MedNEXT
Journal of Medical an Health Sciences

REVIEW ARTICLE

DOI: 10.54448/mdnt26S204

Main clinical considerations in restorative dentistry and aesthetic rehabilitation of implant-supported prostheses: a systematic review

Nathalia Godoi Mendonça[1,*], Camila Tamarossi Manzano[1], Gabriela Mulina Teles[1], Janaina Cardoso Moreira[1]

[1] UNORTE - University Center of Northern São Paulo - Department of Dentistry, Sao Jose do Rio Preto, Sao Paulo, Brazil.

*Corresponding author: Nathalia Godoi Mendonça.
UNORTE - University Center of Northern São Paulo -
Department of Dentistry, Sao Jose do Rio Preto,
Sao Paulo, Brazil.
E-mail: bn.gm2310@gmail.com
DOI: https://doi.org/10.54448/mdnt26S204
Received: 01-19-2026; Revised: 03-28-2026; Accepted: 04-01-2026; Published: 04-27-2026; MedNEXT-id: e26S204

Editor: Dr. Abiodun Oyinpreye Jasper MD, MHP.

Abstract

Introduction: In the field of restorative dentistry and aesthetic rehabilitation, the long-term success of a dental implant depends on the prosthesis. The key to obtaining perfect dentures depends on the passive seating between its connector and the implant itself. The compromised fit between the contact surfaces of implant-supported prostheses creates uncontrolled tensions in the peri-implant components and tissues, evoking biological and mechanical complications. **Objective:** Considering that choosing the most precise technique and material for each particular case has become a challenging task for professionals, this study aimed to review the literature on the types of impression used in implant prostheses for the best aesthetic rehabilitation. **Methods:** The PRISMA Platform systematic review rules were followed. The search was carried out from December 2025 to January 2026 in the Web of Science, Embase, Scopus, PubMed, Science Direct, Scielo, and Google Scholar databases. The quality of the studies was based on the GRADE instrument and the risk of bias was analyzed according to the Cochrane instrument. **Results and Conclusion:** A total of 228 articles were found, and 84 articles were evaluated in full, and 29 were included and developed in the present systematic review study. According to the GRADE instrument, most studies presented homogeneity in their results, with an $X^2 = 85.8\% > 50\%$. Considering the Cochrane tool for risk of bias, the overall assessment resulted in 20 studies with a high risk of bias and 90 studies that did not meet GRADE and AMSTAR-2. The choice of closed tray or open tray impression techniques depends on the number, depth, angulation, and relative parallelism of the implants. The materials of choice for making impressions, following the closed-tray and open-tray printing techniques, were polyether and polyvinylsiloxane. Most studies reported more accurate impressions with the splinting technique than with the non-splitting technique. Acrylic resin was the most frequently used material. Therefore, minimizing contraction appears to be the most important factor in ensuring an accurate impression for this technique. Digital printing has achieved high patient acceptance, reduces possible impression and master mold errors, reduces time in the chair, provides a three-dimensional image of the preparation, and ease of communication between the clinician and the laboratory. However, there is a dearth of scientific data regarding implant fingerprints and their accuracy. Research on implant fingerprinting has been limited to a few in vitro studies and case reports.

Keywords: Aesthetics. Reabilitation. Restorative Dentistry. Prosthesis. Implant prosthesis.

Introduction

In the field of restorative dentistry and aesthetic rehabilitation, the long-term success of a dental implant depends on the prosthesis that is placed over it. The key to achieving perfect prostheses depends on the passive fit between its connector and the implant itself. Compromised fit between the contact surfaces of implant-supported prostheses creates uncontrolled stresses in the components and peri-implant tissues, evoking biological and mechanical complications [1-3].

Loosening and fracture of the screw, implant fracture, and occlusal imprecision have been reported as mechanical complications resulting from prosthesis misfit. Biologically, the marginal discrepancy of the misfit can cause unfavorable reactions in soft and/or hard tissues due to increased plaque accumulation [1]. Although achieving an absolute passive fit is virtually impossible, minimizing misfit to avoid potential complications is a generally accepted goal in implant-supported prosthesis procedures [2,4].

Thus, the technique selected for making the impression, which simulates the exact position of the implant on the working model, is a crucial step and must be as precise as possible. An ideal impression is one that records the precise three-dimensional spatial position of the implant, analogue, or abutment in relation to other structures in the oral cavity [2,5,6].

The accuracy of the fabrication of the plaster cast for the implant transfer positioning of a prosthesis is influenced by the technique and type of impression material, parallelism or not of the implants, depth of the implant position, dimensional stability of the plaster, and repositioning of the transfer copings in the correct position [7]. The angulation of the implants can increase the likelihood of the impression material becoming dislodged and the consequent distortion of the final plaster cast. Each step of the procedure can be influenced by human error or error in the impression material [8,9].

A variety of impression materials have been suggested, and some parameters must be met, such as ease of handling, low toxicity and biocompatibility, tear resistance, hydrophilicity, precision, elastic recovery, and dimensional stability [5,10]. Hydrocolloids and elastomers are mentioned, with four basic types of polysulfides, polyether, condensation silicones, and polyvinylsiloxane, also known as addition silicones [11]. Polyether has been recommended for implant impressions due to its dimensional stability, rigidity, tear resistance, and hydrophilicity. Another frequently used material is polyvinylsiloxane, which presents many of the desirable properties of polyether with respect to the quality of implant impressions, at a lower cost [11].

Since the property of the impression material to avoid distortion of the position between the implant analogs, caused by accidental displacement of the impression copings, is a key factor, polyvinylsiloxane and polyether have been suggested as materials of choice [2,5]. Regarding impression techniques, several have been suggested, such as open tray and closed tray techniques, and different impression and material transfers have been investigated for their accuracy [12], and are classified as direct or indirect techniques. Direct (dragging) techniques, with or without splinting, are also described as open tray impression techniques because they have an open window to unscrew the guide pins of the impression copings [13]; the entire assembly is removed at the same time, and the copings are repositioned by fixing the same screw [14].

Indirect techniques are also known as closed tray techniques. They consist of copings that remain on the implants while the impression tray is removed from the mouth. The coping is removed from the implant, fixed to the analog outside the mouth, and repositioned in the impression. The closed tray technique is performed when indications such as limited space between the arches, nausea, or difficulty accessing a posterior implant are present [12]. Transfer copings are devices that adapt to the implant platform or prosthetic abutment and transfer, through a molding technique, the position and shape of these elements to the plaster model; round copings are used in closed trays and square copings in open trays [15].

Another recommendation to increase the accuracy of molding in cases involving multiple implants is splinting the transfer copings to each other or to the custom tray before making the impression. The open tray technique is used when the transfer copings are joined by splinting [4]. Although different materials have been tested for this procedure, such as composite resin, impression plaster, and stainless steel pins, acrylic resin, alone or in combination with dental floss, is the most widely used material to prevent individual movement of the transfer copings during the molding procedure [4,16].

Because conventional techniques can incorporate many human errors, such as impression tray design, component fixation, impression and material flow at various levels, if not followed meticulously, and in addition, dimensional changes in impression materials, laboratory pouring techniques and plaster expansion are the main technical errors found in these techniques [17], as well as patient discomfort due to additional components, tolerance required for mouth opening and the taste and odor of silicone materials remain a disadvantage [18], the advent of computer-aided design and computer-aided manufacturing (CAD/CAM) technology has improved the manufacturing procedures of structures and increased the accuracy of fit of implant-supported prostheses [13]. The creation of a virtual impression can be performed intraorally or by digitizing conventional impressions with a scanner. Benchtop scanners have become more frequently used because they combine the advantages of a CAD/CAM prosthesis and the reduction of laboratory costs [14].

Since passive adjustment depends on the accuracy of the impression technique and the resulting master model produced, and because the implant/abutment connection is directly related to the long-term success of the implant-supported prosthesis [3], an accurate impression is extremely important to produce a reliable mold [1,2].

Considering that choosing the most accurate technique and material for each particular case has become a challenging task for professionals, this study aimed to review the literature on restorative dentistry and the types of impressions used in implant-supported prostheses for better aesthetic rehabilitation.

Methods

Study Design

This study followed the international systematic review model, following the PRISMA (preferred reporting items for systematic reviews and meta-analysis) rules. Available at: http://www.prisma-statement.org/?AspxAutoDetectCookieSupport=1. Accessed at: 12/11/2025. The AMSTAR 2 (Assessing the methodological quality of systematic reviews) methodological quality standards were also followed. Available at: https://amstar.ca/. Accessed at: 12/11/2025.

Search Strategy and Search Sources

The literature search process was carried out from December 2025 to January 2026 and developed based on Web of Science, Embase, Scopus, PubMed, Lilacs, Ebsco, Scielo, and Google Scholar, covering scientific articles from various periods to the present day. The following descriptors were used in health sciences (DeCS/MeSH terms): *"Aesthetics. Reabilitation. Restorative Dentistry. Prosthesis. Implant prosthesis"*, and the Boolean "and" was used between the MeSH terms and "or" between the historical findings.

Study Quality and Risk of Bias

Quality was classified as high, moderate, low, or very low regarding the risk of bias, clarity of comparisons, precision, and consistency of analyses. The most evident emphasis was on systematic review articles or meta-analyses of randomized clinical trials, followed by randomized clinical trials. Low quality of evidence was attributed to case reports, editorials, and brief communications, according to the GRADE instrument. The risk of bias was analyzed according to the Cochrane instrument by analyzing the Funnel Plot graph (Sample size versus Effect size), using Cohen's test (d).

Results and Discussion

Summary of Findings

A total of 228 articles were found. Initially, duplicate articles were excluded. After this process, the abstracts were evaluated, and a further exclusion was performed, removing articles that did not include the theme of this article, resulting in 104 articles. A total of 84 articles were evaluated in full, and 29 were included and developed in this systematic review study (Figure 1). According to the GRADE instrument, most studies presented homogeneity in their results, with an X^2 = 85.8% > 50%. Considering the Cochrane tool for risk of bias, the overall evaluation resulted in 20 studies with a high risk of bias and 90 studies that did not meet the GRADE and AMSTAR-2 criteria.

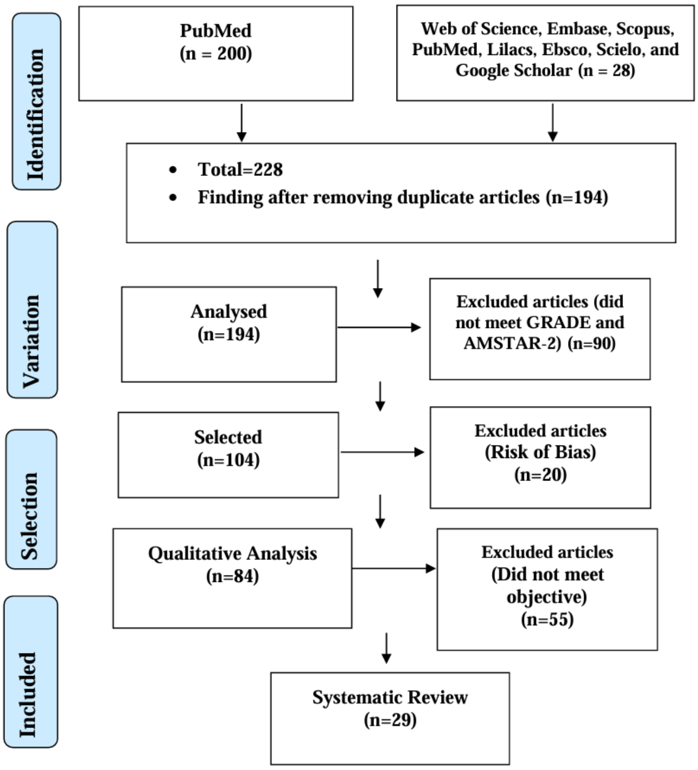

Figure 1. Flowchart showing the article selection process. Source: Own authorship.

Figure 2 presents the results of the risk of bias of the studies using the Funnel Plot, showing the calculation of the Effect Size (Magnitude of the difference) using Cohen's Test (d).

The sample size was determined indirectly by the inverse of the standard error (1/Standard Error). This graph showed symmetrical behavior, not suggesting a significant risk of bias, both between studies with small sample sizes (lower precision) that are shown at the bottom of the graph and in studies with large sample sizes that are presented in the upper region.

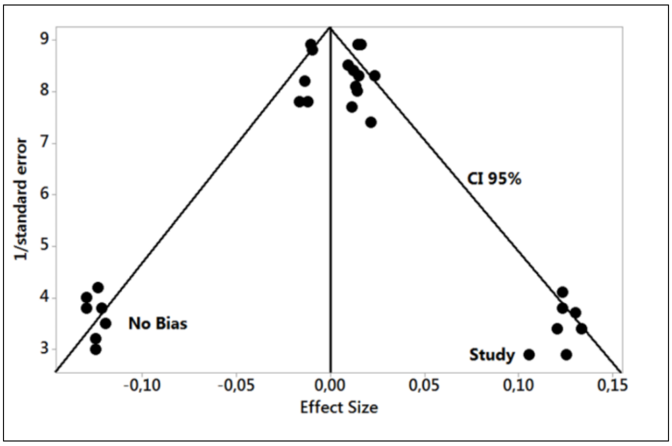

Figure 2. The symmetrical funnel plot does not suggest a risk of bias between the small sample size studies that are shown at the bottom of the graph. High confidence and high recommendation studies are shown above the graph (NTotal=29 studies evaluated in full in the systematic review). Source: Own authorship.

Major Findings and Discussion

Conventional and digital impressions facilitate the recording and transfer of the impression to a working model, in stone or virtual, for the fabrication of an implant-supported prosthesis. According to Flügge et al. (2018) [17], the accurate transfer of the implant position in relation to neighboring implants or teeth is vital for selecting the appropriate prosthesis design and ensuring a good passive fit, for achieving long-term implant success without mechanical and biological complications [1,6]. Corroborating these authors, Gayathridevi et al. (2016) [5] postulated that the implant impression is one of the most important steps to obtain a passive fit, accurately relating an implant analogue or implant abutment to other structures in the dental arch. In addition, the accuracy of the impression is affected by the selection of the impression tray, the technique and type of impression material, and the number and angulation of the implants.

Conventional impressions can be performed using closed (indirect/transfer) or open (direct/drag) impression techniques. A systematic review by Lee et al. (2008) [4], when comparing the accuracy of open and closed tray impression techniques, found no significant difference between them when making impressions for three or fewer implants. The open tray technique was recommended for situations involving four or more implants. Similarly, in the experimental analysis performed by Osman et al. (2019) [19], no statistically significant difference was found between open and closed impression techniques.

Martínez-Rus et al. (2013) [15] reported that the open tray technique was more accurate than the closed tray technique for edentulous patients. Similarly, in another systematic review, Papaspyridakos et al. (2014) [20] found that open tray impressions were more accurate for completely edentulous arches. No significant difference between the two techniques was found for partially edentulous patients. Kalpana et al. (2019) [21] also stated that the open tray technique was better than the closed tray technique, especially in cases with a greater number of implants and in edentulous patients.

The open tray technique was superior and more precise in the study by Elshenawy et al. (2018) [22]. Moretti et al. (2018) [12] reported that the open tray technique is especially indicated for impressions of more than three implants to reduce the effects caused by angulation, decrease the deformation of the impression material, and eliminate the need to reposition the transfer coping in the respective impression space. They mentioned that its disadvantages are the difficulty and the need for experience to remove the entire impression coping + transfer assembly from the mouth.

Authors also evaluated the need for splinting the impression copings [4,5,15,20,21]. According to Lee et al. (2008) [4], the splinting technique for an implant impression was introduced along with the development of a methacrylic resin implant-supported fixed complete denture for an edentulous mandible. The underlying principle was to connect all impression copings with a rigid material to prevent their individual movement during the impression procedure. These same authors stated that impressions are more accurate with the splinting technique. Martínez-Rus et al. (2013) [15] reported that the technique with splinting was more accurate than the one without. Papaspyridakos et al. (2014) [20] also supported the splinting technique of impression copings for completely edentulous patients. In their systematic review, they found that some authors sectioned the splinting material connection, leaving a thin space between them and then joining them with a minimal amount of the same material to minimize shrinkage, or connected all the printing transfers with splinting material, then waited for the material to finish polymerizing.

According to authors Gayathridevi et al. (2016) [5] and VINODH et al. 2023 [1], the accuracy of a splinting impression technique depends on its resistance to deformation under the forces of the impression material; therefore, the use of rigid material is essential for an accurate master model. Kalpana et al. (2019) [21] corroborated these authors, recommending the splinting procedure in the case of multiple implants to decrease the amount of distortion and improve impression accuracy and implant stability. Splinting the transfer copings prevents rotational movement of the impression copings in the impression material during analog fixation, which provides better results than not splinting.

Regarding the splinting material, Dashaputra et al. (2021) [22] described that self-curing acrylic resin is the most commonly used because of its desirable properties of low shrinkage and fast setting time. The timeline for splinting with this resin varies anywhere from immediately before to 24 hours before impression, according to Lee et al. (2008) [4]. Thus, Dashaputra et al. (2021) [22] recommended sectioning the resin and splinting the segments again before impression to compensate for polymerization shrinkage of the resin, which affects impression accuracy. Splinting can be performed intraorally on a model made from a previous unmodeled impression.

Self-curing acrylic resin was chosen as the immobilization material in the study conducted by Elshenawy et al. (2018) [23] because it is easy to apply and does not require a dry environment. Splinting with acrylic resin was sectioned and re-splinted after 17 min in order to minimize any discrepancies due to polymerization shrinkage. Gayathridevi et al. (2016) [5] added that splinting of impression copings includes light-cured composite resin, impression plaster, thermoformed material, and acrylic resin. For Kalpana et al. (2019) [21], several splinting methods can be used, each with advantages and disadvantages. The technique that uses dental floss as a framework for chemically activated acrylic resin is widely used and requires more clinical time for application. Other forms of splinting are prefabricated bars and metal rods, which use a smaller amount of acrylic resin.

Regarding implant angulation, in the systematic review conducted by Lee et al. (2008) [4], four studies examined the effect of implant angulation on impression accuracy. Two reported less accurate impressions with angled implants than with straight implants, and the other two reported that there was no angulation effect. According to these authors, when multiple implants are inserted at different angles, the distortion of the impression material upon removal may increase. Furthermore, this effect may be potentiated by an increasing number of implants. To determine the relationship between the angulation effect and the number of implants, more studies are needed.

Papaspyridakos et al. (2014) [20] found that most in vitro studies reported accuracy results with angled implants. Also, clinical studies, even those not focusing on the details of implant angulation, reported that the splinting technique was clinically better than those without splinting or with closed trays with angled implants. Of the six in vitro studies, three reported that the splinting technique was more accurate when taking an impression of angled implants. Hazboun et al (2015) [24] conducted a study to evaluate the distances between angled and straight implants in impressions taken with open and closed trays and found no statistically significant differences between the groups or the angles.

Similar to these authors, Moura et al. (2019) [14] found no difference in the distance measurements between angled and straight implants for conventional techniques. The rationale for the posterior inclination of a distal implant in the study by Osman et al. (2019) [19] was that anatomical and aesthetic considerations do not always allow for parallel implant placement. Such placement would be a valid compromise for bone grafting, maxillary sinus lift, or mandibular nerve displacement, with the added benefit of shorter treatment times, lower potential morbidity, and reduced cost. This finding was similar to the study conducted by Hazboun et al. (2015) [24], reporting that impression techniques (open versus closed tray) and implant angulation (0º, 15º, and 30º) did not have a significant effect on in vitro impression accuracy.

In the study by Elshenawy et al. (2018) [23], increasing the angulation between implants to 30º affected the accuracy of the direct technique without splinting, while it did not significantly affect the accuracy of the direct technique with splinting. This is in agreement with Martínez-Rus et al. (2013) [15]. According to Lee et al. (2008) [4], this may occur because splinting the impression copings with a rigid material prevented their individual movement during the impression making procedure.

With regard to impression materials, Lee et al. (2008) [4], Gökçen-Rohlig et al. (2014) [25], Papaspyridakos et al. (2014) [20], and Osman et al. (2019) [19] agreed that polyvinylsiloxane and polyether appear to be the materials of choice for making an accurate impression. According to Gökçen-Rohlig et al. (2014) [25], the main objective of implant impression is to transfer the position of the implant/abutment from the oral cavity to the master model, and the impression material must be rigid enough to hold the copings and minimize positional distortion during the placement of the replica.

In the study by Osman et al. (2019) [19], polyvinylsiloxane was used, as it has been reported to have superior strain recovery, higher physical and mechanical properties, less potential for dimensional changes, accurate reproduction of details and desirable modulus of elasticity. It is also easier to remove from lower cuts, with less deformation, which makes it a popular choice in implant dentistry.

To overcome the disadvantages and limitations of conventional impression techniques, digital impression techniques have been developed. Intraoral scanners have revolutionized the field of prosthetic and implant dentistry, outlining the possibilities of error in several stages involved in the manufacture of prostheses, from impression taking to cementation [8,13,14,18,21,22,26-29].

According to Dashaputra et al. (2021) [22], digital impression, when made with the appropriate scanning technique, provides good clinical results. Papaspyridakos et al. (2020) [13] stated that digital impressions are as accurate as conventional ones. Yuzbasioglu et al. (2014) [8], in a clinical trial with 24 individuals who had not experienced conventional and digital impression procedures, after answering a standardized questionnaire to record attitude, preference, and perception regarding digital and conventional impression procedures, reported that subjects preferred digital impression over conventional impression, mainly because of comfort. Similarly, Joda et al. (2017) [18] demonstrated in their study that digital impressions are time-efficient, as they enable a reduction in working time and therefore costs, when compared to conventional impressions. In fact, they argued that with these impressions, there is no need to pour stone molds and obtain physical plaster models; it is possible to email the patient's 3D virtual models (proprietary or STL files) directly to the dental prosthesis laboratory. This allows for saving a considerable amount of time and money during the working year. However, Flügge et al. (2018) [17], in a systematic review and meta-analysis to evaluate and compare the accuracy of conventional and digital implant impressions, concluded that most studies were conducted in vitro and therefore compromised in their informative value to the clinician. They considered that the main obstacle to conducting in vivo studies could be the lack of an adequate protocol to evaluate the accuracy of intraoral impressions.

Finally, a clinical study conducted by the authors Vinodh et al. (2023) [1] evaluated and compared the development and distribution of deformations of maxillary implantsupported complete fixed dental prostheses (ISCFDP) with a computer-aided design and computer-aided fabrication milled PEEK BIO-HPP superstructure when placed using All-on-4 and All-on-6 situations using an extensometer and finite element analysis (FEA). The minimization of stress and strain developed in the implant in premolars was compared in two clinically simulated situations of All-on-4 and All-on-6 ISCFDP. The study involved converting a human skull into STL format to create 3D printed stereolithography models with a modulus of elasticity closer to bone. Implants were placed in two models (M1 and M2) in the incisor, premolar, and pterygoid regions. A fixed dental prosthesis framework was fabricated in both models, and extensometer sensors were attached. The results obtained were tabulated and showed deformation around the neck of the ISCFDP at the 100N setting in the extensometer analysis. Stress was found to be higher in the molar region compared to the premolar region. This design showed that the highest stress around the neck of the ISCFDP under a 100N load was found more in the premolar region compared to the molar region due to the reduction of stresses in the pterygoid region in the FEA. Therefore, the extensometer analysis at 100 N for loading in the premolar and molar region shows a reduction in stress on the inclined implants in the All-on-6 situation due to stress dissipation to the terminal pterygoid implant using the extensometer.

Conclusion

It was concluded that the choice of closed-tray or open-tray impression techniques depends on the number, depth, angulation, and relative parallelism of the implants. The materials of choice for making impressions, following the closed-tray and open-tray impression techniques, were polyether and polyvinylsiloxane. Most studies reported more accurate impressions with the splinting technique than with the non-splinting technique. Acrylic resin was the most frequently used material. Thus, minimizing its shrinkage seems to be the most important factor in ensuring an accurate impression for this technique. Digital impressions have gained high patient acceptance, reduce potential molding and master impression errors, reduce chair time, provide a three-dimensional image of the preparation, and facilitate communication between the clinician and the laboratory. However, there is a scarcity of scientific data on implant digital impressions and their accuracy. Research on implant digital impressions has been limited to a few in vitro studies and case reports.

CRediT

Author contributions: **Conceptualization-** Nathalia Godoi Mendonça, Camila Tamarossi Manzano, Gabriela Mulina Teles, Janaina Cardoso Moreira**;** **Investigation-** Nathalia Godoi Mendonça, Camila Tamarossi Manzano, Gabriela Mulina Teles; **Methodology-** Nathalia Godoi Mendonça, Camila Tamarossi Manzano, Gabriela Mulina Teles; **Project administration-** Nathalia Godoi Mendonça; **Supervision-**Janaina Cardoso Moreira; **Writing - original draft-** Nathalia Godoi Mendonça, Camila Tamarossi Manzano, Gabriela Mulina Teles, Janaina Cardoso Moreira; **Writing-review & editing-** Nathalia Godoi Mendonça, Camila Tamarossi Manzano, Gabriela Mulina Teles, Janaina Cardoso Moreira.

Acknowledgment
Not applicable.

Ethical Approval
Not applicable.

Informed Consent
Not applicable.

Funding
Not applicable.

Data Sharing Statement
No additional data are available.

Conflict of Interest
The authors declare no conflict of interest.

Similarity Check
It was applied by Ithenticate@.

Application of Artificial Intelligence (AI)
Not applicable.

Peer Review Process
It was performed.

References
1. Vinodh S, K Jingade RR, Ajjikuttira PA, Kyathappa P, Nataraj M, Chalana BO. Comparative evaluation to study the effect of implant support on complete fixed dental prosthesis fabricated with peek framework when implants placed in all-on-4 and all-on-6 situation, by strain gauge analysis and finite element analysis - An in vitro study. J Indian Prosthodont Soc. 2023 Oct-Dec;23(4):373-378. doi: 10.4103/jips.jips_196_23.
2. Hashemi HM, Aval SK, Hashemi AM. Evaluation of the success rate, prosthesis-related quality of life, and satisfaction in patients undergoing rehabilitation with an implant-supported auricular prosthesis. Int J Oral Maxillofac Surg. 2025, Feb 24:S0901-5027(25)00053-0. doi: 10.1016/j.ijom.2025.02.006.
3. Katsoulis J, Takeichi T, Sol Gaviria A. et al. Misfit of implant prostheses and its impact on clinical outcomes. Definition, assessment and a systematic review of the literature. Eur J Oral Implantol, Berlin, 2017, v. 10, Suppl 1, P. 121-138.
4. Lee H, So JS, Hochstedler JL, Ercoli C. The accuracy of implant impressions: a systematic review. J Prosthet Dent, St. Louis, 2008, v. 100, n. 4, p. 285- 291.
5. Gayathridevi SK, Gowda H, Vaishali K, Suma J. Impression techniques in implants. J Dent Oro-facial Res, 2016, v. 12, n. 02, p. 11-19.
6. Pelekanos S, Vergoullis I. Clinical Advances in Implant Transmucosal Contouring for Single Implant Sites: Prosthetic and Biologic Considerations. Int J Periodontics Restorative Dent. 2023 May-Jun;43(3):301-310. doi: 10.11607/prd.6054.
7. Ebadian B, Rismanchian M, Dastgheib B, Bajoghli F. Effect of different impression materials and techniques on the dimensional accuracy of implant definitive casts. Dent Res J, Isfahan, 2015, v. 12, n. 2, p. 136-143.
8. Yuzbasioglu E, Kurt H, Turunc R, Bilir H. Comparison of digital and conventional impression techniques: evaluation of patients' perception, treatment comfort, effectiveness and clinical outcomes. BMC Oral Health, London, 2014, v. 14, p. 1- 7.
9. Li XC, Bidra AS. A technique for improved gingival esthetics on complete arch implant-supported acrylic resin prototype prosthesis. J Prosthet Dent. 2023 Aug;130(2):160-163. doi: 10.1016/j.prosdent.2021.10.027.
10. Lajoinie L, Barbary S. Total trapeziometacarpal prosthesis: Radio-clinical advice on cup implantation. Hand Surg Rehabil. 2023 Sep;42(4):358-361. doi: 10.1016/j.hansur.2023.04.009.
11. Tabesh M, Alikhasi M, Siadat H. A comparison of implant impression precision: Different materials and techniques. J Clin Exp Dent, Spain, 2018, v. 10, n. 2, p. e151e157.
12. Moretti KP, De Castro RA, Ana PA. et al. Comparison between open and closed-tray impression techniques on the implant transfer accuracy. Braz Dent Sci, São José dos Campos, 2018, v. 21, n. 3, p. 320-327.
13. Papaspyridakos P, Vazouras K, Chen YW. et al. Digital vs conventional implant impressions: a systematic review and meta-analysis. J Prosthodont, Hoboken, 2020, v. 29, n. 8, p. 660-678.
14. Moura RV, Kojima AN, Saraceni CHC. et al.

Evaluation of the accuracy of conventional and digital impression techniques for implant restorations. J Prosthodont, Hoboken, 2019, v. 28, n. 2, p. e530-e535.
15. Martínez-Rus F, García C, Santamaría A. et al. Accuracy of definitive casts using 4 implant-level impression techniques in a scenario of multi-implant system with different implant angulations and subgingival alignment levels. Implant Dent, Baltimore, 2013, v. 22, n. 3, p. 268-276.
16. Velders BJJ, Groenwold RHH, Klautz RJM, Vriesendorp MD. Causal Inference on Avoiding Prosthesis-Patient Mismatch. JACC Cardiovasc Imaging. 2023 Sep;16(9):1244. doi: 10.1016/j.jcmg.2022.10.030.
17. Flügge T, Van Der Meer WJ, Gonzalez BG. et al. The accuracy of different dental impression techniques for implant-supported dental prostheses: a systematic review and meta-analysis. Clin Oral Implants Res, Copenhagen, 2018, v. 29, Suppl 16, p. 374-392.
18. Joda T, Lenherr P, Dedem P. et al. Time efficiency, difficulty, and operator's preference comparing digital and conventional implant impressions: a randomized controlled trial. Clin Oral Implants Res, Copenhagen, 2017, v. 28, n. 10, p. 1318-1323.
19. Osman MS, Ziada HM, Abubakr NH, Suliman AM. Implant impression accuracy of parallel and non-parallel implants: a comparative in-vitro analysis of open and closed tray techniques. Int J Implant Dent, Heidelberg, 2019, v. 5, n. 1, p. 1-10.
20. Papaspyridakos P, Chen CJ, Gallucci GO. et al. Accuracy of implant impressions for partially and completely edentulous patients: a systematic review. Int J Oral Maxillofac Implants, Lombard, 2014, v. 29, n. 4, p. 836-845.
21. Kalpana D, Smitha Sharan D, Sreeharsha TV. et al. A Review on dental implant impressions. Int J Appl Dent Sci, India, 2019, v. 5, n. 1, p. 33-36.
22. Dashaputra R, Kachwala I, Aphale A, Chitnis S. Modelling and Impressions in Implants. In: Chaughule RS, Dashaputra R. (eds). Advances in dental implantology using nanomaterials and allied technology applications. Springer, Cham, 2021.
23. Elshenawy EA, Alam-Eldein AM, ABD Elfatah FA. Cast accuracy obtained from different impression techniques at different implant angulations (in vitro study). Int J Implant Dent, Heidelberg, v. 4, n. 1, p. 1-9, Mar 2018. Evaluation of the effects of implant position, impression material, and tray type on implant impression accuracy. Implant Dent, Baltimore, 2014, v. 23, n. 3, p. 283-288.
24. Hazboun GBA, Masri R, Romberg E. et al. Effect of implant angulation and impression technique on impressions of NobelActive implants. J Prosthet Dent, St. Louis, 2015, v. 113, n. 5, p. 425-431.
25. Gökçen-Rohlig B, Ongül D, Sancakli E, Sermet B. Comparative Implant casts generated with conventional and digital impressions – an in vitro study. Int J Environ Res Public Health, Basel, 2018, v. 15, n. 8, p. 1-18.
26. Ribeiro P, Herrero-Climent M, Díaz-Castro C. et al. Accuracy of Osseointegration of implants – a biological and clinical overview. JSM Dent Surg, United States, 2017, v. 2, p. 1-6.
27. Kim KR, Seo KY, Kim S. Conventional open-tray impression versus intraoral digital scan for implant-level complete-arch impression. J Prosthet Dent, St. Louis, 2019, v. 122, n. 6, p. 543-549.
28. Oliveira NRC, Pigozzo MN, Sesma N, Laganá DC. Clinical efficiency and patient preference of digital and conventional workflow for single implant crowns using immediate and regular digital impression: A meta-analysis. Clin Oral Implants Res, Copenhagen, 2020, v. 31, n. 8, p. 669-686.
29. San SP, Win TN, Aung T. et al. Effect of impression technique and material on accuracy of implant impressions. J Clin Dent Rel Res, Mandalay, 2020, v. 1, n. 1, p. 44- 51.