



E- Newsletter/ Journal IPS West Bengal Branch

Vol. 1 : Issue 1 : January 2020



CONTENT

1	Messages from State Branch office Bearers	4-8
2	Messages from Head office Bearers	9-15
3	Messages from Head of the Department of our Dental colleges	16-19
4	Picture from Events throughout the year	20-24
5	Evaluation of the biomechanical response, for the comparison of single versus double implants replacing the mandibular first molar via a three dimensional finite element analysis	25-38
6	Mastering the art of Shade selection in daily practice.	39-49
7	Robocasting And Its Application In Prosthodontics	50-54
8	Erasing The Misprogram With A Deprogrammer	55-58
9	Reviews and Author's Instructions	59-61
10	Upcoming Events	62-53

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Editorial



It is my great honour and privilege to present the editorial for our first newsletter of our Indian Prosthodontic Society West Bengal Branch. At the outset I would like to thank from the core of my heart to Dr Tapan Kumar Giri and Dr Udey Vir Gandhi for giving me the responsibility of the editor of this state branch.

My dream of forming a regional branch dates back to the year 2009 when I was doing my post graduate training in the prestigious Dr R Ahmed Dental College and Hospital, Kolkata. After many repetitive attempts we were able to successfully form our branch on 28th April 2019 in presence of Indian Prosthodontic Society office bearers and distinguished prosthodontists at Swabhumi Rajkutir. The concept of a regional branch was to enhance prosthodontic education, bonhomie with fellow prosthodontists, share interesting and challenging cases and create awareness in the population.

This year we have also successfully conducted a CDE Program on “Demystifying Occlusion” by Dr. Mahendranadh Reddy. Last but not the least, I extend my heartfelt gratitude towards my co-editor Dr. Arka Swarnakar for his dedication and hard work behind making of this newsletter.

A handwritten signature in white ink that reads "Saunav Banerjee". The signature is fluid and cursive.

Editor

Indian Prosthodontic Society
West Bengal State Branch

Founder President's MESSAGE



Its my proud privilege to lead the Prosthodontists of my own state - West Bengal. I am delighted to bring home the Culture & Ethos of The Indian Prosthodontic society.

I am very happy that the Prosthodontists of Bengal have believed in me & my enthusiasm to steer the branch to greater heights.

I am confident that this effort towards innovation & communication in Prosthodontics will go a long way in spreading the cutting edge knowledge of Prosthodontics across all.

This will also provide a invaluable source of inspiration to the young minds seeking to gather in-depth information about their organization.

A handwritten signature in white ink that reads "Uday Vin." with a stylized flourish at the end.

Founder President

Indian Prosthodontic Society
West Bengal State Branch

Greetings from President Elect



It gives me immense pleasure that IPS West Bengal state branch is publishing a E-newsletter/journal.

I sincerely hope that this publication will provide information about the recent advances in prosthodontics that will enrich our members. This is a platform to help our PGTs hone their skills in scientific writings.

Wishing everyone Merry Christmas and Very happy new year 2020.

Jagan Kumar Sin

President Elect

**IPS West Bengal
State Branch**



Secretarial Statement

Dear esteemed members

I congratulate you all for making the IPS West Bengal State Branch a truly vibrant society and creating an atmosphere of bonhomie among us. It is my pleasure and privilege to be able to serve the society with unstinting support from all members. The journey which we embarked on 28th April this year through inauguration function and CDE was done in best possible way with our limited resources. We are taking small steps regularly to make our society the best among its peer. We have been able to fulfil the requirements as per our IPS constitution by applying the sound principles of governance.

A well documented research paper forms the backbone on which future study and research is designed to generate the cutting edge technology. It is important to distinguish between Primary research (Clinical Trials, Surveys, Cohort study, and case control studies) and Secondary research (Systematic and non systematic reviews, Meta analyses etc). It needs proper training to extract the meaningful information from the plethora of published articles in various journals. Professional newsletter is of great importance in transfer of information about new ideas, technology among members and students. I thank the members of editorial team for making it possible to bring this first newsletter in such a short time. I am sure that in future we will be able to bring this newsletter in still better way containing much useful information. I invite you all to celebrate the upcoming Prosthodontic Day next month with full enthusiasm and in much bigger way than last year.

I extend my Christmas and New Year Greetings well in advance`

Jai Hind

Jai IPS

Secretary

Indian Prosthodontic Society
West Bengal State Branch



From the Desk of Treasurer

Dear members,

It's a great pleasure in acknowledging the fact that the Newsletter of IPSWB is going to be released and I am pretty sure that it will be a continuous endeavor from all members to mark it as an ongoing feature.

This initiative will have an immense scope to contribute to the progress of Prosthodontics in sharing our knowledge and experiences on discovery, research, experimentation and development.

I would like to mark this milestone and thank our editor for this enterprising initiative.

Best wishes

Treasurer

Indian Prosthodontic Society
West Bengal State Branch



Voice of The **FOUNDER**

It is indeed a pleasure to know that the West Bengal State Branch of IPS is publishing this Newsletter the first time.

We had such a good 47th IPS Conference in Raipur, so well organized and so well attended by about 2000 delegates including PG students.

The session on Practice Management hosted on the second day was so well highlighted by our Past President IPS Dr. Gandhi. I wish this subject is included by all universities in the dental curriculum in India.

We the practitioners of this noble profession support three major industries: one, the equipment and instrument manufacturers, two the dental laboratories and three the dental material manufacturers. Therefore, a fresh graduate is totally lost as to what fees to recover from our patients.

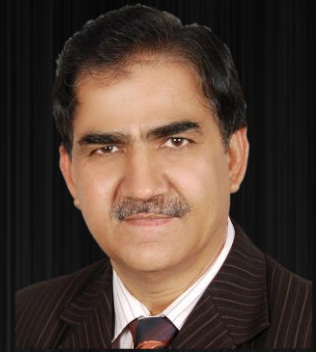
My first experience at Kolkata airport was to meet the three stalwarts of our IPS Society. It was indeed a great pleasure talking to them.

May I, on the occasion of the launch of this Newsletter wish you great joy and good luck in your venture in years to come. This will keep us informed about what goes on in this great city of Kolkata and will bring good fellowship to our members of the Indian Prosthodontic Society. We have come a long way since IPS was started in 1973.

Dr. Firoze D. Mirza

Founder of IPS

Letter from The **PRESIDENT**



Dear Colleagues & Friends,
“Seasonal Greetings”

I congratulate all office bearers and members of IPS West Bengal branch for successful release of 1st newsletter under the leadership of Dr. Uday Vir Gandhi. May almighty show his choicest blessing upon the young enthusiastic branch. I extend my best wishes and unrestrained support for the triumphant & prosperous journey ahead for this new spur of IPS.

Friends, together with setting up new standards for our organization, I look forward to promote three matters of concern to carry Prosthodontics to greater heights through all regional branches.

First is the promotion of integration of artificial intelligence with human resources for better learning and problem solving. This includes encouragement for more usage of digital technologies for designing and manufacturing of prosthesis, which is definitely help in improving the cumulative dental health in terms of accuracy, time & convenience.

Second is to create awareness among general public towards Prosthodontic Driven Implantology and Maxillofacial Prosthesis by conducting free denture camp of implant supported over dentures and maxillofacial prosthesis as a part of community outreach programs.

Third is a "Prosthodontic Power". Organizing various activities like Yoga, Prostho Marathon, Sports Meet, Go Green, Swachchhata Abhiyan etc. for good health of the members.

I am sure that West Bengal branch also will take lead role in such activities. Once again I Congratulate IPS West Bengal Branch for the efforts made to publish this 1st informative newsletter.

Jai Hind, Jai IPS

Dr. J R Patel

President,
Indian Prosthodontic Society (HO)



Message from

IPS IMMEDIATE PAST PRESIDENT

The Indian Prosthodontic Society was founded in Mumbai in 1972. Since its inception, the IPS has always been a front runner for improving the academic and clinical experience of its members. The Society also has the general public on its mind. Community outreach programs are conducted all over the country where there is an endeavour by our members to give free Dentures to the deserving.

Keeping the adage Think Globally and Act Locally in mind, the IPS decided to form Regional Branches all over the country in 2012. Since then, the West Bengal branch is the 17th branch to be formed in the Country.

Prof. Uday Gandhi, the Charter President has used all his experience gained from the IPS head office to steer his team, also comprising of Prof. Tapan Kumar Giri, Hon Secretary Dr. Sanjay Prasad, Dr. Dipankar Pal, Treasurer and of course Dr. Saurav, the Editor, amongst others in a coordinated manner. Under his leadership, I am sure you will achieve even more heights.

It is very heartening to note that the WB branch is very active in its CDE programs and in the community outreach camps also.

My best wishes to the Branch and all the members of the branch. you all are a fantastic team.

Regards. Jai Hind, Jai IPS

Prof. Dr. Ravindra Savadi

Professor and HoD of Prosthodontics, The Oxford Dental
Phd Guide, RGUHS
Past: President, Indian Prosthodontic Society

A Note from IPS SECRETARY



It gives me immense pleasure to note that IPS West Bengal state branch has decided to bring out a journal for the branch .

This am sure will be a positive flip in the association activities of your branch and will enable the branch members to express themselves both in the academic and social front .

The journal also will also be a mouthpiece to proclaim the various activities your branch undertakes and will go a long way in the promotion of the society in your part of the world and nationally

I once again wish you the very best and hope and pray continuity will be maintained for eons on the same .

Beat regards



Dr Rupesh P L
Secretary
Indian Prosthodontic Society



অভিনন্দন from IPS TREASURER

Dear IPS West Bengal,

April 28, 2019, witnessed the rise of a new dawn from the east. IPS West Bengal was born. The excitement in the IPS fold was heartwarming. The exuberance of the Prosthodontic fraternity from your region was palpable. And why not? You deserved every moment of your moment in the sun. IPS West Bengal has left a memory that will never fade.

The fabric of the IPS has become richer with your inclusion. And the days ahead promise to be even more exciting.

This Newsletter is ample testimony of the vigor that is reflected in your intent. It should grow as the voice of the IPS from the East and herald the beginning of a mellifluous convergence of thought, purpose and outcome.

I remain in absolute awe of the professionalism that abides in your branch. You continue to remain the Treasured Jewel of the IPS.

অভিনন্দন

Warm regards,

Prof. Dr. George P. John

Treasurer

Indian Prosthodontic Society

Appreciation from IPS EDITOR



The journal reports aid us to be updated with the developments in research and clinical dentistry. It is a paramount responsibility for any standard organization to publish a journal and apprise its members. The periodical from a standard organization is always treasured and the regional branch journal can give us more information on the customized approaches in research, clinical practice followed in the province, that are always educational to the members. I appreciate the efforts made by IPS- West Bengal branch in releasing the journal. I congratulate Dr. Udey Vir Gandhi, Dr. Tapan Kumar Giri, Dr. Sanjay Prasad, Dr. Dipankar Pal, Dr. Saurav Banerjee and the team for this forward step.

My best wishes for the team.

With smile,

A handwritten signature in white ink, appearing to read 'Gopi Chander', written over a horizontal line.

Prof. Dr. N. Gopi Chander
Editor,
The Journal of Indian Prosthodontic Society



A word from

Prof. Dr. Anand Kumar

President

IPS Tamil Nadu and Puducherry Branch

It gives immense pleasure in congratulating Indian Prosthodontic society West Bengal State Branch on launching your own News letter.

Like the rich heritage of Kolkata, the intellectual and cultural capital of our country, I am sure the News letter would yield many intellectual thinking, provoking research work which encompasses the union between the old and modern approaches.

Indian Prosthodontic society was formed in the month of January 1973. Likewise, this January marks the launch of your Newsletter and I am sure that it will be another crown for our esteemed society. Kudos Team West Bengal.

Message from



Prof. Dr. Uttam Kumar Sen

Principal,
Haldia Institute of Dental Sciences and Research

It gives me immense pleasure to know that the West Bengal State Branch of IPS is publishing this E-Newsletter. I wish to see both students and practitioners contribute in this academic publication.

I wish the editorial team all the very best.

Best regards



Prof. Dr. Sanjit Lal Das.

Professor and Head
Department of Prosthodontics,
Haldia Institute of Dental Sciences and Research

I am really glad to be a part of the IPS newsletter of West Bengal branch which will come up with all updates and new cases.

This will be an inspiration for all of us and at the same time we will be aware of new products and techniques and the relationship between each of us will be strengthened.

Thank you,.



Message from

Prof. Dr. Jayanta Bhattacharya.

Principal, Professor & Head,

Dept of Prosthodontics and Crown & Bridge,
Guru Nanak Institute of Dental Sciences & Research.

Dear esteemed fellow members,

As we all know that dissemination of education and knowledge to one and all is the most desired objective that any professional society strives to achieve. I believe that it is in this context that the inaugural issue of the Newsletter of IPS West Bengal is being launched through the untiring efforts of its office bearers.

It is indeed commendable that within a very short period of its official formation the Society has taken the initiative to publish its first newsletter for the benefit of the society. Surely all efforts will be made to keep the members updated through quality articles covering the wide domain of Prosthodontics.

On behalf of Guru Nanak Institute of Dental Sciences & Research I wish this endeavour a grand success and sincerely hope that it reaches great heights through the cooperation and contribution of articles by all the eminent prosthodontist's of West Bengal.

Message from



Prof. Dr. Sampa Ray.

Professor and Head

Department of Prosthodontics,
North Bengal Dental College and Hospital

It is a matter of immense pleasure, that the IPS WEST BENGAL is going to issue a newsletter on regular basis from now on.

This newsletter is the demand of the present hour for the IPS WEST BENGAL. I would like to offer my best wishes to the organizers for the newsletter to come out as a grand success.



Prof. Dr. Sugata Mukherjee

Professor & Head,

Dept of Prosthodontics and Crown & Bridge,
Dr. R. Ahmed Dental College and Hospital.

It is a great pleasure that the IPS West Bengal State Branch is publishing a newsletter which is the need of the hour .

I wish all success on this endeavor by the team led by Dr. Sanjay Prasad

Message from



Prof. Dr. Swapan Mazumdar

Professor & Head

Dept.of Prosthodontics and Crown & Bridge

Kusum Devi Sunderlal Dugar Jain Dental College & Hospital.

I feel happy to know that an E- news letter has been launched to provide a platform for the exchange of ideas among professionals in order to advance the skill and knowledge of prosthodontics.

Guided by foremost authorities in all disciplines of dentistry I hope this journal will communicate the standard for rehabilitative care of patients. I wish all the success in this enlightening and knowledgeable endeavour.



Prof. Dr. Jahar Roy

Professor & Head,

Dept of Prosthodontics and Crown & Bridge,
Burdwan Dental College and Hospital.

It is always great to know that an e-newsletter / journal is being published by IPS West Bengal State Branch. I wish the editorial team all the best. Looking forward towards some good articles and interesting cases to be discussed and published at regular interval.


Inaugural event




Inaugural event



1st Knowledge Exchange Programme

INDIAN PROSTHODONTIC SOCIETY
West Bengal State Branch
Presents
**DEMYSTIFYING
OCCLUSION**

Speaker: 

Dr. K. Mahendranadh Reddy
9 am to 5p.m * 7th September 2019
Kusum Devi Sunderlal Dugar Jain Dental College and Hospital
6, Ram Gopal Ghosh Road
Cossipore, Kol- 700002

IPS Head Office	IPS West Bengal Branch
Dr. Ravindra Saradi President	Dr. Uday Vir Gandhi President
Dr. Rakesh P.L. Secretary	Prof. Dr. T. K. Giri President Elect
Dr. Manoj Kohari 1 st Vice President	Dr. Santoy Prasad Secretary
Dr. Ramesh A.S. 2 nd Vice President	Dr. Dipankar Pal Treasurer
Dr. N. Gopi Chander Editor	Dr. Saunav Banerjee Editor



Community out reach Programme



47th IPS Conference, Raipur



Evaluation of the biomechanical response, for the comparison of single versus double implants replacing the mandibular first molar via a three dimensional finite element analysis

Abstract:

The replacement of the missing mandibular 1st molar poses a definite biomechanical challenge to the dentist. Studies on bite force measurement indicate that there is considerably greater force generated in the posterior compared to the anterior part of the same jaw. To decrease stress, the clinician may elect to increase the number of implants or use an implant design with greater surface area. The greater surface area that is incorporated by use of the double implant design simulates the roots of the mandibular molar. Hence this study aims to compare the single versus double implant design for replacing the mandibular first molar via a three dimensional finite element analysis.

Key Words: Dental Implants, FEM study, Single vs Multiple

Authors

Nikita Parasrampur

MDS, Fellow in TMD,

Orofacial pain and sleep medicine

Senior lecturer

Kusum Devi Sunderlal Dugar Jain
Dental College and Hospital

Introduction:

The ideal goal of modern dentistry is to restore the patient to normal contour, function, comfort, esthetics, speech, and health. What makes implant dentistry unique is the ability to achieve this ideal goal regardless of the atrophy, disease, or injury of the stomatognathic system¹. For years, patients were advised to place their desires aside and accept the limitations of a fixed partial denture. However, implant dentistry has remolded the available treatment option for the replacement of a posterior single missing tooth. Dental implant therapy based on the principle of osseointegration to replace the natural tooth has been widely accepted and well documented.²

Implant-supported restorations for fully and partially edentulous patients have exceedingly good long-term success rates.³⁻⁴

The suggested method of restoring a single implant-supported molar is to control the occlusion by reducing the force level and centering its action relative to the implant axis.⁴

Natural tooth size significantly increases in the molar region and proportionately the root surface area is almost double as compared to the other teeth in the dentition. Therefore the clinicians face a unique biomechanical challenge. So to achieve the natural crown root ratio, implant diameter is often increased in the molar region for immediate loading, especially when the bone density is less or the masticatory forces are greater.⁵ Mechanical overload appears to be more of a problem with the implant-supported molar crown. Methods suggested to improve biomechanics with an implant-supported single molar crown include the use of a wider-diameter implant and the use of 2 splinted implants to support a single crown.⁶ A recent in vitro model analysis by Seong et al investigated implant strains associated with 3 different single-molar implant designs when subjected to various loading conditions.

The investigators reported that the double implant design used in the study resisted loads better than the other two designs under most loading conditions.⁷ The complex geometry of the coupled bone-implant biomechanical system prevents the use of closed-form approach for stress evaluation. Therefore, the behavior of endosteal dental implants can be investigated by using numerical techniques. Recently, the finite element method has been widely applied to prosthetic dentistry to predict stress and strain distributions at periimplant regions, investigating the influences of implant and prosthesis designs, the magnitude and direction of loads, and bone mechanical properties, as well as modeling different clinical scenarios.⁸ This study aims to evaluate the biomechanical response of the bone by the comparison of single versus double implants replacing the mandibular first molar via a three dimensional finite element analysis.

OBJECTIVE

A Three Dimensional Finite Element Analysis was conducted to: Compare the induced displacements and stresses as a result of various loading conditions on a mandibular first molar crown supported by a regular 4.2-mm-diameter implant and Two 3.5mm - diameter implant

MATERIALS AND METHOD :

A finite model of a section of mandibular bone with a missing 1st molar and an ADIN Touareg-S implant with an all ceramic crown superstructure to replace a missing molar was used in the study.

Materials:-

A workstation computer with hardware Pentium four processor with 2 GB RAM

A 3D CAD Design software: software CATIA v5 R21

A Finite element analysis (or engineering simulation) software: ANSYS version 14.0

Manufacturer data of ADIN Implants with diameters 3.5mm, 4.2mm, and length of 10 mm each.

An all-ceramic crown superstructure (mandibular 1st molar) was prepared on the model (Figure 5), the details of external morphology of crown being sourced from a standard text book of Dental anatomy. This also was common for all finite element models.

Method:

The models were integrated into a single structure in the same software, such that the specified implant with the screw retained straight abutment was vertically positioned in the bone block with the all-ceramic superstructure.

The 3- D model (Figure:1) was designed to simulate the three single molar implant designs for the comparison of the induced displacements and stresses as a result of various loading conditions on a mandibular first molar crown. The Geometric properties of the two implant designs used for the analysis are elaborated in Table 2. The crown was supported by a

Design 1: Regular 4.2-mm diameter implant,

Design 2 : Two 3.5mm diameter implants.

The models which were generated were analyzed for a **force magnitude of 70 N²¹, directed in the vertical²¹ direction.** (This was kept constant throughout the study).

Conversion to finite element model, applying material properties and meshing:-

The 3D models were transferred to the ANSYS version 14.0 software for finite element analysis, and the Young's modulus and Poisson's ratio values of materials were inputted, the values being adopted from the literature, as given in Table 1.

All materials were assumed to be linearly elastic, homogeneous and isotropic. A state of optimal osseointegration was assumed, i.e. Cortical and cancellous bone were assumed to be perfectly bonded to the implant. (Figures: 2)

This finite element model was divided into small elements. Each element was considered to be interconnected at a number of discrete points called nodes. Each model was meshed by elements defined by ten nodes and three degree of freedom in tetrahedral bodies. The displacement of each of these nodes was calculated to determine the Von Mises stresses throughout the structure.

The number of nodes and elements for each model is given in Table 2.

Loading and boundary conditions:

The boundary conditions were established at the inferior surface of the models.

And a vertical intrusive force of 70 N was applied on the occlusal surface of all ceramic crown superstructure at three specified locations²² enumerated below:

Location A: Central fossa

Location B: Buccolingual midpoint of the Distal marginal ridge

Location C: Disto buccal cusp tip

Finite element analysis:-

Values of von Mises equivalent stresses and resultant displacement throughout the models were computed using the finite element analysis. Digital images were taken for each specimen to study the stress distribution pattern within all models (Figure 3). Values for the most stressed elements of each variation were measured with the ANSYS software (version 14.0) at the specified locations.

RESULTS

The results obtained from the FEA simulation showed the relationship between loads applied on the system, geometrical characteristics of materials, joints and strain. In materials science and engineering the von Mises stress is used to predict yielding of materials under any loading conditions from results of simple uniaxial tensile tests. Although formulated by Maxwell in 1865, it is generally attributed to Richard Edler von Mises (1913). The stresses were shown as different colors representing their magnitudes according to the legend given at the side of every figure.

Tables [4-5] contain the numerical findings pertaining to the force direction, force magnitude, the von Mises stress (figure 4), the resultant displacement. The results have been described under the designs of the implant supported molar crown.

Design 1 : Regular implant :4.2-mm Implant

For each implant design, the loading process 70 N, on 3 locations [vertical to the long axis], generated von Mises equivalent stress and resultant displacements as

follows, in the different bone qualities. The micro movements and the stresses around the implant are :

von Mises Stress: The maximum stress of 173.61 MPa at the disto buccal cusp tip (location C) and the least value of 160.97 MPa at the distal marginal ridge (location B) was observed.[Table 4]

Resultant Displacement : The range of micro movements was found to lie between 0.0175u/m -0.04u/m other highest displacement of 0.04u/m was produced at the distal marginal ridge(location B).[Table 5]

Design 2: Double-implants [3.5mm-implants]

For each implant design, the loading process 70 N, on 3 locations [vertical to the long axis], generated von Mises equivalent stress and resultant displacements as follows, in the different bone qualities. The micro movements and the stresses around the implant are :

von Mises Stress: The maximum stress of 145.12 MPa at the disto buccal cusp tip and the least value of 127.73 MPa at the central fossa (location A) was observed. [Table 4].

Resultant Displacement: The range of micro movements was found to lie between 0.009 u/m -0.02 u/m. The highest displacement of 0.02 u/m was produced at the disto buccal cusp tip (Table 5]

DISCUSSION

During mastication, overstress around dental implants may cause bone resorption, which leads to infection on the peri-implant region and failure of oral rehabilitation. The way in which bone is loaded may influence its response. The results of cyclic loading into the bone differ from those of static loading. In case of repetitive cyclic load application, stress micro fractures in bone may occur and may induce osteoclastic activity to remove the damaged bone. So far, it is imperative to understand where the maximum stresses occur during mastication around the implants in order to avoid these complications.⁹

Stresses in dental structures have been studied by various techniques, such as brittle coating analysis, strain gauges, holography, 2-dimensional (2D) and 3 dimensional (3D) photo elasticity, finite element analysis (FEA), digital investigations and other numerical methods. FEA is a popular numerical method in stress analysis. This method involves a series of computational procedures to calculate the stress and strain in each element, which performs a model solution. FEM circumvents many of the problems of material analysis by allowing one to calculate physical measurements of stress within a structure³

Cibirka et al, in an in vitro simulated study, compared the force transmitted to human bone by gold, porcelain, and resin occlusal surfaces and found no significant differences in the force absorption quotient of the occlusal surfaces among these 3 materials.¹⁰ Therefore, porcelain was used as the material for the crown superstructure. This study expressed the result (failure criteria) in maximum equivalent stresses (von Mises stresses).

The reason for selecting von Mises criteria, which apparently results in a tensile type normal stress, lies in the fact that the brittle materials (e.g. tooth, bone) fail primarily because of tensile type of stress.¹¹The present study also measured the resultant displacement (which represents the absolute movement as a result of all the induced strains).⁶

The models simulated by the FEM analysis in the present study made a comparison between two different designs of the implant supported molar crown.

For the design variable, the two designs of the implant supported crown experienced different values of stress and displacements.

For the von Mises stress and resultant displacements, the double implant (design 2) performed better (strained less), deformed less than the regular diameter implant (design 1). This result was agreed well with the research observations of the following authors.

In the finite element study done by **Allahyar Geramy et al**⁶, the micro motion was found to be better controlled by a wider diameter implant or by incorporation of 2 implants for a molar implant supported crown.

The reduction in mesiodistal displacement was especially pronounced with the double implant design and this design should be considered when the mesiodistal space for artificial tooth is larger than average. These results observed by Geramy⁶ were comparable to the present study,

Balshi et al¹² stated that 2 implants for the restoration of a single molar can double the support capacity in the buccolingual direction. These results were comparable to the present finite element analysis.

In a radiographic comparison done by **R.S. Bedi et al**¹³ demonstrated the superiority of the use of two standard sized implants. Their research answered for the short comings associated with the wide diameter implants. These findings were analogous to the observations of the present study where the overall significant decrease for the double implant design indicates better clinical applicability.

Vicki C.Petropoulos et al¹⁴ in his clinical report identified the use of two implants as the most logical solution for the replacement of the missing mandibular molar, to overcome the masticatory overload in pronounced bruxers or clenchers.

In an in vitro study done by **Seong⁷ et al**, for the single –molar implant designs, an increase in implant number and diameter was found to effectively reduce the experimental implant abutment strains. He concluded that the regular diameter implant (design 1) experienced the largest implant abutment strains for all the tested conditions. The results of this study were comparable to the present finite element analysis.

Nevertheless there are limitations to this study design as because the natural variations in the constants for the mechanical properties of biologic tissue as well as their non linear behavior, an FEM analysis cannot predict the behavior of biologic tissues and precisely cannot predict the behavior of the inert materials such as metal and porcelain. The vertical occlusal static loads used in the study do not produce the most challenging load transfer within the prosthesis or the surrounding bone. Greater differences are expected between different configurations when oblique loads are used. According to **Becker and Becker¹⁵** “

Ideally two implants should be used to replace a single molar: however ,a molar edentulous space is often bound by natural teeth ,which results in insufficient mesiodistal bone width for placement of more than one(3.75mm wide) implant

In the study done by **Sato et al^{16, 17}** evaluated the biomechanical effects of double and wide implants for single molar replacement and concluded that forces for the double implants fluctuated from point of point. As Fem analysis doesn't take the clinical complications into consideration, **Balshi et al¹²** reported higher marginal loss with double implants compared to single implants replacing a single molar.The biologic factors, such as potential difficulty in maintenance of oral hygiene with double implant design, which resembles a molar with an advance furcation invasion, were not taken into consideration for this analysis. The double implants presents a greater surgical, prosthetic and hygiene risk.

Therefore within the limitations of this present finite element analysis for the design variable, the higher number of implants provides the advantage of the greater seating surface and the greater outer surface area can reduce the stress levels on the implant components and bone-implant interface. Engineering principles suggest that the double implant arrangement provides better support for the artificial crown, and also this implant arrangement closely resembles the naturally occurring anatomic form of the roots of the mandibular molar.

CONCLUSION

Within the limitations of this in vitro FEM analysis ,for the three designs of implant supported mandibular molar crown, it was concluded that the regular 4.2mm diameter implant (design 1) produced the maximum micro movements for the specified loading conditions in comparison to the double implants (design 2).

For the Clinical implications of the current analysis, use of double and wide diameter implants may be mechanically advantageous in restoring single molars. As they enhance the mechanical properties of the implant system through increased surface area, stronger resistance to component fracture, increased abutment stability, and enhanced emergence of a profile.

This study also demonstrated that:

In all the tested designs, the number of implants used for the rehabilitation of a single molar significantly affected the micro movements experienced by the individual implant abutments.

The least value for von mises stress and micro movements from the vertical intrusive force was recorded for the double implant design.

The largest strains were observed at the disto buccal cusp tip. This value was about two times larger that of the measured central fossa loading. These findings suggest the precise control of centric contacts on the occlusal surface.

Figures

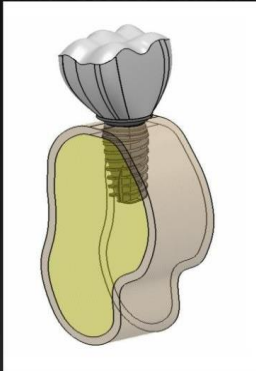


Figure 1: Solid mathematical model of implant placed in bone

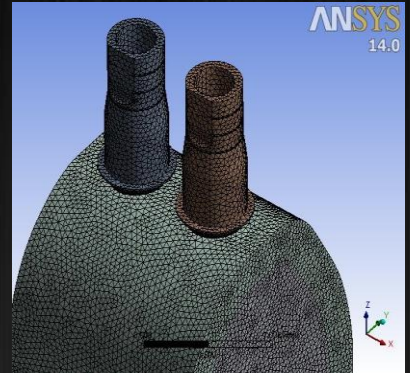
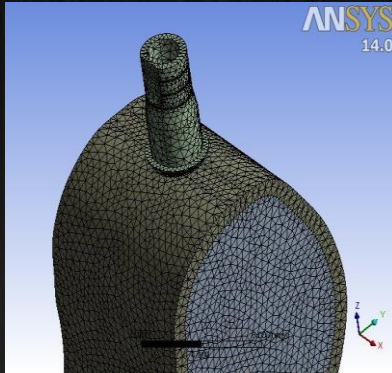
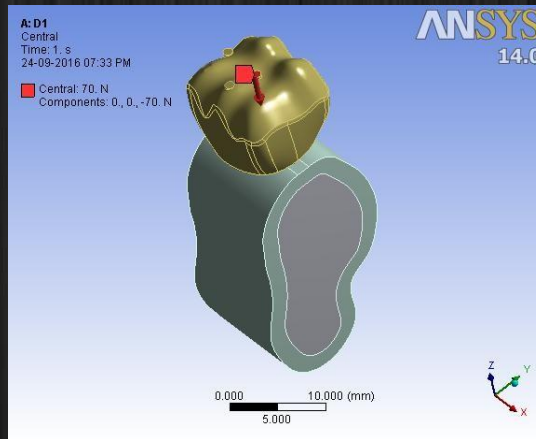
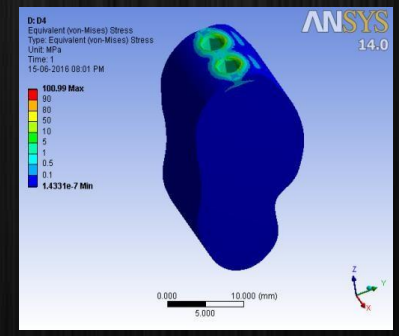
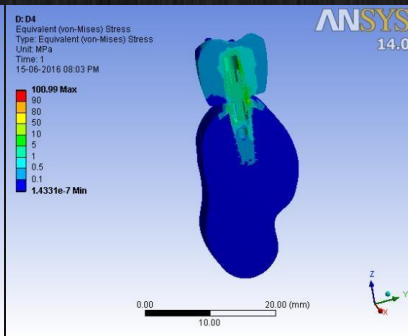
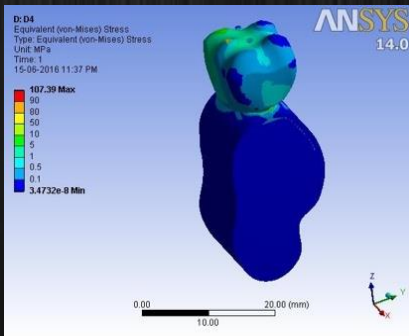


Figure 2 – Meshed Models in the software



Figures 3: Values and distribution of applied force 70 N on the designs



Figures 4 : Distribution of von Mises equivalent stresses at the three locations.

Tables

Table 1: The Material properties

Material	Young's Modulus	Poisson's Ratio
	(GPa)	
Titanium: implant, abutment -	11	0.35
Porcelain	68.9	0.28
Mucosa -	10	0.40

Table 2 : Geometric properties of the three implant designs used for the analysis.

Implant Model	Diameter	Length
1 st (single)	4.2mm	10mm
2 nd (Two implants)	3.5mm each	10mm

Table 3 : . The number of nodes and elements for each model

Sl no.	Implant Design	No. of Nodes	No. of Elements
1.	Regular diameter - 4.2mm	294811	178352
2.	Double – 3.5 mm diameter	2041278	1332664

Tables

Table 4: Von Mises Stress Distribution for the Implants

SI No.	Point of Application	Von Mises Stress [MPa]	
		Single 4.2 mm	Double , 3.5 mm
A.	Central Fossa	162.24	127.73
B.	Distal Marginal Ridge	160.97	129.26
C.	Disto Buccal Cusp Tip	173.61	145.12

Table 5: Resultant displacement for the Implants

SI No.	Point of Application	Resultant Displacement [u/m]	
		Single 4.2 mm	Double , 3.5 mm
A.	Central Fossa	0.0175	0.009
B.	Distal Marginal Ridge	0.04	0.019
C.	Disto Buccal Cusp Tip	0.039	0.02

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Mastering the art of Shade selection in daily practice.

Abstract

When we talk about esthetics dentistry the one thing which determine the outcome is the colour of our restoration. If the selection of the right shade is incorrect the entire hard work of the clinician and the technician ends in a failure. Therefore we need a through knowledge of shade selection in our day to day clinical practice. Again we need to communicate this selection with the laboratory technician. Shade guides are one of the many means of communication between the dentist and the technician available today. This scientific article describes how to select the shade in your clinic using shade guides.

Keywords: *Shade selection, esthetics, Vita classical, Vita 3D Master, shade guides*

Authors

1. Arka Swarnakar, Senior Lecturer
Kothiwal Dental College and Research
Centre, Moradabad
3. Angana Swarnakar
Prosthodontist

INTRODUCTION

The primary goal of restorative dentistry is to restore what has been lost which include function form and esthetics. Colour is an important factor that govern and decide the success of an esthetic treatment plan. Only then it is possible to restore the lost and simulate nature.¹ Not only visual perception, but communication with dental technician is an aspect which is often not considered. Hence a standardized protocol must be followed.² This article will discuss how to select the proper colour or shade of a tooth using shade guides in our daily clinical practice and communicating this to the dental laboratory.

Manual, Visual Shade Selection Techniques

The most frequently used technique in the shade matching of teeth to restorative materials is done manually and visually using dental shade guides.³ Today a wide range of shade guides are available to the clinician. Some are composite resin made while rest are the ceramic universal shade guides.

The ceramic made shade guides include the Vita line of shade guides (Vita North America, Yorba Linda, CA, USA), Chromoascop (Ivoclar Vivadent, Amherst, NY), and Vintage Halo (Shofu Dental, Menlo Park, CA). Examples of resin-made shade guides are Tetric Cream (Coltene/Whaledent, Cuyahoga Falls, OH, USA), Esthet-X (Densply/Caulk, Milford, DL, USA), Vit-lescence (Ultradent, South Jordan, UT, USA) and Venus (Haeraus Kulzer, South Bend, ID, USA).⁴

The best friend of a dentist even today is the VITA Classical Shade Guide (Fig.1). Introduced in 1927, this guide is still manufactured by VITA Zahnfabrik in Bad Säckingen, Germany. Surprisingly, the manufacturer never used a logical arrangement, systematic, or scientific approach based on range of known human tooth shades to develop this guide (Fig. 2).⁵ The VITA Classical A1-D4 shade guide (Vita North America, Yorba Linda, CA, USA) was introduced to dentistry in 1956 which is composed of sixteen tabs arranged into four groups (A-D) according to hue with increasing chroma within the groups.

Group A is reddish-brown, Group B is reddish-yellow Group C is grey, and Group D is reddish-Grey.

Limitations⁶:

1. It's been reported to cover only 6% of the colour range of human teeth.
2. Not uniformly positioned throughout tooth colour space.
3. No standard incremental difference between adjacent shades.
4. In between shades (A2.5) are inaccurate.

In the 1990's, the VITA System 3-D MASTER shade guides were introduced (Fig.3). This system is composed of the VITA Linear guide 3-D MASTER, the VITA Bleach guide 3-D MASTER, and the VITA Tooth guide 3D-MASTER with Bleached Shades. The VITA System 3-D MASTER shade guides consist of 26 shade tabs in five groups according to value. Addition of 3 bleach tabs were done later on. Within each group, the tabs are arranged vertically according to chroma and horizontally according to hue.

The concept of the VITA 3D-MASTER system is based on a colour classification principle where the values of lightness, chroma, and hue have been positioned an equal distance from each other (Fig. 4). Therefore, the shade determination can be easily carried out according to systematic criteria. The VITA Linear guide 3-D MASTER simplifies tooth shade determination compared to the VITA Classical A1-D4 and the VITA Tooth guide 3D-MASTER with bleached shades. It is organized in terms of lightness, chroma, and hue, and the shade can be determined in two steps. The VITA Bleach guide 3-D MASTER with Bleached Shades is a one-step process to determine the level of lightness for the tooth whitening process.⁴

When comparing the VITA 3-D MASTER system with the VITA Classical A1-D4 shade guide it can be noted that the value range is wider, there are more chromatic tabs, the hue range is extended into the reddish colour spectra, there is more uniformity in the shade tab spacing, and the overall tab arrangement is improved over the VITA Classical A1-D-4.⁴

Drawback of Shade Guides⁶

1. The inaccuracy in the name of the shade guides is less a problem than the guides themselves they have historically been a weak link in an orderly; approach to colour matching in dentistry.
2. The colours of shade guides, from a given manufacturer, vary from guide to guide.
3. The porcelain for the guide is not necessarily the same as the porcelain used for the restoration.
4. The guides do not duplicate the manner in which porcelain restorations must be constructed (thickness of opaque, thickness of body and incisal porcelain, metal bonding, etc.).
5. The colours of the guides are illogically arranged and do not cover the volume of colour space of the natural teeth.
6. All standard shade tabs are thick (3-4.5mm) as compared to a crown (1-1.5mm), and are made of synthetic resin
7. Light is reflected and transmitted through a shade guide tab giving it translucency and vitality whereas in the restoration, light is reflected and barely transmitted making it look dense and opaque.

MANUAL SHADE GUIDES

SUGGESTIONS TO OPTIMIZE SHADE MATCHING⁷

- *Try to utilize a shade guide that is colour keyed for the restorative material or media that you are using.*
- In most cases, manufacturers offer their denture teeth, porcelain powders, ceramics blocks, and acrylic and composite resins in the shades corresponding to one of the common shade guides (VITA Classic, VITA 3D Master, Chromascop, and Trubyte Bioform).
- *Try to use a shade guide made of the actual restorative material.*
- Using a porcelain or plastic shade tab to select a shade for a resin composite may not always produce a good match. Similar materials are likely to have similar optical properties. Fluorescence, opalescence, and translucence all vary greatly from one material type to another, and even one brand to another.
- *Use multiple shade guides to extend the shade range coverage*
- Using one guide exclusively is extremely limiting. Additional guides extend the likelihood of finding a better match.
- *Always take the shade at the very beginning of the dental appointment before the teeth have a chance to dehydrate.*
- It is well known that dehydration temporarily raises the value of the teeth. This effect is significant and may not fully resolve for up to 24 hours. Ideally if the shade selection has not been done at the beginning of the appointment, it is better to ask the patient return the next day for shade evaluation.
- *Your first step in any shade evaluation is always to find the best value match.*
- Buy your shade guides prearranged by value or arrange them by value from lightest to darkest

Guidelines for Selection of Shade using VITA CLASSICAL:

- **Value the Value over Hue:** When matching teeth, the shape, surface geography, and the value are the most important characteristics.

- **Value is the most important dimension of shade rendering.**⁸ Use a value based guide like the Vita 3D Master or convert your hue based shade guide to a value based guide by rearranging the shade tabs. For example if we rearrange the Vita Classical according to B1, A1, B2, D2, A2, C1, C2, D4, A3, D3, B3, A3.5, B4, C3, A4, C4 the hue based guide converts to a value based guide (Fig. 5).

- a. Miller has suggested using two Vita shade guides.⁹ The first guide should have the tabs arranged in order of brightness (value). The order is printed on the back of the shade guide. The second shade guide should be arranged by hue with the A and B hues at opposite ends and C and D in the middle. C and D have hues in between A and B44 on the linear rainbow (chroma and value are manipulated to yield different looks).

- b. When choosing the hue family, use the A-4 and B-4 tabs which facilitate the process of elimination by using tabs with the greatest hue spreads.

- c. The chroma is very low for shades A1 and B1. It can frequently be very difficult to distinguish the proper hue family. Compare highest chroma tab in each hue family with the maxillary cuspids.

- d. When choosing the hue with a shade tab, look to the mid-buccal of the tooth. Differences between the shade tabs and the natural colour of the teeth increase near the root. Compared to the Vita shade guide, natural teeth exhibit increased redness and lower translucency at the cervical

- **Remove bright lipsticks or distracting make ups.** When looking at a bright red, the cones in our eyes will saturate and fatigue quickly giving an afterimage of the complimentary colour blue-green thus making our colour assessment of the teeth too blue.

- **Hold the shade tab incisal edge to the incisal edges of the teeth.** This effectively isolates the shade tabs from the teeth so they don't reflect onto each other reducing afterimages.¹⁰

- **Shade matching must be under near ideal lighting condition.** A light source that approaches 5500K, CRI of 100, with the proper luminosity, is considered the ideal light under which a shade should be selected. Review and optimize your ambient lighting conditions or use a dedicated task light like the Rite- Lite 2 (AdDent). It uses 2 types of LEDs to provide a choice of the following 3 different controlled light temperatures: 5,500 K (the daylight standard for dentistry), 3,900 K (ambient mix), and 3,200 K (incandescent). This offers the operator the ability to judge the shade match under differing lighting situations and help avoid problems related to metamerism (Fig. 6). Metamerism happens when 2 shades appear to match well under a specific lighting, but match poorly under differing lighting conditions. This task light also makes use of disposable mauve colour cards which can be used a backdrop to help reduce colour distractions and more accurately demonstrate the tooth's value.¹¹
- **Viewing teeth under diffuse illumination** will minimize the distortion of the reflected light. Reflection from the

specular surfaces of a tooth reveals more of the colour of the illuminating light than the colour of the tooth.¹²

- **Selection should be done before turning on the dental unit light.** This dental chair light is too bright and causes eye fatigue due to glare.¹³ Rods are very sensitive even with small amounts of light while the cones are to brighter and higher light levels. When the cones are functioning, then hue and chroma can confuse value discrimination. Low light levels, even if you have to squint are the best for value evaluation. If the light is too strong, the high reflectivity of the buccal surface will read high incorrect values.
- **Selection should be done before treatment is due to dehydration.** The value increases and the chroma and translucency decrease as the teeth dry out during treatment. This is why restorations frequently are too light. This will happen while doing composites also. If your composite build up is slightly light when you finish, you know that it will probably be very light when the tooth rehydrates. *When in doubt, err to the darker.*¹⁴
- **Avoid fatigue of your eyes.** Don't stare at the teeth for more than 5 seconds to prevent hue accommodation.¹⁵

- **Grey is the best background for hue and chroma selection** and not blue or black. The 18% or lighter reflective grey card is the photographic industry standard. The colour of the walls in the operatories and lab can alter colour perception. In a blue room you see more orange than originally is since the complement of blue is orange. The ideal background colour is neutral grey.¹⁶ Neutral grey has no complimentary colour and is restful to the cones. This is more critical with aged teeth that have a glossy surface that reflects the shade of any colour placed in close proximity. Remember that the mounting stand of our shade tabs are grey in colour also.
- **If in doubt** as to the hue family, **choose the A family**.¹⁷ Most natural teeth have more red than B. Perhaps as much as 80% of natural teeth belong to the A hue family. When drawing proximal translucence, ask the patient to turn from right to left, which allows a better analysis. Employing a black background will allow you to see the blue of the opalescence in the translucent enamel. Do not use a black background for hue and chroma evaluation.
- Shades should be evaluated looking at the tooth at different angles. This re-evaluation at different angles is called vectoring.¹⁸ Sometimes the value of the gingival and incisal thirds of a tooth is seen as lower than it actually is due to the natural curvature of the tooth. We only see reflected light if it is perpendicular to us.
- Developing a Shade-map will help to draw a three-dimensional drawing. Utilize several views (e.g. 90° straight buccal, 135° angle from the buccal incisal, and straight incisal/occlusal). Break the labial face of the crown into 9-16 zones.
- Describe surface texture and luster as heavy, moderate, and light therefore giving nine different combinations of surface characteristics. Because these surface features determine the character of light reflection and affect the amount of light that enters the tooth (opacity), the surface texture of a crown must be designed to simulate the light transmission and reflectance pattern of adjacent teeth.¹⁹

VALUE-BASED SHADE GUIDES ^{7,20}

Recommended Procedure

To select a shade with a value-based shade guide (VITA 3D Master), the following clinical protocol is recommended.

Step 1. Review clinical and ambient lighting conditions or use a dedicated task light to facilitate the most ideal lighting.

Step 2. Evaluate the best value group. While this can be done with all tabs in the 3D Master guide, it is somewhat easier if you remove all of the R and L hue groups from the guide leaving only the M hue groups. Alternatively, it may be more convenient to purchase a Value guide 3D Master (VITA), consisting of only the six value tabs in the M hue. Starting from darkest to lightest, move the tabs across the tooth being matched while squinting the eyes slightly. It should be easy to eliminate some groups/tabs that are obviously too light or dark. Remove those tabs from the guide. Focusing on the remaining tabs, try to select the three value groups where one is clearly lighter than the tooth being matched and one is clearly darker than the tooth. Select the value group between those two. If you are not sure which is the best for value,

take a monochrome or grayscale photograph of the shade tab and tooth. This will be very helpful to confirm the best value match.

Step 4. The final step would be to finalize the hue. The M hue group is found exactly in the middle of the yellow to red colour range of teeth and is therefore orange. Studies have shown that this hue is very close to more than 50% of the population. However, if you feel the actual hue for the tooth being matched is skewed to the yellow or red range, you'll want to evaluate the L (yellow) and R (red) hues. These hues only contain two possible chroma variations, one light and one dark. Even if a colour shift is not suspected, it is a good idea to confirm that an L or R hue is not better than the M hue.

CONCLUSION

It is hoped that this three-part article series reviewing the application of colour science to dentistry was beneficial to the practicing restorative dentist. Close shade matching of dental restorative materials with natural teeth is vital to producing restorations that are biomimetic. Patients expect the modern dentist

to restore missing and broken down teeth to and proper form and function with an acceptable esthetic appearance. A better understanding of the physical and physiological processes involved in human colour vision, colour theory, and colorimetry should enhance an appreciation for the challenges associated with tooth shade selection.

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Pictures



Figure 1



Figure 2

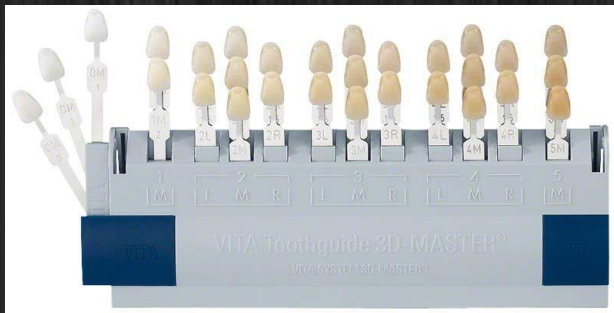


Figure 3

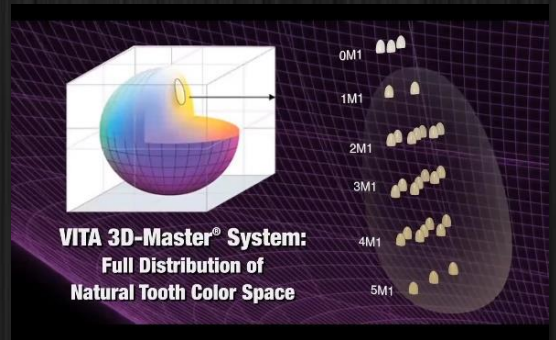


Figure 4



Figure 5



Figure 6

Robocasting And Its Application In Prosthodontics

Authors

Dr. Kritika Rajan
Clinical Tutor,
Department of Prosthodontics,
Dr. R. Ahmed Dental College and
Hospital,
Kolkata

Dr. Ishan Roy Choudhury,
Clinical Tutor,
Department of Prosthodontics,
Dr. R. Ahmed Dental College and
Hospital,
Kolkata

INTRODUCTION:

Prosthodontics has had a long association with subtractive manufacturing usually described as ‘milling’. Although an effective manufacturing technique, subtractive methods have the following limitations:

- ✓ Reduction of internal fit precision due to larger bur diameter than the prepared tooth,
- ✓ Considerable amount of wastage of the unused portions of the mono-blocks,
- ✓ Excessive abrasion and wear during machining causing shorter running cycles of the milling tools,
- ✓ Microscopic cracks onto the surface of the ceramic,
- ✓ Labor-intensive and time-consuming technique.

Advancements in the fields of computers and imaging over the last decade, have led to the introduction of Additive manufacturing technique also known as Rapid prototyping technique or 3-D printing and exhibits the potential to overcome the above described shortcomings. This technology is generally used to build objects one layer at a time, adding multiple layers to form an object.

3-D printing has its earliest application in surgery in the production of an anatomical 'study model'. In fixed and removable prosthodontics, CAD design may be used to mill or print crown or bridge copings, implant abutments, and bridge structures. In implant dentistry, they help in producing batches of complex dental implants with varying geometries which may not be produced by milling alone.

The trend of using ceramic restorations in the dental field has been on the rise due to their outstanding aesthetic features as compared to metallic restorations. The methods traditionally used for processing dental ceramic restorations such as conventional sintering, heat-pressing and slip casting lack sufficient accuracy and marginal integrity.

The newer generative methods of production which overcome these limitations include the following –

Stereo-lithography – uses photosensitive liquid resin bath, a model-building platform, and an ultraviolet (UV) laser for curing the resin.

2. ***Fused Deposition Modeling (FDM)*** – where thermoplastic material is extruded layer by layer from a nozzle, controlled by temperature.

3. ***Selective Electron Beam Melting (SEBM)*** – in which powder is sintered layer by layer by scanning electron beam on a descending build platform.

4. ***Laser powder forming*** - scanning laser sinters metal powder layer by layer in a cold build chamber as the build platform descend.

5. ***Direct Inkjet printing or Robocasting.***

The first four techniques can only produce porous structures. Direct inkjet printing on the other hand can generate restorations at a higher resolution having complex shapes.

SOLID FREE-FORM MODELLING BASED DIRECT INKJET PRINTING OR ROBOCASTING

Direct inkjet printing ejects small drops of ink propelled with pressure, heat and vibration towards a substrate which change phase almost immediately on deposition. It requires minimum tooling and gives great design and fabrication flexibility. Robocasting is a unique technique developed by the *Sandia National Laboratories* and received its patent on October 18th, 2005 and is the newest among the additive manufacturing processes. It involves the computer-controlled robotic extrusion and deposition of highly concentrated colloidal suspensions of slurries, gels or inks that assemble geometries in a layer-by-layer process. The printing process is much like writing with a pen only automated and takes close to 24 hours for a complete prototyping process.

The advantages over a conventional CAD/CAM system include –

✓ Capability to spatially grade composition and/or microstructure,

✓ Permits internal morphology, shape, distribution, and connectivity to be controlled more precisely,

✓ The ability to ‘print’ with multiple materials at one time as well as create graded structures.

- The greatest disadvantage of robocasting is the formation of a ‘stair stepped’ surface. The step size is a function of the nozzle diameter used for printing. This requires some post-processing prior to final sintering.

COLLOIDAL INKS USED IN ROBOCASTING

- Inks which are generally used in direct write techniques are incapable of fully supporting their own weight during assembly. But those used in robocasting are designed to solidify via a drying-induced pseudoplastic to dilatant transition and are thus capable of supporting their weight.

The ink typically contains 50 - 65 vol.% ceramic powder, < 1 vol.% organic additives, and 35 - 50 vol.% volatile solvent (usually water). A recent innovation in the ink formulation by *Smay et al* uses ink that contains 45 to 47% solids. He used aluminum oxide for dental crowns because of their high strength.

- *Current list of materials systems used with robocasting include -*
- Alumina (dense and porous) PZT
- Aluminium oxide / TiCuSi composites ZnO
- Aluminium oxide/ Al composites Kaolin
- Aluminium oxide/ Mo Stabilized Zirconia
- Mullite
- In Development: Silicon Nitride, PMN .

RECENT DEVELOPMENTS IN ROBOCASTING

β-tricalcium phosphate (β-TCP) scaffolds with designed, three-dimensional (3-D) geometry and mesoscale porosity have been fabricated by Robocasting techniques with tailored performance for bone tissue engineering applications.

A biocompatible ceramic, *Hydroxyapatite*, processed through robocasting is being used to develop bone scaffolds that can be implanted in the body so bone cells will grow into pore space and make new bones. These can be fabricated using CT and MRI data.

CONCLUSION

3-D printers are becoming more affordable in terms of the cost of running, materials, maintenance, and the need for skilled operators. As with any evolution of a process for the challenging job of dental restoration production, robocasting has room for improvement. An accompanying effort involves the calculation of optimal support structures to yield the best geometric results.

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Erasing The Misprogram With A Deprogrammer

ABSTRACT

Centric Relation is well described in the dental literature and although easy to understand is but difficult to achieve clinically in some patients whose CR position does not coincide with maximum intercuspal position. The use of anterior deprogramming device in such patients, provides relaxation to the hyperactivity of the elevator muscles by separating the posterior teeth just prior to achieving CR position which helps to seat the condyle in proper position. These deprogrammers are indicated in patients with masticatory muscle disorder. The various types of deprogrammers include – Lucia Jig, The NTI, The Cranham Deprogrammer, Dawson's B splint, leaf gauge.

Authors

Dr.Madhumaitri Patra,

Dr.Md.Ashiqur Rahman,

Dr.Md.Haroon Rashid,

Dr.Piyali Bhattacharya,

Dr.Srabanti Nandy,

Dr.Subhajit Saha,

Post Graduate Trainee

Haldia Institute of Dental Sciences And
Research

INTRODUCTION:

In patients with natural teeth the Centric relation usually doesn't coincide with the maximum intercuspal position, the mandible during hinging movement may be stymied. This is due to well established protective reflexes that strengthen every time the teeth occlude, so these patients don't allow the mandible to be hinged easily. If the tooth contact could be removed, then such reflexes could disappear, and the manipulation would be easier. The teeth could be kept apart using a cotton rolls, plastic leaf gauge, or a device known as lucia jig. These appliances eliminate occlusal interferences. The lateral pterygoid muscle is allowed to release and the joints are allowed to seat fully in centric relation. And while contacting on the anteriors elevator muscle activity also gets shut down for people that clench or grind or have headaches from parafunctional activity.

The leaf Gauge :

Construction: It consist of 10 leaves of acetate, 0.01-inch-thick, 0.5-inch-wide, and 20 inch long. A hole is punched in one end of each leaf and the ten leaves are riveted together.

Use in locating Centric relation: All the 10 leaves of the gauge are placed between the anterior teeth, and the number of leaves is reduced one by one until the first contact is felt between the posterior teeth. Then the number of leaves is increased by one or two so that the posterior teeth could be just out of contact. Warm wax or other plastic recording material is placed between the posterior teeth, the gauge is then replaced in the anterior part of the mouth, and the mandible is retruded and held with biting pressure until the recording medium is hard or set. By increasing the vertical dimension of occlusion by a small degree, a minimal error is assured when the casts are mounted on an articular and closed to first contact of the teeth. The leaf gauge, when placed between the anterior teeth, helps the patient to retrude the mandible. The biting force tends to move the condyles against their menisci.

Since the patient is applying all pressures, the position of the mandible is not likely to exceed physiologic limits.



Anterior Jig (lucia jig)

It is made of auto-polymerized acrylic resin, so it is rigid. It can be directly made in the mouth or on a cast. It covers maxillary central incisors and small portion of palate with minimal spacing. Its outer surface is adjusted so that lower central incisor contacts with the smooth lingual incline of the jig at only one point. The jig incline must stop the closure of mandible before any tooth contact there should be at least 1mm of spacing between the posterior teeth. This lingual incline should slope 45 to 60 degree posteriorly and superiorly from occlusal plane.

Principle

The anterior jig prevents the posterior teeth from occluding and, in so doing, appears to modify proprioceptive memory. As the anterior jig (or leaf gauge) is rigid, once it is contacted by the lower incisor on retruded closure, anterior resistance is created and the leverage of the mandible is reversed, creating a naturally braced tripod effect with the two condyles.

The reversal of the class III lever situation that occurs when a patient chews food or bites into an elevated anterior stop preventing further closure. As the jig is engaged by the lower incisors with the closing muscles continuing to contract, the condyles are more likely to become seated in their middle and most superior positions. The protrusion is avoided because a natural reflex prevents contraction of the lateral pterygoid muscles as the patient bites firmly on a leaf gauge.



Cranham Deprogrammer: Deprogrammer can be used for equilibration, centric relation records, or as a night-guard. This has to be worn the night before the visit. This appliance features a small anterior stop contacting the lower central incisors and slightly disoccludes all teeth. It is comfortable for the patient, requires no retention clasping, and is easy to use.



Dawson B-Splint : can be used for night time retention and protection for those with significant parafunction. Clenchers generate even less force than they can with an equilibrated splint. It eliminates the possibility of posterior super eruption.

The NTI: Helpful for the temporal headache patient, or for the headache patient of occluso-muscle origin. They can be quickly made in the office; even long-time sufferers of headaches and facial pain get rapid relief. Hence, focus can be directed to diagnosing and solving the cause – the occlusal discrepancies. It should be remembered that it's a temporary solution and a great appliance for differential diagnosis. If the mandible can't be manipulated satisfactorily after an anterior programming device has been in place for 30 minutes, then such patients are more likely to have neuromuscular dysfunction. This problem is solved by occlusal devices. Also, in case of intra-capsular disorder these deprogrammer cannot be used. It may increase the symptoms.

SUMMARY :

The utilization of these methods can help the clinician to record centric relation or provide centric relation closure. It helps prevent adaptive closure of mandible and clinician guided jaw closure as well as help in recognizing other errors in assessing occlusal contact.

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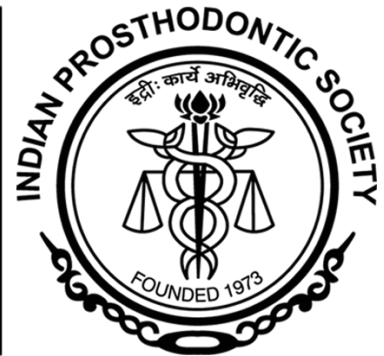


22nd January



22nd

Indian Prosthodontic
Society PG Convention
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First Announcement



The 12th Biennial Congress of Asian Academy of Prosthodontics




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Stephen F. Rosenstiel
Charles J Goodacre | Sreenivas Koka

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Main Speakers: Sreenivas Koka
Removable and Implant Prosthodontics
San Diego, California

Dr. Sreenivas Koka earned his DDS and MS degrees from the University of Michigan, PhD degree from the University of Nebraska and MBA degree from MIT's Sloan School of Management. He is currently on the faculty of Loma Linda University and UCLA.

Dr. Sreenivas Koka is a sought-after international speaker who has experience presenting to a wide range of audiences such as dental students, clinicians, educators, researchers and leaders/executives. He has made hundreds of presentations in over 20 countries spanning North America, South America, Australasia, Asia, Europe and Africa. Audiences range in size from less than 10 to over a 1000 and topics include clinical dentistry, research and management. He has learned the value of tailoring each presentation to the audience, the context and the environment.

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Main Speakers: Charles J. Goodacre
Dental Surgery, Restorative Dentistry, and Endodontics
Loma Linda, California


Dr. Charles J Goodacre received his DDS degree from Loma Linda University School of Dentistry in 1971. He completed a three year combined program in Prosthodontics and Dental Materials at Indiana University School of Dentistry.

He served as an Editor of the International Journal of Prosthodontics for 10 years, has over 100 publications and has given more than 600 invited presentations. Recent educational activities have focused on the development of interactive, navigable electronic education programs with particular emphasis on 3-D formatting, applications, and effectiveness.

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Main Speakers: Stephen F. Rosenstiel
Restorative and Prosthetic Dentistry
Columbus, Ohio

Dr. Stephen F. Rosenstiel is a 1973 dental graduate of Birmingham University in England and completed his Masters in Prosthodontics at Indiana University in 1977. He is a Professor Emeritus of Restorative and Prosthetic Dentistry at The Ohio State University College of Dentistry, where he maintains an intraoral prosthodontics practice.

Dr. Stephen F. Rosenstiel is an author of the textbook Contemporary Fixed Prosthodontics, the fourth edition of which was published in 2006. The textbook has sold over 50,000 copies, is used in many dental schools and has been translated into eight languages. He has authored over 180 scientific articles and abstracts, principally on the fracture properties of dental ceramics and dental esthetics.

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