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Original Research Article

A modified open tray direct abutment level impression technique: A clinical tip

Navdeep Singh^{1,*}, Saurav Kumar¹, Thiruvalluvan N¹, Parag Dua¹,
Sonam Yangchen¹¹Dept. of Periodontics, Armed Forces Medical College, Pune, Maharashtra, India

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ABSTRACT

Reproducing the accurate intraoral relationship of an implant through impression making is first step in achieving accurate fit prosthesis. Traditionally impression techniques used in implant dentistry can be classified into closed tray and open tray impression techniques. Open tray impressions are considered to be more accurate as compared to the closed tray impressions in cases with multiple implants. It requires long impression copings which are picked up in the impression during impression procedure thereby reproducing the exact relationship of an implant. Present article describe a modified direct abutment open tray impression technique utilizing applicator tips in absence of long impression copings.

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1. Introduction

The accuracy of the impression is crucial in implant dentistry to ensure proper fit and function of the implant-supported restoration. The traditional impression techniques used in implant dentistry are the closed tray and open tray techniques, each with its advantages and disadvantages.^{1,2} The closed tray impression technique involves placing an impression coping onto the implant and securing it with a screw. The impression material is then injected into the tray, covering the coping and the surrounding tissues. Once the impression material sets, the tray is removed, and the impression coping remains attached to the impression. This technique is faster and more comfortable for the patient than the open tray technique, but it can be less accurate due to the potential for distortion when removing the impression coping from the impression.

The open tray impression technique involves using a custom tray that has a window to expose the implant and impression coping. The impression material is injected into

the tray and around the impression coping, allowing for direct visualization and verification of the implant position and soft tissue contours. This technique is more accurate than the closed tray technique but may take longer and be less comfortable for the patient. It is important to note that other impression techniques, such as digital impressions, are also available in implant dentistry and may offer additional advantages in terms of accuracy and efficiency. The choice of impression technique should be made based on the clinical situation and the clinician's experience and preference. Recent systematic review that compared the two impression techniques, found that the open tray technique had significantly less discrepancy between the impression and the master cast compared to the closed tray technique. The authors suggested that the greater accuracy of the open tray technique is likely due to the ability to directly visualize and verify the impression copings and the implant positions during the impression procedure.³

The closed tray impression technique can also be used with the abutment secured on the implant fixture. The direct abutment level impression method, also known as

* Corresponding author.

E-mail address: palleos@yahoo.com (N. Singh).

the direct prosthetics method, involves reconstructing the implant abutment to resemble a natural tooth. This is done by screwing a titanium abutment onto the implant body with the final torque, and then impressing the abutment inside the patient's mouth after it has been milled.⁴ It is preferred by many dentists due to its ease of use and fewer stages involved however in a study done by Alikhasi et al. authors concluded that implant level impressions were better than abutment level impression in transferring implant positions.⁵ This article describes a technique of making an open tray impression with using extensions made from applicator tip when the longer open tray impression copings are not available for making an impression.

2. Procedure

1. Secure the titanium abutment onto the implant body with the final torque. (Figure 1)
2. Select an applicator tip that fits snugly into the screw access channel of the abutment and cut the tip to the desired length so that they may be exposed during open tray impression making procedure. (Figure 2)
3. Next step is to modify the tray so as to create a window that will expose the applicator tips during impression making procedure. (Figure 3) Once the window has been made it is checked for its position in the mouth
4. On confirming the position of the tray in patients mouth, Splinting of all the abutments with a light polymerizing pattern resin (Easyform LC; DETAX GmbH & Co KG) is done. After the polymerization of pattern resin applicator tips are secured in their position. (Figure 4)
5. An adhesive is applied on the modified stock tray and the impression is made with a polyvinyl siloxane impression material using a monophasic technique. (Figure 5)
6. After the impression material has completely polymerized and is rigid, the applicator tips are removed from their position with the help of a tweezer to create channels, gaining access to the screw channel of the abutment.
7. A hexagon driver is inserted through the channel to gain access to the screw of abutment and it is unscrewed.
8. Once all the screws of the abutment are loosened, the impression is retrieved from the mouth along with the splinted abutments. (Figure 6)
9. Implant analogs are secured the secured onto the abutments and screw is tightened again and dental cast is poured.

3. Discussion

There have been various modifications to dental implant impression techniques to improve their accuracy and



Fig. 1: Abutments secured on implant Fixture

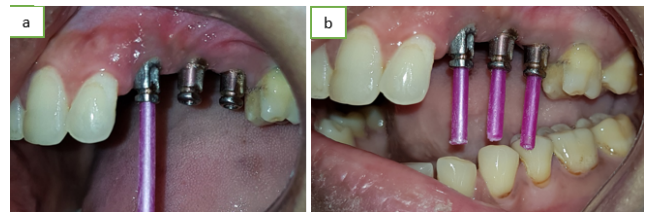


Fig. 2: a: Snuggly fitting applicator tip; **b:** Applicator tip cut to desired length



Fig. 3: Window preparation in tray to expose the applicator tips

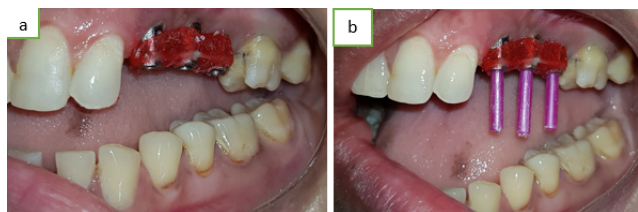


Fig. 4: a: Splinting of abutments; b: Securing tips on Splinted abutments

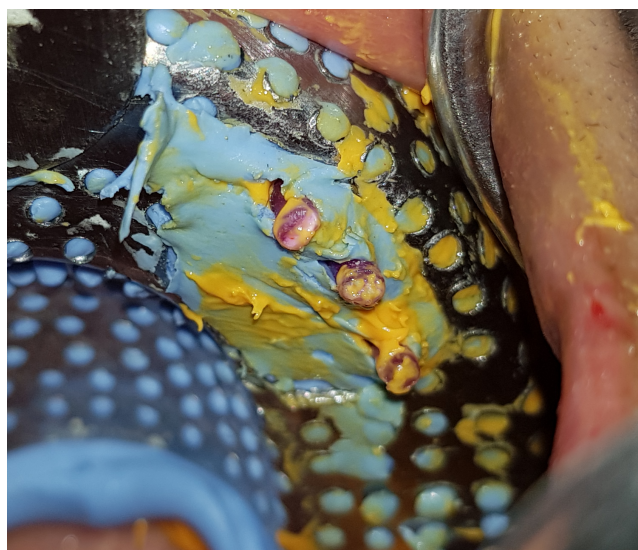


Fig. 5: Open tray impression with exposed applicator tips

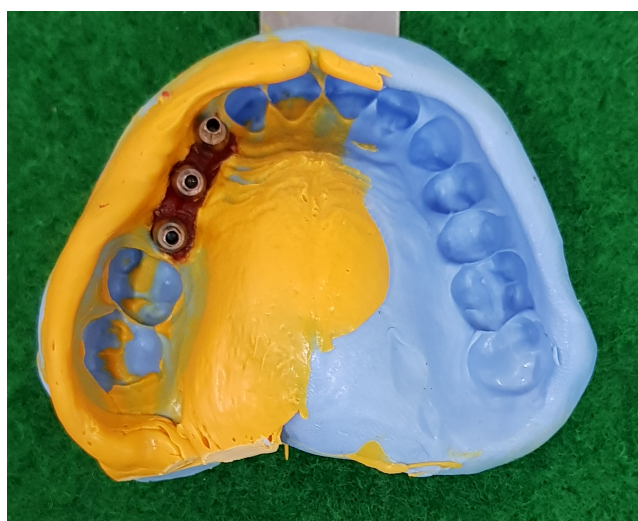


Fig. 6: Open tray impression with splinted abutment pick up

efficiency. Including:

1. Splinted impression technique: This technique involves splinting multiple implant impression copings together to form a single unit, which can help to minimize impression distortion and improve accuracy.
2. Digital impression technique: Digital impression systems use intraoral scanners to capture digital images of the implant position and soft tissue contours. These digital impressions can be more accurate and efficient than traditional impression techniques, as they eliminate the need for impression material and can be sent directly to the laboratory for fabrication.
3. Two-stage impression technique: This technique involves taking two separate impressions - one for the implant position and one for the soft tissue contours - and combining them to form a single impression. This can help to improve the accuracy of the impression, particularly in cases where there are significant differences in the implant position and soft tissue contours.
4. Customized impression coping technique: Customized impression copings are fabricated specifically for each implant patient, which can help to improve the accuracy of the impression and reduce the likelihood of impression distortion.
5. Non-rigid impression technique: Non-rigid impression techniques involve the use of impression material that is less rigid than traditional impression materials, which can help to minimize distortion and improve accuracy.

Various modifications have also been made based of the specific situation, some of which are.

1. Snap fit impression: The snap-fit impression technique is a modification of the closed tray impression technique and involves the use of press-fit impression copings that are attached to the implant fixture by pressing them onto the implant platform. This is different from the traditional screw or cement-retained impression copings. The snap-fit technique allows for easy removal of the impression copings during the impression making process and their subsequent reattachment to the implant fixture.⁶ The snap-fit impression technique is often used in situations where there is limited vertical space or limited access to the implant fixture. It can be useful in capturing accurate implant positions and minimizing the potential for errors or inaccuracies in the impression due to the transfer of the impression coping. Additionally, the snap-fit technique can be faster and easier to use compared to other impression techniques, which can save time and reduce patient discomfort.

2. **Functional impression technique:** This functional impression technique is a type of impression technique used in the fabrication of implant-retained overdentures. In this technique, the goal is to accurately transfer both the soft tissue profile and the location of the implant to the dental laboratory to ensure a proper fit and function of the final prosthesis. The functional impression technique involves recording the mucosa in a functional state, meaning that the impression is taken while the patient is performing functional movements such as chewing and speaking. This helps to capture the compressibility of the soft tissues and ensure a more accurate fit of the prosthesis. The technique typically involves the use of both a zinc oxide eugenol impression paste and an elastomeric impression material. One of the main advantages of the functional impression technique is that it can help to reduce the amount of chair time required for post-insertion adjustments of the prosthesis. However, the technique can be more time-consuming than other impression techniques and may require greater skill and experience to achieve accurate results. Additionally, recording the border relation with different impression materials can be technique-sensitive and require careful attention to detail.
3. **Implants with close proximity:** The implants placed in close proximity are difficult to manage during conventional impression making, McCartney et al⁷ described a technique of using gold cylinders instead of impression coping for better access, Chaimattayompol et al⁸ utilised screw-retained titanium or frictional fit plastic index copings for making impression.
4. **Tray less technique⁹:** The tray-less impression technique is a relatively new method that has been developed to simplify the process of making complex impressions. This technique involves using a pressable putty material that is placed directly onto the implant fixtures and surrounding soft tissue. The putty is then removed and used to create a mold of the implant site. The main advantage of this technique is its simplicity and speed. It eliminates the need for traditional impression trays, which can be time-consuming and uncomfortable for patients. Additionally, the tray-less technique can be used in edentulous patients who have limited access to their implant sites. However, this technique is not widely used and there is limited research available to support its effectiveness. Furthermore, it may not be suitable for all clinical situations, such as cases with multiple implant sites or for cases where more precise impression accuracy is required.
5. **Deeply placed implants:** For a deeply placed implants, a solution to properly get the surrounding soft tissue is

to use a longer impression coping which also increase the surface area. Though, few implants consider making a longer impression coping.

Tomas Linkevicius et al, described a simple technique using a roll of composite resin, tray adhesive, and a small amount of occlusal registration material applied around a transfer coping in a direct implant impression.¹⁰

It is important to note that the choice of impression technique should be made based on the specific clinical circumstances and the clinician's experience and preference. In the present case a direct abutment impression technique was modified to convert it into an open tray technique in the absence of long impression coping. This modified direct abutment open tray impression technique has advantages of being easier to use, they eliminate the potential for error of closed tray copings when manually placed in the impression, they can be used when long copings for open tray are unavailable, and they can also be used in submerged implants.

4. Conflict of Interest

There are no conflicts of interest in this article.


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None.

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Author biography

Navdeep Singh, Post Graduate Student  <https://orcid.org/0000-0001-9817-8496>

Saurav Kumar, Assistant Professor

Thiruvalluvan N, Associate Professor

Parag Dua, Associate Professor  <https://orcid.org/0000-0002-9467-1176>

Sonam Yangchen, -

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