Correct use of artificial gum for implant-assisted prosthesis

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Abstract

Introduction
The general practitioner and dental technician should attempt to prosthetically restore the area that cannot be surgically reconstructed. Regardless of technician’s endeavours to meet aesthetics and functionality criteria, final restoration can be viewed as a failure, since it departs from previously set goals and ultimately disappoints the patient. This article discusses the correct use of artificial gum for implant-assisted prosthesis.

Methodology
Treating the anterior segment of both jaws in complex clinical cases is always difficult, even with clear diagnostic parameters and in spite of following a sensible treatment plan. Completing a bone and soft-tissue graft and conditioning them in a second-stage surgery do not guarantee success in treatment: in some cases, it is necessary to resort to use of prosthetic devices, such as artificial gum.

Discussion
Clinical success with the use of pink gum restoration depends on the precise planning of prosthetic surgical steps.

Conclusion
The use of artificial gum is a new way for dental professionals (surgeons, prosthetists and dental technicians) to assess a case and devise a treatment.

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Figure 1: Facial appearance: A to F.

Figure 2: Preoperative photos: A to F.

of clinical case requires implants to be placed 3 or 4 mm more apically in order to solve the problem
• Impossibility of placing a lingual screw to achieve a screw-retained restoration: this limits recoverability and disassembly of distance-control devices
• Placement of more implants than necessary due to a diagnostic error, making it impossible to restore all of them
• Bone crest anatomy makes it impossible to place the artificial gum.

A CT and a radiographic guide on the basis of the diagnostic wax-up are fundamental tools of the field, which, coupled with 3D dental imaging software, help to establish appropriate implant number and position.

Arch position and number of implants, implant angle and depth are critical to establish the right approach to successful gingival prosthetic restoration.

The lower the number of implants, the easier it is to restore the arch. This means fewer posts and more pontics. As long biomechanics are not jeopardized, limiting the number of implants gives the lab technician leeway to shape the anatomy of artificial gum, therefore optimizing patient hygiene.

Placing the implants far away from the midline and the anterior segment, which can be restored with pontics, is good for aesthetics and phonation, since it can create a ‘prosthetic premaxilla’ meeting the patient’s needs.

Implant angle must be duly planned to facilitate lingual screw
access for a screw-retained prosthesis. The screw-retained prosthesis will facilitate emergency profile monitoring; the aesthetic material can be placed closer to the implant collar, thus allowing the dental technician to shape the profile in the transmucosal area during the process of prosthesis manufacturing and testing. Using a more conventional, cement-retained prosthesis would be more complex, since it relies on posts, thus limiting the space available to modify the artificial gum–natural gum interface.

Another good reason for choosing a screw-retained prosthesis is maintenance, since it is easier to reach for hygiene and repair purposes, which is sometimes necessary. The restoration’s recoverability allows the general practitioner and the dental technician to take it out and repair it as necessary.

Implant depth is a critical factor for achieving functional and aesthetic restoration. In conventional implant restoration, the implant must be placed 2 or 3 mm apically, towards the cervical edge of the crown. For an artificial gingival reconstruction, the implant must be placed 3 mm beyond the tip of artificial gum.

The greater the loss of horizontal tissue, the deeper the surgeon will have to drive in the implant to achieve a harmonious gingival profile, creating a 30° to 40° artificial gum angle in relation to the occlusal plane, which will prevent food from getting caught in the area and allow good upper-lip mobility.

Important factors:

- Surgical aesthetics of hard and soft tissue in the implant area
- Dental aesthetics: it determines the location of dental restoration and use of artificial gum
- Facial aesthetics: face of the patient must be taken into account when making prosthetic considerations (Figures 5 to 9).

Discussion

Clinical success with the use of pink gum restoration depends on the precise planning of prosthetic surgical steps.

Surgical considerations

The surgical placement of implant must be accurate. Surgical guide will provide the implant axis and placement depth. From a surgical point of view, it is preferable to drive the implant deeper into the bone, enabling the use of a lingual screw and a greater number of pontics (following biomechanical principles), instead of using multiple adjacent posts. This
Methodology

Figure 5: Maxilla implants abutments installation: A and B.

Figure 6: Prosthetic design: A to C

Figure 7: Vestibular view: A to C

Figure 8: Screw structure sealing with resin pink (Sinfony 3M ESPE).

surgical perspective breaks with tradition.

Accordingly, ridge restoration should be carried out more horizontally than vertically. In contrast with most implants, which seek to recreate vertical inter-proximal support for the papilla, bone reduction or remodelling is often necessary when working with artificial gum, in order to create a flat ridge between implants. This will help to link patient’s ridge with pontics in a functional and aesthetic manner, which again is a departure from traditional surgical methods in favour of this prosthetic technique.

Prosthetic considerations

The dental ceramist must understand the basic clinical principles of implant-assisted prosthesis, the components that make up a balanced smile, the alveolar bone resorption classification and the aesthetic principles behind a pink contour, colour and texture. It is important that he/she searches for anatomical references. Morphological research through photographs, old casts, the patient’s teeth and the contour of the gum in the adjacent areas may follow similar dental-gingival standards necessary to make the most accurate prosthetic choice possible.

Consequently, dental-casting technique is highly important in this case because it is meant to provide an accurate reproduction of the soft tissue, which will support the artificial gum and the pontic. If the temporary restoration involves tissue conditioning, the copy of the abutment profile must be perfect.

Temporary tooth/gum

Temporary restoration represents an important step in planning an artificial gum procedure. It gives the dental professional a second chance to test the design (the diagnostic wax-up being the first)—under ideal circumstances, in any
Methodology

Temporary teeth or gum are essential for treatment. They serve to test the union between the natural gum and the artificial gum, checking the interface to guarantee that the tip of the gum does not show during full smile. Phonation must be tested after completing temporary restoration.

It is important to solve hygiene and maintenance concerns with the temporary teeth or gum already in position.

Emergency profiles are key to artificial gum restoration, which is substantially different from traditional restoration. Technicians must create an artificial gum that reproduces the characteristics of the missing tissue and improves aesthetics.

The aim is to create a buccal contour in which the artificial gum looks like the patient’s own gum before the loss of teeth. The artificial gum should rise from the implant and form an acute angle after crossing the transmucosal area. This will help breach the gap between natural and artificial soft tissue.

There are three artificial gingival restoration (papilla) designs to choose from:

- The papilla may be fully artificial when completely missing between two crowns.
- It may be partly natural and partly artificial if the papilla next to the crown is slightly atrophied.
- The papilla may be partly artificial when not completely missing between two crowns.

To have enough space for hygiene purposes in a partially edentulous patient, it is necessary to take special care when creating:

- the first artificial gum interface: check the transition from natural to artificial gum.
- the second ceramic interface, which involves the configuration of the tooth axis (before the pink gum is finished), dental anatomy, vertical dimension and inter-dental space.
- the third ceramic interface, which involves checking the pink gum material, tooth–gum connection and papilla location.

Final artificial gum touch-ups are done directly on the patient (Figure 10). By using a thin diamond bur, the edge of the artificial gum can be trimmed to have it match the patient’s own gum, if the shape and sulcus of the latter area is greater (twice as much). The surface in contact with the gum must be shiny, smooth and concavity free. A flat or oval surface is recommended for areas in contact with natural tissue.

There is a choice of two materials and three techniques for creating the artificial gum:

**Composite**

There are a number of reasons for selecting this material:

- It preserves the physical properties of the porcelain fused to metal restoration.
- The pink aesthetic shade, shape and texture can be controlled.
- It facilitates maintenance and repair.
- Foreseeable results.
- Composite gum manufacturing enables to carry out any type of prosthesis repair, or even to replace the prosthesis, without affecting the ceramic crowns.

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which is one of the main reasons for deciding on a screw-retained prosthesis.

**Ceramic**
- This restoration cannot be screw-retained due to anatomical and angle difficulties; therefore, it needs to be cement-retained.
- When only a small amount of gum is required, such as part of a papilla, it is easy to add pink ceramic while working on the crowns.
- When a large amount of artificial gum is necessary in order for the transition line to be outside of the aesthetic zone, it is advisable to use ceramic.

**Hybrid**
- The pink core is done in ceramic and a composite overlap preserves the aesthetic aspect, giving maximum interface control (Figure 7, and Figures 11 to 14).

The soft-tissue interface and the mesostructure are done in pink ceramic, facilitating sub-gingival biocompatibility. Pink composite is only used supra-gingivally, so that it matches the aesthetic interface.

**Conclusion**
To restore aesthetic defects in the anterior segment of the jaw is one of the greatest challenges in restorative dentistry today.

The use of artificial gum represents a new way for dental professionals (surgeons, prosthodontists, and dental technicians) to assess a case and devise a treatment. To apply these techniques, it is essential to reach an accurate diagnosis and to plan treatment in advance, given that implants must be suitable for this restoration system. Patient should know that restoration will be supported by three main posts before beginning treatment and that the procedure involves less surgical steps and risks, since vertical bone growth is not its goal. This method is aimed at gaining

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**Figure 11**: Final restoration: ceramic and hybrid prosthetic over five implants: A to D (MR 31 osseotite).

**Figure 12**: Final restoration: ceramic and hybrid prosthetics over five implants: A and B.

**Figure 13**: Prosthetic installation. Occlusal view: A to C.
greater aesthetic control and limiting the number of surgical steps.

References


