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Prosthodontics

SHORT STUDY ON OPTICAL SCANNERS AMONG DENTAL PRACTITIONERS – A QUESTIONNAIRE BASED SURVEY AMONG SUB URBAN CHENNAI

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ABSTRACT Intraoral scanners (IOS) are devices for capturing direct optical impressions in dentistry. The purpose of this narrative review on the use of IOS was to: (1) identify the advantages/disadvantages of using optical impressions compared to conventional impressions; (2) investigate if optical impressions are as accurate as conventional impressions; (3) evaluate the differences between the IOS currently available commercially; (4) determine the current clinical applications/limitations in the use of IOS

KEYWORDS : optical scanner, diagnostics, impression making, digital dentistry, sustainable

INTRODUCTION

In current dental practice, incorporation of digital technology has increased to improve diagnosis, treatment planning and better treatment outcomes. The application of 3D technology has become more significant in prosthetic dentistry.

Precision and accuracy of master impressions are critical and an important factor to the overall excellence and marginal fit of definitive fixed restorations. CAD/CAM technology makes the work of clinicians and laboratory technician's easier, accurate and allows for user and patient friendly clinical procedures. CAD/CAM systems are available in different types either it can be digitally scanned and fabricated chairside or that capture chairside digital impressions and then sent to a laboratory. In-office CAD/CAM allows clinicians to provide indirect fixed restorations in the same visit that are accurate and esthetically pleasing.

MATERIALS AND METHODS

This cross - sectional study was a questionnaire survey which contained 10 close ended self directed comprehensive questions which were framed and circulated among post graduates, under graduate students and dental practitioners.

The questions were generated as online survey forms and circulated via the internet (google forms) . In total 103 respondents were selected and the survey was conducted from January 2022 to January 2024 in Chennai city. Responding to the questionnaire did not require any consent as answering was online and with implicit consent. Among the respondents were students 53 and 11 were dental practitioners with practice experience ranging from 1 to 10 years. Most of the respondents were within the age of 40 and so the sample can be considered as young population.

An intraoral scanner is a handheld device used to directly create digital impression of the oral cavity. Light source from the scanner is projected onto the scan objects, such as full dental arches, and then a 3D model processed by the scanning software will be displayed in real-time on a touch screen. The device provides accurate details of the hard and soft tissues located in the oral area through high-quality images. It is becoming a more popular choice for clinicians due to short lab turnaround times and excellent 3D image output. It only takes a minute or two to scan, and the system will be able to produce a detailed digital impression. In this survey Advantages & Drawbacks of digital impressions were assessed .

Digital dentistry work flow pattern & its accuracy of digital impressions were evaluated.

This questionnaire was circulated among private practitioner, teaching faculty, post graduate & under graduate students

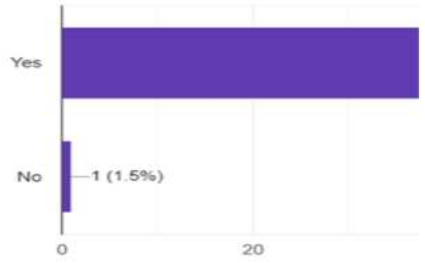
Hence this survey lets us to know about on optical scanners and their importance in private practice among clinician and students.

QUESTIONNAIRE AND GRAPHICAL REPRESENTATION-

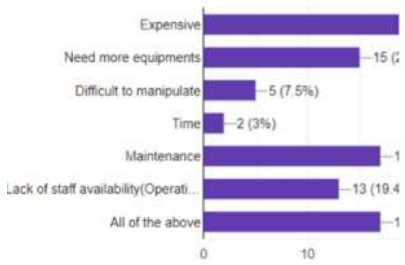
Knowledge regarding application of digital technology in prosthodontic aspect (Multiple Response)	Crown & bridge Fabrication	22 (24.7)
	Implant restoration	8 (9.0)
	Impression making	14 (15.7)
	Maxillofacial prosthesis	6 (6.7)
	Surgical reconstruction	1 (1.1)
	All of the above	38 (42.7)
Do you think accuracy of impression made with the intraoral scanner is better than the conventional one?	Yes	56 (83.6)
	No	11 (16.4)
Disadvantages of using digital technology (Multiple Response)	Expensive	45 (40.2)
	Need more equipment	15 (16.4)
	Difficult to manipulate	5 (4.5)
	Time	2 (1.8)
	Maintenance	15 (13.4)
	Lack of staff availability (Operating staff)	13 (11.6)
	All of the above	17 (15.2)
Digital dental technology will replace traditional techniques in fabricating dental restorations and will have a positive impact on our profession	Strongly disagree	1 (1.5)
	Disagree	2 (3.0)
	Neutral	30 (44.8)
	Agree	21 (31.3)
	Strongly Agree	13 (19.4)
Do you utilize computer software to manage your patient records / practice?	Yes	48 (72.7)
	No	19 (27.3)
Which digital technology do you plan to incorporate in your practice in the future?	Digital shade matching	9 (13.4)
	Digital designing for Maxillofacial prosthesis	8 (11.9)
	Digital occlusion and TMJ Analysis	6 (9.0)
	Digital impressions	11 (16.4)
	Digital smile designing	22 (32.8)
	Others	11 (16.4)
Do you think accuracy of impression made with the intraoral scanner is better than the conventional one?	Yes	11 (16.4)
	No	

Disadvantages of using digital technology (Multiple Response)	Expensive	45 (40.2)
	Need more equipment	15 (16.4)
	Difficult to manipulate	5 (4.5)
	Time	2 (1.8)
	Maintenance	15 (13.4)
	Lack of staff availability (Operating staff)	13 (11.6)
	All of the above	17 (15.2)
Digital dental technology will replace traditional techniques in fabricating dental restorations and will have a positive impact on our profession	Strongly disagree	1 (1.5)
	Disagree	2 (3.0)
	Neutral	30 (44.8)
	Agree	21 (31.3)
	Strongly Agree	13 (19.4)

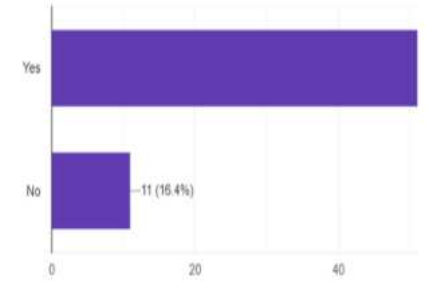
Which digital technology do you plan to incorporate in your practice in the future?/ Would you suggest digital technology in dental practice ?



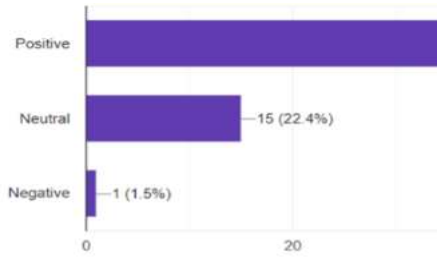
2.Advantages of using digital technology/Disadvantages of using digital technology?



3.Do you have digital radiographs – RVG \ OPG ? / What is your perspective on the emerging influence of optical scanners in dentistry?



4.Knowledge regarding application of digital technology in prosthodontic aspect/What is your perspective on the emerging influence of optical scanners in dentistry?



5.Awareness regarding use of optical scanners in dentistry?/ Have you received any training for any kind of digital dental workflow?

DISCUSSION

In routine dental practice, the era of digital production has taken up a special place. Digital impressions made with intraoral scanners have started to find a comprehensive place in prosthodontic practice. Intraoral scanners have found usage in implant dentistry, especially in complete arch impressions.

Intra-orasl scanners have found greater patient expectance and efficiency cross-reference Jennifer AJO Conventional impression procedures take greater chairside time and also have a have a negative effect on pts Berkman 6 to 8.

For this limitation, conventional impressions will soon be replaced by digital impressions.

This study was aimed at finding the knowledge, ability, and attitude towards usage of digital scans in regular practice.

The questionare study was given to dental fraternity in teaching and non-teaching fields for postgraduate and undergraduate dental students.

The results showed that practitioners and postgraduates had greater knowledge regarding digital scans.

The reason for the apparent awareness is the fact that currently digitization is part of the curriculum for postgraduates, and intraoral scanning companies are conducting extensive courses and programs to educate awareness among private practitioners.

Impressions made with optical scanners are becoming a trend in the current day. For their versatile use, which is patient-friendly, they have become a must in a digital era. In this study, more than half the respondents were positive that optical scanners will become the future of dental impressions. Only one percent of the respondents answered negatively to the question. In research conducted by Beckmann et al. comparing digital and conventional impressions for complete arch implants, the results showed that digital impressions were definitely superior to conventional impressions in cases where multiple implants were used. Regarding the use of optical scanners in their practice, most of the respondents rarely or never used optical scanners. Only 17 percent of the practitioners are using optical scanners regularly in their practice. Though 60 percent felt that usage of optical scanners would save time in the dental office, fewer respondents used it regularly. The reason could be higher cost of initial investment, pt-related factors like saliva, transparency, and the amount of reflection of light from oral tissues, pt movements, and the inability of the scanner tip to reach posterior regions, especially in pts with limited mouth opening. In addition, during jaw movements, the mucosal surface may affect the scanner's ability to locate the reference for getting a definitive occlusal relation.

Ref 11. In this study, the results show that more than 50 percent of respondents agreed that intraoral scanners were better than conventional impressions. The results of the study are similar to other studies that have reported superiority, trueness, and precision of digital impressions. ref jpd 2017 11

The use of cad cam technology, 3D printing, and direct optical measurements has revolutionized the way prosthodontists will function. In this study, 50 percent of the respondents were supportive of the fact that digital technology was useful in prosthodontic practice. The major advantage is digital dentistry's comfort, simplicity of operative steps, and feasibility of better communication between dentists and patients, particularly in the posterior region. Ahmed et al., 11 to 13.

In this study, respondents were asked why they were finding digital technology useful; most of the respondents agreed that digital technology was more effective than conventional procedures. However, cost seems to be the most important limitation and impediment to the usage of dental digital technology. About one-fourth of the respondents required more equipment, maintenance, and special skills to operate within the limits of the study. Though digital technology seems to be a good alternative to conventional procedures, the initial investment and cost were one of the important limitations of the use of digital technology. Limitations of this study include that the study is based on opinion and the attitude of individuals in the future. More demographic data can be collected to give actuals regarding the

usage of digital technologies in dental practice. The results of this study will be helpful as preliminary data to show that digital technology will be the future.

In conclusion, this questionnaire study gives an insight into the knowledge and awareness regarding the acceptance of digital technologies since day-to-day practice in the upcoming generations of practicing dentists. to study mostly consisted of young practitioners who will become the future dental practitioners, and their acceptance of digital technologies shows that soon it will be the future of every dental practice. The study shows and gives a very positive note to the use of digital technologies in the upcoming generations of dental practitioners.

In the current survey questions were asked due to the usage of scanners in dentistry, more than half the responses answered negatively, which indicates that still most dental practices do not have the infrastructural requirements for the usage of intraoral scanners.

With regard to knowledge and use of intraoral scanners by attending courses, it was found that about one-fourth of the responses only had been trained.

More than 75 percent of respondents have not undergone any training for intraoral scanners. This indicates that a greater number of practitioners and students are required to attend special training programs to use intraoral scanners.

Respondants were questioned regarding the availability of digitized instruments in their practice; more than 50 percent of respondents had rvgs and opgs and maintained patient records in computer software. The results show that dental practice in general has the proper setting for use of intraoral scanners.

CONCLUSION

- The Normality tests Kolmogorov-Smirnov and Shapiro-Wilks tests results reveal that all variables follow Normal distribution. Therefore, parametric test are applied to analyze the data.
- Data was entered in Microsoft excel spread sheet and analysed using SPSS software (version 25).
- For test, a p value of <0.05 is to be considered statistically significant.
- Descriptive, Frequency and Inferential analysis is performed.

Chi square test: To assess the difference in the responses to the questions related to Knowledge, Awareness & attitude and Practice towards optical scanners among the study subjects

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