



The Provisional Prosthesis Using The Shell Technique: When And How?

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Abstract: The provisional prosthesis is an essential prerequisite that provides crucial information for the realization of permanent prostheses both in terms of the periodontal environment and from an aesthetic and functional point of view. Several techniques now allow the realization of the provisional prosthesis. The choice between these different techniques is guided by the operating conditions, the requirements of the patient, as well as the knowledge of the practitioner and the prosthetist. Among the techniques that have essential advantages both aesthetically, mechanically and psychologically is the shell technique, which consists of making the provisional prosthesis on the plaster model and then adapting it in the mouth. This article will present in detail the principle of this technique, its advantages and main indications, as well as the implementation technique.

Keywords: Provisional prosthesis, technical shell, aesthetic, resin.

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INTRODUCTION

The development of a fixed dental prosthesis inevitably includes a pre-prosthetic phase. During this phase, the realization of the prosthesis of use is, therefore, deferred and the notion of "temporization" is essential. It passes, in fixed prosthesis, by the realization of provisional prostheses. With the exception of film preparations for bonded bridges or veneers, any restoration with fixed prosthesis must be preceded by this step. Several techniques now allow the production of these temporary prostheses. However, in order to fulfill its role aesthetically, functionally and biologically, this prosthesis is generally made in the laboratory using indirect techniques. These techniques have better qualities and guarantee better integration of the prosthesis.

In this article, we will focus on one of the indirect techniques for making provisional prostheses: the "Shell Technique" which will be illustrated by a clinical case

OBJECTIVES AND ROLES OF PROVISIONAL PROSTHESIS

The provisional prostheses have multiple functions: they temporarily replace missing, dilapidated or prepared teeth, while at the same time restoring function and aesthetics, they protect the supporting teeth from physical, mechanical, chemical and bacterial attack. allow to test and evaluate the acceptance of the final result thanks to aesthetic, biological and functional criteria. The role of provisional prostheses is well known today: they will cover the prepared support teeth and replace the missing teeth. They make it possible to evaluate and validate the choice of an occlusal concept during prosthetic rehabilitation. Their place is therefore predominant within the framework of the prosthetic treatment plan, and they must meet the same quality criteria (finishing lines, contour shapes, access to hygiene, points of contact, respect for embrasures, surface condition, emergence profile...) than customary prostheses. Finally, they must be of reasonable cost, easy to achieve and modifiable by adding or subtracting the constituent material (resin).

PERFORMANCE OF A PROVISIONAL PROSTHESIS BY THE SHELL TECHNIQUE

Principle

This technique consists of making the provisional prosthesis in the laboratory before extracting the teeth to be replaced and preparing the supporting teeth in the mouth.

This temporary prosthesis is made on a corrected model, on which dental preparations will be made and the planned extractions will be simulated. The validation of the provisional prosthesis obtained will mark the passage to preparations and extractions in the mouth.

Advantages and Disadvantages

By comparing this technique with the provisional prosthesis by direct technique, we find that it offers pulp protection (the exothermic reaction linked to the polymerization of the resin being exo-buccal). The precision of the adaptation of the peripheral joints of the prosthesis is better. The mechanical properties of the prosthesis are also improved (the cured resin being harder). Aesthetics are also improved (possibility of having shades very close to natural teeth). Finally, this technique saves us considerable time.

Comparing this technique with the immediate removable prosthesis, the absence of hooks offers a notable aesthetic gain. In addition, being sealed, the prosthesis is fixed and therefore more stable. Finally, patient comfort is guaranteed.

However, this technique has a cost which is relatively high compared to direct techniques.

Indications and Contraindications

This technique is perfectly suitable for patients who are too esthetically demanding and who refuse to wear a removable partial prosthesis after extraction.

Clinical Protocol

A 45-year-old patient presents significant mobility in the mandibular incisors (Fig 1). The decision to extract these teeth was made, but the patient refuses to remain with apparent toothlessness during the healing phase and he does not agree to the wearing of the immediate removable partial denture.

The therapeutic choice therefore fell towards making a provisional prosthesis using the Shell technique, ensuring the psychological comfort of the patient. The clinical protocol is simple; it consists of making an alginate impression of the two arches before the extraction of the mobile teeth and the preparation of the supporting teeth (Fig 2). On

the mandibular model resulting from this impression, a wax up is carried out foreshadowing the future prosthetic project (Fig 3).

At this stage, all modifications are possible by adding or subtracting the wax, taking into account the wishes of the patient, but also functional and occlusal requirements. Once validated, the imprint of the corrected model is then taken, making it possible to obtain a 2nd model on which all the work will be carried out. We then start by simulating dental extractions by scraping all the teeth that are intended for extraction (Fig 4). The next step is to prepare the supporting teeth (Fig 5). It is a minimum preparation that obeys all the principles of preparation in fixed prosthesis (Fig 6). Once validated, we move on to making the provisional prosthesis; to do this, a silicone key is made on the wax up already validated in the first phase of the treatment (Fig 7a and 7b). This key is then filled with fluid resin (Fig 8). The material of choice for temporary dentures is acrylic resin which can be self, photo or heat polymerizable. The SHELL technique uses two types of resins:

The thermopolymerizable resin (Fig 9) for the laboratory phase: its polymerization takes place under the effect of heat. It is a resin that is at the same time dense, stronger, harder, more aesthetic and has a better surface finish than the self-curing resin.

The chemo or self-polymerizing resin for the Rebasement of the shell in the mouth. This resin is aesthetic and easy to handle.

The key filled with resin is then placed in the oven for cooking (Fig 10). The cooking temperature is indicated by the manufacturer. On leaving the oven (Fig 11), the provisional prosthesis is then examined, trimmed and polished.

At this stage, the clinical phase is then initiated. The dental preparations are then made (Fig 12), followed by the extraction of the mobile teeth. The extraction site is then sutured to speed healing and promote hemostasis (Fig 13). We move on to trying the temporary prosthesis in the mouth. Relining was essential to have the seal tight and the stability of the prosthesis. To do this, we use the chemopolymerizable resin (Fig 14), which is applied to the level of the intrados of the provisional prosthesis (Fig 15), which in turn is immediately put back on the prepared teeth (Fig 16).

After the resin has hardened, the temporary prosthesis is removed, trimmed and polished (Fig 17).

After sealing, the result is satisfactory in the eyes of the patient and the doctor (Fig 18).



Fig 1: Initial situation



Fig 2: Impression of the two arches before preparation and extraction of the teeth



Fig 3: Wax up of the future prosthesis



Fig 4: Simulation of dental preparations on the model



Fig 5: Preparation of the teeth on the model



Fig 6: Finished preparations and the model is ready for making the provisional prosthesis



Fig 7a, b: Silicone key from wax up

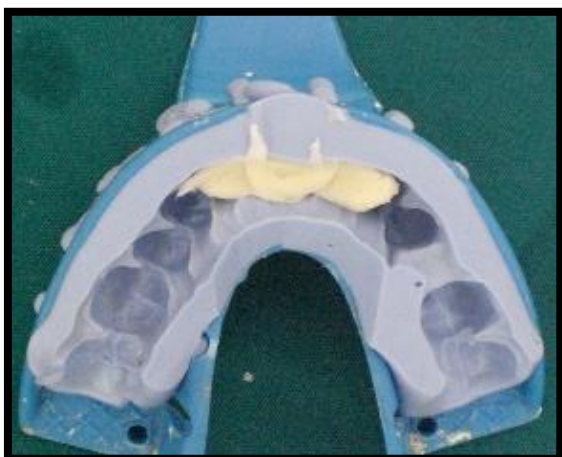


Fig 8: Silicone key filled with fluid resin



Fig 10: Resin baking



Fig 9: Thermo-polymerisable resin used for indirect techniques



Fig 11: Temporary prosthesis in baked resin after removal from the oven and before roughing



Fig 12: Dental preparations



Fig 15: Relining of the provisional prosthesis: injection of the resin on the intrados



Fig 13: Tooth extractions + stitches



Fig16: Placement of the provisional prosthesis after lining the lower surface with the chemopolymerizable resin



Fig 14: Chemopolymerizable resin used in direct techniques

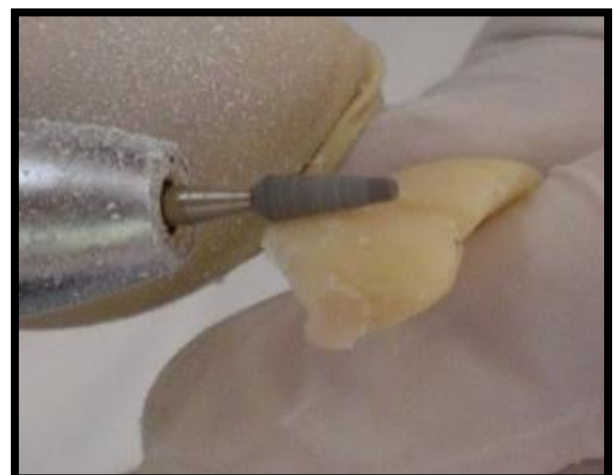


Fig 17: Trimming of the provisional prosthesis



Fig 18: Final result after cementation of temporary prosthesis

CONCLUSION

The provisional prosthesis stage is an essential part of prosthetic therapy. These prostheses make it easier to record the cervical limits when taking an impression. They allow spatial stabilization of the preparation while preserving the periodontium thanks to the reconstruction of embrasures and contact points. They allow a simulation of the future prosthesis of use. Their aesthetic role is essential in the current socio-professional context where the absence, even temporary, of visible teeth can be prejudicial to the person concerned. The choice between the different techniques of its realization is guided by the operating conditions, the requirements of the patient, as well as the knowledge of the practitioner and the prosthetist.

REFERENCES

- Hego, J., & Gombeau, F. (1994). Transient cemented restorations in prosthetic therapy. *Cah de proth*, 94, 44-50
- Marmy O, Cioppi G, Michellini F, Transient restorations. *Cah de prothèse* 96. 96: 66-75
- Vest, J. F., & Morin, F. (1998). Role of the transient prosthesis in fixed prosthetic reconstructions of small extent. *Cah de prothèse*, 104, 17-24.

- Graux, F., & Dupas, P. H. The transient fixed prosthesis.
- Ciancaglini, R., Sgarzini, P., & Sgarzini, L. (1994). The role of the transient prosthesis in craniomandibular rehabilitation. *Réal Clin*, 5, 63-73.
- Krug, R. S. (1975). Temporary resin crowns and bridges. *Dent Clin North Am*, 19, 313-320.
- Malquarti, G., Comte, B., Allard, Y., Martin, J. P., & Bois, D. (1998). Immediate provisional prosthesis. *Encycl Méd Chir (Elsevier SAS, Paris), odontologie*, 23-272-B-10.
- Skurow, H. M., & Nevins, M. (1988). The rationale of the preperiodontal provisional biologic trial restoration. *Int J Periodontics Resorative Dent*, 8, 8-29.
- Valentin, C., & Yakhou, O. (1993). Reconstruction of the anterior guide by means of joint prosthese. *Réal Clin*, 4, 163-176.
- Viennot, S., Malquarti, G., Guiu, C., & Pirel, C. (2007). Fixed temporization prosthesis. *Encycl Méd Chir (Elsevier SAS, Paris), odontologie*, 23-272-B-20.
- Graux, F., & Dupas, P. H. (2000). The transient fixed prosthesis. Rueil-Malmaison: CdP, 2000 (Guide clinique).
- Laurent, M., Lacroix, P., & Laborde, G. (2001). Knowing how to reconcile fixed prosthesis and periodontium. *Strateg Proth*, 1, 103-113.
- Morenas, M., Deschaumes, C., & Compagnon, D. (1998). Transient fixed prosthesis and biomaterials. Current state of knowledge. *Cah Prothese*, 104, 5-14.
- Pierrisnard, L., Penin-Lambert, M., & Nebot, D. (2004). The provisional fixed prosthesis in daily practice. Interest of the "technical block". *Chir Dent Fr*, 74, 39-42.
- Sous, M. (2002). Transient fixed prosthesis. The "technical block". *Cah Prothese*, 118, 45-48.
- Bohnenkamp, D. M., & Garcia, L. T. (2004). Repair of bis-acryl provisional restorations using flowable composite resin. *The Journal of prosthetic dentistry*, 92(5), 500-502.