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Digital Dentistry Transforming Full-Mouth Rehabilitation

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Full-mouth rehabilitation (FMR) remains one of the most challenging areas in restorative dentistry due to its complexity, multidisciplinary requirements, and the need for precise functional and esthetic outcomes. With the advent of digital dentistry, clinicians can now plan, communicate, and execute FMR cases with unparalleled accuracy and predictability.[1]

This issue explores how digital workflows are reshaping diagnosis, treatment planning, patient communication, and prosthetic delivery for complex rehabilitation cases. [1]

1. **Enhanced Diagnostic Accuracy**

- *Intraoral Scanners:*

Capture highly accurate 3D digital impressions of the dentition and soft tissues.
Reduce chairside time, eliminate inaccuracies from traditional materials, and enable instant evaluation (fig 1).[3]

- *3D CBCT Imaging:*

Provides precise visualization of bone volume, TMJ anatomy, and sinus proximity. Enhances risk assessment and improves implant planning (fig 1). [3]

Fig 1: integrated intra-oral scanning with

- *Facial Scanning:*

Integrates facial landmarks with digital models for esthetically driven planning (fig 2&3). [3]

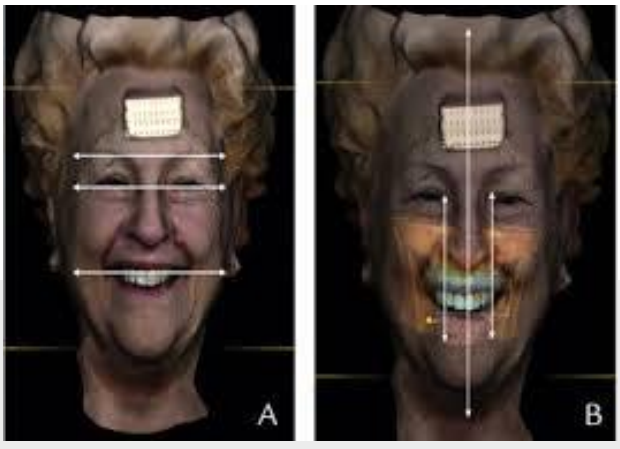

Fig 2: facial scanning with anatomical

2. **Digital Mock-Ups & Virtual Treatment Planning**

- *Digital Smile Design (DSD) & CAD Software:*

Allow virtual testing of different occlusal schemes, esthetic outcomes, and proportional changes.
Improve clinician–technician communication.
Enable accurate evaluation of the smile frame, lip mobility, midline, and tooth proportions (fig 5). [1]

- *Virtual Occlusion Analysis:*

Detects occlusal interferences and guides rehabilitation strategies (e.g., Dahl concept, increasing VDO, occlusal schemes). [1]

Fig 3: face scanner

3. **Precision in Vertical Dimension of Occlusion (VDO) Planning**

- Digital articulators and jaw tracking systems (e.g., Modjaw, ARCUSdigma) allow simulation of mandibular dynamics, accurate evaluation of space requirements before raising the bite and reduction in trial-and-error during the provisional phase (fig 4). [1]

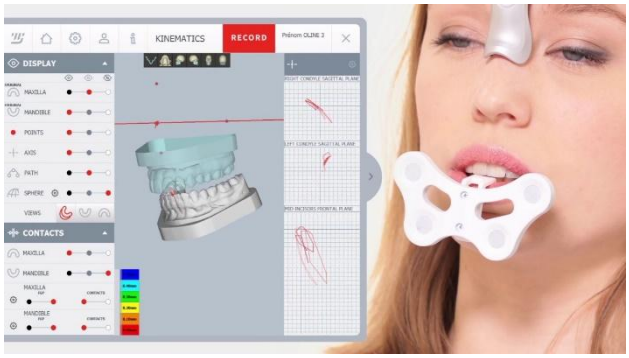

Fig 4: mandibular motion tracing using

4. **Improved Communication with Patients**

- Digital tools help patients visualize their future smiles through: Photorealistic 3D smile previews, Virtual try-ins and augmented reality simulations. Patients develop stronger motivation, better case acceptance, and deeper understanding of the treatment steps. [1]

5. **More Predictable Provisionalization**

- 3D-Printed Provisionals provide functional prototypes for testing occlusion, esthetics, phonetics, and VDO. They allow quick adjustment and fast turnaround with the lab. Testing provisional restorations digitally before finalizing reduces clinical complications (fig 5). [2,4]

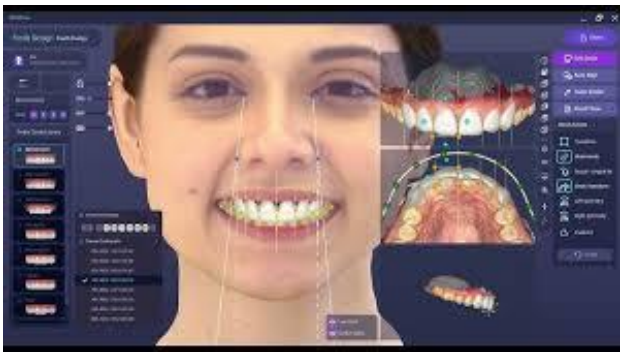

Fig 5: integrated facial scanning with

6. CAD/CAM and 3D Printing for Final Restorations

- Modern materials such as: Milled monolithic zirconia, 3D-printed zirconia (e.g., Nanoksa ZR), and Lithium disilicate. They offer superior strength and esthetics for long-span rehabilitations.

- Digital workflows ensure consistent thickness control, accurate marginal integrity, precise occlusal morphology, reduced remakes and fewer chairside adjustments (fig 6). [2,4]

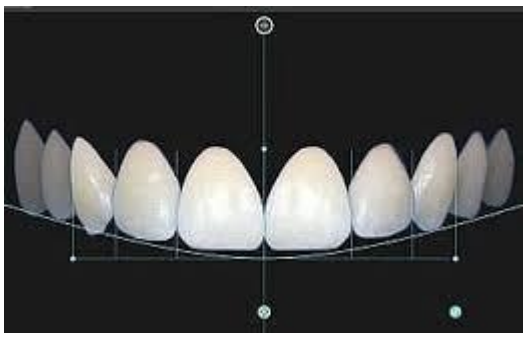

Fig 6: Digital mockup with

7. Digital Implant Planning for FMR

- Fully guided and semi-guided digital implant surgery provide accurate implant positioning relative to bone anatomy and prosthetic needs, safer surgery, especially in atrophic jaws, shorter surgical time, immediate loading possibilities and implant-supported FMR becomes more efficient and more predictable.[5]

8. Multidisciplinary Collaboration Made Easy

- Digital platforms allow real-time communication between Prosthodontists, Periodontists, Orthodontists, Technicians and Surgeons. Shared 3D files and cloud-based planning (Exocad, 3Shape, BlueSkyPlan) ensure everyone works with the same precise data. [2,4]

Digital dentistry has revolutionized full-mouth rehabilitation by improving diagnostic accuracy, enhancing communication, and increasing precision in planning and execution.
The shift toward digital workflows leads to greater predictability, reduced clinical complications, improved patient satisfaction, and more efficient treatment delivery.

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