A Simple Technique for Placing Extraoral Implants at an Optimal Position in Orbital Defects

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Abstract
Translucent acrylic templates have been used to indicate implant positions for implant-retained extraoral prostheses; however, this procedure can be challenging, as the acrylic templates have to be positioned onto reflected skin flaps. The fabrication of an acrylic-based colorless template or duplicating an existing prosthesis can facilitate the location of extraoral implants. Spots can be created on templates to indicate the optimal position of the implants. Afterward, punching the skin to the bone with a very thick sharp needle or a small sharp bur will mark the desired implant position on the bone before reflecting the skin.

Maxillofacial prostheses are a reliable treatment option to restore maxillofacial defects and therefore improve the quality of life of patients.1,2 Technology (e.g., rapid prototyping [RP] involving computer-aided design and computer-aided manufacturing) and materials (e.g., silicone) used for maxillofacial rehabilitation have improved significantly in the last decade.3,4 However, the rehabilitation of craniofacial defects still remains a challenge for maxillofacial prosthodontists.1,5 It is difficult to simultaneously achieve a satisfactory esthetic outcome, prevent the discoloration of silicone materials, and obtain an adequate retention for maxillofacial prostheses.1,5

Retention can be performed either by using skin glue or dental implants.1,5 A disadvantage of glue-retained maxillofacial prostheses is that they are difficult to place in the correct position. Furthermore, the skin glue can easily dissolve, leading to a loss of retention. The glue remnants may also cause discoloration and tear the silicone material, thereby affecting the prosthesis esthetics. Therefore, implant-retained maxillofacial prostheses are favored, since the placement of implant-retained prostheses is easy, and sufficient retention can be achieved without the use of skin glue. Furthermore, it is possible to fabricate prostheses for large maxillofacial defects and prostheses with thin margins so that they can perfectly blend, move, and rest on different areas of the peripheral skin.5 However, surgery is necessary to insert the extraoral implants in the bone surrounding the defect. Additionally, the position of the implants is crucial. Implants positioned in thin, low-quality bone run the risk of high failure rates.2 Furthermore, if implants are placed in an unfavorable position (e.g., underneath the prosthesis), the esthetic outcome is typically poor, since the suprastructures necessitate a minimal amount of space within the prosthesis. Therefore, especially in the case of orbital prostheses, well-positioned extraoral implants are essential if the volume of the orbital bone is thin. Orbital prostheses have a very limited volume to allow for suprastructures such as bar suprastructures.6

Communication between surgeons and prosthodontists is therefore important. Both sets of professionals must work together to determine the ideal implant positions with respect to both the bone volume and the available space within the future prosthesis. Planning and designing implant-retained orbital prostheses can be done traditionally with the aid of plaster, wax, and acrylics or with the aid of three-dimensional (3D) digital technology and RP.1,3,4 Although 3D technology can be very helpful in certain steps of the maxillofacial prosthesis workflow, such techniques require extensive computer training, expensive software, and the latest computer technologies. As a consequence, the 3D technique is not available at all clinics. The cost to patients for such technologies is also high (roughly 2400 USD per artistic waxing).6 Furthermore, to the best of our knowledge, no 3D workflow for maxillofacial prostheses...
has thus far been properly tested. Traditional techniques are accordingly still used, and they are always in need of modification to maintain their simple, low-cost, and effective nature.

The purpose of this article is to describe a simple, cheap, and widely available technique for planning and placing extraoral implants in the orbital rim at an optimal position.

**Technique**

1. Fabricate a template of translucent acrylic resin by duplicating either the approved try-in wax model of the future prosthesis or the existing orbital prosthesis. Mark and perforate the preferable implant positions at the acrylic template (Fig 1).

2. Place the translucent acrylic template on the orbital rim prior to reflecting the tissue or placing the implants. Next, the bone of the orbital rim is marked by punching the tissue with a very thick, sharp needle or a small, sharp bur through the perforations in the template. Three or four implants are recommended for the orbital area (e.g., two extraoral implants in the upper lateral rim and one or perhaps two implants in the lower lateral rim). The medial rim is not a first-choice option for implant placement, because the bone toward the nose is thin and soft.

3. Next, the tissue is reflected, and the orbital bone rim is inspected. The surgeon should ensure that the marks in the bone are consistent with those in the implant planning (Fig 2). Otherwise, a new position should be selected as close as possible to the marks (Fig 3).

4. Start the implant placement at the marked positions.

**Discussion**

Considering that there is no clear evidence with regard to the most optimal retentive system for maxillofacial prostheses, prosthodontists must choose the type of suprastructures based on the location of the defect, the design of the prosthesis, the skills of the technician, and the advantages and disadvantages of each system. Fortunately, the described technique is applicable for any type of attachment system (bar-clips, magnets, or the combination of both); however, it is important to highlight that prosthodontists should consider the type of retentive system when perforating the template. Bar-clips may require more space within the future prosthesis so that the silicone material can be thick enough to hide the grayish color of the retentive infrastructure and avoid the rupture of silicone material, for example. Therefore, implants should be placed more internally. Magnets do not require very thick silicone because the prosthesis can be easily handled. As a result, implants can be placed less internally.

**References**