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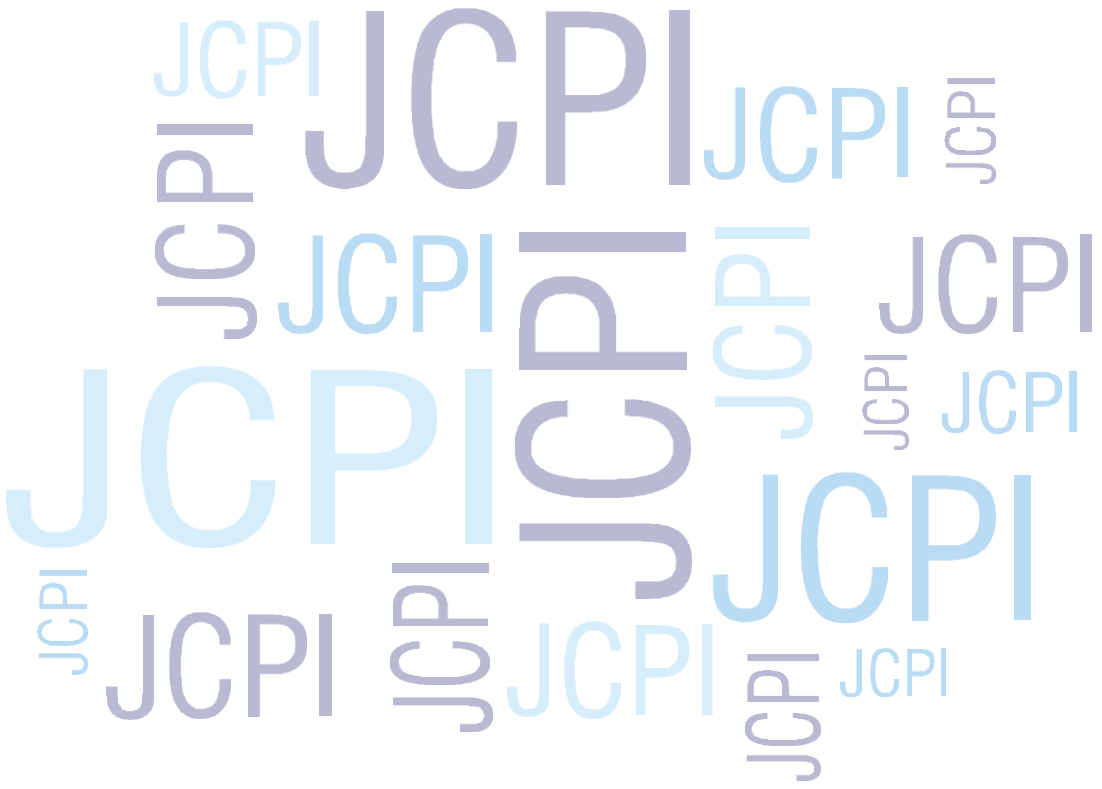

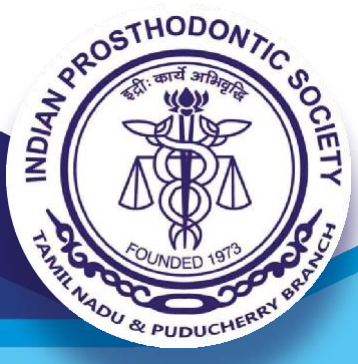

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C O N T E N T S

EDITORIAL

'Where is the Life we have lost in living?
Where is the wisdom we have lost in knowledge?
Where is the knowledge we have lost in information?'
-T.S Eliot

We live in a world where our access to information is unrivaled. And yet, with all of this abundant unrestricted information, we are not cognizant of the vast unknown. What we need are clinicians who can access information that is before them and interpret it, within its context to effectuate pioneering knowledge, and enable clinicians to take that knowledge and distill it down to wisdom that can be easily passed on.

Amongst researchers, the adage "Publish or Perish" emphasizes the importance of providing scripted visibility for research. The phrase makes publishing of evidences, and availing it to the wider users, which is critical for the progress of science.

The best appreciation for any research is its usefulness and practicality, which is evident by the research being cited by fellow colleagues. In this vein, *The Journal of Clinical Prosthodontics and Implantology* is dedicated to advancing knowledge on clinical presentations, trials and related research methodologies. Clinical studies are a vital component of biomedical research; this journal provides an opportunity for practitioners and researchers in sharing this.

At this juncture, i am thankful to the President, Secretary, the Executive Committee members, the editorial board and former editors Dr. Chitra Shankar & Dr. Lakshmi Gopikrishna for upgrading the newsletter of our society to the status of a journal.

As scientific publication is an important component of prosthodontic practice and prosthodontics being a field of constant evolution, readers are encouraged to partake and benefit from the information and vision this journal has to offer.

Dr. Ponsekar Abraham A
Editor
The Journal of Clinical Prosthodontic & Implantology

GUESTE DITORIAL

Documentation is significant for progression of science. This is best done by publishing manuscripts in the Journals. The journal of specialist society is highly valued by all members of the community. In this regard I appreciate the forward step initiated by the IPS- Tamil Nadu branch on the release of the Journal of Clinical Prosthodontics and Implantology. I congratulate the Editor, Dr. A. Ponsekar Abraham, Editorial board members and office bearers of IPS-TN in this progressive stride and wish in near future this becomes a standard platform for documentation

My best wishes
With smile,
Prof.Dr.N. Gopi Chander
Editor
The Journal of Indian Prosthodontic Society

ORIGINAL RESEARCH

Effect of Denture Cleansers on Surface Roughness and Flexural Strength of Heat Polymerised Acrylic Resin – Invitro Study

Sandhya G,[a] Prem Kumar MM,[b] Manimaran P,[c] Dhinesh kumar C,[d] Sai Sadan D, [e] Abirami M,[f]

ABSTRACT

The surface roughness of denture base fabricated with Acrylic resin is crucial in the maintenance of denture hygiene. Rough surfaces are found to accumulate microorganisms which can colonise the microirregularities leading to foul smell and also compromise the health of the oral tissues. This Study was aimed to measure the surface roughness and flexural strength of heat polymerised resin of 180 day use after its immersion in denture cleanser. Two types of heat polymerised acrylic resins Acryln – H and DPI were selected. 40 specimens were prepared out of each resins. Amoung 40 specimens 20 specimens are taken as a control from each of the resins. Then the specimens were immersed in distilled water and in denture cleansing tablet sodium perborate monohydrate. Surface roughness (RA) and flexural strength (S) was measured before and after immersion in denture cleanser solution.The surface roughness were increased in both Acryln-H and DPI heat cure acylic resin materials after immersion in denture cleansers. The flexural strength were much reduced in Acryln-H material on comparing with DPI after immersion in denture cleanser.

Key words: Denture cleanser, surface roughness, acrylic denture

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Denture cleansing is an important measure that can prevent cross contamination and contributes to patient's oral health, denture longevity and overall quality of life.[1] Improper prosthesis maintenance may contribute to formation of plaque, biofilm and pathogen colonization on the tissue surface of dentures, which are the significant factors in the pathogenesis of denture stomatitis.[2]Patient education regarding prosthesis hygiene and maintenance, is one of the main criteria for successful dental treatment. Daily disinfection of the prosthesis usually reduces the progression of biofilm formation on denture surfaces. There are several types of denture cleanser and mainly chemical method of cleansing is preferred nowadays. The main drawback of the denture cleansers is their detrimental effect on physical properties of denture base materials. Chemical method of cleansing is preferred nowadays. The main drawback of the denture cleansers is their

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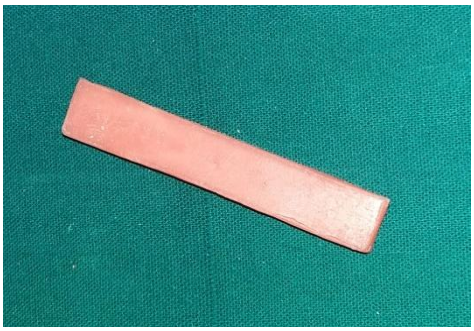
detrimental effect on physical properties of denture base materials.
Since, these hygiene procedures have been shown to alter the physical and mechanical properties of acrylic resins, the short study was conducted to evaluate the effect of denture cleansing tablets (alkaline peroxide). Hence, the aim of this short study was to measure the surface roughness and flexural strength of heat-polymerized acrylic resin after immersion in denture cleansers, simulating a 180-day use. The hypothesis tested was that, immersion in effervescent tablets would influence the surface roughness and flexural strength of denture bases.[3]

MATERIALS AND METHODS

Specimen fabrication: A total of 40 rectangular specimens were prepared[4]from two types of heat polymerisedacrylic resin denture base materials and divided into two main groups based on heat polymerised acrylic resin.

Among 40 specimens 20 specimens is taken as a control from each of the heat polymerised acrylic resins (Acryln-H and DPI). Forty rectangular shaped wax pattern of size 65*10*3mm as per ISO 1567 was prepared respectively[4] [Figure1a] Wax patterns were invested with dental plaster. After setting the flask halves were separated and wax was removed and cleaned. Moulds were packed with two types of heat polymerised acrylicresin (Acryln –H and DPI.)



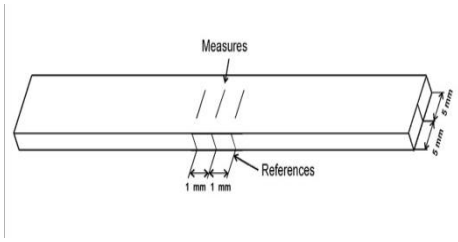


Figure 1a: Wax pattern
Figure 1b: Schematic of surface markings

The specimens were processed in a water at 74 degree Celsiusfor 8 hours and then increasing the temperature to 100 degree Celsius and processing of 1 hour. After polymerisation the flasks were allowed to cool to room temperature before opening. After that resins were recovered and excess was trimmed. One surface of the resin were left unpolished and other surface was polished on wet rag wheel with slurry of pumice.

Four markings [Figure 1b] were made in unpolished surface of specimen, one in half of the width of rectangular specimen and three on length. First marking in length is half the distance of its length and other two 1mm drawn apart laterally to first connecting these points in an area on polished surface of specimen surface roughness measured [3] Each specimen has an separate identity marks according to type of heat cure material with numbers were marked in their respective specimen randomly, as A-1 TO A-20 for Acrlyn-H material in which A-11 to A-20 is control group and D-1 TO D-20 for DPI material in which D-11 to D-20 is a control group for the purpose of easy identification during assessment of surface roughness and flexural strength.

Immersion procedure: Out of 20 Acryln-H and 20 DPI specimens 10 from each type is selected randomly as control (A-11 to A-20, D-11 TO D-20) and both the test specimens and control specimens are immersed in beaker containing distilled water for 0+2hr, [Figure3 a] to eliminate the residual monomer.[1]After immersion in distilled water the measurements are made for surface roughness and flexural strength.

The test group specimens(A-1 to A-10 and D-1 to D-10)were immersed in the solution/water containing denture cleansing tablets for six days with 30 immersions per day simulating 180 days use. Each immersion was done with time interval of 2 minutes in denture cleanser sodium peroxide solution (Clinsodent - ICPA Health products limited)

Figure 3a: Distilled water immersion to remove residual monomer. **Figure 3b.** Control(distilled water) and Experimental immersion (denture cleanser)

The samples are taken and dried with cotton and immersed in distilled water for 15 minute. [3] This

cycle was repeated for entire period of study. [Figure 3b].The control group specimens (A-11 to A-20, D-11 to D-20) were stored in distilled water for entire period of the study [Figure 9].

Specimen analysis:

Surface roughness analysis

Surface roughness is the alteration in the surface of the polished denture surface. Surf test SJ-201P Rugosimeter [Figure10]a surface analyser was used to measure surface roughness of specimens before and after immersion. The stylus of the analyser moved across the specimen surfaceand recorded in four makings that are made in specimens. Roughness of each specimen was calculated by arithmetic mean of the measurements. The tracing length was 2.5mm and cut-off value was 0.8mm,at 0.5 mm/s. The resolution of the data was 0.01µm. Alteration in surface roughness Ra was obtained by difference between roughness before and after immersion.

Flexural strength

Flexural strength represents the highest stress experienced within the material at its moment of yield. It was measured using three point bending test in DL 2000 universal testing machine[Figure11].

Three point flexural test,adopted by international standards for polymer materials, including ISO 1567:1999 Dentistry-Denture base base polymers is the most common technique of measuring flexural properties of denture bases.[8]Specimens were subjected to flections until fracture. Peak load was noted at which the specimens fracture.

Flexural strength was calculated using formula $S=3PL/2bd^2$

S - Flexural strength
P-Peak load applied
L-span length(50mm)
b -specimen width (10mm)
D-specimen thickness(2.5mm)

Statistical analysis:

The surface roughness (Ra) and flexural strength (S) values were submitted via Microsoft excel sheet and subjected for statical analysis using SPSS version 20.The tests applied very normality test to check the normality of data. Intragroup comparison was done using paired T test(student t test) and intergroup comparison was done using unpaired T test (students independent t test). All tests were were performed using confidence level of 95% with a P value of <0.05.

RESULTS

Surface roughness:

The surface roughness were higher with samples after immersion in denture cleanser in both Acryln – H and DPI materials.

The overall comparison before and after immersion procedures using paired t test has significant P values for both test and control specimens.

Flexural strength:

The flexural strength were significantly reduced in both type of heat polymerised acrylic resin specimen samples after immersion in denture cleanser.

The overall comparison before and after immersion procedures using paired T test has significant P values for both test and control specimens. [Table1-4]

DISCUSSION

Denture cleaning being an important part in maintenance of prosthesis and reducing the oral problem, needs to be performed effectively as well as routinely. Denture cleansing methods is of two types, they are mechanical method and chemical method. Chemical method is found to be better and recommended method especially in patients with poor dexterity and in old age people. The use of chemical cleansers is usually associated with mechanical methods, and their efficacy in removing stains and reducing biofilm formation on the surface irregularities of dentures have been reported.

Clinsodent, the denture cleansing tablet is the commercial denture cleansing product containing sodium perborate as the main ingredient. This denture cleansing tablets when dissolved in water readily decomposes to form hydrogen peroxide. This peroxide solution subsequently releases nascent oxygen, which in turn cleanses the surface debris stains via effervescent action.

There are several studies that investigated the effect of denture cleanser on the physical and mechanical properties of denture base acrylic resin,and they showed that effervescent tablets are efficient in removing biofilm and stains,[6]but the alkaline peroxide solution alters the resin properties if not used correctly. [3]

Based on the results of this study, simulating the period of 180 days immersion in sodium perborate tablets, alters the physical properties such as flexural strength and surface roughness. The specimens were reported significant increase in surface roughness and decrease in flexural strength in Acryln-H material than DPI Material. But this immersion in the denture

cleansing chemical solution will not involve any change in physical, chemical and mechanical properties of the acrylic resin if it is used correctly.

Paranhos, et al. in 2013 studied the physical properties of heat polymerised acrylic resin specimens after immersion in alkaline peroxide and alkaline hypochlorite simulating a period of one and half year of use of overnight immersion and concluded that alkaline peroxide does not alter the flexural strength of specimens but causes the noticeable color change where the alkaline hypochlorite causes increase in surface roughness of the specimens after its immersion.[1]

Table 01: Overall comparison before and after immersion using a paired t test

Overall comparison		N	Baseline	Post Test	Mean difference	t value	p value
			Mean ± S.D.	Mean ± S.D.			
Surface roughness	Test	20	5.6 ± 2.15	8 ± 2.92	-2.47	-12.144	0.001**
	Control	20	5.3 ± 2.17	5.9 ± 2.15	-0.58	-10.099	0.001**
Flexural strength	Test	20	66.4 ± 4.26	44.6 ± 4.92	21.86	15.241	0.001**
	Control	20	66.2 ± 3.92	45.4 ± 3.81	20.77	20.495	0.001**

Table 02: Comparison before and after immersion based on Acrylic materials using a paired t test

Based on Acrylic materials used			N	Baseline	Post Test	Mean difference	t value	p value
				Mean ± S.D.	Mean ± S.D.			
Surface roughness	Acryln-H	Test	10	7.4 ± 0.93	10.6 ± 1.43	-3.1887	-13.891	0.001**
		Control	10	7.3 ± 0.90	7.9 ± 0.82	-0.5799	-9.542	0.001**
	DPI	Test	10	3.7 ± 1.12	5.5 ± 1.11	-1.7535	-19.983	0.001**
		Control	10	3.4 ± 0.85	4 ± 0.86	-0.5986	-5.798	0.001**
Flexural strength	Acryln-H	Test	10	64 ± 2.79	41.6 ± 1.23	22.4174	19.203	0.001**
		Control	10	65.1 ± 3.32	42 ± 1.14	23.064	20.786	0.001**
	DPI	Test	10	68.9 ± 4.14	47.6 ± 5.43	21.3085	7.91	0.001**
		Control	10	67.3 ± 4.32	48.9 ± 1.92	18.483	13.267	0.001**

Table 03: Subgroup analysis between test group and control group based on type of material using unpaired t test

		Subgroups	N	Mean	S. D.	Mean difference	T value	P value
surface roughness in µm	Baseline	Acryln -H Test	10	7.4	0.93	0.14	0.356	0.726
		Acryln- H control	10	7.3	0.9			
	post test	Acryln -H Test	10	10.6	1.43	2.75	5.247	0.001
		Acryln- H control	10	7.9	0.82			
flexural strength (MPa)	Baseline	Acryln -H Test	10	64	2.79	-1.1	-0.831	0.417
		Acryln- H control	10	65.1	3.32			
	post test	Acryln -H Test	10	41.6	1.23	-0.49	-0.926	0.367
		Acryln- H control	10	42	1.14			
surface roughness in µm	Baseline	DPI test	10	3.7	1.12	0.32	0.723	0.479
		DPI control	10	3.4	0.85			
	post test	DPI test	10	5.5	1.11	1.47	3.319	0.004
		DPI control	10	4	0.86			
flexural strength (MPa)	Baseline	DPI test	10	68.9	4.14	1.55	0.82	0.423
		DPI control	10	67.3	4.32			
	post test	DPI test	10	47.6	5.43	-1.27	-0.697	0.495
		DPI control	10	48.9	1.92			

Table 04: Subgroup analysis between test group and control group based on type of material using unpaired t test

		test group			control group		
		subgroups	t	p value	Subgroups	t	p value
surface roughness in µm	Baseline	Acryln -H	8.046	0.001	Acryln- H control	9.874	0.001
		DPI			DPI control		
	post test	Acryln -H	8.961	0.001	Acryln- H control	10.254	0.001
		DPI			DPI control		
flexural strength (MPa)	Baseline	Acryln -H	-3.116	0.006	Acryln- H control	-1.291	0.213
		DPI			DPI control		
	Posttest	Acryln –H	-3.421	0.003	Acryln- H control	-9.592	0.001
		DPI			DPI control		

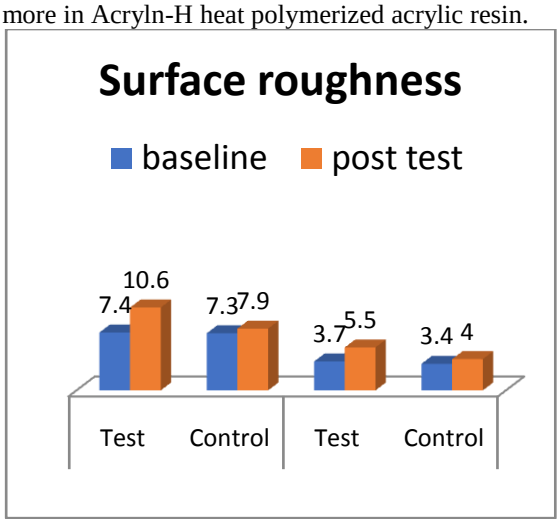
Veeran and Maryan in 1997 compared the candida albicans cells on rough and polished surface of denture base resins and found that more cells in the rough surface. In order to avoid this and to produce smooth and flat surface on the specimens of the present study, the sand papers, wet rag wheel with slurry of pumice was used.[9]

The surface roughness is of particular clinical relevance since it can affect the biofilm formation or make its removal difficult, the critical value of surface roughness is to be 2µm, beyond which the microbial plaque and stains adheres to it.[10]With the use of sodium perborate chemicalcleanser there is an increase in surface roughness that causes difficulty in removal of biofilm, because of inability to remove pellicle formed on acrylic surface.[11]

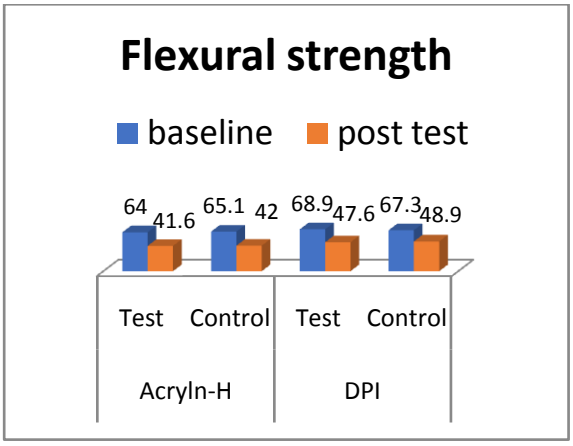
The flexure of the denture base is the important property, where the longevity of the dentures are depends on it.Karin Hermasna NeppelenbroekKH in 2005 [13] demonstrated significant reduction of the mean hardness values of acrylic resin on immersion with sodium perborate.

In the present study, the flexural strength were much reduced in Acryln-H material on comparing with DPI after immersion in denture cleanser. If denture cleansers lead to a reduction in strength, a higher incidence of denture fractures may occur.[11] Immersion in denture cleansers and disinfecting solutions may also decrease the flexural strength of acrylic resins because of resin fatigue and also cause mucosal irritation and allergy on daily usage.[13]

Graph 01:Comparison of surface roughness before and after immersion based on Acrylic materials. The surface roughness of the samples after immersion in denture cleanser were found to be increased in both type of heat polymerizedacrylic resins. On comparison between the two types of heat polymerized acrylic resin(Acryln-H and DPI) the surface roughness was more in Acryln-H heat polymerized acrylic resin.



Graph 02:Comparison of Flexural strength before and after immersion (based on Acrylic materials. The flexural strength were reduced with after immersion in denture cleanser in both Acrlyn-H and DPI Materials. On comparing the Acryln-H and DPI the flexural strength was reduced in Acryln-H.



CONCLUSIONS

From the above results, the heat polymerised acrylic resin specimens after immersion in denture cleansing solutionthere is a significant increase surface roughness in both types of heat polymerized acrylic resin materials(Acrlyn-H and DPI). But significant decrease in flexural strength were found in Acryln-H material on comparing with DPI after immersion in denture cleanser.

Therefore the alkaline peroxide effervescent denture cleansers should be used with caution, (i.e)once a day after brushing the dentures. The patient must follow the manufactures instructions. Thus, the cleaning method applied should not only remove the biofilm but also it should not change the properties of the acrylic resin, or produce deleterious effects.

Further studies can be directed to assess the effect of varying concentrations and immersion periods of chemical cleansers on other relevant physical properties of denture base resins, so as to help the clinician choose the best material.

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CLINICAL REPORT

Alternative Prosthodontic Management Of Segmental Mandibulectomy- A Case Report

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ABSTRACT

Ameloblastoma is a benign tumor of odontogenic epithelial origin commonly affecting the mandible than the maxilla. The ameloblastoma is a rare metastatic neoplasm with lesions causing abnormalities of face and jaw. Abnormal cell growth would affect the surrounding bony structures which could be managed only by surgical excision. Mandibulectomy of various levels could be done depending on the extent of the lesion. Surgical excision of mandible can be done with or without preservation of the basal cortical bone. Prosthodontic management of mandibulectomy patients with alternate options than conventional dentures have not been reported. Here, we report a case of 37 year old male patient with segmental mandibulectomy ` managed with a hollow cast partial denture.

Keywords: Ameloblastoma, segmental mandibulectomy, Hollow denture.

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INTRODUCTION

Ameloblastoma is a benign tumor of odontoblastic origin, mainly affecting the mandible more than the maxilla. Ameloblastomas are generally associated with unerupted teeth causing painful swelling and facial asymmetries. They extend till the ascending ramus of mandible or upto the tuberosity in maxilla. They can be managed by surgical excision with common chances of recurrences. Ameloblastoma in mandible can be surgically managed by excision of part of the mandible involved and surrounding bony structures[1]. Depending on the extent of the lesion, mandibulectomy can be Marginal (involving the marginal bone alone), Segmental (involving segment of the mandible with preserved basal cortical bone), and complete excision of the mandible either in one quadrant or extending till the midline. Cantor and Curtis in 1971[2] proposed a classification of edentulous patients with resected mandibles based on the amount of bone preserved after surgical excision and Firtnell and Curtis gave classification of removable partial denture design for mandible resected patients[3].

Case Report

A 37 year old male patient, reported to Department of prosthodontics, SRM dental college,

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Ramapuram, Chennai, Tamilnadu, India with a chief complaint of missing teeth in lower front and right back tooth region for past six months. Past dental history revealed that patient has underwent surgical excision of the mandible (segmental) with preservation of basal cortical bone in right mandibular region, six months back due to ameloblastoma and has been partially edentulous since then. On clinical examination, edentulism was seen in right mandibular region with preserved basal mandibular bone and no evident asymmetry of face and deviation of the mandible. [Fig 1]

Figure 1. Intra oral view

The present case according to Cantor and Curtis classification is type I, with preservation of mandibular continuity and is Kennedy's class 1V classification of partially edentulous condition as the defect crosses the midline.

Prosthodontic Rehabilitation

In patients with mandibulectomy conventional management is done with removable partial denture. In this case report, as there is continuity of the mandibular basal cortical bone, cast partial denture has been constructed with an alteration of hollow denture fabrication to reduce the overall weight of the prosthesis so as to lessen the load transfer over the resected region.

Diagnostic Impression [Fig2] were made for maxilla and mandible with alginate and casts were made with type III dental stone. Diagnostic cast was surveyed for conventional removable partial denture design and was tripoded. The design included embrasure clasp in 36,37, I bar in 33(RPI),cingulum rest in 33 and simple circlet clasp design in 47.Lingual bar was chosen as major connector with lattice type as minor connector.

Figure 2. Diagnostic impression and cast

Mouth preparation was done based on the design. Sufficient reduction was done in rest seat areas and guiding planes were prepared in 33 and 47. Elastomeric final impression was made with addition silicone and master cast was obtained using Type IV Gypsum (Die stone- Ultra Rock) [Fig 3].

Figure 3. Final impression

Wax block-out was done and duplication of master cast with reversible hydrocolloid (Agar) was carried out. Refractory cast was obtained and wax pattern was fabricated, invested and casted and the framework was finished and polished. Try-in of metal framework was done [Fig 4].

Figure 4. Metal framework try in

Teeth arrangement was done on trial bases prepared over the metal framework and wax-trial carried out. The master cast with tried in acrylic teeth was duplicated with irreversible hydrocolloid impression material (alginate) and cast was obtained. A template was fabricated with the duplicated master cast to determine the height and width of space available for placing the hollow material [Fig 5].

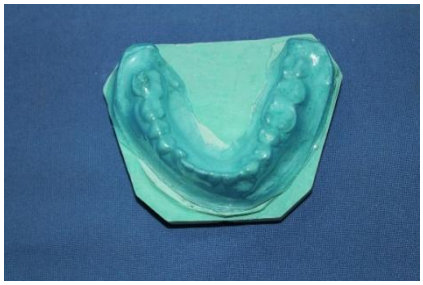

Figure 5. Duplicated cast with template

Master cast with complete wax up of teeth was initially flasked and dewaxed as conventional procedures of processing. After dewaxing, base of another counter flask was used to flask the master cast to obtain shim denture base. It was again dewaxed and packed with heat cure acrylic (Polymethyl methacrylate-DPI) to obtain the shim denture base, which was then retrieved and finished [Fig 6].

Figure 6. Shim denture base

The shim of the acrylic denture base was placed in the master cast, and the available space was determined using the template to place the Thermocols (hollow material). Small striations were made in the shim denture base and thermocols were stabilized with cyanoacrylates [Fig 7].

Figure 7. Thermocol placed

Finished and polished denture was delivered to the patient after evaluation of fit, comfort and esthetics [Fig 8]. Post insertion review was done and the patient was satisfied with the function and esthetics of the denture.

Figure 8. Denture Placed

DISCUSSION

Cysts or tumors can be managed by surgery, chemotherapy or radiotherapy depending on the extent of the lesion which will eventually determine the extent of rehabilitation needed for specific patients[4]. Various authors have described about prosthodontic management of resected edentulous patients. Normal occlusion as present earlier cannot be achieved even though mandibular continuity is not altered. Teeth are placed in lingual relationship[4,5,6].

This article reports a case where the mandible has been segmentally removed with preservation of basal bone (Cantor and Curtis Type I) and the edentulous space extends beyond the midline (Kennedy's classification class IV). There was no evident mandibular deviation as there was not much of soft tissue loss and adequate intercuspation with opposing natural teeth was present[7,8].

Implant supported fixed prosthesis or cast partial denture are the two treatment modalities for mandibulectomy patients. Implant supported prosthesis could not be advised due to inadequate bone support and financial constraints[9].

Type I mandibulectomy patients could be managed with cast partial denture as there is not much of anatomic and functional suppression. The prosthesis design should basically follow the principles of broad stress distribution, optimization of the prosthesis and cross arch stabilization. This design supports the resected region and maintains the proportion of the missing segment thereby rehabilitating the anatomic form and function. [10]. Hollow dentures are preferred in severely resorbed ridges to minimize the occlusal load over the ridges that could accelerate ridge resorption. Hollow space is created within the dentures which could reduce the overall weight of the prosthesis thereby decreasing the occlusal load. The hollow space could be created using putty, salt, sugar, thermocols and cotton. The use of hollow materials in fabrication of dentures reduce the weight of the

prosthesis and they are usually indicated in severely resorbed ridges. [11] The denture provided support to collapsed lips and cheeks, restored function with ease and enhanced esthetics. The patient was well satisfied with the lightness of the denture.

CONCLUSION

The case report describes simple and effective prosthodontic management of patients with type I mandibular resection for treatment of ameloblastomas. This can be an alternative for conventional removable prosthesis enhancing patient satisfaction and comfort. This alternative method of fabricating hollow denture reduces the amount of load transferred with an added advantage of light weight prosthesis over the surgically resected region. This design has improved the patient compliance and satisfaction in terms of function by restoring the facial form.

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CLINICAL REPORT

Cone Beam Computed Tomography [CBCT] in Guided Implant Surgery -A Case Report

Jayashree M,[a] Mohan N,[b] Sunantha S,[c] Parithimar K[d], Paul J[e]

ABSTRACT

Cone Beam Computed Tomography [CBCT] is a newer dental imaging which helps in planning implant position and selection of the length and width of the implant to be used. It can also clearly demarcate or relate the relationship of vital structures to planned implant position. This case report describesa systematic approach to a CBCT based implant planning and surgical guidance. The easy steps, result in transferring the accurate detail to the surgical site and there by achieving success.

Key Words: Guided Implant surgery, All on 4 Concept, CBCT

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Esthetics plays a huge role in our lives. Individuals with missing anteriorteeth avoid meeting people, hardly smile and shun from socializing with others.Implants have become a viable option for the replacement of missing teeth either anterior or posterior.

The introduction of endosseous implant treatment has initiated a revolution in oral rehabilitation for partially and fully edentulous patients.

The concept of 'Osseointegration' introduced in the mid-sixties soon has shown to deliver predictable long term success rates in replacement of teeth. Cone Beam Computed Tomography [CBCT] is becoming increasingly popular in planning of treatment with implants in the restoration of dentition. The conventional computed tomography popularly known as CT scan have been replaced in the dental fraternity with CBCT.[1]

With the introduction of newer Digital imaging, predictable Implant planning is possible.[2,3,4]Presented below is the case report of a guided implant surgery performed in an individual requiring complete rehabilitation of dentition.

CASE REPORT

The patient is 64 years of age, male, completely edentulous with no relevant medical or systemic conditions or illnesses which preclude implant treatment. The patient demanded for a fixed replacement.

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The basic requirements for guided surgery are, a cast made out of an accurate impression and the CBCT of the patient. Mguide Guided implant stent is prepared usingstereolithography. With the help of special surgical drills, it is possible to carry out the implant placement in a very simplified manner. Orthopantomogram was taken to rule out any basic pathology and CBCT was taken of maxilla.[Figure 1]

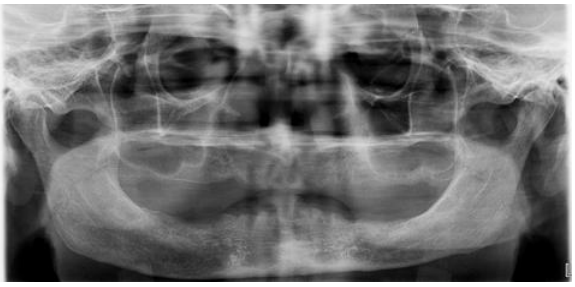

Figure 1.Orthopantogram of the patient

Accurate impressions were made with elastomeric impression material and with help of M guide - Guided Implant Stent was prepared using stereolithography models.[Figure 2 &3] The maxillary surgical stent was tried and the area anesthetized with local anesthetic.[Figure 4 &5] The surgical procedure for maxilla were performed under local anesthesia. Broad spectrum Antibiotics (Clavulanic acid + Amoxicillin) were given 1 hour before surgery and dailyfor five days thereafter. Analgesics were given for 4 days and then just if needed.A surgical template for ostectomy was positioned and fixed with two anchor pins. [Figure 5]Flapless guided surgery was carried out and Implants were placed through the sleeves of the surgical template in the planned anatomic sites.[Figure 6] Four implants [ADIN Dental Implant Systems Ltd, Afula, Israel], were placed, Insertion torque of 35 nm was given.With guided implant surgery the accurate placement of implant in the planned position was possible. [Figure 7]

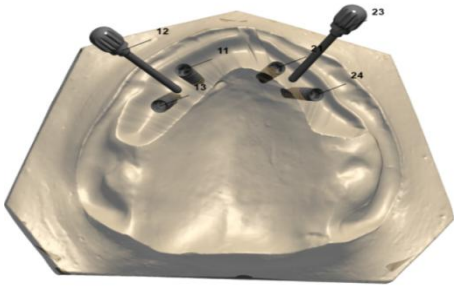

Figure 2.Virtual Planning on the Model

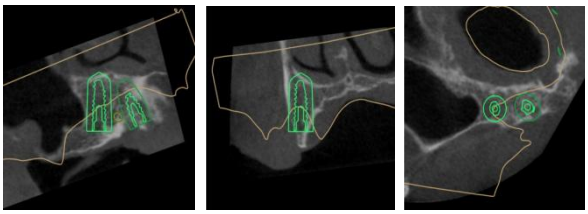

Figure 3. CBCT with Implant site planning using MGUIDE

Figure 4.Surgical Guide

Figure 5.Placement of Surgical Guide

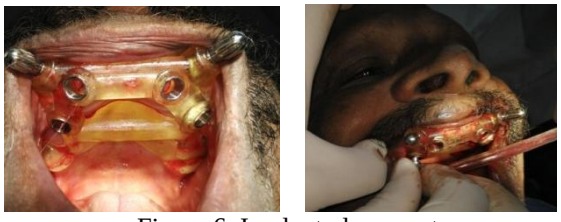

Figure 6. Implant placement

Figure 7. All on 4 implant placement and radiographic presentation

The guided implant surgery kit includes the length of the drills plus the sleeve thickness which enables accurate placement of implants and the procedure can be completed in less time. The patient was followed up, evaluated for osseointegration and planned for rehabiliatation later.

DISCUSSION

Evolution of Imaging Technology

Since the introduction of X-rays by Wilhelm Roentgen more than a century ago, the imaging techniques have improved over the years. the conventional computed tomography which was widely used in Implant planning, is being replaced by the newer one, CBCT (cone Beam Computed tomography). CBCT is redefiningprecision in Guided implant surgeries. Only an exhaustive and comprehensive radiological assessment can provide the necessary information to select such optimal sites and the number and size of implants to be placed. The selection of the radiological technique should be based on weighing the required image quality against the radiation risks and costs involved. In the perspective of implant surgery, a correct identification of some anatomic structures such us the mandibular canal is important to avoid nerve damage or other perioperative complications.

Computed tomography is a very common imaging technique, which allows the capture of information through a spiral movement of the radiation source and the detectors around the region of interest. For maxillofacial applications, dedicated software was developed capable of reformatting the data of the axial slices into panoramic images and multiplanar cross-sectional images. The advantages offered by computed tomography (CT) technology are direct volumetric reconstructions, faster data transfer to workstation and archives device, and faster and easier data transformation for use in 3-D analyses including functional imaging and real time imaging for guiding interventional procedures. On the other hand, CT sections impart relatively high radiation doses to the patient. This radiation dose has to be balanced by the required information for implant placement. Its use can seldom be justified except for the imaging of large jawbone segments. A further development and improvement of CT equipment has inspired researchers and clinicians to use it as low-dose CT. This is where the cone beam CT may offer a promising alternative approach.

With CBCT technology, the images can be recorded in less than a minute. Dental clinicians can have the diagnostic quality of periapical radiographs, panoramic radiographs, cephalograms, occlusal radiographs, and TMJ images at their disposal, along with views that cannot be produced with regular radiographic machines such as axial and cross-sectional views. A number of clinical applications have already been reported in the literature.

Implantologists have long appreciated the value of 3-dimensional imaging. Conventional CT scans are used to assess the osseous dimensions, bone density, and alveolar height, especially when multiple implants are planned . Locating landmarks and anatomy such as the inferior alveolar canal, maxillary sinus, and mental foramen occurs more accurately with a CT scan. The use of the third dimension has improved the clinical success of implants and their associated prostheses, and led to more accurate and aesthetic outcomes.[5]

With CBCT technology both the cost and effective radiation dose can be reduced. CBCT has been in use in implant therapy and may be employed in the clinical assessment of bone graft quality following alveolar surgery in patients with cleft lip and palate. The images produced provide more precise evaluation of the alveolus. This technology can help the clinician determine if the patient should be restored or if teeth should be moved orthodontically into the repaired alveolus.

Guided Surgery in Dentistry

The Guided implant surgery is carried out in a very simplified and predictable manner. A surgical guide is a medical device that is 3D printed based on a CBCT and is custom-made for the specific patient. It is used to accurately assist in immediate placement of an implant in the bone structure. It replicates the exact surfaces of the patient's intraoral situation and assists the surgeon to perform the clinical application of drilling implants into the bone with optimal accuracy. Once the surgical guide is placed on the patient's jaw, it uses sleeves to help guide your surgical instruments and, if appropriate, your implant, accurately to the position you have accurately planned. It presents easy visualization, diagnosis and planning. Good Predictability with just a raw

DICOM data from commonly available CT scanners has attracted its users.[7, 8]

CBCT image data is loaded into our software providing the dentist with a user-friendly interface for viewing the anatomy of the dental implant site. The software allows the dentist and technician to plan with confidence the optimal location for dental implants taking into account anatomical, functional and aesthetic considerations. The treatment plan decided upon and approved by the dentist is then printed using resin.Use of surgical guides helps in reduction of surgical time, reduced trauma, pain swelling, short recuperation time, accurate transfer from virtual to clinical setting, improved prosthetic results and enables immediate loading and flapless surgery in selected cases.Guides are manufactured from medically approved acrylic resin. Drill sleeves are medical grade titanium tubes.T he correct angulation is built into the guide and the exact length is known from the top of the sleeve to the apex of the implant. Many surgeries can be done flapless.
All the above said advantages along with accuracy, precision and smart approach to surgery has benefitted the patient towards better quality of care.

CONCLUSION

There can no doubt that CBCT has made guided implant surgery simpler and more precise.
Conflict of Interest: None Declared

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CLINICAL REPORT

Full Mouth Rehabilitation with Mandibular Precision Attachment and Cast Partial Denture & Conventional Maxillary Denture-a Case Report.

Jayashree M,[a] C.Subashini,[b] Parithimar K,[c] Syed Ershad,[d] Sunantha S[e]

ABSTRACT

A prosthesis should fulfill the needs of the patient and also meet the biological, mechanical, and esthetic considerations.Among the various methods of oral rehabilitation, precision attachments are viable alternative to connect fixed (FDP) and cast partial dentures (CPD).Precision attachment partial dentures have been used successfully on natural tooth abutments.The advantages of attachment retained CPD are improvements in appearance by virtue of its design without a clasp assembly and renders improved biomechanics.There are significant number of patients who could benefit from this treatment option. The proposed article is a case report which is intended to provide an overview of a simplified approach to this treatment modality.

Key Words: Full Mouth Rehabilitation, Precision attachment, Cast Partial Denture

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Rehabilitation of a Class I and Class II Kennedys partially edentulous arch can be quite challenging with respect to the support availability, retention and stability needs of the prosthesis.[1]

Fixed dental prosthesis using the remaining teeth to replace a distal extension situation may not be a feasible option because of unfavourable biomechanical factors. The use of dental implants may be an option, if conditions permit otherwise.

Sometimes, it is not uncommon where fixed option through entirely tooth or bone support is not possible. In such cases connecting a fixed prosthesis to a cast partial denture [CPD] by using precision/ semiprecision attachments may be a viable option.[2]A successful prosthesis in such challenging situations require meticulous planning in a carefully selected cases to offer optimal esthetic and functional result. Precision attachments offer considerable advantages in dentistry because of their flexibility in the options available and their use in various clinical situations.[3] Prosthetic Treatment has taken a new direction with

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the advent of precision attachments. Precision attachments could be extracoronal or intracoronal. Intracoronal describes an attachment within the confines of the cusps and normal proximal axial contour or within the normal contours of the crown of a tooth. Extracoronal is described as that attachment which exists beyond the confines of the anatomy of the crown portions of a natural tooth. The extracoronal attachment provides either a rigid or resilient connection between the teeth and the prosthesis. Attachment-retained cast partial dentures facilitate both esthetic and functional replacement of missing teeth.[4,5]

This article describes rehabilitation with precision attachment retained cast partial denture for the partially edentulous [Kennedy's Class I] mandibular arch and a conventional complete denture for the maxillary arch.

CASE REPORT

A 62 year old female patient reported to the Department of Prosthodontics of our institution, needing replacement of teeth for completely edentulous maxilla and partially edentulous[Kennedy's Class I] mandible. She complained of chewing disability and poor appearance of her face following loss of teeth. Intra Oral Examination revealed acrylic crowns over mandibular anterior teeth and otherwise healthy completely edentulous maxillary arch bilateral distal extension partially edentulous mandibular arch which are not restored with dentures. There is an obvious collapse of the vertical dimension because of lack of posterior support. Radiographic examination with Orthopantograph revealed root canal treated mandibular anterior teeth with no evidence of periapical pathology. Diagnostic casts were mounted to evaluate the restorative space and for the choice of options available. Based on the above mentioned investigations possible treatment options like implants, conventional cast partial dentures and attachment retained cast partial dentures were explained to the patient. Attachment retained partial dentures for the mandibular arch was chosen by the patient and Implant supported prosthesis was ruled out due to financial constraints. Conventional Complete Dentures was chosen for the Maxillary arch.

Special tray was fabricated over primary cast and border moulding and secondary impression were made for maxillary arch.[Figure 1a] Crown preparation was refined in mandibular central lateral, canine and first and second premolars on right and left side, and impression was made with vinyl polysiloxane elastomeric impression material[GC-Flexceed®, GC, India] using two step putty wash technique. [Figure 1b]

Figure 1a and 1b. Maxillary and Mandibular impressions with vinyl poly siloxane impression material

The maxillary cast was oriented on to the semi adjustable articulator [Hanau™ Wide Vue articulator, Whipmix Corporation, USA] with a facebow record [Hanau Spring Bow™, Whipmix Corporation, USA] and the mandibular cast was mounted with centric interocclusal record. [Figure 2]

Figure 2. Face bow Transfer to semi adjustable articulator

Cobalt Chromium alloy metal substructures were fabricated for the mandibular anterior teeth, with rigid extra coronal precision attachments [OT CAP, Rhein 83 Inc, USA] with a vertical freedom of movement and an activation portion were cast on the distal surface of the mandibular right and left first premolar.[6,7,8][Figure 3]

Figure 3. Metal coping Try in

Extra coronal OT CAP arecastable attachments with elastic retention. With its elasticity it can control the flexure and construct a resilient and shock absorbing prostheses. The patrix portions were positioned during the fabrication of the crown wax patterns using a dental surveyor.

The casting procedures were executed, following standard protocol to obtain a rigid connection between the FPD and the patrix portion. Additional care was taken during the finishing and sandblasting procedures of the casted FPD to avoid abrasive wear of the attachment. As the matrix portion need not be welded to the framework, it was picked up from the patrix portion using autopolymerising acrylic resin. This procedure facilitates long-term repair and/or attachment activation or replacement.[9,10]

The metal copings were clinically examined and the marginal fit was verified. The metal copings were placed on the prepared teeth and pick up impression was made with elastomeric impression material. The FDP/cast assembly was duplicated with reversible hydrocolloid, and a refractory cast was produced. Lingual bar major connector was designed. Framework trial was done along with the bisque trial of mandibular anterior teeth. [Figure 4] Centric Inter occlusal record was taken.

Figure 4:Framework try in

Figure 5. Maxillary and Mandibular prosthesis try in

The artificial teeth were selected and positioned using the form, occlusal plane and color reference.[Figure:5].O-Ring is held into the denture base acrylic (matrix portion) by a metal ring. This allows for ease in replacement of the rubber O-Rings if they are worn out in the future with minimal damage. To ensure adequate seating during FDP cementation, the prostheses were attached extraorally, and glass ionomer cement was used. This procedure must be carried out when attachments are used for the association of an FDP/RPD, because a minimal error during FDP cementation may compromise the oral rehabilitation.[11,12].Maxillary conventional denture was processed. Final prosthesis was given. [Figure 6]

Figure 6. Maxillary Complete Denture and MandibularAttachement retained cast partial denture

The patient received oral hygiene and care instructions in writing and was educated on maintenance care of his prostheses. During 1and 2week control appointments, and after 6, 12 months follow-up, enhanced esthetic appearance and improved retention could be observed.

CONCLUSION

Challenges in Prosthetic rehabilitation in distal extension situations can be overcome by use of smart devices like precision attachments which can provide a superior, effective prosthesis in esthetics and function. Appropriate planning and meticulous execution are key to success in treating such cases. In this case report esthetic and functional outcomes are highly satisfactory.

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CLINICAL REPORT

Markus Bader– Surgical guide: An alternate for CBCT generated implant surgical guide

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ABSTRACT

Computer generated implant surgical guides with the help of CBCT, help in the accurate positioning of implants. However, the high cost and high dose of radiation limits its usage forconventional procedures. Through this study, we intend to introduce an innovative device which uses values obtained from a measurement software to customize a surgical guide for implant placement. We aim at reducing the dose of radiation for the patient as well to place the implants as precisely as a CBCT generated surgical guide thus, providing us with an easy, cost effective and accurate alternative to a computer generated surgical stent.

Key Words: Surgical Guide, CBCT generated guide

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INTRODUCTION:

The concept of stents which act as surgical guides for an accurate implant placement is now bridging the gap between diagnostic and pretreatment time lapse[1]. This is done, in order to reduce the time of surgery and also to precisely place the implants in relation to the available bone in bucco-lingual and mesio-distal directions. The advantage of these types of stents are quite variable and available for different implant systems as well.

Depending upon the amount of surgical limitation offered by the surgical guides, they are classified as either non-limiting, partially limiting or completely limiting surgical guides. With the advent of 3D printing and Stereolithography, the accuracy of these surgical stents are very good[2]. Owing to the cost of fabrication of this type of surgical guide and to reduce the dose of radiation the patient is put through, the usage of these surgical guides are limited in everyday practice. Hence, we have developed an innovative device with degrees of measurement embedded in it, to transfer the readings from diagnostic casts, so as to fabricate a surgical guide which works as precisely as the CBCT generated surgical guide.

CASE REPORT:

A 29 old male patient, reported to the department of prosthodontics for the replacement of his missing teeth in upper right back tooth and lower left back tooth region for the past 3 months. The radiograph explains the missing 14 and 36 tooth with sufficient amount of bone available for implant placement (fig 1). Following the treatment plan, bone mapping was done in the diagnostic cast to assess the width of the available bone(fig 2 and figure 3).

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This is done, so as to evaluate the diameter of the implant to be placed. The center of the ridge is marked, to locate the position of implant placement in the center of the available ridge.

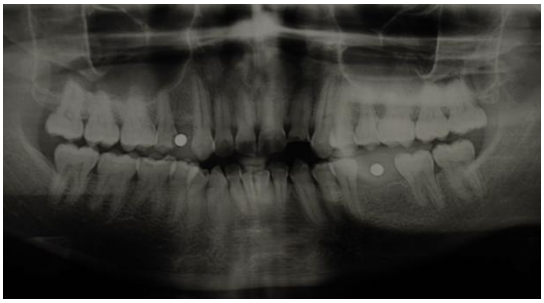


Figure.1-Pantamograph of the patient showing missing 14 and 36

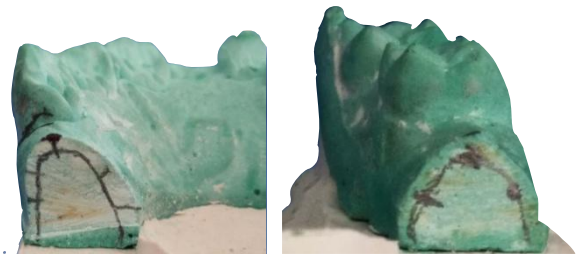
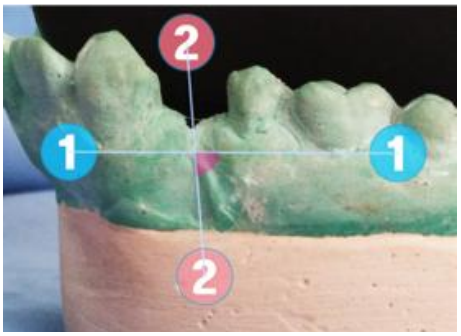


Figure.2 and 3-Bone mapping done in relation to 14 and 36 respectively

The image of the bone mapping of diagnostic cast as well as the edentulous space in relation to abutment tooth is taken and fed in to protractor software application in our mobile phones. When using this software, the preferred angulation for placement of implant in mesio-distal direction is measured using the side of the cast fig 4) and bucco-lingual width is measured using bone mapping image.



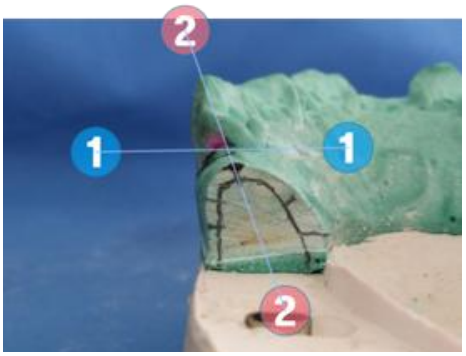


Figure 4-Buccolingual and mesiodistal measurement in relation to 14

The degree of angulation is directly measured from the software for both bucco-lingual and mesio-distal direction of placement of implant. With the help of the innovative device which we fabricated, the two angulations are marked such that the center of the pointer is placed in the center of the ridge in the edentulous area. A guide sleeve of 2mm inner diameter is attached to the pointer and placed over the ridge and stent is fabricated with clear acrylic which includes two adjacent teeth on either side of the ridge to ensure the fit of the surgical guide (fig.5)

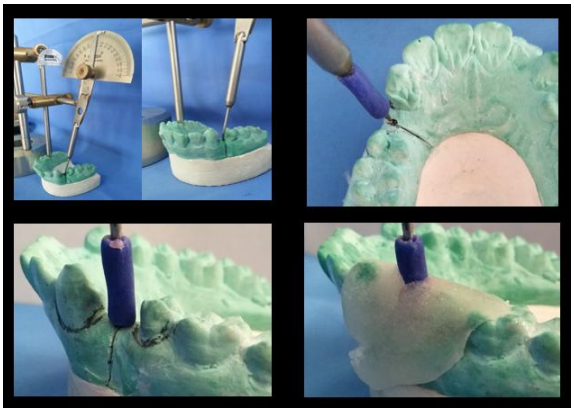


Figure.5 - fabrication of surgical stent with the device. Acrylic sleeve of inner diameter 2mm attached to the pointer for pilot drill(blue color is added to the acrylic in order to differentiate from the surgical stent)

With the help of the customized surgical guide, the implants in relation to 14 and 36 are placed. After the drills, the angulation for parallelism was also checked to verify the angulation of the implants respectively. Post-operative radiographs angulation was also checked to verify the precise angle transfer from device to the surgical stent.By this method, we have established the accurate

placement of the dental implants without the use of any CBCT or any other sophisticated method for fabrication of implant surgical guide stent (fig.6)

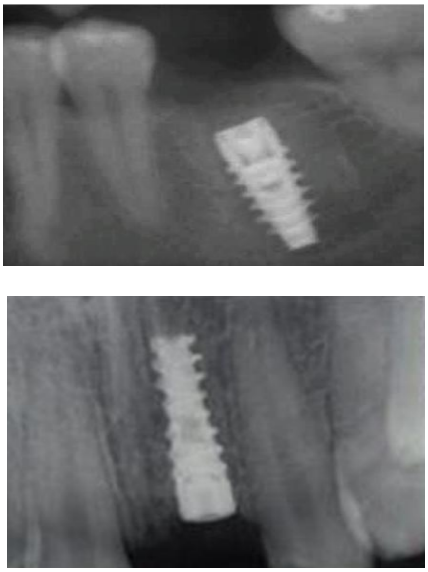


Figure 6- Post operative radiographs for confirming the angle of placement of implants

DISCUSSION:

The precise placement of dental implants is very crucial owing to the presence of anatomical structures such as mandibular canal, incisive foramen, maxillary sinus floor etc. Usage of guided implant placement is now widely prevelent with the use of CBCT and 3D printing as well. Due to the high cost for fabrication of these stents and as well as high radiation exposure of CBCT, these guided implant stents are not quite commonly used. In order to avoid the errors caused due to improper positioning and placement of implants, we designed a device for transfer of the measurements from the cast to the oral cavity, so as to accurately place the implants according to those measurements. DP Sarment et al, advocated that the transfer of the angulation to the device for formulation of the surgical stent played a vital role in implant placement[3].

The importance of guided implant placement is widely accepted in order to preserve the surrounding natural teeth and also the surrounding anatomical structures. The main advantage of the guide we fabricated is that it is cost effective, easy to use, more precise, the angulations can be measured in all directions and reduced radiation exposure. The various other innovations that can be done in the same device is introduction of various drills at the pointer end so as to convert the partially limiting guide sleeve into a completely limiting sleeve for accurate implant placement.

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SHORT COMMUNICATION

The path less taken in clinical research

Anitha K V[a]

INTRODUCTION

Integration of various dental specialties plays a crucial role in restoration of diseased or lost dental component.Promising clinical research across different dental specialties are done individually with very less collaboration between disciplines. Aquality interdisciplinary communication, can have definitive positive impact on patient's treatment outcomes.[1]

Several benefits like exchange of scientific intellectual thoughts towards common goal is possible, invocation of fresh ideas/concepts between specialists, increased productivity in dental services, and management of complicated clinical situations can be handled with great ease.Rendering proficient treatment when skillful operators of various branches manage aclinical scenario, enhances intrapersonal and interpersonal professional relationships to mutually help each other are documented with interdisciplinary integration.[2]

To achieve optimum results of such approaches the undermentioned traits serve as base guidelines in providing competent dental services.[3]

- **Framing of concrete working associations** among dental fraternities.Koch in his research has described ideal relationship as one in which the members are courteous, readily acceptable and maintain genuineness. Each team mate is committed to working as a group towards a common goal maintaining professional ethics.
- **Identification of levels of responsibility**in research, so that various role authorization is made depending upon the potential and inclination of each person.The major intellectual contributor occupies pivotal role in research.
- **Dividend principle** to achieve one common destination in research so that the entire work is shared between team mates to make each one accountable for the research outcome.
- **Acceptance of conflicts of interests** among the team researchers, as each individual poses independent schools of thoughts. Active and healthy deliberations in the research topic can aid to taper until uniform consensus is obtained.
- **Maintenance of professional ethics**throughout the organizational body. This helps in achieving excellence in professional and personal patient care

CURRENT LACUNAE OF INTERDISCIPLINARY CLINICAL RESEARCH

Only scarce research is performed with integrated methodology.Each specialty works independently to

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prove the superiority of one over the other. Most of our researches are done on laboratory settings, instead of clinical studies.Lack of resources in the form of equipment, animal research labs, funding or grants leave us with substandard researches in the dental field.Structural working environment as individual departments mandates a person to adhere to specific discipline rather than collaborative effort.Insufficient awareness about the benefits of team effort among the dental health care professionals,conditionally blinded to refer patient in situations where other specialist's involvement is needed have become habitual.Numerous confounders play their role in completing a multi-disciplinary clinical research and are primarily divided into subjective and objective variables. Human resource in the form of intellectual property, quality time contribution by resource personnel and dexterity or skill of operator are considered as subjective variables. Availability of technological aids, actualizing resource materials required and financial grants/aids serve as objective variables.[4]

Overcoming the barriers to promote interdisciplinary clinical research

○ Create awareness of transdisciplinary health care approach
○ Implement in dental schools as stringent curriculum protocol
○ Identify members showing willingness to share common goals in research
○ Frame concrete mutual working environment
○ Furnish and share intellectual thoughts towards clinical research

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