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Digital Immediate Denture —

# A Paradigm Shift

Salvatore D'AMATO, MD, DDS

Corresponding Author: Dr. Pietro VENEZIA

**Removable prosthesis is playing an increasingly important role in modern dentistry. The introduction of new materials (teeth, resins, composites for characterization) allows to achieve functional and aesthetic excellence.**

**Fabricating an immediate denture in the conventional manner may be complicated and difficult, especially when the patient show a terminal dentition.**

**In this article, we describe a case that we treated utilizing digital technologies for the construction of an immediate and diagnostic full denture.**

**T**he conventional methods for fabricating immediate dentures and complete dentures have not changed for the past 50 years and involve multiple clinical appointments and lengthy laboratory schedules<sup>(1, 2,3,4,5,6)</sup>.

Several commercial manufacturers currently fabricate complete dentures using computer-aided design and computer-aided manufacturing (CAD/CAM) technology.

The use of computer - aided engineering (CAE) and computer - aided design/computer - aided manufacturing ( CAD/CAM ) technology to fabricate complete dentures was introduced in 2011.

Digital dentures fabricated using CAD/CAM technology can reduce

clinical appointments, provide high accuracy in denture fit, allow less polymerization shrinkage of the denture base, and facilitate easier duplication of dentures.

A full digital workflow can be used to produce immediate denture <sup>(7,8,9,10,11)</sup>.

## Clinical Report

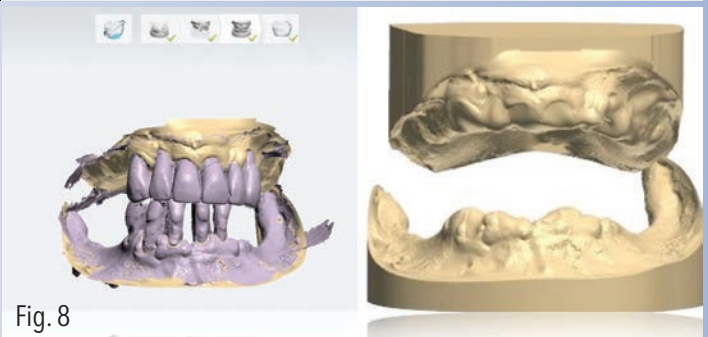
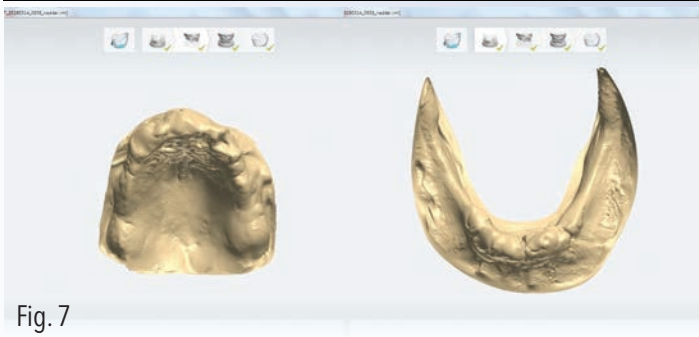
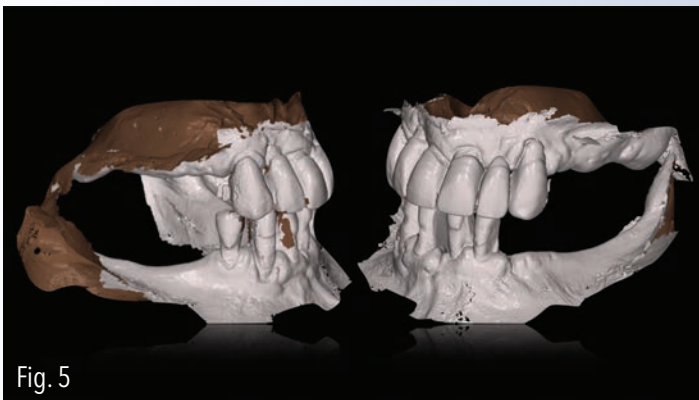
A 55 years old woman (Fig. 1-3) showed a bilateral edentulous areas located posterior to the remaining natural teeth. both in the the upper and the lower jaw, according to class I of Kennedy's classification.

The upper front elements were treated with PFM crowns with distal attacks acts to stabilize a removable partial denture.

All the remaining teeth showed severe periodontal attachment loss.

Treatment for this patient included extraction of the remaining mandibular dentition and an immediate digital mandibular and maxillary denture. The finalization of the case, provide for the delivery of two removable dentures, stabilized by two implants placed in intraforaminal region.

A careful aesthetic and functional analysis was performed, especially facial, dento-labial and phonetic analysis. Parallelism between the commissural line was evaluated on the facial plane, as well as the relationship between the e-line and lips on the sagittal plane. The patient showed an altered pattern of incisal plane, the correct phonetics and a preserved



vertical dimension. Absent conditions affecting the tempora-mandibular joints.

An intra-oral scanner (True Definition Scanner - 3M) was used to detect the primary impression (Fig. 4-5). The use of this technology has made it possible to minimize the inconveniences associated with the use of traditional impression

materials<sup>(12)</sup>. The enormous mobility of teeth residues would not allow easy removal of the impression tray without exposing the patient to risk of unwanted avulsions.

Intermaxillary relations were recorded at deemed appropriate vertical dimension and sent to our reference laboratory (Fig. 6).

The next step involved the virtual avulsion of dental elements residues resulting in two models of edentulous arches properly oriented in space (Fig. 7-8).

Patient's pictures were used by the software to correctly orient virtual models in the space and to assess the discrepancies to correct.



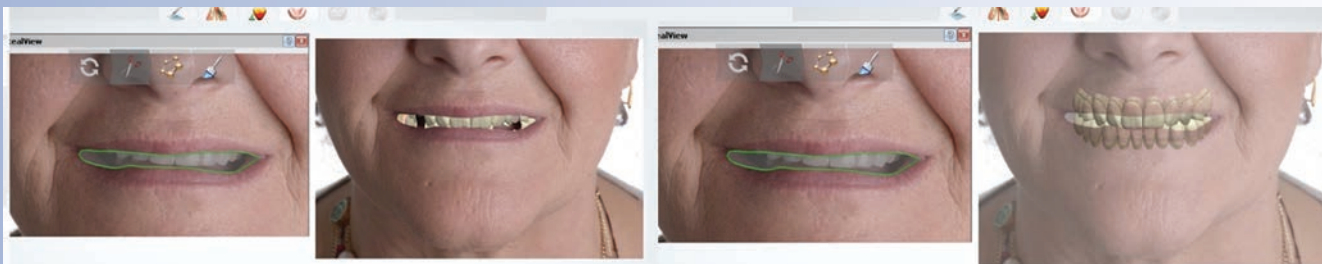


Fig. 9

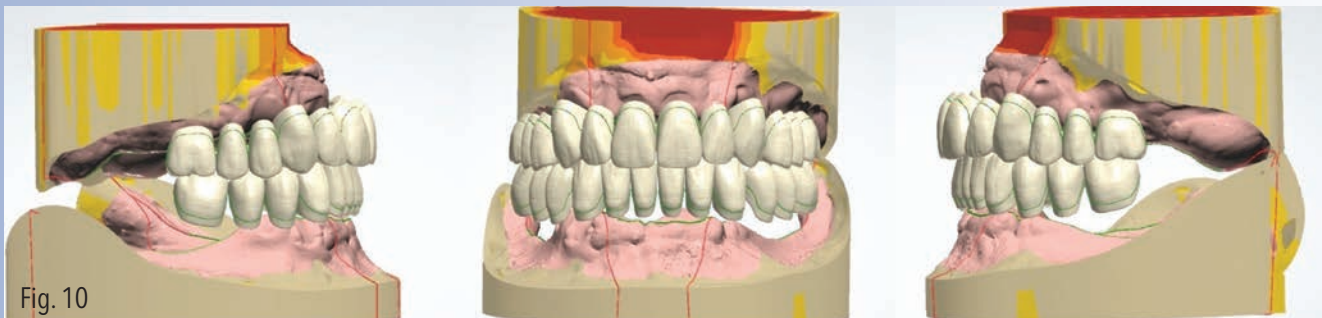


Fig. 10

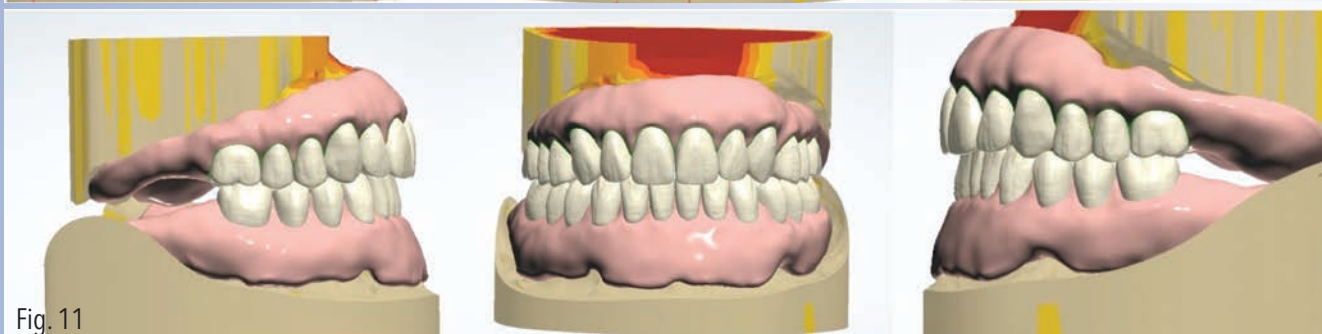


Fig. 11

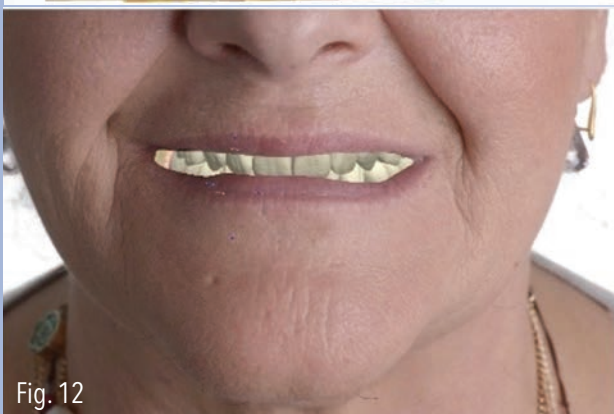


Fig. 12



Fig. 13

The software has allowed us to also evaluate the relationship between dental elements residues and peri-oral tissues.

The software for the construction of full dentures, Denture Add-on Digital Professional (Wieland Dental) based on Denture Digital Design software (3Shape) was used to analyze the anatomical parameters

normally used for complete dentures (incisive papilla, rugae, performance of ridges) The software has proposed a mounting that was individualized on the case treated (Fig. 9-12).

The dental technicians decided the extension of the prosthesis and used its considered suitable tooth shape by choosing it from among those present in the dental library. In-Software

Add-on Digital Denture Professional is stored various functional dental fittings selected from dental libraries of Ivoclar Vivadent or Candulor. This allows a considerable saving of time. Functional parameters and dynamics of the lower jaw are evaluated in a virtual articulator comparable to the Stratos 300 (Ivoclar) and any interference could be detected.



CAD construction of protein bases was transmitted to the unit Milling ZENOTEC select ion (Wieland Dental) and then milled. The denture design had been approved for CAM manufacturing (Fig. 13).

The next sequence phase involved the tooth encourage trade in milled wells. E 'it was used a primer and a bonding agent (CAD Ivo Base Primer and Bond- Ivoclar Vivadent) for adhesive procedures.

The transfer template calculated automatically facilitated the fastening of denture teeth in the position designed in the prosthetic body. The prosthetic bases were then milled and, after the separation from the disk, they were polished (Fig. 14-16).

The second session focused on clinical extractions of all dental elements residues and delivery of the prosthesis (Fig. 17-19).

The result of this digital stream has been fully satisfactory both from a functional and aesthetic point of view (Fig. 20).

The use of these prostheses allows adequate surgical wound healing and a more accurate diagnosis, necessary in order to a suitable prosthetic finalization.

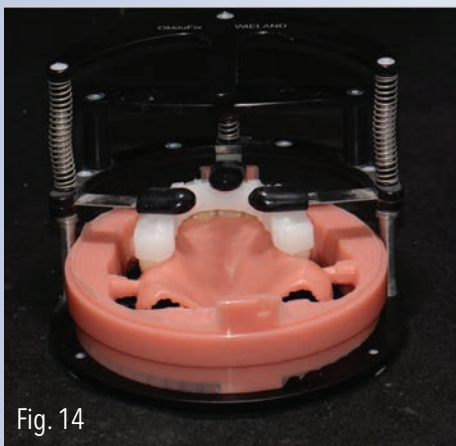


Fig. 14

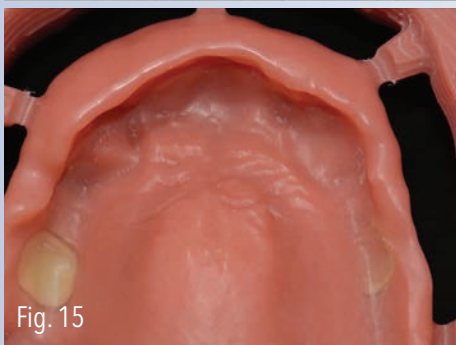


Fig. 15



Fig. 16

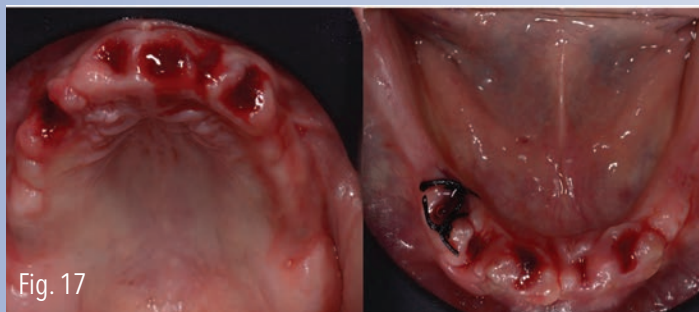


Fig. 17



Fig. 18

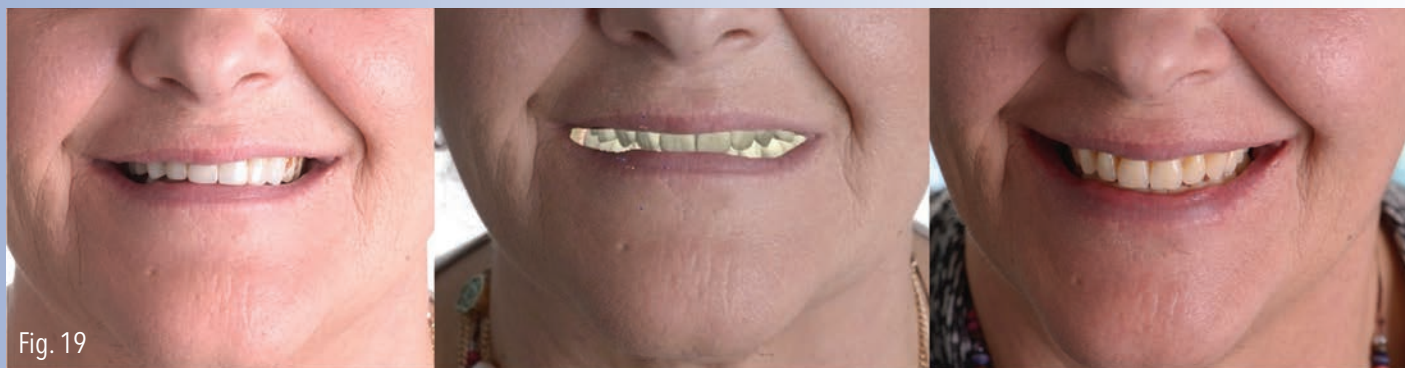


Fig. 19

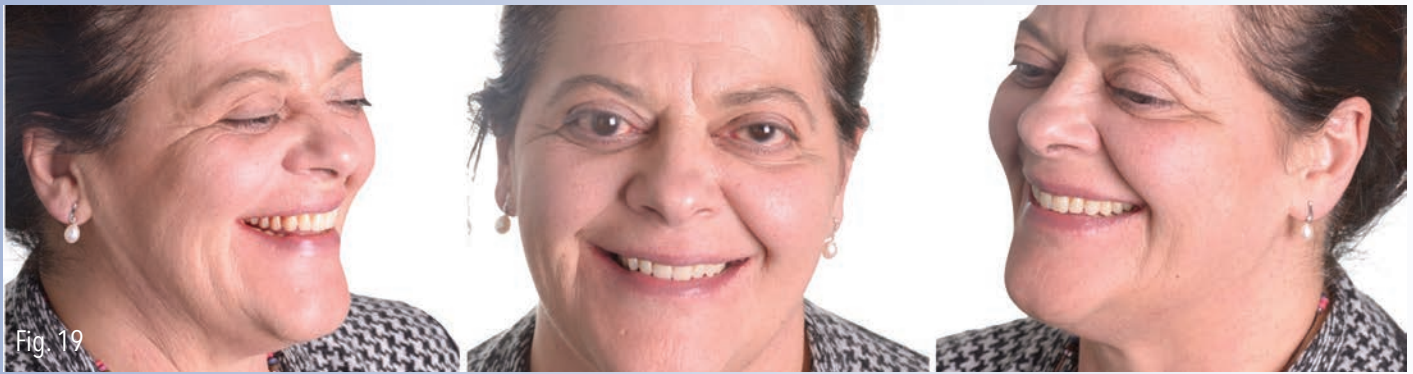



Fig. 19

## Conclusions

This technique not only reduced treatment time, clinical visits, and dental expenses but also maintained the patient's appearance, mastication, occlusal vertical dimension, and maxillomandibular relationship.

The use of intra-oral scanning technology in combination with the CAD / CAM procedure allows reducing considerably the times of making dentures. The full-digital workflow permitted the immediate rehabilitation of the hopeless dentition patient described in the article. 

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