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To comparatively evaluate the accuracy of digital versus conventional impressions for complete dentures: A systematic review

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Abstract

Introduction: Definitive impressions play a vital role in the process of fabrication of prosthesis. Quality of the final prosthesis to a large extent depends on the accuracy of impression. The most significant change in the dental field in recent years is, without a doubt, the development of digital dentistry.

Materials and Methods: Digital technologies for the design and fabrication of removable complete dentures have made rapid progress. Current innovations and

technological developments in computer-aided design and computer-aided manufacture (CAD-CAM).

Results: The internal adaptation did not statistically significantly differ between the conventional and digital with regard to the maxillary arches. The digital were inferior to the conventional CDs in terms of masticatory efficiency and pronunciation

Conclusion: The most popular type of prosthesis treatment for total edentulism is removable complete dentures. Making an impression of the edentulous arches

is one of the clinical measures that is most important in this type of therapy.

Keywords: Conventional Impression, Conventional And Digital, Intraoral Anatomy.

Introduction

Definitive impressions play a vital role in the process of fabrication of prosthesis. Quality of the final prosthesis to a large extent depends on the accuracy of impression. Conventional Impression (CI) making with elastic impression materials is still the widely used technique for replicating the intraoral anatomy and to transfer this information to the dental laboratory for fabrication of indirect dental restorations.^[9]

The most significant change in the dental field in recent years is, without a doubt, the development of digital dentistry. Regarding the fabrication of prostheses, with computer-aided Design computer-aided manufacturing (CAD-CAM) systems, it became possible to mill frameworks designed by a computer and to use aesthetic materials such as alumina and zirconia ceramics, which cannot be cast.^[8] The concept of computer aided design and computer aided manufacturing (CAD-CAM) Complete Dentures originated in Japan with the first English literature published describing the CAD-CAM system for the fabrication of Complete Dentures.^[1]

The need for Complete Dentures will increase substantially in the future as shown by the projected increased over a span of 30 years. Even though implantassisted CDs are reported to be more efficient and stable than conventional dentures, the financial costs associated with implant prostheses can be 5 to 10 times more than conventional complete dentures. Complete dentures, therefore remain a popular choice for patients despite the advancements in dental treatment options for those with complete edentulism.^[2] Conventional fabrication protocols for the construction of complete removable dental prostheses are well established and continue to form a part of contemporary clinical practice. These conventional complete denture protocols require multiple patient visits with considerable amounts of chair side and laboratory time. The conventional protocol is considered the current 'gold-standard' for undergraduate teaching.^[5]

The application of digital computer-aided design and computer-aided manufacturing (CAD-CAM) technologies to the design and fabrication of removable dentures may provide numerous advantages. Current CAD-CAM denture systems start with digitizing impressions or definitive casts by using laboratory scanners. The production of a removable denture in a fully digital approach, without a physical cast, eliminates patient discomfort related to conventional impression making, problems of potential allergies to impressions materials, errors related to the distortion of impressions and gypsum casts.^[7]

Digital technologies for the design and fabrication of removable complete dentures have made rapid progress. Current innovations and technological developments in computer-aided design and computer-aided manufacture (CAD-CAM), such as milling and rapid prototyping, allow the design and manufacture of removable dentures to be fully digitized and less time-consuming tooth arrangements, easy data storage, and production of duplicate dentures.^[2]

For full-arch scans, still higher transfer accuracy has been described for conventional impression (CVI) techniques. Several clinical studies investigated the accuracy of full-arch scans for different IOS systems using a conventional impression or a plaster model as reference. However, for a precise evaluation of the

transfer accuracy, an external reference structure is indispensable. Even anterior structures have already been recorded using an extraoral scanner, the entire jaw of a real patient cannot be scanned using a high precision laboratory scanner to obtain a reference dataset.^[13]

Intraoral scan data in the actual oral cavity are likely to be different. In addition, since this study evaluated the accuracy of scan data using the best-fit algorithm for superimposition, the accuracy of inner surface and margin portion evaluated when the actual prosthesis is fabricated on the casts may vary.^[4]

Research Question: "Is there any difference in the accuracy of digital versus conventional impressions for complete dentures?"

Pico criteria (population, intervention, comparison and outcome measures)

Population: Geriatric population selected irrespective of age, gender and geographic area.

Intervention: Complete denture prosthesis.

Comparison: Accuracy of Digital versus conventional impression procedures.

Outcomes: To enable delivery of complete denture prosthesis with accuracy.

Review of literature

Mathew T. Kattadiyil and Abdulaziz AlHelal (2016) conducted a systematic review on clinical outcomes and applications associated with Computer Engineered complete Dentures as they found that systematic reviews are lacking in the literature. The purpose was to determine the clinical outcomes and applications of CECDs. Electronic searches of the English literature from January 1984 to May 2016were performed in MEDLINE and Cochrane databases, with the results by hand searches and citation mining to address to relevant PICO questions: What are the clinical outcomes associated with CECDs. Are there specific applications and significant advantages for CECDs.

Jong-Eun Kim, Ami Amelya, Yooseok Shin and June-Sung Shim (2017) conducted a study to determine the effect of an artificial landmark on a long edentulous space on the accuracy outcomes of intraoral digital impressions. Mandibular model containing 4 prepared teeth and an edentulous space of 26 mm in length was used. A blue LED(light-emitting diode tabletop scanner was used as a control scanner, and 3 intraoral scanners were used as experimental groups.

Murali Srinivasan et al (2018) conducted this study to compare the clinical time spent and the costs incurred whilst constructing complete dentures (CDs) using a two-visit digital-denture protocol with the conventional complete denture, in a university setting.

Nadica Mihajlo Janeva et al (2018)conducteda review to analyse the existing literature on computer-engineered complete dentures and to determine their advantages over the conventional dentures. Electronic search of the English literature from January 1994 to March 2018 was performed in PubMed/MEDLINE, using the following keywords: CAD/CAM complete dentures, computer engineered complete dentures, complete digital dentures, complete milled dentures, and rapid prototyping dentures.

Hidemichi Kihara et al (2019) conducted this review to evaluate accuracy and practicality of various intraoral scanners and verification method of intraoral scanners. This review was based on articles searched through the MEDLINE and PubMed databases from 2010 to 2018. Sachin K Chandran, JL Jaini, Anna Serene Babu, Anil Mathew, Arun Keepanasseril (2019) reviewed thisexisting reports, to bring forth the comprehensive overview on the comparative superiority of digital impression technique based on accuracy, patient

acceptance, operators preference and time effectiveness when compared to conventional technique. The materials and methods used were search strategy for this review was based on Population, Intervention, Comparison, and Outcome(PICO) framework.

Murali Srinivasan et al (2019) described two workflows for fabricating computer-aided design and computer-aided manufacturing (CAD-CAM) milled complete dentures (CDs). The first technique illustrates a manufacturer-independent workflow using conventional clinical steps and a novel, custom modified tray to successfully fabricate CAD-CAM milled CDs. The second technique highlights a nearly digital workflow for manufacturing a CAD-CAM milled CD and a milled resin interim removable partial denture.

Martin Schimmel et al (2020)evaluated that a newgeneration intraoral scanner(Primescan; Sirona, Bensheim, Germany) are suitable for digital scans of long-span edentulous spaces and completely edentulous arches, however, the evidence is lacking. The current study evaluated the accuracy of intraoral scanning (IOS) in partially and completely edentulous arch models and analyzed the influence of operator experience on accuracy.

Gary Hack et al (2020) evaluated the feasibility and accuracy of computerized optical impression making of edentulous jaws in an in vivo setting. The sample size was 29 edentulous patients (27 maxillae and five mandibles) underwent conventional impressions as well as computerized optical impressions. The conventional impressions and the resulting stone casts were digitized and superimposed over the computerized/digitized optical impressions(Lava Chair side Oral Scanner, C.O.S. or True Definition Intraoral Scanner, (3M ESPE, St. Paul, MN, USA) in order to obtain information on differences between the two datasets. Statistical analyses were performed to identify relevant deviations.

Alexander Schmidt, Leona Klussmann, Bernd Wostmann, Maximiliane Amelie Schlenz (2020) conducted this clinical study to update the available data in the literature regarding the transfer accuracy (trueness/precision) of four current intraoral scanners (IOS) equipped with the latest software versions and to compare these data with conventional impressions (CVI). A metallic reference aid served as a reference dataset. Four digital impressions (Trios3Cart, Trios3Pod, Trios4Pod, and Prime scan) and one CVI were investigated in five patients.

Can Wang, Yi-Fei Shi, Pei-Jin Xie and Jun-Hua Wu (2020) conducted this systematic review to evaluate the accuracy of digital CDs and to summarize influencing factors. Electronic search of the English language literature from January 2009to October 2019 was performed in the database PubMed/MEDLINE, with the results by manual searches and citation mining. Factors investigated in the selected articles included the fabrication technique, type of computer-aided design and computer-aided manufacturing (CAD- CAM) system, shape of reference model, long-term service, analytical method, and statistical indicators. They concluded that most of the studies reported clinically acceptable values for the occlusal trueness and adaptation of digital CDs.

Fernando Zarone et al (2020)conducted this study to compare the accuracy of impressions of a reference typodont (RT) reproducing a totally edentulous maxilla made with three impression materials: polysulfide, polyether, and polyvinyl-siloxane. Materials used were reference typodont that was scanned using a desktop scanner, obtaining a reference scan. Ten impressions for each of the three tested materials were made using a

mechanical device with a standardized and consistent modality.

Simon Peroz et al (2021)conducted this randomized, controlled, blinded crossover trial to evaluate the impact of the digital versus conventional production of complete dentures on oral health related quality of life (OHRQoL) measures. There were sixteen participants who received 2 sets of new complete dentures produced with a digital (2 visits) and conventional (5 visits) workflow.

Mohamed Ahmed Alkhodary (2021) conducted this study to compare the accuracy of optical impressions to the conventional impressions of the edentulous mandibular and maxillary arches via a digital superimposition process. Optical impressions using the CERAC omnicam, and conventional impressions using green compound peripheral molded individual trays and Zinc-Oxide eugenol impression material were made for 18 completely edentulous male patients.

Mohammed M. Gamal Elkafraw , Safa Alsayed Asal, Ali Mohamed El-Sheikh (2021)conducted this study to compare the accuracy of intraoral digital impression versus conventional selective pressure impression technique for maxillary flabby ridge registration in complete denture construction regarding soft tissue assessment. Seven completely edentulous patients with a localized maxillary anterior flabby ridge were enrolled in this study. Each patient received two identical maxillary complete dentures opposing one mandibular complete denture.

Mohamed M. Dohiem (2021) aimed to evaluate the deviation between of intraoral scanning (IOS) impression and conventional impression in completely edentulous patient and to analyze the accuracy of IOS [Medit i500 (Nobel Bio-care USA, LLC)] in completely edentulous maxillary arch. Two types of impression

technique were made for eight completely edentulous patients. Intra oral scanning and conventional impression technique of the maxilla was done for each patient, the two-impression techniques were compared for accuracy using GOM inspect software.

Luigi Vito Stefanelli et al (2021) evaluated the use of digital devices that strongly influence the dental rehabilitation work flow both for single-crown rehabilitation and for full-arch prosthetic treatments. Trueness was analyzed by overlapping the scan dataset made with Medit I-500 (by using two different tips and two different scan strategies) with the scan dataset made with lab scanning, and the values of the $(90^{\circ}-10^{\circ})/2$ method were reported.

Methodology

Eligibility criteria

Inclusion criteria for admittance in the systematic review were selected clinical studies on humans, literature reviews, systematic reviews to assess the following:

- The relationship between the accuracy of conventional and digital complete denture impressions diagnosed clinically or by means of questionnaires/interviews.
- The relationship between the accuracy of conventional and digital complete denture impressions diagnosed by means of fit.
- 3. The effects of accuracy of complete denture after the denture insertion.

Exclusion Criteria

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- 1. Studies in which outcomes were not directly related to complete denture impressions
- 2. Studies that were prior to 2015 for Systematic review
- 3. Abstracts, case reports, protocols, personal opinions, letters and posters.

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4. Full-text not available

Information Sources

For this systematic review the following search engine and electronic data bases were considered by 2 reviewers - National Library of Medicine's PubMed Database, Google Scholar, Scopus. Web of science, COCHRANE and EBSCO. A search was performed to identify all peer-reviewed articles in the English literature dealing with the accuracy of impressions in conventional and digital complete dentures according to the search strategy described in the following sections. The studies included for review were assessed independently by the 2 authors on the basis of a structured reading of articles approach, which is also described in detail in the following sections.

Search strategy

A literature search was performed using the keywords "complete denture", "impression techniques", "digital and conventional" and "accuracy". The search was limited to aron adult populations (+50 years) in the English language published later than January 1, 2015.

The search string was

("complete denture"[Mesh] OR denture [text word] OR conventional [text word] OR digital [text word] OR digitalization [text word]) OR edentulous OR accuracy OR accurate OR impressions OR digital impressions OR conventional impression. OR intra-oral scanner OR special tray OR final impressions)

AND

Results

Impression techniques [text word] OR Impression materials

AND

Accuracy

Selection process

For article selection or first approach, two researchers independently selected potentially eligible articles by title and abstract. Articles that met PICO and inclusion criteria are included in the review for the final analysis.

Data collection process

Data were collected from studies that evaluate the accuracy of conventional and digital impression technique, defining the accuracy, according to the circadian expression. The accepted diagnostic studies were taken in the study.

Prisma Flowchart



	Author & Year	Type of	Population	Intervention	Control or	Outcome	Conclusion
		Study			Comparison		
Ī	Mohamed M.	Clinical	8 subjects 4		No	The results of	The results of this
	Dohiem 2021	trial	males mean age:		comparison	this study	study support the
			54 years; and 4		group	indicate total	assumption that the
			females mean			deviation	accuracy of IOS not

		age: 50 years.			between two	reliable for
		Eight patients			groups to	completely edentulous
		were identified			hypothesized 0	arches digital
		as edentulous.			representation	impression does not
					conventional	show a great
					one group &	advantage over
					then calculated	normal impression
					using special	including accuracy
					inspection	enhanced patient
					software	comfort, acceptance.
Mohamed	Clinical	24 patients were	A targeted		In the maxillary	Optical impressions
ahmedalkhodary	article	subjected,	interview and		arches,	were not able to
2021		24 men. 12	examination		significant	register the functional
		maxillary	were carried out		deviations of	depth of sulcus in the
		readings and 12	in accordance to		the optical	maxillary and
		mandibular	the accuracy of		impressions	mandibular
		readings were	digital and		from the	edentulous arches,
		taken.	conventional		conventional	neither the selectively
		The study group	complete		impressions	pressed buccal
		consisted of	denture		were found in	shelves of bone and
		completely	impressions		the buccal	retromolar pads in the
		edentulous			vestibules, and	mandibular
		arches.			in the	edentulous arches.
					mandibular	
					arches,	
					significant	
					deviations were	
					found in all the	
					anatomical	
					regions except	
					for the residual	
					ridges.	
Mohammed M.	Clinical	7 completely	A interview was	No control	There was	Intraoral scanning of
gamalelkafrawy	trial	edentulous	conducted to		statistically	edentulous arch due to
2021		patients with a	evaluate the soft		significant	lack of anatomical
		localized	tissue response		difference	landmarks. More and
		maxillary	using analytical		between the	more attention must
		anterior flabby	tests.		two maxillarv	be paid during
		ridges were			dentures	intraoral scanning of
			1			seaming of

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			taken			regarding soft	edentulous ridges]
						tissue	with flabby tissues	
						assessment in	due to the difference	
						favour of the	in the degree of	
						second	mucosa	
						maxillary	compressibility.	
						denture.		
	Simon peroz	Clinical	16 adult patients	Changes of sum	comparison	The data of 16	The perspective of the	1
	2021	trial	(5 women and	scores over time	group	participants (11	participants, the	
			11 men), aged	and differences		men and 5	fabrication method of	
			between 64 and	between the		women; 66	the complete dentures	
			72 years.	workflows were		±8.5 years)	had no significant	
				analyzed by		were evaluated.	influence on	
				using the		The median	OHRQoL. However,	
				Wilcoxon		values of the	digital dentures	
				signed-rank test		total OHIP-G49	needed only 2 visits, 1	
						sum scores and	hour less chair time,	
						the sum scores	and 5 hours less time	
						of OHIP-G49	for the dental	
						dimensions did	laboratory technicians	
						not differ		
						between		
						workflows		
						(P>.05). With		
						digital dentures,		
						more physical		
						pain was		
						observed after 2		
						weeks		
						(P=.039).		
						Participants		
						with		
						conventional		
						dentures had		
						less functional		
						limitation after		
						14 days and felt		
						less		
						handicapped		
						1	1	1

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					after 3 months]
					(P=.036).		
					Digital dentures		
					were fabricated		
					within 4 hours,		
					whereas		
					fabrication of		
					conventional		
					dentures took		
					10.5 hours for		
					dentists and		
					dental		
					laboratory		
					technicians.		
Fernado zarone	Case	Ten impressions	The scans in .stl	The control	Trueness	The accuracy of the	
2020	control	for each of the	format were	sample was	(arithmetic	scans obtained from	
	study	three tested	imported into	constituted to	proximity)	polyvinyl-siloxane,	
		materials were	Geomagic	demographical	values (95%CI)	polysulfide, and	
		made using a	Control X and	ly match the	were:	polyether impressions	
		mechanical	then compared	case sample	polysulfide =	can be considered	
		device with a	to RT to	on age, socio-	249.9 (121.3–	comparable in a fully	
		standardized	evaluate the	economic	378.5),	edentulous maxilla	
		and consistent	accuracy of	status, self	polyvinyl-		
		modality. A	each scan by	identified race	siloxane =		
		laboratory	calculating	and self-	216.8 (123.1–		
		scanner	trueness and	identified	310.6),		
		performed the	precision in µm.	Hispanic	polyether =		
		digitization of	Recorded data	ethnicity.	291.1 (219.9–		
		each impression	were subjected		362.3).		
			to descriptive		Precision		
			statistics		values (95%		
					CI) were:		
					polysulfide =		
					261.9 (108.8–		
					415), polyvinyl-		
					siloxane =		
					209.4 (111.9–		
					306.8),		1
					polyether $= 283$		V V
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					(227.9–338.1).	
					Statistically	
					significant	
					differences	
					were not	
					detected	
					between the	
					means of the	
					experimental	
					groups, both for	
					trueness and	
					precision	
Alexander	Clinical	Five patients	The mean	Control group	Current IOS	Within the limitations
Schmidt	trial	with a complete	values for the		equipped with	of this clinical study,
2020		lower dental	deviations		the latest	current IOS scanners
		arch were	between the IOS		software	equipped the with
		included in the	results and the		versions	latest software
		present clinical	reference aid		demonstrated	versions demonstrated
		study	describing		less deviation	less deviation for
		Ĵ	trueness,		for short-span	short-span distances
			standard		distances	(D1 2 and D3 4)
			deviation		compared with	compared with CVI
			describing		the	techniques. However.
			precision for the		conventional	for long-span
			different		impression	distances, the CVI
			impression		technique.	technique provided
			techniques were		However for	the lowest deviation
			shown		long-span	although no
			Shown		distances the	significant difference
					conventional	was demonstrated for
					impression	PRI and T4PODwl
					technique	Hardware components
					provided the	of the Trios scanner
					lowest	avhibited an influence
					deviation	exhibited an influence
Complexit	Clinical	20	Dationta' aliminat	No		Within the limitations
	clinical	29	historia	INO	inere is a	of the present of 1
2019	trial	edentulouspatie	talage a little l	comparison	statistically	of the present study,
		nts were	taken, additional	group	significant	the investigated
	1	examined, 27	data were		association	scanners were not

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		maxilla and 5	gathered from		between The	able currently to fully	
		mandibles	the patients, and		overall mean	replace a conventional	
			the		difference	impression for the	
			questionnaire		between the	fabrication of a	
			was filled out by		stone cast,	complete denture	
			the patients. A		digital scans		
			comprehensive		and the		
			physical		computerized		
			examination of		optical scans		
			the edentulous		were 336.7 ±		
			site was done.		105.0 μm (n =		
					32), 363.7 ±		
					143.1 μ m (n =		
					24), and 272.1		
					$\pm 168.5 \ \mu m \ (n =$		
					29),		
					respectively.		
					The visual		
					evaluations		
					revealed		
					highest		
					deviations (\geq		
					500 μ m) in the		
					areas of the soft		
					palate, the		
					sublingual		
					areas, and the		
					vestibule		
Lucio lo russo	Cases and	10 maxillary	The mean	No	. The full-scan	The mean distance	
2019	controls	and 10	distance	comparison	mean distance	between the IOS and	
	study	mandibular	between the full	group	between the	CIS may be	
		edentulous	and trimmed		IOS and CIS	significantly different	
		arches were	IOS and CIS		(-0.19 ±0.18	if they are not	
		investigated	was statistically		mm) was	properly	
			investigated,		significantly	superimposed. The	
			and subgroup		different from	mean distance (-0.02	
			analysis was		that of the	± 0.05 mm) between	
			performed for		trimmed scan	the IOS and CIS falls	1
			the maxillary		mean distance	within the range of	V
L	1	1	1	1	1		

			and mandibular		(-0.02 ± 0.05)	mucosa resilience.
			arches. The		mm), with no	Thus, 3D differences
			statistical		significant	between the IOS and
			significance of		differences for	CIS can be attributed
			the differences		maxillary and	to the different
			between the 2		mandibular	physics behind the 2
			impression		arches. The	impression methods
			methods was		differences	and not to defects in
			also		between the	accuracy of one
			investigated.		IOS and CIS	method compared
					were	with the other. The
					statistically	size of the measured
					significant for	difference between
					full scans; they	the 2 impression
					were not	methods was not
					significant for	statistically significant
					trimmed scans,	and was not clinically
					except for the	significant for
					maxillary	removable denture
					subgroup.	fabrication.
lajla chebeb	Clinical	12 maxillary	Accuracy was	No	The difference	Edentulous
018	trial	impressions	evaluated by	comparison	at the ridge was	impressions made
		were made with	calculating the	group	significant	with PVS, PVSM, and
		impression	effective		when	TRI had similar
		technique.	deviation known		comparing PVS	deviations and may
			as root mean		(0.18 ±0.07	yield clinically
			square (RMS)		mm) with	acceptable results.
			for the entire		PVSM (0.28	Irreversible
			surface (ES) and		±0.19 mm;	hydrocolloids are
			for specific		P=.015) but not	contraindicated for
			regions of		among the other	definitive impression
			interest such as		groups. A	making in completely
			peripheral		significant	edentulous jaws
			border, inner		difference was	
			seal, midpalatal		also found for	
			suture, ridge,		posterior palatal	
			and posterior		seal when	
			palatal seal		comparing PVS	
					(0.55 ±0.41	

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					mm) with		ĺ
					PVSM (0.60		ĺ
					±0.43 mm;		ĺ
					P=.034). Patient		ĺ
					perceptions		ĺ
					showed		ĺ
					significantly		ĺ
					better		ĺ
					satisfaction		ĺ
					scores for ALG		ĺ
					(1.83 ±2.03)		
					and PVS (3.17		
					± 2.40) than for		
					TRI (4.08		
					±2.71), PVSM		
					(4.58 ±2.35),		
					and ZOE (6.83		
					+1.75)		
	Murali Sriniyasan	Cases and	Four (1 male 3	Digital	The mean value	Digitizing edentulous	
	2018	controls	female) subjects	impression were	of difference	iaws with the use of	
	2010	study	who had no	taken using an	between the	IOS appeared to be	
		study	previous	intra-oral	two impression	feasible in vivo	
			experience with	scanner After	techniques	although peripheral	
			oithor	that	ranged from	tissue were not	
			conventional or	conventional	210 to 347 µm	offectively	
			digital	impressions of	219 to 347 µm.	rangeduced On the	
						have a f the member of	
			impression	maxinary	of models	disis of the results of	
			participated in	edentulous jaws	obtained with	this study, the authors	
			this study	were taken with	the two	could not recommend	
				an irreversible	techniques	the use of IOS for	
				hydrocolloid	showed that the	digitization of	
				impression	compression	edentulous jaws in	
				material. Then	given by the	vivo in view of	
				all IOSs datasets	impression	mobile prosthetic	
				were loaded in a	material on the	rehabilitation, until it	
				three-	peripheral	will be found a way to	
				dimensional	areas, such as	give a selective	
				evaluation	oral vestibule	pressure in peripheral	C
				software	and soft palate,	areas as occurs during	V

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	•••••		(3DReshaper		determined the	edging of impression
			2017.Hexagon).		most important	trav
			where they were		differences	
			superimposed		recorded	
			on the model		iccorded.	
			ohtainad using			
			obtained using			
			conventional			
			impression and			
			compared			
lucio lo russo	Cases and	Five patients	The mean	Control group	Current IOS	
2017	controls	with a complete	values for the		equipped with	
	study	lower dental	deviations		the latest	
		arch were	between the IOS		software	
		included in the	results and the		versions	
		present clinical	reference aid		demonstrated	
		study	describing		less deviation	
			trueness,		for short-span	
			standard		distances	
			deviation		compared with	
			desoribing		the	
			describing		the .	
			precision for the		conventional	
			different		impression	
			impression		technique.	
			techniques were			
			shown			

Discussion

The most popular type of prosthesis treatment for total edentulism is removable complete dentures. Making an impression of the edentulous arches is one of the clinical measures that is most important in this type of therapy. Mucostatic, mucocompressive, selective pressure, functional, and neutral zone impressions are a few of the methods to make conventional impressions.^[10]

Additionally, a variety of impression materials, including polysulfide, polyvinyl siloxane, irreversible hydrocolloids, pastes made of zinc-oxide eugenol, and polyethers, can be used. Traditionally, study impressions are created using stock trays and irreversible hydrocolloids or impression chemicals. To provide a high level of precision, final impressions are created using zinc-oxide eugenol pastes or elastomers such polyethers, polyvinyl siloxanes, or polysulfides.^[2]

Certain Problems are faced in fabrication of conventional CD:

- 1. Chair side time
- 2. Lack of pressure equalization during final impressions
- 3. Inaccuracy due to Multi-step procedure

By adding a distinct layer of zinc-oxide eugenol for the inner seal, some writers suggested a third phase that attempted to make a confined compression of the tissues to increase prosthetic retention. For clinical success in terms of technical quality, patient's level of satisfaction or improvements in oral health-related quality of life and masticatory function, a two-step impression method is not necessary. The use of optical impressions in removable prosthodonticsis a rising demand for a fully digital process as of today.

Conclusion

The history of complete denture impression procedures has been largely influenced by the development of new impression materials and techniques. There are various researches for achieving an optimum impression indifferent ways by different researchers. The problem of accuracy still plays a main challenging role in complete denture construction. The present systematic review covered articles published over the past decade, and the following suggestions can be drawn:

- The dentures made with conventional impression technique will provide better retentive force than the dentures made with digital impression technique.
- Most of the studies reported a clinically acceptable range for occlusal trueness and denture base adaptation.
- The digital CDs showed similar or better denture adaptation than conventionally fabricated CDs. The greatest misfit of the intaglio surface of the digital CDs was shown in the posterior palatal seal area and the border seal area.
- The accuracy of digital CDs is influenced by the fabrication technique, the different CAD-CAM systems used, and the long-term service.

 No clear conclusions can be drawn about the superiority of CAD-CAM milling and conventional denture regarding denture accuracy

It can be concluded from the present review that subjects treated using conventional impression technique could be a viable and advantageous alternative to digital impression techniques and can be accomplished using different techniques and materials. The choice of a particular technique should be based on clinical indications, operator skill, and convenience.

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