

Interest of Tissue Conditioner for Recording Peripheral Seal in Complete Denture

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Abstract

Deferred or ambulatory impressions are the complementary anatomical and functional impression's method in Complete Denture. They are made on transitional or old prostheses. Their interest is to allow to record the bearing surface under physiological conditions offered by the oral functions. The materials used are the tissue conditioners or gum resins by their properties ensuring the long-term modeling these materials must be always associated with a surfacing impression using precise materials. These are made in most optimal conditions of maxillo-mandibular reports to ensure physiological trace. Through a clinical be described the different stages of this type of impression.

Keywords: Ambulatory Impression; Tissue Conditioner; Complete Denture

The anatomofunctional impression in Complete Denture, is a very important step in the success of prosthetic balance. It is carried out by several techniques and with several materials. Their goal is to record the play of the peripheral musculature as physiologically as possible. However, these so-called secondary impressions sometimes present the problem of the lack of coordination of patients to perform the movements requested by the practitioner. This is often the cause of imperfections amplifying during the prosthetic chain and manifested by a real loss of tightness of the prosthetic prosthesis, and therefore a loss of one of the feet of the prosthetic balance. Currently, several schools recommend the realization of physiological impressions called deferred or ambulatory impressions. These are complementary impressions made using soft liners whose long-lasting elasticity makes it possible to record the movements of peripheral organs during oral functions. Given

their elastic properties and the average quality of their surface finish, these materials cannot be considered as imprinted materials, hence the need to systematically join them to another surfacing material.

Clinical observation

This is Mr EM, aged 50 and who consulted for the renewal of his Removable Complete Denture (RCD) because of the loss of stability and wear of the prosthetic teeth thus putting at stake his aesthetics and function. The classic clinical examination revealed two major problems

- The first is related to the general state of health represented by diabetes, hence the interest of modifying the sequence of prosthetic steps both in terms of the number of sessions and in terms of techniques used for these fragile terrains.

- The second is related to the patient’s attachment to his current prostheses hence the exploitation of existing reference parameters after correction, in this case the occlusion vertical dimension (slightly decreased) and the occlusion plan (disturbed by the abrasion of the prosthetic teeth) which allowed us to opt for reduced prosthetic management in four sessions.

First session

Ambulatory impression

This impression was made using a tissue conditioning material including Kerr’s FITT® indicated to correct the imperfections inherent in the loss of peripheral joints, reassess the DVO a little diminished by the wear of the prosthetic teeth and restore the tissues to their histological and physiological qualities. The prosthetic intra-backs were thus filled by the modeling material and the patient is seen again after 4 days to renew the material for a period of two to three weeks (Figure 1,2).

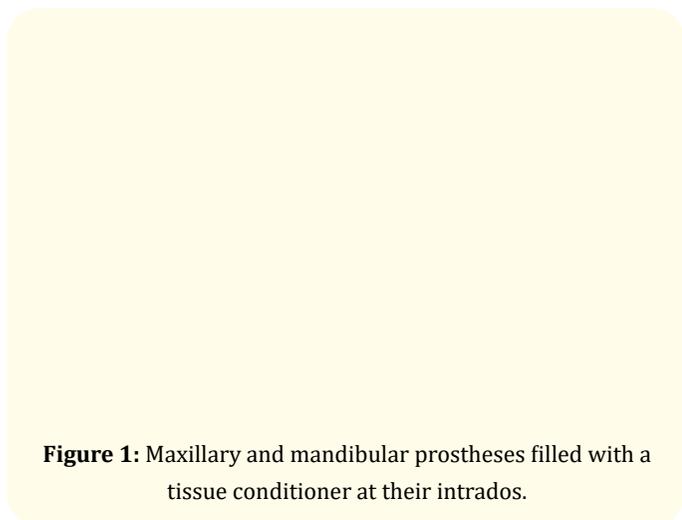


Figure 1: Maxillary and mandibular prostheses filled with a tissue conditioner at their intrados.

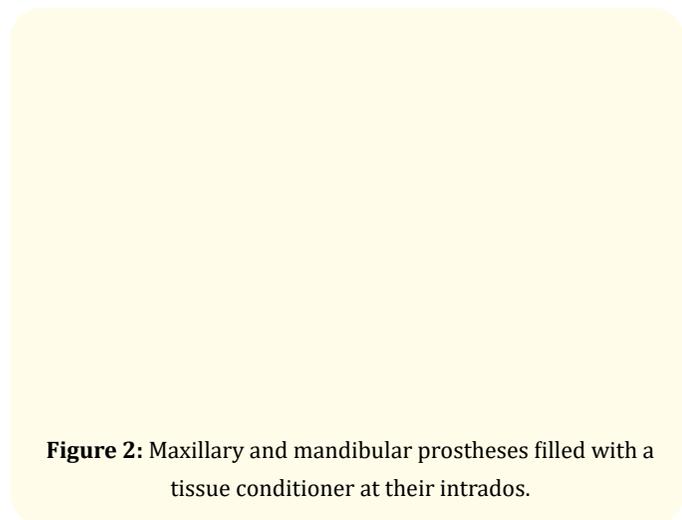


Figure 2: Maxillary and mandibular prostheses filled with a tissue conditioner at their intrados.

Second session

Anatomo-functional impression

We first hollowed out the modeling material at the prosthetic intra-back leaving only the peripheral joint and the post-dam at the maxillary level as well as the lingual joint at the mandibular level (Figure 3,4). After recording the maxillo-mandibular ratio (RMM) using a recording wax (aluwax®) in centered relation and a physiological Occlusion (Figure 5), a specific adhesive (Permalastic Adhesive kerr®) was applied (Figure 6) and imprints of the support surfaces at the maxillary and mandibular level were made in a single time using a low polysulfide elastomer viscosity (Kerr® Permalastic Light Body) at the maxilla (Figure 7) and medium viscosity (Kerr® Permalastic Regular Body) at the mandible (Figure 8) according to the predetermined RMM (Figure 9).

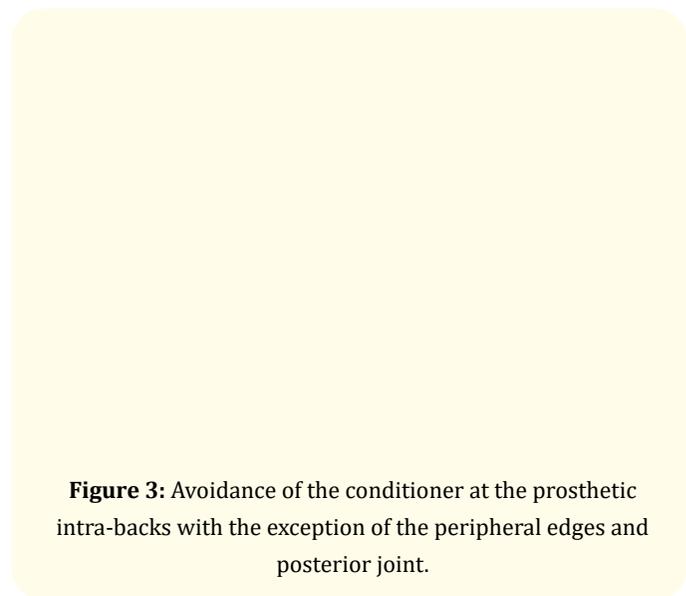


Figure 3: Avoidance of the conditioner at the prosthetic intra-backs with the exception of the peripheral edges and posterior joint.

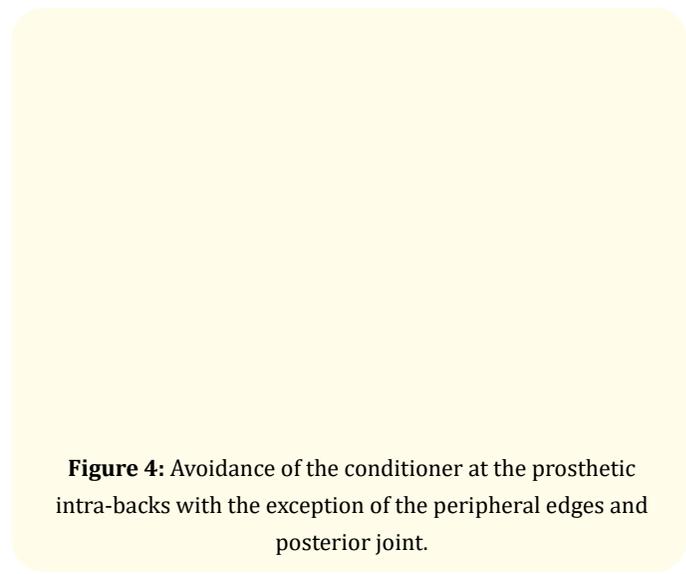


Figure 4: Avoidance of the conditioner at the prosthetic intra-backs with the exception of the peripheral edges and posterior joint.

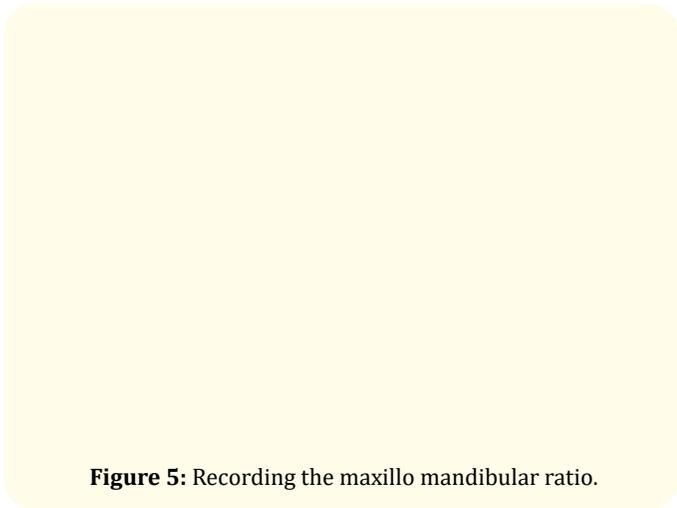


Figure 5: Recording the maxillo mandibular ratio.

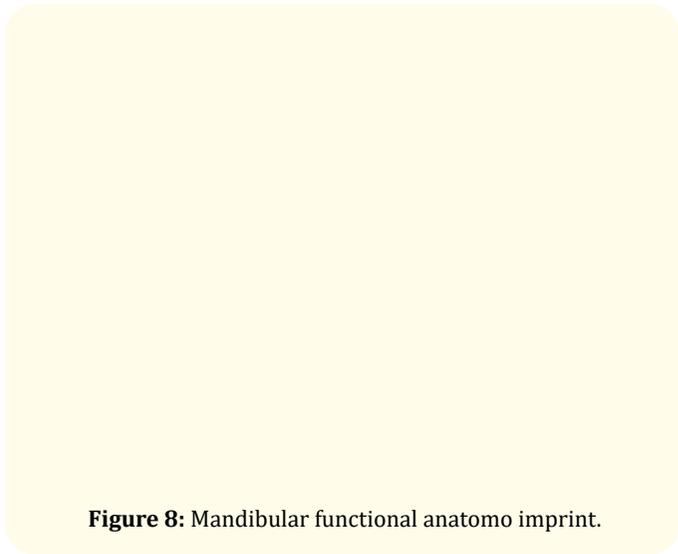


Figure 8: Mandibular functional anatomo imprint.

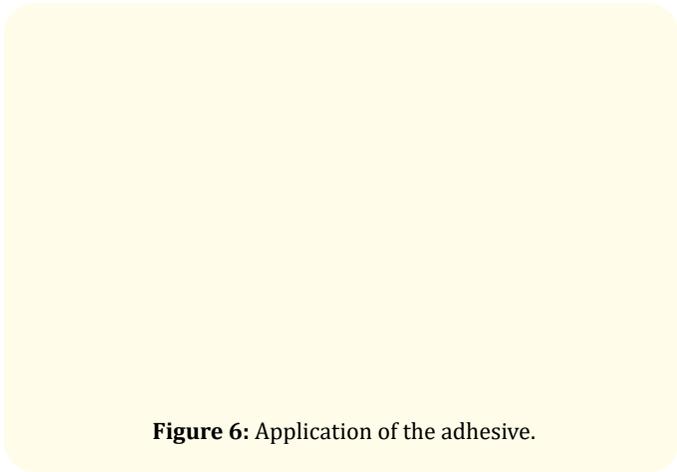


Figure 6: Application of the adhesive.

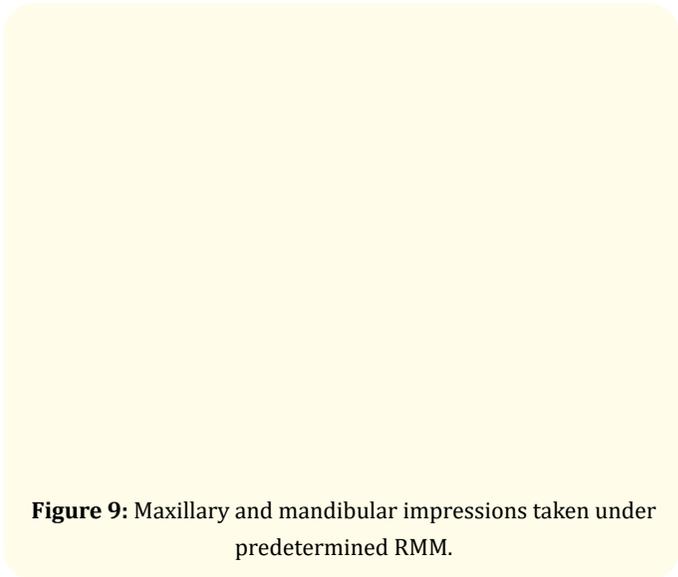


Figure 9: Maxillary and mandibular impressions taken under predetermined RMM.

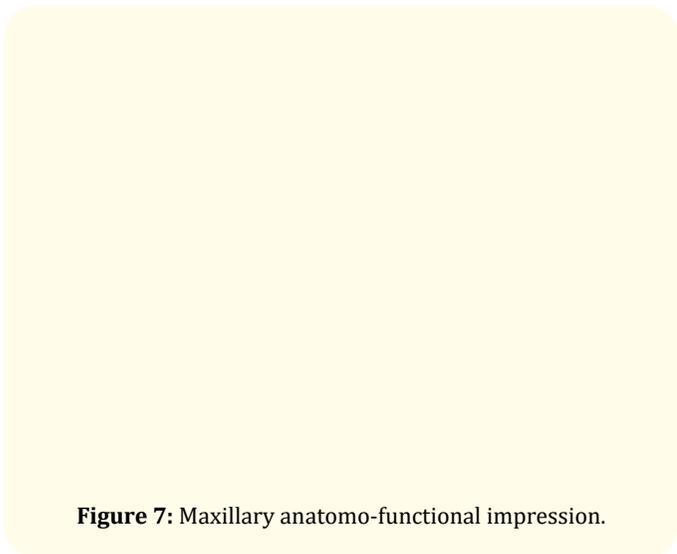


Figure 7: Maxillary anatomo-functional impression.

The cast and then transferred to the articulator before demoulding the indentments (Figure 10,11); the maxillary model being transferred using an assembly table. An assembly plane made of heavy silicone (Optosil®) was fixed on the mandibular model at the same level as the free edges and cuspidial tips of the maxillary prosthetic teeth in order to preserve the occlusion plane and the DVO already clinically validated (Figure 12). The choice of prosthetic teeth was made by making a compromise between Lee's rule (width of the central incisor = 1/4 of the width of the base of the nose) and the dimensions of the old prosthetic teeth very satisfactory for the patient.



Figure 10: casting and transfer of impressions to an articulator before demoulding.

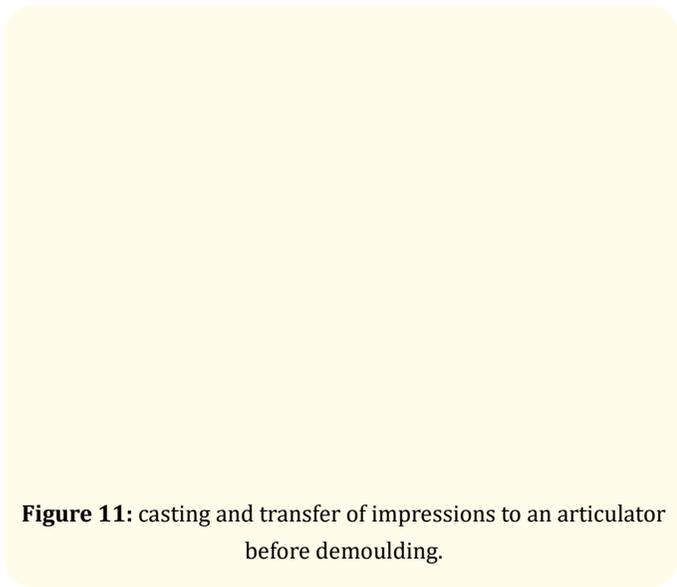


Figure 11: casting and transfer of impressions to an articulator before demoulding.

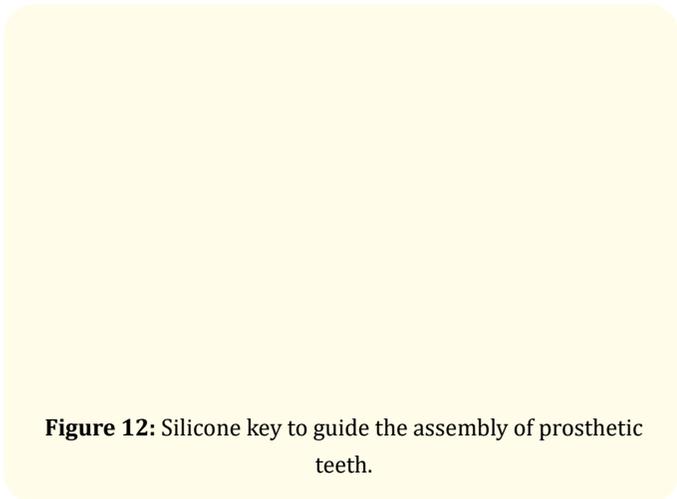


Figure 12: Silicone key to guide the assembly of prosthetic teeth.

Third session

Validation in the mouth of the assembly of prosthetic teeth

We have slightly modified the orientation of the prosthetic teeth to better meet aesthetic criteria, including labial support and the location of the free edges in relation to the labial edges, as well as the function that is dictated by the concept of fully balanced occlusion. Then the prosthesis was sent to the laboratory for finishing and polymerization (Figure 13-15).

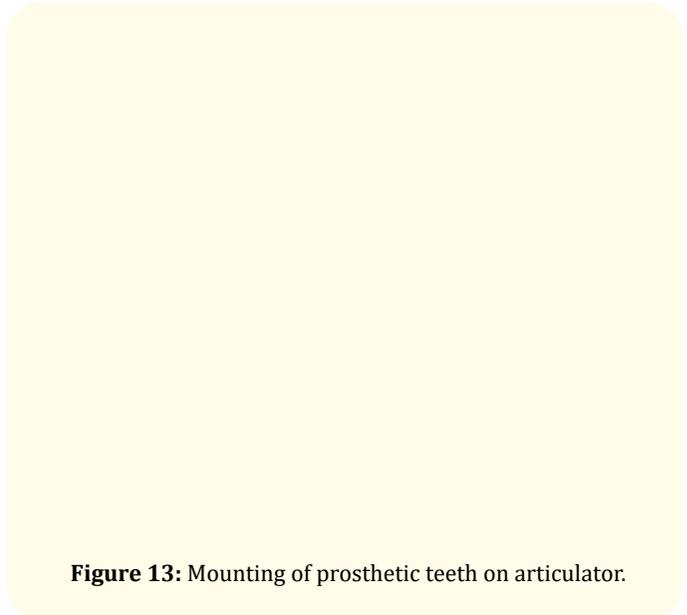


Figure 13: Mounting of prosthetic teeth on articulator.

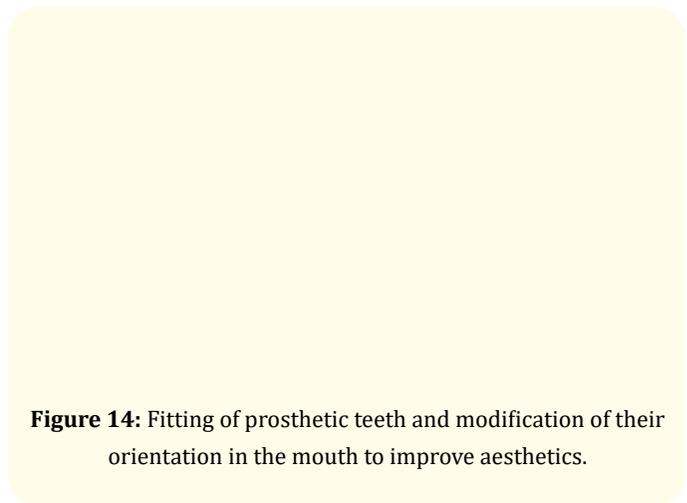


Figure 14: Fitting of prosthetic teeth and modification of their orientation in the mouth to improve aesthetics.

Figure 15: Fitting of prosthetic teeth and modification of their orientation in the mouth to improve aesthetics.

Fourth session

Placement of the bi-maxillary prosthesis

The installation step must be associated with immediate balancing and verification of the prosthetic intrados using a low viscosity elastomer (Xantopren® VL plus) to remove any area of overextension or compression (Figure16).

Figure 16: Polymerization and insertion in the mouth.

Discussion

Definitions

Deferred impressions

Deferred impressions are carried out on existing prostheses or transient prostheses made for the purpose of tissue condition-

ing, periodically rebased by flexible products whose principle is to exercise, for a certain time, a modeling action by the progressive modification of surface. The final registration of a prosthetic intrados is sometimes carried out after a period of tissue conditioning or healing after extraction. These impressions fall within the scope of complementary impressions and not tertiary impressions, which are piezo graphic impressions intended to shape the "stabilizing polished surfaces", areas extending from the peripheral joint to the crushing edge of the prosthetic teeth [1].

Functional impression material

A functional impression material is a product that, when applied to fabrics, allows the recording of their topography under the effect of physiological movements. Wilson., *et al.* [2]. In the literature, there is a very great controversy regarding the use of soft liners as an imprint material on their own.

Some authors, such as Ogolnik and Wilson through their work, show that these products cannot be used alone as part of anatomic-functional impressions. According to Wilson., *et al.* the imprint product must be plastic in order for it to be accurate, which is not the case for soft liners that are elastic materials [2,3].

Another current of authors, including Rantanen and Echardson through studies on the degree of reproductive accuracy of soft liners, have approved that these conditioning materials can be used to take functional impressions, provided that the impression is poured immediately after its removal from the oral cavity. Indeed, according to them, variations in temperature and humidity between the oral cavity and the external environment can modify the behavior of these materials [4,5].

According to Righnon Bret [6], functional impressions with a soft liner must be carried out after packaging or tissue modelling phases. This author brought Klein's notion of physiological imprint further into the context of piezo graphic impressions by exploiting physiological functions in the shaping of prosthetic support surfaces. Soft liners therefore make it possible to physiologically record the support surface while exploiting the functional space modeled for a period not exceeding three weeks (loss of elasticity and beginning of the granular desiccation phase).

Composition and properties of tissue packaging resins

The attached table (Table) summarizes the work carried out by Murata., *et al.* [7] concerning the different tissue conditioning ma-

materials as well as their composition and properties. These authors conclude that, Viscogel and Coe-Comfort are the best tissue conditioners given their properties. Indeed, they have a very low viscosity, therefore a very important creep that is maintained over time,

these qualities being sought in the context of tissue conditioning. The taking reaction of these materials is of the gelling type; it is carried out in four distinguished phases (Figure).

Materials	Composition		Temps de Gélification	Creep	Viscoélasticité
	Powder	Liquid			
Fitt	Methyl methacrylate ethyl + White pigments	Ethanol 20% + Palatal butyle 80%	1.59 min	++	+++++
Viscogel	Polyethyl methacrylate	Ethanol 5 - 10% + Of palatal butyle	8 to 10 min	++++	+++
Coe-comfort	polyethyl methacrylate + Join us from Zinc	Ethanol < 5% + Of palatal butyle	8 to 10 min	+++++	++
GC-soft-line	Polyethyl methacrylate + Benzoyl peroxide	Ethanol 15% + Of palatal butyle	3 min	+++	++++
Hydrocast	Polyethyl methacrylate	Ethanol < 10% of palatal butyle	5min	++	++

Table 1: Composition and certain characteristics of delayed-taking resins.

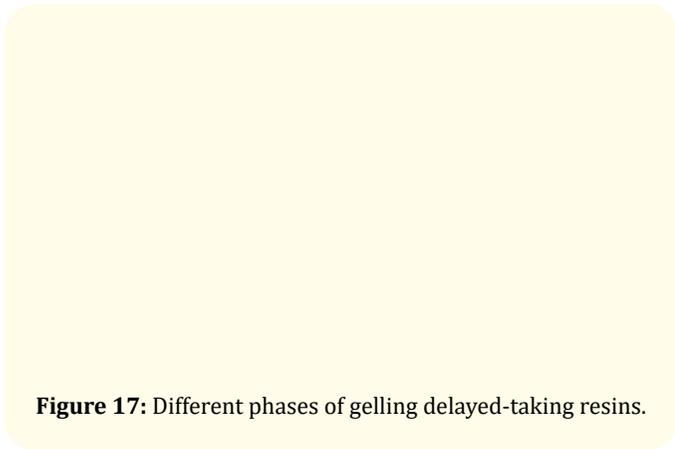


Figure 17: Different phases of gelling delayed-taking resins.

Characteristics of a tissue conditioner

For a tissue conditioner to be effective, it must meet the following specifications as much as possible [8,9]

- Taking reaction (gelling) as slow as possible.
- **Occlusal stress damping:** Reduce the occlusal forces transmitted to the support surface.
- **Significant elasticity and flexibility:** Long elastic phase and short plastic phase.
- **Biocompatibility:** No tissue reactive effects of fibromucosus

- **Minimal biodegradability:** In the presence of other proximity or contact materials including acrylic resins.
- **High creep quality:** Accompany changes in surface finish and volume of tissues with the prosthesis for a long time.
- Be viscous to present resistance to deformation and maintain an optimal thickness to ensure a balanced distribution of loads.

Interests of a tissue conditioner

Tissue conditioners are active materials in the elastic phase, they allow in addition to a tissue conditioning and indirectly a neuro-musculo-articular conditioning, a physiological imprint of the support surface. In other, we can mention the main objectives of a tissue conditioner [10]

- Improve the morphological and histological aspect of the support surface.
- Participate in the sanitation of the tissues of the support surface by promoting the regression of pathological lesions.
- Increase the bio-functional space by the mechanical properties of the material.
- Restore oral functions in particular by the accuracy of the anatomic-functional recording and the reassessment of the OVD (Occlusion Vertical Dimension).

- Ensure a progressive restoration of aesthetics by establishing a physiological labia jugal support.
- Ensure the psychological comfort of the patient by immediately reducing these complaints.
- Participate in the neuro musculo-articular conditioning.

Steps to make deferred impression

Tissue conditioning and modelling [11,12]

Old prostheses (or transient prostheses) should be prepared to receive delayed-plug acrylic resin. The intrados is reduced by 1 mm in thickness, to allow the resinous material to take place there. The lining of the mandibular prosthesis is, in general, carried out before that of the maxillary prosthesis.

After mixing the liquid and the powder, the intrados of the prosthesis is filled and wait 2 to 3 minutes for the material to enter its active plastic phase before insertion in the mouth. This must always be started first at the posterior level and then starting with a tilting movement at the bottom and forward, in order to avoid the concentration of the material at the level of the anterior sector. Two to three minutes later, when the viscosity of the conditioning resin increases, the dynamic recording of the periprosthetic structures begins with contractions of the orbiculo-oral strap (retraction and projection movements of the lips). This recording is carried out first of all under a slight digital pressure, before the insertion of the maxillary prosthesis whose intrados is also filled by RPR by looking for the DVO allowing an occlusal pressure harmoniously distributing the existing loads during swallowing and chewing, on the maxillo-mandibular support surfaces and ensuring muscle isotonic. Indeed, the tissue conditioning resin must have a uniform thickness and at least equal to 1.5 mm. Areas of pink resin that are exposed or insufficiently covered are reduced in thickness and refilled with delayed-setting resin before being reinserted in the mouth. After 15 minutes of dialogue and verification of vocabulary, the patient is released. This treatment should be repeated every four days for two to three weeks for both prostheses.

New extensions of the edges can be objectified over the sessions especially in areas difficult to record using conventional techniques due to lack of coordination of the patient to the Herbst tests requested by the practitioner in this case the Eisen ring areas and the mucous reflection line of the anterior sector at the maxillary level and the retromolar regions, Fish's pockets and the sublingual region at the mandibular level.

Surfacing impression [13,14]

The surfacing impression is programmed after 2 to 3 weeks of tissue conditioning. We first check the vertical dimension of occlusion and validate it based on the aesthetic and functional parameters, then we remove the prostheses

and ensure the proper registration of the maxillary and mandibular physiological peripheral joint as a whole.

The modeling material is then removed at the prosthetic intrados and only the modeling of the peripheral edges is left. The surfacing imprint is carried out using materials such as polysulfides, polyether's or zinc oxide eugenol under occlusal pressure by inviting the patient to perform the classic Herbst movements. This impression is carried out under occlusal pressure by associating it most often with the recording of the maxillo-mandibular ratio using a wax bit in centered relationship and the right DVO.

Conclusions

Deferred impressions are complementary functional impressions to be distinguished from tissue conditioning carried out as part of pre-prosthetic therapy to arrange the prosthetic space or to sanitize the tissues of the support surface. The ambulatory impression, performed with the same materials, is a purely prosthetic step performed on transient prostheses or on old prostheses and whose purpose is to modulate the intrados and prosthetic edges during oral functions. This recording must be carried out, however, in a healthy musculo-articular environment, at a good OVD and ac-

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