quality articles in this magazine.

As you are aware we are the official publication of the Computer Aided Implantology Academy (CAI), and hence a brief summary of the annual congress held in Florence will be showcased in this issue .

Also announcement for the next congress to be held in the beautiful city of ATHENS in JUNE 2023 will be announced.

CBCT magazine was started with a vision to disseminate knowledge among dentists across the globe on digital dentistry . With his aim in mind we always encourage and motivate authors and clinicians to share their knowledge on this platform so that our readers benefit from reading their extraordinary work and replicate in their clinical practice .

Hope you have a enjoyable reading .

Editor-in-Chief
Dr. Prashant P. Jaju MDS
Scientific Coordinator-CAI

From the
Editor's Desk

Editor's Desk

CRANIOCATCH: A NEW AI TOOL IN DENTISTRY

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The term "Artificial Intelligence", which emerged in the 1950s, refers to the idea of making computers and computer-assisted machines that can perform tasks normally performed by humans with the cognitive functions of the brain. In AI technology, computers gain the ability to solve problems through learning from the data obtained. 1-3 "Artificial Neural Networks (ANN)", which was developed as a mathematical model of the neuronal structure in the human brain, has an important place. ANN is designed similar to the signal transmission mechanisms of biological neurons in the human brain. The ANN architecture is structured in layers of interconnected nodes. By combining artificial neurons and these layers using mathematical operations, a network is designed that aims to solve a specific task such as image classification. For ANNs to solve more complex and difficult problems, multi-layer artificial neural networks formed by increasing the number of layers has been developed. Among different DL methods, Convolutional Neural Networks (CNNs) have become popular in computer vision applications especially due to their success in object detection on images. CNNs can automatically extract image features using original pixel information. Due to successes in AI algorithms, these algorithms have started to be used frequently in the medical and dental fields. 1-5

CranioCatch is one of the pioneer technologies that uses artificial intelligence in dentistry for education and clinical practice, which will lead to innovations in profession as an important technological development. CranioCatch employs AI algorithms based on deep learning for the evaluation of dental radiographs, automatic analysis, and reporting of dental radiographic images. It is developed to facilitate the work of dentists and it enables automatic evaluation of radiographs that are routinely used in dental clinical practice, such as panoramic, periapical, bitewing, cone beam computed tomography. CranioCatch AI provide an accurate diagnosis and treatment.

"CranioCatch" an AI-based software has emerged as a product of 4 years of scientific studies that can be used by dentists and patients through a web-based application. It can be used to solve different clinical problems in all branches of dentistry and it is one of the pioneers of AI-based clinical decision support systems in the field of dentistry across the world. Moreover, with training module of CranioCatch software, dental students will have an opportunity to increase their professional knowledge and skills with an online education system based on AI.

● CRANIOCATCH MAIN FEATURES:

- It has a feature of automatic evaluation of radiographs and providing diagnosis and treatment planning.
- It allows systematic reporting and archiving of radiographs.
- It has an online-data labelling platform to strengthen a power of artificial intelligence.
- It provides AI-supported online-training opportunities in dentistry education.

● HOW IT WORK" +1:

Since its foundation CranioCatch has been creating AI solutions in dentistry to make game-changing improvements with an accurate, fast and reliable diagnosis, and a systematic patient follow-up and treatment planning with only 3 steps:

- 1 **DATA:** Select the images or radiographs to be uploaded to the system.
- 2 **ANALYSIS:** Start AI analysis with one click.
- 3 **REPORTING:** Get results in seconds.

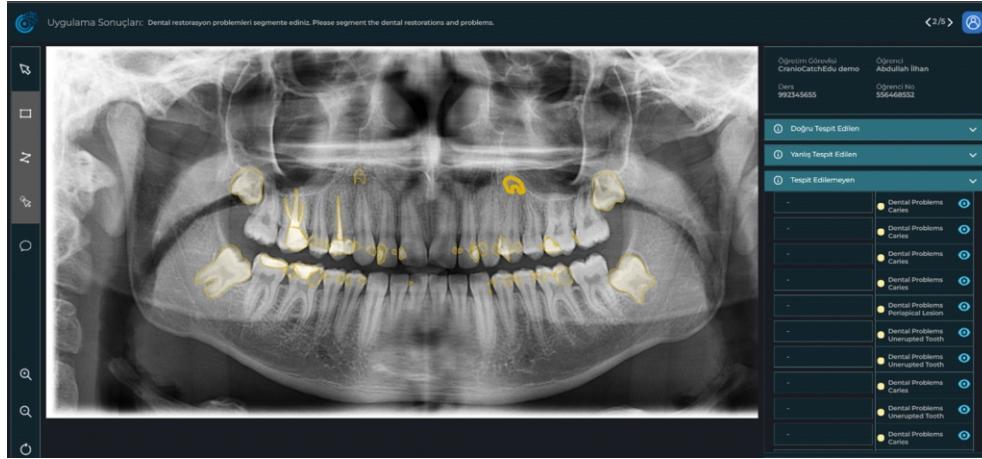


Figure 1. Analysis of panoramic radiography with CranioCatch's AI software

After a radiograph is taken, it is uploaded to the CranioCatch system, and any pathologies patient might have can be automatically detected with this Dental AI system.

CranioCatch can solve many clinical problems such as:

- Determination of tooth deficiencies.
- Determination of dental restorations.
- Detection of caries.
- Detection of periapical pathologies.
- Diagnosis of cysts and tumors.
- Determination of periodontal problems.
- Detection of dental anomalies.
- Treatment planning options based on these diagnostic determinations.

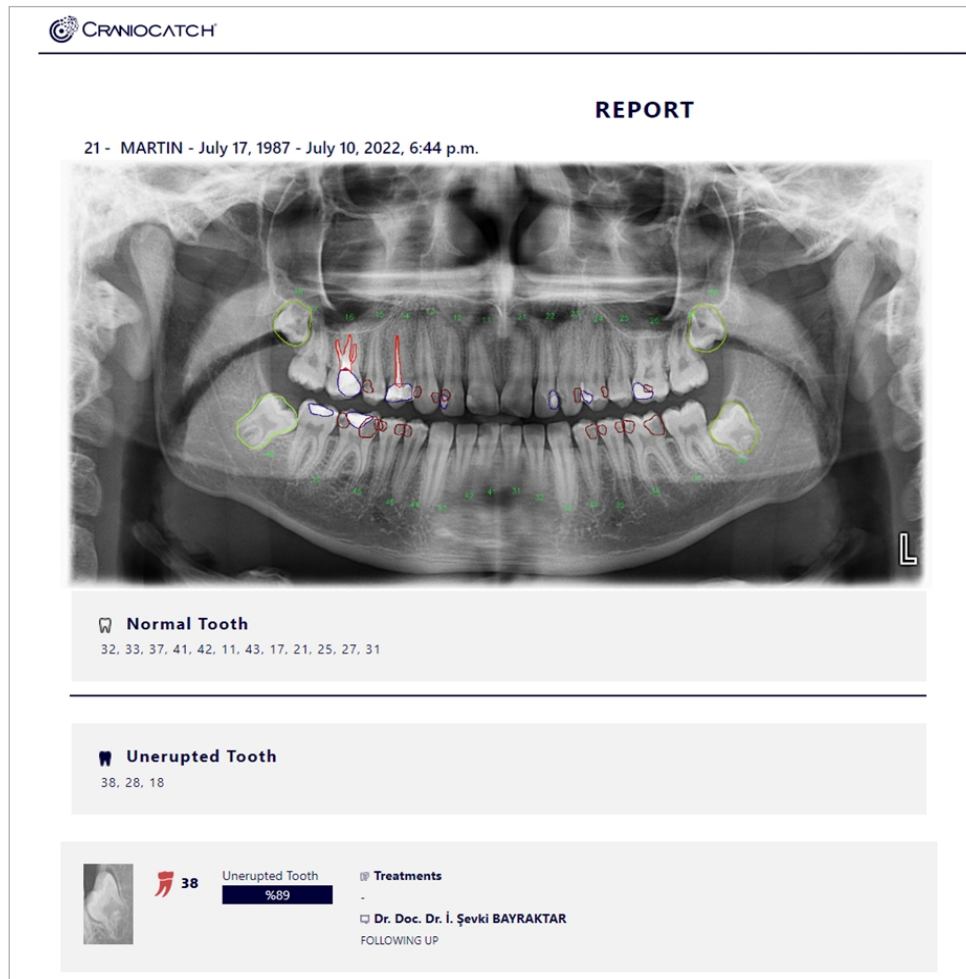


Figure 2. Example of report obtained as a result of the analysis of panoramic radiography with CranioCatch's AI software

CRANIOCATCH EDUCATION MODULE: A new and innovative tool for dental education

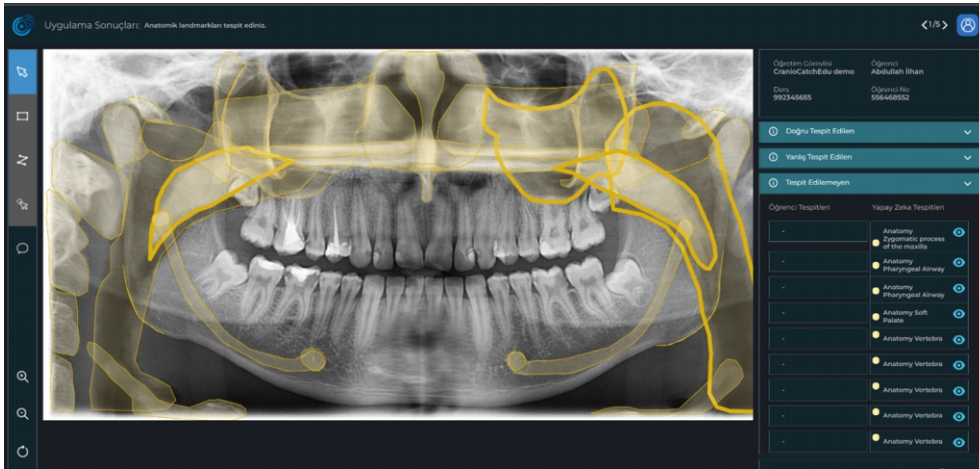


Figure 3. A study prepared to teach anatomical structures in panoramic radiography in the CranioCatch Education module.

Artificial intelligence has a potential to play an important role in dental education, especially in the diagnosis and treatment planning education for students. With CranioCatch's AI-assisted dental education application, students can learn identification of anatomical structures and detection of common pathologies such as caries, periodontal bone loss, periapical lesion, impacted tooth, intraosseous jaw pathologies, defective restorations, root canal filling errors, dental implant planning etc. on conventional and advanced imaging. They will have a chance to learn and practice diagnostics using AI software. Educators can automatically evaluate exams they prepare with AI and will have the opportunity to objectively evaluate learning status of the students (Figures 3, 4, 5). In the near future, simulations of patient examinations in a virtual environment will take place in dental education through AI system integrated with virtual reality and augmented reality applications.



Figure 4. Study prepared for the detection and numbering of teeth in panoramic radiography in CranioCatch Education module.



Figure 5. A study prepared to teach dental pathologies and dental restorations in panoramic radiography in CranioCatch Education module.

Web site: <https://www.cranio catch.com/en/>

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Journey
into the
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Interview with **Eng. Anas Al Madani - AEEDC**



Eng. Anas Al Madani

Vice Chairman & Group CEO of INDEX HOLDING

Eng. Anas Al Madani is the Vice Chairman and Group CEO of INDEX Holding. His core responsibility is to oversee the operation of INDEX Holding and its subsidiaries to develop, expand, and nurture business opportunities globally. He holds a BSCE Civil Engineering, Specialization: Environmental Engineering from Seattle University, Seattle, Washington, and an MBA from Korea University Business School in Seoul, Korea, with concentrations in Strategy and Marketing.

AEEDC Dubai is one of the biggest gathering of dentists and dental companies. What is special in this year of AEEDC Dubai 2023 which our viewer should know?

AEEDC Dubai was launched 27 years ago with a vision of providing a professional scientific and business platform for dentists, technicians, and dental industries in the region. It is now the largest scientific dental conference and exhibition in the world and has become the central point of scientific knowledge and commercial business for dentists and industry executives alike.

This year, AEEDC Dubai is introducing the all-new E-dental Market, where buyers and sellers can connect with each other from all over the world online all-year-round to shop and display their products. You will be able to preview exclusive products that are not even available your region.

The Scientific Committee will hold the AEEDC Dubai Industry Symposia, which is a dedicated platform where leading experts and thought leaders share knowledge and present major advancements in cutting-edge innovative products and services. The exhibition will highlight new inventions like Dentaverse, which is a web3 project that uses innovative technology to connect dental professionals from across the globe through a Virtual Reality (VR) platform. We are also placing the spotlight on start-up companies to help them present their business to the international market.

AEEDC Dubai is a novel concept, what role does INDEX Holding play in organizing in such events?

INDEX Conferences and Exhibitions - a member of INDEX Holding, is a leading UAE national company that excels in event management as well as exhibitions and conferences organization. We provide unrivalled innovative solutions for all kind of events from corporate events, medical and healthcare conferences to trade shows. These events are important to expanding each industry where they also contribute to

the growth of the economy in the UAE that affect multiple sectors including education, tourism, and hospitality.

Many of our events are CME accredited and provide high-quality content that helps doctors and specialists alike to remain up-to-date with the latest scientific knowledge and advancements in their respective industry.

Which other cities does AEEDC conduct such trade fairs. What is the difference between these trade fairs and the one in Dubai?

INDEX Conferences and Exhibitions organizes more than 35 events globally across the UAE, Saudi Arabia, Kuwait, Singapore, New York, and so on which cover various educational and medical disciplines like dentistry, dermatology, physiotherapy, and in some areas content creation and entertainment, and so much more. The commitment to provide a memorable experience remains, however, the organization depends on the region and the cultural mind-frame. We research the needs of the people within

these cities to ensure we are providing what they are missing and what would advance their markets to the next level.

Post-covid, has there been changes in the outlook of the dentists or companies in attending such conferences?

The Covid-19 pandemic had no direct effect on AEEDC Dubai, it only showed us how important it is to hold such events. As a smart-solutions provider, we created a virtual platform for dentists and countless other individuals around the world to stay informed and stay connected. We introduced platforms such as the Waterfalls Initiative for Continuous Education from UAE to the world, a not-for-profit global initiative that delivers continuous education across the world through accredited and specialized online webinars presented by well-renowned local and international speakers and lecturers.

However, we realize that more dentists and companies alike are more interested in attending AEEDC Dubai in-person to witness first-hand the latest technology, in addition to exchange knowledge and information together, and because of this, we have seen a 30% increase in the amount of visitors to AEEDC Dubai to where we currently have more than 66,000 people from 155 countries visiting and participating in the conference and exhibition. We expect even more people to visit in the future since this region welcomes all people to meet for similar things alike.

What can we expect from AEEDC Dubai in the coming years which would be unique to this congress?

AEEDC Dubai will continue to highlight the future of dentistry and what the dental practice will look like around the world. This includes the use of new technology being introduced into the market, the interaction between the patients and dentists, looking into Web3 technology to enhance the industry, and 3D printing and scanning. Dentistry is adapting to these changes and AEEDC Dubai will display all these practices to be used and explained throughout the event.

You will also see more international collaborations at AEEDC Dubai over the coming years. Currently we have well-established organizations from the US, Italy, Switzerland, Korea and so many more to come that will share their expertise with the world. You will also witness the latest use-of-technology and innovative inventions where the profession is expanding on the use of digital dentistry which provides more accurate imaging and results for better patient care, helping to reshape the industry into the future.

What is your message to all participants from across the globe from AEEDC Dubai team?

We welcome you all to attend the next edition of AEEDC Dubai to witness the passionate and dedicated efforts of which the scientific and organizing teams have built and accomplished over the years and involve yourself in the largest scientific dental conference in the world. You will be impressed with how deep and fulfilling AEEDC Dubai can be, in addition to observing first-hand the latest technology advancements, gain fresh opportunities for new business deals and expand your

network, and dive deeply into the transfer and exchange of knowledge and expertise where you will connect with counterparts from around the world that will last a lifetime. We guarantee that you will have a memorable experience.

Will you be kind enough to share something about you and INDEX Holding as an organization?

Our legacy as a UAE national company that was founded in 1928 with extraordinary skills in tailoring and textile trading, and since then we have expanded to an international conglomerate who strives to provide innovative services to clients around the world. INDEX Holding simultaneously promotes the UAE's promising business prospects while attracting foreign investments and reinforcing the events industry in the UAE and the region.

INDEX Holding now embraces 7 subsidiaries, focusing on events management, trading and investment, textile trading and tailoring, healthcare management, media, and interior design, in addition to a specialized company in designing and building custom-made exhibition stands. INDEX Holding forms a corner stone which will witness the legacy of a far-fetched and diversified business industry forging ahead and overcoming challenges, guaranteeing to leave you with a memorable experience.

DIGITAL ORTHODONTICS

■ **Dr. Anchen Goyall**

BDS, MDS

Orthodontics and Dentofacial Orthopedics



DR. ANCHEN GOYALL

BDS, MDS

ORTHODONTICS AND
 DENTOFACIAL ORTHOPEDICS

I completed my B.D.S. from MGV's KBH Dental College and Hospital, Nashik in the year 2017, and my M.D.S in Orthodontics and Dentofacial Orthopedics from Rural Dental College, Pravara Institute of Medical Sciences, Loni in the year 2022. I specialize in growth modification therapies, conventional orthodontic treatment, and aligners as well. I have attended many National and International conferences as well as presented papers and posters in their scientific session.

● INTRODUCTION

Technology has grown exponentially worldwide and impacted all areas of life including the medical sector. Dentistry has had a significant impact since its digitization in diagnosis, as teaching tools, treatment modalities, and planning in the last two decades to improve oral health care.

The field of orthodontics has also progressed and is more up-to-date from a technological point of view. Every area of orthodontics has been impacted by the growing use of digital workflows in orthodontic practices, including documentation, study casts, analysis of dental malocclusions, designing smiles, treatment planning, and the creation of orthodontic appliances. Treatment planning in three dimensions by imaging of dentition, skeletal components, and the face and the use of computer-aided design (CAD) and computer-aided manufacture (CAM) have made customized orthodontic appliances a possibility. Simulating the treatment plan and achieving appropriate patient communication are made possible by software integration of digital models, 3D facial imaging, and cone-beam computed tomography (CBCT). Recent technological advances in digital videography have made it possible for clinicians to simultaneously record a patient's speech, oral and pharyngeal function, and smile. With digitalization, the patient's necessary tooth movement can be monitored to ensure it is efficient and ideal. With the aid of cloud-based computing storage systems, the patient's information can be accessed from any location. The effectiveness, precision, consistency, and predictability of treatment outcomes have all increased because of these developments, which have also helped the educational and communication components advance. The field of diagnosis and treatment planning is undergoing a transformation as a result of digitalization, which is testing clinical expertise and efficiency. (1)

● CONSULTATIONS

With a pandemic hitting the world in 2021, "Teledentistry" served as a boon. The term "Teledentistry" was first used in 1997 when Cook defined it as "... the practice of using video-conferencing technologies to diagnose and provide advice about treatment over a distance."(2) It combines telecommunication and dentistry to improve the accessibility of oral health care even in remote and distant areas by exchanging clinical information and images for consultation and treatment planning (3) (4). This process of networking has evolved oral healthcare thereby improving patient care, dental education, and the effectuation of the communication between dentists and dental laboratories.(5)

Online consultation or teleconsultation can be done in either a direct method where the dental professional (orthodontist) and the patient communicate via videoconferencing and can personally see, hear and understand each other: "Real-time Consultation"(6) or an indirect method - "Store and Forward Method" where the patient is not present at the time of consultation as the discussion and treatment planning takes place between the dental professional and orthodontists by exchanging all the clinical information including patient information, photographs, radiographs, lab results, and any other relevant patient-related information. (7)

Teledentistry provides an alternative method to deliver the existing dental services in situations with long-term unavailability of dental care, e.g., during space flights, on transoceanic ships, and in various rural areas. The results achieved so far are very encouraging, setting the road signs for future investigations.

● DIAGNOSIS AND TREATMENT PLANNING

Advancements in digital dentistry have enabled orthodontists to work with three-dimensional (3D) virtual setups. Digital orthodontics involves digital office setup, digital study models, three-dimensional imaging, virtual treatment planning, artificial intelligence, and the role of robots. (8)

Three-dimensional (3D) digital technology has brought a revolutionary change in the diagnostic planning and treatment strategy of orthodontics. Acquisition of 3D image data of the hard and soft tissues of the patients, diagnostic analysis and treatment prediction, and ultimately the individualized orthodontic appliance, will become the development trend and workflow of 3D orthodontics. (9)

● DIGITAL MODELS:

The development of 3D digital technology in the form of intraoral scanners, has replaced impressions and plaster casts with accurate virtual casts (e-models/digital impressions) that become part of the diagnostic record. This has eliminated the need to store physical impressions and allowed other dental professionals to view patient records when not physically present in the office when planning multidisciplinary cases. Files are sent electronically to authorized dental laboratories, eliminating concerns about proper disinfection and saving delivery time. (10)

● 3D SCANS AND CBCT:

Meanwhile, 3D facial soft tissue and cone-beam CT scans have been gradually applied to clinical orthodontics, making it possible to get 3D virtual anatomical structures for patients. The conventional cephalometric analysis by tracing the x-rays manually over a view box has taken a shift by assessing and analyzing the x-rays digitally through CBCT scans with the help of 3D cephalometric analysis. (10) CBCT scans have also helped in assessing problems of the temporomandibular joint and airway. 3D scans have helped in evaluating the position of condyles in the glenoid fossa which can result in skeletal malocclusions or detection of conditions like condylar hyperplasia/hypoplasia or other morphologic changes leading to facial asymmetries and malocclusion and are important for orthodontic diagnosis. Airway disorders such as Obstructive Sleep Apnea have been readily diagnosed due to 3D volumetric analysis of the airway on 3D scans thus guiding practicing orthodontists for its management. (10)

● VIRTUAL TREATMENT PLANNING:

Treatment planning is the most crucial part of orthodontics as it involves making decisions by keeping the final outcome in mind. The movement of teeth is based on space availability and space required and their final positions have to be well predicted before the start of treatment to decide on expansion, extractions, or interproximal reduction techniques or the various biomechanics that are to be applied. These decisions are often based on the knowledge and experience of the expert by using the cumbersome process of Kesling setup(11) and considering the patient records. But with Artificial Intelligence (AI), this process of decision-making has become more easier and accurate and helps the orthodontist to work more efficiently and therefore to be more adapted to the needs of society.

The virtual simulation helps to plan the tooth movements and their final position from the beginning of the treatment using the virtual segmentation with software like Ortho Analyzer software (3Shape, Copenhagen, Denmark) (12). Conventional wax setups and repeated duplication of plaster models are not required and repeated virtual simulation can be carried out to test various treatment approaches for the same malocclusion.

The most common use of digital flow in Orthodontics is the fabrication of clear aligners. With digital technology treatment, the simulation process has become faster and more practical. The models referring to the treatment stages are automatically generated by the setup software and are used for the aligner production. Though it is important to note that, unlike real biological dental movements, virtual movements are unlimited and often the results may not be realistic. Therefore, additional investment in knowledge of aligners biomechanics is required to increase the efficiency of movements, as well as the need to perform movements in stages, overcorrect or use auxiliary mechanics. (13)

● VIRTUAL SURGICAL PLANNING:

Correction of dentofacial deformities has been a huge part of corrective orthodontics as Orthognathic surgery. Computer-aided surgical simulation (CASS) has greatly enhanced the efficiency and accuracy of orthognathic surgery. Virtual surgical planning (VSP) improves the efficiency of the presurgical work-up and provides an opportunity to illustrate the multidimensional correction at the dental and skeletal levels. VSP provides preoperative insight into the surgical intervention and the fabrication of cutting jigs/ guides and templates can help decrease intraoperative surgical inaccuracies as a result of errors in extensive laboratory preparation used in conventional work-up. It has also enhanced and supported easy communication regarding the surgical procedures to be carried out and their final outcome on patients' skeletal and soft tissue structures. VSP is rapidly becoming the standard of care for surgical treatment planning of dentofacial deformities. (14)

● CAD-CAM TECHNOLOGY IN ORTHODONTICS

Computer-aided design and computer-aided manufacturing help to create personalized orthodontic appliances for patients. Various studies on orthodontic CAD-CAM applications suggest that clear aligner treatment, lingual appliances, titanium Herbst appliances, customized brackets with patient-specific torque, machine-milled indirect bonding jigs, and robotically bent archwires, digital models are all among the newest CAD/CAM advances in the specialty. The ultimate goal of incorporating CAD/CAM technology into the field of orthodontics can be best summed up as "improving reproducibility, efficiency, and quality of orthodontic treatment". (15)

● BRACKET SYSTEM:

The digital workflow for bonding fixed orthodontic appliance allows greater precision in the placement of the brackets and reduces the laboratory time required for conventional direct bonding. Indirect bonding in Orthodontics arose to minimize isolation and view difficulties inherent to the conventional procedure. Besides that, correct bracket placement and enamel adhesion success are essentials for orthodontic treatment efficiency. Virtual bracket placement allows for customized torque systems to be placed in individual brackets according to the malocclusion being treated. In this sense, indirect bonding provides better accuracy in accessories positioning and turns the bonding appointment faster and more comfortable for patients.

● LINGUAL ORTHODONTICS

Lingual orthodontics has been made easy with the help of a virtual setup thus allowing for the placement of pre-positioned and pre-torqued brackets customized based on the malocclusion. (16) The pre-determined mushroom archwire design with robots has permanently eliminated the need for compensating bends in the archwire to overcome the inaccuracies of the conventional bracket systems. (17)

● SURGICAL SPLINTS AND RETAINERS:

CAD-CAM technology is utilized in printing surgical guides and templates after VSP for increased accuracy during surgery. CAD-CAM retainers provide for accurate retention and stability after completion of treatment and avoid the frequent debonding of fixed retainers over a period of time post orthodontic treatment. As they are perfectly designed and seated on each tooth, plaque accumulation is reduced arising from conventional fixed retainers, thus increasing oral hygiene.

● CONCLUSION

Technological innovations in dentistry and in orthodontics have benefitted both the patient and the orthodontist. It has facilitated 3D imaging, 3D printing, virtual setup, monitoring of tooth movement, and treatment planning to another level in the diagnosis and treatment aspect of our specialty. It has also improved the communication between patients and dental professionals and the understanding of treatment options available to the patient through software integration of digital models, 3D facial scans, and CBCT enabling the simulation of treatment. Digital workflow and Artificial intelligence have aided in saving time and producing complex appliances with high precision. Digitalization is bringing about a revolutionary change in diagnosis and treatment planning posing a challenge to clinical efficiency and knowledge. With the fast development of digital technologies, orthodontists can now propose diagnoses and treatment plans in a feasible way.

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DYNAMIC NAVIGATION IN IMPLANTOLOGY

■ **Dr. Gernot Obermair**
Medical Director, Expert In Implantology



**DR. GERNOT
OBERMAIR**
MEDICAL DIRECTOR,
EXPERT IN IMPLANTOLOGY

Born in Bolzano (Italy) in 1966, Studies of dentistry at the University of Ulm (Germany) Foundation of the private praxis in 1996 in Bolzano Specialized in advanced implantology Experience in implantology since 1994, 3D navigated implantology since 2002, Examiner expert of the implantology DGOI 2001, Active Member of the CAI Academy since 2016, 3D planned, template guided and dynamic navigated implantology (xGuide/ immediate loading)

● CASE-1

Extremely absorbed upper jaw in 83-year-old patient. Smoker. Patient wished an improved prosthesis.

Age and general condition of the patient and the risk profile of a smoker do not allow invasive augmentative measures. In addition, such approach was rejected by the patient.

When examining carefully the minimal residual bone, islands of bone are present that can still be utilised.

The normal protocol for edentulous cases would require attachment of the tracker arm directly to the maxillary bone. However, the minimal amount of residual bone and the poor bone quality are not suitable for such action. The risk of loosening of the retaining screws during the implant procedure and the need to stop the operation as a result would be too great.

A duplicate prosthesis was therefore made. This served as a reference during the CBCT for the planned tooth position and the X clip, but also as a base for mounting the tracker arm. The regions in which the implants are placed were opened by the dental technician. The template with tracker arm was kept in place during surgery by an assistant. This allowed minimally invasive and precise implant placement. The bone islands and narrow bone were used for placing 6 implants.

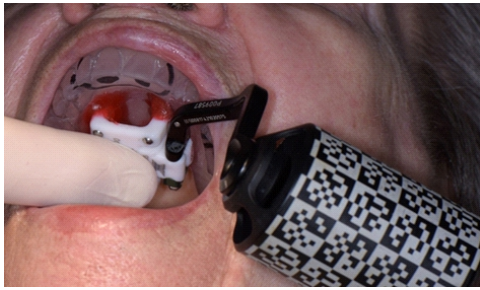
All the implants were placed as planned despite minimal bone volumes, even if the base template was only held by hand. The alternative would be a traditional surgical guide. However, guidance is not guaranteed with such narrow jaw ridges. The tactile feeling is reduced by the friction of the drills within the drill sleeves. In case of a problem, the operation must be continued without any guidance. In the case of dynamic navigation though, after flap formation, guidance is constantly available, since drilling can be controlled.

1 implant in region 21 was lost (due to prosthesis loading).

A bar was placed on the remaining implants over which a removable palate-free prosthesis was fixed.



Patient tracker attached onto the denture duplicate



Try-in mouth



Planned implant positions cleared



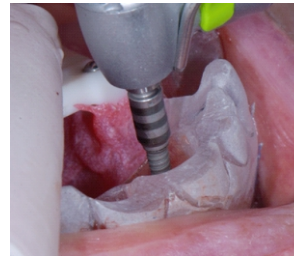
Initial situation



Template in place



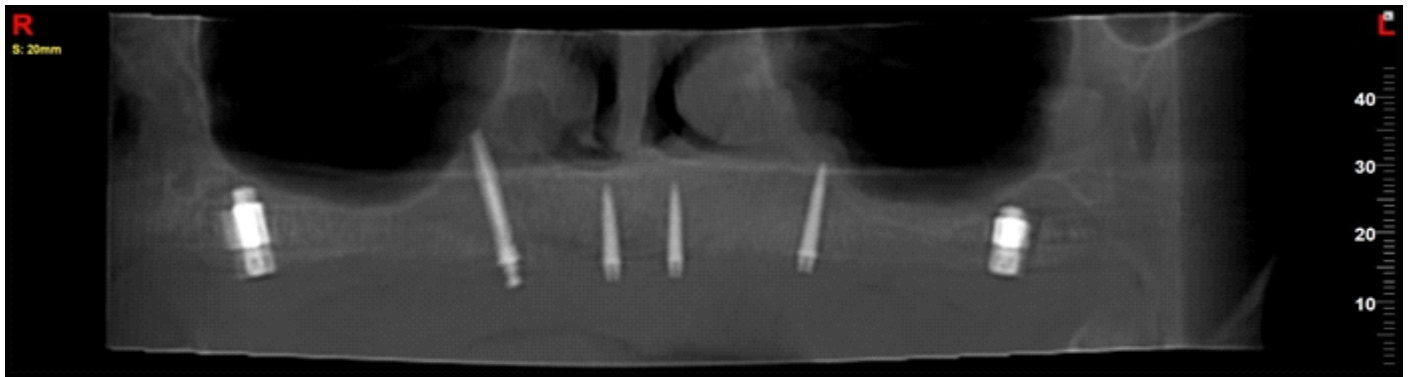
Calibration



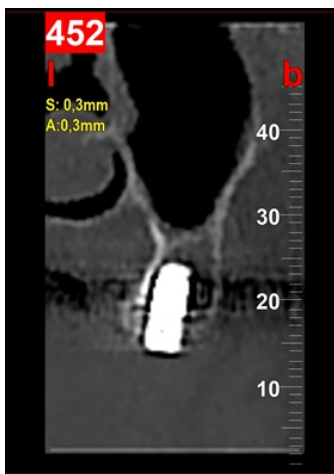
Implant navigation



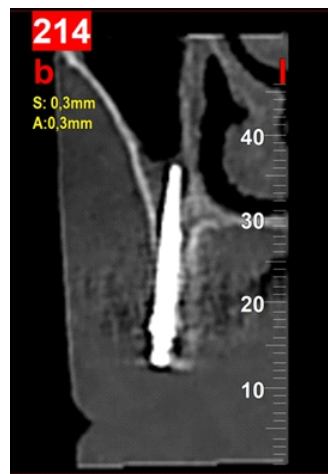
Post-op implant placement



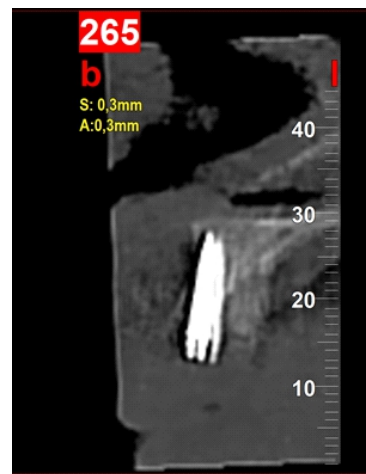
Checking implant placement



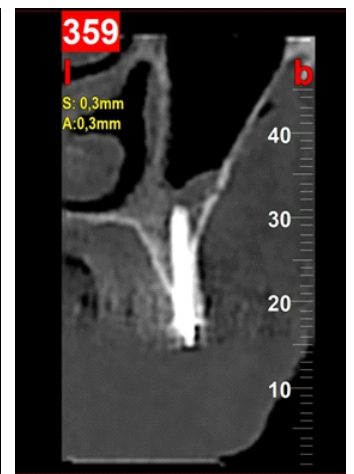
Position 18



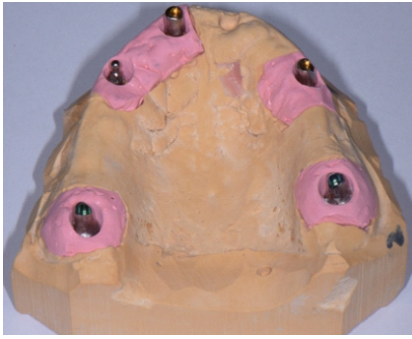
Extreme narrow placement at position 14



Position 11



Position 23



Model with superstructure



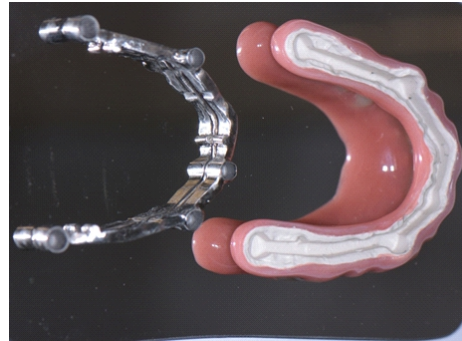
Mouth situation after healing



Bar in position



Bar and prosthesis



Bar and prosthesis



Final result

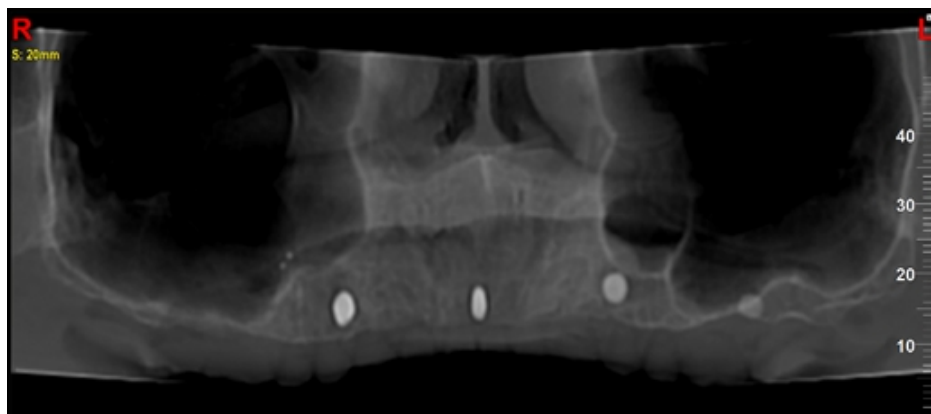
● CASE-2

Edentulous upper jaw. A 52-year-old patient has been wearing a full denture for about 15 years and wants a fixed restoration.

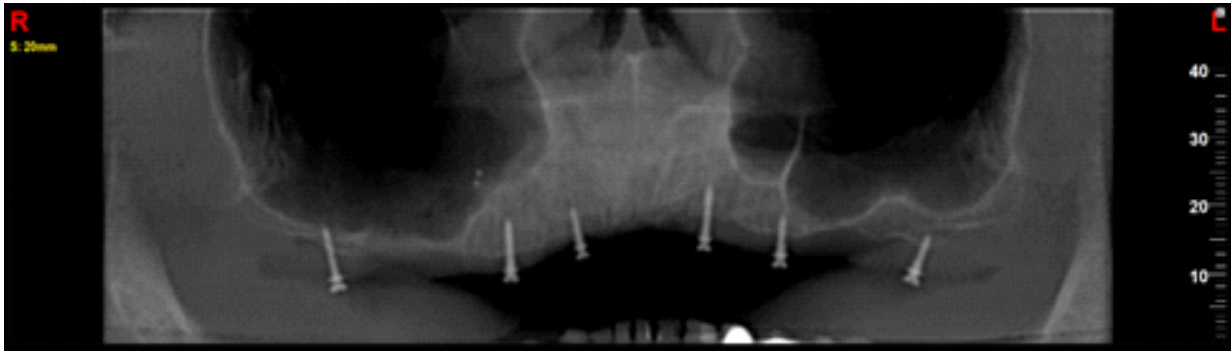
The remaining bone was greatly reduced. Thanks to 3D planning, the remaining bone could be used to maximum effect (bone island 27!) and augmentations were avoided.

Planning with double scan - via X Guide- dynamic navigation. Radiopaque markers were attached to the full denture.

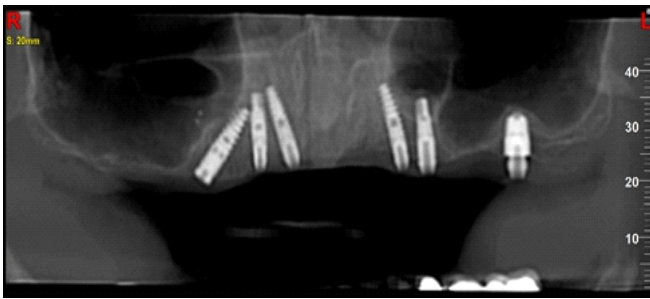
Mini implants were placed for calibration on the day of the implant surgery. These are automatically recognized by the X Guide software and are used to calibrate the tracker arm, which is screwed directly into the bone of the upper jaw. 6 implants were placed as initially planned, in a minimally invasive fashion. All implants healed. Toronto Bridge was placed after 3 months.



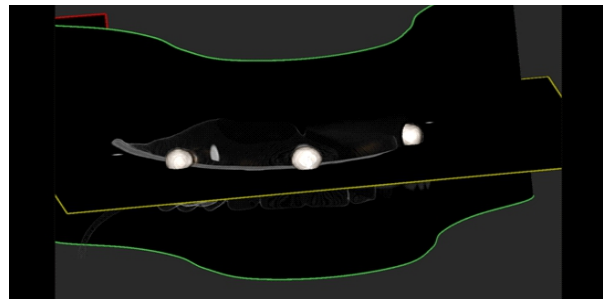
Starting situation



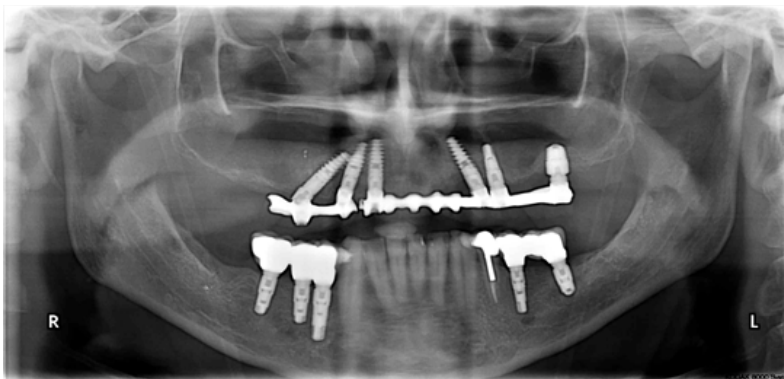
Temporary implants for calibration



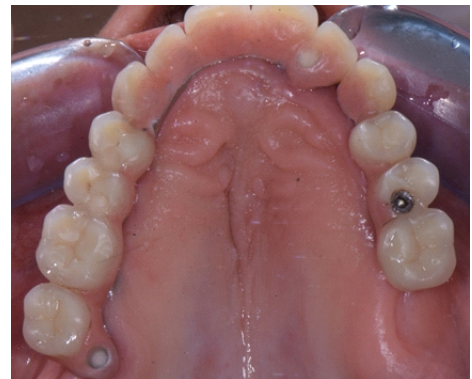
Implants



Scan prosthesis for double scan



Integration of dentures OK



Dentures occlusal view



Dentures frontal view

Interview of Guest of Honour of AEEDC 2023- KOREAN TEAM



Korea is the official Guest of Honour for Aeedc Dubai 2023, how do you appreciate this gesture from AEEDC team

2023년 한국이 주빈국으로 선정된 것에 대해 한국의 치과산업을 대표하여 깊은 감사를 전합니다.

한국은 지난 2007년 8개 부스를 시작으로 2023년 81개 부스로 규모가 확장될만큼 지난 15년간 AEEDC 전시회에서 크게 발전해왔으며, AEEDC의 동반파트너로서 함께 성장해 왔음을 느낍니다.

대한민국이 주빈국으로 선정됨으로써 전세계에 한국 치과산업의 위상을 보여주는 계기가 될 것이며, 한국 치과 산업 기업들에 대한 신뢰의 근거로서, 이번 주빈국 선정이 중요한 역할을 할 것이라고 생각합니다. 2023년 주빈국 선정에 다시한번 감사드리며, 앞으로도 한국은 AEEDC와 함께할 것임을 약속드립니다.

We would like to express our deep gratitude for the choice of Korea as the Guest of Honour at AEEDC Dubai 2023 on behalf of the Korean Dental Industry.

Over the past 15 years, as a long-standing friend and partner of AEEDC Dubai, KDIA and Korea have achieved remarkable growth with AEEDC Dubai, starting from 8 booths in 2008 and expanding to 81 booths in 2023 (from 8 companies to more than 130 companies).

The Choice of Korea as the Guest of Honour will be an opportunity to show the recognition of the Korean dental industry to the world, and we also expect that the Guest of Honour will have a very important role in the establishment of confidence in the Korean dental industry.

We would like to express our sincere gratitude to AEEDC Dubai. We promise that Korea will always be with AEEDC and its great success.

What according to Korea is their biggest strength in the dental industry arena .

한국의 기술력은 이미 전세계적으로 입증된 바, 높은기술력과 제품경쟁력으로 세계 시장속에서 바이어들의 선택을 받고있습니다. 특히나 임플란트와 디지털덴티스트리 분야에서 강세를 보이고 있으며, 오스템 임플란트, 덴티움, 네오바이오텍과 같은 한국의 임플란트 기업들이 10%에 가까운 세계시장 점유율을 차지하고 있습니다. 특히나 전시회가 개최되는 중동지역에서는 수년간 UAE 임플란트 수입국 1 위였던 스위스를 제치고 한국이 1 위를 차지하였습니다. 한국 치과제품은 앞으로 더욱 성장할 것으로 기대됩니다.

Korea's cutting-edge technology in the dental industry is already well-known around the world. It is being chosen by buyers in the global market for its high technology and product competitiveness.

Korea is particularly strong in implant and digital dentistry. Many implant companies such as Osstem Implant, Dentium, and Neo Biotech have a global market share of nearly 10%.

In addition, Korea has been ranked as the number one implant-importing country in the UAE, according to a recent report. We expect further growth in the MENA market for Korean dental products.

Digital dentistry is the backbone of modern dentistry. How is the Korean companies responding to this development

전세계적인 트렌드에 맞춰 한국에서도 디지털덴티스트리 분야 기업들이 강세를 보이고 있습니다. 국가적으로 정부지원을 통해 디지털 덴티스트리 포럼 진행, 정책지원등을 시행하고 있으며, 한국의 대형기업들은 해외법인을 설립하여 글로벌 진출에 박차를 가하고 있으며, 디오, 덴티스, 레이와 같은 한국의 기업들이 세계적으로 강세를 보이고 있습니다.

In line with global trends, Korean digital dentistry companies are showing strong growth in Korea. While focusing on creative research and development to use digital dentistry in all processes from diagnosis to treatment to capture and expand market share, many companies are actively trying to enter overseas markets by establishing overseas companies and participating in global events.

In addition, at the government level, policies and budget support for fostering the digital healthcare industry are being presented, and companies are actively utilizing them. In addition to the above, digital dentistry competitors such as Arum Dentistry and Vatech, and global implant companies such as Neo Biotech and Osstem are expected to attend this year's event.

What according to your contingent is one of the most innovative product showcased in this AEEDC event

All Korean products are excellent, but among them, we introduce this year's innovative products.

Neo Biotech ' Y2 Link system'



A New Dawn for Prosthetic system: 'YK Link system' No Screw, No Cement but, Detachable Prostehsis 'YK Link system' has been developed a new concept prosthetic system by Dr. Heo's (CEO of Neobiotech) Designed for simplicity and flexibility, especially with regard to prosthetics, it features a detachable hook locking design without screw and screw hole. Since 'YK Link System' is provided with the crown and link combined from the laboratory, this allows easy and simple setting of prosthesis to occur at the gingival level without no cementation in oral. As a result, It can reduce the incidence of various problems that occur after the procedure, such as peri-implantitis due to residual adhesive. Also, Disadvantages such as screw loosening, fracture, and bone loss due to various causes such as structural problems or the change of patient's oral condition have been minimized. It makes the entire maintenance process more effective for the clinician and pain-free for the patient.

Osstem Implant 'K5 unit chair'



Osstem Implant proudly introduces its amazingly attractive K3 dental unit chair. The K3 has been sold over 40,000 units in 72 countries and it becomes one of the most beloved dental chairs among clinicians. Today, along with the K3, it is an honor to announce the global launch of brand new, next generation dental unit chair, K5, through AEEDC 2023 for the first time.

The concept of K5 is defined as stylish and comfort. Compare to the K3, it is highly improved in design and convenience of clinical treatment. The K5 comes with 9 different trendy colors and able to harmonize the mood of clinics and satisfy clinicians respectively.

In terms of design, the slimmer backrest minimizes the interference of knee movement and the lift function of lower cushion enables to perform more precise treatment for patients.

The maintenance of unit chair becomes a lot easier. Wireless foot controller implies hygienic medical environment. Additionally, to avoid germs in the water pipeline, Sterilizing Water Supply device is equipped for clinicians.

RAY 'RAYFace'

New technology is revolutionizing the way dental professionals approach aesthetic cases.

RAYFace, a leading face scanner, offers dental professionals a fast and accurate solution. The scanner provides a wealth of information on how an intraoral scan of a patient fits the patient's face, allowing for an accurate face-centered workflow. The device automatically generates midline by detecting the pupils, medial line, FH line, orbital lines, occlusal plane, initial guideline for DSD necessary for clinical practice. When matched with oral scanners, oral scan data are precisely matched to the face.

This technology benefits aesthetic dentistry, dentures, or all-on-X cases, making it a valuable tool for dental professionals. With the increasing popularity of facial scanning technology, it's becoming clear that it will soon become a mainstream practice in the dental industry.



RAY-1



RAY-2



RAY-3

How many dental companies have participated in AEEDC 2023 from Korea and which is the most innovative product which is getting displayed.

한국관은 54 개사, 전체 한국기업으로는 130 개 이상의 기업이 2023 년 에 참가 예정입니다. 아름덴티스트리, 바텍과 같은 디지털 덴티스트리 분야 기업, 네오바이오텍, 오스팀임플란트와 같은 임플란트 기업들이 대거 참석하며, 그외에도 재료, 교정, 인상재 등 다양한 제품의 한국 기업들이 참석예정이니, 많은 관심을 부탁드립니다.

The Korean Pavilion, co-organized by KDIA and KOTRA (Government of Korea), will feature 54 companies. In total, more than 130 Korean companies are expected to participate in AEEDC 2023.

In addition to the above companies, digital dentistry competitors such as Arum Dentistry and Vatech, and global implant companies such as Neo Biotech and Osstem are expected to participate this year.

Korean companies with breakthrough and innovative products in various fields such as dental equipment, dental materials, orthodontic materials, and impression materials will also be in attendance.

We hope that many visitors who have participated in AEEDC will have the best experience by visiting Korean companies. We expect them to build strong networks with each other.

Glimpse of **CAI Annual Congress** in **Florence 2022**

President Message



During last years, the pandemic has seriously obstructed the plan of our educational programme. However, during 2022, it was possible to resume many of our activities and set a concrete base for the further development of our International CAI Academy. Despite the obstacles, our educational plan was initiated. The CAI Webinar Series & Study Club did start-up with clinical and technical presentations from Dr Kaan Orhan, Dr Robert Pauley, Dr George Zorogiannidis, Dr Jacques Vermeulen, Dr Christos Lamprinos, Dr Philippe Tardieu, Dr Gregory Fejoz. Moreover, with the kind assistance of many Active Members, certain in-person seminars, courses and meetings did take place. In France, with the kind assistance of Dr Jacques Vermeulen and participation of Dr Laurent Sers, a CAI Session was organised in the framework of ARIA. In Belgium and Spain, Prof Maurice Mommaerts continued with the advanced courses on AMSJI. Dr Philippe Tardieu launched a new cloud-based patient management software, as well as contributed with seminars and courses on Guided Implantology. In India, with the initiative of Dr Prashant Jaju, a first CAI Course on Dental Imaging was organised. Also in India, with the active interest and help of Dr Sanjay Asnani, a major conference was organised in collaboration with the newly formed Indian Society of Digital Dentistry (ISDD) and a very important partnership with the CAI Academy has been established. Of course, with the continuing dedication and enthusiasm of Dr Marco Rinaldi, the 15th International CAI Meeting took place in Florence, Italy. At the same time, the CBCT Magazine, under the direction of Dr Prashant Jaju, also continued the quality publications such as this current issue. Overall, it has been an special privilege and great honour to preside and serve the CAI Academy during the last two years and I would like to thank all the CAI Members for their continuing support and participation during that very difficult period. Of course, it is the intention to continue the efforts and I am very happy to announce that the next 16th International CAI Academy meeting will take place in Athens, Greece, on 23rd & 24th June, marking the formal beginning of our 'Computer Aided Implantology' Educational Programme. More information will be announced soon, therefore please check regularly the CAI Academy website and follow the CAI Academy Facebook page for more details.

Look forward to meeting you and discussing 'The Past, the Present and the Future of Computer Aided Implantology' this summer in Greece!

With my very best wishes for 2023!

Panos Diamantopoulos

President of the CAI Academy

INTERNATIONAL MEETING OF COMPUTER AIDED IMPLANTOLOGY ACADEMY XV ANNUAL MEETING

CONGRESS SITE : Auditorium CTO - Careggi Hospital - Florence, Italy
November 25-26, 2022



CONFERENCE PRESIDENTS



MARCO RINALDI



EXHIBITORS



PARTICIPANTS



EXHIBITORS



ROLF EWERS

INTERNATIONAL MEETING OF COMPUTER AIDED IMPLANTOLOGY ACADEMY XV ANNUAL MEETING

CONGRESS SITE : Auditorium CTO - Careggi Hospital - Florence, Italy
November 25-26, 2022



DIAMANTOPOULOS AWARD



VALENTE AWARD



RINALDI AWARD



ROBERT PAULEY



LONGONI AWARD



TEDESCO AWARD

INTERNATIONAL MEETING OF COMPUTER AIDED IMPLANTOLOGY ACADEMY XV ANNUAL MEETING

CONGRESS SITE : Auditorium CTO - Careggi Hospital - Florence, Italy
November 25-26, 2022



MALO AWARD



SPINELLI CONTI



TORI AWARD



AMUNI AWARD



DIAMANTOPOULOS



PHILIPPE TARDIEU

INTERNATIONAL MEETING OF COMPUTER AIDED IMPLANTOLOGY ACADEMY XV ANNUAL MEETING

CONGRESS SITE : Auditorium CTO - Careggi Hospital - Florence, Italy
November 25-26, 2022



ROY AWARD



PALUMBO AWARD



RUBRUMLILIUM



RUBRUMLILIUM

NOVEMBER 25- 26 2022

The use of current technologies to optimize the outcome of post-extraction implants: a case of rehabilitation of the upper jaw with Full digital technique

BALTHAZAR FORNACA DDS, MS

AIM

Full arch implant rehabilitation, in the case of terminal dentition, is a consolidated treatment; the creation of an immediate provisional is useful to restore functionality and aesthetics to the patient, but also to promote correct tissue healing.

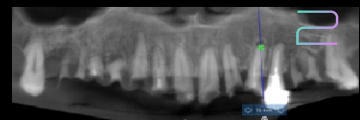
The aim of this work is to present a completely digitally planned case: from the key points of the planning, through the creation of a provisional in the pre-surgical phase and up to the finalization with full-arch zirconium prosthesis.

Materials and Methods

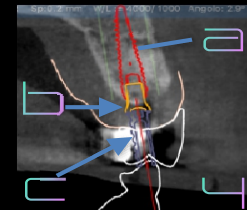
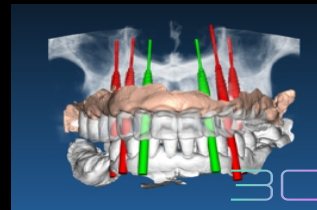
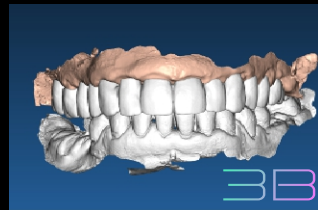
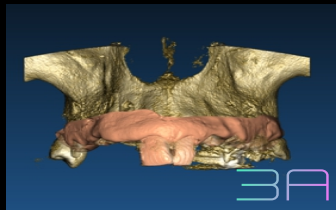


58-year-old female patient, in health.

Presence of terminal dentition of the upper arch (1); intraoral scans and cone beam tomography (2, panorex view) are performed, and the data are coupled with prosthetic implant planning software (3diemme Realguide). (3A)



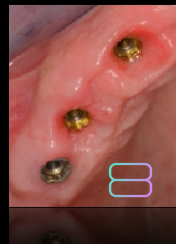
Virtual extractions are performed with planning software and a diagnostic wax-up is made (Exocad) (3B). In accordance with the prosthetic project, the positioning of the implants is simulated (3C). Together with the implants (3P Smart devices) (4a), according to the Bone abutment one time principle, the insertion of a mesostructures with conometric connection (TLC Base, 3P Smart Devices) (4b) is planned, which will remain coupled to the implants even with the definitive prosthesis. The implants are planned so that the correct depth allows a stable adaptation of hard and soft tissues, and the temporary prosthesis is fixed with non-engaging temporary abutments. (4c)



The extractions were carried out sequentially; the two incisors 11 and 21 were initially used to stabilize the surgical guide, together with two anchoring pins. After inserting the implants in the posterolateral sectors of both sides, teeth 11 and 21 were extracted. In the extraction sockets of the frontal sectors, heterologous grafting was performed to maintain the volume of the crest. The TLC bases with conometric connection (4b) were placed on the implants, and the pre-made temporary prosthesis was screwed onto these.



In the healing period, soft tissue maturation was achieved (8) and osseointegration was completed. After 8 months, a digital impression was performed with an intraoral scanner. A trial of the final structure was performed with a resin milled bridge to verify the passivity of the screw-retained prosthesis, then the definitive zirconia bridge was delivered (7-9).



Conclusions

Guided surgery offers the advantage of planning the implants correctly and reducing post-operative discomfort. Nowadays the digital workflow is focused on the final prosthetic result; thanks to a correct virtual planning, right from the pre-surgical phase, the correct positioning of the implants in the three axes is established, the most suitable prosthetic components are chosen and the correct prosthetic margins are defined. The maintenance of the bone and gingival profiles is favored by the correct depth of the implants, by the non-removal of the abutments and by the conometric connection of the same.

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Use of Cone Beam Computerized Tomography to check for defective teeth horizontal overlap

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sez. Anatomia Umana, Università degli Studi di Firenze

AIM

To check for defective horizontal overlap in implant supported crowns using Cone Beam Computerized Tomography (CBCT), in order to avoid cheek and tongue biting¹³.

Materials and Methods

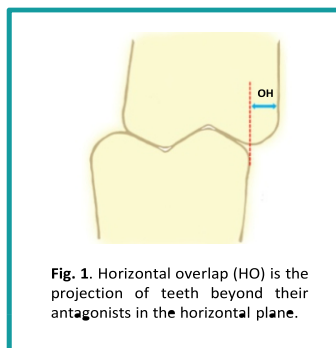


Fig. 1. Horizontal overlap (HO) is the projection of teeth beyond their antagonists in the horizontal plane.

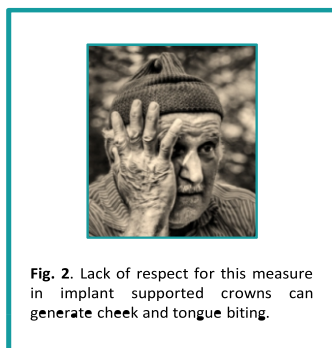


Fig. 2. Lack of respect for this measure in implant supported crowns can generate cheek and tongue biting.

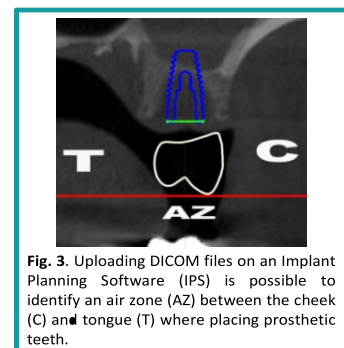


Fig. 3. Uploading DICOM files on an Implant Planning Software (IPS) is possible to identify an air zone (AZ) between the cheek (C) and tongue (T) where placing prosthetic teeth.

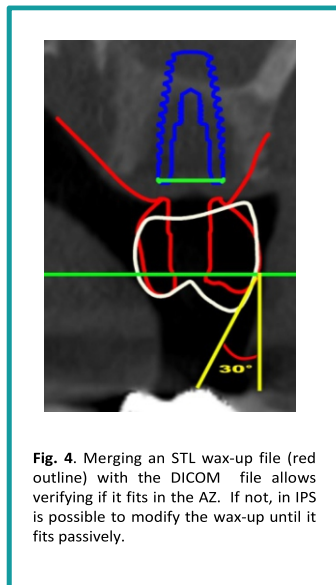


Fig. 4. Merging an STL wax-up file (red outline) with the DICOM file allows verifying if it fits in the AZ. If not, in IPS is possible to modify the wax-up until it fits passively.

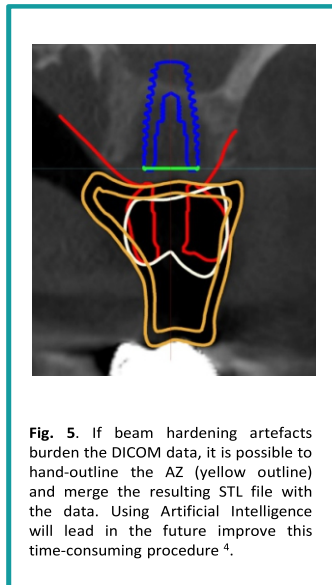


Fig. 5. If beam hardening artefacts burden the DICOM data, it is possible to hand-outline the AZ (yellow outline) and merge the resulting STL file with the data. Using Artificial Intelligence will lead in the future improve this time-consuming procedure⁴.

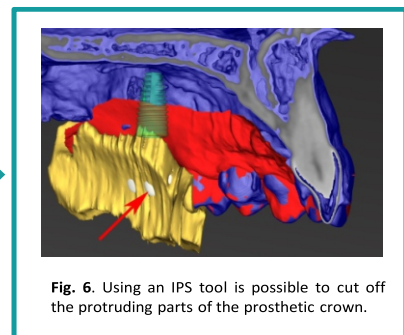


Fig. 6. Using an IPS tool is possible to cut off the protruding parts of the prosthetic crown.

Conclusions

This method allowed us to reduce CTB by digitally identifying the horizontal overlap in ISC. The main limitations are that hypertrophic cheek and tongue can make it difficult to identify the AZ. Therefore, it may be necessary to clinically check the horizontal overlap and then digitize the resulting file for using in the IPS. Moreover, this method may be time-consuming when applied to large cases but enough precise for one or two ISC.

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2023, ISSUE 2

CBCT

CONE BEAM COMPUTED TOMOGRAPHY
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Chirurgia 3D dinamica : lo stato dell'arte



Dr. Gernot Obermair
10 febbraio 2023

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Abstract

La chirurgia guidata è ormai da anni una modalità operativa molto diffusa, che presenta indubbi vantaggi sia per l'operatore, in termini di precisione e di standardizzazione dei flussi di lavoro, sia per i pazienti, soprattutto in relazione alla minore invasività delle procedure. Nel tempo, i protocolli si sono evoluti grazie all'introduzione di nuove tecnologie a supporto della pianificazione e dell'esecuzione dei trattamenti. La più recente di queste innovazioni è la chirurgia guidata dinamica, che offre una interessante alternativa all'uso dei template chirurgici. In questa giornata verrà presentato lo stato dell'arte nella chirurgia guidata: le indicazioni, i vantaggi clinici, le diverse opzioni operative, le tecnologie e gli strumenti. La più recente di queste innovazioni è la chirurgia guidata all'uso dei template chirurgici. Durante la giornata verrà presentato lo stato dell'arte nella chirurgia guidata : le indicazioni, i vantaggi clinici, le diverse opzioni operative, le tecnologie e gli strumenti.

Profilo del relatore

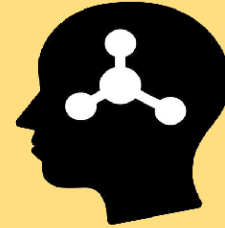


Nato a Bolzano 1966
Laureato in odontoiatria nel 1991 presso l'Università di Ulm /D
Dal 1994 esercita l'implantologia
dal 1996 lavora come libero professionista in studio proprio a Bolzano
2001 esperto qualificato in implantologia (DGOI/D)
Dal 2002 esegue l'implantologia computer guidata statica
2006-2008 specializzazione in odontoiatria biologica
2009 fonda il happy smile dental center
Dal 2012 implantologia guidata full arch postestrattiva carico immediato
2016 membro attivo della CAI academy
2019 implantologia navigata dinamica (X-Guide®)
Da anni esercita prevalentemente l'implantologia guidata statica con guide chirurgiche e dinamica a mano libera.
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- il corso è rivolto a medici dentisti / odontoiatri
- il corso si terrà in lingua italiana



Programma

08:30 - 09:00	Welcome e registrazione partecipanti
09:00 - 10:00	Introduzione a X-Guide
10:00 - 10:30	Presentazione del caso
10:30 - 12:00	Live surgery con X-Guide
12:00 - 13:00	Pranzo
13:00 - 14:30	Discussione finale e chiusura lavori

Quota di partecipazione

€ 50,00 + IVA 22% (€ 61,00 IVA inclusa)
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 Non comprende il viaggio e la prenotazione alberghiera.

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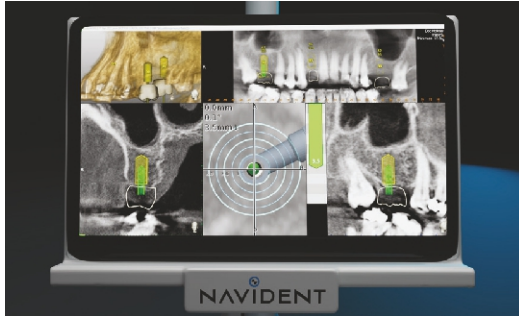
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DYNAMIC NAVIGATION, VIRTUAL TO REALITY: TARGETING PERFECTION IN IMPLANT SURGERY



Date: Saturday May, 6, 2023

Time: 11:30am - 5:00pm CST

Location: Periodontal Medicine and Surgical Specialists
Education Center

2300 Lehigh St. Suite 245 Glenview, IL 60026

Tuition: Doctor \$499.00 / Assistant \$200.00

Credit: 5 CEUs

Registration: kemisha@claronav.com

Information: beth@claronav.com

Dynamic navigation technology is the next leap forward in the field of computer guided implantology. Navigation surgery allows for real time verification and validation of positional accuracy to ensure prosthetically directed results are realized. If you're interested in learning how to become more accurate, precise, versatile and consistent with your implant surgical therapy, spend a half day with us to learn first hand how dynamic navigation can enhance your outcomes. This course will allow the attendee to practice drilling on models with navigation and treatment planning with navigation software. A live surgical demonstration is included.

Objectives:

1. To review and describe the use of a dynamic surgical navigation system for dental implant placement using surgical navigation
2. To understand the advantages of dynamic surgical navigation
3. To be able to fabricate prosthetically directed navigation implant surgical plan for use in surgery that represents the outcome goals
4. To understand the digital workflow and demonstrate execution of navigation surgery



Dr. George Mandelaris attended the University of Michigan from undergraduate through dental school. In 1999, he completed a three-year post-graduate residency program in periodontics at the University of Louisville, School of Dentistry, where he also obtained a Master of Science (MS) degree in Oral Biology. Dr. Mandelaris is a Diplomate of the American Board of Periodontology and has served as an examiner for Part II (oral examination) of the American Board of Periodontology certification process. He has served as an assistant clinical professor in the Department of Oral and Maxillofacial Surgery at Louisiana State University, School of Dentistry (New Orleans, LA) and, currently, is an adjunct clinical assistant professor in the Department of Graduate Periodontics at the University of Illinois, College of Dentistry (Chicago, IL) as well as the University of Michigan, School of Dentistry, Department of Graduate Periodontics (Ann Arbor, MI). Dr. Mandelaris is a fellow in both the American and International College of Dentists.



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