Surgical guide assisting **temporary crown positioning in immediate implants**

Diego Klee de **VASCONCELLOS**[1], Cláudia Ângela Maziero **VOLPATO**[2]

Abstract: *The technique presented herein uses a surgical guide to assist tridimensional positioning of an immediate implant and subsequently provides ease for temporary crown manufacture. The pre-existing tooth references remain unchanged in the surgical guide, which ensures more predictable esthetic outcomes.* ***Keywords:*** *Dental implants. Immediate loading. Dental esthetics.*

[1] Adjunct professor of Partial Denture, Universidade Federal de Santa Cataria (UFSC), Florianópolis, Santa Catarina, Brazil.
[2] Associate professor of Partial Denture, Universidade Federal de Santa Cataria (UFSC), Florianópolis, Santa Catarina, Brazil.

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Contact address: Diego Klee de Vasconcellos
E-mail: diegokv@terra.com.br

» The authors report no commercial, proprietary or financial interest in the products or companies described in this article.

» Patients displayed in this article previously approved the use of their facial and intraoral photographs.

INTRODUCTION

In the anterior esthetic zone, the technique of immediate implant placement after extraction of compromised teeth has been increasingly employed by dental professionals due to its reduced surgical morbidity, maintenance of gingival architecture and good esthetic outcomes.[1,2] Patients also benefit significantly, since decreased healing time not only minimizes and simplifies the surgical procedures, but also results in quicker and more comfortable treatment.[3]

The predictability of this technique has been widely disclosed in the literature and confirmed by high success rates;[4,5] however, despite being an easy-to-perform surgical technique, prosthesis placement success relies on the need for proper planning carried out by the clinician.[2] Good dental casts, diagnostic wax-ups, tridimensional implant positioning planning and surgical guide manufacture are the essential phases of planning, as they aim at yielding good surgical and esthetic outcomes.

Surgical guides have been used to guide implant tridimensional placement.[6,7] When properly manufactured, they provide good visibility and access to the surgical site, in addition to assisting implant placement and location and allowing final angulation and inclination to be predicted.[6]

In the immediate implant placement technique, atraumatic tooth extraction is a key factor to achieve implant primary stability and preserve gingival architecture.[8] Integrity of surrounding bone walls should be preserved, and potential gaps formed between bone walls and implants should be filled.[9]

Temporary crowns are manufactured soon after implant placement and provide immediate esthetics. Furthermore, they eliminate the need for a second surgical procedure, thereby reducing treatment time and costs. They are manufactured based on a copy of the extracted tooth emergence profile, which allows gingival architecture to be preserved after the extraction procedure.[10,11]

The present study aims at presenting a surgical guide used not only to guide implant tridimensional placement, but also to allow a temporary crown to be quickly and safely manufactured soon after surgery.

TECHNIQUE DESCRIPTION

A dental cast should be manufactured and used during planning so as to allow the technique of immediate implant placement to be properly performed. This cast should include a diagnostic wax-up manufactured on consideration that tooth contour and shape as well as gingival esthetics should be restored (Figs 1, 2). The diagnostic wax-up will guide preparation of temporary crowns which will be used soon after the surgical procedure (Fig 3). For this technique, it is paramount that temporary crowns be prepared before surgery, since they will function as the basis on which the guide will be manufactured. Temporary crowns might be prepared by means of

direct (acrylic teeth) or indirect (pressed acrylic) techniques.

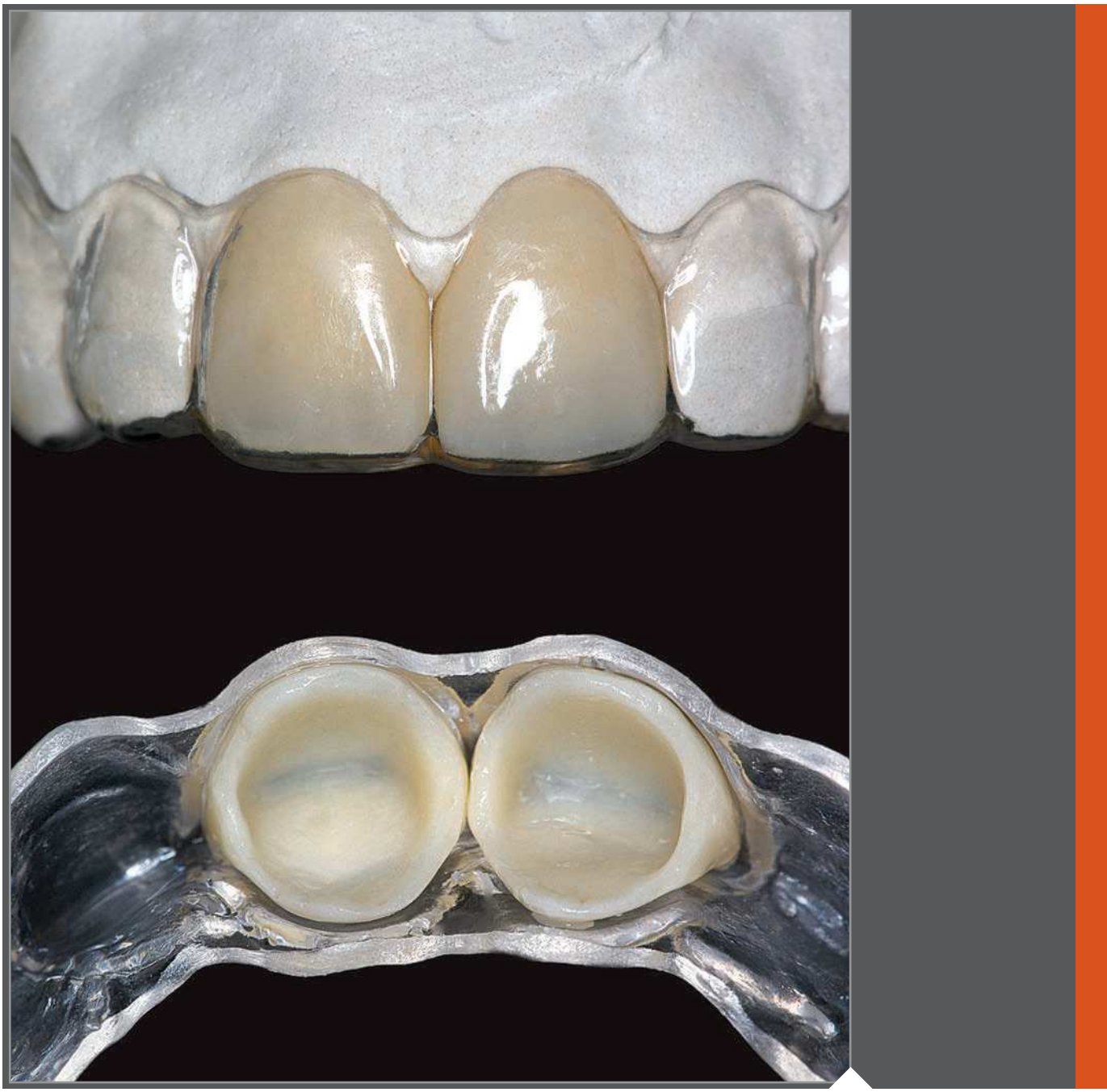
Once temporary crowns are ready, a 2-mm acetate sheet is pressed over the dental cast and the crowns (Figs 4, 5). In the buccal region, the sheet is trimmed following the gingival contour; whereas in the palatal region, corresponding to the temporary crown, the sheet must have an opening that makes access by surgical burs feasible. The aforementioned procedures must be followed in order to allow proper implant placement. The surgical guide should be tested in the patient's mouth before surgery (Fig 6).

During surgery, tooth extraction should be atraumatic, so as to ensure bone and tissue

Figure 1. Initial photograph of the case. The root of tooth #21 had been fractured; for this reason, extraction and immediate implant placement were recommended.

Figure 2. Diagnostic wax-up of the case.

Figure 3. Based on the references of the tooth obtained with the diagnostic wax-up, temporary crowns were manufactured in a new dental cast.

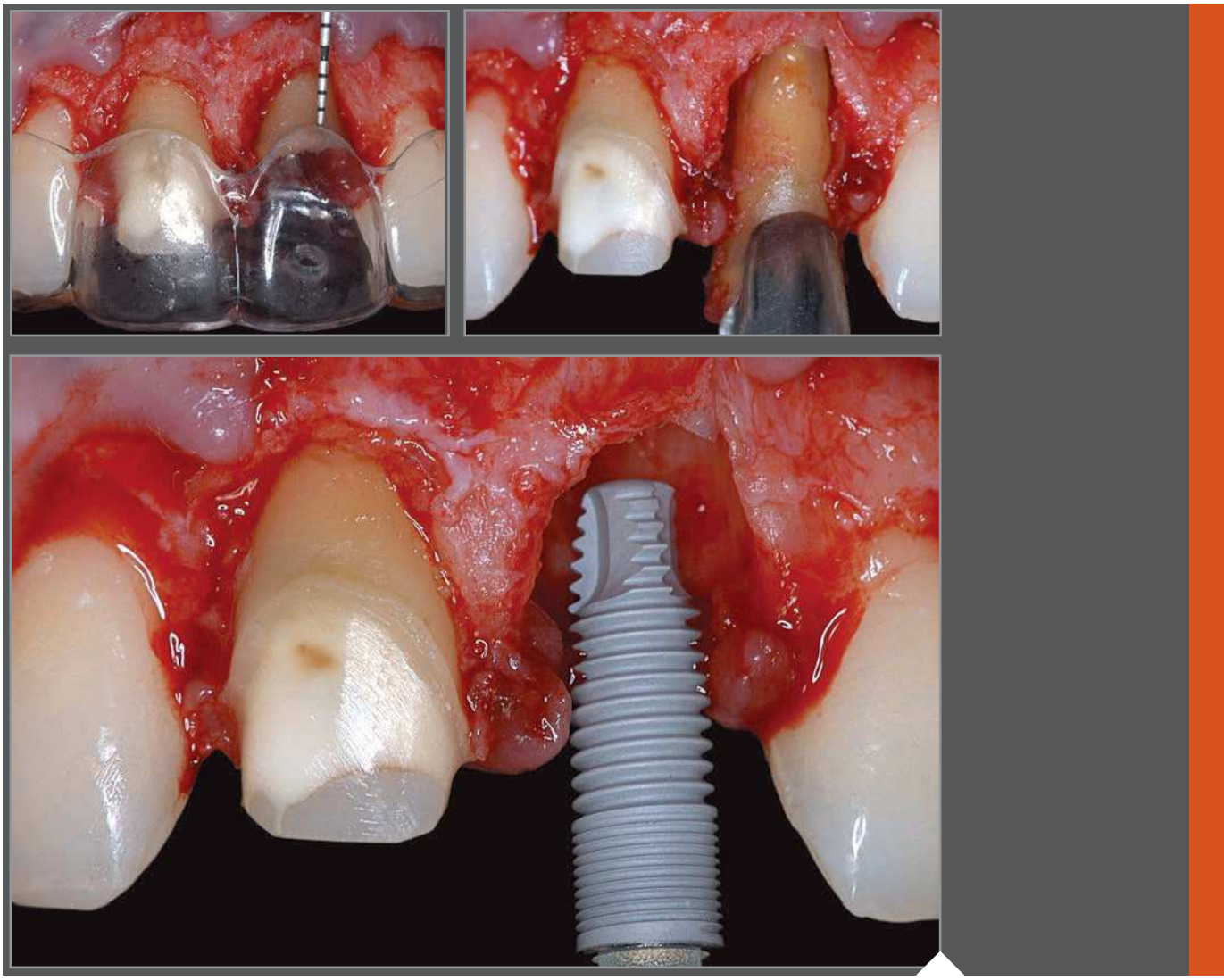


Figures 4 and 5. An acetate sheet used for surgical guide manufacture was pressed over the temporary crowns. Note that they fit perfectly into the guide.

Figure 6. The surgical guide is tested in the patient's mouth before surgery.

integrity and, as a result, good esthetic outcomes (Fig 7). The surgical guide is used to assist the surgical procedure (Figs 8, 9) and the window created on the palatal surface of the guide will make surgical access feasible while its buccal contour will aid tridimensional implant positioning.

The component for the temporary tooth can be installed after implant placement and torque. The temporary crowns are placed inside the surgical guide and the whole set is placed inside the patient's mouth. Whenever necessary, relieves in the internal surface of the temporary crowns using a cylindrical-round end head fine cross cut tungsten carbide bur should be performed until the whole set is perfectly secured in the patient's mouth. At this point, it is possible to note initial esthetic outcomes. The temporary crown is rebuilt with the aid of a brush and acrylic resin (Nealon technique). The opening on the palatal surface of the guide allows this procedure to be carried out with the guide/temporary crowns set placed inside the patient's mouth (Fig 10). The surgical guide should remain in place until the acrylic resin is completely cured. Subsequently, minor corrections in the emergence profile of the temporary crowns might be rendered necessary. This technique might be employed not only for screw-retained temporary crowns, but also for cement-retained crowns.



Figures 7, 8 and 9. Surgical procedure carried out to extract a compromised tooth and place the implant (AR Morse 3.75 x 13 - Conexão Sistemas de Prótese Ltda., São Paulo, Brazil) with the aid of a surgical guide.

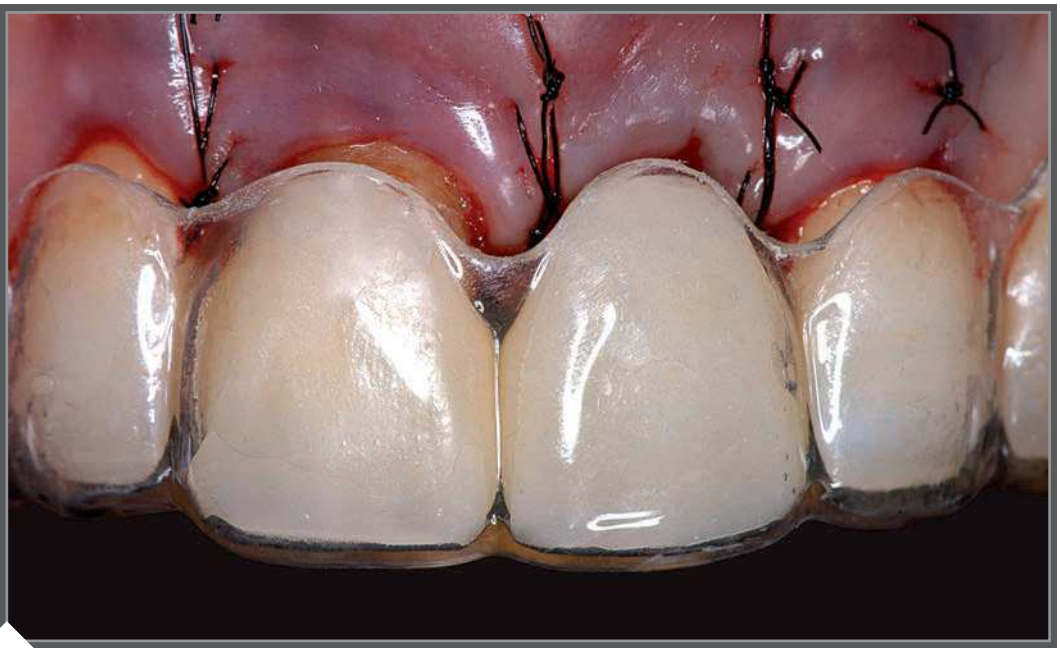


Figure 10. After surgery, the same surgical guide is used to assist temporary crown positioning and rebuilding.

Before placing the temporary crown, it is paramount to assess whether gingival architecture is properly preserved. Should excess pressure be exerted, the emergence profile must be worn out, so as to allow tissue adaptation (concave profile). In order to allow proper tissue healing, the temporary crown must be well finished and polished, especially in the area of contact between the crown and the gingival tissue (Figs 11-14).

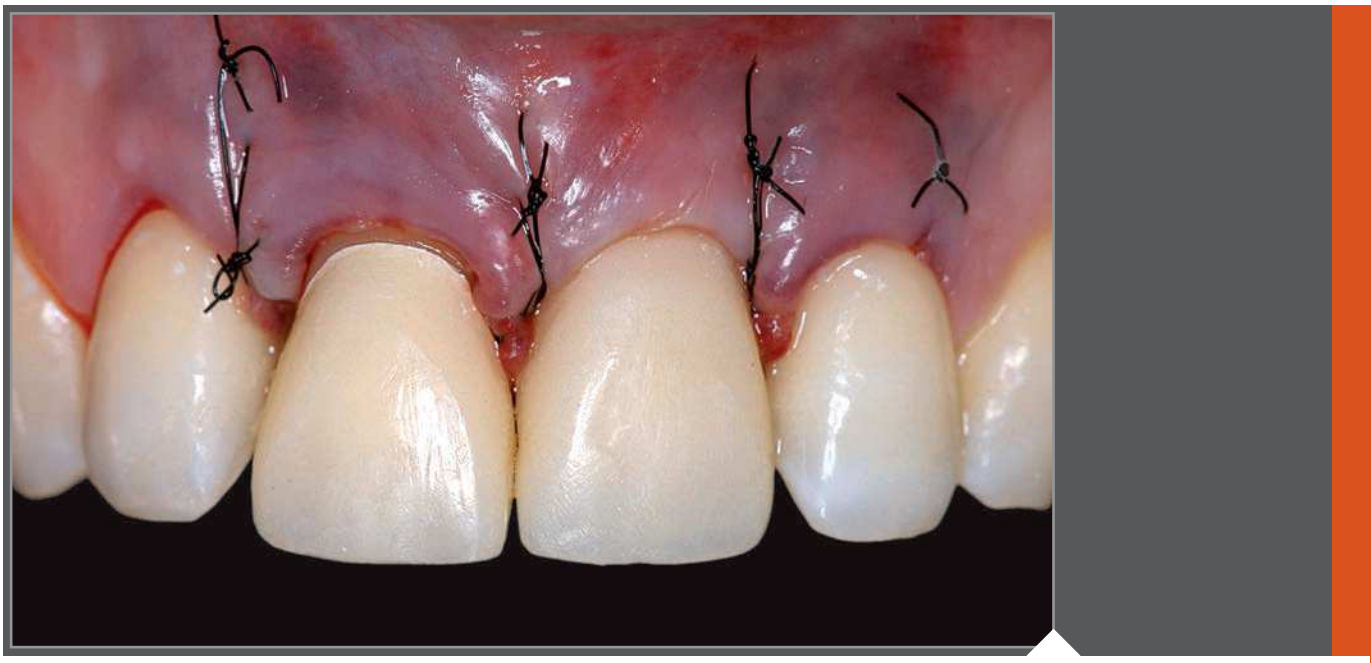


Figure 11. Temporary crowns in place soon after surgery.

Figure 12. After implant osseointegration, new temporary crowns were installed.

Figures 13, 14. Note the quality, health and tissue architecture achieved.

DISCUSSION

When immediate implants are properly recommended and previously planned, they are considered an excellent treatment choice to replace compromised anterior teeth. This is because in addition to allowing gingival architecture to be preserved, they provide patients with esthetics, comfort and function soon after surgery.[2,3]

Nevertheless, for this technique, planning is much more critical than clinical implementation itself, since it is by means of the surgical guide derived from planning that the tridimensional positioning of implants is determined.[6,10] Implant positioning is key to achieve final esthetic outcomes in cases requiring immediate implant placement. Should an implant be poorly positioned, esthetic outcomes are likely to be hindered and, most of times, correction is hardly possible.[6]

After implant placement, soft tissue healing and maturation are guided by the temporary crown which, by means of the technique presented herein, allows papillae to be preserved as a result of guidance provided by the emergence profile.[5] In comparison to the conventional technique, immediate implant placement allows papillae and gingival architecture to be preserved,[1] especially if the temporary crown is manufactured respecting the emergence profile, with a smooth and polished surface.[10,11]

Importantly, gingival papillae not only act as a biological barrier that protects periodontal structures, but they also play a crucial role in smile esthetics. For this reason, it is highly important to respect their integrity during dental procedures. Loss of interdental papillae leads to speech problems and esthetic drawbacks, such as black holes.[2,5] Thus, surgical techniques that ensure their preservation have been the choice of many clinicians.

The technique presented herein also renders clinical as well as laboratory procedures easier. The surgical guide is manufactured based on the same dental cast the temporary crowns are prepared, and has a dual purpose: guide implant placement during surgery and assist the operator with the position of temporary crowns in a practical and simple way.[7] However, emergence profile finishing, occlusal adjustments and finishing as well as polishing of the temporary tooth need to be carried out by the same operator without the surgical guide.

CONCLUSION

In the technique of immediate implant placement, the surgical guide assists the operator with the positioning of temporary crowns, soon after implant placement. Thus, due to being a practical and easy-to-perform technique, it allows temporary crowns to replace lost teeth and properly guide tissue healing, thereby making future prosthetic therapy feasible.

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