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RESEARCH ARTICLE

IMPRESSION TECHNIQUES FOR IMPLANT DENTISTRY (PART 1) : CLOSED TRAY TECHNIQUES.

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Manuscript Info

Abstract

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Introduction:-

Successful implant prosthodontic treatments depend on optimum passively fitting prosthesis. In fact, it is a precondition for the maintenance of osseointegration, which relies upon the fact that the interface between the bone and the implant permits limited movements of 10um, unlike natural teeth. The minimum prosthesis-to-implant misfit produces stress on implant, and generates mechanical complications; such as fracture or loosening of occlusal and/or abutment screws with functional loading, and fracture of prosthetic framework or veneering material.

Therefore, reproducing and transferring a 3-dimensional intraoral position of implants or abutments to working casts, the most meticulously, is the first step in achieving an accurate passive fit between the implant and the suprastructure.

Many impression techniques have been described, some made on the abutment level, others on the implant level. A plethora of literature work is made on pros and cons of various impression techniques. However, no evidence is supporting that one technique is better than the other. (1-6)

The aim of this work , is to describe, step by step, the closed-tray technique of impression as a first part, then the open-tray technique lately, along with indications of each technique.

Implant Impression techniques

The objective of any implant impression procedure is to capture accurately the position of the implant or the implant abutment, as well as its relation to the other structures in the dental arch, in order to obtain a passively fitting implant prosthesis. (4,7)

Closed tray technique may include indirect transfer technique and «snap-on» technique. Unlike open tray techniques, they require no custom tray. (4,8)

This technique is indicated when there is: (2-4, 9)

1. limited mouth opening and /or difficult access implant in the posterior region
2. limited intra-arch space
3. patient with an exaggerated gag reflex
4. few and parallel implants

It is recommended to take a radiograph when the level of the connection between the transfer coping and the implant/abutment is below the level of the mucosa.

Closed tray indirect transfer technique

Indirect techniques, named closed tray or reposition techniques, use an impression coping that is retained in the mouth when the set impression is removed. The coping for this technique is known as the transfer type impression coping. (2-4, 9)

The transfer coping is attached to the implant or abutment with screws.(4,9) The impression technique is a 1-step method using either vinyl polysiloxane material (putty and light-body combination), or polyether material (medium-body monophase) (3,4)

Figures 1 to 7 illustrate a case where the transfer technique was used. The two transfers type coping are connected to the implants after removing the healing abutments. (fig 1 to 3). A 1-step VPS impression (using both putty and light-body simultaneously) is made (fig 4). Once the impression removed, each transfer, left intraorally, is screwed out, attached to the analogue (fig 5), then the assembly is inserted in the corresponding indentation left on the impression (fig 6).

Closed tray «Snap-on» technique

It's a closed tray technique that uses direct plastic transfer coping which is clipped to the top of the implant abutment intraorally. Once the impression made, the transfer coping that is embedded in the impression, is pulled off of the implant abutment and picked-up in the removed impression set. The abutment analogue is then connected to the transfer coping inside the impression. This procedure uses a common stock tray, and either vinyl polysiloxane or polyether impression material for a 1-step method. (8,9)

This technique is easier to manipulate, time saving and more comfortable for the patient as well as the clinician. (2,8)

This technique is not a pick-up impression because it does not require an open tray, but instead uses a closed tray. It is not a transfer impression, either, because the plastic impression copings are picked up in the impressions. (2,6,9)

This procedure is illustrated step by step on the figures 8 to 13.

Discussion:-

1. One of the most important factors for the success of implant prosthesis is the accuracy of the impression procedure. Many comparative studies were conducted in order to find the most accurate impression procedure to obtain the original position of the implants or abutments, and to allow the passivity of the framework casting to its supporting abutments without interference between the prosthesis-implant connections. (2) Despite the existence of surveys investigating impression techniques accuracy, no consensus has been achieved among them, and the different works present heterogeneous results. (10)
2. The accuracy of impression is affected, mainly, by impression technique and type of impression material, number and angulation of implants. (9)
3. In the illustrations above, we showed step by step, abutment and implant level closed tray techniques using for both of them the VPS (putty and light body) as an impression material.
4. Polyether and VPS material impression were more frequently tested, since both are the material of choice for making accurate impression for implant supported prosthesis. (9-11). Indeed, there are numerous studies done to investigate the accuracy of impression materials for implant impression and it was found that polyether and vinyl polysiloxane impressions provided superior reproduction in comparison with other impression materials. (7,9,10)
5. Lee *et al* (12) reported that putty and light body of polyvinylsiloxan impression material was more accurate than medium-body polyether impression material when implant was placed subgingivally. (2, 6, 11)
6. In 11 studies out of 13 comparing the accuracy of these materials, no difference was reported and one study described VPS as more accurate. (11) and many studies show that there is no difference in accuracy of impression made from polyether or vinyl Polysiloxane. (7,9)
7. Wenz *et al* (13) reported that one step impression using both putty and light body simultaneously is more accurate than the two step impression. (2,6,11)
8. A newer impression material Vinyl polyether silicon (VPES) which is a combination of vinyl polysiloxane(VPS) and polyether(PE) has been introduced. This material has intrinsic hydrophilicity and high dimensional stability. However the data regarding its accuracy is very limited and studies done using VPS,VPES and PE to evaluate the accuracy and reproducibility by 3D analysis does not show significant difference in terms of spatial deviation.(9)

9. As to impression techniques, those compared are usually transfer technique (closed tray) and pick-up technique (open tray technique), which would be exposed in the second part of this work.
10. Studying the closed tray techniques shows that the primary source of error in the transfer impression technique is that copings never returned to the original position and this error is increased in case of impression with multiple implants. This investigation was reported by Daoudi *et al*(14) with 3 different group of people: senior dentists, postgraduate dental students, and dental technicians. (2,6,11)
11. The snap-fit technique may be considered as intermediate between transfer and pick-up techniques. In fact, the plastic coping used in this technique, is picked-up in the impression. however, the technique does not require an open tray. It has the advantage of both open and closed tray impression techniques. Thus the press-fit impression copings help to overcome movement of impression copings inside the impression material. (2)
12. From the 14 studies, none advocated the indirect (closed) technique. Although six of these studies reported similar results between both open and closed techniques. In situations where four or more implants are used, a greater number of studies showed accurate impressions with the open technique. For three or fewer implants, half of the studies consider the open technique as the one offering the best accuracy. (10)
13. Not much literature is available comparing the direct transfer snap-on impression coping closed tray impression technique and direct transfer open tray impression technique. (15)
14. One study reported a similar accuracy between snap-fit plastic impression copings and metal copings . Nevertheless, this study also reports on the breakage and distortion of the impression cap engaging the implant shoulder, compromising its reliability.(10).
15. Nakhaei et al (8) compared the three-dimensional accuracy of open-tray and three closed-tray impression techniques and concluded that the snap-on impression technique exhibited better three-dimensional transfer compared to transfer coping impression techniques. In addition snap-on technique accuracy was comparable to that of open-tray technique.
16. When multiple implants are placed with different angles, the distortion of the impression material on removal may increase. Also, this effect may be heightened by an increasing number of implants. Though, more studies are required to determine the relation between implant angulation and number of implant. (2, 6, 11)

References:-

1. Alikhasi M, Siadat H, Monzavi A, Momen-Heravi F. Three-Dimensional accuracy of implant and abutment level impression techniques: Effect of marginal discrepancy. *Journal of Oral Implantology* 2011;6: 649-657.
2. Prithviraj DR , Pujari ML, Garg P , Shruthi DP. Accuracy of the implant impression obtained from different impression materials and techniques: review. *J Clin Exp Dent*. 2011;3(2):e106-11.
3. Balouch F., Jalalian E., Nikkheslat M., Ghavamian R., Toopchi Sh., Jallalian F., Jalalian S. Comparison of Dimensional Accuracy between Open-Tray and Closed- Tray Implant Impression Technique for 15° Angle Implants. *J Dent Shiraz Univ Med Sci*, Sept. 2013; 14(3): 96-102.
4. Chee W, Jivraj S. Impression techniques for implant dentistry. *British Dental Journal* 2006; 201: 429-432
5. Shankar YR, Sahoo S, Krishna MH, Kumar PS, Kumar TS, Narula S. Accuracy of implant impressions using various impression techniques and impression materials. *J Dent Implant* 2016;6:29-36.
6. Lee H, Joseph S. So, Hochstedler J.L, Ercoli C. The accuracy of implant impressions: A systematic review. *Prosthet Dent*. 2008;100:285-91.
7. Baig M.R. Multi-unit implant impression accuracy: A review of the literature. *Quintessence Int* 2014;45:39–51
8. Nakhaei M., Madani A.S., Moraditalab A., Rajati Haghi H. Three-dimensional accuracy of different impression techniques for dental implants. *Dent Res J* 2015 Sep-Oct; 12(5): 431–437.
9. Gayathridevi S.K, Harshita G.,Vaishali K., Suma. Impression Techniques in Implants. *Journal of Dental & Orofacial Research* Vol 12 Issue 02 Aug 2016
10. Moreira A.H.J, Rodrigues N.F. Pinho A.C.M, Fonseca J.C, Vilaça J.L. Accuracy comparison of implant impression techniques: A systematic review. *Clinical Implant Dentistry and Related Research* 2015; 17 (2): 751-764.
11. Yeshwante B.J, Gaikwad S.V, Baig N, Patil S, A Shaikh W. Comparative evaluation between accuracy of implant impression techniques : A systematic review. *Journal of Dental and Medical Sciences* 2015; 14 (4):30-36.
12. Lee H, Ercoli C, Funkenbusch PD, Feng C. Effect of subgingival depth of implant placement on the dimensional accuracy of the implant impression: an in vitro study. *J Prosthet Dent* 2008;99:107-13.
13. Wenz HJ, Hertrampf K. Accuracy of impressions and casts using different implant impression techniques in a multi-implant system with an internal hex connection. *IntJ Oral Maxillofac Implants* 2008;23:39-47.
14. Daoudi MF, Setchell DJ, Searson LJ. An evaluation of three implant level impression techniques for single tooth

- implant.Eur JProsthodontRestor Dent 2004;12:9-14.
15. T. BalaMuruganP.Manimaran. Evaluation of accuracy of direct transfer snapon impression coping closed tray impression technique and direct transfer open tray impressio technique: an in vitro study. J. Indian prosthodont Soc 2013 13(3): 226-232.