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University of Baghdad
College of Dentistry

Impression Techniques For Implant Supported Prosthesis

A Project
Submitted to the College of Dentistry,
University of Baghdad, Department of Prosthodontics
in Partial Fulfillment for the Bachelor of
Dental Surgery

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Certification of the Supervisor

I certify that this project entitled **"Impression Techniques For Implant Supported Prosthesis"** was prepared by **Linda Oday Nazar** under my supervision at the College of Dentistry/University of Baghdad in partial fulfillment of the graduation requirements for the Bachelor degree in dentistry.

Signature

Dedication

To my family

My dear mother and father who have been my greatest supporters, they were my inspiration to apply for dental school and it's only because of them I'm able to reach this far.

To my friends

Reemy , Dody, Meena and yousra my amazing friends who helped me and provided comfort throughout the years. Words would never be enough to express my gratitude, but I will forever be grateful for all those precious memories.

Finally

I would like to take a moment and appreciate myself, it's been long difficult years specially this finale stage, for that I'm proud of myself for having the patience to get through all of that.

To my younger self, we finally made it.

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First and foremost, I would like to praise and thank God, the almighty, who has granted countless blessing, patience, health, knowledge and the opportunity to accomplish this project.

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List of Abbreviations

FDT	Fixed Dental Prosthesis
RP	Removable Prostheses
TMD	Temporomandibular Disorders
3D	Three Dimensional
IOS	Intra Oral Scanner
CAD	Computer Aided Design
CAM	Computer Aided Manufacturing
DDT	Digital Dental Technology
ISB	Intraoral Scan Body

Introduction

During the last decade, Implantology has become an indispensable part of mainstream dentistry, helping dentists to improve the quality of life of large patient populations. While implant treatment could often be a convenient alternative to conventional treatment options, in certain cases, it is the treatment of the first choice for the rehabilitation of severe functional, anatomical or aesthetic problems arising from tooth lost. This is probably most striking in the treatment of the severely atrophic mandible **(Qassadi et al., 2018).**

In the early days of clinical application of osseo-integration, implants were placed where adequate bone was available, and the prosthetic restoration was a screw-retained Fixed Dental Prosthesis (FDP). The evolution of prosthetic components and the technique of Guided Tissue Regeneration have offered increased possibilities in implant restorations. Proper pre-surgical diagnosis remains, however, a crucial stage when planning an implant restoration **(Sahin *et al*., 2001).**

The accurate transfer of the clinical situation to the dental- laboratory by means of the impression is an important stage in implant-supported restorations, concerning the position, the inclination, the geometry of the prosthetic platform of the implants, as well as the condition of the peri-implant tissues **(Herbst *et al*., 2000; Chee *et al*., 2006).** The impression procedure in implant cases present certain differences compared to natural teeth, as implants are mechanical devices that are rigidly connected with the prosthetic components. In contrast to natural teeth, implants and their components have no micro-movement that could possibly compensate for minor inaccuracy of fit **(Sahin *et al*., 2001).**

Aims of The Study

1-The aim is to present the impression materials and techniques that are nowadays used in implant-supported restorations.

2- Demonstrate the effect of selection of these material and techniques on the accuracy of implant impression.

3- Explore the digital impression and its advantage in the procedure.

Chapter One: Review Of Literature

1.1 Etiology of Missing Teeth

Missing teeth is a very common issue that will affect everyone at some point in life. Loss of teeth can bring be of discomforting to those affected depending on the number of teeth missing and other factors, like the position of the tooth. Some of the reasons that lead to teeth loss **(Quaker, A.S, 2011)**:

- **Periodontal or gum disease:** Gum inflammation and infection is the most prevailing cause of missing teeth in adults.
- **Physical trauma:** Sportspersons are at high risk of physical injury to their incisors which can ultimately lead to tooth loss.
- **Decayed tooth:** Untreated cavities that lead to tooth decay are a major cause of lost or missing tooth.
- **Congenital missing teeth:** At times, some specific teeth like wisdom tooth, premolars or incisors are not positioned correctly. This can be a reason of isolation or medical problem.
- **Medical Conditions:** Ectodermal dysplasia and a person's genes can be reasons behind missing teeth.

There is some changes related to missing teeth, when a tooth is lost, the integrity of the dental arch is impaired. Loss of one or more teeth is known to disrupt the balance of the stomatognathic system and trigger several structural and functional changes. These include impaired chewing ability, changes in occlusal stability and occurrence of temporomandibular disorders (TMD), excessive occlusal wear of the remaining dentition and overeruption of unopposed teeth, also If missing teeth are not replaced, it could lead to "facial collapse," which is an

aesthetic effect that can dramatically alter one's appearance and make them look quite a bit older than they really are **(Quaker, A.S, 2011)**.

1.2 Dental Implant

An implant can be defined as, "A graft or insert set firmly or deeply into or onto the alveolar process that may be prepared for its insertion". A dental implant is an artificial root that interfaces with the bone of the jaw to support a dental prosthesis such as a crown, bridge, denture, facial prosthesis or to act as an orthodontic anchor **(Nallaswamy, 2003).**

Success or failure of implants depends on the health of the person receiving the treatment, drugs which affect the chances of osseo-integration, and the health of the tissues in the mouth. The amount of stress that will be put on the implant and fixture during normal function is also evaluated. Planning the position and number of implants is play an important role to the long-term health of the prosthetic since biomechanical forces created during chewing can be significant **(V. John *et al*., 2007).**

1.2.1 Components of Implant System as shown in (Figure 1.1) (Hupp, Ellis iii E and Tucker, 2019):

1. Implant Fixture/Implant Body
2. Cover or Healing Screw
3. Healing or Interim Abutment
4. Impression Coping
5. Implant Analog or Replica
6. Implant Abutment
7. Prosthesis Retaining Screw

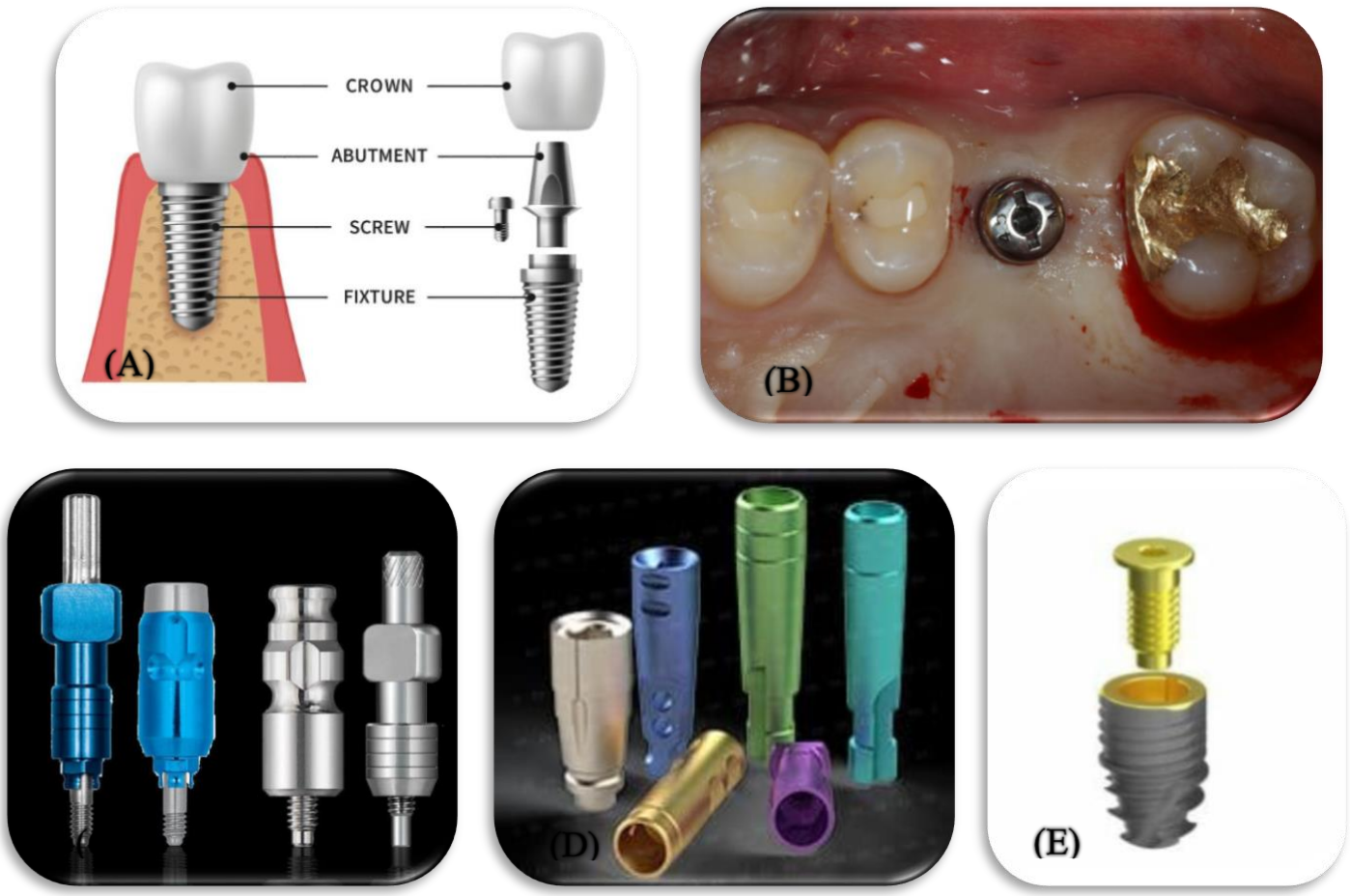

Figure 1.1: A, Implant components. **B**, Healing abutment **(Al-Hamdan.KS, 2011). C**, Implant impression coping **(Zimvie inc, 2023)**. **D**, Implant analog **(Edison medical, 2018)**.**E**, Implant cover screw **(subadental, 2020).**

1.2.2 Advantages of Implant-Supported Prostheses (Misch, 2015):

- Maintain bone.
- Restore and maintain occlusal vertical dimension.
- Maintain facial esthetics (muscle tone).
- Improve esthetics (teeth positioned for appearance vs. decreasing denture movement).

- Improve phonetics.
- Improved health related to diet.
- Improve occlusion.
- Improve or regain oral proprioception (occlusal awareness).
- Increase prosthesis success.

  Improve masticatory performance or maintain muscles of mastication and facial expression.
- Improve stability and retention of removable prostheses.
- Increase survival times of prostheses.
- No need to alter adjacent teeth.
- More permanent replacement.
- Improve psychological health.

1.2.3 Disadvantages of Implants (Qassadi *et al*., 2018), (Nallaswamy, 2003):

- It is very expensive. Patient affordability is the primary concern in the use of implants.
- Many patients do not accept longer duration of treatment and tedious fabrication procedures.

- It requires a lot of patient cooperation because repeated recall visits for after care is essential. With better patient compliance, the success rate of the dental implant increases. The patient should attend the appointed dates regularly, maintain good oral hygiene, smoking cigarettes is a contraindication during implant placement. The patient has to follow this to get better prognosis.
- Anatomical limitations: dental implants placement require proper alveolar bone height to support the implant prosthesis, in old age the lack of bone support is a major hurdle in the dental implant procedure.

Figure 1.2: Implant Replacing One Tooth **(Misch, 2015).**

Figure 1.3: Implant Replacing All Teeth **(Misch, 2015).**

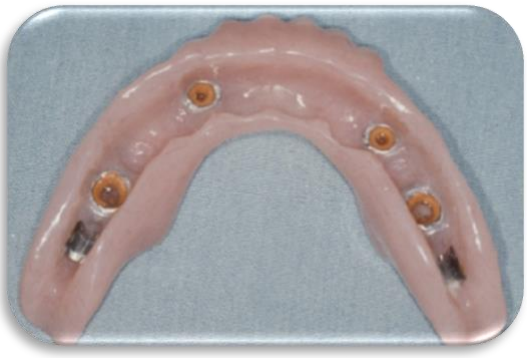

Figure 1.4: Implant Overdenture **(Misch, 2015).**

Figure 1.5: Implant Supported Bridge **(Misch, 2015).**

1.2.4 Prosthetic Options In Implant Dentistry (Misch, 1991):

Type	Definition
FP-1	Fixed prosthesis; replaces only the crown, looks like a natural tooth.
FP-2	Fixed prosthesis; replaces the crown and a portion of the root; crown contour appears normal in the occlusal half but is elongated or hypercontoured in the gingival half.
FP-3	Fixed prosthesis; replaces missing crown and gingival color and portion of the edentulous site; prosthesis most often uses denture teeth and acrylic gingiva, but may be porcelain to metal.
RP-4	Removable prosthesis; overdenture supported completely by implant.
RP-5	Removable prosthesis; overdenture supported by both soft tissue and implant

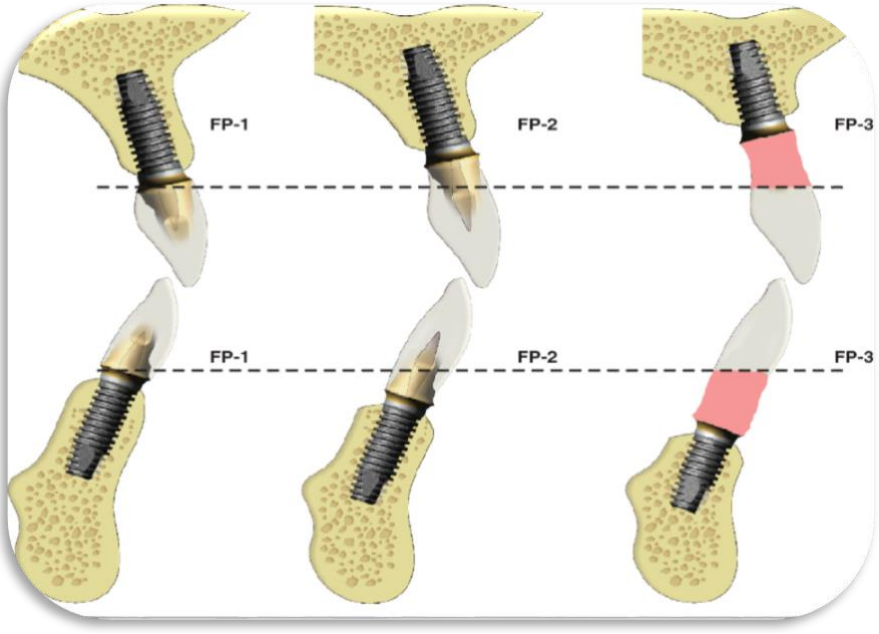

Figure 1.6: Prosthetic Options In Implant Dentistry **(Misch, 2015).**

1.3 Impression Material in Implants

The term “impression” is used to describe a negative “copy” of the hard and soft tissues of the oral cavity, including teeth, implants, gingival margin, alveolar ridge and the covering mucosa. The goal is the fabrication of a life-size positive “copy” of the abovementioned tissues, in the form of a cast **(Stewardson, 2005).**

A number of ideal properties can be defined for impression materials. These are accuracy, elastic rebound, dimensional stability, flow, flexibility, workability, hydrophilicity, long shelf life, patient comfort and economy. Impression materials vary considerably in properties, and these differences may provide a basis for the selection of particular materials in particular clinical situations. Some impression material properties, such as hardness and dimensional stability, can affect the accuracy of the implant impression. When direct (open tray) implant impression technique is applied, to ensure the positions of impression posts are similar in impression and patients mouth, a tight relationship must be obtained between impression material and impression post in order to have minimum positional distortion, and impression material should be rigid in such a way that it does not cause distortion that may occur in the impression when placement of combined implant analogues and impression posts **(Donovan TE and Chee WWL, 2000)**.

Although no impression material provides perfect accuracy, four types of elastomeric impression materials are generally used for implant impressions: polysulfide, condensation silicone, additional silicone (polyvinyl siloxane) and polyether. In terms of dimensional stability, the greatest dimensional inconsistency was observed with condensation silicones, with volumetric inconsistency greater than 0.5%.On the other hand, rigidity of polyether is useful for positioning impression posts accurately, also has high resistance to permanent deformation,

and sufficient dimensional stability, making it an acceptable impression material for implant-supported prostheses **(Misch, 2015)**. Furthermore, polyvinyl siloxane impression materials showed a good result in terms of high dimensional stability, elastic recovery ability without permanent deformation, and precision impression of details **(Lee *et al*., 2008).**

Regarding the viscosity of the impression material, the use of medium viscosity offers certain advantages in the clinical practice. Medium viscosity or monophase materials can flow around the impression posts without exerting pressure. Due to their increased hardness after polymerization, an accurate impression can be achieved. Their use however should be combined with a custom tray that allows an even thickness of the impression material around the implants. Medium viscosity materials can be used alone or combined with high flowing materials to achieve maximum detail reproduction or to allow the material to flow/penetrate even in small gaps around the impression posts. Putty or high viscosity impression materials offer rigidity and can also be used but their flow is limited compared to medium viscosity. For this reason putty or low flowing (high viscosity) materials should be used in combination with high flowing (low viscosity) flowing materials to achieve detail reproduction **(Stefos *et al*., 2018).**

1.4 Impression Techniques for Implant Restorations

The choice of the impression technique and the accuracy of the resulting impression affects directly the passive fit of the implant-supported restoration, which is an important goal in the restorative procedure. An inaccurate impression may result in a metal framework fitting non-passively, which can possibly cause mechanical complications, such as screw loosening or fracture, and/or abutment

fracture. The most widely used impression techniques for implants in clinical practice are the open tray technique and the closed tray technique.

1.4.1 Open Tray Technique

The open-tray (or pick-up) technique involves the embedding of the impression posts (also referred to as impression copings) **(Figure 1.7)** within the mass of the impression material during the final impression and their removal from the mouth in the tray after setting the material **(Stefos *et al*., 2018).** Open tray technique is more accurate than closed tray technique, especially in case of larger number of implants and in edentulous patients **(Papspyridakos *et al*; 2014).**

Figure 1.7: Impression posts with long screws for the open tray technique **(Stefos *et al*., 2018).**

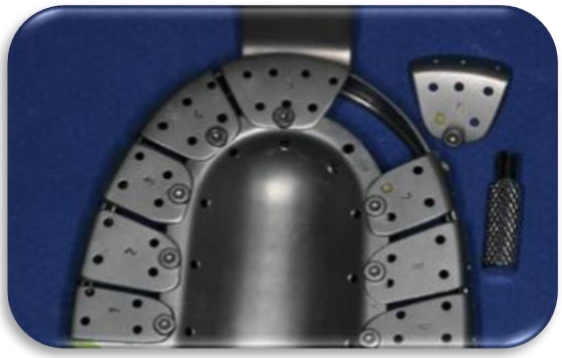

Figure 1.8: Prefabricated metal impression tray with removable parts used with the open tray technique **(Stefos *et al*., 2018).**

In the direct impression technique, the impression post is attached to the dental implant and it is important that the impression post is longer than the body of the screw when making the impression. After the impression material, the screw is loosened in order to remove the impression post from the impression material. The implant analog is then fixed onto the impression post using the same screw. Then the impression is ready to be poured. The direct impression technique allows the impression piece to be removed while removing the impression material from

the mouth to prevent the impression post from being placed back into the negative within the impression material copings while they are embedded in the impression tray **(Figure 1.9)** A custom tray with access to the impression coping screws is required **(Yasar *et al*., 2022) (Figure 1.8).**

The impression tray can be either a modified prefabricated plastic tray or a custom tray fabricated from auto- or photo-polymerizing resin on a study cast. For the open tray technique, metal trays with removable parts are also available, which allow access to the screws of the impression posts through the impression material, as some occlusal parts of the metal tray can be removed prior to impression. After complete polymerization of the impression material, the retention screws are completely removed from the impression posts and the implants. The posts remain embedded within the impression material and are simultaneously removed from the mouth **(Stefos *et al*., 2018).**

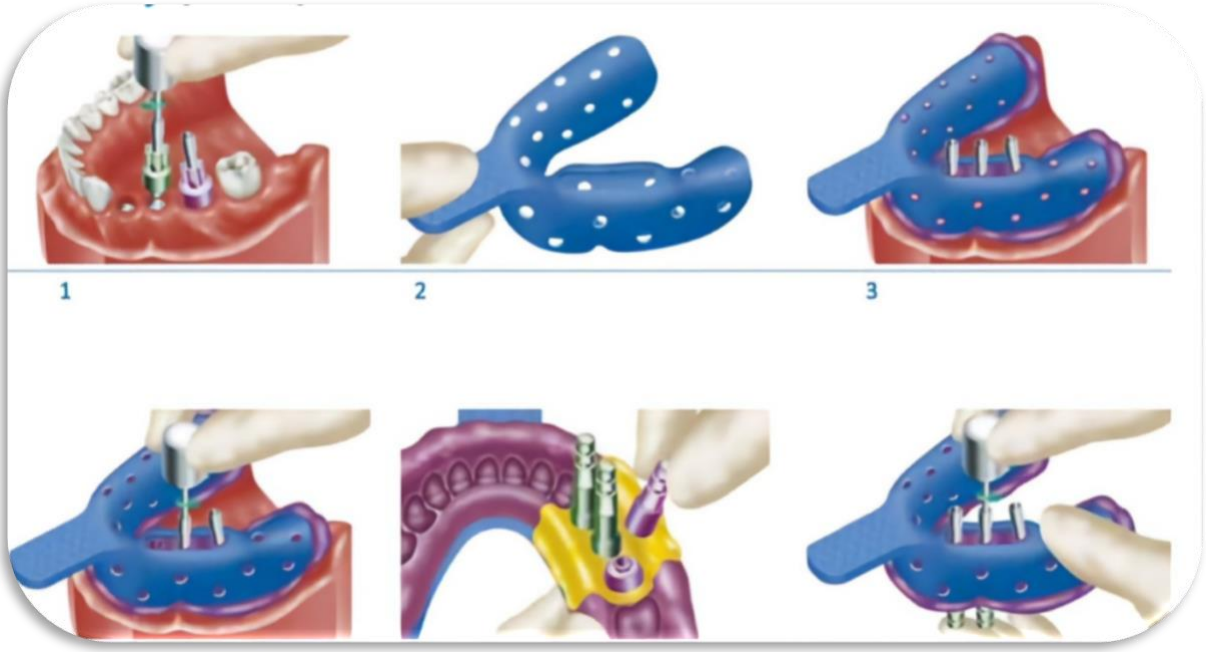

Figure 1.9: Open Tray Technique **(Kalpana *et al*., 2019).**

1.4.1.1 Advantages of the Open Tray Technique (Garg *et al*., 2017):

- Easier impression of implants with unfavorable inclination. The impression posts remain embedded in the impression material and do not require repositioning; therefore, possible errors due to incorrect handling can be avoided.
- Less strain is induced in the impression material during its removal from the mouth since it does not need to be detached around the impression posts.
- Easier impression of implants with converging axes, or in great proximity to each other.

1.4.1.2 Disadvantages of the Open Tray Technique (Garg *et al*., 2017):

- Necessity of a custom tray, or a modified prefabricated tray.
- Necessity to find and expose the protruding screws of the impression posts before setting of the impression the material
- Difficulty to apply in the posterior regions due to the increased height of the screws.
- Longer working time is needed intraorally, as all screws must be loosened before removing the impression.

1.4.2 Closed Tray Technique

Closed tray (transfer, indirect) technique using tapered impression copings is an easy and simple technique ideal for single implant impressions and multiple parallel implants in patients with limited mouth opening **(Singh.S , and Kumar.A 2016).** When there is limited mouth opening they can be used as there may not be enough space for access to the screws retaining pick up type impression copings

with the impression in place and in patients with an exaggerated gag reflex, when the impression must be removed as quickly as possible **(Jivraj *et al*., 2006).**

The impression tray (custom or prefabricated) has no opening over the implant area. During the impression procedure, the impression posts remain attached to the implants. After the setting of the material, the impression is detached from the mouth, while the impression posts remain fixed on the implants in the same way as the prepared natural teeth. For that reason, the impression posts are shorter than those used in the open tray technique, and they are equipped with shorter screws that do not protrude from the posts **(Figure 1.10)**. The shape of the posts is also rounded to allow removal of the polymerized impression material around the posts without exerting increased strain. Subsequently, the impression posts are loosened and sent separately to the dental laboratory**. (Singh.S , and Kumar.A 2016).**

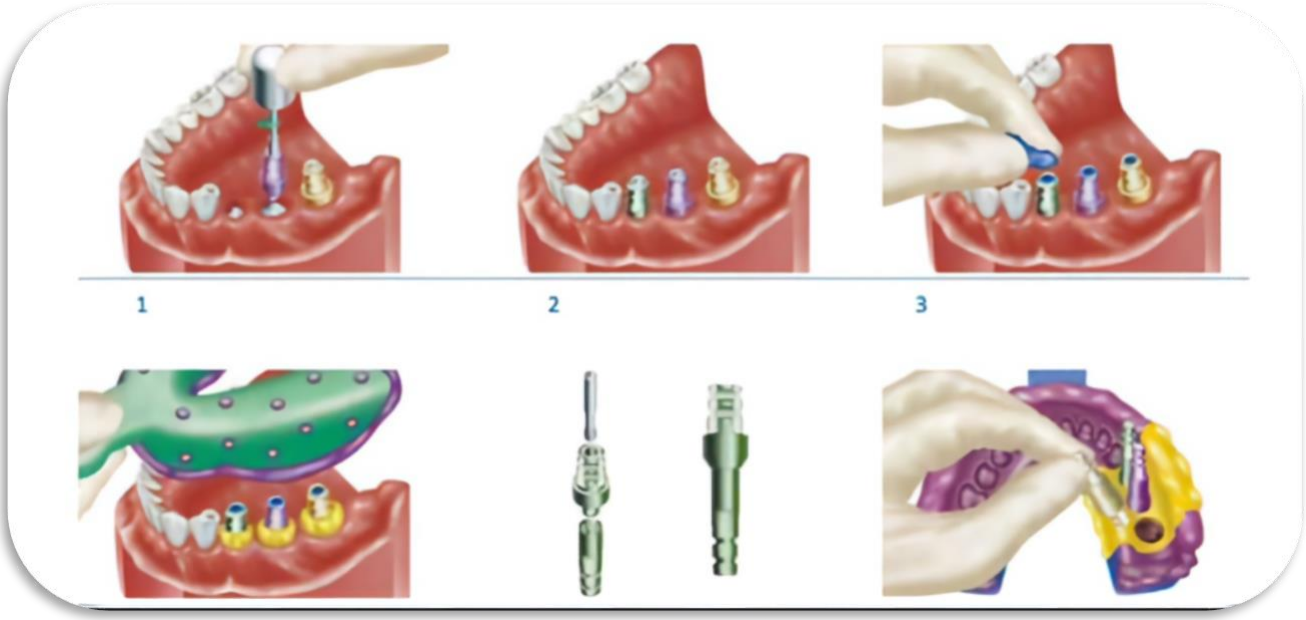

Figure 1.10: closed tray technique **(Kalpana *et al*., 2019)**.

1.4.2.1 Advantages of The Closed Tray Technique (Garg *et al*., 2017):

1. Simpler procedure, presenting great similarities with the usual impression techniques used for natural teeth.
2. Easier clinical application in all areas without need for excessive mouth opening.
3. Possibility of simultaneous impressions for teeth and implants.
4. The use of a custom tray or a modified prefabricated tray is not necessary.
5. The intraoral working time is reduced compared to the open tray technique.

1.4.2.2 Disadvantages of the Closed Tray Technique (Garg *et al*., 2017):

1. The repositioning of the impression posts in the impression material may lead to inaccuracy of the working cast, especially if plastic transfer caps have not been used.
2. Increased strain in the mass of the impression material may be induced upon impression removal.
3. Difficulty in removing the impression from implants with unfavorable or diverting inclination.
4. Doubtful accuracy in cases of implants in proximity

1.5 Splint versus Non-Splint Impression

Splinting mean using material to splint the impression and the materials include light-curing composite resin, impression plaster, thermoforming material, acrylic resin, and auto-polymerizing acrylic resin **(Papspyridakos *et al*; 2014).**The common practice of joining the direct transfer copings with acrylic resin is an attempt to **(Spector. MR *et al*; 1990):**

1. Stabilize the copings against rotation during fixture or abutment analog fastening.

2. Control the relationship between implants in a rigid fashion.

Twenty two studies was made for comparing the effect of splinting and non-splinting technique on the accuracy of impression, more than the half (12) of studies show that using splinting have positive effect on the accuracy of the impression **(Papspyridakos *et al*; 2014).**

1.6 Closed Tray Direct Snap-On Impression Technique

The Snap-On procedure is best described as a hybrid between the two techniques shown previously. In this closed tray procedure, the direct transfer coping "snaps-on" to the top of the implant abutment in the mouth. Once the impression has set, the coping becomes embedded in the impression and is pulled off of the implant abutment when the set impression is removed from the mouth. Once outside of the mouth, the implant analog is connected to the transfer coping prior to pouring the stone model **(Figure 1.11) (Nissan, J and Ghelfan, O, 2009).**

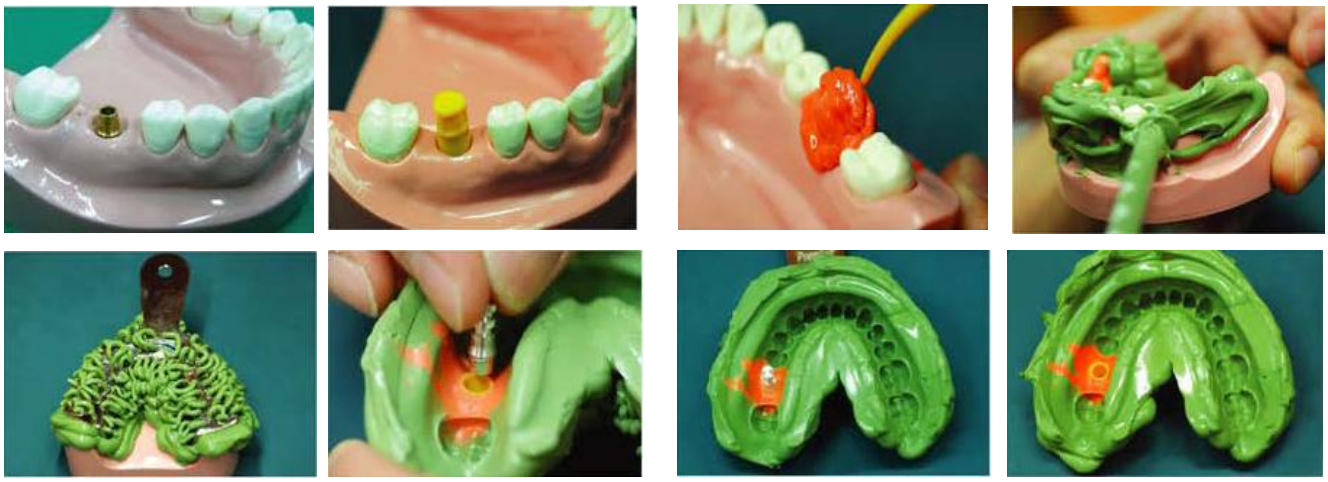

Figure 1.11: Indirect- Abutment Level Impression Technique
(Nissan, J and Ghelfan, O, 2009).

1.7 Digital Impression

In the intra-oral scanning, the scope is to acquire a 3D digital image of the teeth and/or implants by the scanning device. Digitalization of the dentition was initially introduced using an indirect scan of the stone model in the dental laboratory and 3D-digital images could be obtained. The direct intra-oral scanning (IOS)—also referred to as digital impression is becoming increasingly popular in conjunction with CAD/CAM technology **(Figure 1.14)**. Digital Dental Technology (DDT) for fabrication of dental restorations including computer-aided design/computer-assisted manufacturing (CAD/CAM) has been in development since the 1980s **(Mormann *et al*. 1987**). Its rapid expansion and incorporation into the field of dentistry has been documented since the beginning of 1990s **(Priest 2005; Miyazaki *et al*. 2009).**

Obviously, a higher impression accuracy is needed for implant-supported prostheses compared to natural teeth, as beside the position and the inclination of the implants, the retention mechanism (internal or external hexagon) must also be recorded and transferred with precision **(Flügge *et al*., 2016).**

For digital impressions of implants with IOS devices, the impression trays, materials and also impression copings are not needed. Consequently, the patients can avoid opening their mouths widely for prolonged time during the impression procedure. Digital impressions of implants can be achieved by scanning of special components (scan bodies) that are fixed on the implants

The intra-oral scanning with scanbodies is a simpler procedure compared to the conventional procedure, which includes tightening and loosening of screws for the impression copings, especially if the open tray technique is used **(Figure 1.12) (Sawase and Kuroshima, 2020).**

scanbodies (scannable impression posts) are available from most major implant manufacturers in various shapes, size and materials including titanium, polyetherketone (PEEK) and resins **(Figure 1.13) (Mizumoto and Yilmaz, 2018**). The 3D digital image of the implants is combined in the laboratory with digital implant analogs available in digital libraries by means of the indicated software. In this way, a digital model is produced that contains the position, inclination, and geometry of the implant.

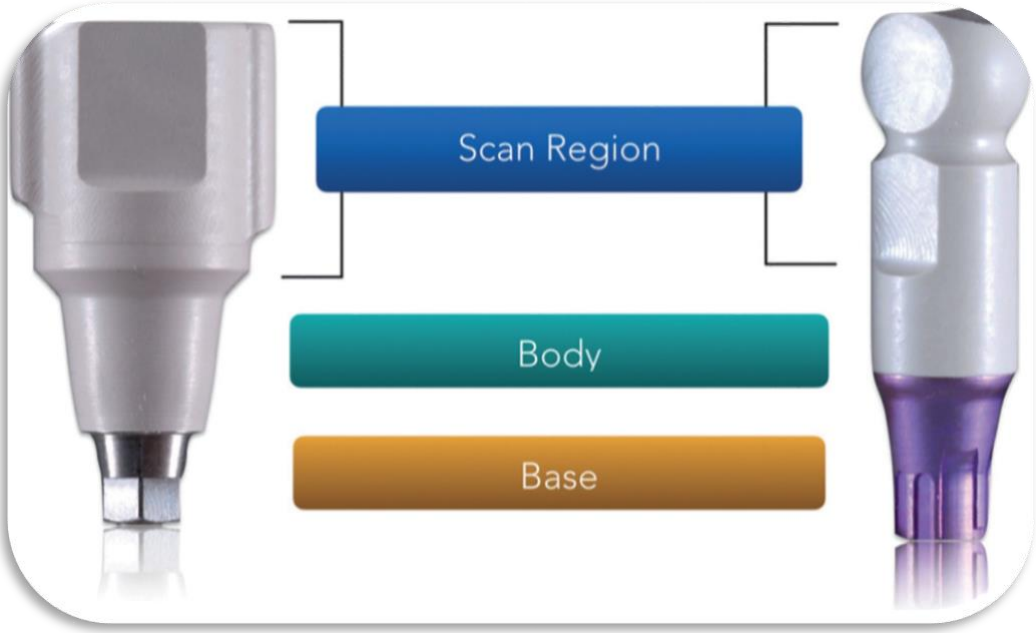

Figure 1.12: ISBs Component **(Mizumoto *et al*., 2018)**

Figure 1.13: Commercially available ISBs **(Mizumoto *et al.,* 2018)**

1.7.1 Advantages and Disadvantages of the Intra-Oral Scanning:

The main advantages of the digital impressions compared to the conventional technique can be summarized as following: **(Patel 2010).**

1. The digital impressions seem to eliminate errors and material defects such as voids, air bubbles, inadequate polymerization, or distortions.
2. Reduced patient discomfort and time saving as the scanning procedure lasts on average less time than the conventional procedure.
3. Easier and less technique-sensitive procedure for the clinician.
4. Simplified communication with the dental laboratory.
5. Visualization of the result from the clinician and the patient.
6. Avoidance of impression materials and elimination of the stone working casts.
7. Immediate, simple, safe, and cost-effective transfer of the acquired data to the dental laboratory.
8. Possibility of digital archiving of the data from each patient.
9. Correction of the digital impression by local re-scanning if a region has not been scanned or depicted clearly.
10. Easier integration of the digital images in the CAD/CAM fabrication of the prosthetic restoration.
11. Integration of the digital impressions from the initial steps to a digital planning of the implant positioning and the fabrication of a surgical guide for guided implant insertion.
12. Emergency profile configuration before proceeding with laboratory steps.

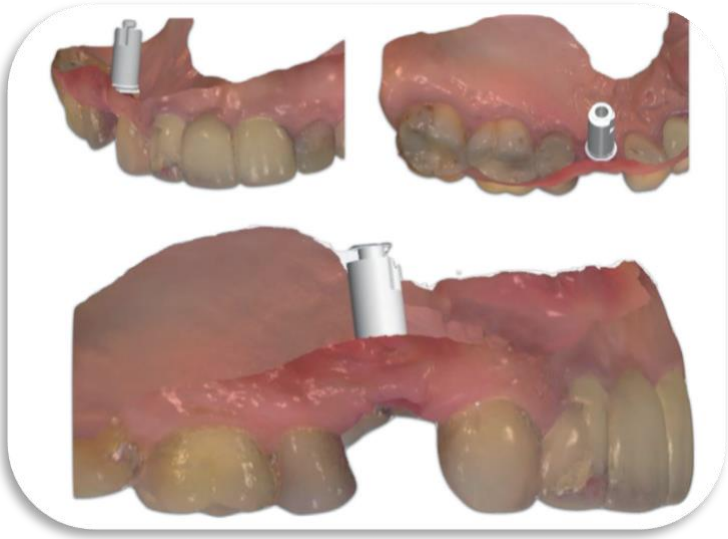

Figure1.14: implant analog using CAD software. CAD, computer-aided design **(Mizumoto *et al.,* 2018)**

1.8 Accuracy of the Digital Impressions

Accuracy is defined as the "closeness of agreement between a measured quantity value and a true quantity value of a measurement" It is expressed by two factors "trueness" and "precision." Trueness represents the closeness of the measurement to the accepted reference value, whereas precision represents the closeness of repeated measurement of the same object **(Sawase and Kuroshima, 2020).** The precision of IOSs can be measured easily in vivo by repetitive captures of the object and assessment of their reproducibility, whereas the calculation of trueness is slightly difficult.

There are some factors that may influence the accuracy of digital impressions and they still require further investigation. For instance, many authors support the accuracy of digital impressions for the rehabilitation of single implants; however, the extension of the edentulous space and the increased number of implants are major obstacles to a full digital workflow in implant dentistry **(Marques *et al*., 2021).** Most studies agree that the inaccuracy of the impressions increase with the length of the edentulous area **(Mangano *et al*., 2017).** Some other clinical parameters that may influence the accuracy of a digital impression are the

angulation of the implants, the design of the used scanbodies, the depth of the implant, the scanning protocol, and the kind of the scanning device **(Abduo *et al*., 2018).** The accuracy of digital and silicone impressions for single-tooth implants and short span FDPs was comparable, as concluded an in-vitro study **(Nagata *et al*., 2021).** In full arch restorations, however, the accuracy of intra-oral scanning compared to the conventional technique was shown as doubtful **(Sawase and Kuroshima, 2020).**

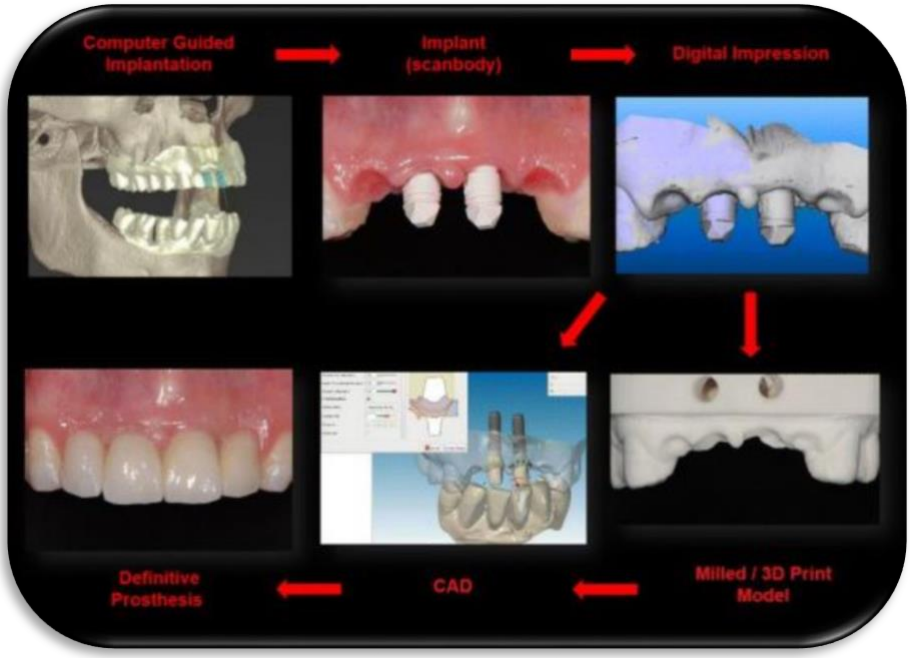

Figure 1.15: Digital impression procedure **(Kalpana *et al*., 2019).**

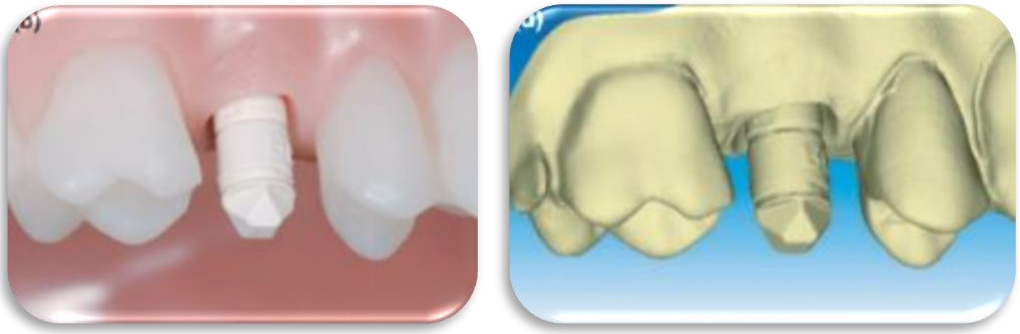

Figure 1.16: A, Scanbody**. B,** Virtual model from digital impression **(Sang J. Lee and German O.Gallucci 2013).**

Chapter Two: Discussion

Several impression techniques have been advocated for implant impressions to obtain a definitive cast. Different impression techniques have some advantages and some limitations, but selection of technique depends upon operator choice and various clinical situations **(Singh.S, and Kumar.A 2016).**

For implant impressions, addition silicones (or poly-vinyl-siloxane) and polyether are currently considered as the materials of choice. Comparative studies have been published, investigating the accuracy and clinical behavior of both elastomeric impression materials. Most researchers agree that there is no significant difference in the accuracy of implant impression between poly-vinyl-siloxane and polyether **(Stefos *et al*., 2018).** Furthermore, **(Wenz *et al*., 2008)** compared the different impression techniques using only addition-type silicone, and concluded that the single-step (single mixing) impression technique resulted in more accurate impressions. Polyether material is favorable to be used with pick up impression technique because it showed the greatest torque values **(Lee *et al*; 2008).**

Digital impression technique was less time consuming than the conventional one in impression time and total amount of time consumed. The present results showed that the level of difficulty for the dentist and the level of discomfort felt by the patients were significantly lower for the digital impression technique than for the conventional technique. It has been shown that the use of digital impressions increases the patients' level of comfort and treatment acceptance. The present study found a moderate relation-ship between the impression time and the level of

difficulty judged by the dentist, suggesting that an increase in impression time makes the dentist consider the procedure as more difficult. Considering the level of difficulty judged by the dentist, the intraoral scanner seems to be easier to manage than the conventional impression materials. Rescan of the missing areas seems to be more convenient and less troublesome than re-taking the entire impression with a conventional technique. Moreover, conventional impressions require more experience to achieve the same level of proficiency than digital impressions, suggesting that the learning process for digital impressions would be simpler than for conventional impressions **(Gjelvold *et al*., 2015).**

The indirect (laboratory scanner), where the lab scans either the impression or the model, or direct (intra-oral scanner) using chair-side scanning Laboratory scanners are considered in general more accurate than the conventional impression, and for this reason they are used as points of reference in in-vitro studies that compare the accuracy of intra-oral scanners **(Renne *et al*., 2017).** There is still controversy about the accuracy of intra-oral scanning, laboratory scanning and conventional impressions. In another in-vitro study the laboratory scanning using the photogrammetry technique showed better accuracy compared to intraoral scanning scanner and conventional impressions **(Tohme *et al*., 2021).**

Chapter Three: Conclusion

1. A good impression is the main requisite of implant supported prosthesis. Without accurate impression, the prosthesis will be failed. Benefits of Impression in implant dentistry is to record; Position, Depth, Axis/Angulation, Rotation-Hex position, Soft Tissue Contour (Emergence Profile). Hence, Impression technique is the key for the success in the field of implant dentistry.

2. The open-tray impression technique was more accurate than the closed-tray impression technique for completely edentulous patients, but there seems to be no difference for partially edentulous patients.

3. The accuracy of implant impressions is not affected by the impression material (polyether and addition PVS) for both partially and completely edentulous patients.

4. The splinted impression technique was more accurate than the non-splinted conventional impression techniques for both partially and completely edentulous patients.

5. Digital impressions resulted in a more efficient technique than conventional impressions when assessed by total treatment time. A longer preparation, working, and retake time were needed to complete an acceptable conventional impression compared with a digital one.. Digital impressions allows for additional re-scans without the need of repeating entirely the impression technique. This results in a shorter treatment time. The level of difficulty was lower for the digital impression compared with the conventional ones when performed by inexperienced second year dental students. Digital impressions were deemed as the most preferred and effective technique according to the participants perception.

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