Immediate implant placement and provisional restoration in the aesthetic zone

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The immediate implant placement approach, introduced decades ago, has established the practice of implant placement in freshly extracted sockets. Indeed, research and evidence support the assertion that immediate restoration is at least as effective and safe as delayed restoration.[1]

Immediate implant placement offers notable benefits, such as a reduced number of surgical interventions, a shorter overall treatment duration, and improved aesthetic outcomes. This approach also preserves the existing bone and gingival structure, contributing to the support of interdental papillae.[2]

However, reaching and maintaining optimal gingival aesthetics around implants in the anterior region is a challenging task. Ensuring sufficient primary stability is a prerequisite for the success of this approach. The design of the implant itself is a crucial factor. Recently, the findings from a series of cases indicated that the immediate placement of a novel self-cutting, tapered implant (Straumann® BLX, Straumann) with immediate provisionalisation through an integrated digital workflow, can yield reliable functional and aesthetic outcomes when transitioning compromised single teeth in the aesthetic zone.[3]

The Straumann® BLX Implants are made from Roxolid® material with the SLActive® surface. The use of Roxolid® material allows the placement of reduced-diameter implants while ensuring successful osseointegration. Moreover,

Figs. 1 & 2: Chipping of the metal–ceramic crown on tooth #12. **Fig. 3:** Hopeless tooth #12 after the crown removal. **Fig. 4:** Gingival inflammation surrounding the residual root. **Fig. 5:** CBCT image showing adequate apical bone.

the integration of SLActive® surface technology accelerates osseointegration and minimises the healing period.

The following case report outlines a successful treatment result for a compromised tooth in the aesthetic region, characterised by a thin gingival biotype. The treatment involved the utilisation of the Straumann® BLX Implant System, along with cerabone® and mucoderm® (botiss biomaterials) with a digital workflow.

Initial situation

A young and healthy non-smoker 25-year-old male patient, presented at our clinic due to the fracture of his crown on the upper right lateral incisor. The patient was seeking a prompt, durable, and aesthetic solution.

The extra-oral examination showed a medium smile line. On intra-oral examination, a metal–ceramic crown with chipping on the palatal side was observed on tooth #12 (Figs. 1 & 2).

After removing the crown, there was not enough stump left. The tooth was listed as hopeless. Additionally, signs of gingival inflammation around the residual root were noted (Figs. 3 & 4).

The cone beam computed tomography (CBCT) imaging revealed that the root was oriented toward the buccal wall (~1 mm), and there was an adequate amount of apical bone, making it feasible for an immediate implant placement (Fig. 5).

In terms of surgical classification, the patient was categorised as complex and prosthodontically advanced based on the SAC classification (Fig. 6).

Treatment planning

Considering the clinical and radiographic observations, the chosen treatment approach included the immediate implant placement and subsequent restoration.

The treatment workflow encompasses several essential steps. Initially, a multifunctional guide will be prepared, including both the surgical guide and the provisional restoration for optimal outcomes. The hopeless tooth #12 will be extracted. Following the extraction, an immediate Straumann® BLX Roxolid®, SLActive implant, measuring

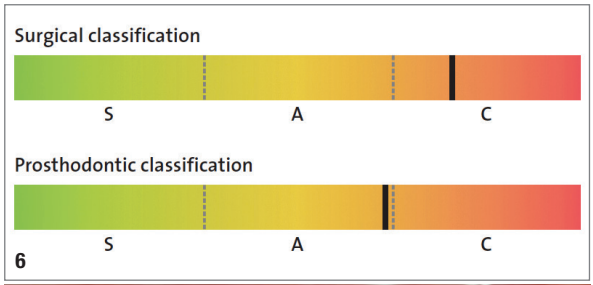
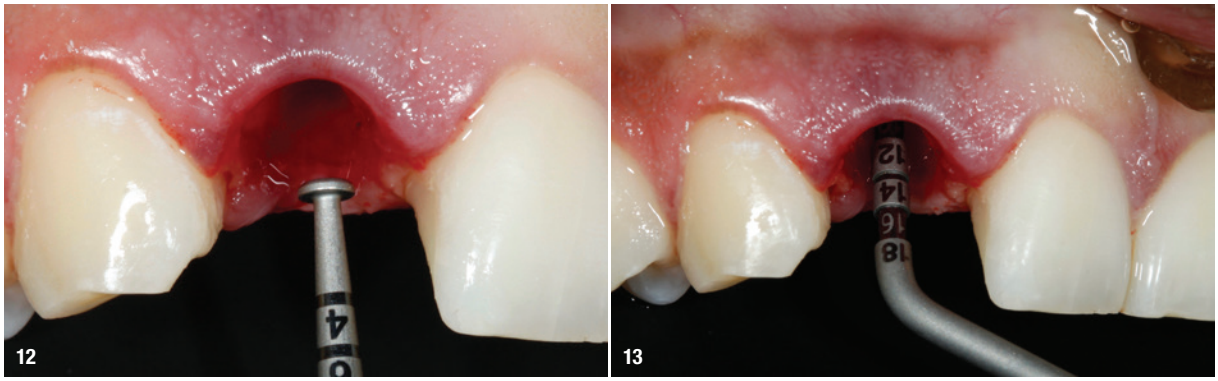


Fig. 6: SAC classification of the patient. **Fig. 7:** Pre-surgical check of multifunctional guide for accurate fit. **Fig. 8:** Assessment of the distance between gingival margin and buccal bone wall. **Figs. 9 & 10:** Implant bed preparation following manufacturer's instructions. **Fig. 11:** Placement of the surgical guide to check proper alignment.



Figs. 12 & 13: Buccal wall integrity was verified with an implant depth gauge.

Figs. 14 & 15: The Straumann BLX implant was inserted.

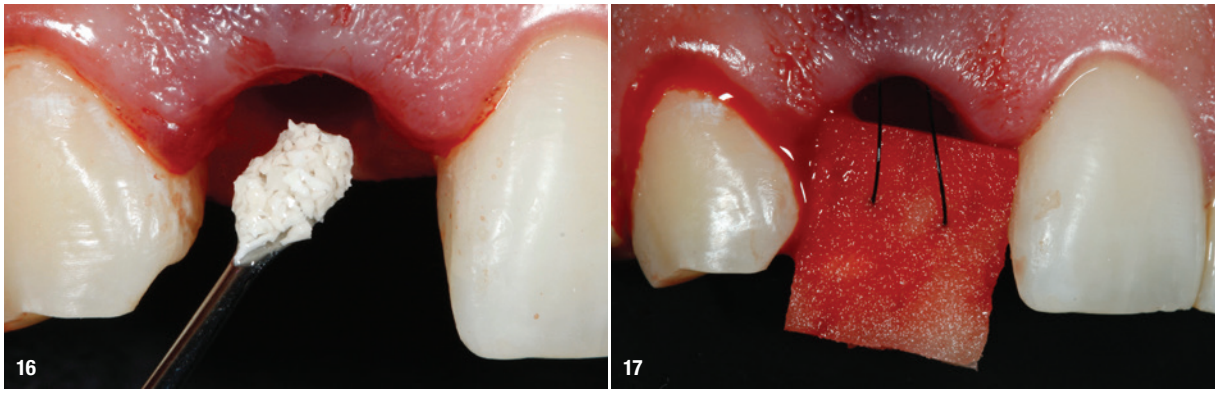


Fig. 16: The gap is filled with Cerabone® xenograft. **Fig. 17:** Gingival tunneling followed by placement of botiss mucoderm®.

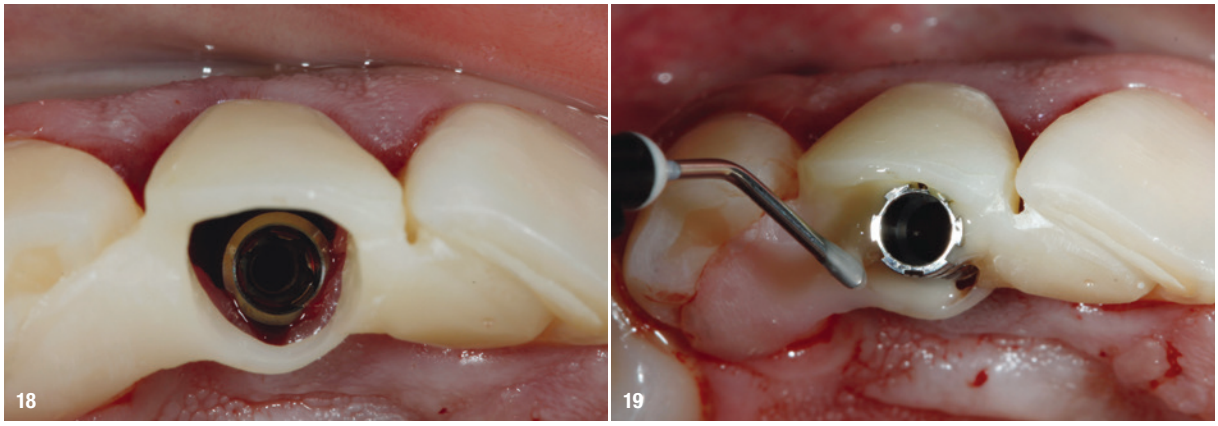


Fig. 18: A temporary abutment was placed. **Fig. 19:** The multifunctional guide was bonded to the temporary abutment with resin.

3.75 x 12 mm, will be inserted without a flap elevation. To address the resulting gap, cerabone® will be used, along with the placement of mucoderm® in the buccal zone. An immediate temporary abutment will then be applied, along with a chairside tooth shell pick-up. Next, digital crown planning will be carried out using the Straumann® CARES Visual system. Finally, the treatment will conclude with the delivery of the final screw-retained crown.

Surgical procedure

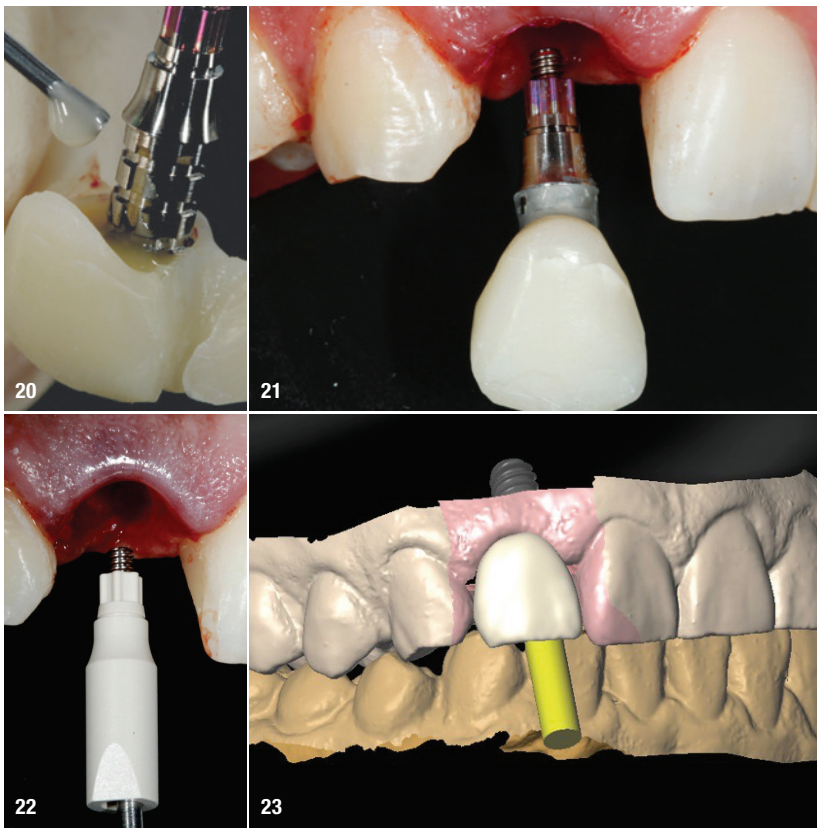
Prior to the surgical procedure, the individualised and prefabricated multifunctional guide—designed to serve both as a surgical guide and a prospective temporary restoration—was carefully checked in the oral cavity to ensure a precise fit (Fig. 7). After confirming its proper position and alignment, a local anesthetic containing 2% lidocaine and 1:100,000 epinephrine was administered. Following this, a meticulous extraction of tooth #12 was performed with the goal of minimising trauma to the surrounding tissues. The socket was then debrided using a bone curette and irrigated with saline solution to ensure cleanliness. A thorough evaluation of the gingival margins was subsequently conducted, revealing a distance of 3 mm between the gingival margin and the buccal wall margin of the bone (Fig. 8).

Within the Straumann® Implant System, all BLX drills are delivered with a distinct colour code that corresponds to the specific diameter of the implant. The implant bed preparation was done following a prescribed sequence, which included the utilisation of a needle drill 1.6 mm followed by a 2.2 mm pilot drill (blue) and a subsequent 2.8 mm BLX drill (yellow; Figs. 9 & 10), in accordance with the position determined by the surgical guide. The surgical guide, along with the alignment pin, was employed to ensure precise depth measurements and the accurate alignment of the osteotomy's orientation and position (Fig. 11).

After concluding the drilling procedure according to the manufacturer's instructions, the osteotomy was checked using an implant depth gauge (> Ø 2.1 mm end) for accurate depth measurement, tactile examination of the osteotomy and the verification of the integrity of the buccal wall (Figs. 12 & 13).

Next, the Straumann® BLX 3.75 x 12 mm implant was carefully inserted into its final position using the implant driver, applying a torque of 50 Ncm with the BLX Torque Control Device for Ratchet. The implant was turned clockwise during this process (Figs. 14 & 15), achieving optimal primary stability.

The space between the implant and the buccal wall was filled with Xenograft cerabone® (botiss biomaterials). This choice was made due to its sustained graft preservence, which aids in preserving volume over the long term (Fig. 16). Subsequently, gingival tunneling was performed, and mucoderm® (botiss biomaterials) was positioned on the buccal side with a 5/0 Nylon suture. This was done to facilitate the gradual growth of bone tissue into the grafted area (Fig. 17).



Figs. 20 & 21: The subgingival segment was contoured with flowable composite. **Figs. 22 & 23:** The final prosthesis was created using a digital workflow.

Prosthetic procedure

The placement of the BLX implant was done according to the prosthetic plan (Fig. 18). Subsequently, the multifunctional guide was adhered to the temporary abutment by injecting flowable resin into the contours (Fig. 19).

Furthermore, the subgingival segment was contoured with flowable composite in accordance with the slim concave emergence profile concept, contributing to the shaping of the gingival tissues (Figs. 20 & 21).

The final prosthesis was manufactured using a digital workflow. A digital impression was obtained with the Straumann® Virtuo intra-oral scanner, which accurately captured the 3D position of the implant, aided by a scan body attached to the BLX implant (Fig. 22). This process generated an STL file. Subsequently, we used CARES® Visual—recognised as one of the dental industry's most

flexible and powerful CAD/CAM software platforms—for the design of the crown for tooth #12 (Fig. 23).

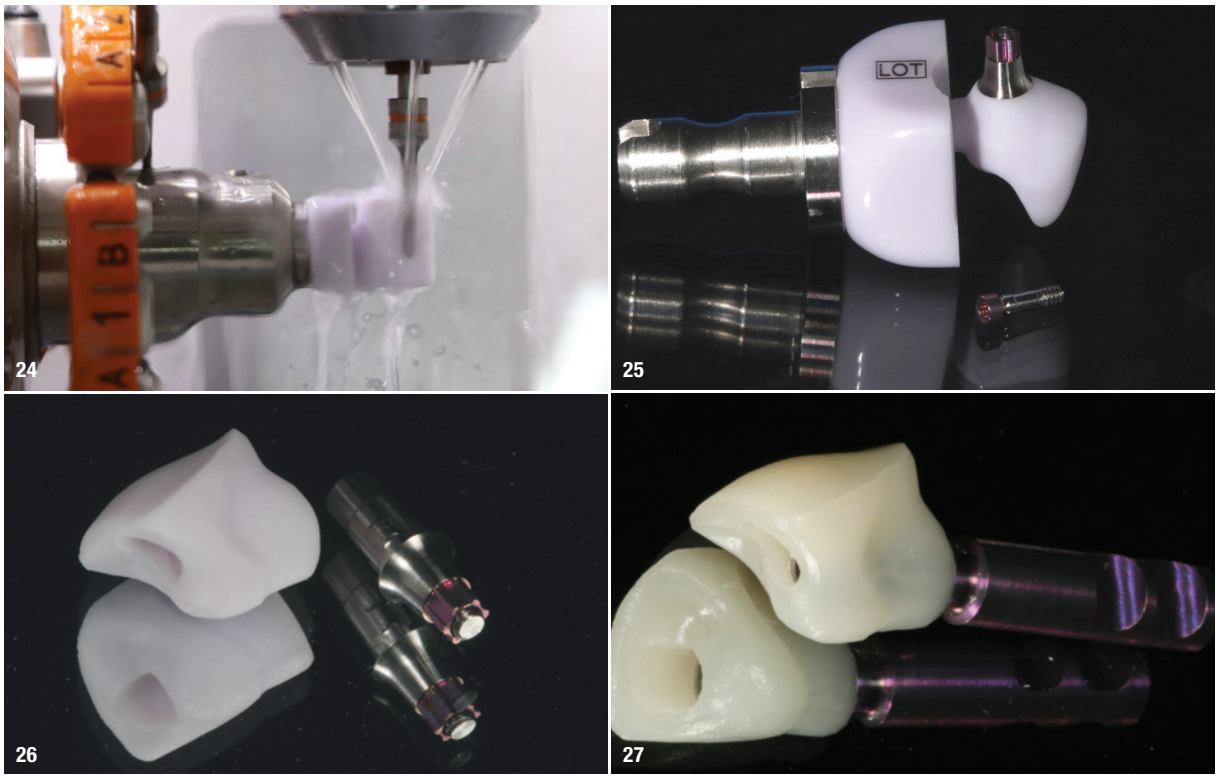
Subsequently, the Straumann® CARES® C series was utilised in-house to mill a customised lithium disilicate abutment (Figs. 24–26). This abutment was then cemented extra-orally to an RB/WB Variobase® using Multilink® cement (Fig. 27). Following this, a lithium disilicate veneer was adhered to the customised abutment (Figs. 28 & 29).

The restoration was then positioned and secured by screwing it in place with a torque of 35 Ncm (Fig. 30). Afterwards, the access holes were filled with composite restoration material and Teflon. A thorough occlusion check was performed, and oral hygiene instructions were provided to ensure proper postoperative care.

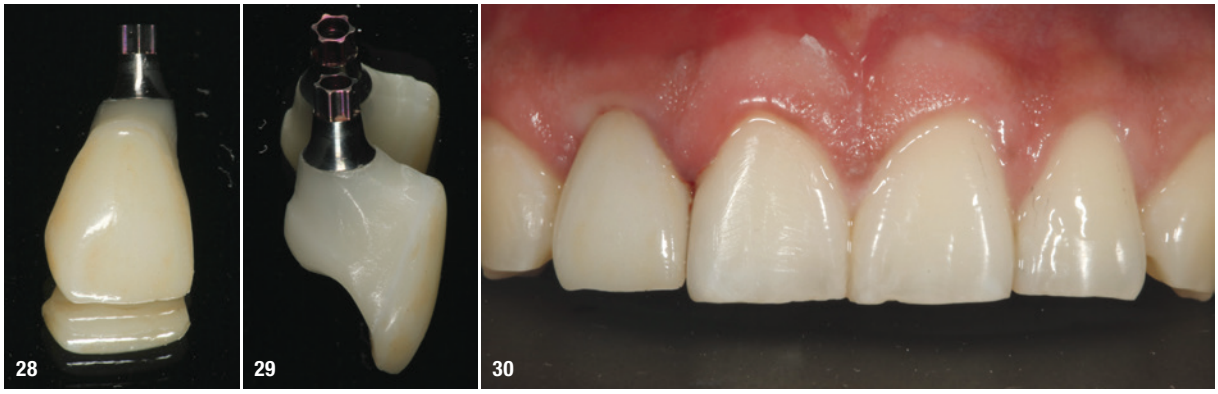
Treatment outcomes

The patient was very satisfied with the implant placement procedure and the opportunity to receive a restoration promptly following the extraction of his anterior tooth (Figs. 31–33). The patient was enrolled in an annual maintenance programme.

Four years post-implant placement, a comprehensive clinical and radiographic assessment revealed favourable implant stability and the healthy condition of the adjacent tissues (Figs. 34 & 35).



Figs. 24–26: The Straumann® CARES® C series was used to mill a customised abutment. **Fig. 27:** The abutment was cemented extra-orally to an RB/WB Variobase®.



Figs. 28 & 29: A veneer was adhered to the abutment. **Fig. 30:** The restoration was positioned, and the access hole was filled with composite and Teflon.

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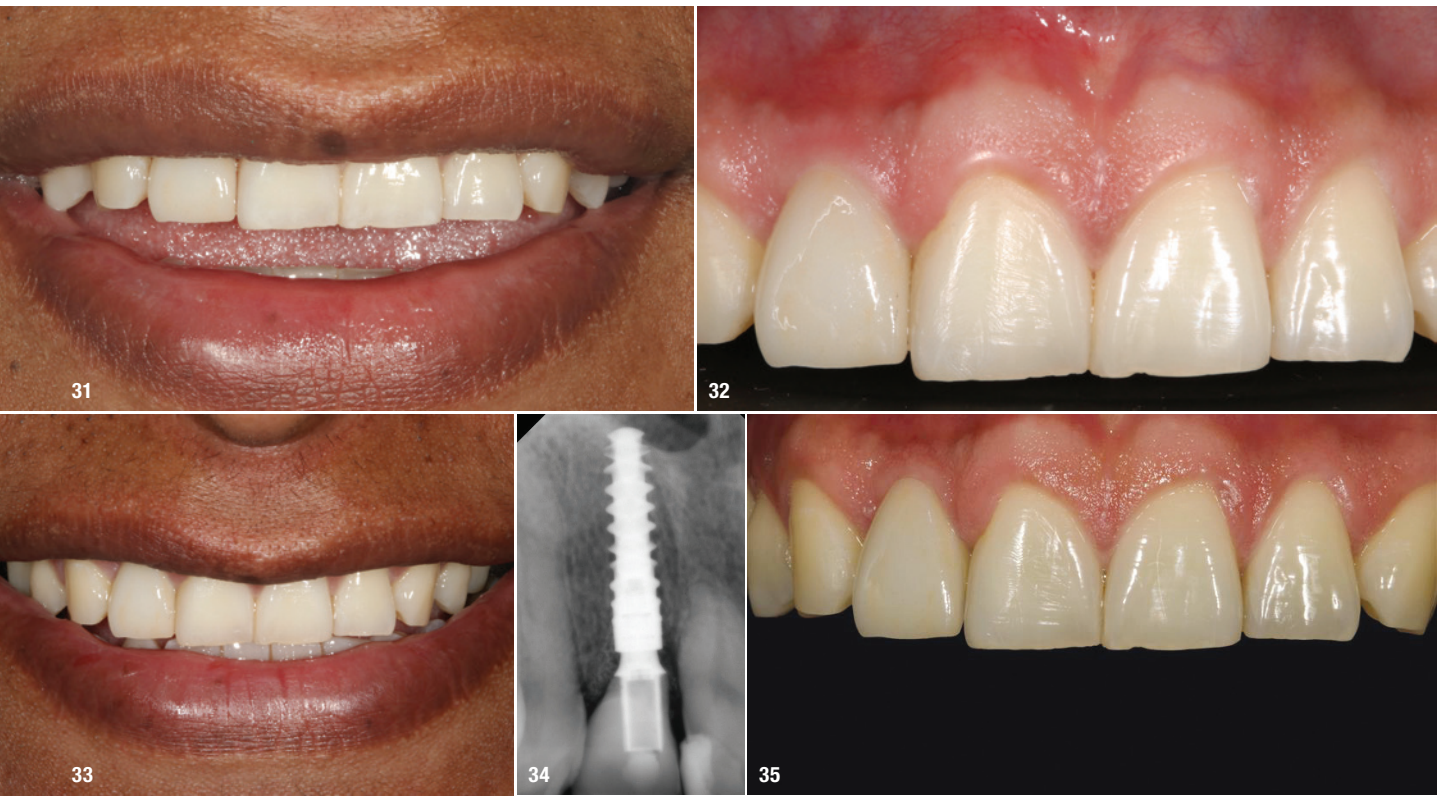

Figs. 31–33: A happy patient with final outcome. **Figs. 34 & 35:** At the four-year follow-up, implant stability and healthy tissues were observed.

The final outcome resulted in health maintenance in the hard and soft tissues.

Adequate primary stability is a prerequisite to enable this type of treatment. The implant design plays an important role in this context. In my clinical experience, the Straumann® BLX implant offers the ideal properties for these clinical situations. At the same time, the SLActive® surface has an impact on the early osseointegration of immediately restored implants.

Authors' testimonial

Reaching and maintaining optimal gingival aesthetics around implants in the anterior region is a challenging task. One of the main characteristics of immediate implant placement and provisionalisation is its effectiveness in the aesthetic outcome, preserving the existing bone and gingival architecture.

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Literature

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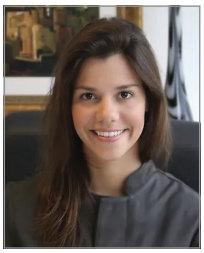
Dr Luiz Otavio Camargo holds both a Master's and PhD in prosthodontics from the University of São Paulo, Brazil. He serves as the Director of the ImplanTeam project in São Paulo and has a private practice specialising in oral rehabilitation and implantology. Additionally, Dr Camargo is an ITI Fellow and a sought-after speaker.



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