MUCOSAL CONDITIONING
IN A POST-EXTRACTION AND POST-IMPLANTATION
MOBILE PROSTHESIS:
USE OF AN INNOVATIVE MATERIAL

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Prosthetic rehabilitations, both total or partial, include an intermediate stage for recovery and tissue conditioning, during which are used post-implantation and post-extraction immediate prosthesis, in order to restore the patient's function and normal social life.

Quite obviously, even in these delicate stages the achievement of a functional and aesthetic, although temporary, result must in no way affect the integrity of either the masticatory apparatus or the underlying tissues.

In patients diffusely or totally edentulous, the control of load pressure is a key factor to success. In fact, the odontologist shall rely on different clinical methods, during which the prosthesis will be temporarily supported by tissues previously subjected to surgery.

Furthermore, as everyone knows, the control of the masticatory load on the mucosa is an essential component, even in healthy edentulous patients, since a faulty pressure of the prosthesis causes alterations and mouth ulcers which may prove extremely painful.

Therefore, in order to achieve a better control of the masticatory load, it is essential to fabricate soft prosthetic bases.

For this purpose, retarded-setting plastic acrylic resins are used for direct rebasing, as they precisely record details and can, as an essential requirement, among others, induce an immediate suction and absorption of the masticatory loads. It should be pointed out that, in these circumstances , self-polymerizing acrylic resins, both soft or hard, should be avoided, since they originate a very high discharge of monomer, which has proved to be toxic for tissues in contact with it.

Thus, it would be better to avoid their use both with healthy tissues and in case of wounds or bleeding tissues.

However, retarded-setting plastic acrylic resins have some inconveniences mainly connected to the processing methods and the technical characteristics of the components.

These materials are in fact made up of the combination of two compounds (powder and liquid) which, while mixing up, undergo different physical and chemical states, essentially showing five phases which have been codified in literature as follows.

- First phase, *physical:* powder and liquid mixing (2-3 minutes)
- Second phase, *chemical:* waiting period to allow the material to become gluey (2-3 minutes)
- Third phase, *active:* placement of the prosthesis inside the oral cavity, with the material in the plastic phase.
- Fourth phase, *elastic:* passage from the plastic to the elastic phase (average duration: 1 to 3 weeks).
- Fifth phase, *drying process granular:* total loss of elasticity; in this state the material becomes rough and is a receptacle of dental plaque, promoting the development of micro-organisms.

Fig. 1 and 2: clinical case

Fig. 3: upper immediate prosthesis

Fig. 4: lower immediate prosthesis

Fig. 5: checking the adaptation of the upper prosthesis

These materials are marketed under different names: Ivosel, Hydrocast, Kerr-Fit, Visco-Gel, where the first three phases are more or less similar as far as processing methods and time are concerned, while the elastic phase duration changes considerably.

This phase, which, being functional, is considered the most important one, depends on the quality of the material and on the quantity of liquid (containing plasticizer) blended in the powder.

The elastic phase should ideally last as long as possible and, throughout this period, the material should keep this state unchanged, otherwise some problems would arise, such as the following.

- Some of these materials enter the fifth phase after only one week, thus becoming irritant and detrimental to mucosae.
- A poor adhesion of the material to the acrylic prosthetic base causes the material detachment, particularly on prosthesis adges, reducing stability.
- The surface porosity, even initial, is a receptacle of dental plaque and micro-organisms, causing, in time, unpleasant smells.
- Need of constant and frequent checks of the material with repeated replacements.
- Changes in colour and sensorial alterations in taste mean discomfort, and repeated complaints by the patients whose prostheses have been rebased with such materials.

To prevent these problems, we have found a material with many advantages.

For about five years we have been clinically evaluating this new thermoplastic material, which has meanwhile become ready, with an optimal formulation.

This material, marketed under Dinabase trademark, is a monocomponent high viscous copolymer vinyl solution, with no monomer. It does not absorb water and is non-toxic and non-allergenic. Beside being used for tissue reconditioning and temporary rebasing, this material is suitable for indirect rebasings in order to obtain dynamic and functional precision impressions.

We are here below describing the use of this material reporting a case of total pre-extraction immediate prosthesis.

Fig. 6: detail of the adaptation to the mucosa

In a 55-year-old female suffering from periodontal disease and destructive caries, a thorough cleaning of the oral cavity was performed, followed by the adaptation of the immediate prostheses, which had been previously prepared (fig.1-6).

The material is contained in an aluminium cartridge and a syringe dispenser is required for its application.

Fig. 7: the material is warmed up in a thermostatic pan

Being high-viscous, thermoplastic material, it needs to be warmed up for few minutes in hot water, at a temperature of 45° C (fig.7) to become soft and mouldable. Afterwards, the cartridge is removed and dried , then it is put inside the special syringe and eventually perforated (fig.8).

Fig. 8: cartridge perforation

The material is injected all over the prosthetic base and then spread and shaped with fingers, carefully following the ridge morphology (fig.9-12). It is essential that the material firmly adheres to the peripheral edges particularly, in order to prevent that water or saliva may infiltrate between the prosthetic base and the material. In this stage the first evident practical advantage is that the material does not stick to finger, nor to tools and neither to gloves, and may thus be quite easily worked (everyone knows how sticky traditional materials are).

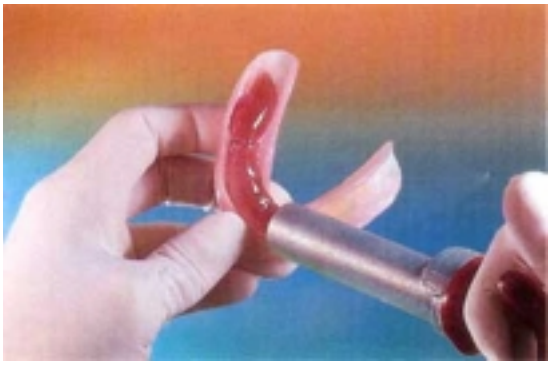

Fig. 9 and 10: the material is placed on a clean and dry base

Now, before setting the prosthesis in the oral cavity, it is suggested to dip it in hot water (45°C) for few seconds (fig.13), in order to obtain a fluider and smoother material, since the latter is likely to have cooled down during the spreading and shaping stage.

Fig. 11: material shaping

Fig. 12: adaptation of the material to the upper prosthesis

Fig. 13: the prosthesis is left in hot water for a few seconds before being set inside the oral cavity

Fig. 14: prosthesis in situ with discharge of excess material

After the setting of the prosthesis in the oral cavity, it should be left there for about 5 to 10 minutes at least to obtain a correct functionalization and allow the removal of excess material.
It sometimes happens that at first, being unfamiliar with a material having the above characteristics and being used to work with very fluid ones, one may exceed in spreading this material, thus causing remarkable occlusal rises.

In that event, the prosthesis shall be removed and the self-modelling of the material shall be helped by finger pressure; the prosthesis shall then be dipped in hot water once again before being set back inside the oral cavity.

It should be reminded that, since this material is thermoplastic, one may play with temperatures in order to obtain a more or less fluid material.

When the functionalization phase is over, the prosthesis is taken out and the excess material removed.

Contrary to the manufacturer's suggestion (hot scalpel), we would advise to put the prosthesis under a jet of cold water to harden the material, and then perform the cut using an ordinary scalpel, or even just small scissors, at room temperature (fig.15,16 and 17).

Fig. 15: material cooling down

Fig. 16: after cooling down, the back portion of the material turns whitish

Fig. 17: the excess material is cut out

Fig. 18: adaptation and functionalization are over

Fig. 19: the precision of the material and the abundance of details are remarkable

After having cut the excess material out, the prosthesis shall be dipped in hot water for few seconds and then set back inside the oral cavity, where it shall be left for some minutes until the final check (fig.18 and 19).

Before dismissing the patient, it is advisable to dip the prosthesis in cold water for few minutes in order to harden the material; the patient should also be advised not to drink very hot beverages at least during the first day of use.

The material, in contact with saliva and air, starts its reticulation process, therefore gradually becoming more consistent but still remaining more elastic if compared to traditional retarded-setting resins.

One week after the surgical operation, the usual control should be performed. It should be noticed the complete recovery, with neither mouth ulcers nor inflammatory processes arising (fig.20 and 21). This clinical pattern is further confirmed by the follow-ups carried out 2 and 4 weeks later, and it is quite clear how the material can still perform its task (fig.22-27).

Compared to traditional retarded- setting plastic resins, the most important practical advantages we found in Dinabase, which in our opinion are clinical (for the dentist) and motivational (for the patient), are the following.

I) Using a monocomponent and ready-to-usematerial, first of all, there will be a great saving of time (reduced of 2/3 at least) and furthermore there will be no chance that any mixing errors occur (constant result). In fact, the three phases, physical, chemical and active, will no longer exist, since the material is already in an active stage and will remain such for several hours. This means less stress and great adaptability, thanks to the chance of adding and removing the material at will, without time or mixing limits.

II) The longer active stage together with the higher consistency of the material allow a better dynamic and functional adjustment of the prosthetic base and a larger extension of the prosthetic plates. In this regard, it should be reminded that, in order to reduce the pressure affecting the underlying tissues during the function, some authors suggest to provide enough extension and a suitable support to the prosthetic plates, since the greater their extension is, the greater will be, although within certain limits, the masticatory load allowed.

III) The elastic phase, which is the most important one from a clinical point of view, has a double duration compared to any other material available on the market; furthermore, there is no drying—process granular phase. In fact, even after two weeks when the material has become more consistent, it will suffice to warm it up to bring it back to a more elastic condition. This means that the material can absorb masticatory loads and, above all, the full recovery of periodontal tissues.

IV) A great stability in time and an excellent suction by the prosthesis, with a remarkably higher adhesion to mucosae, since, while traditional materials trend to stay on edges only, Dinabase spreads all over the prosthetic plate.

V) Perfect adhesion to acrylic resin in time, with no detachment occurring even in case of particularly thin edges. In fact, while a simple small spatula is required to detach or to replace traditional materials, in this case a milling cutter should be used, owing to the extremely steady adhesion.

VI) The patient's enthusiastic response as regards comfort, stability and the total lack of any change in taste. Furthermore, aesthetically speaking, the material has a better appearance (pink colour), it does not change colour and takes no unpleasant smell in time. For operators this means a lower number of unexpected calls at the surgery by patients.

Fig. 20 and 21: lower prosthesis – clinical results after one week

Fig. 22 and 23: check of lower and upper prosthesis after 15 days


Fig. 24 and 25: upper prosthesis and tissues after 28 days


Fig. 26 and 27: lower prosthesis and tissues after 28 days

The only disadvantage found is the chance that some rises in the vertical dimension may occur at the beginning, owing to the lack of familiarity and to the material consistency. It should however be underlined that, even in these circumstances, the material proves to be extremely adaptable. Actually being thermoplastic, it spreads thoroughly after few hours, thanks to the warmth of the body temperature.

Conversely, with retarded-setting resins, the opposite problem arises. In fact, although it is less easy to obtain rises (since these materials are fluider after mixing), the active phase lasts 3 to 5 minutes only. In the even that, after a mixing error or a wrong period of time elapsed, a rise should be found, the latter cannot be modified unless the rebasing is made anew.

CONCLUSIONS

The use, made for several years, of this innovative material for tissue conditioning after surgery and after implantation has clinically shown its great adaptability, reliability and easy use. It is in fact extremely helpful but, above all, has proved to be of great comfort and relief to patients undergoing the delicate stage of total prosthesis fabrication.

In addition, some recent researches we have carried out in collaboration with Milan University, and now in course of publication, showed that the non-toxicity of this material is four times higher than that of the best traditional material available on the market.

We therefore consider that Dinabase characteristics are superior to those of the retarded-setting plastic acrylic resins.