Straumann Pro Arch with BLT implants in a periodontal patient with hopeless dentition: A five-year follow-up

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Nowadays, patients are not merely concerned with the functionality of their dentition, but aspire for natural aesthetics and predictable results. Consequently, the comprehensive rehabilitation of edentulous patients has emerged as a critical challenge, needing a fusion of diverse dental specialties, advanced technologies, and innovative treatment modalities.

Fig. 1: Initial intra-oral situation. **Fig. 2:** Mandibular occlusal view after scaling and root planing.

Full-arch fixed dental prostheses present high survival and success rates. In recent years, several clinical studies and systematic reviews have demonstrated that the early and immediate functional loading of dental implants can be as effective as conventional loading protocols.[1, 2] Immediate loading of dental implants offers various advantages, including time-savings, enhanced aesthetic and occlusal function, elimination of the need for provisional removable prostheses, avoidance of secondary surgical procedures and preservation of the residual alveolar ridge.[3]

The following case report demonstrates the successful management of a patient with a hopeless dentition and the desire for a long-term fixed solution. Through periodontal and orthodontic treatment and implant-supported rehabilitation with four Straumann Tissue Level implants in the maxilla and six Straumann Bone Level Tapered (BLT) implants in the mandible, we fulfilled her expectations. The interdisciplinary approach employed in this clinical scenario reflects the collaborative synergy between dental professionals, each contributing their expertise to create a customised treatment plan that renewed not only the patient's smile but also her confidence and quality of life.

Initial situation

A 67-year-old female patient without any relevant medical history came to the clinic seeking a solution for her oral health concerns. She stated that for as long as she could remember she had been experiencing feelings of embarrassment about her mouth. Her ongoing struggles with bleeding gingivae and mobile teeth had significantly hindered her ability to eat and smile confidently. She expressed her desire for fixed rehabilitation of her failing dentition and emphasised her inability to tolerate traditional removable complete dentures at any treatment step.

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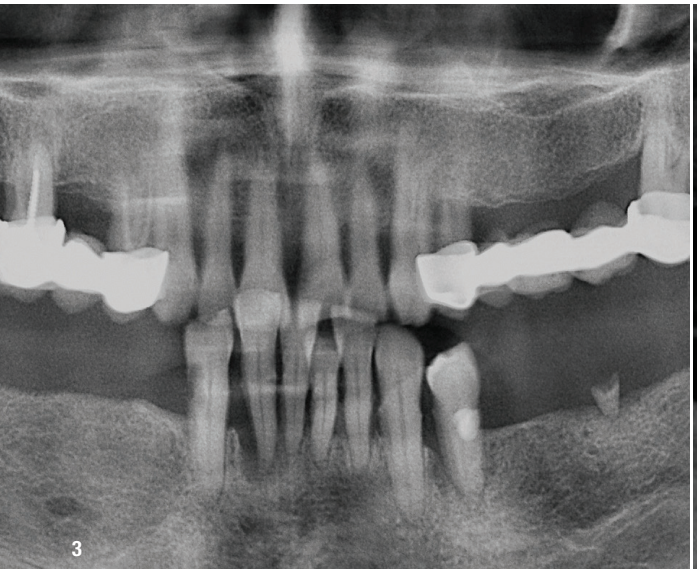

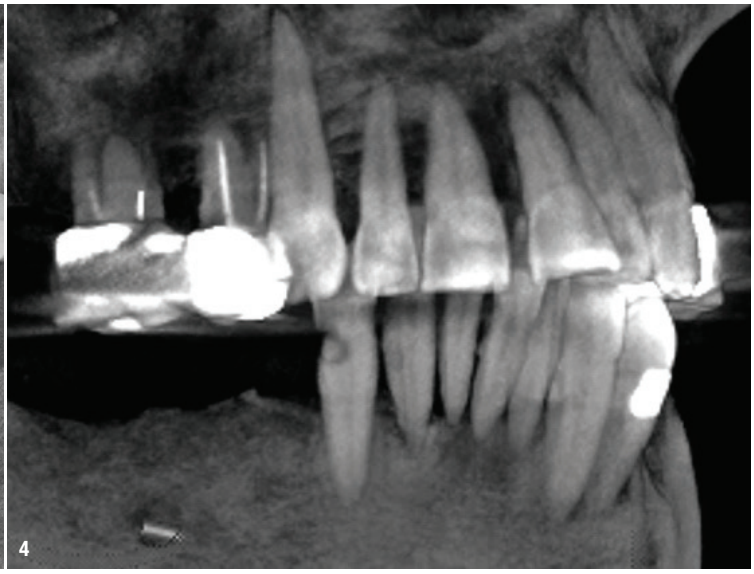

Fig. 3: Panoramic view: severe bone loss in the anterior mandible. **Fig. 4:** Right side 3D CBCT view: severe bone loss in the anterior mandible and posterior maxilla.

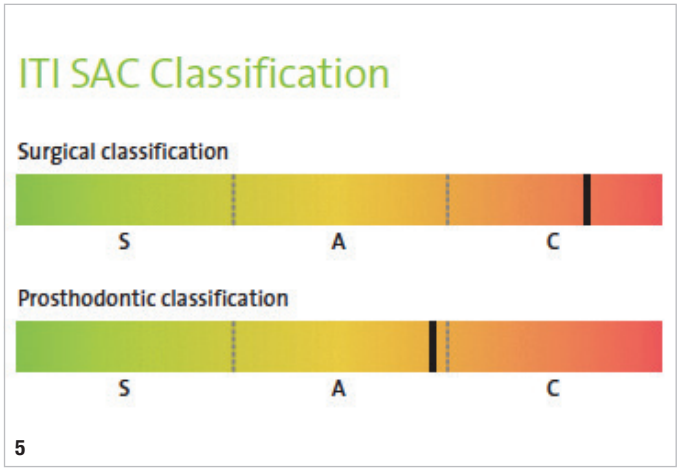

Fig. 5: ITI SAC classification tool indicates high surgical and medium prosthetic complexity.

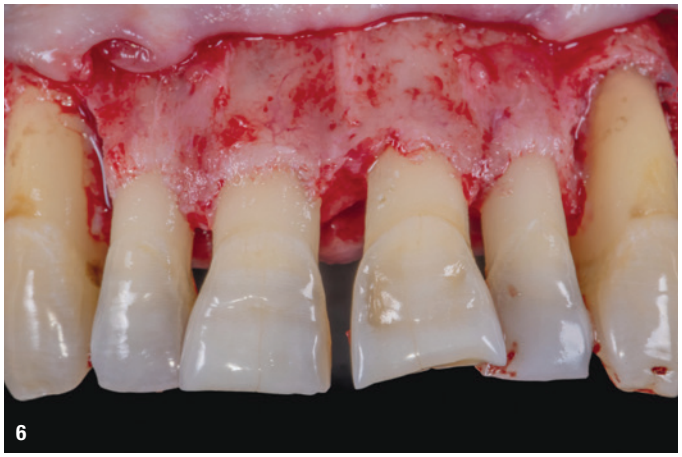

Fig. 6: Periodontal therapy in the maxilla including root planing, GTR, and soft-tissue grafting.

The intra-oral examination revealed inadequately treated teeth and dentition with a mostly poor prognosis in terms of preservation and prosthetic restoration. In the maxilla, she presented with two metal–ceramic bridges from tooth #16 to tooth #14 and from tooth #24 to tooth #27, and the abutment teeth presented with mobility and cervical caries. The mandible presented with deep periodontal pockets, active infection, mobility, suppuration and bleeding on probing, especially regarding tooth #42, and only the root of tooth #36 remained (Figs. 1 & 2).

The radiographic assessment showed moderate bone resorption around the maxillary anterior teeth and bone loss around the abutment teeth. In the lower jaw, severe alveolar bone resorption was observed, particularly in the anterior around tooth #42 (Figs. 3 & 4). According to the International Team for Implantology's SAC classification, the patient case was categorised as complex in terms of the surgical classification and advanced in terms of the prosthodontic classification (Fig. 5).

Treatment planning

Through a comprehensive discussion of the available treatment options with the patient, it was determined that a comprehensive periodontal treatment would be carried out in the upper jaw, and all the mandibular teeth would be extracted. Immediately thereafter, BLT implants using the Straumann Pro Arch system would be placed.

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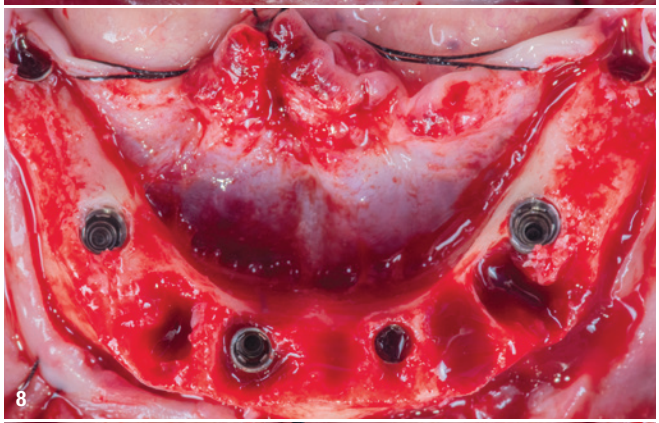

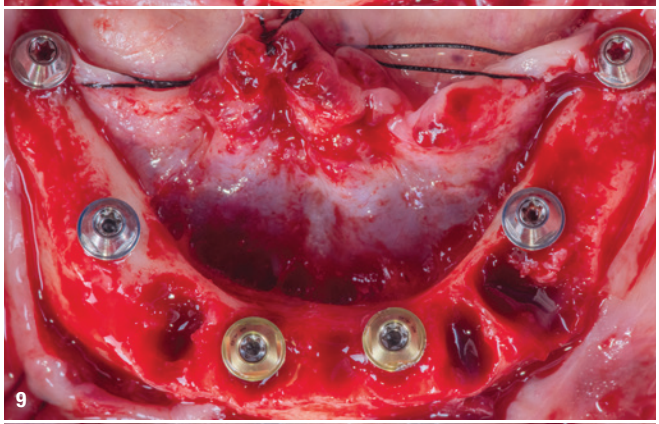

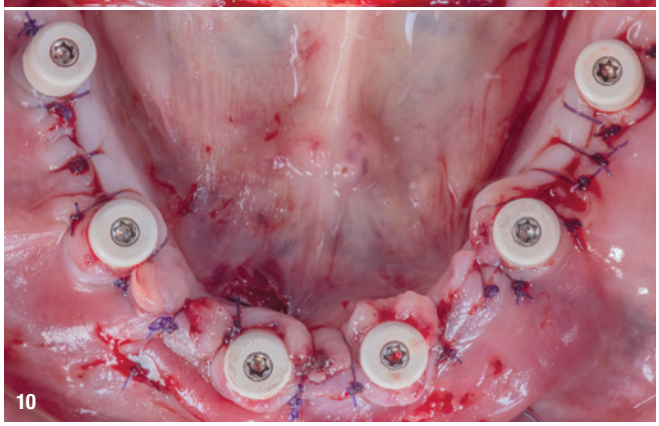

Fig. 7: Bone reduction due to severe alveolar bone destruction. **Fig. 8:** Placement of six Straumann® BLT implants with optimum anterior posterior distribution to ensure an optimal force distribution. **Fig. 9:** A minimum of 2 mm buccal bone thickness to create stable long-term bone around implants. **Fig. 10:** Tension-free softtissue closure by periosteal releasing and apical mattress sutures.

The treatment workflow included:

1. full-mouth scaling and root planing and oral hygiene instructions;
2. periodontal surgery and soft-tissue grafting of the maxillary anterior teeth;
3. orthodontic treatment of the maxillary anterior teeth;
4. implant placement in the posterior maxilla;
5. extraction of the mandibular teeth;
6. prosthetic and aesthetic analysis;
7. preparation of a provisional mandibular full-arch prosthesis;
8. preparation of an analogue implant insertion guide;
9. immediate implant placement and bone augmentation in the mandible;
10. immediate loading of the mandibular implants;
11. placement of the final monolithic zirconia screw-retained prostheses; and
12. supportive periodontal therapy (every three to four months).

Surgical procedure

Initially, the patient was scheduled to undergo a comprehensive periodontal treatment regimen that included oral hygiene instructions, scaling and root planing, and regular follow-up evaluations. Clinically, significant improvements were noted in oral hygiene, gingival health and periodontal pocket depths. Subsequently, periodontal therapy was performed in the maxilla, including root planing, guided tissue regeneration and soft-tissue grafting (Fig. 6). As the patient also expressed a desire for enhanced aesthetic outcomes, it was decided to improve the alignment of the maxillary teeth through orthodontic treatment before implant placement in the maxilla.

In the maxillary arch, two 4.1 × 12.0 mm Straumann Tissue Level implants and two 4.8 × 10.0 mm Straumann Tissue Level implants were surgically positioned in regions #16, 14, 24 and 26. After this, under local anaesthesia, a mucoperiosteal flap was elevated, and an atraumatic extraction technique was employed to remove all the mandibular teeth with the aim of preserving the soft and hard tissue and minimising any potential trauma. Furthermore, reduction of the crestal alveolar bone was carried out using a straight surgical handpiece with copious sterile saline irrigation to address the significant bone deficiency, thereby augmenting the available bone volume to optimise the placement of dental implants (Fig. 7). The same day, a thorough prosthetic and aesthetic analysis was conducted for the fabrication of the immediately loaded fixed mandibular full-arch prosthesis, along

with the preparation of an analogue implant insertion guide.

The drilling sequences for the BLT implants were performed in accordance with the manufacturer's instructions. Six BLT implants (SLActive, Roxolid; 3.3 × 12.0 mm, 4.1 × 12.0 mm, 4.1 × 10.0 mm) were then strategically positioned with an anterior–posterior distribution, carefully planned to ensure the most effective distribution of forces (Fig. 8). The implants were placed utilising the Pro Arch guide. The insertion torque was between 35 and 55 Ncm, measured using a torque wrench. The decision was made to use Straumann BLT implants owing to their design, which facilitates primary stability, allows for immediate loading and can be seamlessly integrated with Straumann Pro Arch for the creation of implant-supported fixed full-arch prostheses, ensuring predictable outcomes.

Bone augmentation was performed to establish a stable buccal bone thickness of at least 2 mm for the implant placement (Fig. 9). Straight screw-retained abutments (Narrow CrossFit 3.5 × 4.0 mm, Regular CrossFit 4.6 × 4.0 mm and Regular CrossFit 4.6 × 2.5 mm) were chosen based on soft-tissue thickness. Healing caps were then screwed in place. The soft tissue was closed without tension through periosteal releasing and apical mattress sutures (Fig. 10).

Impression copings were seated and splinted to guarantee an immediate, precise and passive fit of the prosthesis (Fig. 11). An impression was taken using polyvinylsiloxane material, and it was sent to the laboratory for the production of a full-arch provisional prosthesis. The provisional prosthesis was delivered on the same day and was inserted to a torque of 15 Ncm. The occlusal contacts were carefully adjusted to align with centric relation to prevent excessive stress on the implants during the healing period (Fig. 12).

Prosthetic procedure

At the three-month follow-up after implant placement, osseointegration of all the implants had been achieved. It was also noted that there was sufficient buccal keratinised tissue, which plays a crucial role in ensuring the long-term stability of the soft tissue and facilitating proper oral hygiene maintenance (Fig. 13). The screw-retained definitive prostheses made of monolithic zirconia were then placed (Fig. 14). The patient received oral hygiene instructions, and the occlusion was checked. She was scheduled for supportive periodontal therapy sessions at intervals of three to four months.

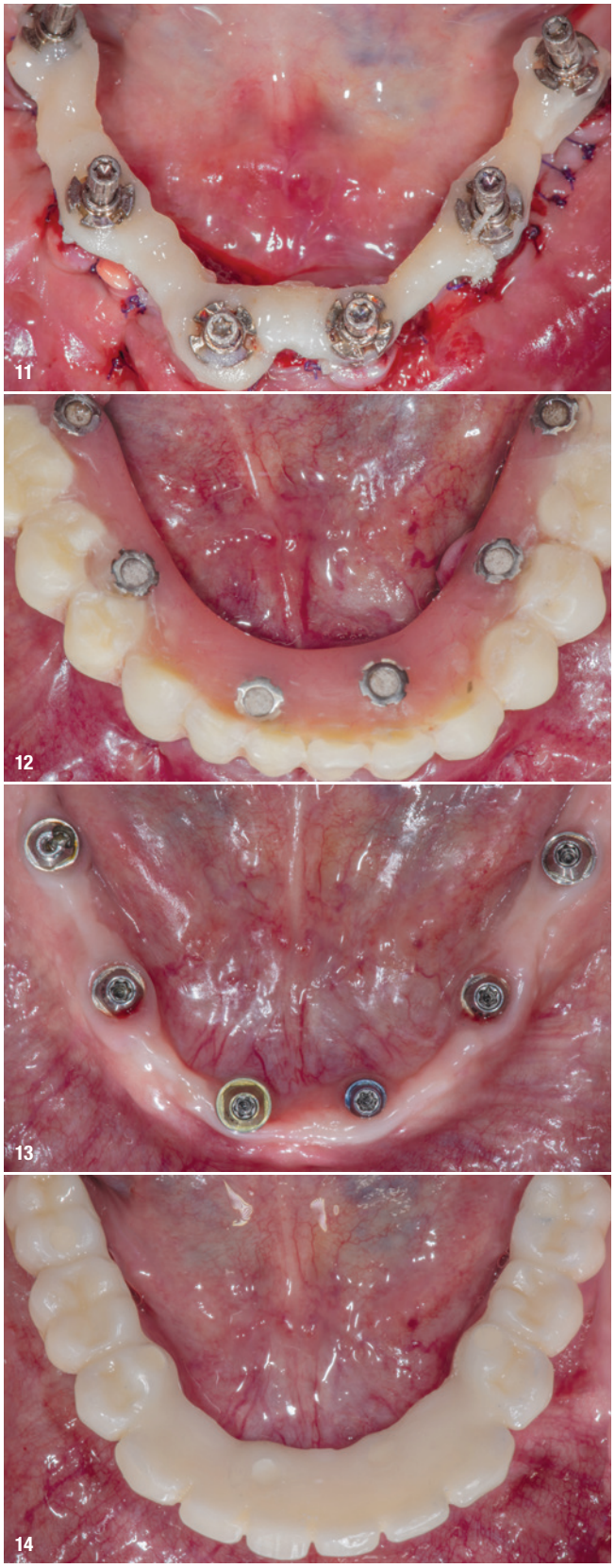

Fig. 11: Impression copings are splinted to ensure immediate passive fit of the prosthesis. **Fig. 12:** Occlusal contacts in centric relation to avoid implant overloading during the healing period. **Fig. 13:** Adequate buccal keratinised tissue guarantees long term soft-tissue stability and proper oral hygiene. **Fig. 14:** Monolithic zirconia final restoration.

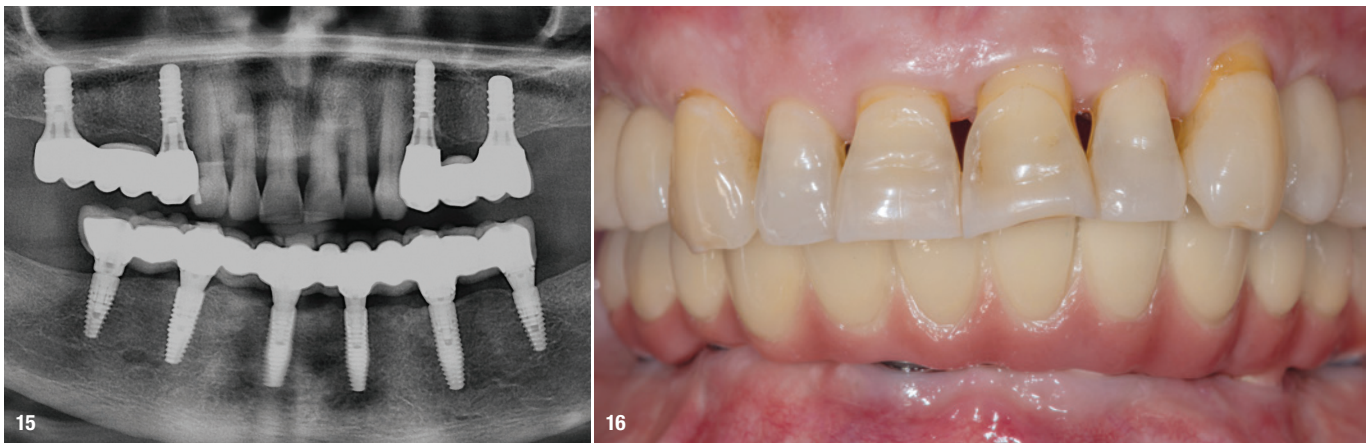

Fig. 15: Three years follow-up panoramic view demonstrates stable periodontal and peri-implant bone. **Fig. 16:** Three years follow-up shows healthy, stable soft tissue and prosthesis.

At the three-year follow-up, the periodontal and peri-implant bone was stable, demonstrating the long-term success of the initial treatment (Figs. 15 & 16). After five years, clinical and radiographic examination of the implant rehabilitation were carried out and demonstrated the continued long-term success of the initial treatment (Fig. 17).

Treatment outcomes

Utilisation of BLT implants following the Straumann Pro Arch concept in a patient with compromised periodontal health delivered exceptional results, including the health of both soft and hard tissue, functional improvement and enhanced aesthetics. This system allowed for immediate implant loading and successful osseointegration. The patient was satisfied with the results.

Author's testimonial

"Full-arch immediate implant restorations in patients with advanced periodontal deterioration can be challenging for any practice. The Straumann Pro Arch workflow offers a more predictable and simplified approach with a proper anterior–posterior distribution that provides optimum force distribution and also, for your patients, reliability, comfort and compliance for an excellent long-term result."

Literature

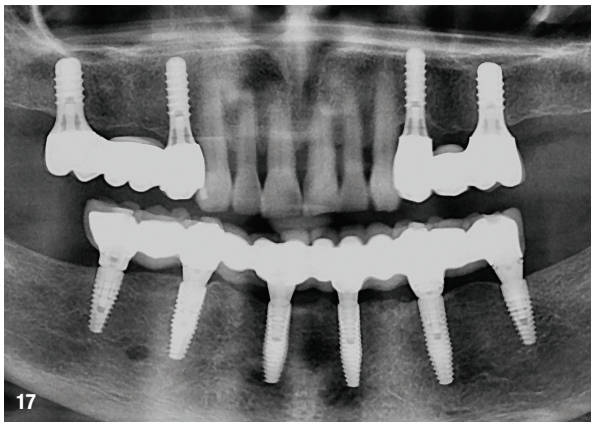

Fig. 17: Stable periodontal and peri-implant bone at five years follow-up panoramic view.

about the author

Dr Amin Motamedi holds a DDS and an MSc in periodontics from Shahid Beheshti University of Medical Sciences in Tehran in Iran and completed the fellowship in laser therapy in dentistry at the Aachen Dental Laser Center in Germany and the master clinician programme in implant dentistry at the Global Institute for Dental Education in Los Angeles in the US. He is a fellow of the International Team for Implantology and served as the chair of and postgraduate programme director in the periodontics department at the dental school of Kerman University of Medical Sciences in Iran. He runs his own specialist practice in Kerman.

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