









(Intro)





































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## Digital Workflow

This casebook features exclusively dental implant cases with the **matrix**<sup>®</sup> implant system, the world's first dental implant without an abutment for the digital workflow. The below digital workflow guideline shows throughout the book the selected software and technology partner choosen for each step.



### matrix<sup>®</sup> Post-Market Clinical Follow-up Study (PMCF)





Prof. Dr. med. dent. Ronald E. Jung, PhD (Switzerland)



Dr. Ivan Peev (Bulgaria)



**Prof.** Tomas Linkevičius (Lithuania)



**Dr. Joel Teles** (Portugal)



Dr. Alessandro &

(Italy)

(Switzerland)

Dr. Ramon Gomez Meda

Andrea Agnini (Spain)



Prof. Costantin Von Dr. Marco Zeltner See (Austria)

Dr. Stefano Giudici (Switzerland)

















THE WORLD'S FIRST DENTAL IMPLANT

# WITHOUT AN ABUTMENT

# Single crown immediate restoration



# University of Zurich<sup>uz∺</sup>

### by Prof. Dr. med. dent. Ronald E. Jung, PhD

(Switzerland)

- Trained in oral surgery, prosthodontics and implant therapy
- · Head Division of Implantology at the Clinic of Reconstructive Dentistry, Center of Dental Medicine, University of Zürich.
- 2006: he worked as Visiting Associate Professor at the Department of Periodontics at the University of Texas Heath Science Center at San Antonio, USA (Chairman: Prof. Dr. D. Cochran)
- 2008: he finalized his "Habilitation" (venia legendi) in dental medicine and was appointed at the University of Zürich
- 2011: he became his PhD doctorate degree of the University of Amsterdam, ACTA dental school, The Netherlands
- 2013: he worked as Visiting Associate Professor at the Department of Restorative Dentistry and Biomaterials Sciences at Harvard School of Dental Medicine in Boston, USA.
- 2015: he has been promoted to full Professorship for Implantology at the University of Zurich. He is an accomplished and internationally renowned lecturer and researcher, best known for his work in the field of hard and soft tissue management and his research on new technologies in implant dentistry.
- Currently President Elect of the EAO, Past President of the Swiss Society of Reconstructive Dentistry and member of the Board of Directors of the Osteology Foundation.



3:00pm Insertion of a Tissue-Level matrix<sup>®</sup> Implant







DENTAL SOFTWORKS

IO Scanning



**3** CAD Design



Chairside Milling of PMMA Provisional





5 PMMA Provisional



4:30pm 90 minutes after surgery, perfect fit of provisional



HAPPY UNIVERSITY ZURICH TEAM





8 FINAL RESULT Excellent fit of final restoration



# **1-year follow-up**: Tissue-Level implant in high esthetic zone



### by Dr. Joel Teles, DDS (Portugal)

- Graduation in FMDUP, Oporto
- Clinical director of Medindouro, Peso da Régua, Portugal
- 2007 Post graduate Degree in Orthodontics, São João Hospital, Oporto
- 2008 Post graduate Simplified Straight Wire Technique, Dr. Messias Rodrigues
- 2005/2006 Implants immersion course, Dr. Sérgio Motta
- 2007 Advanced Surgery Clinical Residency, CLIVO (Rio de Janeiro)
- Attendant in several periodontal and implant surgery courses
- KOL and International Speaker for TRI®

#### Anamnesis

- Female patient
- 56 years old
- Failing crown on the 11
- Lost 21 due to failed crown
- Wrong Zenit position
- Bone & Tissue defect





DOF

/imes-icore exocad







CBCT Scan





4

Tissue-Level matrix® Platform 3.7 mm Implant ø 4,1

Tissue-Level matrix<sup>®</sup> Platform **3.7 mm** Implant ø 3,3







- - 6 Immediate esthetic temporary



7

Exchange of temporary with PMMA provisionals to create high esthetic emergence profile









Ceramic veneering for high esthetic outcome 12



13 10 days after insertion Excellent fit and high aesthetic result of final restoration



1 YEAR FOLLOW-UP

## 1 YEAR FOLLOW-UP





Significant papillas and bone situation improvement

### Two crowns on one matrix® Tissue-Level Implant



#### Anamnesis

A 45-year-old man with two broken teeth which were restored with two crowns many years before. After radiological exploration a chronic infection is observed in root 44. The root 44 is diagnosed as non-restorable and the tooth 43 has a poor long-term prognosis due to the aforementioned fracture. The patient's request was a long-term predictability, a shorter treatment time and low overall costs.

Treatment plan was extraction of teeth 44 and 43 and immediate implant placement in the canine socket, socket preservation at 44 site and restoration with a full-thickness zirconia fixed 2 unit cantilever bridge after 3 months.







### by Dr. Ramón Gómez Meda

(Spain)

- Dr. Ramón Gómez Meda completed his Degree in Dentistry at University of Santiago de Compostela. He had his Thesis Award from the Autonomous Community of Galicia for Academic Excellence.
- He received a Grant from the College of Dentists of Cordoba to the best Academic record among the Spanish Dental Schools. And a Grant from the Rhone Poulenc- Rourer Foundation for Research.
- Dr. Meda had a Master degree in Occlusion and Temporo-mandibular Dysfunction. A Postgraduate training in Orthodontics with Prof. David Suarez Quintanilla. University of Santiago de Compostela, as well a Post-graduate in Periodontics and Implantology. He has published many articles, mainly about hard and soft tissue management in the esthetic area.
- He is the Ex-partner of the departments of Restorative Dentistry, Endodontics and Surgery at the University of Santiago de Compostela.
- Dr. Meda has been lecturing extensively in Asia, Europe, North and South America giving more than 300 lectures about Periodontics, Implantology and Aesthetic Multidisciplinary treatments, and training hundreds of doctors in his Institute throughout hands-on courses and clinical residencies.
- His private practice in Ponferrada (Spain) is focused in the multidisciplinary ortho-perio-prostho management of complex cases DentalXP Expert







2 Insertion of **matrix**® Tissue-Level Implant, bone grafting and suturing





**3** Soft tissue management















Healed Situation digitalization through IO scanning 5











CAD designing of PMMA temporary restoration for high aesthetic tissue management





IO scanning of esthetic established tissue situation to CAD design final Zirconia monolithic restoration





Insertion of final Zirconia monolithic restoration



Initial Situation

Post OP

# 1 YEAR FOLLOW-UP







1 Year Follow-up

Fully digital treated esthetic single crowns on matrix® Tissue-Level implant and root resections



### by Dr. Alessandro Agnini & Dr. Andrea Mastrorosa Agnini

(Italy) & Dental Technician Pierfrancesco Golfarelli

- Dr. Alessandro Agnini graduated in 1989 from the University of Modena and Reggio Emilia, Italy
- He has private dental practices in Modena and Sassuolo, Emilia Romagna, Italy and specialises in fixed prosthetics, paradontology and implantology
- He attended a two year programme of studies with Gianfranco Carnevale and Gianfranco Di Febo.
- In 2002 he obtained a diploma in the Multidisciplinary Treatment of Parodontal Patients from the University
   of Bern, Switzerland
- From 2006 he has been an active member of the Italian Academy of Prosthetic Orthodontics.
- He is a lecturer of specialist courses at the University of Foggia, Puglia, Italy
- He is the author of many Italian and international scientific publications and lectures frequently at national congresses in Italy
- Since 2007 he has been scientific director of an annual course in Fixed Prosthetics, Paradontology and Implantology based at his own private studios in Emilia Romagna, Italy
- Dr. Andrea Mastrorosa Agnini graduated in 2007 from the University of Modena and Reggio Emilia
- Dr Agnini works in private practice in Modena and Sassuolo, Emilia Romagna, Italy, following his brother, Alessandro, specialized in fixed prosthodontics, periodontology, and implantology
- He attended the NYU Dollege of Dentistry with Dr. Dennis Tarnow, Dr. Christian Stappert, Dr. Stephen Chu, Dr. Michael Bral
- He is actually a Clinical Research Fellow of the Ashman Department of Periodontology and Implant Dentistry at NYU, with Dr Sang Choon Cho
- He is co-author of Italian and international scientific publications
- Since 2007 he has been Clinical Fellow of an annual course of Fixed Prosthetics, Periodontology and Implantology based at his brother Alessandro's, who is the scientific director, private practices in Emilia Romagna, Italy

#### Anamnesis

This case provides a perfect example on how tradional knowledge and innovative protocol are setting the stage in modern dentistry. In fact, partially edentulous patients are challenging to treat for many different reasons: an absence of an organized diagnostic criteria for example, or the effective recognition of risk factors. Infection Control, Treatment Strategic Sequencing and Management of the proper occlusion are key to control during rehabilitation.

The very first step in such complex cases is the endo conservative treatment and then position a first set of provisional restoration to improve esthetics, phonetics and patient comfort. After, osseous resective surgery, in combination with implant placement, which in this case was the innovative **matrix**<sup>®</sup> Implant.

It is true in fact that the advent of new technologies has enabled the dental team to use new material and new equipment that facilitated the production of an adaptation and an accuracy of the prosthetic rehabilitation that has, up to now, been difficult to obtain

Today, intra-oral mapping technology is one of the most exciting new areas in dentistry since three dimensional scanning of the mouth is required in a large number of procedures such as prosthodontics, implant dentistry and orthodontics. All the existing intra-oral scanners are trying to face the limitations and the disadvantages of the traditional impression procedure maintaining an high accuracy level in order to be used as an efficacious alternative to the conventional impression technique.

Working with the innovative design, abutment and ti-base free, provided by the **matrix**<sup>®</sup>, helped the authors in finalizing this case in a timely fashion, maintaining an high level of accuracy.











Insertion of **matrix®** Tissue-Level Implant



- 4
- After healing phase digital impression taking





Digitalization of mouth situation



6 Design of final monolithic restoration



7 Final design monolitic restoration ready to get milled









#### Final restoration in situ

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Posterior single crown restoration with immediate 3D-printed patient-based healing collar



### by Dr. Marco Zeltner

(Switzerland)

Marco Zeltner is a Specialist for Reconstructive Dentistry and co-owner of a Dental Clinic in Horgen Switzerland, where he leads a team of 6 specialized dentists and 2 general pracitioners. He graduated in 2006 at the University of Zurich, Switzerland, and received the "doctor medicinae dentium" (Dr. med. dent.) 2010 at the same University. After the Federal Board Examination for Dentists, he worked for a 5-year period as a full-time associate at Grimmzahnaerzte in Horgen. Thereafter, he completed a 3- year post-graduate training in Reconstructive Dentistry at the Clinic of Fixed and Removable Prosthodontics and Dental Material Science at the University of Zurich. During this time, he was trained in prosthodontics and in implant dentistry. In 2015 he received the Research Award from the Swiss Society of Reconstructive Dentistry. After his postgraduate education he served as a part-time Senior Teaching and Research Assistant at the Clinic for Fixed and Removable Prosthodontics and Dental Material Science at the University of Zurich Since for 1 year. Since 2016 he works in his private clinic (Grimmzahnärzte) and part time at the Center of Dental Medicine in Zurich as an instructor. His clinical focus is on the comprehensive treatment of complex, fully dentated or partially edentulous patients applying all available options of reconstructive dentistry including dental implants. Beside the specialization in Reconstructive Dentistry (Swiss Society for Reconstructive Dentistry) he received also the diploma of advanced education (WBA) in Oral Implantology (Swiss Society of Oral Implantology). His main scientific interest is related to regenerative concepts in the field of implant dentistry.

#### Anamnesis

The 40-year-old female patient was referred for replacement of the missing tooth 36 with an implantsupported crown. Her general health condition was wirhout pathological findings and she was a non-smoker. She had regular dental recalls in the reffering clinic and showed good oral hygiene. Apart from a localised gingivitis, no pathological diagnoses were found. The tooth was extracted alio loco 3 months before implant placement and wound healing was reported to be uneventful.



1	
Initial	
situation	







Insertion of **matrix®** Tissue-Level & immediate IO scanning & data transfer to lab 2



During grafting & suturing the labs designs immediate individual healing collar



Standard healing collar hand-tighted during grafting and suturing process. In the meantime the lab designes and 3D prints individual healing collar 4





With patient-based emergence profile











9 Soft tissue healing



**10** Final monolithic crown











FINAL MONOLITHIC CROWN IN SITU







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### Integrating **matrix**® in the world's most modern dental clinic



### by Dr. Ivan Peev

(Bulgaria)

- 2000-2001 Deutsches Rotes Kreuz MKG Uniklinik Bonn
- 2011 Graduation Zahnmedicin University Varna
- 2011 Joined Dentaprime Clinic
- 2016-2021 Head of implantology department at Dentaprime
- 2021 Director of Innovation and Medical Education Dentaprime Worldwide
- Experience more that 20000 implants placed
- KOL and Instructor of TRI® and 3Shape



3shape<sup>▶</sup>



IOS and digitalisation of initial situation

### Anamnesis

Male patient with an edentulous upper and partially edentulous lower jaw + 3rd grade mobility of 33-43 came to us with wish for treatment with implants and fixed prosthetics. The patient had a Total Upper and Partial Lower dentures with not optimal stability, causing the patient constant discomfort, inability for normal eating and speaking. We decided that the optimal treatment plan was with All- on-matrix® implants and immediate loading with screw retained PMMA full-arch bridges for upper and lower jaw. Patient is a heavy smoker. During healing phase loss of one implant position 23. After 7 month healing phase placement of final full zirconia monolithic screw-retained full-arch restoration in lower and upper jaw.



Initial situation

+ + + + +





**3** Upper jaw Implant planning and designing of pilot guide template with 3Shape



4 Pilot guided open flap surgery in upper jaw



5 free hand open flap surgery in lower jaw





Insertion of 10 matrix® Bone-Level Implants (6 in upper and 4 in lower jaw)







Suturing around Healing-Caps







Direct IOS of implant situation in upper and lower jaw











Finalisation of PMMA full-arch temporary restoration design



Milled and individualised PMMA full-arch temporary restoration









**12** 3 hours after implant placement, chairside insertion of screw-retained PMMA temporaries







2 MONTHS FOLLOW-UP Patient with PMMA Temporaries









### MONOLITHIC ZIRCONIA RESTORATION





### DAY OF INSERTATION FINAL MONOLITHIC ZIRCONIA RESTORATION



15

matrix<sup>®</sup> removable Full-Arch **Restoration** with 4 Zirconia Telescopes screw-retained directly on implants





Prof. Dr. Karsten Kamm (Germany)



Dr. Torsten Kamm (Germany)



ZTM Oliver Heinzmann (Germany)



2 Insertion of 4 matrix<sup>®</sup> Bone-Level Implants, grafting & suturing





- Residual tooth 13 in the upper jaw
- Fractured teeth 12/22
- Tooth 46 needs to be removed
- High esthetic demands of patient
- Functional problems deep bite



exocad worknc





Scan bodies in position and ready for IO scanning







5 Digitalized mouth situation



Designing of 4 zirconia primary telescopes & parallelized with a 1° conus

7 Galvano gold secondary caps produced directly on the Zirconia primary parts





CAD/CAM tertiary metal construction fitted above ZI primary & Galvano secondary parts

8

46







9 Zirconia primary telescopes in situ



**10** Galvano secondary parts positioned above zirconia primary telescopes





- **11** Tertiary metal frame positioned and tensionfree glued on secondary Galvano caps









12 Final full-arch restoration designed with exocad software above the tertiary framework and produced in a ceramic-filled composite



**13** Tertiary framework with glued Galvano caps gets polymerized into full arch restoration on master model



FINAL REMOVABLE RESTORATION IN SITU









### Peace of mind for your dental clinic

### **NO ABUTMENT.** Full anatomic crowns and

bridges without abutment

**NO** CEMENT. 100% screw-retained – cement-free restoration

NO LIMITS. Unlimited design flexibility milled or 3D printed locally

The **matrix**<sup>®</sup> is the first-ever dental implant connection that has been specifically designed for the new digital manufacturing technologies such as CAD/CAM milling or 3D printing. The implant concept allows to plan the restoration directly on the implant without the use of the abutment and without manual cementation.





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