



*The Journal of*

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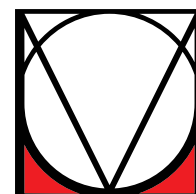
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FROM THE EDITOR'S DESK



**DR. NEELAM PANDE**

*“Hope is wishing for a thing to come true. Faith is believing it will come true. Work is making it come true.” - Dr. Norman Vincent Peale*

It's my privilege to be editor of “The Journal Of Prosthetic Rehabilitation”, IPS Nagpur Branch during 2023. IPS Head office celebrated 50 years and hosted Golden Jubilee Conference at Delhi between 10th -13th November 2022, which was a grant event in the history of Prosthodontics. IPS Nagpur Branch members including post-graduate students from Nagpur, Wardha, Amravati and entire Vidarbha region conducted PCC, participated in scientific & cultural events and won attractive prizes during this mega event.

Enriching our brains with new and valuable information improves our ability to think, analyze and process the world around us. The learning process is important because it results in new knowledge: knowledge that opens our minds to new perspectives, ideas, beliefs, cultures and solutions. Awareness about different perspectives and worldviews helps any person quickly adapt to new and unfamiliar environments. It also sparks the imagination and helps us tackle unfamiliar challenges. With this truism, the present issue contains the original research, review articles and clinical case reports in Prosthodontics. I hope this issue inspires the members and post graduate students to share their research and clinical work for exchange of knowledge.

I would like to take this opportunity to sincerely thank my fellow colleagues Dr. Surekha Godbole/ Dubey, President IPS Nagpur Branch for her constant support and also to Dr. Rajlakshmi Banerjee, Secretary for her precious suggestions. I would like to extend my thanks to, all the advisors, Co-editor, Guest editors, Section editors, Peer Reviewers, EC members and entire Branch members for their help.

Jai Hind! Jai IPS!!

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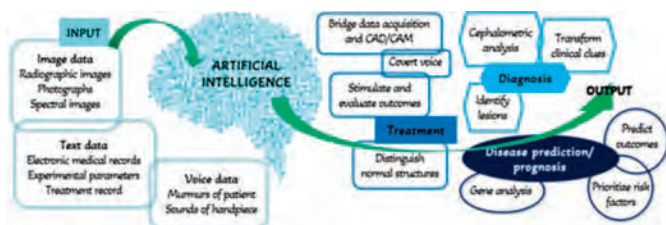


## ● Artificial Intelligence in Prosthodontics



**DR. NAISARGI SHAH**

The rapid pace of development in this digital era along with everyday life is also reflected in dentistry, including the emergence of the first systems based on artificial intelligence. AI applications have become a routine part of digital everyday life, for example in the form of virtual assistants such as “Siri” or “Alexa”. Inspiration for the formation of artificial networks can be stated back in the biology of the human brain. “An artificial neuron is a mathematical function conceived as a coarse model of a biological neuron.” In Dentistry, AI algorithms are ubiquitously used for image processing and Digital dental processes are continuously being standardized and are becoming part of routine treatment protocols recently<sup>1</sup>. In particular, computer-aided design/computer-aided manufacturing (CAD/CAM) procedures have found their way into everyday clinical and laboratory practice<sup>1</sup>. Digitization in dentistry continues to develop and new trends are emerging, including the application of AI.



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**Hierarchy of Artificial Intelligence System in dentistry 2:** In Prosthodontics CAD/CAM has its routine implications in clinical as well lab practices. AI integration with CAD/CAM increases its chairside use in various aspects of Prosthodontics such as use of treatment planning softwares like DTS Pro, virtual planning in Fixed and Removable Prosthodontics, Implant dentistry and Maxillofacial prosthesis.

**AI in fixed and removable Prosthodontics:** The integration of AI in treatment of partial edentulism helps in designing of the final prosthesis of FDP/CPD thus reduction of tedious manual labour with the analogue process of fabrication of fixed and removable prosthesis. Zhang et al.<sup>3</sup> conducted deep learning (DL) model research to extract marginal lines with precision. There were 380 dental preparation models in this study. To extract the data, a Convolutional Neural Network (CNN) model, called Sparse Octree (S-Octree), was utilized. Back-projection and boundary extraction methods were used in the study and a tooth preparation line was extracted to address the drawbacks of manual practice. The average precision reached was 97.43%. This increased accuracy demonstrated AI’s ability to overcome manual errors, making it a viable alternative for adoption.

**AI in smile designing:** The combination and super imposition of intraoral scans and extraoral scans can help as to have a holistic approach towards architecturing the smiles perfectly in reduced time. Digital simulations help in assessing the overall success of the smile designing and AI integration in it helps to deliver it optimally.

**AI in implant dentistry:** Artificial intelligence algorithms can provide a powerful diagnostic tool in identification of dental implants by using radiographs, predict implant survival or assist and optimize dental implant designs. Before the actual surgery, AI software has assisted in the planning of surgeries down to the finest detail. Following the acquisition of an intraoral and CBCT scan, based on the tissue thickness, bone type/thickness, emergence profile and the patient's individual medical history, AI will automatically combine the two scans, design the future restoration and then insert the suitable implant with the proper design in the optimal position. After that, the surgical guide can be created, and the procedure can be performed. Predictive AI models can help into

### References:

Miyazaki T., Hotta Y. CAD/CAM systems available for the fabrication of crown and bridge restorations. *Aust. Dent. J.* 2011;56:97–106.

Agrawal P, Nikhade P. Artificial Intelligence in Dentistry: Past, Present, and Future. *Cureus.* 2022 Jul 28;14(7):e27405.

The extraction method of tooth preparation margin line based on S-Octree CNN. Zhang B, Dai N, Tian S, Yuan F, Yu Q. *Int J Numer Method Biomed Eng.* 2019;35:0.

build predictive model designs concentrating on bone levels and individual clinical outcomes using Machine learning. By simultaneously evaluating the implant system, patients' data, and surgeons' operations, a recurrent artificial neural network (ANN) with memetic search optimization produced 99.2% efficiency in success rate predictions.<sup>4</sup>

**AI in maxillofacial prosthesis:** Any natural facial structure if deformed due to any anomaly or any acquired defect is present, CAD/CAM technology can be utilized to create immediate maxillofacial prosthetics with a form chosen from a digital library. This method takes less time than the traditional method. The bionic eye, developed in the United States, has already been trialed on a dozen people who have lost their vision. These technologies, which use AI, can help patients achieve vision without requiring surgery. In this approach, a smart camera mounted on special glasses enables the user to understand the text or recognize faces.<sup>5</sup>

AI is the map to achieve the unachievable and can help to achieve a more sustainable and eco friendly treatment planning methods thus

Singi SR, Sathe S, Reche AR, Sibal A, Mantri N. Extended Arm of Precision in Prosthodontics: Artificial Intelligence. *Cureus.* 2022 Nov 1;14(11):e30962.

Application of artificial intelligence in prosthodontics. Shajahan PA, Raghavan R, Joe N. *Int J Sci Health Care Res.* 2021;1:57–60.



# “Knowledge and Attitude About Dental Laser Application Amongst Dental Interns and Postgraduate Students” – A Survey Report.

Dr. Abhilasha Bhasin<sup>1</sup>, Dr. Sneha Mantri<sup>2</sup>

**Abstract:** The teaching of undergraduates and postgraduates (PGs) in dentistry is changing due to technological improvements. Dental lasers are one of the most recent technologies. Their use has increased dramatically since the 1960s, when they were first put to use.

Given the widespread usage of lasers in dentistry and the requirement for education and training of dental students at the UG and PG levels, this survey was conducted to determine the degree of knowledge and attitude of dental students regarding applications of lasers in dentistry.

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A survey was administered to dental students from several Madhya Pradesh colleges, including dental interns and postgraduates. The dental students who participated in the study were given the 13-question self-administered questionnaire. Among the questions are ones concerning the student's demographics.

Since the study was a cross sectional survey conducted on a small sample size, the results cannot be applied globally as teaching patterns and syllabi vary across the world.

**Keywords:** Technology, lasers in dentistry, knowledge, recent advances.

**Introduction:** Advancing technologies are changing the face of dentistry and the ways we are training undergraduates (UGs) and postgraduates (PGs).<sup>[1]</sup>

Dental lasers are amongst the new technologies.<sup>[2]</sup> Applied first in 1960s, their use has increased dramatically.<sup>[3]</sup> According to Lacopino, dental practitioners prefer using only those materials and technologies which they have learnt and are trained about.<sup>[4]</sup> In view of vast application of lasers in dentistry and the need for education and training of dental students at UG and PG levels, this survey was conducted to access the level of knowledge and attitude of dental students regarding applications of lasers in dentistry.

## Aims and Objectives:

**Aim:** To evaluate the knowledge and attitude regarding the application of dental lasers amongst

dental undergraduate and postgraduate students.

## Objectives:

- 1 To evaluate the knowledge and attitude about the application of dental lasers at the undergraduate level amongst dental undergraduate students.
- 2 To evaluate the knowledge and attitude about the application of dental laser sat the postgraduate level amongst postgraduate students of all branches of dentistry.
- 3 To compare the level of knowledge regarding laser application between dental undergraduate and postgraduate students.
- 4 To compare the attitude of dental undergraduate and postgraduate students regarding Laser application.

**Materials and Methodology:** A survey was conducted amongst dental students consisting

of dental interns and postgraduates of different colleges in Madhya Pradesh. The sample size was estimated to be 140, considering the population size of 2000, power of study 80% and a design effect of 1. An additional 10% was included in the study, to compensate for the people who refused 9 (n=154, rounded off to 160).

A self-administered questionnaire (Figure1) consisting of 13 questions was given to the dental students who participated in the study. The question list included demographic details of the student and questions to access knowledge and attitude about dental lasers. The survey was completed in a time period of 1 month. The responses were coded and a Microsoft excel sheet was formed, data collected were statistically evaluated.

**Result:** A total of 160 dental students participated in the study. The response rate was 100% (Table 1). Out of the eight knowledge-based questions (K1- K8), K1 and K2 were basic questions about familiarity with the term “LASER” and types of Lasers. Out of the total students, 92.06% UGs and 97.05% PGs could answer these positively. 88.23% PGs and 71.43% UGs could correctly answer on the types of lasers. Questions K3 to K8 were based on knowledge about laser application. On analysis of K3- K6, the majority responses were positive for knowledge, in which PGs had more percent of positive knowledge. On the contrary, for K7 & K8, the percent of positive response was more in PGs than UGs but overall negative knowledge was in majority. To evaluate the attitude of Laser application, five attitude-based questions were formulated. Data were divided into three groups that were negative, neutral, and positive attitudes for UGs and PGs (Table 2 & 3). When asked about the inclusion of laser in the UG curriculum, 93.75% of candidates gave positive responses, of which 94.11% were PGs. 81.25% of candidates found Laser as comfortable means of treatment when applied to Pediatric dentistry. 58.82% of PGs didn't agree when asked

if the Laser application needs complex equipment while 47.5% overall participants were neutral about it. 86.25% of candidates felt that the application of Laser is a professional privilege. When asked about the reason, they marked the choice for limited use of lasers, 100% responses indicated, it to be due to high cost and complex equipment.

**Discussion:** The first source of knowledge and development of attitude towards any dental procedure, material, equipment and technology is the education given at dental college during graduation. The understanding provided at the undergraduate level is groomed at the postgraduate level.<sup>[5]</sup> New technologies are changing the traditional materials and techniques in dental practice. Parallel to this the UG and PG syllabi are regularly updated. Considered as a significant development in modern dentistry, lasers are being routinely used in dental practice.<sup>[6]</sup>

In the present study, 97.05% PGs and 92.06% UGs knew what dental lasers were and the full form of the term “LASER”. This finding is similar to a study conducted by Bordea et al who reported that 94.98% of participants knew what dental laser was.<sup>[7]</sup> When asked about the most preferred laser for hard tissue application (K3) 63.75% of students had positive knowledge, out of which 61.9 %were UGs and 70.95% were PGs (Table 3). On asking about choice of laser for soft and hard tissue application (K4 - K5) 63.75% preferred using Diode laser for both soft and hard tissue applications. This was in accordance with a study done by Baglar et al where 60% of the participants preferred using Diode laser for soft and hard tissue applications.<sup>[8]</sup> When asked if Laser training should be included at the UG level, 93.75% had a positive attitude to this. 81.25% of the students strongly agreed that the dental lasers are a more efficient mode of treatment for minor surgeries and findings were similar to a study done by Bordea et al and Kadam et al.<sup>[7,9]</sup>

When asked if dental laser requires complex equipment's, 41.25% students showed negative attitude while 47.5% were neutral to this question. 86.25% students believed that working with a laser unit is a professional privilege. When questioned about the probable reason for the restricted use of lasers in practice, 100% students had a neutral attitude, which meant that they believed it due to the lack of knowledge and skills, high cost, complex equipments needed and lack of clinical experience. These findings were similar to the one reported by Bordea et al and Kadam et al.<sup>[7,9]</sup>

Since the study was a cross sectional survey

conducted on a small sample size, the results cannot be applied globally as teaching patterns and syllabi vary across the world.

**Conclusion:** From the survey, it could be concluded that,

- 1 Majority of the participants knew about dental lasers theoretically but lacked practical knowledge.
- 2 Most of them believed that the use of lasers could be more comfortable for minor surgeries.
- 3 Undergraduates have less knowledge of laser. So, lasers must be included in UG curriculum along with practical training.

**Table 1:** Distribution of study participants based on the responses to knowledge based questions (n=160). Test applied: Chi square test; p>0.05 (Non-significant)

Ques-tions	Group	Negative knowledge N(%)	Positive knowledge N(%)	Total N(%)	p-value
K1	UG	10(7.94)	116(92.06)	126(100)	0.636
	PG	1(11.77)	33(88.23)	34(100)	
	Total	14(8.75)	73(91.25)	80(100)	
K2	UG	36(28.57)	90(71.43)	126(100)	0.381
	PG	4(41.18)	30(58.82)	34(100)	
	Total	40(31.25)	120(68.75)	160(100)	
K3	UG	48(38.1)	78(61.9)	126(100)	0.581
	PG	10(29.41)	24(70.59)	34(100)	
	Total	58(36.25)	102(63.75)	160(100)	
K4	UG	40(31.75)	86(68.25)	126(100)	0.155
	PG	18(52.94)	16(47.06)	34(100)	
	Total	58(36.25)	102(63.75)	160(100)	
K5	UG	44(34.92)	82(65.08)	126(100)	0.778
	PG	10(29.41)	24(70.59)	34(100)	
	Total	54(33.75)	106(66.25)	160(100)	
K6	UG	70(55.56)	56(44.44)	126(100)	0.413
	PG	14(41.18)	20(58.82)	34(100)	
	Total	84(52.5)	76(47.5)	160(100)	



Ques-tions	Group	Negative knowledge N(%)	Positive knowledge N(%)	Total N(%)	p-value
K7	UG	80(63.49)	46(36.51)	126(100)	0.076
	PG	4(11.77)	30(11.77)	34(100)	
	Total	84(68.75)	76(31.25)	160(100)	
K8	UG	72(57.14)	54(42.86)	126(100)	0.789
	PG	16(47.06)	18(52.94)	34(100)	
	Total	88(55)	72(45)	160(100)	

**Table 2:** Distribution of study participants based on responses to attitude based questions(n=160)Test applied: Chi square test; p>0.05 (Non-significant)

Ques-tions	Group	Negative attitude	Neutral attitude	Positive knowledge	Total	p- value
A1	UG	0	8(6.35)	118(93.65)	126 (100)	1.000
	PG	0	2(5.89)	32(94.11)	34 (100)	
	Total	0	10(6.25)	150(93.75)	160 (100)	
A2	UG	0	10(15.87)	53(84.13)	63 (100)	0.108
	PG	2(5.88)	8(23.53)	24(70.59)	34 (100)	
	Total	2(1.25)	38(17.5)	130(81.25)	160 (100)	
A3	UG	46(36.51)	70(55.55)	10(7.94)	126 (100)	0.014
	PG	20(58.82)	6(17.65)	8(23.53)	34 (100)	
	Total	66(41.25)	76(47.5)	18(11.25)	160 (100)	
A4	UG	6(4.76)	10(7.94)	110(87.30)	126 (100)	0.862
	PG	2(5.59)	4(11.76)	28(82.35)	34 (100)	
	Total	8(5.00)	14(8.75)	138(86.25)	160 (100)	
A5	UG	0	126(100)	0	126 (100)	1.000
	PG	0	34(100)	0	34 (100)	
	Total	0	160(100)	0	160 (100)	

**Table 3:** Comparison of Knowledge and Attitude Between Dental Undergraduate and Postgraduate students. Test applied: Student’s t-test; p>0.05 (Non-significant)

Variables	Group	N	Mean %	Std. Deviation	Std. Error Mean	p-value
Negative Knowledge	UG	126	39.6837	18.29458	6.46811	0.725
	PG	34	43.3825	22.65740	8.01060	

Variables	Group	N	Mean %	Std. Deviation	Std. Error Mean	p-value
Positive Knowledge	UG	126	60.3163	18.29458	6.46811	0.725
	PG	34	56.6175	22.65740	8.01060	
Negative Attitude	UG	126	8.2540	15.92949	7.12389	0.675
	PG	34	14.0580	25.18669	11.26383	
Neutral Attitude	UG	126	37.1420	40.44560	18.08782	0.835
	PG	34	31.7660	38.70652	17.31008	
Positive Attitude	UG	126	54.6040	46.43417	20.76599	0.986
	PG	34	54.1160	40.41075	18.07224	

### References:

- 1 Dragan I F. Impact of scientific and technological advances. *Eur J Dent Educ.* 2018;22 (Suppl.1):17-22.
- 2 Goldman L,P Hornby, R Meyer, B Goldman. Impact of the Laser on dental caries. *Nature* 1964;203:417.
- 3 Walsh LJ, The current status of Laser application in dentistry. *Aust Dent J* 2003;48:146-55.
- 4 Lacopino A. The influence of Newsience on dental education: current concepts, trends and models for the future. *J. Dent Educ* 2007; 71:450-52.
- 5 Autio-Gold JT, Tomar SL. Dental students opinion and knowledge about caries management and prevention. *J Dent Educ* 2008;72:26-31.
- 6 Dansie CO, Park JH Mark IR. Training and use of Lasers in postgraduate orthodontic programs in the United states and Canada. *J Dent Educ* 2013;77:773-81.
- 7 Bordea R et al .Students knowledge and opinion regarding the need of implementation of Lasers in dental faculty curriculum. *HVM Bioflux* 2016;8;157-60.
- 8 Baglar's S, Avundux AT. Determination of the awareness and knowledge level in dental faculties regarding laser system. *J Dent Lasers* 2017;11:52-7
- 9 Kadam SR, Naviwala GA, Panchal AM. Dental Laser education and knowledge among students from dental colleges of Mumbai and Pune city: A Questionnaire study. *J Indian Assoc Public Health Dent* 2017;15:368-72.

**KNOWLEDGE AND ATTITUDE ABOUT DENTAL LASER APPLICATION AMONGST DENTAL INTERNS AND POSTGRADUATE STUDENTS**

Name- \_\_\_\_\_ Age / Gender \_\_\_\_\_

Graduate / Postgraduate (branch)..... \_\_\_\_\_

---

**Knowledge**

1. LASER is
  - a) Light Amplification Of Standard Emission Of Rays
  - b) Light Amplification By Stimulated Emission Of Radiation
  - c) Light Activated And Simultaneous Emission Of Radiation
  - d) Light Application By Stimulated Emission Of Radiation
2. Which of these is a type of dental laser?
  - a) NO<sub>2</sub>
  - b) CO<sub>2</sub>
  - c) O<sub>2</sub>
  - d) SO<sub>2</sub>
3. Which type of these is a hard tissue application of Dental Laser
  - a) Caries removal
  - b) Implant exposure
  - c) Bacterial decontamination
  - d) Gingival retraction
4. The most preferred laser in soft tissue applications is
  - a) Excimer
  - b) Diode
  - c) Ruby
  - d) Argon
5. The most preferred laser in hard tissue applications is
  - a) Nd:YAG
  - b) Diode
  - c) Ruby
  - d) Erbium
6. The active medium in diode laser is
  - a) Gas state
  - b) Solid state
  - c) Semiconductor solid state
  - d) Liquid state
7. Photodynamic therapy using dental lasers is applied for
  - a) Hard tissue cutting
  - b) Depigmentation
  - c) Caries removal
  - d) Malignancies of mucosa
8. Dental lasers are more effective in treating dental hypersensitivity than topical medicaments
  - a) Yes
  - b) No
  - c) Don't Know

**Attitude**

1. Dental lasers should be included in UG teaching curriculum
  - a) Strongly agree
  - b) Agree
  - c) Neutral
  - d) Disagree
  - e) Strongly disagree

2. Compared to conventional, Dental lasers are more comfortable mode of treatment for Paediatric patients?
  - a) Strongly agree
  - b) Agree
  - c) Neutral
  - d) Disagree
  - e) Strongly disagree
3. Application of dental lasers requires complex equipments.
  - a) Strongly agree
  - b) Agree
  - c) Neutral
  - d) Disagree
  - e) Strongly disagree
4. Having a laser unit is considered as a professional privilege?
  - a) Strongly agree
  - b) Agree
  - c) Neutral
  - d) Disagree
  - e) Strongly disagree
5. What is the most important reason for not using dental lasers
  - a) Lack of knowledge & skill
  - b) Complex equipments
  - c) High cost
  - d) Lack of clinical experience

CONSENT- I HAVE BEEN INFORMED ABOUT THIS SURVEY AND I AM WILLINGLY PARTICIPATING IN CONTRIBUTION FOR THE SAME.

SIGN AND DATE

Figure:- Questionnaire for the survey

## Ligaplants-Tissue engineered ligaments in Prosthodontic and implant dentistry: A revolutionary concept

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**Abstract:** In today's era, fixed partial denture and removable partial denture are replaced by implants which are considered ideal for replacing missing teeth, bioengineered implants can be constitute as an modified tool to restore lost tooth. The term "tissue engineering" was up to the mid 1980's loosely applied in the literature, in cases of surgical manipulation of tissues and organs or in a broader sense when prosthetic devices or biomaterials were used. The term "tissue engineering" was introduced in medicine in 1987. Current reparative dental treatment which usually replaces a missing tooth with biocompatible or bioactive alloplastic material, was often accompanied by additional problems such as mechanical and biological failures.

Ligaplants which are nothing but a combination of PDL cells with implant biomaterial . A more ideal solution would be to completely restore PDL onto implanted surface to fully replace the extracted tooth. Osseointegrated implants lack the property of PDL attachments as in natural teeth. Osseointegrated implants limits the bio functional and physiological efficiency, shock absorbing capacity , occlusal over load and proprioception. Development of ligament can satisfy the above biofunctional requirements of natural teeth. Ligaplant is a next generation prosthodontic implant. It is a new revolutionary concept to implant dentistry.

**Keywords:** 3G of dentition, implant dentistry next generation prosthodontic implant, Biohybrid implant, bioengineered pdl.

**Introduction:** Bone resorption following tooth loss can lead to a significant decrease in alveolar bone height, thereby compromising subsequent implant placement and long-term stability. Dental implants are nowadays the treatment of choice to replace missing teeth due to their high predictability and long-term success. This success is the outcome of several cellular and molecular events that take place at the implant-bone interface.

Despite the high success rate of dental implants, complications have been reported such as implant prosthetic screw fracture, fracture of implant abutment screws, infection, prolonged bleeding, damage to other teeth, delayed bone healing, jaw

fracture and many others. Many strategies to improve the osseointegrative property of the implant have been documented; these include surface treatments of implants to improve mechanical, physical, and chemical characteristics of implants or altering surface topography to control cell behavior. Addition of biomimetics (growth factors) to the implant surface also proved beneficial.

In prosthodontics and implant dentistry researches are going on with the alginate scaffolds encapsulating Mesenchymal cells (MSCs), modifying the titanium surfaces which is the most common material used for dental implants to improve osseointegration and decrease the chances of failure. Also semi

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- 2 HOD & Professor
- 3 Professor & Guide
- 4 Senior lecturer
- 5 Senior lecturer
- 6 PG Student
- 7

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## OBSERVATIONAL STUDY

interpenetrating collagen composite hydrogels are gaining importance in the bone regeneration. Thus tissue engineering has become one of the most important aspects of dentistry.

Recent advances in the field of prosthodontics and Implant dentistry promises significant changes in the more traditional areas of clinical dentistry. In this review we attempt to discuss the advances made since inception of tissue engineering, various modalities involved, its versatile application aspects, and future interventions required to translate it for clinical implementation.

### Tissue Engineering:

- Proposed by : Langer and Colleagues in (1993)
- The important elements required in this reconstruction procedure is
  - I. Matrix or a scaffold
  - II. Signalling molecules
  - III. Cells

This can be done by both in vivo and in vitro.

- Interphase of Implant and Periodontal Ligament

MODELS FOR CELL-BASED ENGINEERING OF TOOTH AND IMPLANT SUPPORTING TISSUE CONSTRUCTS

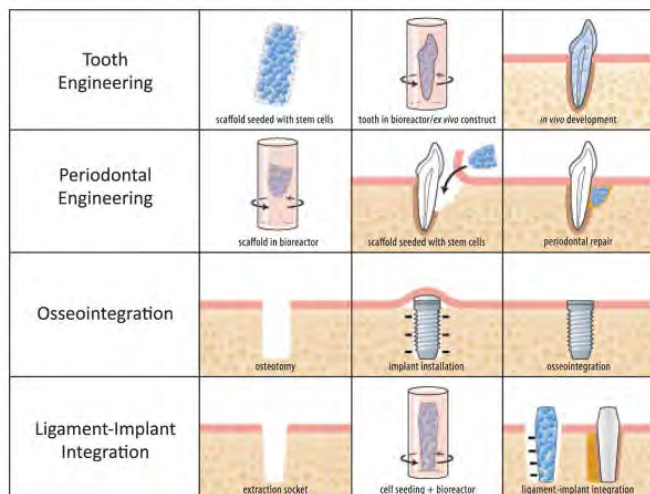


Fig 2

- Second technique is to induce intrinsic healing activity at site of tissue Defect using these three elements (in vivo approach)
- In 1990, Buser et al conducted a study which he found that the periodontal Ligament cells could be a source of regeneration as they have the ability to cover The surface of dental implants during healing period.

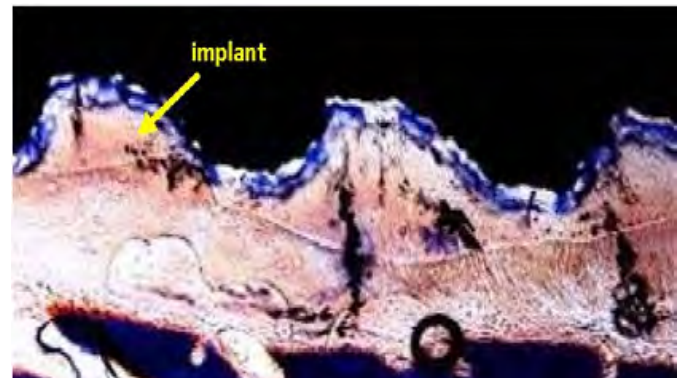


Fig 3

**Applications In Prosthodontic:** In prosthodontics, the applications of tissue engineering are related to the following aspects.

**Surface Coated Titanium:** Despite its remarkable success as a bone tissue implant-material, decades of experience in Ti implantation have highlighted some aspects that need to be improved. Surface modifications intend to improve the interactions of Ti based implants with surrounding biological media and to overcome some of the limitations associated with Ti. Particularly, major challenges in the field are issues such as osseointegration capability, prevention of bacterial colonization, and reduction in implant rejection (which may be related to the biofilm formation).<sup>[7]</sup>

Certain topographic characteristics of Ti implants, such as porosity or roughness, directly affect the progression of the cell adhesion, proliferation, and differentiation. Additionally, increased surface area promotes cell attachment and augments



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biomechanical interlocking between bone and an implant.

### Preparation of Ligaplant:

- Double pdl stimulation is done by the help of tooth Transplantation which increases the healing capacity.
- Prior to transplantation, the donor tooth extraction is done before 14 days and this tooth is planted immediately into the alveolus.
- The trauma is induced deliberately which activates a Physiological healing process in the pdl, enhancing the cells To proliferate and to differentiate.
- The present in vivo cell Cultures peak is reached after 14 days

**Temperature responsive culture dishes preparation:** Polystyrene culture dishes were taken N iso propylacrylamide monomer along with 2-propanoal solution was unrolled onto the seculture dishes. These dishes were exposed to electron beam irradiation with area beam electron processing system. Coldwater is used to rinse the temperature responsive polymer-graft dishes which help in removal of engrafted monomer, ethyleneoxide is used for sterilization.

**Obtaining the cell and culturing of the cell:** The cell (human periodontal ligament) is obtained from an extracted tooth . A scalpel blade is used to scrape of the periodontal tissue ,which is obtained from the middle third portion of the root. Culture dishes prepared containing Dulbeccos modified eagles minimal essential medium, supplemented with 10% fetal bovine serum and 100units/ml of penicillin-streptomycin. The harvested tissue is placed in the culture dishes.

**Bioreactor PDL cell culturing:** The out grown cells are cultured in a humidified atmosphere of 5% CO<sub>2</sub> at 37°C supplemented with 50mr/ml ascorbic acid 2-phosphate, 10nm dexamethasone and 10nM B glycerophosphate, all these form a substances

which function as osteodifferentiation medium. Hollow plastic cylinder is taken inside which are titanium pins they are coated by hydroxyl appatite (HAP) and are positioned at a gap of about 3mm is left around the pin. Continuous pumping of the culture medium is done through the gap. The cell suspension, which is derived from human, is seeded primarily into the plastic vessel then on the titanium pins under the flow of the growth medium for a time period of 18 days.

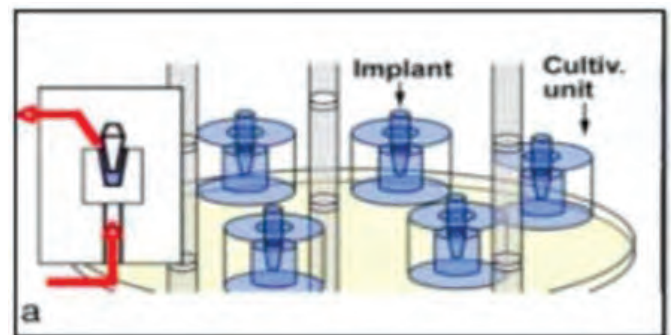


Fig 4

**Precaution:** A cushion of sufficient thickness favours the formation of PDL and on the other, the prolonged cell culturing may favour the appearance of non-PDL cell types.

In order to preserve the cell differentiation and to obtain adequate cell stimulation, the bioreactor has been constructed with the aim to resemble the PDL situation during cell growth; Cells are positioned in a narrow space in between the ligaplant and surrounding hollow cylinder. It was thereby anticipated that the PDL phenotype would be favoured implicating a tight attachment of cells to the implant. So, the preparation of the ligaplant should have minute mechanical movements of the medium flow and space between the implants and the culture should be optimal and the duration of the surface treatment should also be optimal to obtain the successful ligaplants which brings big improvements to the implant system.

## OBSERVATIONAL STUDY

### Properties:

1. PDL cells act as a soft, richly vascular and cellular connective tissue which permits forces elicited during masticatory function and other contact movement to be distributed to the alveolar process via alveolar bone proper
2. It acts as a shock absorber giving the tooth some movement in the socket.
3. Natural implant anchoring might also be compatible with further growth and development of the alveolar bone housing, and it may also allow tooth movement during orthodontic therapy.
4. It provides proprioception.
5. Periodontal ligament homes vital cells like osteoclast, osteoblast, fibroblast, cementoclast, cementoblast and most importantly undifferentiated stem cells which are osteoconductive in nature.

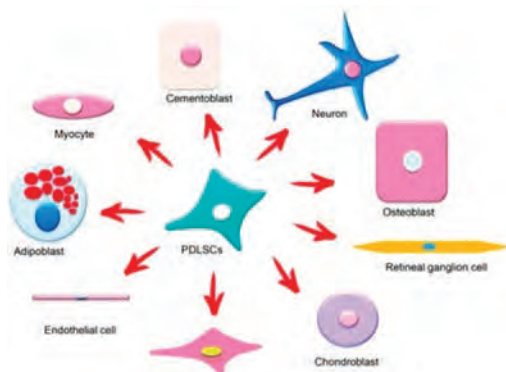


Fig 5

### Advantages:

1. It alleviates problems like gingival recession and bone defects of missing tooth.
2. Bone formation as induced and movements of ligaplasts inside the suggesting an intact communication between bone and implant surface.
3. Ligaplasts become firmly integrated without interlocking and without direct bone contact, despite the initial fitting being loose in order to spare PDL cell cushion.

4. Mimics natural insertion of natural tooth roots in alveolar process.

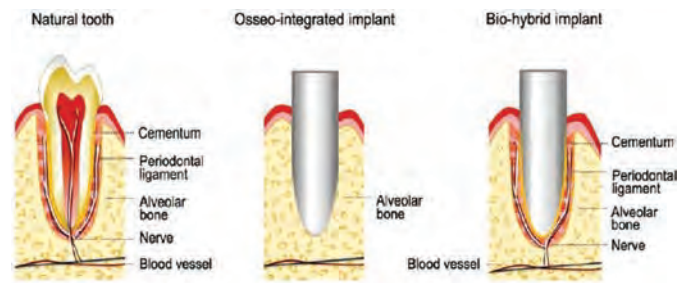


Fig 6

### Disadvantages:

1. Culture sensitivity, the temperature, culturing cells used, culturing time and others. Any problem in these leads to failed ligaplast.
2. **LIMITATIONS**-Limited members to do this kind of research, limited facilities, cost factor is more.
3. There is certain unpredictability on how the host accepts the ligaplast and PDL cell growth inside the socket, this leads to failure of the ligaplast.

### Osseointegration versus PDL integration

Osseointegrated implants versus Periodontally integrated	
OSSEOINTEGRATED IMPLANTS	LIGAPLASTS
Localized bone loss- Excessive stress that accumulate at the crestal region of the implants leads to bone loss at this region <sup>10</sup>	dissipates these forces <sup>11</sup>
diminished ability of dental implants to adapt to occlusal trauma can be attributed to this lack of periodontal proprioceptive mechanism. <sup>12</sup>	sensitive proprioceptive mechanism and is therefore capable of detecting and responding to a wide range of forces applied to the teeth.
connecting teeth to osseointegrated implants presents a biomechanical challenge due to the differential support and mobility provided by the implant and the tooth <sup>13</sup> .	when tooth-implant supported restorations would be fabricated using support from periodontointegrated implants higher success rates can be expected due to similar resilience of tissues supporting teeth and implants
contraindicated in growing patients <sup>14</sup>	successfully place implants in patients undergoing craniofacial/skeletal growth process,
behave as an ankylosed element	move them orthodontically
the tissues around implants are more susceptible to plaque-associated infections that spread into the alveolar bone, primarily due to the lack of a periodontal ligament, making them more prone to bone loss <sup>15</sup>	provide better defensive capacity, also enhance repair and regeneration of bone defects in their vicinity

Fig 7

## OBSERVATIONAL STUDY

### Recent studies to justify use of Ligaplasts:

Author and year	Material and Method	Animal/ human study	Conclusion
Gault et al.(2010) <sup>4</sup>	Cells isolated from PDL and cultured in a bioreactor on titanium pins and then implanted in enlarged dental alveolae in dogs and humans	Human and animal study	Ligament anchored implants, have potential advantages over osseointegrated implants
Rivadulla/Anus-Chaves(2010) <sup>7</sup>	Titanium mini-implant placed between the buccal roots of the mandibular first molar of 24 adult rats. Ultrastructural analysis done after 21, 30, 45, 60, 90, and 120 days of implantation.	Animal study	Titanium surface through its well-known biocompatibility exerts an effect on the periodontal ligament to lay down a cementum-like layer on the implant surface.
Lin et al.(2011) <sup>5</sup>	Test site: PDL derived autologous DPSCs seeded implants placed in the molar region of the rat model. Control site: Non-cell seeded implants placed in the molar region of the rat	Animal study	Suggested the potential to replace missing teeth in humans with dental implants augmented with autologous cell-derived bioengineered periodontal tissues
Kano et al.(2012) <sup>6</sup>	HA-/OCL <sup>+</sup> , HA+/OCL <sup>-</sup> , and HA+/OCL <sup>+</sup> immediately implanted into extracted tooth sockets with remaining PDL of rat molar model and the regeneration of PDL examined histomorphometrically and histologically	Animal study	The remaining PDL tissue around extracted sockets has the ability to regenerate bone and PDL-like tissue on HA-coated tooth-shaped implants. Occlusal loads to the HA-coated implants may induce regeneration of PDL-like tissue in the peri-implant

Fig 8

**Success of the Ligaplasts?:** The development of a regenerative PDL depends on site specific signaling, which in turn is mediated by an anatomic code, written in expression patterns of homeogene coded transcription factors. Hence, the homeoproteins influence the synthesis of cell surface and signaling components, and signals from the cell surface

### References:

1. Anchorage effect of various shape palatal osseointegrated implants: a finite element study (Doctoral dissertation).
2. Sennerby L, Rocci A, Becker W, Jonsson L, Johansson LÅ, Albrektsson T. Short-term clinical results of Nobel Direct implants: A retrospective multicentre analysis. *Clinical oral implants research*. 2008 Mar;19(3):219-26.
3. Tissue reactions SA. *Oral implantology*. In: Schroeder A, Sutter F, Krekeler G, editors. *General principles and ITI hollow cylinders System*. Stuttgart: Gedorg Thieme Verlag; 1988. pp. 91–115.
4. Gault P, Black A, Romette JL, Fuente F, Schroeder K, Thillou F, Brune T, Berdal A, Wurtz T. Tissue-engineered ligament: implant constructs for tooth replacement. *J Clin Periodontol*. 2010 Aug 1;37(8):750-8. doi: 10.1111/j.1600-051X.2010.01588.x. Epub 2010 Jun 9. Erratum

feedback to modulate homeogene expression, where by cell identities are established according to the anatomic site and tissue type.

**Conclusion:** It can be said forth that periodontal ligament—like tissue attachment may form surrounding dental implants when it is placed along with cultured periodontal ligament cells. Application of cultured periodontal ligament cells onto the Surface of the implant may open a new perspective in implant dentistry. The ligaplast placement is comparatively easy as the implant is not tightly fit. On the other hand the patient may not have the need to undergo any further discomfort of grafting with ligaplasts. Mostly these studies are carried out on animals, these studies revealed that pdl layer around the implant is possible, yet a proper method to produce such a implant with a accurate method has not been developed, more studies are essential especially in humans to understand the ligaplasts and their durability.

in: *J Clin Periodontol*. 2010 Sep;37(9):873. PMID: 20546087.

5. Kirsch A. The two-phase implantation method using IMZ intramobile cylinder implants. *The Journal of Oral Implantology*. 1983 ;11(2):197-210. PMID: 6368849.
6. Arunachalam, Lalitha Tanjore; Sudhakar, Uma; Merugu, Satyanarayana; Janarthanan, Akila Sivaranjani. Tissue-engineered periodontal ligament on implants: Hype or a hope?. *Journal of Dental Implants* 2(2):p 115-116, Jul–Dec 2012. | DOI: 10.4103/0974-6781.102227
7. Benjamin A, Mahajan R, Sura S, Suthar N. ‘Ligaplasts’ The next generation implants. *IJIRS*. 2014;3:571
8. Nakahara T. A review of new developments in tissue engineering therapy for periodontitis. *Dent Clin North Am*. 2006 Apr;50(2):265-76, ix-x. doi: 10.1016/j.cden.2005.11.004. PMID: 16530062

## OBSERVATIONAL STUDY

9. User D, Warrer K, Karring T. Formation of a periodontal ligament around titanium implants. *J Periodontol.* 1990 Sep;61(9):597-601. doi: 10.1902/jop.1990.61.9.597. PMID: 2120417.
10. Isidor F, Karring T, Nyman S, Lindhe J. The significance of coronal growth of periodontal ligament tissue for new attachment formation. *Journal of clinical periodontology.* 1986 Feb;13(2):145-50.
11. Kiong AL, Arjunker R. Tissue-engineered ligament: Implant constructs for tooth replacement (Ligaplants). *Journal of Pharmaceutical Sciences and Research.* 2014 Mar 1;6(3):158.





# Precision Attachments in Prosthodontics: A Review

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**Abstract:** The precision attachments used in prosthodontics—mechanical devices used to fasten, retain, and stabilize dental prostheses, especially partial dentures—are the subject of this article. For both fixed and removable partial dentures, these attachments provide a compromise between aesthetic appeal and functional stability. They are thought to be better than other solutions in terms of comfort, security, and aesthetics. The matrix, which is a metal container or keyway, and the patrix, which is fastened to the detachable partial denture, are the two metal parts of precision attachments.

An articulate joint is made up of these parts. They assist in distributing stresses to the connecting abutment teeth and provide micro-movement between segments.

**Keywords:** precision attachments, functional stability, retention, stress distribution.

**Introduction:** This article discusses about precision attachments used in prosthodontics, which are mechanical devices used for fixation, retention and stabilization of dental prosthesis, particularly partial dentures. These attachments strike a balance between functional stability and cosmetic appeal in fixed and removable partial dentures. They are considered superior in terms of comfort, security, and aesthetics compared to other options. Precision attachments consist of two metal components – matrix (metal receptacle or keyway) and the patrix (attached to the removable partial denture). These components create an articulate joint. They allow for micro-movement between segments and help distribute stresses to the connected abutment teeth.

## Classification of Precision Attachments: by M C Mensors system of classification

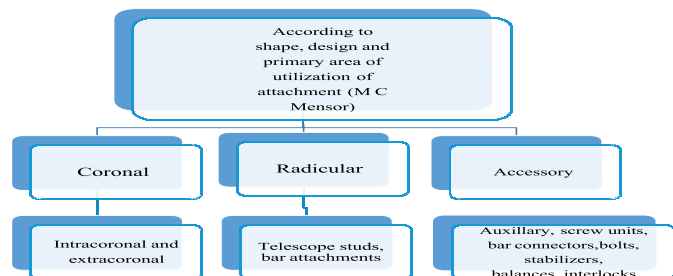


Fig 1

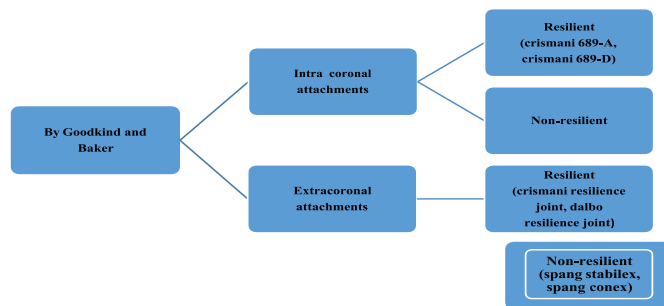


Fig 2

## Classification system by Goodkind and Baker:

### Parts of Precision Attachments: Male

- Patrix
- Flange
- Insert
- Key
- Fitting point

### Female

- Matrix
- Slot
- Crypt
- Keyway
- Receptacle



**Mechanism of Action: Friction:** Friction occurs when parallel wall of closely fitting bodies pass over one another. The frictional force is directly related to the area of the opposing forces and the length of axial walls. In dental retainers, friction helps prevent the separation of the prosthesis components.

**Binding:** occurs when the parallel walled body tips within its receptor site. This mechanism contributes to resistance against separation within the attachment.

**Wedging of conical bodies:** this mechanism involves the use of conical bodies. Friction plays the role only in the terminal position, and it is lost as soon as the bodies begin to separate. Conical shapes help provide stability and resistance to separation.

**Internal spring loading:** In some cases, the friction within retainers is increased by loading them with internal spring clips slots in the main portion allow for adjusting the pressure. This additional spring loaded force enhances attachments retention.

**Active Retention:** occurs when one body must be temporarily deformed to be fully withdrawn from its fully seated position. It involves a physical obstruction to the separation of other parts requiring elastic deformation before separation can occur this mechanism ensures a secure fit and resistance to accidental detachment.

**Prefabricated attachments:** Prefabricated attachments usually consist of two matched metal components. The prefabricated attachments can be classified as intracoronal and extracoronal attachments based on the shape of the attachment.

The two parts of an intracoronal attachment consist of a flange and a slot. The flange is joined to one section of the prosthesis and the slot unit embedded in a restoration forming another section of the prosthesis hence providing a rigid section to the prosthesis.

**Types of intracoronal attachments:**

- a) Attachments whose retention is entirely frictional.
- b) Attachments whose retention is augmented by a mechanical lock.

Semi-precision intracoronal attachments have a significant amount of taper. The casting for these is done from patterns or they can be entirely laboratory produced.

**Extracoronal attachments:**

The attachments having the part or all their mechanism outside the crown of the tooth are extracoronal attachments.<sup>(1)</sup> The extracoronal attachments are divided into following groups

- a) Projection units
- b) Connectors
- c) Combined units

**Projection units:** These are attached to the proximal surface of the crowns.

**Connectors:** These units connect a two sections of a removable prosthesis and allow play between the components.<sup>(1)</sup>

**Combined units:** The attachments feature an extracoronal placed hinge-type units connected to an intracoronal attachments.

**Stud attachments:** These attachments are so called because of the shape of ale units that are usually soldered to the diaphragm of a post crown.<sup>(1)</sup>

**Bar attachments:** These consist of a bar spanning an edentulous area joining teeth or roots. The denture fits over the bar and is connected to it with one or more sleeves. Bar joints and Bar units.

Auxiliary		attachments:	
<p><b>Screw units</b></p> <ul style="list-style-type: none"> <li>• These devices are useful for securing and dismantling parts of a prosthesis in the mouth.</li> <li>• They are useful for joining of telescopic crown .</li> </ul>	<p><b>Friction devices</b></p> <ul style="list-style-type: none"> <li>• Spring loaded plungers are commonly employed to increase retention between two sections of telescopic prosthesis.</li> <li>• Split post can be used in conjunction with sectional dentures.</li> </ul>	<p><b>Bolts</b></p> <ul style="list-style-type: none"> <li>• Bolt units are used to connect two parts of sectional denture in the mouth.</li> <li>• Each part of denture is inserted separately and a patient locks them with bolt.</li> </ul>	<p><b>Hinged flanges</b></p> <ul style="list-style-type: none"> <li>• This design allows mucosal undercuts and interdental spaces to be used for retentive purpose.</li> </ul>

Fig 3

**Intracoronal attachments: Attachment systems:**

- a) The stern G/A unit

- b) Crismani series
- c) The McCollum attachment
- d) Ancra attachment
- e) The T-Geschiebe
- f) Biloc attachment by cenders and Metaux
- g) Schatzmann series
- h) Stern gingival latch attachment

**Extra-coronal attachments:** Units with part or all of their mechanism is outside the tooth are called as extracoronal attachments. The main application of these kind of attachments is with distal extension prosthesis. The extracoronal attachments can be divided into 3 groups<sup>(1)</sup>

**Projection units:**

- This is the most popular group.
- No box preparation is required.
- The disadvantage of this type is that it facilitates plaque control.
- The sub-groups are as follows:
  - 1) Rigid projection units.

Projection units allowing play between two sections.

**Connecting units:**

- These units provide a joint between 2 sections of a removable prosthesis.
- In this type prosthesis is not anchored to the tooth.
- Movement between the two sections of the denture base is allowed.

**Combined units:**

- This type has two attachments: A hinged type of connecting element outside the tooth joined directly to an intracoronal attachment. The male section of this attachment is interchangeable with suitable intracoronal attachment.
- Box type of preparation is required.
- As the design is very complex the application is limited.

**Examples of extracoronal attachments:**

The RHEIN 83 OT CAP attachments system.

Acrylized prosthesis showing male and female O-ring attachment. McCollum unit.

T-Geschiebe 123

**Recent advances in precision attachments:**

- The Sphero Flex implant overdenture attachment (54)
- Sphero Block (54)
- OT UNILATERAL castable attachment from Rhein83 (54)
- The OT BAR MULTIUSE (54)
- The SOLID RECONSTRUCTIVE SPHERES (54)
- OT CEM (54)
- OT Cap (54)

**Discussion:**

Combination of cases with precision attachments.

Table 1 -

Sr. No.	Type of precision attachments	Indications
1	Extracoronal attachment	Areas of inadequate space.
2	Intracoronal attachments	Used in areas with adequate space as they direct the forces along the long axis of abutment teeth.
3	Semi-precision attachments	Aesthetic zones. Areas where redistribution of forces is required. In cases to minimize trauma to soft tissues. In control of loading and rotational forces. In cases where non parallel abutments are present. In cases of improved retention. In segmenting long span bridges.
4	Resilient attachment	In cases where Functional forces are directed to tissues and alveolar ridge.
5	Non- resilient attachment	These are used in cases where the vertical forces are primarily directed to abutment teeth.

*Dubravka Knezovi' c Zlatari' et al (2002)* studied The Effect of Removable Partial Dentures on Periodontal Health of Abutment and Non-Abutment Teeth. A removable partial denture (RPD) is a common treatment available for restoration of partially edentulous ridges. Longitudinal studies indicate that RPDs have been associated with increased gingivitis, periodontitis, and abutment mobility. He used a total of 205 patients with RPD wearer in his study. There were 80 males and 125 females aged 38 to 89, with 123 maxillaries and 138 mandibular RPDs. Patients were wearing existing RPDs for different periods ranging from 1 to 10 years. A two-part questionnaire was devised for this study. In the first part, patients answered questions on gender; age; smoking habits; denture age; denture wearing habits; mouth odour; and problems with food accumulating under the denture base, on the outside surface of the denture, and on the outside surface of remaining teeth after eating. The Kennedy classification, material, denture support, denture base shape, and number of teeth in contact, number of existing clasps, and occlusal rests were categorized. He evaluated quality of denture construction. In the second part of the questionnaire, baseline recordings of plaque (PI), gingival (GI), and calculus (CI) indexes were made, and Tarbet index (TI), as well as probing depth (PD), gingival recession (GR), and tooth mobility (TM) were measured, both on abutment and non-abutment teeth. The author concluded that the RPD design plays an important role in the state of the periodontium. Appropriate design and good oral hygiene may decrease the appearance of periodontal disease.<sup>(2)</sup>

*M. SAITO et al (2003)* Stress distribution of abutments and base displacement with precision attachment and telescopic crown-retained removable partial dentures. Five types of removable partial dentures (two attachment dentures, two telescopic dentures and one clasp denture) were designed. The

two attachment dentures were retained by the rigid precision attachments with or without a stabilizing arm, and the two telescope dentures were retained with cone telescope

crowns with or without crossarch stabilization. The stresses acting on abutment teeth and denture bases and the movements of denture bases were investigated, and the influences of denture design were clarified. The stress acting on a terminal abutment tooth retained by a rigid precision attachment or cone telescopic crown was larger than that acting on a terminal abutment tooth retained by a clasp. The attachment dentures tended to concentrate more stress at the terminal abutment tooth than did the telescopic dentures. The stress of denture base of an attachment denture and a telescopic denture was less than that of a clasp denture. There was no difference between the stresses of attachment and telescopic dentures. The displacement of the denture base tended to be less when the denture was designed with a rigid connection for the retainer and with cross-arch stabilization.<sup>(3)</sup>

*Naveen Gupta et al in (2013)* published a case report titled combined prosthesis with extracoronary castable precision attachments. Satisfactory restoration in a patient with a partially edentulous situation can be challenging especially when unilateral or bilateral posterior segment of teeth is missing. Successful restoration can be done with various conventional and contemporary treatment options. One such treatment modality is attachment-retained cast partial dentures. This paper describes a case report of a patient with maxillary bilateral distal extension edentulous span restored with a cast partial denture having an extracoronary castable precision attachment (RHEIN 83 OT CAP attachments system).<sup>(4)</sup>

*H. M. Khuthija Khanam et al (2014)* published a review article on precision attachments. These are mechanical devices for the fixation and

stabilisation of a dental prosthesis and include frictional, internal, intracoronal, extracoronal, key-key way, parallel, precision and slotted types. (Boucher 1976). Attachments are used as alternative to clasps in removable partial denture therapy for both aesthetic and functional purpose. Their application is not only limited to removable partial dentures, but has a broader usage in fixed bridges, overdentures, implant supported dentures as well. Hundreds of attachments are available commercially and significant differences exist between them. In this article, different systems of classification of attachments have been reviewed. They are categorised as precision and semi-precision depending on the method of manufacture, intracoronal and extra coronal depending on their location relative to the abutment tooth, rigid and resilient determined by the amount of movement allowed between the component parts, also as stud and bar attachments depending on the design. A classification system to more accurately evaluate differences among resilient attachments has also been described here.<sup>(5)</sup>

**K. Raghavendra Reddy et al (2016)** published a series of case reports on precision attachments. These are the functional mechanical parts of the removable partial denture. Great advantage of the attachment-retained prosthesis rests with the fact that the removable part can be treated as a partial denture and has a superficial resemblance to the fixed prosthesis.

Studies have also demonstrated that when the prognosis with fixed partial denture is dubious, attachment retained prosthesis offers excellent retention and stability provided by the path of insertion of the prosthesis. Demanding upon operator and technician, extracoronal attachments allows a considerable flexibility in treatment planning of unfavourable biomechanics present after the loss of teeth and can be used as a successful

treatment option on implant abutments. This article brings a series of case reports by using different extracoronal Precision attachments for partial edentulous rehabilitation, which are one of the best prosthesis available in dentistry.<sup>(6)</sup>

**Shraddha Rani et al (2016)** published a review article on Clinical Applications of Precision Attachments: A Review The main purpose of each precision attachment, besides retention, is its concealment within or under a restoration as an esthetically better alternative to a visible clasp retainer. This article reviews other such clinical applications of precision attachments.<sup>(7)</sup>

**Arti et al (2018)** published a review article on precision attachments in prosthodontics a review. Many edentulous patients experience problems with their dentures and removable partial dentures, especially the lack of stability and retention together with a decrease in chewing ability, to overcome this problem and the desire to balance between functional stability and cosmetic appeal give rise to the development of Precision attachments also known as connecting link between the fixed and removable type of partial dentures because they incorporate features common to both types of construction.<sup>(8)</sup>

**Manisha Singh et al (2018)** published a case report on attachment: source of retention. Retention is the ability of the prosthesis to resist the movement of denture away from the supporting tissues/teeth. Concern for removable partial denture (RPD) is retention when compared with other prosthesis. The use of attachment acts as a direct retainer, and how it provides retention without compromising esthetics as compared with the conventional RPD is the main goal of this report. This case report describes the use of Rhein 83 precision attachment in Kennedy's class 1 modification 1 situation.<sup>(9)</sup>

**Krishankumar Lahoti et al (2020)** published a review article on Precision attachments are small



interlocking devices to connect prosthesis and abutments that offer a variety of solutions to the challenge of balance between functional stability and cosmetic appeal. A conservative treatment that can delay or eliminate future prosthodontic problems should be considered, as rehabilitation of a patient with few teeth remaining is challenging. Inherent instability of dentures or resiliency of the supporting tissues during functional and parafunctional movements cause movement of the denture which the complete denture patients unsatisfied. Precision attachment plays important role to eliminate such problems. Precision attachments have wide applications, used in fixed removable bridge, removable partial dentures, overdentures, implant retained maxillofacial prosthesis. Attachment retained overdentures helps in distribution of masticatory forces, minimizes trauma to abutments and soft tissues, attenuate ridge resorption, improves the esthetics and retains proprioception. Attachment devices for the fixation and stabilization of a dental prosthesis and include frictional, internal, intracoronal, extracoronal, key-key way, parallel, precision and slotted types. (Boucher 1976). Attachments are used as alternative to therapy for both aesthetic and functional purpose. In this article, different systems of classification of attachments, its indications, contraindications, advantages and disadvantages have been reviewed.<sup>(10)</sup>

*Jinson James et al in (2022)* published an article on PRECISION ATTACHMENTS IN DISTAL EXTENSION CASES: AN ENLIVENING IDEA. The desire to balance between functional stability and cosmetic appeal in partial dentures gave rise to the development of precision attachments. Satisfactory restoration in a patient with a partially edentulous situation can be challenging especially when unilateral or bilateral posterior segment of teeth is missing. In distal extension cases dentures requires support from teeth, mucosa and the underlying alveolar ridges which are subjected to

many forces that unduly effect the abutment teeth and the residual ridges during functional activity. Precision attachment is an interlocking device, one component of which is fixed to an abutment or abutments, and the other is integrated into a removable dental prosthesis in order to stabilize or retain it. This article provides an overview and a simplified approach through a case report for treating the patient.<sup>(11)</sup>

*Edward Feinberg et al (2023)* published a case report on Precision Attachment Case Restoration with Implant Abutments a case reports. Passively retained precision attachment partial dentures have been used successfully on natural tooth abutments since the 1920s. However, the dental profession has not advocated their use with implant abutments. When used in the passive manner that has proven successful on natural tooth abutments, precision attachment cases on implant abutments can be an excellent treatment option. This type of case has been used successfully for more than 17 years and offers tremendous advantages over the conventional overdenture approach to removal restorations on implant abutments.<sup>(12)</sup>

**Conclusion:** More than 100 types of attachments are available and are being designed since past century. If we consider the classification of precision attachments based on function the higher the attachment the greatest is the resilient effect. It is being proposed that the classification systems will simplify and standardize descriptions of resilient attachments for

- 1) appropriate applications in prosthodontic therapy
- 2) relevant discussion in dental literature
- 3) specific analysis in dental research.

The use of precision attachments requires through knowledge of basic prosthodontic principles, appropriate training and use with particular attachment systems used, technical skills, clinical ability and judgement.



Proper case selection and treatment planning of precision attachment such as Rhein 83 OT, CAP attachment systems can be used to improve retention, esthetics and function of prosthesis. To conclude

### References:

- 1 Preiskel HW. Precision attachments in prosthodontics. Overdentures and telescopic prosthesis. 1985;2:13-21.
- 2 The Effect of Removable Partial Dentures on Periodontal Health of Abutment and Non-Abutment Teeth.
- 3 Saito M, Miura Y, Notani K, Kawasaki T. Stress distribution of abutments and base displacement with precision attachment-and telescopic crown-retained removable partial dentures. Journal of oral rehabilitation. 2003 May;30(5):482-7.
- 4 Gupta N, Bhasin A, Gupta P, Malhotra P. Combined prosthesis with extracoronal castable precision attachments. Case reports in dentistry. 2013 Dec 9;2013.
- 5 Khanam HK, Bharathi M, Reddy KR, Reddy SG. Attachments in prosthodontics: different systems of classification: a review. Journal of Evolution of Medical and Dental Sciences. 2014 Jul 14;3(28):7937-45.
- 6 Reddy KR. Precision attachment options in Prosthodontic treatment protocols-A series of case Reports.
- 7 Rani S, Kumar S, Pratibha VK. Clinical Applications of Precision Attachments: A Review'. International Journal of Contemporary Medicine and Research. 2016;3(2):342- 6.
- 8 Arti AG, Khanna G, Bhatnagar M, Markose GM, Singh S. Precision attachments in prosthodontics: A review. Int J Prev Clin Dent Res. 2018;5:34-9.
- 9 Singh M. Attachment: Source of Retention.
- 10 Krishankumar Lahoti, Neha Alone. Precision attachments a review. International journal of advanced research (oct) 2020.
- 11 Jinson james precision attachment in distal extension cases an Enlivening idea. World journal of pharmaceutical and medical research. (dec 12) 2022. 9(1)
- 12 Feinberg E. Precision attachment case restoration with implant abutments: a review with case reports. Journal of Oral Implantology. 2011 Aug 1;37(4):489-98.
- 13 Preiskel HW. Impression techniques for attachment-retained distal extension removable partial dentures. The Journal of Prosthetic Dentistry. 1971 Jun 1;25(6):620-8.
- 14 Elcharkawi H, ABDALLA M, Hourazaty N. Biting force of patients rehabilitated with Precision Attachments Unilateral Removable Partial Denture. Egyptian Dental Journal. 2022 Jan 1;68(1):579-87.
- 15 The Effect of Removable Partial Dentures on Periodontal Health of Abutment and Non-Abutment Teeth
- 16 Feinberg E. Precision attachment case restoration with implant abutments: a review with case reports. Journal of Oral Implantology. 2011 Aug 1;37(4):489-98.
- 17 Mensor Jr MC. Classification and selection of attachments. The Journal of prosthetic dentistry. 1973 May 1;29(5):494-7.
- 18 Roy M, Idzior-Haufa M, Hędzielek W. Precision attachments: A review to guide clinicians. Dental and Medical Problems. 2016;53(4):559-65.
- 19 Jenkins G. Precision attachments: a link to successful restorative treatment/Gareth.
- 20 Burns DR, Ward JE. A Review of Attachments for Removable Partial Denture Design: Part 1. Classification and Selection. International Journal of Prosthodontics. 1990 Jan 1;3(1).
- 21 Nandeeshwar DB, Singh M, Budihal DK. Attachment: Source of Retention. International Journal of Prosthodontics and Restorative

I would like to say that precision attachments are very excellent example of bio- engineering that would be beneficial for the betterment of the health of masticatory apparatus.

- Dentistry. 2018 Aug 1;8(1):32-5.
- 22 Preiskel HW. Precision attachments in prosthodontics. Overdentures and telescopic prosthesis. 1985;2:13-21.
  - 23 Vigarniya MM, Ritwal PK, Chowdhary P, Yadav B, Yadav P, Madan R. Non-rigid attachment to break the stress on pier abutment: A case report. International Journal of Development Research. 2017;7(12):17826-9.
  - 24 Fernandes FL, Chaware S. Precision (Tenon-Mortise) Attachment For Pier Abutment–.
  - 25 Mishra A, Gulati M, Kumar MS. Precision Attachments: A Review. International Journal of Health Sciences.:135-42.
  - 26 Burns DR, Ward JE. A review of attachments for removable partial denture design: Part 2. Treatment planning and attachment selection. International Journal of Prosthodontics. 1990 Mar 1;3(2).
  - 27 Swaminathan AA, Prasad A. A simplified approach to semi-precision attachment. Journal of Health and Allied Sciences NU. 2016 Sep;6(03):51-7.
  - 28 Coye RB. Precision attachment removable partial dentures. Journal of the California Dental Association. 1992 Nov 1;20(11):45-52.
  - 29 Jain R, Aggarwal S. Precision attachments-an overview. Ann Prosthodont Restor Dent. 2017 Jan;3(1):6-9.
  - 30 Patel H, Patel K, Thummer S, Patel RK. Use of precision attachment and cast partial denture for long-span partially edentulous mouth-A case report. Int J Appl Dent Sci. 2014;1(1):22-5.
  - 31 Angadi PB, Aras M, Williams C, Nagara S, Angadi P. Precision attachments; applications and limitations. J Evol Med Dent Sci. 2012 Dec;1(6):1113-21.
  - 32 Ghiaz K, Shaik SS, John P, Kumar A, Vijayakumar N. Precision attachment boon to prosthodontists. Journal of Pharmacy and Bioallied Sciences. 2022 Jul 1;14(Suppl 1):S1030-2.
  - 33 Wangoo A, Kumar S, Phull S, Gulati M. Prosthetic Rehabilitation Using Extra Coronal Castable Precision Attachments. Indian Journal of Dental Sciences. 2014 Oct 1;6(4).
  - 34 Lau HG. The Use of Semi-precision Attachments in Removable Prosthodontics Part 1: Classification & Survival Rate.
  - 35 Chhabra S, Shetty RM, Nandini Y. SEMI PRECISION ATTACHMENT IN REMOVABLE PARTIAL DENTURE. Guident. 2018 Dec 1;11(1).
  - 36 Arafa KA. Effect of two different types of precision attachments on the retention of partial denture (A comparative study). Life Science Journal. 2014;11(9).
  - 37 Den Haan R, Battistuzzi PG, Witter DJ, de Baat C, Creugers NH. (Semi-) precision attachments for cast metal frame removable partial dentures. Nederlands Tijdschrift Voor Tandheelkunde. 2011 Feb 1;118(2):93-100.
  - 38 Shu J, Liu Z. The Biomechanical comparisons of different periodontal conditions under the different extracoronary precision attachment restorations for the mandibular Kennedy I dentition defect. Journal of Mechanics in Medicine and Biology. 2020 May 21;20(04):2050019.
  - 39 Garhnayak M, Tomar GK, Mahapatra A, Panda S. Rehabilitation of Mutilated Dentitions with Precision Attachments: A Conservative Approach!. Indian Journal of Public Health Research & Development. 2019 Nov 1;10(11).
  - 40 Al-Okh A, Al Samahy M, Amin H, Khashaba U. Stresses induced by integrated and nonintegrated extracoronary semi-precision attachments for maxillary distal extension bases. Al-Azhar Dental Journal for Girls. 2018 Jul 1;5(3):297-304.
  - 41 Arora S, Anand S, Mittal S. Use of a semi-precision attachment to fabricate a removable partial denture. J Dent Specialities. 2017:86-9.
  - 42 Williams G, Thomas MB, Addy LD. Precision attachments in partial removable prosthodontics: an update for the practitioner Part 1. Dental Update. 2014 Oct 2;41(8):725-31.

- 43 Gill S. 29. Semi-precision attachments for aesthetics and function-case reports. *The Journal of the Indian Prosthodontic Society*. 2018 Nov;18(Suppl 2):S104.
- 44 Riedy SJ. The precision attachment removable partial denture. *The Journal of the Tennessee Dental Association*. 1997 Apr 1;77(2):36-9.
- 45 Afify, M., Helmy, M. and Abbas, N., 2020. Evaluation of biting force of New Design of extracoronary castable precision attachment versus conventional partial denture for treatment of unilateral mandibular distal extension area: A randomized controlled trial. *Open Access Macedonian Journal of Medical Sciences*, 8(D), pp.23-28.
- 46 Degirmenci K. ESTHETIC REMOVABLE DENTURES PART II: PRECISION ATTACHMENTS. *Dentistry Concepts, Researches and Practice*. 2022 Dec 25:31.
- 47 Preiskel HW. Precision attachments for the partially dentate mouth. *Annals of the Royal College of Surgeons of England*. 1974 Dec;55(6):294. Brudvik JS, Shor A. The milled surface as a precision attachment. *Dental Clinics*. 2004 Jul 1;48(3):685-708.
- 48 Kanathila H, Doddamani MH, Pangi A. An insight into various attachments used in prosthodontics: A review. *Int. J. Appl. Dent. Sci*. 2018;4:157-60.
- 49 Vaidya S, Kapoor C, Bakshi Y, Bhalla S. Achieving an esthetic smile with fixed and removal prosthesis using extracoronary castable precision attachments. *The Journal of the Indian Prosthodontic Society*. 2015 Jul;15(3):284.
- 50 Brown WA, Yoshioka CF. Mission attachment and satisfaction as factors in employee retention. *Nonprofit management and leadership*. 2003 Sep;14(1):5-18.
- 51 Wichmann MG, Kuntze W. Wear behavior of precision attachments. *International Journal of Prosthodontics*. 1999 Sep 1;12(5).
- 52 Kaplan DM, Wiley JW, Maertz Jr CP. The role of calculative attachment in the relationship between diversity climate and retention. *Human Resource Management*. 2011 Mar;50(2):271-87.
- 53 Klein G. Modern laboratory techniques for construction of movable-removable precision attachment cases. *Dental Laboratory Review*. 1951;48:27-9.
- 54 Attachments and prefabricated castable components. *Catalog/ Technical Manual for Dentist and dental technicians*. Rhein 83. 12th edition.
- 55 Swaminathan AA, Prasad A. A simplified approach to semi-precision attachment. *Journal of Health and Allied Sciences NU*. 2016 Sep;6(03):51-7.



**OBITUARY****DR. ATUL ALSI**

With heavy heart the IPS Nagpur branch bids adieu to our dear Dr. Atul Alsi sir as he peacefully passed away due to a cardiac arrest at 1:38 am on September 21st, 2023. He was an active EC member of the IPS Nagpur branch and an ex-Faculty at Ranjeet Deshmukh Dental College and Research Centre, Nagpur and VYWS Dental college, Amravati. He was a virtuous and kind hearted person contributing to various social initiatives all throughout. He was an ardent music lover and a talented singer himself. His loving memory will forever last in our hearts. We pray for eternal peace to the departed soul...

Om Shanti

# Aesthetic rehabilitation of a patient with proclined anteriors without orthodontic correction: a case report

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**Abstract:** Ceramic laminates can be considered for aesthetic correction of a number of conditions such as tooth discoloration, malalignment, diastema, tooth defects, tooth abrasion, coronal fracture, etc.

They have been used in corrections and dental reconstructions with a high degree of predictability of success thanks to advancements in restorative materials and adhesion techniques, particularly because they require less wear or, in many cases, no wear, preserving more sound dental structure and promoting pulp and periodontal health.

In addition to these benefits, the cosmetic procedure employing ceramic laminates also offers others like biocompatibility, color stability, and good optical qualities, enabling the restoration of teeth with biomechanical properties that are comparable to those of natural teeth. For some clinical scenarios, choosing the right ceramic system could increase the lifetime of these restorations.

Although the majority of these systems encourage pleasing aesthetic outcomes, some are more appropriate for anterior areas due to the material's greater translucency.

**Introduction:** The public is constantly subjected to media messages touting the merits of "The Perfect Smile." A person may get psychologically unhappy and become less socially active if they have discolored, ugly, malposed, or deformed anterior teeth and midline diastemas. With the advancement of numerous materials and techniques in cosmetic dentistry in the twenty-first century, teeth that are stained, broken, misshapen, or malposed can be transformed and restored to a highly desirable form.

When teeth are stained, pitted, or have midline diastemas, a conservative procedure called laminate veneering can restore their appearance. It is a conservative alternative to more involved restorative operations and offers incredibly outstanding aesthetic outcomes.

**Case Report:** A 45-year male patient, reported to department of prosthodontics with chief complaint

of bad aesthetics due to discrepancy, proclination and slight discoloration in anterior teeth. Patient wanted proper alignment of anterior teeth and was not convenience for any orthodontic corrections.

Medical history of the patient was not significant, Dental history suggested H/O RCT 5 yrs back with upper anterior tooth.

On intraoral examination crowding in upper arch was evident especially in left side of the arch, slight rotation was seen with upper left first premolar, and proclination with upper left central and lateral incisors.

A conservative treatment plan was advised to the patient stating full veneer crown restoration with 11 and 21 and ceramic laminate with 12 and 22 for proper correction of angulation and proclination to correct the smile and patient agreed with this treatment plan.

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## CASE REPORT



Pre-op maxillary arch



Pre-op frontal view

**Treatment Plan:** After a thorough examination, irreversible hydrocolloid impressions were made for use in diagnostic models. To evaluate the models and establish the size and shape of the restorations, a diagnostic wax up was utilized. PLV was offered to the patient as a potential long-term treatment. Prior to starting the procedure, the teeth were carefully scaled and polished.

On the maxillary left central incisor, the outdated PFM crown was swapped out for a metal ceramic one. Prior to dental preparation, shade was selected using the Vitapan Classical shade guide.

The maxillary lateral incisors could then be fitted with porcelain laminate veneers. Using a depth-cutting diamond, the tooth preparation was kept in the enamel at a 0.5 millimeter depth.

After the sharp line angles and point angles were completed, gingival retraction was carried out. A silicone impression of the maxillary arch was made using a one-step double-mix method. In this method, a prefabricated perforated tray covered in

tray adhesive is loaded with silicone that has been given a putty-like consistency.

Light body material was syringed around the prepared teeth to record the fine features while the previously loaded tray was placed in the mouth to generate the impression. Temporary restorations were not used because of the minimal and limited tooth reduction.



Gingival retraction



Silicone impression



For shade, fit, marginal adaptability, shape, size, symmetry, and contacts, the laminates were tested. They were first tested out individually with glycerin acting as a holding agent. Following individual evaluation, a group try-in was conducted to

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recognize the aesthetic improvement. The patient's consent was gained at the time of the try-in.

**Laminate Preparation:** To prevent erroneous placement and unintentional breakage, the laminates were put on a wax sheet that indicated the position of the tooth in the arch. With great care, the facial surface was kept out of contact with the 4% hydrofluoric acid used to etch the laminates for 3 minutes. They were properly cleansed with plenty of water after being etched. A coat of Silane coupling agent after drying.



Laminates of 12 and 22



**Tooth preparation:** Starting at the midline, two teeth were prepared for cementation at a time. 37% Phosphoric Acid was used to etch the prepared teeth for 15 seconds. Bonding agent was applied and exposed to light for 10 seconds to cure.

For cementation, a dual cure composite crown and bridge luting agent was used. The laminates were initially spot-cured for 5 seconds. After removing extra cement using an explorer, complete curing was performed for 20 seconds. The occlusion was examined for interferences in the centric and eccentric positions after the cementation technique was complete. They polished and erased the high points.



After cementation , PFM crowns on 11 and 21, Laminates on 12 and 22



**Discussion:** The preservation of tooth structure has come to light as a key aspect in determining the long-term success of any restorative operation. Bonded porcelain veneers' great conservatism in terms of tooth reduction is one of their most significant benefits. Only 0.5 mm of the labial surface were reduced in the current case. This slight reduction almost never, if ever, results in pulpal involvement, which is a significant benefit. Plaque accumulation is prevented by the porcelain laminates' highly glazed surface, which is thought to be crucial for achieving a healthy periodontal response.

Due to the porcelain's realistic appearance and the luting cement's dispersing action, excellent aesthetics may also be attained. Laminates made of porcelain do, however, have some drawbacks of their own. They must not be applied.

**Conclusion:** Bonded porcelain veneers can successfully treat patients' aesthetic and functional needs throughout the long term. When utilized carefully, porcelain laminate veneers offer more applications, and both the patient and the cosmetic dentist have been pleased with the results. It is becoming more and more clear that preserving tooth structure is crucial for deciding the outcome of any restorative operation in the long run.

## CASE REPORT

### References:

1. Bowen RL: Development of a silica-resin direct filling material. Report no. 6333. National Bureau of Standards, 1958, Washington DC.
2. Buonocore MG: A simple method of increasing the adhesion of acrylic filling materials to enamel surfaces. *Journal of Dental Research*, 1955;34(6):849-853.
3. Calamia JR: Clinical evaluation of etched porcelain veneers. *American Journal of Dentistry*, 1989;2(1): 9-15.
4. Cho GC, Donovan TE, Chee WW: Clinical experiences with bonded porcelain laminate veneers. *Journal of California Dental Association*, 1998;26(2):121-127.
5. Dlugokinski MD, Frazier KB, Goldstein RE: Restorative treatment of Diastema. In: *Esthetic in Dentistry (Vol.2)*. RE Goldstein, VB Hoywood (Eds.); 2nd Edn.; BC Decker Inc. London, 2002;pp703-732.
6. Dumfahrt H, Schäffer H: Porcelain laminate veneers. A retrospective evaluation after 1 to 10 years of service: Part II-Clinical results. *International Journal of Prosthodontics*, 2000;13(1):9-18.
7. Dunne SM, Millar BJ: A longitudinal study of the clinical performance of porcelain veneers. *British Dental Journal*, 1993,175:317-321.
8. Horn HR: Porcelain laminate veneers bonded to etched enamel. *Dental Clinics of North America*, 1983; 27(4):671-684.
9. Jordan RE, Suzuki M, Senda A: Clinical evaluation of porcelain laminate veneers: a four-year recall report. *Journal of Esthetic & Restorative Dentistry*, 1989; 1(4):126-132.
10. Karlsson S, Landahl I, Stegersjo G, Milleding P: A clinical evaluation of ceramic laminate veneer. *The International Journal of Prosthodontics*, 1992; 5(5):447-451.
11. Oesterle LJ, Shellhart WE: Maxillary midline diastemas: a look at the causes. *Journal of the American Dental Association*, 1999;130(1):85-94.
12. Peumans M, De-Munck J, Fieuws S, Lambrechts P, Vanherle G, Van Meerbeek B: A prospective ten-year clinical trial of porcelain veneers. *The Journal of Adhesive Dentistry*, 2004;6(1):65-76.
13. Pincus CR: Building mouth personality. *Journal of South California Dental Association*, 1938;14:125-129.
14. Pippin DJ, Mixson JM, Soldan-Elis AP: Clinical evaluation of restored maxillary incisors: veneers vs PFM crowns. *Journal of the American Dental Association*, 1995; 126(11): 1523-1529.
15. Rammelsberg P, Spiegl K, Eickemeyer G, Schmitter M: Clinical performance of metal free polymer crowns after 3 years in service. *Journal of Dentistry*, 2005;33:517- 523.
16. Sheets CG, Taniguchi T: Advantages and limitations in the use of porcelain veneer restorations. *The Journal of Prosthetic Dentistry*, 1990; 64(4):406-411.
17. Strassler HE, Nathanson D: Clinical evaluation of etched porcelain veneers over a period of 18 to 42 months. *Journal of Esthetic Dentistry*, 1989; 1(1):21-28





## A multidisciplinary digitally aided approach for treating arch length- tooth size discrepancy using combined orthodontics and Prosthodontics - A Case Report.

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**Abstract:** An aesthetically compromised smile due to severe incisor inclination and microdontia requires correction to improve the individual's facial appearance. Not only will cosmetic but also functional improvements following dental rehabilitation boost one's optimism and have a positive impact on the oral health related quality of life. This case report describes a combined orthodontic and Prosthodontics approach to treat a 19-year-old female patient with severely proclined maxillary and mandibular anterior with a generalized spacing due to microdontia in the maxillary arch. The treatment began with the orthodontic correction to align the teeth in arch and to create and distribute space using mini-implant anchorage. This was followed by prosthetic management with an all-ceramic digitally fabricated bonded restorations to correct the shape and form of teeth. Digital Smile Designing was done over Microsoft PowerPoint and veneers were planned and fabricated using the digital workflow. The patient received the most aesthetic and functional satisfaction from the step-by-step interdisciplinary approach at an accelerated rate. A diligent effort made in the diagnosis and planning will treat Microdontia in the best possible way among many options available.

**Keywords:** Microdontia, Peg-shaped laterals, Bonded restorations, Digital workflow, Digital smile designing

**Introduction:** Peg lateral is defined as 'an undersized, tapered, maxillary lateral incisor' that may be associated with other dental anomalies such as canine transposition and over-retained deciduous teeth.<sup>(1)</sup> Individuals with malformed lateral incisors frequently have a diastema in the midline region caused by the distal movement of the central incisor. In 739 Swedish children, 0.8% had peg-shaped incisors.<sup>(2)</sup>

According to Arte et al the prevalence of hypodontia and/or peg-shaped teeth was higher than 40% in first and second-degree relatives and 18% in first cousins in the Finnish population.<sup>(3)</sup> Four of the nine hypodontia gene obligate carriers had dental anomalies such as small upper lateral incisors, ectopic canines, taurodontism, and rotated premolars. They

concluded that hypodontia and/or peg-shaped teeth were a genetic condition with autosomal-dominant transmission and were associated with a number of other dental anomalies.

There are numerous factors to take into account when restoring peg lateral incisors, depending on the patient's expectations and the clinician's level of experience. Based on functional and aesthetic requirements, the need for extractions, the position of the canines, and the possibility of coordinating orthodontic and restorative treatment, the type of treatment should be espoused.

Multiple Treatment options are available for the same, but to mention a few are:

(1) Extraction of the peg-shaped tooth, followed

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by orthodontic movement of the canine into the lateral incisor space.<sup>(4)</sup> The canines can then be reshaped to look like lateral incisors.

- (2) Extraction and replacement with an implant-supported single-tooth restoration or a fixed partial denture (FPD).
- (3) Direct or indirect restoration of the peg lateral incisors after orthodontic alignment to develop normal tooth morphology.

Treatment options for restorative dentistry include porcelain laminate veneers, metal-ceramic restorations, and all-ceramic crowns, as well as minimally invasive procedures like direct resin composite bonding veneers. A thorough assessment along with the restorative dentist, patient, and orthodontist is warranted prior to any orthodontic treatment.

Appointment scheduling and sequencing are critical near the end of orthodontic treatment so that required spacing is achieved.<sup>(5)</sup> This case report describes an interdisciplinary (Orthodontic and Prosthodontic) approach to treating peg-shaped lateral incisors.

**Case report:** A 19-year-old female patient presented to the Department of Orthodontics with the primary complaint of forwardly placed upper and lower front teeth.

An intra-oral examination revealed skeletal class I jaw bases with Prognathic maxilla and Orthognathic mandible, Angle's class I malocclusion with Dewey's type 2 modifications. Peg-shaped laterals in the maxillary arch, clinically missing 45 (Extracted due to various reasons) and Prosthesis with 36. **(Figure 1A and 1B)** The patient also had a habit of thrusting her tongue. Cephalometric analysis was done digitally in NemoCeph Software and the treatment results were compared with pre-treatment **(Figure 2A)** and post treatment **(Figure 2B)**

**Treatment plan:** Based on the space analysis, the upper arch needed 8 mm of space for proclination correction and 6 mm for restorative procedures. The

extraction of 14 and 24 added up to the total space needed. Additionally, the lower arch needed 16 mm of space to correct proclination, which was obtained by extracting 34 and using an edentulous space of 45.

**Alternative treatment option:** Another treatment option would have been to extract 15, 25 and 35, however, the space requirement was greater and the first premolar was close to the site of discrepancy. Hence in order to not disturb the established posterior occlusion, extraction of 14, 24, and 34 was chosen instead.

**Treatment Progress:** After discussing all treatment options with the patient, she chose the combined orthodontic and restorative treatment plan. The treatment plan called for closing the spaces with orthodontics. To improve aesthetics and retention, the bonded restorations would be placed from canine to canine. MBT Appliance 0.022 Slot was used to bond the case, and leveling and alignment were started with 0.016, 0.016 x 0.022, 0.017 x 0.025, and 0.019 ssx0.025 NiTi wires. From the beginning of leveling and alignment, a fixed habit-breaking appliance was also placed. **(Figure 3A)**

Leveling and alignment was completed in 6 months. The space closure was started on 0.019x0.025 ss arch wire. The individual canine retraction was started with an implant in the upper arch, and 4 mm of space was created Mesio-distal to the lateral incisor for the restorative procedure. Lower arch retraction as an en-mass. Excessive incisor display (Gummy smile) was corrected by intruding the maxillary incisor by 2 mm with two Mini-implants. Interradicular Mini implants were placed between canine and lateral incisor. **(Figure 3B & 3C)** Space closure took 7 months.

The lower arch was given orthodontic retention as soon as the braces were taken off. However, after orthodontic treatment, upper teeth could not receive either bonded or removable retainers. The



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prostheses themselves served as retainers after the restorative procedure.

Post Orthodontic correction, (**Figure 4A, 4B & 4C**) patient was referred to dept. of Prosthodontics for the restorative procedure. Diagnostic impressions and Photographs were taken and were subjected to Digital smile designing using Microsoft PowerPoint Software. The photographs were calibrated to the horizontal and vertical plane and the dimensions changed to match that of the life size. A Smile curve was established using the lower lip line as a guide (**Figure 5A**) and with a 75% of the height to width ratio, the maxillary central incisors were designed. Proportionately, the lateral incisors and canines were outlined (**Figure 5B**).

Based on the dimensions, a tentative wax-up was done on the diagnostic cast (**Figure 5C & 5D**). Veneers with wrap-around incisal edge design were planned with all the teeth; as the surface area of the tooth was very less, a full coverage restoration was planned for 12. Using the direct temporization technique, temporaries were given to the upper anterior teeth. Minor changes were done as per the patient's requirements. The anterior guidance values were obtained using a protrusive bite record. Guided tooth preparation through the temporaries was done. (**Figure 6A and 6B**) After adequate gingival retraction, (**Figure 6C**) an intraoral scan of the upper and lower arch was done using CS3500 Scanner (**Figure 6D**). The acquired Horizontal and lateral condylar guidance values were introduced to the virtual articulator and the restorations were designed on Exo-CAD software (**Figure 7A and 7B**).

High translucency E-max ingots of A2 shade were milled; after staining and glazing, (**Figure 7C**) the veneers were bonded using clear shade Variolink N, Ivoclar light cure resin under strict isolation. (**Figure 8A and 8B**) The restorative treatment was completed within 3 days as a digital workflow was

obtained. Post operative instructions were given to the patient. (**Figure 9A and 9B**)

**Discussion:** It is of prime importance to spend more time during the diagnosis and planning phase so as to enhance the overall treatment outcome.<sup>(6)</sup> An anterior tooth restoration is governed by many factors like aesthetics, phonetics, occlusal contact, anterior guidance, the plane of the incisors, etc. A meticulous assessment of the space available, arch form, tooth form, and facial guidelines yield in restoring the form and function of these teeth; which is not only in harmony with the stomatognathic system but also satisfies the patient's demands.<sup>(7)</sup>

Ideal tooth positions and arch form is mandatory in this regard to circumvent the problems of excess tooth preparation or endodontic treatment. In this case, proper leveling and alignment followed by space closure and a timely consult with the restorative dentist led to the success of the overall treatment. In cases of arch-to-tooth size discrepancy, space dispensing is of paramount importance to preserve the existing tooth architecture and bring an optimum smile with the minimalistic treatment possible.<sup>(8,9)</sup>

The above-mentioned case highlights the merits of the digital workflow involved in the designing and fabrication of more accurate bonded restorations which reduced the overall time required for its fabrication. Using digital smile designing (DSD) aids in explaining and showing the patient the end result, which can be expected.<sup>(10)</sup> The same plan when converted into the analog mock-up can be tested in the patient's mouth to evaluate the planning done. This gives a sense of confidence and motivation to the patient about the treatment being done and also high predictability to the operating clinician.<sup>(11)</sup>

A guided tooth preparation will mitigate the issues of excess tooth preparation which can lead to dentinal hypersensitivity. It is best advisable to contain the

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tooth preparation in enamel so as to uplift the bond strength of the restoration and thereby its longevity.<sup>(12)</sup> An interdisciplinary approach with collaboration of conventional and advanced treatment technique like mock-up and DSD reduced the chair side time.

Long-term stability should be taken into account when considering retention after maxillary intrusion. 14 months after miniscrew intrusion, Hsu and Liou<sup>(13)</sup> reported a 30% relapse rate. According to additional studies<sup>(14)</sup>, the majority of relapses following molar intrusion with TSADs happen within the first year of treatment.

It is advised to keep the TSADs that were used for intrusion to anchor a clear retainer in order to provide

### References:

- 1 Glossary of Prosthodontic Terms (1999) J Prosthet Dent 81: 90.
- 2 Backman B, Wahlin YB (2001) Variations in number and morphology of permanent teeth in 7-year-old Swedish children. Int J Paediatr Dent 11: 11-17.
- 3 Arte S, Nieminen P, Apajalahti S, Haavikko K, Thesleff I, Pirinen S (2001) Characteristics of incisor-premolar hypodontia in families. J Dent Res 80: 1445-1450
- 4 Contemporary Orthodontics - Proffit 4th ed. (2009) St Louis Mosby.
- 5 Operative Dentistry - A Practical Guide to Recent Innovations – Hugh Devlin Springer
- 6 Proffit WR, Fields Jr HW, Sarver DM. Contemporary orthodontics. Elsevier Health Sciences; 2006 Dec 8.
- 7 Proffit WR, Fields Jr HW, Sarver DM. Contemporary orthodontics. Elsevier Health Sciences; 2006 Dec 8.
- 8 Oquendo A, David S. Space Management. Smile Design Integrating Esthetics and Function-E-Book: Essentials in Esthetic Dentistry. 2015 Oct 30:151.
- 9 DO A, ST EVEN DA. Space Management. Smile Design Integrating Esthetics and Function: Essentials in Esthetic Dentistry. 2016 Jan 14;2:151
- 10 Hooda S, Paul G. Digital Smile Design. In: Digitization in Dentistry 2021 (pp. 373-399). Springer, Cham.
- 11 de Cristina Mocelin R, Penteadó MM, Pierre FZ, Saraiva AC, Uemura ES, da Silva JM. Assessment of patient and dentist preference between conventional and digital diagnostic waxing. The international journal of esthetic dentistry. 2021 Aug 17;16(3):300-9.
- 12 de Cristina Mocelin R, Penteadó MM, Pierre FZ, Saraiva AC, Uemura ES, da Silva JM. Assessment of patient and dentist preference between conventional and digital diagnostic waxing. The international journal of esthetic dentistry. 2021 Aug 17;16(3):300-9.
- 13 Hsu SP, Liou EJW. Stability evaluation of en masse maxillary retraction and intrusion by using miniscrews: one year follow up. Taiwan Association of Orthodontists Annual Meeting at Kaoshiung on Dec 17 & 18, 2005.
- 14 Scheffler NR, Proffit WR, Phillips C. Outcomes and stability in patients with anterior open

better retention in the first year post intrusion.<sup>(15)</sup> Scheffler et al<sup>(16)</sup> inferred that maxillary first molars relapse 0.5-1.5 mm after TSAD intrusion supported their hypothesis that maxillary molar intrusion with TSADs was effective in reducing long anterior facial height. However, when compared to intrusion arch or J-hook headgear, upper incisor intrusion with TSADs was much more successful.

**Conclusion:** A multi-disciplinary approach with timely consultation with the specialist will bring about a treatment which is aesthetic and functionally sound; thereby optimizing the smile of the patient. A diligent effort should be made in this direction to plan and execute such cases to obtain best results.

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bite and long anterior face height treated with temporary anchorage devices and a maxillary intrusion splint. *Am J Orthod Dentofacial Orthop* 2014;146:594e602.

15 Kaku M. Gummy smile and facial profile



Figure 1A- pre-Operative intraoral photograph (Right lateral)  
1B- pre-Operative intraoral photograph (Left lateral)

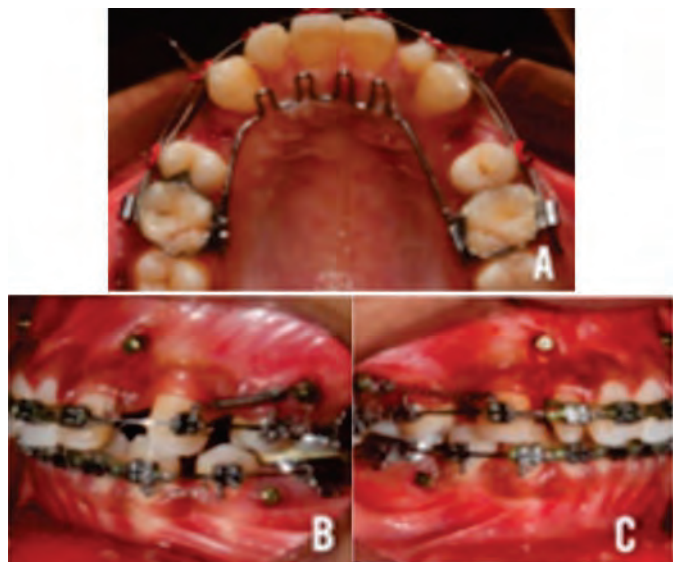


Figure 3A: fixed habit breaking appliance  
3B& 3C: Implant assisted canine retraction (segmental)

correction using miniscrew anchorage. *Angle Orthod* 2012;82:170e7.

16 Kaku M. Gummy smile and facial profile correction using miniscrew anchorage. *Angle Orthod* 2012;82:170e7.

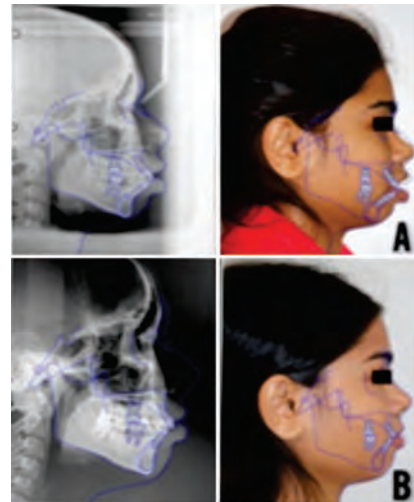


Figure 2A: Digital lateral cephalometric analysis using NemoCeph Software (pre-treatment)  
2B: Digital lateral cephalometric analysis using NemoCeph Software (post treatment)



Figure 4A: Post orthodontic treatment (Frontal view)  
4B: Post orthodontic treatment (Right lateral view)  
4C: Post orthodontic treatment (Left lateral view)



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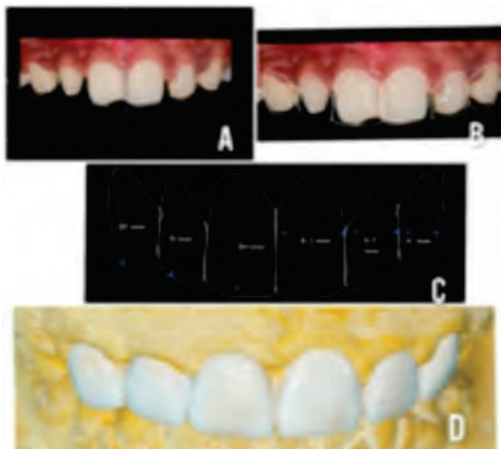


Figure 5A: Digital smile designing- Establishing the smile arc according to the lower lip line 5B: Digital smile designing- Proportionately designing the tooth shape and form from 13-23 5C: Digital smile designing- Measurements of the planned tooth sizes 5D: Analogue mock up over diagnostic cast based on the measurements



Figure 6A: Guided tooth preparation through the temporaries 6B: Final tooth preparation. (Occlusal View) 6C: Final tooth preparation and gingival retraction (Buccal view) 6D: Intraoral scanning of upper and lower arches

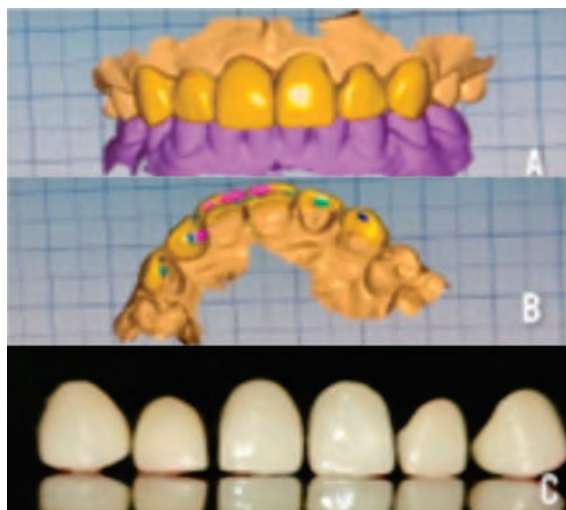


Figure 7A: Designed restorations on EXOCAD software (Buccal view) 7B: Designed restorations on EXOCAD software (Occlusal view) 7C: Milled, stained and glazed restorations before bonding



Figure 8A: pre-Operative photograph (frontal view) 8B: post-Operative photograph (frontal view)



Figure 9A: pre-Operative extraoral photograph (frontal view) 9B: post-Operative extraoral photograph (frontal view)

# Aesthetic Rehabilitation in a Patient with Dental Fluorosis using Ceramic Laminate Veneers: A case report

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**Abstract:** Fluorosis is an endemic disease in India, affecting 20 states out of 36 entities. The excess level of fluoride in drinking water or in diet affects both dental hard tissue and skeletal system of the body. Excess level of fluoride in the body affects ameloblast cells and leads to defective enamel formation. Pigmentation on teeth is the major concern for the patients which compromise their esthetics. Veneers are the most conservative treatment for enhancement of dental esthetics. In this case moderate fluorosis is treated with lithium disilicate veneers. Veneers are fabricated with lost wax hot-pressed technique using IPS E-max Press (Ivoclar Vivadent).

**Keywords:** Moderate Fluorosis, Lithium Disilicate Veneers, Discoloration, Resin cement

**Introduction:** In the nature Fluorine is the most abundant and near about 96% in the human body is found in bone and teeth. Which has been considered as one of the 14, physiologically most essential mineral required for normal mineralization of dental enamel and bone. It is well known fact that fluoride can have both beneficial and detrimental effects on the dentition ever since Mc Kay and G.V. Black published the effect of fluoride on dentition in 1916.

Dental fluorosis clearly defined as hypomineralization of enamel resulting from excessive intake of fluoride during tooth development. In areas where fluoride levels in drinking water is >1.5 mg/l will affect the morphology of the dentition resulting into unesthetic appearance. Our daily fluoride requirement is 0.05-0.07 mg per kg body weight. The permissible level of fluoride in drinking water in India is 0.5-0.8ppm.

Dental fluorosis being endemic globally (32.1%), including India, reports >20% of children affected. In Indian subcontinent, total 19 states have been declared endemic for fluorosis. In Maharashtra, ten districts are declared endemic for fluorosis. These

are Amravati, Nagpur, Bhandara, Chandrapur Akola, Nanded, Solapur and Yavatmal. Fluoride source of drinking water is ground water i.e wells and bore wells.

Increased intake of fluoride at the time of enamel maturation unfavourably disturbs the cleavage and elimination of enamel proteins like amelogenins. The retention of proteins and water inhibits the crystal growth of the enamel leading to different sub-surface porosities, the pore volume and depth of which increases with the increased amount of fluorides thus, causing severe discoloration of the teeth that is esthetically unpleasant and psychologically disturbing.<sup>[1]</sup>

**Prevention:** Dental fluorosis is irreversible in nature and its treatment requires skilled technicians, complex and expensive procedures which are extremely time consuming and are not accessible to all sections of the society. There is no specific or particular treatment measures for skeletal fluorosis. Therefore, prevention of dental fluorosis through appropriate measures is found to be the best method to combat this endemic disease - FLUOROSIS.



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As we already saw the most common way through which fluoride ions enters our body is through the heavily fluoridated groundwater (drinking water) due to the universal presence of fluoride in the earth crust. Hence the first step in prevention of dental fluorosis is provision of safe and no fluoridated drinking water.

**Treatment for Fluorosis:** Management and treatment of dental fluorosis depends on the severity of the condition as well as patients' motivation towards the treatment. The most common reason for which the patients come seeking treatment for fluorosed teeth is the discolouration of tooth.

For mild fluorosis discolouration and for moderate fluorosis discolouration, treatment to change the aesthetic appearance of the teeth can be accomplished with minimally invasive procedure using micro-abrasion. Micro and macro-abrasion, which is used as an option for mild-to moderate fluorosis is a faster procedure but it involves the use of high-speed hand piece. If proper coolants are not used or if the operator is not skilled and experienced, it can even result in damage to the tooth structure.

In case of severe fluorosis, micro-abrasion in combination with bleaching can be used as a treatment to provide acceptable results. Bleaching in other words known as tooth whitening is restoration of natural tooth shade. Techniques which are used in bleaching are bleaching strips, bleaching pen, bleaching gel and laser tooth whitening. Bleaching is considered as the least invasive option, but it is also associated with sensitivity in some cases. Other alternatives may be veneers or full coverage crowns. Full coverage restoration requires very careful planning as well as execution of the procedure.

Severe fluorosis with dark discolouration and surface pitting, adhesive restorative dentistry may be necessary to fulfill a patient's aesthetic desires. As such, there is no standard treatment for skeletal fluorosis; but there are assumptions that it can

be reversible in some instances. After fluoride ingestion is stopped, existing fluoride level in the bone starts to recede and is excreted via urine<sup>[12]</sup>. But this usually shows negligible results, and is accompanied with very disastrous side effects, hence is not widely accepted.

Therefore, minimally invasive therapeutic intercession, is frequently required to manage and correct such cases of dental fluorosis. It has been documented that moderate to severe types of fluorosis require decisive dental treatment. There are certain treatment options like bleaching or microabrasion that shows less efficiency quite frequently or delivers a temporary result, whereas, composite restorations tend to discolor the teeth and also can wear-out over time or may chip or debond.<sup>[1]</sup> Hence, porcelain veneers have emerged as the ultimate choice of treatment to be used as the restoration for severely fluorosed teeth, as they have the capability to retain their color, wear resistance, and biocompatibility.<sup>[3]</sup> Dental veneer refers to a thin layer of dental porcelain that is bonded to the tooth surface.

The thin porcelain shield covering the front surface of the tooth are the Ceramic Veneers that epitomize an everlasting resolution to the alterations of the dentition or enhance the appearance of un-aesthetic teeth that might be stained, chipped, broken. However, ceramic veneers have gradually acquired acceptance, admiration and approval among the clinician and the patients, as a common aesthetic management option for fluorosed teeth and is being widely used globally. This case report documented the result of porcelain veneer as a restoration in a patient with dental fluorosis.<sup>[4]</sup>

**Case report:** A female patient of age 22 reported to our Department (Prosthodontics) with the chief complaint of un-esthetic appearance due to discolored upper front teeth since childhood.

On extra-oral examination, no gross abnormality is

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detected. All the mandibular movements are within the range and had a medium smile line (Figure 1). On intraoral examination brown discolorations are present in all the teeth with hypo calcified enamel (Figure 2)



(Fig 1: Preoperative Extraoral View)



(Fig 2: Preoperative Intraoral View)

**Clinical Examination:** Clinical examination revealed generalized fluorosis with loss of the outermost enamel in irregular areas involving less than half of the entire surface, as well as changes in the morphology caused by merging pits and attrition. In this case, based on the Thylstrup and Fejerskov index (TFI) for dental fluorosis classification, the dental fluorosis is classified as TFI = 7.

**Treatment Plan:** After the clinical examination, radiographs, preoperative photographs, and upper and lower alginate impressions for diagnostic models are taken. The patient is presented with treatment options, which included ceramic or composite veneers, along with the advantages and disadvantages of each option. The patient agreed to smile enhancement using ceramic veneers for his upper teeth given that he desired an optimum aesthetic and a long-term result. The veneers would

be placed on the patient's upper teeth, from his upper right canine to upper left canine. The patient decided to postpone veneering his lower teeth, given his limited financial capacity. Diagnostic models are analyzed to evaluate the occlusion, and a diagnostic wax-up is made of white-colored wax. The use of the wax-up allows the patient to preview the desired appearance of his teeth, and this wax-up is also essential for the fabrication of a putty index for temporary restorations.

**Tooth Preparation:** The desired shade is selected using the VITAPAN classical shade guide (VITA Zahnfabrik, Germany). The enamel of the eight maxillary teeth is prepared using a flat-end tapered diamond bur to a depth of 0.5–0.75 mm facial reduction with 1.5 mm incisal reduction (Figure 3). A chamfer finish line is maintained at the level of the gingival margin. The proximal margin is extended into the facial and gingival embrasures.



(Fig 3: Depth Orientation grooves)

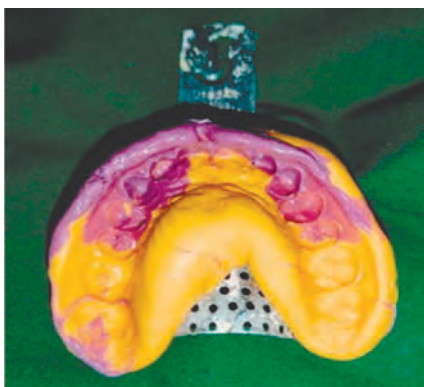
**Final Impression and Temporization:** Following tooth preparation, gingival retraction is achieved using retraction cords soaked in a hemostatic agent. (figure 4) Impressions are taken with a polyvinylsiloxane material. The impression material is manipulated according to the manufacturer's instructions. (Figure 5) Temporization is performed by spot etching on the facial surface of each prepared tooth with 37% phosphoric acid (Total Etch, Ivoclar Vivadent, Schaan, Liechtenstein). Bonding agent (OptiBond Solo Plus, Kerr, Orange, CA, USA) is applied on the enamel-etched spots and light cured for 20 seconds using a high-intensity light-emitting diode (LED) curing light (Elipar S10, 3M ESPE,

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MN, USA). The putty index that is previously fabricated is loaded with a temporization material (Protemp Plus, 3M ESPE, MN, USA) and placed over the prepared teeth. Then, the putty index is gently removed away from the prepared teeth. (Figure 6) A number 12 scalpel blade is used to remove the excess temporization material. Facial and lingual embrasures are refined with a thin diamond disk, the occlusion is adjusted, and the temporary restorations are polished using polishing discs and points.



(Fig 4: Tooth Preparation and Gingival Retraction)



(Fig 5: Final Impression)



(Fig 6: Provisionalization)

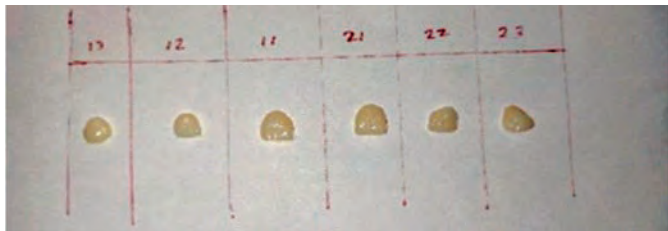
**Veneer Try-In and Cementation:** Ceramic veneers are fabricated with a lithium disilicate-reinforced glass ceramic material (IPS e.max Press, Ivoclar

Vivadent, Schaan, Liechtenstein). Temporary veneers are removed, and the teeth are cleaned using pumice. Ceramic veneers are tried-in using a transparent shade try-in paste (Variolink Veneer try-in paste, Ivoclar Vivadent, Schaan, Liechtenstein) to assess marginal adaptation and shade. Afterwards, veneers are prepared for bonding. Fitting surfaces of the veneers are etched with hydrofluoric acid (Porcelain Etchant 9.5%, Bisco Inc., Schaumburg, IL, USA) for 60 seconds, washed under running water for another 60 seconds, and dried with an air syringe. A layer of silane coupling agent (Monobond Plus, Ivoclar Vivadent, Schaan, Liechtenstein) is applied on the veneers fitting surfaces and gently air-dried after one minute. Then, the prepared teeth are etched using 37% phosphoric acid for 30 seconds, rinsed, and dried. (Figure 8) A layer of bonding agent (Adhese Universal, Ivoclar Vivadent, Schaan, Liechtenstein) is applied on the prepared tooth surfaces and air-thinned. The inner surface of the veneers is covered with light-cured resin cement (Variolink Veneer, transparent shade, Ivoclar Vivadent, Schaan, Liechtenstein). Veneers are positioned appropriately on the teeth by applying gentle pressure, following which excess resin cement is carefully removed with an explorer before light curing. Light curing is first performed for 2 seconds, and the excess resin cement is removed with a microbrush. After that, each veneer is light-cured from the facial aspect for 40 seconds and from the lingual aspect for 40 seconds. The two veneers of the central incisors are first simultaneously cemented. This is followed by cementation of the veneers of the two lateral incisors. Then, the veneers of the two canines are cemented. Finally, Minimal gingival flash of the resin luting cement is removed with a number 12 scalpel blade. A flame-shaped fine diamond bur is used to finish the ceramic margins and to contour the embrasure surfaces. Occlusion is assessed and adjusted. Flossing is performed to ensure interproximal contact patency. Ceramic



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polishing is performed using a series of polishing cups and points (OpraFine polishing system, Ivoclar Vivadent, Schaan, Liechtenstein). Interproximal contacts are finished with finishing and polishing strips. Final surface lustre is achieved by using a diamond polishing paste with a rubber prophylaxis cup. The postoperative clinical photographs are shown in (Figure 9). The patient is satisfied with the final result (Figure 10).



(Fig 7: lithium disilicate-reinforced glass ceramic Veneers)



(Fig 8: Etching using 37% phosphoric acid)



(Fig 9: Postoperative Intraoral view)



(Fig 10: Postoperative Extraoral view)

**Discussion:** Dental fluorosis leads to discolouration of teeth due to intrinsic staining propensity and

there are several treatment options that have been adopted to restore the esthetics of the patient.<sup>[5]</sup> The usage of composite veneers is considered in most of the cases owing to its easy applicability, cost-effectiveness and less operative time, however, they have poor wear resistance and low colour stability and thus, ceramic veneers are preferred over these. Porcelain laminate veneers deliver brilliant esthetics, require minimal tooth preparation as they require minimally invasive design preparation, less plaque retention and are easy to clean. Ceramic veneers are initially introduced in 1938 and since then their acceptance and fame has amplified owing to their biocompatibility and esthetic value.<sup>[7]</sup> These restorations have certain beneficial properties like opalescence, fluorescence, reflection (similar to natural teeth), thus providing the teeth life-like appearance depending on the restoration thickness and shade of the resin cement.<sup>[19]</sup> The porcelain veneers are not appropriate to be applied in all cases of dental fluorosis. For instance, in cases of minor fluorosis the invasive removal of tooth structure might not be warranted. Thus, all the necessary indicative parameters should be precisely judged and the tissue structure of the dentition should be well-preserved to produce appealing results in very less time.<sup>[15]</sup> The long-standing success of these veneers relies upon appropriate case selection and treatment protocol including shade selection, tooth preparation, cementation, oral hygiene maintenance and follow-up. Hence, ceramic veneer is the ultimate choice of treatment for the patient in the present case. The primary aim of the treatment in the present case is to enhance the patient's smile and reintegrate the esthetic appearance. In a similar previous case, it is reported that ceramic veneers produced satisfactory results in fluorosed teeth that are restored with porcelain laminate veneers over a period of 6-year follow-up. There are other studies also that have demonstrated adequate aesthetic results in cases of moderate to severe fluorosis with



the application of ceramic veneers.<sup>[3]</sup> The ceramic veneer restorations are predictably long-lasting with good durability and an approximated survival probability of 93.5% over a period of 10 years as is previously reported in few studies. In another study by *Smales RJ et al. (2004)*, the clinical success rate of 110 ceramic veneers is determined for a time-period of 7 years and a 96% success rate is observed for the incisal overlap design as compared to the 86% success rate for those veneers without incisal coverage.<sup>[2]</sup> There are certain drawbacks of these veneers as they can often fracture, acquire marginal discolouration and there can be loss of marginal integrity and postoperative sensitivity in some cases. A procedural worry with the use of such restorations is the bonding procedure of the adhesive cement.<sup>[16]</sup> This is because, in severe dental fluorosis the hypermineralized surface layer

along with the organic network must be grinded and removed prior to subsurface etching of the enamel that leads to the micromechanical tags. Therefore, the etching time needs to be

**Conclusion:** The major goal of esthetic or cosmetic dentistry is to deliver maximum satisfaction to the patients in terms of looks and appearance with minimal invasion or trauma to the dentition and surrounding structures. Thus, the use of ceramic veneers being an extremely adaptable clinical technique that restores the esthetic value of the patient, has conservative tooth preparation and is fracture resistant along with tissue acceptance, patient gratification, approval and insignificant caries incidence. Hence, the present case showed great esthetic results and helped to enhance the psychological morale of the young patient along with enhanced self-esteem.

### References:

- 1 Dr Hetal Khuva et al., MANAGEMENT OF FLUOROSSED TEETH USING CERAMIC VENEERS - A CASE REPORT, *Eur. Chem. Bull.* 2023, 12(Special Issue 4),6220- 6227
- 2 P Rani, S S Phukela, N Dabas, Nisha, O Shetty, Diksha. Ceramic Veneers in Moderate Fluorosis: - A Case Series. *Bull. Env.Pharmacol. Life Sci.*, Spl Issue [2]: 2022: 191-195
- 3 Zeynep Basagaoglu Demirekin et al, Laminate veneer ceramics in aesthetic rehabilitation of teeth with fluorosis: a 10-year follow-up study, *Demirekin and Turkaslan BMC Oral Health* (2022) 22:42 <https://doi.org/10.1186/s12903-022-02079-4>
- 4 Aminah M. El Mourad et al, Aesthetic Rehabilitation of a Severe Dental Fluorosis Case with Ceramic Veneers: A Step-by-Step Guide, *Hindawi Case Reports in Dentistry Volume 2018*, Article ID 4063165, 4 pages <https://doi.org/10.1155/2018/4063165>
- 5 Dr. Ankit Verma et al, Smile Makeover in a Patient with Severe Dental Fluorosis using Ceramic Laminate Veneers: A Case Report, *international Journal of Science and Research (IJSR) ISSN: 2319-7064 ResearchGate Impact Factor (2018): 0.28 | SJIF (2018): 7.426*
- 6 Maj Ravinder Singh, Lt Col Poonam Prakash, Lt Col Vijaya Kumar R, Lt Col Prashant Awasthi. Esthetic rehabilitation of a patient with dental fluorosis using porcelain laminate veneers - a case report. *International Journal of Contemporary Medical Research* 2018;5(11):K8-K11.
- 7 Jagadeesh K, Hombesh MN, Shashidar HS, Kumar GV, Sharma A, Vijayalakshmi CR. Esthetic Management of Dental Fluorosis with Ceramic Veneers. *J Health Sci Res* 2018;9(1):27-30.
- 8 Dogui Houda et al, Aesthetic rehabilitation of severe dental fluorosis with Porcelain Veneers: About a case report, *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) e-ISSN: 2279-0853, p-ISSN: 2279-0861. Volume 18, Issue 11 Ser.5 (November. 2019), PP 57-63* [www.iosrjournals.org](http://www.iosrjournals.org), DOI: 10.9790/0853-1811055763

## CASE REPORT

- 9 Møller IJ. Fluorides and dental fluorosis. *Int Dent J.* 1982 Jun;32(2):135-47
- 10 DenBesten PK, Heffernan LM. Enamel proteases in secretory and maturation enamel of rats ingesting 0 and 100 PPM fluoride in drinking water. *Adv Dent Res.* 1989 Sep;3(2):199-202
- 11 Aoba T, Fejerskov O. Dental fluorosis: chemistry and biology. *Crit Rev Oral Biol Med.* 2002;13(2):155-70.
- 12 DenBesten PK, Thariani H. Biological mechanisms of fluorosis and level and timing of systemic exposure to fluoride with respect to fluorosis. *J Dent Res.* 1992 May;71(5):1238-43.
- 13 Thylstrup A, Fejerskov O. Clinical appearance of dental fluorosis in permanent teeth in relation to histologic changes. *Community Dent Oral Epidemiol.* 1978 Nov;6(6):315- 28.
- 14 Ermis RB, Van Landuyt K, Van Meerbeek B, Swift EJ Jr. Bonding to fluorosed teeth. *J Esthet Restor Dent.* 2009;21(4):213-4.
- 15 Akpata ES. Therapeutic management of dental fluorosis: a critical review of literature. *S J Oral Sci.* 2014;1(1):3-13.
- 16 Alothman Y, Bamasoud MS. The Success of Dental Veneers According To Preparation Design and Material Type. *Open Access Maced J Med Sci.* 2018 Dec 14;6(12):2402-2408.
- 17 Singh R, Prakash P, Kumar RV, Awasthi P. Esthetic rehabilitation of a patient with dental fluorosis using porcelain laminate veneers - a case report. *International Journal of Contemporary Medical Research* 2018;5(11):K8-K11
- 18 Ouada D, Adli A, Dakhli R, Daouahi N, Riahi Z, NouriaZ, Harzallah B, Cherif M. Aesthetic management of dental fluorosis with ceramic veneers: a case report. *Int J Dent Med Sci Res.* 2020;4(11):26-31.
- 19 Jagadeesh K, Hombesh MN, Shashidar HS, Kumar GV, Sharma A, Vijayalakshmi CR. Esthetic Management of Dental Fluorosis with Ceramic Veneers. *J Health Sci Res.* 2018;9(1):27-30.
- 20 Shahroom NSB, Mani G, Ramakrishnan M. Interventions in management of dental fuorosis, an endemic disease: a systematic review. *J Family Med Prim Care.* 2019;8(10):3108–13.



## Rehabilitation of case of Post COVID Mucormycosis with Combination Prosthesis and Digitalized Planning.

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**Abstract:** Mucormycosis is an invasive, fast progressing, opportunistic fungal infection that affects the head and neck region's nose and paranasal sinuses and has a high mortality and morbidity rate. Both the healthcare provider and the patient find it challenging to have these problems fixed. One of these problems brought on by maxillectomy is the development of a communication between the oral cavity, the antrum, and/or the nasopharynx. Changes to facial anatomy, function, and general quality of life are consequences of severe surgical debridement during the maxillectomy. Depending on the extent and seriousness of the problem, rehabilitation of these cases using some modified procedures becomes necessary.

**Key Words:** Rehabilitation, Mucormycosis, Digital Prosthesis, Partial Denture.

**Introduction:** Due to the most recent COVID outbreak, the black fungal disease called Mucormycosis was widespread.<sup>1</sup> Mucormycosis is an invasive, fast progressing, opportunistic fungal infection that affects the head and neck region's nose and paranasal sinuses and has a high mortality and morbidity rate.<sup>1,2</sup> During the COVID-19 Period, there was a significant increase in the number of instances of mucormycosis, and the disease has turned out to be fatal. It primarily affects people who already have weakened immune systems and concomitant conditions. The disease can manifest clinically in a number of ways, including disseminated, cutaneous, pulmonary, gastrointestinal, and rhino cerebral.<sup>2</sup>

Maxillofacial deformities can be caused by trauma, tumor excision surgery, or congenital abnormalities. Both the healthcare provider and the patient find it challenging to have these problems fixed. One of these problems brought on by maxillectomy is the development of a communication between the oral cavity, the antrum, and/or the nasopharynx.<sup>3</sup> Changes to facial anatomy, function, and general quality of life are consequences of severe surgical debridement during the maxillectomy. The

maxilla can be rebuilt using soft tissue flaps or a prosthetic obturator. The separation of the oral and nasal cavities to allow for proper deglutition and articulation, support of the soft tissue to restore the contour, and an acceptable aesthetic result are the objectives of prosthetic rehabilitation for these patients.<sup>3,4</sup>

In this case report, one of the successful rehabilitation techniques for Mucormycosis patients is reviewed.

**Case Report:** A 45 year-old male patient underwent surgical debridement of mucormycotic necrosis and then presented for prosthetic rehabilitation of an acquired defect. The patient began to have a diffuse, dull, continuing, progressive toothache in the left upper jaw three days after the first signs of COVID-19 infection. Then he underwent maxillectomy and reported to the department for rehabilitation after 2 months of surgery. The chief complaint of patient was difficulty in swallowing, speech and mastication since 2-3 months. The defect was classified as Aramany's Class II defect ( Fig. 1). Initially, a interim obturator was provided to the patient until the scars heal. After 6 months of waiting period a definitive prosthesis was fabricated

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for the patient to aid in proper mastication and to restore the functions,

For fabrication of definitive prosthesis, Primary impression in irreversible hydrocolloids were made. It was decided to digitally plan the CPD. After proper scanning of the casts, the designing of CPD was done on Exocad software. The digitalized designing made the CPD procedure convenient, less time consuming and more accurate. The mouth preparation were done accordingly and a final impression was made in putty and light body addition silicone material on a special tray which was fabricated on primary cast. Trial of CPD framework was done and Jaw relation was made (Fig. 2,3). Final prosthesis with hollow bulb obturator and CPD was delivered after a proper try in procedure. Hollow bulb was fabricated using the lost salt technique. Thus the treatment was best delivered to patient in time (Fig.4).

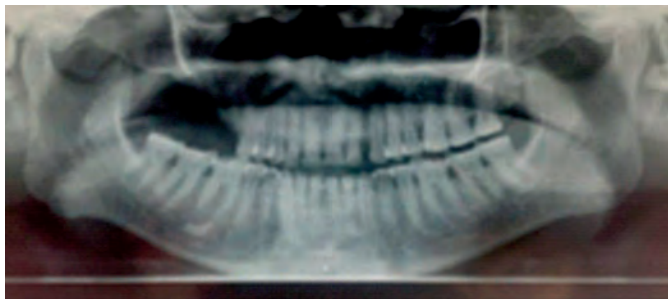


Fig. 1



Fig. 2

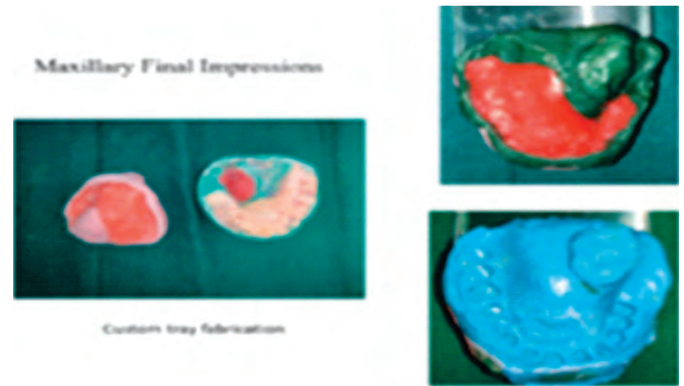


Fig. 3



Fig. 4

**Discussion:** This case report describes a patient who had mucormycosis infection, which required substantial surgical removal of the patient's teeth, soft tissue, alveolar process, and maxillae. A transitional plate was used to block the communication between the oral and nasal cavities after surgical resection, and then the final prosthesis was placed. A skillfully crafted prosthesis improves speech comprehension and masticatory efficiency while reducing psychological discomfort in the aftermath of facial resection.<sup>1-4</sup> The best treatment for such severe defects is an obturator retained by implants, but it increases the cost of treatment. In such scenarios a combination prosthesis serves the function.<sup>5</sup> Nowadays with advancing technology in dentistry, the procedures has been simplified also the accuracy of the prosthesis has increases. Digitally planned prosthesis which are CAD-CAM fabricated shows more accuracy in terms of fit and material properties and patient satisfaction. However these



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prosthesis may also be costly. Digitally planned prosthesis gives us an extra cutting edge over the conventional. Also we must always remember the words by the Great Benjamin Franklin “Planning to Fail, is Failing to Plan”.<sup>4-5</sup>

**Conclusion:** The very invasive etiology of mucormycosis typically necessitates substantial surgical resection. This can lead to facial distortion and greatly impair phonetics, mastication, and

References:-

- 1 Kubin CJ, McConville TH, Dietz D et al. Characterization of bacterial and fungal infections in hospitalized patients with coronavirus disease 2019 and factors associated with health care-associated infections. *Open Forum Infect Dis* 2021;8:201
- 2 The rising challenge of mucormycosis for maxillofacial prosthodontists in the Covid-19 pandemic: a literature review. *Journal of Prosthodontic Research*. 2022;66(3):395-401.
- 3 Kumar PR, Kalavathy N, Shetty MM, Sanketh AK, Venkataramani A, Ramyashree SV. Prosthodontic perspectives in mucormycosis: A review. *RGUHS Journal of Dental Sciences*. 2021;13(4).
- 4 Chander NG. Mucormycosis and prosthodontic management. *The Journal of the Indian Prosthodontic Society*. 2021 Oct;21(4):317.
- 5 Oh WS, Roumanas E. Dental implant-assisted prosthetic rehabilitation of a patient with a bilateral maxillectomy defect secondary to mucormycosis. *J Prosthet Dent* 2006;96(2):88-95.



deglutition. Depending on the extent and seriousness of the problem, rehabilitation of these cases using some modified procedures becomes necessary. The degree of resection, the kind of mucormycosis, the stability of lesions over time, the existence of contiguous disease, the availability of dental and prosthodontic resources, and patient expectations are just a few of the variables that need to be taken into account.

## Full mouth Rehabilitation with Tooth Supported Fixed Prosthesis and Cast Partial Denture:- A Case Report

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**Abstract:** Over time, there has been a substantial advancement in tooth replacement techniques. More people are now partially edentulous, despite a decline in the proportion of totally edentulous persons. Patients who are partially edentulous had better results while using “cast partial dentures (CPD)” as opposed to typical removable partial dentures. In order to improve the aesthetics and longevity of the prosthesis, attachments are frequently utilised to treat partial edentulous conditions. These connectors allow the prosthesis to move freely, shifting potentially damaging forces away from the abutments and onto the supporting bone and tissue. The handling of Kennedy’s class II modification in the maxillary arch is described in this case study. Semi-precision attachments are used to retain a cast partial denture in opposition to a fixed dental prosthesis for Kennedy’s class III modification in the mandibular arch.

**Keywords:** Tooth Supported, Fixed Prosthesis, Cast Partial Denture, Semi-precision attachments.

**Introduction:** Techniques for replacing teeth have advanced significantly over time. Although the percentage of people who are completely edentulous has dropped, more people are now partially edentulous. Compared to traditional removable partial dentures, the use of “cast partial dentures (CPD)” has enhanced outcomes for patients who are partially edentulous. The fact that distal extension issues are sustained by tooth and tissue and require suitable abutment teeth can render rehabilitation of these conditions quite challenging at times.<sup>[1]</sup>

Attachments are often used to treat partial edentulous conditions in order to enhance the aesthetics and durability of the prosthesis. During function, extra coronal attachments move in a hinge-like, vertical, and rotating fashion. These connectors permit the prosthesis to move freely, transferring potentially harmful stresses to supporting bone and tissue and away from the abutments. Semi-precision attachments are those wherein wax patterns are

traditionally cast using a wax pattern that is carved into the wax. Precision attachments, on the other hand, are prefabricated metals that may be included right into the restoration.<sup>[2]</sup> The retention with precision attachments is therefore superior to



Fig. 1a- Pre-treatment Intraoral Photographs



Fig. 1a- Pre-treatment Intraoral Photographs

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Fig. 1a- Pre-treatment Intraoral Photographs



Fig. 1b- Pre-treatment Intraoral Photographs



Fig. 1b- Pre-treatment Intraoral Photographs

that with semi-precision attachments. Cast partial dentures with extra-coronal attachments are a better option in terms of function and appearance.<sup>[1]</sup>

This case report describes the management of Kennedy's class II modification in maxillary arch using semi-precision attachments retained cast partial denture opposing fixed dental prosthesis for Kennedy's class III modification in mandibular arch.

Case report:-

A 55 year old female patient reported to the Department of Prosthodontics, Ranjeet Deshmukh Dental College and Research Center, Nagpur complains of missing teeth causing inability to chew food and unaesthetic appearance. On intra oral examination teeth present were 11, 15 to 17, 21 and 22, 31 to 35 and 37, 41 to 45 and 47. The



Fig. 2- Facebow transfer



Fig. 3- Occlusal Plane Analysis

missing teeth were 12 to 14, 23 to 26, 36, 45, 46. The extractions with the missing teeth were done 2 years before due to mobility. A tooth-supported fixed prosthesis in the lower arch with precision attachments distal to the abutments with a cast partial removal denture in the maxillary arch with semi-precision attachments were planned for treatment after the necessary periodontal treatment and initial analysis of the diagnostic casts as the patient was not consenting for the implant supported fixed prosthesis.

Maxillary and mandibular impressions were obtained using irreversible hydrocolloid and dental stone. Facebow records were made and transferred to the semi-adjustable articulator and the occlusal plane analysis was achieved. To identify soft tissue and hard tissue undercuts, as well as the path of insertion and removal of the CPD and the position



Fig. 4 - Interim Denture and Temporary Prosthesis



Fig. 4 – Interim Denture and Temporary Prosthesis



Fig. 5– Teeth preparation-Anterior

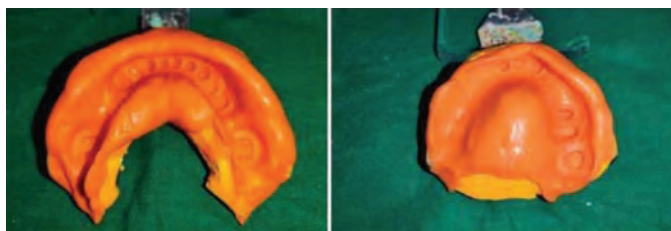


Fig. 5– Final Impressions



Fig. 6- Metal Trial

of the direct and indirect retainer, the casts were surveyed using a dental surveyor. On the working cast, CPD metal framework design for Kennedy Class II Modification 1 in the maxillary arch was completed and then applied to the patient's teeth. On 11, 21 and 22, mouth preparation was done to receive the full veneer crowns. FPD replacement in

the first quadrant was planned. The treatment and related procedures were explained to the patient.

To address the patient's main concerns during the course of therapy, oral preventative measures were implemented, and standard detachable partial dentures were made for both arches. Minimal tooth preparation was done to receive metal ceramic restorations in the permanent maxillary left lateral



Fig.7- Trial for CPD



Fig.7- Trial for CPD



Fig.7- Trial for CPD

incisor, permanent maxillary left canine, and permanent mandibular left first premolar during the mouth preparation for CPD. Provisional restorations were created utilising the putty index and non-eugenol temporary cement and were then cemented



with tooth-colored self-curing acrylic resin in the lower arch and maxillary posterior region. The metal copings were tried in and fabrication done with ceramic buildup, and pick-up impressions were created using silicon impression materials. The casts of the stone models were reproduced using agar. Wax templates were made for CPD frameworks and cast in cobalt chromium alloy on refractory casts. Because of their biocompatibility, resistance to corrosion, and rarity of allergies, cobalt chromium alloys were utilised in casting. Teeth setting and try in were done after frameworks tried in jaw relation record. After that, the frameworks were polished, finished, and polymerized while being careful not to scratch the metal parts.

In order to create a single path for insertion and



Fig.8a- Final Maxillary Prosthesis Delivery



Fig.8a- Final Maxillary Prosthesis Delivery

Final occlusal view

Final mandibular occlusal view



Final frontal view

removal during final cementation using Glass Ionomer luting cement, crowns on the permanent maxillary left and right central incisors and right lateral incisor, right left premolar, first molar and second molar were cemented on their abutments along with removable prosthesis. After placing the removable denture, they underwent intraoral evaluation and were modified. For the lower arch, porcelain-fused-to-metal bridges were fabricated and the full arch rehabilitation was done using the modified Pankey- Mann and Schulyer occlusal scheme.

**Discussion:** It has been established that using a Cast Partial Denture (CPD) is a successful way to restore lost teeth. The usage of CPD will boost the patient's confidence in addition to increasing the stability and retention of the prosthesis. Even with the development of newer procedures, when correctly identified and carried out, the conventional approach of replacing missing teeth in those who are partially edentulous is beneficial to the patients.<sup>[2]</sup>

The approach detailed in the rehabilitation of this patient is a cutting-edge method of restoring partially edentulous arches in order to meet the patient's expectations for masticatory efficiency. Forces or stresses applied during the manufacturing of a traditional removable partial denture will be damaging and targeted at the abutments to supporting bone and tissue.<sup>[3]</sup> However, maximum retention and stability for the removal prosthesis is attained with the existing technique for force management. In comparison to denture base materials, the alloys' impact and compressive strengths are superior, and this will primarily allow the patient to meet his needs. Extra coronal attachments make it simple to install and remove patients and just require a regular full coverage abutment preparation. The patient's speech, taste perception, and perception of heat all improved thanks to the usage of CPD.<sup>[4]</sup>

**Conclusion:** Restoration of the partially edentulous

condition necessitates difficult clinical choices without sacrificing the needs of the patient. Distal extension cases offer advantages for fixed and removable prostheses when treated with cast partial denture precision or semi-precision attachments. Since they are attractive, patient acceptance is higher.<sup>[3]</sup> The unattractive appearance of the clasps can be avoided, and the retention can occasionally be improved, by swapping out the retentive

caps, notwithstanding technique-sensitivity in manufacture. Additionally, it demonstrates that it is a less expensive option than surgical procedures including implants. Long-span FDPs in the opposing arch with precision attachments also provide stable and successful rehabilitation. The method used to treat this patient is straightforward, but it nevertheless yields good outcomes.<sup>[5]</sup>

#### References:

- 1 Balaji A, Jei JB, Murugesan K, Muthukumar B. Rehabilitation of Distal Extension Edentulous Case With Claspless Extra-Coronal Attachments-A Case Report. *Annals of Dental Specialty* Vol. 2022 Apr;10(2):1.
- 2 Reddy KR, Thumati P, Reddy GK. Prosthetic Rehabilitation of a Partial Edentulous Condition By a Combination Of Extracoronal Semi Precision Attachment and a Cast Partial Denture: A Clinical Report. *Journal Of International Dental And Medical Research*. 2013 Jan 9;6(3):113-6.
- 3 Kuriakose EM, Aradya A, KN RS. Cast partial denture: A preferred choice of the patient over acrylic partial and flexible denture-A case report. *IJARIT*. 2019;5(3):615-7.
- 4 Munot VK, Nayakar RP, Patil R. Prosthetic rehabilitation of mandibular defects with fixed-removable partial denture prosthesis using precision attachment: A twin case report. *Contemporary Clinical Dentistry*. 2017 Jul;8(3):473.
- 5 Brown AB. McCracken's Removable Partial prosthodontics.



## Preserving Oral Functionality: Tooth-Supported Overdentures in Patients with Medical Constraints : A Case Report

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**Abstract:** Overdenture has been proven as a backbone of conservative prosthodontic treatment when proper diagnosis, treatment planning, and most importantly, patient compliance is achieved. Despite recent advances in dental implantology, the conservative approach to root preservation followed by an overdenture remains effective. Root retention has numerous advantages, including alveolar bone preservation, improved prosthesis support, proprioceptive feedback, aesthetics, and psychological benefits. This paper gives a case study of an edentulous patient's rehabilitation with a tooth-supported overdenture.

**Key Words:-** Overdenture, Proprioception, Natural teeth, Denture stability, Support

**Introduction:** An overdenture is a complete or removable partial denture that covers and rests on one or more natural teeth, natural tooth roots, or dental implants. Overdentures provide several advantages over traditional full dentures. The most important advantages are the preservation of the residual alveolar supporting bone as well as enhanced prosthesis stability and retention. Keeping natural teeth under an overdenture preserves sensory information from periodontal receptors, which is more precise than input from oral mucosa. Periodontal receptors are also involved in the masticatory-salivary reflex, regulating the range and kind of masticatory stroke. Thus, overdentures are more advantageous because they bring psychological, functional and biological benefits to patients.

**Case Report:** A 52-year-old woman visited the clinic, expressing concern about her difficulty chewing food due to missing teeth. She sought replacement for her missing teeth. Her medical history included an angiography a year ago and she was currently taking ecospirin, which had implications for her prosthodontic treatment. External examination indicated bilateral symmetry,

and an intraoral examination revealed the presence of teeth 13 and 23, along with remaining root fragments of teeth 33 and 34. Both her maxillary and mandibular ridges exhibited a Class I ridge relationship.

The available treatment options for this patient included:

1. Extraction of the remaining teeth in the maxillary arch followed by a conventional complete denture in both the maxillary and mandibular arches.
2. Tooth-supported overdenture in the maxillary arch and a conventional complete denture in the mandibular arch.

The original plan was to preserve the remaining teeth in the upper jaw and use them as support for an overdenture. Due to medical advice, the lower root fragments were also retained. The patient was eager to proceed with this treatment. The remaining upper teeth underwent root canal treatment and were prepared to receive metal copings. Impressions were taken, and a wax pattern was created over the prepared teeth. Metal copings were cast from the wax patterns, finished, polished, and cemented onto the abutments (Fig 1). A final impression was taken

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with the copings in place, and jaw relations were recorded. Teeth arrangement was done, and a trial fitting was conducted (Fig 2). The complete denture for the upper arch was made conventionally, with a recess created on the inner surface to accommodate the abutments. The dentures were finished, polished, and inserted into the patient's mouth. The patient received instructions on insertion, removal, and denture maintenance. Follow-up appointments were scheduled, and the post-operative appearance can be seen in the images. Additionally, pre-operative and post-operative extra-oral pictures are provided (Fig 4).



Fig. 1



Fig 2



Fig 3



Fig 4

**Discussion:** The creation of a tooth-supported overdenture is a step towards preventive prosthodontics.<sup>1</sup> At an old age, persistent ridge reduction combined with decreased dexterity impairs adaptation to denture prosthesis. Preserving natural teeth, even with reduced periodontal support, offers biomechanical and psychological benefits to patients. Overdentures provide a way to maintain these teeth and prevent ridge resorption caused by masticatory stress, especially in the mandibular anterior region where remaining teeth can be used as support.<sup>2</sup> The most obvious strategy to avoid denture complications is to keep your natural teeth.<sup>3</sup> For biomechanical and psychological benefits, healthy teeth with reduced periodontal state can be changed and preserved. Overdentures can be used to achieve this preventive approach.<sup>4</sup> The two most important aspects for the overdentures success are proper patient selection and creating a careful mode of treatment that will please both the patient and the dentist.<sup>5</sup> The maxillary overdenture is quite useful when opposing remaining mandibular anterior teeth because it helps to protect the ridge from resorption caused by masticatory stress.<sup>6</sup> Root canal therapy is an essential part of the preparation process for the chosen teeth; single-rooted or double-rooted teeth with easily accessible canals are recommended. When the clinical crown is decreased to near ridge height, teeth that are movable due to bone loss can become appropriate for overdenture support.<sup>7</sup> The choice of coping design significantly influences



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stress distribution on the roots. Short coping designs minimize stress and horizontal torque on the roots, making them suitable for overdenture support. This design also aids in oral hygiene maintenance, ensuring the long-term success of the overdenture.<sup>8</sup> The short coping design produced the least amount of stress compared to the tapered coping and tapered coping with occlusal bearing designs. This design reduces horizontal torque on the roots<sup>7</sup> and facilitates oral hygiene maintenance. Various attachments and coping techniques are used in overdenture preparation. These range from simple tooth modification to complex cast coping designs. The choice depends on the specific clinical scenario and the condition of the remaining teeth.<sup>9</sup>

Various techniques used in the treatment of teeth to serve as abutment for overdenture ranges from simple tooth modification and reduction, tooth preparation with cast-coping to endodontic therapy with amalgam plug or cast-coping utilizing some form of attachments.

### References:

- 1 Wayne R. Frantz: The use of natural teeth in overlay dentures, JPD. 34:135-140, 1975.
- 2 Smith DE, Zarb GA. Criteria for success of osseointegrated endosseous implants. J Prosthet Dent. 1989;62(5):567-72.
- 3 Pound E. Cross-arch splinting versus premature extraction, JPD 1966;16:1058-68.
- 4 Crum RJ, Rooney GE Jr: alveolar bone loss in overdentures: a 5-year study. JPD 1978;40:610-13.
- 5 Toolson LB, Smith DE. A five-year longitudinal study of patients treated with overdentures. JPD 1983;49:149-156.

**Conclusion:** In this case report, the use of root abutments to support complete dentures is discussed, emphasizing the effectiveness and cost-efficiency of tooth-supported overdentures. Overdentures are often preferred due to their mechanical advantages. Even if the retained teeth have periodontal issues, they can still offer sufficient support for transmitting chewing pressure and stimulating periodontal ligament receptors, triggering a jaw-opening reflex. These abutments enhance denture stability and support, slowing down the rate of alveolar resorption. The clinical procedure is uncomplicated and can be easily implemented in general dental practice.

In the presented case report, the patient had a chronic heart condition, making the extraction of mandibular root pieces inadvisable. Therefore, overdentures were provided as a treatment option. This approach not only met the patient's aesthetic and functional requirements but also left her satisfied with the treatment outcome.

- 6 Dixit S, Acharya S. Benefits of overdentures. Journal of Nepal dental association 2010; 11:97-100.
- 7 The Internet Journal of Geriatrics and Gerontology. JPD 1982;10:217-25.
- 8 A.B Warren, A.A Caputo. Load transfer to alveolar bone as influenced by abutment design for tooth-supported dentures. JPD 1975;33:137-148.
- 9 Mericske-Stern R. Clinical evaluation of overdenture restorations supported by osseointegrated titanium implants: a retrospective study. Part 1. Clinical outcomes. Int J Oral Maxillofac Implants. 1990;5(4):375-83.



## Class III Prosthodontic Rehabilitation State- Case report

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**Abstract:** A frequently proper setup for a regular ridge relationship takes little work, but modifying conventional principles to fulfill all expectations becomes difficult when ridge relations are atypical. One must deviate from the basic procedures to obtain a suitable arrangement for the unique scenario. Depending on various situations encountered in the patient's mouth, the significance of tooth arrangement with a stable occlusion in ensuring denture stability is widely known. This presentation focuses on a case with a tiny maxillary arch and a wide mandibular arch that was effectively controlled with a cross-arch arrangement of artificial teeth.

**Keywords:** flabby tissue, prognathic mandibular arch, complete edentulous, cross-arch teeth arrangement.

**Case report:** A 57-year-old male patient reported to the Department of Prosthodontics with a chief complaint of loosening an old denture (3 years old). Extra oral examination showed facial profile was concave. On intra-oral examination, anterior flabby tissue was present in the maxillary anterior region and the mandible anteriorly and posteriorly region. The mandibular arch was wider than the maxillary arch. On orthopantomography, no abnormality was detected.

The patient was explained about the treatment procedure and was taken consent before the start of the procedure. Maxillary and mandibular primary impressions were made using alginate (Cavex CA37, Netherlands), and diagnostic casts were made. Based on the Selective Pressure Technique T spacer covers the anterior residual alveolar ridge in the maxilla, with flabby tissue's presence, a double spacer was adapted onto the cast, and a full spacer was on the mandibular cast (fig-1). Clear acrylic (P.M.M.A.) custom trays were fabricated using these diagnostic casts (fig 2). The custom trays were border molded using greenstick compound (D.P.I. Pinnacle tracing sticks, India), and multiple escape holes (fig-3) were

made in the anterior region to prevent displacement of flabby tissue while making a final impression by using a polysilicon light body consistency (fig-4) (Cavex Outline, Netherlands). The master cast was obtained from these impressions. Temporary record bases with wax rims were made on the master casts. Maxillomandibular relations were made using these record bases. Following this procedure, the casts were articulated (fig 5) using centric relation records onto a mean value articulator. The record bases were removed from the articulator, and the inter-ridge relations were evaluated visually. In the anterior region, the mandibular dental arch revealed a prognathic relation to the maxillary arch. In the posterior area, the lower ridge was more buccal than the upper ridge. The teeth arrangement was made by following the principles for mandibular prognathic cases.(fig-4-6)

A good setup for a regular ridge relation can usually be performed with little effort. Still, altering the standard guidelines to meet all requirements may be difficult when ridge relations are exceptional. One must deviate from traditional practices to establish an approach that works for the individual.

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The two most common types of abnormal jaw relations are mandibular protrusion and a wider lower arch and maxillary protrusion with a wider upper arch<sup>1</sup>.

**Arrangement of anterior teeth in mandibular protrusion:** To introduce standard horizontal overlap, the inclining of upper anterior teeth labially or lower anterior teeth lingually has been done anteriorly. This procedure will be detrimental to the stability of their respective dentures.

**Arrangement of posterior teeth when the mandibular arch is wider:** In this case, the posterior part of the lower arch is much broader than that of the upper arch, and the crest of the mandibular posterior ridge is placed more buccally than the maxillary residual ridge. An interchange can be accomplished for managing such conditions by using maxillary teeth on the mandibular denture and mandibular teeth on to maxillary denture. The interaction is made cross arch as well like the right side of maxillary teeth are placed on the left side of the mandibular denture. The left side of the maxillary teeth is placed on the right side of the mandibular denture. Vice versa with mandibular teeth on to maxillary denture. Here we start arranging the mandibular posterior teeth by placing them in the maxillary ridge. As the length of both the arches is adequate, the space was provided between the canine and first premolar to accommodate both premolars. The mesiobuccal cusp of the mandibular 1st molar teeth should coincide with the buccal groove of the maxillary 1st molar, thus maintaining the anatomic relations, though they are inverted<sup>2</sup>. This led to excellent and stable occlusion. The palatine rugae play an essential role in speech; when the tongue cannot identify the rugae, it may move forward until it comes across a favorable structure, such as the teeth. favorable structure, such as the teeth. As a result, some syllables, such as “Th” and “D,” may be challenging to pronounce

because the tongue lacks the dampness required for air imprisonment. As a result, some syllables, such as “Th” and “D,” may be challenging to pronounce because the tongue lacks the dampness required for air imprisonment. Putty index made of the palatal rugae area on the cast and softened wax is added onto the putty index of 1 mm thickens. A temporary record base is trimmed in the palate rugae area and along the mid-palatine raphe, as the patient’s mid-palatine raphe was prominent intra-orally. Putty index with wax has been adapted in the anterior palatal area, the index is removed, and fishing is done. The trying is done, and the patient is asked to pronounce different vowels and consonants to check the palatal, linguodental, and bilabial sounds. After the patient’s approval is taken. The dentures were processed and inserted. The speech

The patient was comfortable, and systematic post-insertion instructions were given. A post-insertion checkup was done after 24 hours, 72 hours, one week, and one month. The patient was satisfied with his denture, and no post-insertion complaints were reported.

**Discussion:** A person with prognathism has a smaller maxillary jaw than a mandibular jaw. This could be brought on by either underdeveloped maxillae, an overdeveloped jaw, or - more frequently - excessive resorption of the maxillary residual ridge. Depending on the degree of the size differences, the prognathic jaw connection may need a cross-bite occlusion of some or all the artificial teeth<sup>3</sup>. The cross-bite interaction can take many different forms. It could be on both sides, one exclusively, or throughout the entire arch. The requirement that the mandibular posterior teeth extend distally sufficiently to provide posterior support for the maxillary denture is critical and is sometimes overlooked (in prognathic patients). Suppose the maxillary arch is split half anteroposteriorly between the incisive papilla and the hamular notches. In that case, some posterior

occlusion must be supplied distal to this dividing line—failure to do so results in anterior damaging forces. The palatine rugae significantly influence speech; a mandibular prognathic problem can be corrected using various techniques, such as a cross-bite arrangement or removing one bicuspid to equalize the space.

When the tongue cannot identify the rugae, it may move forward until it comes across a favorable structure, such as the teeth. As a result, some syllables, such as “Th” and “D,” may be challenging to pronounce because the tongue lacks the dampness required for air imprisonment. The palatine rugae significantly influence speech; hence improving the patient’s speaking ability is a crucial goal of complete denture creation<sup>4</sup>. The majority of individuals can often adjust their speech when wearing a denture. However, some people have trouble adapting because their speech is sensitive to altered relationships with dentures. To orient the tongue in these people, a tactile sensation is necessary. The entire denture’s palatal portion’s absence of texture may make appropriate articulation difficult<sup>3</sup>.

This report describes flabby tissue in the maxillary and mandibular arch and mandibular prognathism with a wide posterior arch treated with the cross-

arch setting procedure. The approach is called a cross-arch arrangement<sup>1,5</sup>. The posterior and lower posterior teeth have been shifted onto opposite sides (contralateral sides). For this patient, the strategy utilized to maintain the occlusion is more significant than the technology used to make the whole denture. Prosthetic teeth placement is considered an art based on biomechanical principles [10]. Occlusion should be intended to work efficiently while putting as little stress on supporting tissues as possible, whether in normal or abnormal jaw connections. The fundamental features of tooth arrangement remain constant regardless of the technologies used to construct a denture or generate an occlusion. Until now, no superior form of tooth arrangement in a specific patient has been reported<sup>6</sup>. As a result, it is always critical to be aware of the various scenarios that may require a dentist to deviate from the usual standards of dentistry.

**Conclusion:** A prosthodontist must be aware of this fact and be able to make the necessary changes wherever they are indicated, all while producing a workable arrangement of teeth on the articulator. Only then would he be able to deal with the anomalies in jaw relations he may meet in his clinical work.

### References:

1. Goyal BK, Bhargava K. Arrangement of artificial teeth in abnormal jaw relations: Maxillary protrusion and wider upper arch. *The Journal of Prosthetic Dentistry*. 1974 Jul;32(1):107–11.
2. Abduo J. Occlusal Schemes for Complete Dentures: A Systematic Review. *Int J Prosthodont*. 2013 Jan;26(1):26–33.
3. Zarb GA, Hobkirk J, Eckert S, Jacob R. *Prosthodontic Treatment for Edentulous Patients: Complete Dentures and Implant-Supported Prosthesis*. 13th ed. London: Elsevier Health Sciences; 2013.
4. Patil MS, Patil SB, Acharya AB. Palatine Rugae and Their Significance in Clinical Dentistry. *The Journal of the American Dental Association*. 2008 Nov;139(11):1471–8.
5. Tambe A, Patil SB, Bhat S, Badadare MM. Cross-arch arrangement in complete denture prosthesis to manage an edentulous patient with oral submucous fibrosis and abnormal jaw relation. *Case Reports*. 2014 Sep 19;2014(sep19 1):bcr2013203065–bcr2013203065.
6. Rangarajan V, Gajapathi B, Yogesh P, Ibrahim Mm, Kumar Rg, Karthik P. Concepts of occlusion in prosthodontics: A literature review, part I. *J Indian Prosthodont Soc*. 2015;15(3):200.



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Figure 1 Double spacer adaptation on primary cast



Figure 2 custom tray with clear acrylic



Figure 3 border molding and wash impression

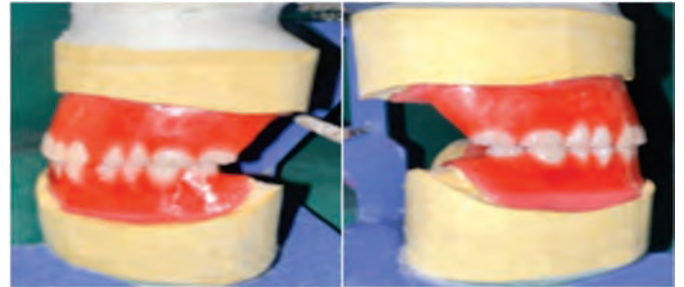


Figure 4 left lateral view of teeth arrangement.



Figure 5 palatal rugae



Figure 6 cross arch teeth arrangement with wide mandibular posterior compared to maxillary arch



Figure 7 post insertion picture



Figure 8 occlusion view



# The Delicate Art of Removing Fractured Prosthetic Screws in Dental Implants

## - A Case report and review

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**Abstract:** The removal of fractured prosthetic screws from dental implants presents a challenging and crucial aspect of implant dentistry. Fractured screws can compromise the structural integrity of the implant system and hinder the successful restoration of dental prosthetics. In our practise, one of the most difficult situations we face is the extraction of broken prosthesis screws from dental implants. Maintaining the integrity of the implant and surrounding structures while ensuring effective outcomes calls for a combination of skill, patience, and specialised instruments.

Successful screw removal not only salvages the implant but also ensures the patient’s oral health and satisfaction. By approaching this task with meticulous planning and execution, we can continue to provide high-quality care in our prosthodontics practice.

This article presents removal of fractured prosthetic screw from a dental implant using ultrasonic device.

**Keywords:** fractured prosthesis, prosthetic screws, screw retrieval.

**Introduction:** The quest of accuracy and superiority in dental restorations is crucial for postgraduate students studying prosthodontics. In our practise, one of the most difficult situations we face is the extraction of broken prosthesis screws from dental implants. Maintaining the integrity of the implant and surrounding structures while ensuring effective outcomes calls for a combination of skill, patience, and specialised instruments.<sup>1</sup>

**Case Report:** A 29 year old female patient reported to the department of Prosthodontics, with the chief complaint of dislodged crown of an implant supported prosthesis. On examination it was found that the prosthesis was dislodged from the implant in the maxillary left side, posterior region. On radiographic examination it was revealed that the prosthetic screw was fractured and half of the fractured screw was partially engaged in the implant screw channel, as shown in the Fig.1. After careful

consideration of it was decided to remove the screw with the help of ultrasonic scaler tip.

**Method of removal:** The soft tissue was reflected under local anaesthesia under all aseptic precautions and the implant was exposed. (Fig.2)

The tip of the scaler was held on the fractured end of the screw and was cautiously moved in anti-clockwise direction. (Fig.3) The screw was loosened in was retrieved successfully.(Fig.4). The other fractured half of the screw was retrieved from the prosthesis. Healing abutment was placed on the implant (Fig.5) and patient was recalled after 7 days for making the impression for a new prosthesis.

After making the impression a new prosthesis was delivered to the patient in proper occlusion.

**Discussion:** The challenge of fractured prosthetic screws There are several causes of fractured prosthetic screws, including overtightening,

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corrosion, and flaws in the manufacturing process. The tricky part is getting rid of these screws without breaking the implant or other parts. Meticulous preparation and implementation are crucial.

A detailed scenario assessment is essential prior to taking any action. The position and extent of the fracture can be ascertained with the aid of radiographic imaging and a clinical examination. It is essential for appropriate management to comprehend the implant system and have access to the manufacturer's instructions.

The next step is to make sufficient access to the shattered screw. To remove a screw, it is often necessary to drill a hole in it. In order to prevent heat generation during this process, constant lubrication with cutting oil or a water-cooling system is

necessary. The extraction procedure ought to be methodical and slow. Applying steady, slow force is necessary to unscrew the broken piece. In certain situations, the screw and implant can be separated by applying heat or using ultrasonic procedures.<sup>2,3</sup>

**Conclusion:** Removing fractured prosthetic screws in dental implants is a challenging task that demands precision, a deep understanding of implant systems, and specialized tools. As prosthodontics postgraduate students, mastering this procedure is an essential skill. Successful screw removal not only salvages the implant but also ensures the patient's oral health and satisfaction. By approaching this task with meticulous planning and execution, we can continue to provide high-quality care in our prosthodontics practice.

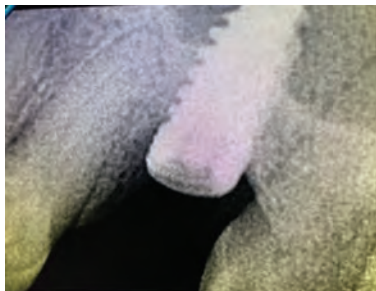


Fig 1



Fig 2



Fig 3



Fig 4



Fig 5

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### References:

1. Nayana P, Nayak SS, Chatterjee A, Sivaraman K, Srikanth G, Singh C. Retrieval of Fractured Implant Abutment Screws: A Narrative Review. *J Int Soc Prev Community Dent.* 2022 Jun 29;12(3):287-294.
2. Williamson RT, Robinson FG. Retrieval technique for fractured implant screws. *The Journal of prosthetic dentistry.* 2001 Nov 1;86(5):549-50.
3. Bhandari S, Aggarwal N, Bakshi S. Ultrasonic oscillations for conservative retrieval of a rare fracture of implant healing abutment. *Journal of Oral Implantology.* 2013 Aug 1;39(4):475-8.
4. Zeng K, Dong Y, Li L. Retrieval of a fractured implant abutment screw using a microtube extraction device: A dental technique. *The Journal of Prosthetic Dentistry.* 2022 Dec 21





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