



CONVENTIONAL IMPRESSIONS IN SUPRA-IMPLANTED TOTAL REMOVABLE PROSTHESIS

| Aicha Oubbaih ^{1*} | Afafe Taouili ² | Imane Elbattahi ³ | Khadija Kaoun ⁴ | and | Samira Bellemkhannate ⁵ |

¹. Professor, Department of Removable Prosthodontics | Faculty of Dentistry, Hassan II University of Casablanca | Post code 21100, Casablanca | Morocco |

². Resident Doctor Department of Removable Prosthodontics | Faculty of Dentistry, Hassan II University of Casablanca | Post code 21100, Casablanca | Morocco |

³. Specialist Doctor Department of Removable Prosthodontics | Faculty of Dentistry, Hassan II University of Casablanca | Post code 21100, Casablanca | Morocco |

⁴. Professor and Head of Department of Removable Prosthodontics | Faculty of Dentistry, Hassan II University of Casablanca | Post code 21100, Casablanca | Morocco |

⁵. Professor and head of the Removable Prosthodontics service at the Casablanca Dental consultation and treatment center (CDCT). Department of Removable Prosthodontics | Faculty of Dentistry, Hassan II University of Casablanca | Post code 21100, Casablanca | Morocco |

| Received October 05, 2020 |

| Accepted October 20, 2020 |

| Published April 07, 2021 |

| ID Article | Oubbaih-Ref18-ajira051020 |

ABSTRACT

Background: Completely edentulous patients often express a desire for increased stabilization and retention of their complete removable denture. supra-implanted total removable prosthesis (SITRP) is a simple and reliable alternative that has proven its effectiveness and increased patient satisfaction. Of course, it is the quality of the prosthetic rehabilitation that will guarantee long-term patient satisfaction and which requires a good mastery of impression protocols. However, thanks to scientific data, the general practitioner must be able to have coherent attitudes and adapt his materials and techniques choices to the objectives of this treatment.

Objectives: The purpose of this article is to review the various factors that can lead to (SITRP) impression failure, as well as to expose the different materials and techniques for (SITRP) impressions. Finally, this article will describe a simplified impression protocol for a clinical case with two axial attachments to the mandible. **Conclusions** Impression protocols are not yet well established for every clinical situation due to the multitude of possibilities. However, the practitioner must be able to have coherent attitudes and adapt his materials and techniques choices to the objectives of the treatment. This article detailed by a clinical case the pick-up technique, used in the completely edentulous patient and that are most frequently used technique and providing more precision.

Keywords: *Impression, Complete overdenture, Implant.*

1. INTRODUCTION

Completely edentulous patients often express a desire for increased stabilization and retention of their complete removable denture. Supra-implanted total removable prosthesis (SITRP) rehabilitation is a simple and reliable alternative that has proven its effectiveness and increased patient satisfaction. Of course, it is the quality of the prosthetic rehabilitation that will guarantee long-term patient satisfaction and which requires a good mastery of impression protocols. However, impression protocols are not yet well established in SITRP for every clinical situation. Many protocols have been described and for each of them, it has been proposed to combine a technique and one or many impression materials. The purpose of this article is to review the various factors that can lead to SITRP impression failure, as well as to expose the different materials and techniques for SITRP impressions.

Finally, this article will describe a simplified impression protocol for a clinical case with two axial attachments to the mandible.

2. OBJECTIVES OF (SITRP) IMPRESSIONS

SITRP impressions must meet a triple objective Register:

- Fibro-mucosal bearing surfaces and the free play of the para-prosthetic organs, the objective of which is to allow the realization of a stable, retentive prosthetic base that ensures optimal sustentation.

- The shape, position and orientation of the implant abutments.

- The relative position of these two structures (implants and mucous membranes) with different biomechanical behavior [1].

3. FACTORS INFLUENCING THE ACCURACY OF IMPRESSIONS AND MASTER MODELS

3.1. Direct implant impression or abutment impression coping: In vitro studies have shown that implant direct impressions are the most accurate. However, it is not always possible to make implant direct impressions in complete dentures because of the very pronounced angulations between the different implants. It is not advisable to use direct implant transfer copings and mixed abutment transfers in the same impression [2].

3.2. Impression with the closed or open impression tray: Closed tray impression techniques should be avoided in SITRP because of the inaccuracies it provides [3]. The size of the opening must be large enough to allow the impression copings to pass through (it is best to give the dental technician a set of impression copings).

3.3. Implant Angulation: For Branemark, it is indicated to angulate the last two distal implants to reduce the distal lever arm. However, this angulation leads to inaccuracy when reproducing the three-dimensional position of the implants in the plaster model. To avoid this, abutment transfers can be used that's crew directly onto the abutment instead of directly onto the implant. Since MUA (Multi-Unit Abutment), abutments can have different angulations to compensate implant angulation, this results in a favorable situation with respect to the impression. However, they are less accurate than an implant direct impression [4].

3.4. Connected and unconnected impression copings: It is preferable to connect the impression copings to each other because the accuracy of the 3-dimensional reproduction of the implant location will be better. In addition, connecting the impression copings with a hard material (such as acrylic resin) before taking the overall impression becomes essential when the prosthetic project involves the connection of several implants with either a framework or a bar [5].

4. SITRP IMPRESSION TECHNIQUES

4.1. Direct pick-up technique: This technique uses pick-up copings with undercuts that are screwed onto the implant neck or the intermediate abutment. An X-ray is used to check the fit of the transfer. The impression tray, which is perforated at the pick-up copings level and filled with impression material, is inserted in the mouth. Once the impression material has solidified, the pick-up impression copings are unscrewed and taken into the impression. The impression copings are screwed onto the implant replicas which will be embedded in the working cast material. The pick-up technique is the most frequently used technique in the edentulous patient because it provides more precision.

4.2. Indirect pop-on technique: This technique uses impression transfers which are undercut, screwed onto the implant neck or the intermediate abutment and are not carried away in the impression. They are reintroduced into the latter before its treatment and thus make it possible to position the replicas of implants in the working model.

5. IMPRESSION MATERIALS USED IN (SITRP)

The expected properties of the impression material registering the prosthetic bearing surface are a long working time and linear setting kinetics in order to allow the patient to perform the full range of extreme functional movements several times. Thus, the materials of choice for this first impression step are polysulfides (Permalstic® light, Kerr) or polyethers (Impregum® or Permadyne®, 3M-ESPE) of medium or low viscosity. They also allow for a perfect replacement of the impression in the mouth.

For the registration of implant abutments, the required qualities are rigidity, wet ability and dimensional stability. The need to reposition abutment replicas in the impression requires the use of a sufficiently rigide elastomeric material after cross-linking, such as medium or high-viscosity polyethers (Impregum® or Permadyne orange®).

It is also possible to register the bearing surfaces at the same time as the position of the implants by using fast-setting plaster of the SNOW WHITE type. However, special attention must be paid to any undercuts that may block the removal of the special custom tray [6, 7].

6. TYPES OF CUSTOM IMPRESSION TRAYS

The custom impression tray (CIT) can be obtained by two methods depending on the clinical approach chosen by the practitioner:

-Either the CIT is made on a model from a primary mucostatic impression. This primary impression is taken with the healing abutments screwed onto the implants to mark the location of the implants on the model. The CIT made on this model is an adjusted CIT made of chemo-polymerizable resin, with an occlusal rim that prefigures the dental arch. The resin occlusal rim must be of sufficient height for occlusal support with the antagonistic arch [8].

-Either the CIT is a duplicate guide of the existing denture. It is therefore used as an imaging guide, then as a surgical guide and finally as an occluso-adapted tray, which is the ideal CIT. It should be noted that the adjustments of this type of CIT are generally minimal compared to a CIT from a primary impression [9, 10].

The design of the CIT varies at the implant level depending on the type of impression coping; if the impression copings used are of the standard screw-retained type, the impression tray is closed including the impression copings; if the selected impression copings are of the screw-retained pick-up type, the impression tray has an occlusal window for access to the screws of the impression copings.

7. PRIMARY IMPRESSION

The primary impression is made in plaster or alginate with a commercially available impression tray for edentulous patients (Cerpac series), according to a perfectly codified technology. This primary impression is taken with the healing abutments screwed onto the implants to mark the location of the implants on the model.

8. SECONDARY IMPRESSION

In order to take into account, the difference in depressibility between the fibro-mucosa of the bearing surface and the implants, it is preferable to make a dissociated impression in two steps. Combined impression techniques recording the position of the implants together with the bearing surfaces and the peripheral seal remain in our opinion highly operator-dependent techniques.

In the first step the custom impression tray is adjusted according to the same sequences and criteria as those defined for a conventional complete denture. The healing screws are removed (**Fig1**); the implant impression copings are placed (**Fig2**). A control by X-Ray must be taken to verify the correct adaptation of the screws. The impression tray is reinserted. The practitioner checks if there is no interference between the screws and the CIT (**Fig 3**).



Figure 1: Unscrewing the healing screws.



Figure 2: Screwed pickup type impression copings.



Figure 3: Checking the fit of the replica of the prosthesis to be used as a custom impression tray in the mouth.

The registration of the seals should be done according to the patient's muscle tone and the extent of resorption (sublingual seals with Kerr paste or a complete peripheral seal with an elastomer). The effectiveness of the seal must be tested in the conventional way by plugging the perforations with elastomer plugs to ensure the hermeticity of the seal. Note that if a duplicate CIT is used, the seals have already been recorded during the fabrication of the prosthesis from which the CIT is made. It is then sufficient to identify any over extensions or over thickness. The extreme functional movements required of the patient during the seal registration and during the impression border molding follow the precise chronology of the "Herbst Tests" [8].

The border molding is carried out under finger pressure. This protocol makes it possible to make a functional impression with the mouth wide open, with protraction of the tongue until the material is completely set, thus avoiding any over-extension due to a "drop" of the material that could occur in the region of the sublingual seal with the lack of support of

the floor of mouth during an occlusal impression. After checking the quality of this impression, excess impression material covering the prosthetic extrados and the CIT teeth (or the occlusal rim) is removed. Then, a recording of the centric relation is obtained by means of a Tench bite with Kerr paste. The impression material at the perforations is then removed with a scalpel blade.

The second step of the functional impression is intended to record the precise location of the implant abutments and also to take into account the biomechanical behavior of the bearing surface in relation to the implant abutments when

occlusal pressure is applied. It is therefore important that the final functional impression is made under pressure, and in particular under occlusal pressure whenever possible. This protects the implant abutments from harmful stresses and promotes biological integration. Thus, it is necessary to make sure that there is no interference between the impression coping abutments and the antagonist teeth. If there is no interference, the impression can be taken under occlusal pressure, however, if there is significant interference, the impression must be taken under finger pressure [11, 12].

In the second step, the impression is placed back in the mouth. It is held firmly on the bearing surface while at the same time a medium-viscosity polyether material (Impregum®, 3M-Espe in the presence of impression copings) is injected into the syringe at the perforations. The patient is then instructed to grit in maximum intercuspitation until the material has fully set (fig 4).



Figure 4: Terminal functional impression made under occlusal pressure.

After the material has set, any impression coping screws are removed and the final impression is removed and checked. The impression copings will be removed from the impression (**fig 5**). The rigidity of the impression material after setting allows the correct replacement of the abutment replicas that will be embedded in the working model material. In order to have more accurate impressions by the pick-up technique for a supra-implanted prosthesis, it is advisable to secure the impression copings either to each other or to the CIT for greater stability (**fig 6**).



Figure 5: Impression copings carried in the impression



Figure 6: Placement of implant analogs



Figure 7: Final impression before casting.

At the end of the session, the abutments are unscrewed and replaced by the decontaminated and thoroughly cleaned healing abutments.

9. PROCESSING THE IMPRESSION IN THE LABORATORY

The impression is treated in the conventional way, it is carefully boxed and then casted in plaster. The model obtained includes all the data required for the setting up of the matrices and the development of the (SITRP).

10. CONCLUSION

Impression protocols are not yet well established for every clinical situation due to the multitude of possibilities. However, the practitioner must be able to have coherent attitudes and adapt his materials and techniques choices to the objectives of the treatment.

In the completely edentulous patient, the pick-up technique is the most frequently used technique providing more precision. CAD/CAM and all computerized dentistry simplify and facilitate prosthetic design and allow for greater precision, but to be able to use these CAD/CAM techniques, a functional intraoral impression must be taken before hand.

11. REFERENCES

1. Olivier Hüe, Marie-Violaine Berteretche. Prothèse complète réalité clinique, solutions thérapeutiques. *Édition Paris Berlin Chicago [etc.] Quintessence International DL 2003.*
2. Papaspyridakos P, Benic GI, Hogsett VL, White GS, Lal K & Gallucci GO. Accuracy of implant casts generated with splinted and non-splinted impression techniques for edentulous patients: an optical scanning study. *Clin Oral Implants Res.* 2012; 23: 676-81.
3. Stephan G, Vidot F, Noharet R and Mariani P. Implant-retained mandibular overdentures: a comparative pilot study of immediate loading versus delayed loading after two years. *J Prosthet Dent.* 2007; 97: 138-45.
4. Slot W, Raghoebar GM, van Dijk G & Meijer HJA. Attachment of clips in a bar-retained maxillary implant overdenture: a clinical report. *J Prosthet Dent* (2012) 107: 353-7.
5. Sadowsky SJ. Treatment considerations for maxillary implant overdentures: a systematic review. *J Prosthet Dent.* 2007 ; 97 : 340-8.
6. Christophe Rignon-Bret, Claudine Wulfman, Benjamin Fournier. Les empreintes en prothèse amovible complète supra-implantaire mandibulaire TITANE. Décembre 2010 ; 7(4).
7. Walker MP, Ries D & Borello B. Implant cast accuracy as a function of impression techniques and impression material viscosity. *Int J Oral Maxillofac Implants.*
8. Rignon-Bret and JM. Prothèse amovible complète. Prothèse immédiate. Prothèse supraradiculaire et implantaire. *Ed CdP, Collection JPIO. Paris.* 2002.
9. Rignon-Bret C. Attachements et prothèses complètes supraradiculaires et supraimplantaires. *Ed Cdp, Guide clinique.* Paris. 2008, 11.
10. Rignon-Bret C. Radiographic and surgical guide fabrication for implant-retained overdenture. *J Prosthet Dent* 2010; 103:53-57.
11. Mariani P. Prothèses totales à complément de rétention implantaire : l'empreinte dissociée. *Stratégie Prothétique* 2001 ; 3 : 229-240.
12. Uludag B, Sahin V & Celik G. Technical tips for constructing a maxillary implant-supported overdenture by using a double-impression technique. *J Oral Implantol.* 2008.



Cite this article: **Aicha Oubbaih, Afafe Taouili, Imane Elbattahi, Khadija Kaoun, and Samira Bellemkhannate** CONVENTIONAL IMPRESSIONS IN SUPRA-IMPLANTED TOTAL REMOVABLE PROSTHESIS. *Am. J. innov. res. appl. sci.* 2021; 12(4): 97-101.

This is an Open Access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>