

Using a 45° Angled Abutment on the Mandible for a Full-Arch Restoration

First, let's get acquainted with the doctor:



Dr. Denis Malyutin

Specialization:

Aesthetic prosthodontics, implantology, and digital dentistry.

Professional experience:

over 20 years

This clinical case is notable for the use of a **single standard abutment with a 45° angulation** in a **clinically challenging scenario**. This approach allowed for optimal prosthetic positioning while **minimizing the extent of surgical intervention**.

Patient Information and Initial Clinical Situation

Treatment objective: Full-arch restoration of the mandible.

Initial clinical assessment:

- The posterior regions of the mandible had been edentulous for an extended period, resulting in significant **alveolar ridge atrophy**. Implant placement in these areas was not feasible without **guided bone regeneration (GBR)**.
- In the anterior region, six teeth remained along with two retained root fragments. The condition of the remaining teeth was **poor**, with an unfavorable prognosis for long-term preservation.

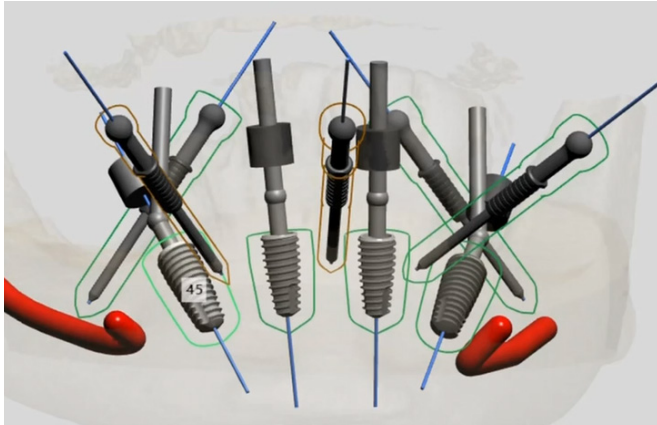


Treatment Plan

As preservation of the remaining teeth was deemed **non-viable**, the following clinical approach was adopted:

- **Extraction** of all non-restorable teeth and retained root fragments.
- **Surgical reduction** of the alveolar ridge to establish a level and predictable bone foundation.
- **Placement of four dental implants** in the anterior mandible, where bone density was sufficient and the risk to the mandibular nerve and other critical anatomical structures was minimal.
- **Fabrication and placement of a screw-retained full-arch restoration** supported by these four implants: initially a **temporary prosthesis**, followed by a **permanent restoration** after osseointegration.

During the preoperative planning phase, it was identified that **one implant (marked '45' in the illustration)** would require placement at a **significantly steeper angulation** than is typical for this type of procedure, necessitating careful prosthetic planning and the use of an appropriately angled abutment.



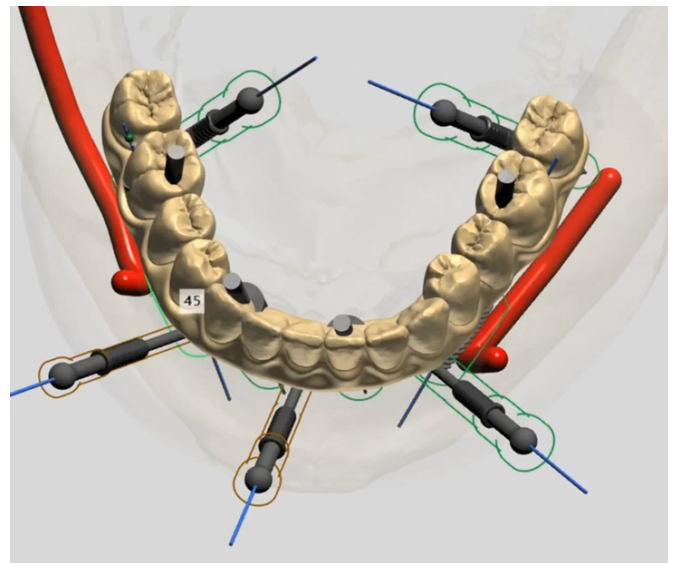
To compensate for the pronounced implant angulation and to align the **screw access channel with the occlusal plane**, a **45° angled abutment** from the XGATE Dental product line (Germany) was selected. This abutment facilitated **proper prosthetic positioning** while maintaining optimal load distribution.



Digital Workflow

It is important to emphasize that a **fully digital workflow** was essential for managing the complexity of this case.

- **Implant positioning**, including the selection of length and diameter, was carefully planned using a **three-dimensional (3D) digital model**.
- The **full-arch restoration** was designed entirely in a **virtual environment**, generating all necessary data for precise fabrication and ensuring accurate prosthetic outcomes.



Two **surgical guides** were designed and fabricated as part of the digital workflow:

- The **first guide** facilitated **alveolar ridge reduction (alveoplasty)**.
- The **second guide** was used for **precise, guided placement of the dental implants**.

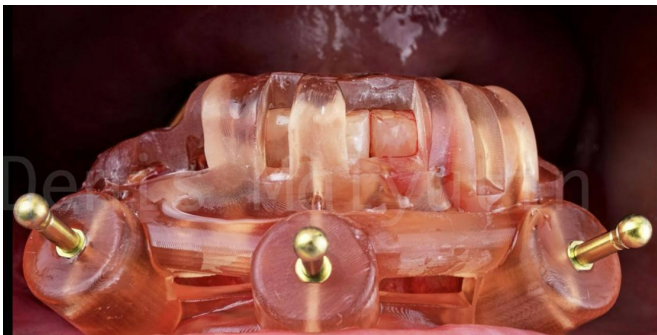
Surgical Procedure and Initial Steps

The treatment began with **preparation for tooth extraction and alveoplasty**.

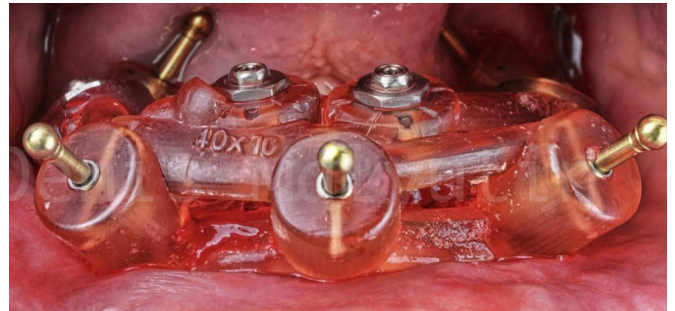
1. Following administration of local anesthesia, the surgeon **reflected the soft tissues** and prepared the underlying bone to ensure proper seating and stability of the **alveoplasty surgical guide**.



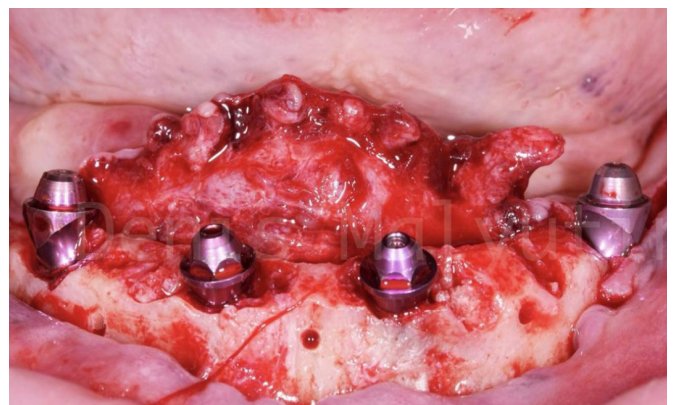
2. Using the **first surgical guide**, the **incision line was precisely marked**, and alveoplasty of the alveolar ridge was performed concurrently with the **extraction of all remaining non-restorable teeth and root fragments**. This approach allowed for the creation of a **level and predictable bone foundation** for subsequent implant placement.



3. Following completion of the alveoplasty, the **implant placement guide** was accurately seated, and **four dental implants** were placed in the planned positions within the anterior mandible. This guided approach ensured **precise implant angulation and spacing**, while minimizing the risk to critical anatomical structures.

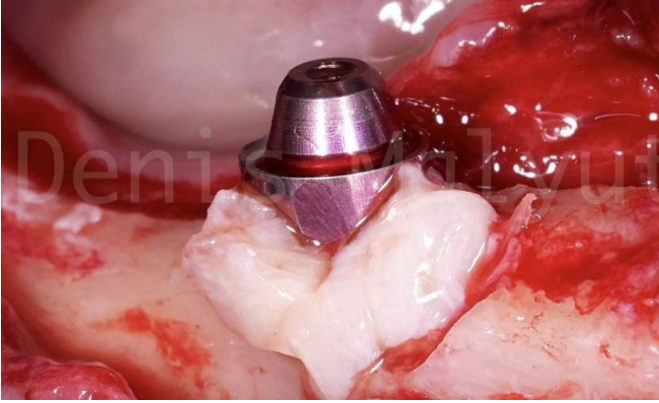


4. Immediately following implant placement, XGATE Dental **D-Type multi-unit abutments** with a **height of 3 mm** were seated: two **straight abutments** in the central positions, one **30° angled abutment** on the right, and one **45° angled abutment** on the left. This configuration facilitated **proper prosthetic alignment** and ensured optimal emergence of the screw access channels



As shown in the image, the **45° angled** abutment was positioned higher above the bone level compared to the other abutments. To achieve proper soft tissue integration and to harmonize the gingival contour around the abutment, a connective tissue graft was placed (see image below)

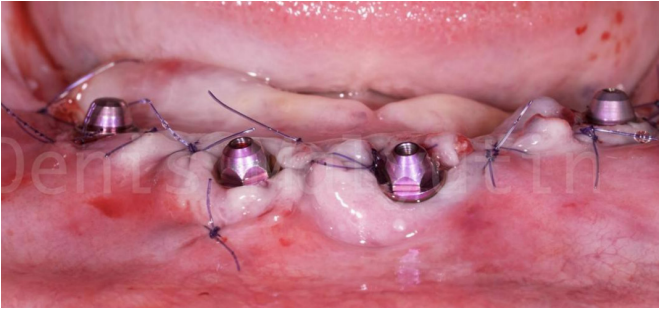
It is important to note that **Rosen conical screws** were used for prosthesis retention. The design of these screws allows for **secure fixation without the need for additional bushings**, ensuring a stable and precise connection between the prosthesis and the abutments



- Subsequently, the **soft tissues were closed using standard suturing techniques**, ensuring **primary closure** and optimal conditions for healing.

Clinical Outcome

At the conclusion of the surgical and prosthetic procedures, the patient was able to **immediately use the temporary restoration** while adhering to all post-operative instructions.



- On the same day, the patient received a **pre-fabricated, screw-retained temporary restoration**, designed and manufactured in advance as part of the digital workflow. The prosthesis provided **immediate functional and aesthetic rehabilitation** while supporting the soft tissues during the healing period

Following the completion of **soft tissue healing and implant osseointegration**, a **permanent screw-retained restoration** will be fabricated and placed, providing **long-term functional stability, optimal load distribution, and satisfactory aesthetic results**.



We hope you found this clinical case interesting.

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