



RESEARCH ARTICLE

WHICH IMPRESSION FOR WHICH CLINICAL SITUATION IN FIXED PROSTHESIS?

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ABSTRACT

Dental impression is a crucial step in the making of a fixed prosthesis. It must accurately transmit the morphological and dimensional data of the dental preparations to the dental technician. The diversity of clinical situations leading to a variety of impression techniques and the multiplicity of increasingly efficient materials exposes the practitioner to a confusing situation while choosing impression's materials and techniques. Our work focuses on the different elements to be evaluated and corrected before the impression is taken, and proposes, after providing a description of the main impression's techniques, an analysis of possible clinical and technical factors affecting the choice of impression's techniques. This thoughtful and reasoned simplification test makes it possible to optimize impression and successfully conduct prosthetic therapy.

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INTRODUCTION

Impression taking in fixed prosthesis is the corner step between the dental preparations performed in the clinic and the development of the prosthesis used in the laboratory. This is the most essential communication step as it aims at transmitting the dimensional and morphological clinical data necessary for the realization of the future prosthesis to the prosthetist. On its quality depends the fidelity of the working model on which the prosthetic elements are fitted (Hajtó, 2012) (Fig 1, Fig 2). Impression should enable the practitioner to do the following: an accurate recording of dental and mucosal tissues, an acceptable patient comfort, an easy disinfection without loss of information, a clear reading of the intrados and preservation without distortion before laboratory processing. For the prosthetist, requirements include: possibility of disinfection without distortion, no properties interfering with the different materials used in the laboratory and possibility of making several replicas without loss of detail (Koubi, 2008). To meet these objectives, different impression techniques have been developed, supplemented by the advent of new materials. Each impression has specific features, advantages and limitations.

Prerequisites for impression taking:

Local conditions analysis: An impression can only be achieved if the terrain provides the conditions for its success.

Thus a careful analysis of the terrain and a tissue conditioner are required. If the terrain offers favorable conditions with a firm and stable gums, no bleeding and no untimely production crevicular fluid, the periodontium is able to undergo a gingival deflection technique and subsequently the impression (Koubi, 2006). With inflammation it will be necessary to defer the impression, cleanse the periodontium and adjust the temporary prosthesis (Koubi, 2006).

Access to the cervical limits: Gingival deflection is intended to expose the cervical limits and allow impression materials to access beyond these limits. Several gingival eviction techniques are possible and the choice depends in particular on the type of periodontium (Dahan, 2010; Richelme, 2007; Folch, 2000) (Table 1)

Global or sectoral impression?: Before discussing the choice of the impression technique best suited to the clinical situation, it will be necessary to decide whether it is necessary to provide the laboratory with an impression of the entire arch or a sectoral impression limited to the hemiarcade concerned by the preparation is sufficient. The choice depends on 3 interdependent factors which are: the situation and distribution of the preparations on the arch, the nature and shape of the occlusal environment to be provided to the laboratory and the consideration of aesthetic data.

The sectoral impression presents as interests:

- Easiness to insert and remove the impression holder, which makes it easier for the practitioner and more comfortable for the patient.

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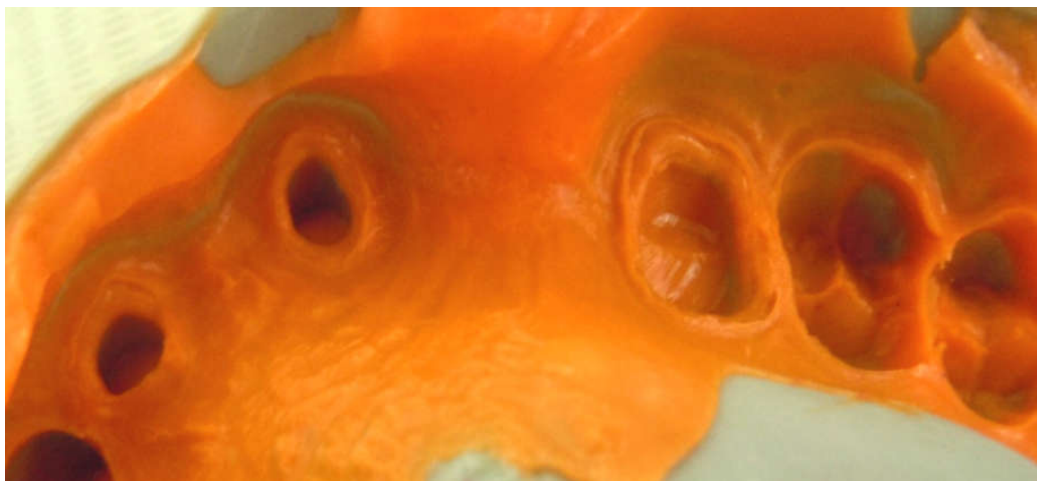


Fig. 1. The analysis of the impression must ensure the quality of the recording of the limits but also the absence of deformation of the axial parts



Fig. 2. A quality impression must result in a casting where the reading of the finishing lines is unequivocal

Table 1. Gingival eviction technique according to the type of periodontium

Type of periodontium	Thick and resistant periodontium	Thin / intermediate Periodontium
Type d'éviction	<ul style="list-style-type: none"> •Subgingival Limit: electrocautery / rotary curettage / dual drawstring •Juxta-gingival limit: single drawstring, dual drawstring 	<ul style="list-style-type: none"> •Surgical techniques are contraindicated. •single drawstring / Dual drawstring / Expasyl

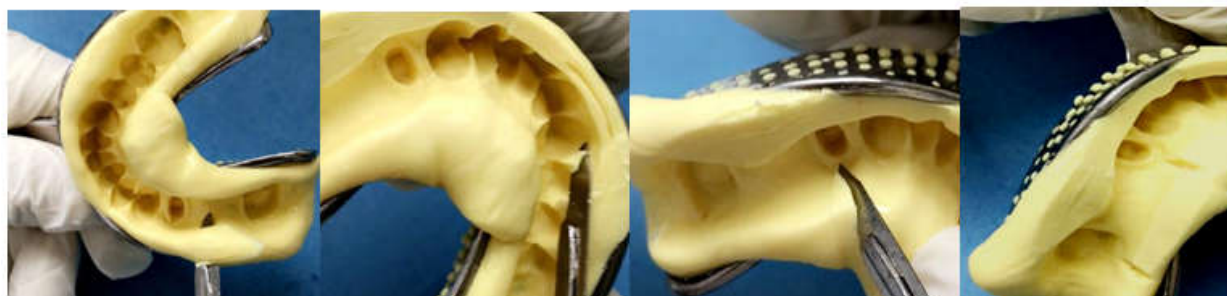


Fig 3. Developments in a first technical wash technique

- Utilization of less amount of material, which results in less distortion and therefore less risk of error.

However, its indications remain limited to a single cuspidated recessed tooth, together with functional anterior guidance and canine protection.

It is contraindicated at the anterior teeth level, in the absence of posterior wedging, in the case of multiple preparations and in the presence of a group function. In these situations, it is essential to make a global impression (Margossian, 2007; Koubi, 2008).



Fig. 4. Final impression after relining with low viscosity



Fig. 5. In the double mélange, the unpolymerized heavy material exerts moderate pressure on the marginal gingiva; the risk of closing the sulcus on the light is therefore reduced



Fig. 6. The light material allows accurate recording of the cervical margin and root emergence

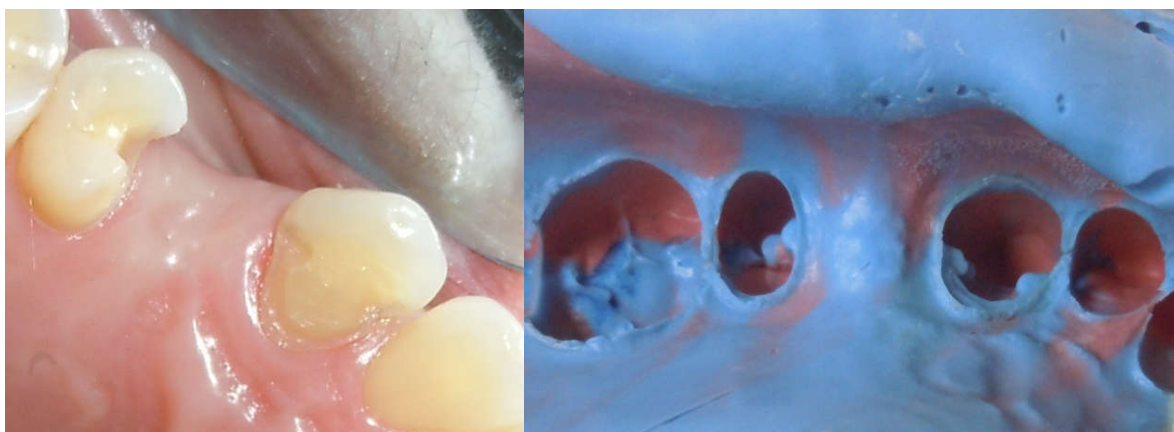


Fig. 7. Partial preparations such as bonded bridges require the use of double mélange



Fig 8. The use of burn-out studs when making the impression of root canal dwellings poses the problem of repositioning the first impression, hence the need to use the double mélange

Table 2. Selection criteria for the impression technique

	Wach technique	Double mélange
operating times	two-step	single time
indicated materials	Silicones: putty heavy and light very low viscosity	Silicones close in viscosity Polyethers
Advantages / indications	Well sequenced, single practitioner Insulated pillars Difficulties in accessing to limits	management of thin and fragile periodonts Recessed pillars Reduced periodontium Faster technique
Disadvantages	Very compressive, beware of thin and fragile periodonts Longer technique Risk of error during repositioning	Risk of deformation Technically difficult

Impression techniques in fixed prosthesis

Two techniques are widely used for fixed prosthesis impressions:

- The two-step impression called the « *Wash technique* »
- The single time impression called « *double mélange* »

Wash technique: First, an impression is taken with a silicone of very high viscosity which roughly and incompletely records the surface shapes and conditions. Second, after installation, this same impression is reinserted, loaded with a very fluid silicone that accurately records all the surfaces involved (Jardel, 2011; Hajtó, 2012; Viennot, 2005) (Fig 3, Fig 4).

Double mélange: Impression is made with two different viscosities of the same material, polymerizing together and at the same time. A fluid material (light) is injected onto the preparations and covered by the impression holder loaded with a higher viscosity material. In order for the material contained in the impression holder not to displace the fluid material, it must have a medium viscosity: "regular" or "putty soft". (Fig 5, Fig 6). Each technique has specifications where knowledge allows the practitioner to avoid the risk of failure and to choose the most appropriate technique according to clinical situations. The *Wash technique* is an easier technique to master since it is very well sequenced, it is suitable for a practitioner operating alone, and it is a highly compressive technique allowing a precise recording of details.

However, it remains relatively long by adding the setting time of the two materials and requires a lot of rigour. The *double mélange* impression is faster to implement but technically more difficult because everything has to be managed at the same time. Thus, four-handed work is essential to allow simultaneous mixing of heavy and light material. Both viscosities are applied before polymerization, which makes this technique much less compressive (Viennot, 2005; Koubi, 2008; Mahiat, 2006).

Optical impression: It is a question of taking successive shots, from different angles, using a camera of all or part of the area on which we will work. There are three main types of shots: views of the preparation area, views of the opposing surfaces and vestibular views which help bring the two arches closer together in static occlusion. Then the impression will be transmitted via the internet and in real time to the laboratory, which will be able to evaluate its quality and dialogue with the clinician while the patient is still in the chair (Moussally, 2007; Magne, 1999).

How to choose the impression technique according to clinical situations?: The choice between the different techniques is made by evaluating a certain number of parameters (Table 2).

Criteria related to the compressive nature of the impressions: The high pressure applied on the light by the heavy polymerized in the *Wach technique* allows to record

deep areas difficult to access and even sometimes to repel crevicular fluids, which makes this technique best adapted in the presence of subgingival cervical limits. On the other hand, the need for biological respect of both the pulp and the periodontium requires the use of the least compressive technique. Thus, the presence of a fine periodontium, a reduced periodontium or preparations on living teeth requires the use of the *double mélange* (Jardel, 2011; Hajtó, 2012; Koubi, 2008).

Criteria related to the procedure for the implementation of the impression: With multiple preparations, it is faster to inject the light into the impression holder than around each prepared tooth, which may induce a polymerization differential between the heavy and light in the *double mélange*. An absolute contraindication of the *Wach technique* resides in the impossibility of reliably repositioning the impression. This mainly concerns clinical situations with reduced periodontium with numerous undercuts in interdental spaces, movable teeth, versions, rotations and multiple mispositions. This technique is also impossible in implant prostheses since the implant situation impression requires the registration of an undercut transfer. Partial preparations (veneers, onlays, inlays) and coronary root reconstructions are all situations in favour of *double mélange* (Dahan, 2011; Dahan, 2012; Pierre, 2002). (Fig 7, Fig 8)

Conclusion

Practitioners have several techniques and materials at their disposal for impression taking. Their mastery remains an essential prerequisite to avoid the failure of this crucial step in the prosthetic chain. However, some specific conditions are potential difficulties that make the impression taking step stressful and make most practitioners use a single technique for all clinical situations encountered. Yet, clinical situations differ and each situation requires special precautions and therefore a specific impression technique. To find the winning combination, it is necessary to know how to evaluate local conditions, know the properties of materials, master the impression techniques, and know the advantages and disadvantages of each technique.

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