

IMPRESSION; DIGITAL VS CONVENTIONAL: A REVIEW

Sankalp Sharma,¹ Swatantra Agarwal,² Divya Sharma,³ Sanjeev Kumar,⁴ Nishtha Glodha⁵

1. Senior Lecturer, Department of Prosthodontics, Kothiwal Dental College & Research Center, Moradabad.

2. Professor & Head, Department of Prosthodontics, Kothiwal Dental College & Research Center, Moradabad.

3. Senior Lecturer, Department of Oral Pathology & Microbiology, Swami Devi Dayal Dental College & Hospital, Barwala, Panchkula

4. Senior Lecturer, Department of Prosthodontics, Dr. B.R. Ambedkar Institute of Dental Sciences and Research Center, Baiely Road, Patna

5. Private Practitioner, Orthodontics, New Delhi.

Abstract

The use of Digital technology for impression making procedures has increased recently. Digital impression has been introduced, potentially eliminating the need for taking conventional impressions for crowns and fixed prostheses. Although majority of clinicians still prefer conventional impression techniques due to number of reasons. This paper discusses the merits and demerits and compares both the digital impressions and conventional impressions.

Key Words: - Digital technology, Digital impression, Conventional impressions

Introduction

Today, digital technology controls almost every aspect of our life, and dentistry is no exception to it. Millions of impressions are taken every year for the production of crowns, bridges, and partial dentures. Making impressions with elastomeric impression material is an everyday procedure in almost every general dental practice. A new way to dispense trays and impression materials is now available that create digital impressions of a patient's teeth.

The digital impression concept is emerging rapidly on the horizon and it is believed that digital impressions will solve the challenges and difficulties of the conventional impressions.

Back-ground of Current Impression Materials

The history of today's traditional impression materials began in the mid-1930's with the introduction of reversible hydrocolloids. This was the first material that made the impression of undercuts possible. By the 1955 polysulphides were introduced and for the first time an elastomeric impression material was used.¹ There was a great improvement in reproducing the characteristics of prepared teeth, but still there were inherent problems like shrinkage of material.

In 1966, further improvements in impression materials occurred with the introduction of polyether. This material proved to be far superior to the hydrocolloid followed by silicones in 1976.¹

Though they are hydrophobic by nature but even in the presence of a moist environment, they are highly dimensional stable resulting in a superior elastic recovery.¹ With the advancement of time and technology improvements are made to these materials to reduce tearing, chair time and enhances the patient comfort. (Table 1)

Evolution of Digital Impressions

It began in 1980's with the introduction of CAD/CAM in the field of dentistry, pioneered by Procera and Cerec.

The current digital impression devices available are the recently introduced Cadent iTero (Carlstadt, N.J.) and the 3M ESPE Lava Chair-side Oral Scanner C.O.S. (St. Paul, Minn.).^{2, 3, 7}

Comparison between Conventional Impression and Digital Impression Technique – Complexity and Cost of Purchase

The initial cost of digital equipment is very expensive when compared to the conventional impressions. Also digital equipment's are complex and trained operator is required to operate and maintain the device. A good and up-to-date laboratory support is required. Whereas conventional impressions technique, promises cost effectiveness and also no major equipment's are required.

Improper Tray Selection

Tray selection is a very important step in impression making. Rigid Stock trays are used for impression making, but sometimes if the tray is not so rigid or is distorted, or improperly selected tray leads to inadequate to inadequate impression. If the stock tray and the impression material inside it are not adequately rigid, the impression's accuracy will be compromised because of the flexibility of the tray and the material.^{2, 3, 4}

The digital impressions do not involve impression trays, thus eliminating the problems related to improper tray selection and potentially improving the quality of impressions.

CLASSIFICATION OF IMPRESSION MATERIAL

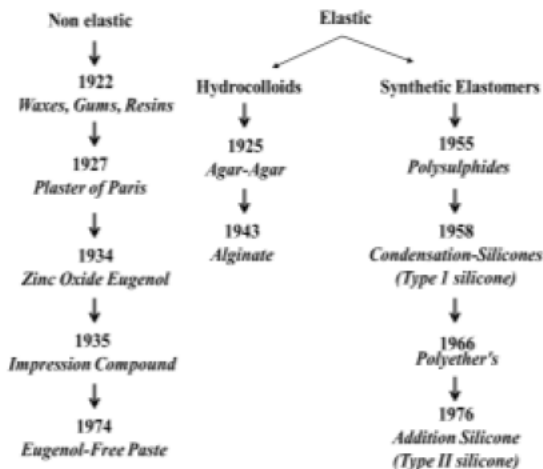


Table 1 Classification of Impression Materials

Distortion of Impression While Removing from the Impression Tray

Polyether and vinyl polysiloxane impression materials require adhesive agents to attach the impression material to the impression tray.^{1,3}

Perforated trays further enhance attachment of the impression material to the tray. Improper separation usually results in distortion of the impression. Impression trays are not required for digital impressions. Therefore, digital impressions eliminate this frequently seen problem.

Storage of Impressions

Storing impressions for some time and not pouring impressions immediately is a common procedure. While Alginate impression has to be poured immediately¹, Polyether and vinyl polysiloxane impression materials are stable for a reasonable period of time after the impression is made, but they can get distorted by inadequate storage.^{5,6,8}

Digital impressions do not involve impression trays or impression materials thereby eliminating the associated problems.

Pouring of Casts/Dies

Sometimes, an impression is poured improperly. The stone used for pouring may be too thick or too thin, or the stone might not have set before it is retrieved.¹ The result of each of these problems is a need to remake the impression which causes inconvenience to the patient, increases the cost of treatment and also takes more chair side time. In case of digital impression, the digital information is stored as it is taken, so in case the problem while pouring of impression or setting of cast or placement of dies arises, the digital information stored on computer can be reused as many number of times, thus saving precious time of clinician and the patient and also the cost of treatment.

Disinfection

The disinfection of conventional impressions is an expensive and cumbersome procedure which is often overlooked by dentists and laboratory technicians. The digital impressions eliminate the use of stock trays and impression materials, thus, eliminating the need for disinfection.

Patient Discomfort and Mess

The discomfort that arises to patient with the use of stock trays and impression material is eliminated to some extent with digital impressions. Gagging and limited mouth opening further complicate the procedure with conventional impression technique. Digital impression technique involves the placement of small intraoral camera in the patient's mouth, which is usually well accepted by the patients. Digital impressions greatly reduce patient discomfort.

Digital impression does not involve impression trays and mixing of impression materials as in conventional technique, thereby, do not cause any discomfort.

Conclusion

We compared the merits and demerits of conventional and digital impression making in routine dental practice. Digital impressions emerge as practical and precise but the need for further research is required.^{2,3} Digital impressions eliminate some of the common problems which occur in conventional impression procedures as in case of elastomeric impressions, but proper soft tissue management following fundamentals of tooth preparation and a good laboratory support is required for success.

The Digital technology has been found to be accurate and offer a number of benefits over traditional impression techniques. In future, the Digital technology in dentistry will continue to develop and flourish.

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Corresponding Author:

Dr. Sankalp Sharma
E164/4, Acme Heights, Sector 126,
Greater Mohali, Punjab, India
Email Id.: - docsankalp16@gmail.com