

Information of Mentor of Training Centre
It shall be verified by the Head of the concerned Training Center

Sr. No.	Particular	-	Information to be filled												
01.	Name of Faculty/Teacher	:	Dr. Amol Mhatre												
02.	Date of Birth	:	01/06/1983												
03.	Address	:	A/12, LIL CHS, Maratha Bhavan Marg, Sec-14, Vashi, Navi Mumbai-400703												
04.	Tel. No./ Mob. No.	:	9223237154												
05.	E-mail id	:	dr.mhatre.amol@gmail.com												
06.	Nationality	:	Indian												
07.	Qualification in details :(attach documentary proof)	:	BDS & M.D.S. (Orthodontics), Fellowship in Oral Implantology (MUHS)												
08.	Teaching experience/Medical: Profession experience /Consultant/Mentor (attached document proof with signature of Head)	:	11years 6 months 4dys.												
09.	Present Appointment	:	Reader												
10.	Publications (List & Proof)	:	<table><tr><td>1</td><td>Malviya H, Mistry L, Gupta B, Mhatre AC, Gopalkrishnan P, Shahbazkar BZ. Evaluation of cleanliness of dentinal tubules using scanning electron microscope in maxillary anterior teeth following gutta-percha removal with and without solvents: An ex-vivo study. Turkish Journal of Physiotherapy & Rehabilitation. 2021; 32(3): 30628-38.</td></tr><tr><td>2</td><td>Pious N, Ravindranath V. K., Patni VJ, Mhatre AC. Review of superelastic archwires in Orthodontics. Trends Biomater Anrtif Organs. 2021; 35(1): 91-94.</td></tr><tr><td>3</td><td>Das N, Jindal H, Gupta R, Mhatre AC, Tribhuvan A, Fernandes M. Nasal changes in Post-surgical nasoalveolar moulding: A Systematic review. IJDSIR. 2021; 4(4); 190-201.</td></tr><tr><td>4</td><td>Pious N, Ravindranath VK, Mhatre AC, Ingole SD, Ingole P. Comparative Evaluation of Dimensional Accuracy and Load Deflection Attributes of Orthodontic Superelastic Archwires from Four Popular Manufacturers. Trends Biomater. Artif. Organs. 2021; 35(4): 387-391.</td></tr><tr><td>5</td><td>Neetha Pious, Amol Mhatre, Sumedh D. Ingole Management of Coronavirus Disease 2019 in Dentistry Journal of Oral Research and Review, Volume 12, Issue 2, July-December 2020</td></tr><tr><td>6</td><td>Amol Mhatre, Arundhati Tandur, Sumitra Reddy, Karunakara B.C., Aravind M., Floyd Fernandes – Non compliance efficient class II treatment with a pendulum appliance – Journal of Oral and Dental Health, 2019: Vol. 5, Issue 1, 126-133</td></tr></table>	1	Malviya H, Mistry L, Gupta B, Mhatre AC , Gopalkrishnan P, Shahbazkar BZ. Evaluation of cleanliness of dentinal tubules using scanning electron microscope in maxillary anterior teeth following gutta-percha removal with and without solvents: An ex-vivo study. Turkish Journal of Physiotherapy & Rehabilitation. 2021; 32(3): 30628-38.	2	Pious N, Ravindranath V. K., Patni VJ, Mhatre AC . Review of superelastic archwires in Orthodontics. Trends Biomater Anrtif Organs. 2021; 35(1): 91-94.	3	Das N, Jindal H, Gupta R, Mhatre AC , Tribhuvan A, Fernandes M. Nasal changes in Post-surgical nasoalveolar moulding: A Systematic review. IJDSIR. 2021; 4(4); 190-201.	4	Pious N, Ravindranath VK, Mhatre AC , Ingole SD, Ingole P. Comparative Evaluation of Dimensional Accuracy and Load Deflection Attributes of Orthodontic Superelastic Archwires from Four Popular Manufacturers. Trends Biomater. Artif. Organs. 2021; 35(4): 387-391.	5	Neetha Pious, Amol Mhatre , Sumedh D. Ingole Management of Coronavirus Disease 2019 in Dentistry Journal of Oral Research and Review, Volume 12, Issue 2, July-December 2020	6	Amol Mhatre , Arundhati Tandur, Sumitra Reddy, Karunakara B.C., Aravind M., Floyd Fernandes – Non compliance efficient class II treatment with a pendulum appliance – Journal of Oral and Dental Health, 2019: Vol. 5, Issue 1, 126-133
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10. Publications (List & Proof)

7	Amol Mhatre , Arundhati Tandur, Sumitra Reddy, Karunakara B.C., Aravind M., Floyd Fernandes – Non compliant therapy for class II correction. Keep it simple: A case report with a long term followup – Journal of Oral and Dental Health, 2019: Vol. 5, Issue 1,100-105
8	Aarti B Madhaswar, V.R. Ravindranath, V.K., Patni ,Divij Joshi, Mhatre AC , Prateek N Daga. Comparative Evaluation of Frictional Resistance of Three Different Types of Passive Self- ligating Ceramic Brackets Using Coated and Uncoated Stainless Steel and Nickel Titanium Arch Wires: An study. Journal of Contemporary Dentistry (2019): 10.5005/jp-journals-10031-1249
9	AsthaNamdhari, VK Ravindranath, Vivek J Patni, Girish R. Karandikar, Amol Mhatre , Divij Joshi, Prateek Daga, Aarti Madhaswar Comparative Evaluation of Enamel Micro-Cracks Observed Before Bonding and After Debonding of Various Types of Ceramic Brackets: A SEM Study - <i>Journal of Contemporary Dentistry, September-December 2018; 8(3):01-10</i>
10	PrathameshFulsunder, Divij Joshi, Rachna Darak, Prachi Gaikwad, QasimMansoorian, Amol Mhatre – Homeopathic Arnica to Control Orthodontic Pain: A Substitute to Conventional NSAIDs - Journal of Contemporary Detistry, May – August – 2018: 8(2): 97-100
11	Floyd S Fernandes, Amol C Mhatre , Divij D Joshi, Prateek Daga, Neeraj E Kolge, Swapnagandha R Kate – Asepesis Measures Undertaken by Mumbai Based Orthodontists: A Survery Report – Original Research – Journal of Contemporary Dentistry , May – August:2018:8(2):77-82
12	Neeraj E Kolge, Vivek Patni, Ravindranath VK, Divij Joshi, Amol Mhatre , Swapnagandha R Kate – Interproximal Reduction: A Twin Helix Device – Clinical Innovation – Journal of Contemporary Dentistry 2018;8(2):112-114
13	Alok Rajendra Shah, Girish Karandikar, V.K .Ravindranath, Manish Sonawane, Amol Mhatre – A Comparative Study of Raliability and Accuracy of Manual nad Digital Lateral Cephalometric Tracing – Journal Contemporary Dentistry – January – April – 2016: 6:(1) : 15-18
14	PS Vivek, V.R. Ravindranath, Girish Karandikar, Sachin Doshi, Amol Mhatre , Manish Sonawane – Frictional Characteristics of the Newer Low – friction Elastomeric Ligatures – Journal of Contemporary Dentistry – January – April – 2016 ; 6 (1): 19-23
15	Amol Mhatre , Arundhati Tandur, Sumitra Reddy, B.C. Karunakara, H Baswaraj – Enamel Surface after Removal of Orthodontic Composite Remnants by Intraoral Sandblasting Technique and Carbide Bure Technique : A Three-Dimensional Surface Profilometry and Scanning Electron Microscopic Study. – J Int Oral Health. 2015; 7(Suppl 2): 34–39

10.	Publications (List & Proof)	:	16	Vinayak Kulkarni, Girish Karandikar, Amol Mhatre , Shaili Shah, Hitesh Burad, Azeem Patel – A New Simplified Metal Guide for Optimal Microimplant Insertion - Journal of Contemporary Dentistry. Jan-April 2014;4(1):413-415
			17	Shashank Gaikwad, Ashwini D, Sachin Doshi, Amol Mhatre - Manish S.- An in Vivo Study Comparing the Characteristics of Esthetic , Self-Ligating and Metallic Brackets – Journal Of Contemporary Dentistry – Sept- Dec – 2012;2(3);73-77
			18	Sachin S Doshi, M Jayarama, Shashank Gaikwad, Amol Mhatre , Ravindranath – Nonsurgical Treatment of a Patient with Class III Malocclusion and Missing Maxillary Lateral Incisors: A Combined Orthodontics-Prosthodontics Approach – Journal of Contemporary Dentistry May- August 2012;2(2):57-63.
			19	Amol Mhatre , Arundhati T, Shashank G, Sachin D, Natasha K Orthodontic Treatment: The Soft Tissue Paradigm Journal of Contemporary Detistry Jan-Apr 2012;2(1):43-46.
11.	Post Graduate Teaching experience (Attach documentary evidence)	:	4years 3months 25dys.	
12.	Any other relevant information	:	-	

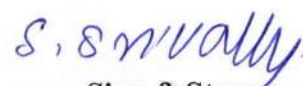


Dr. Amol Mhatre
Name & Sign. of Mentor

Date: 20/05/2022

I have verified the eligibility of the above Director as per the criteria of eligibility prescribed by the University vide clause no.7 of the University Direction No. 05/2017 (Amended).


Prof. Dr. Anand
Dept. Of Orthodontics &
Dento-facial Orthopedics
M. Dental College &
Hospital
Sign & Stamp
Head of the Department
Date: 20/05/2022.


S. S. Nivaly
Sign & Stamp
Dean/ Principal/ Director of Training Centre
Date: 20/05/2022
Kamothe, Navi Mumbai 410 209.



ಕ.ಸಂ. 016857



ರಾಜೀವ್ ಗಾಂಧಿ ಆರೋಗ್ಯ ವಿಜ್ಞಾನಗಳ ವಿಶ್ವವಿದ್ಯಾಲಯ
ಕರ್ನಾಟಕ
RAJIV GANDHI UNIVERSITY OF HEALTH SCIENCES
KARNATAKA

ಡಾ|| ಮಾತ್ರ ಅಮೋಲ್ ಚಂದ್ರಕಾಂತ್

ರವರು, ಶ್ವಾತಕೋತ್ತರ ಪದವಿಗೆ ಯಥಾ ಯೋಗ್ಯವಾದ ಅವಶ್ಯಕತೆಗಳನ್ನು
ಮೇ ೨೦೧೦ ರ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಪೂರೈಸಿರುವರೆಂದು ದೃಢೀಕರಿಸುತ್ತಾ
ಮಾಸ್ಟರ್ ಆಫ್ ಡೆಂಟಲ್ ಸರ್ಜರಿ (ಆರ್ಥೋಡಾಂಟಿಕ್ಸ್)

ಶ್ವಾತಕೋತ್ತರ ಪದವಿಯನ್ನು ಪೂರೈಸಿ, ಸಮಕುಲಾಧಿಕಾರಿ, ಕುಲಪತಿ ಹಾಗೂ ಸೆನೆಟ್ ಮತ್ತು ಸಿಂಡಿಕೇಟ್ ಸದಸ್ಯರುಗಳಾದ

ನಾವು ೨೦ನೇ ಮಾರ್ಚ್ ೨೦೧೧ ರಂದು ನಡೆದ ೧೩ ನೇ ಘಟಿಕೋತ್ಸವದಲ್ಲಿ

ಮಾಸ್ಟರ್ ಆಫ್ ಡೆಂಟಲ್ ಸರ್ಜರಿ ಮುದ್ರೆಯೊಡನೆ ಪ್ರದಾನ ಮಾಡಿದ್ದೇವೆ.

We, the Chancellor, the Pro-Chancellor, the Vice-Chancellor and the
members of the Senate and the Syndicate confer

MASTER OF DENTAL SURGERY (ORTHODONTICS)

on

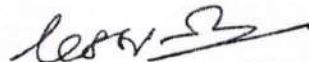
Dr MHATRE AMOL CHANDRAKANT

in recognition of fulfillment of the requirements for the said
Post Graduate Degree in the examination held during MAY 2010

Given under the seal of the University, in the

13th Convocation held on 30th March 2011



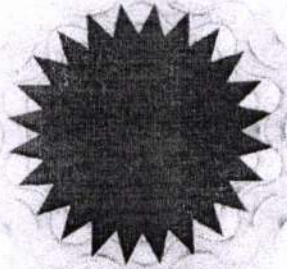

Vice-Chancellor



Bengaluru Date : 30/03/2011

Reg. No. : 07EO553

College : K.L.E SOCIETY'S INSTITUTE OF DENTAL SCIENCES, BANGALORE



M.G.M. Dental College and Hospital,
Kamothe, Navi Mumbai 410 209.

महाराष्ट्र आरोग्य विज्ञान विद्यापीठ, नाशिक
Maharashtra University of Health Sciences, Nashik

दिंडोरी रोड, म्हासूर, नाशिक - ४२२००४, Dindori Road, Mhasrul, Nashik- 422 004

Tel: (0253)2539192/6659239, Student Helpline:(0253)2539111/6659111

Website: www.muhs.ac.in, E-mail : academic1@muhs.ac.in

डॉ. कलिदास द. चव्हाण

एम.बी.एस., एम.डी. (न्यायवैद्यकशास्त्र), पीएच.डी., डी.एस्सी.

रेजिस्ट्रार

Dr. Kalidas D. Chavan

M.B.B.S., M.D.(Forensic Medicine)Ph.D.,D.sc.

Registrar

Ref No.: MUHS/E-2/PG/2741/2021

Date: 05/09/2021

The Principal,
Mahatma Gandhi Mission's
Dental College & Hospital,
Junction of NH-4 & Sion-Panvel,
Expressway, Sector-1, Kamothe,
Navi Mumbai - 410 209

Sub: Regarding extension to Post Graduate Teacher Recognition

- Ref: 1. University Direction No. 01/2017
2. MUHS/E-2/PG/2203/2020 dated 25/11/2020
3. MUHS/PG/E-2/111105/1559/2019 dated 28/11/2019.
4. MUHS/E-2/ UG /2515/2021 dated 14/09/2021
5. Your letter No MGM/DCH/1034/2021 dated 22/03/2021

Sir/ Madam,

With reference to the subject cited above, I am to inform you that, the proposal of extension to recognition as Post-Graduate Teacher of the following teachers have been considered by the University subject to the terms and conditions of appointment order for imparting instructions to the Post Graduate Degree, Diploma or Super Speciality Course in the subject mentioned against their names.

Sr. No.	Subject	Name of the Teacher	Designation	Status of PG recognition
1	Orthodontics & Dentofacial Orthopedics	Dr. Ravindranath V.K.	Professor	w.e.f 30/07/2021 to 29/07/2022 only.
2		Dr. Amol Mhatre	Reader	w.e.f 02/08/2021 to 01/08/2022 only. (against SC Category)
3	Oral & Maxillofacial Surgery	Dr. Sunil Sidana	Reader	w.e.f 30/07/2021 to 29/07/2022 only.
4		Dr. Sagar Vaishampayan	Reader	w.e.f 02/08/2021 to 01/08/2022 only (against SC Category)
5		Dr. Adil Gandeivala	Reader	w.e.f 02/08/2021 to 01/08/2022 only (against ST Category)
6	Conservative Dentistry and Endodontics	Dr. Divya Naik	Reader	w.e.f 02/08/2021 to 01/08/2022 only.
7		Dr. Anuradha Patil	Reader	w.e.f 30/07/2021 to 29/07/2022 only.
8	Prosthodontics and Crown & Bridge	Dr. Anuradha Mohite	Reader	w.e.f 02/08/2021 to 01/08/2022 only. (against SC Category)
9		Dr. Janani Vivek Iyer	Reader	w.e.f 30/07/2021 to 29/07/2022 only.
10	Periodontology	Dr. Sarika Shetty	Reader	w.e.f 02/08/2021 to 01/08/2022 only. (against SC Category)
11		Dr. Sujeet Khiste	Reader	w.e.f 02/08/2021 to 01/08/2022 only.

- 1) The above mentioned teachers are required to attend "Research Methodology Workshop" conducted by Regional Centre, Pune of this University or any other centre authorised by the University (if not attended earlier), within a period of one year from the date of recognition. It is clarified that the validity of 'Research Methodology Workshop' is for five years only and it must be renewed after every five years as per Circular 14/2011 dated 23/06/2011.

MGM / MED
INWARD NO.
DATE 25/10/21
SIGN: 6336

Mr Deepan
S-82
29/10/21

MGM
4919/21
27/10/2021



Shaan Education Society's

Guardian College of Dental Sciences & Research Centre

Ref.: GCDSRC /Relv/ G10/2011

Date: 06/06/2011

To Whomsoever It May Concern

Certificate of Experience & Relieving Order

This is to certify that **Dr. Amol Mhatre** was working in this college as a Lecturer, Orthodontic Department from 01-10-2010 to 06-06-2011.

During this period, his conduct and work was found to be very good.

He is relieved from the duties w.e.f. 06-06-2011 after office hours.

This certificate is issued on his request.



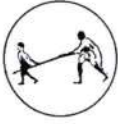
Yours Sincerely

Dr. D. A. Darawade

Dr. D. A. Darawade

Principal

Guardian College of Dental Sciences
& Research Centre,
Ambernath (W), Dist. Thane.



MAHATMA GANDHI MISSION DENTAL COLLEGE & HOSPITAL

Accredited by NAAC with "A" Grade

Plot No. 1 & 2 Sector-01 (Old 18 & 19),

Kamothe, Navi Mumbai- 410209

E-Mail ID: mgmdch@mgmmumbai.ac.in

Dr. Srivalli Natarajan

Dean

Tel: 022- 27436604

022-27433185

No.MGM/DCH/789 /2022

Date: 20/05/2022

Experience Certificate

This is to certify that Dr. Amol Mhatre is working in the Department of Orthodontics & Dentofacial Orthopedics in MGM Dental College & Hospital, Kamothe, Navi Mumbai and his experience is as under :

- Lecturer – 01/07/2011 to 31/07/2017
- Reader – 08/01/2017 to Till Date



S - Srivalli
Dean

Evaluation of cleanliness of dentinal tubules using scanning electron microscope in maxillary anterior teeth following gutta – percha removal with and without solvents: an ex vivo study

¹Dr. Hitesh Malviya, ²Dr. Laresh Mistry, ^{3*}Dr. Bharat Gupta, ⁴Dr. Amol Mhatre, ⁵Dr. Pooja Gopalkrishnan, ⁶Dr. Bushra zohaib shahbazkar

¹Department of conservative dentistry and endodontics, Private practitioner, Mumbai
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Dr.mhatre.amol@gmail.com

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drbushrams@gmail.com

ABSTRACT

Introduction:

Endodontic retreatment therapy has significantly improved in the last few decades due to the introduction of novel materials and techniques. The success of retreatment depends on the removal of the obturated material and gaining access to the full apical working length. The aim of this study was to evaluate the cleanliness of dentinal tubules following gutta-percha removal with and without solvent.

Material & Methods: 70 extracted teeth were stored in thymol, and were root canals were prepared and filled as per standard root canal procedure. Gates glidden drill was used to remove the gutta percha and the samples were divided in to 4 groups. Group I (Control-Unfilled) n=10, Group II (without solvent) n=20, Group III (Eucalyptol) n=20 and Group IV (chloroform) n=20. The samples were studied under SEM (Scanning Electron Microscopy) to assess the effect of different solvents on the cleanliness of dentinal tubules and effect of region of the root (viz. coronal, middle and apical third) on the cleanliness of dentinal tubules

Results: There was statistically significant difference in the cleanness if dentinal tubules in all groups, with Group II showing maximum open tubule compared to Group III (Eucalyptol) and Group IV (chloroform). There was no difference in cleanliness of the dentinal tubules among different regions (viz. coronal, middle and apical third).

Conclusion: The use of solvent (Group III & Group IV) left behind more Gutta-percha compared to non-use of solvent. (Group II), thus it would be wise to assess before one use solvent for retretement.

Key words: Retreatment, solvent, chloroform, dentinal tubules.

INTRODUCTION

Non-surgical endodontic treatment is routinely practiced in modern dentistry. The Revolution of material science and techniques in root canal treatment has resulted in the retention of millions of teeth that would have otherwise been lost.¹

With all the potential for endodontic success, the fact remains that clinicians are confronted with post-treatment disease.^{2,3} Retreatment of the previously obturated canal is becoming, more and more common in endodontic practice. The main causes of endodontic failure making retreatment necessary are insufficient cleaning and inadequate obturation.⁴ Additionally, teeth with inadequate obturation, unfilled root canals or under extended root fillings may require retreatment before coronal restorations, as failure may occur in the future.³

29

Review of Superelastic Archwires in Orthodontics

Neetha Pious, Ravindranath V. Krishnan, Vivek Patni, Amol Mhatre

Department of Orthodontics and Dentofacial Orthopedics, MGM Dental College and Hospital, Kamothe, Navi Mumbai, India

Received: 20 May 2020

Accepted: 1 September 2020

Published online: 10 March 2021

Key words: superelastic; nickel titanium; archwires

Over the last century a plethora of archwires have been introduced into the field of orthodontics. With changing treatment philosophies and advancement in dental materials, treatment has now become simpler. Nickel titanium wires has revolutionized the field of orthodontics with its superelasticity and shape memory properties. They have proved superior compared to other traditional wires. Further improvements have been incorporated into these wires by modifying the composition and advancement in their manufacturing technology. With the availability of thermodynamic, superelastic and aesthetic archwires, several options are being presented to clinicians for treatment of malocclusion. Literature search was performed on electronic databases—PUBMED, ScienceOpen, Lilacs, Google Scholar, SciELO and Cochrane. This article can shed knowledge on the available improved wires and guide orthodontist to choose the ideal wire according to the clinical situation.

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Introduction

Over the last century, material science has made rapid progress. In the branch of orthodontics, not only have materials improved but also the philosophies have changed. Orthodontic wires, which generate the biomechanical forces through brackets for tooth movement, are central to the practice of the profession. The advancement of wire manufacturing technology and the development of new orthodontic techniques has led to the search for better quality alloys [1]. Up until the 1930s the only orthodontic wires available were made of gold and precious metal alloys. Later austenitic stainless steel, cobalt-chromium and titanium wires gained popularity and were widely used [2]. The Nitinol alloy was developed by William F Buehler, a research metallurgist at Naval Ordnance Laboratory in the year 1960 after which Dr. George Andreason introduced it in orthodontics where it brought about a revolutionary change [3]. The initially discovered nitinol was a martensitic stabilized alloy which showed no superelasticity. Nickel titanium (NiTi) archwires have been evolving since their initial development with shape memory and superelastic properties [4]. Superelasticity is a phenomenon wherein the stress remained nearly constant despite the strain change within a specific range and is achieved through stress-related martensite-austenite transformation. This allows a constant force to be delivered over an extended portion of the deactivation range and is therefore more likely to generate physiologic tooth movement and greater patient comfort [5,6]. Thus they can be utilized in the initial

levelling and alignment stage of orthodontic treatment. This article can shed knowledge on the available improved wires and guide orthodontists to choose the ideal wire according to the clinical situation.

Material and Methods

A literature review was performed in PUBMED, ScienceDirect, Lilacs, Google Scholar and Cochrane. Additional studies were hand-searched and retrieved from the reference lists of relevant articles. Data was gathered using the keywords "Superelastic", "Nickel Titanium", "Archwires". The title and abstract of acquired articles were analysed and data was extracted by the authors such that the topic can be adequately summarized in a narrative manner. The search was limited to articles in English. The reference list of selected papers was hand searched for further relevant articles. Only those articles were included which studied various aspects of superelastic archwires in the field of orthodontics. Articles with reviews, abstracts, letters to editorials, clinical and in vitro studies studying properties of superelastic archwires were included, while articles studying applications of superelastic archwires other than in the field of orthodontics were excluded. Articles researching on superelastic materials other than archwires were not considered. A total of 4354 articles were acquired from the literature search, out of which 34 articles were selected from which data was extracted, reviewed and compiled in a correct manner.

Composition and Manufacturing Process

Nickel and titanium are most commonly manufactured into nickel titanium alloy by the process of vacuum induction melting,

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**Nasal Changes Post Presurgical Nasoalveolar Moulding: A Systematic Review**¹Nishant Das, PG, Department of Prosthodontics, MGM's Dental College and Hospital, Navi Mumbai, India²Himanshi Jindal, Intern, MGM's Dental College and Hospital, Navi Mumbai, India²Ruchi Gupta, Intern, MGM's Dental College and Hospital, Navi Mumbai, India³Amol Mhatre, Asst. Professor, Department of Oral and Maxillofacial Orthodontics and Dentofacial Orthopedics, MGM's Dental College and Hospital, Navi Mumbai, India²Abhijeet Tribhuvan, Intern, MGM's Dental College and Hospital, Navi Mumbai, India²Maiqlin Fernandes, Intern, MGM's Dental College and Hospital, Navi Mumbai, India**Corresponding Author:** Dr Amol Mhatre, Asst. Professor, Department of Oral and Maxillofacial Orthodontics and Dentofacial Orthopedics, MGM's Dental College and Hospital. Himanshi Jindal, Intern, MGM's Dental College and Hospital, Navi Mumbai, India**Citation of this Article:** Nishant Das, Himanshi Jindal, Ruchi Gupta, Amol Mhatre, Abhijeet Tribhuvan, Maiqlin Fernandes, "Nasal Changes Post Presurgical Nasoalveolar Moulding: A Systematic Review", IJDSIR- August - 2021, Vol. - 4, Issue - 4, P. No. 190 - 201.**Copyright:** © 2021, Nishant Das, et al. This is an open access journal and article distributed under the terms of the creative commons attribution noncommercial License. Which allows others to remix, tweak, and build upon the work non commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.**Type of Publication:** Review Article**Conflicts of Interest:** Nil**Abstract****Objective:** The objective of this study is to review articles, which have comprehensively studied changes in nasal morphology and function in patients with unilateral cleft lip and palate defects, after undergoing Pre-surgical Naso-alveolar (NAM) moulding therapy.**Methods:** A retrospective systematic review was conducted on twelve study articles. Inclusion criteria comprised of unilateral cleft lip and palate, pre-surgical nasoalveolar moulding, changes in nasal morphology and function. Exclusion criteria included age more than 4 months, patients having undergone surgical treatment, bilateral cleft lip and palate. The articles were reviewed using odds ratio.**Results:** Parameters included in the study were changes in the nasal height and nasal width; changes in nostril height; changes in alar base width on cleft side; columella displacement, length and deviation. As deduced from the articles under review; patients having undergone NAM along with surgical treatment had significantly better nasal morphology as compared to patients having undergone surgical therapy alone.**Conclusion:** The use of NAM can significantly improve nasal morphology at the time of nasal maturity as compared to individuals with no-NAM.**Keywords:** Nasal morphology, Presurgical nasoalveolar moulding, Unilateral cleft lip, Unilateral cleft palate.**Corresponding Author:** Dr Amol Mhatre, [ijdsir](http://ijdsir.com), Volume - 4 Issue - 4, Page No. 190 - 201

Comparative Evaluation of Dimensional Accuracy and Load Deflection Attributes of Orthodontic Superelastic Archwires from Four Popular Manufacturers

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Keywords: superelastic, archwires, load deflection, dimension, orthodontics

To compare and evaluate the dimensional accuracy and load deflection of orthodontic superelastic archwires from four popular manufacturers. Four brands of archwires were subjected to testing. Preformed maxillary archwires with dimension of 0.016" x 0.022" were evaluated. Dimensional accuracy was evaluated using a digital micrometer while load deflection attributes were evaluated using a Universal Testing Machine. Statistical analysis was performed using one-way ANOVA followed by pair wise comparison using post hoc test. There was significant difference in dimensions and load deflection attributes of all four brands of archwires. Currently, several brands of superelastic archwires are available in the market sourced from both foreign as well as indigenous commercial houses. The quality of archwires takes predominance for every orthodontist in the choice of usage and buying of wires. This study will give a good comparison of various physical properties of different brands of superelastic archwires to help orthodontist select the best possible bracket wire combination.

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Introduction

Archwires have always been the central element of orthodontic treatment. There have been numerous advancements in archwires, which has helped in enhancing our orthodontic practice by transition from traditional precious alloys to introduction of stainless steel, Australian, cobalt-chromium, nickel-titanium (NiTi), alpha titanium, beta titanium and esthetic archwires [1].

Nickel-titanium wire was discovered in the 1960's by William F. Buchter at Naval Ordnance Laboratory in Maryland. Dr. George Andreasen developed the first NiTi alloy used in orthodontics. Dr. Fumi Miura in 1958 developed superelastic NiTi wires. Copper NiTi alloys was later developed by Rohit Sachdeva and Shuchi Miyazaki. Nickel-titanium alloys have been commonly used in orthodontics due to their favourable properties and ability to apply constant small forces over a wide range of displacements. Further advancements have been made and currently there are several superelastic archwires being marketed by different brands [2].

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The dimensional accuracy of the bracket-archwire combination is very crucial for effective orthodontic treatment as it has a major influence on the torque expression in fixed appliances [3]. Degree of freedom between the bracket slot and the archwire is known as 'play'. There is a decrease in effective torque by about 5° for every 0.001 inch of freedom between the archwire and vertical bracket slot [4]. Discrepancies in the archwire and bracket slot dimension will thus impede torque control and treatment efficiency [5]. An accurate bracket slot-archwire combination is one of the basic requirements of efficient orthodontic mechanics which can be achieved by precision in manufacturing [6].

The superelasticity of a material is best studied using a three point bending test [7]. Activation and deactivation behaviours of an archwire can be deduced from it and helps in understanding their effect on biological tooth movement. The loading curve indicates the force required to ligate the archwire onto the bracket slot. When archwires are ligated to the brackets, a certain amount of energy is stored, which is later transmitted onto the dentition. The amount of force transmitted to the dentition is represented by the unloading curve [8]. The force required to align the teeth is not the activation force but the deactivation force (unloading force). The plateau is the flat slope along the unloading curve, which

Review Article

Management of Coronavirus Disease 2019 in Dentistry

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Abstract

Coronavirus disease 2019 (COVID-19) is an infectious disease caused by the most recently discovered severe acute respiratory syndrome coronavirus 2. The outbreak of COVID-19 which was first detected in Wuhan, China, has evolved swiftly into a worldwide health crisis. The disease started spreading globally from 2019 and has resulted in the 2019–2020 coronavirus pandemic. Being a recently discovered disease, several aspects about it are unknown. Infection control measures are needed to control this pandemic situation. The characteristics of dental settings may give rise to the risk of cross-infection for both patients and dentists. Thus, certain guidelines should be followed by dental practitioners, and infection control protocols are urgently needed. Literature review was performed in PubMed, PubMed Central, EBSCO, and Google Scholar using keywords to identify and gather data. This article can serve as a guidance for dentists to deal with coronavirus disease.

Keywords: Coronavirus, coronavirus disease 2019, dentistry, infection control, severe acute respiratory syndrome coronavirus 2

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INTRODUCTION

Coronavirus disease 2019 (COVID-19) is an infectious disease caused by the most recently discovered severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).^[1] COVID-19 is a beta coronavirus, a part of the Coronaviridae family.^[2] It belongs to one of the four different groups of coronaviruses categorized by the Centers for Disease Control and Prevention (CDC) and is in the same family of virus which caused severe acute respiratory syndrome and Middle East respiratory syndrome.^[3] The outbreak of COVID-19 which was first detected in Wuhan, China, has evolved swiftly into a worldwide health crisis. The disease started spreading globally from 2019 and has resulted in the 2019–2020 coronavirus pandemic. Being

a recently discovered disease, several aspects about it are unknown to the general public, including how it spreads. Health-care professionals are on the front lines of taking care of patients with confirmed cases as well as suspected cases of coronavirus disease, thus making them prone to the risk of exposure to this new disease.^[4]

METHODOLOGY

Literature review was performed in PubMed, PubMed Central, EBSCO, and Google Scholar database. Data were gathered using the keywords "Coronavirus," "COVID-19," "SARS-CoV-2," "infection control," and "dentistry." The title, abstract, and reference list of acquired articles were analyzed and data were extracted by the three authors on

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NON-COMPLIANCE EFFICIENT CLASS II TREATMENT WITH A PENDULUM APPLIANCE - A CASE REPORT

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INTRODUCTION

Nonextraction treatment and noncompliance therapies have become more popular in correction of Class II malocclusions. Some cases of dental Class II malocclusion cases usually require distal movement of maxillary molars to achieve Class I molar and canine relationship.¹ In this context, in order to avoid extraction, arch lengthening through distalization of the molars can be performed in patients with orthognathic jaw bases. Traditionally, appliances used for molar distalization have been dependent upon the patient compliance for the success of treatment.² Class II malocclusion is seen in an estimated one-third of all the orthodontic patients that are treated for this condition.³ Customized treatment modalities for 'non-compliant' patients are useful applications with 'compliant' patients as well. More predictable results can be harnessed by placing the final outcome under complete control of the orthodontist.⁴ Since its introduction in 1992 by Dr. James Hilgers⁵, the Pendulum appliance has been used to distalize maxillary molars without the patient's role in activation of the appliance as opposed to extraoral appliances. Hence, patient compliance is not required. Haynes defines compliance, as the "extent to which a person's behavior coincides with medical or health advice."⁶

This will guarantee achievement of the desired result. Non-compliant patients require a longer treatment time, extraction of surplus teeth, display destruction of the teeth and periodontium.⁷ For a successful orthodontic therapy, patients must maintain good oral hygiene as well as pay heed to dietary restrictions. Further compliance is expected specific to the treatment plan in therapies like change of elastics, wearing of removable appliances, wearing of orthopedic appliances especially in class II malocclusion.

A decision to perform molar distalization can be made by studying the patient's features and the amount of movement needed. Considering the wedging effect and the cascading events that follow namely, increase in the mandibular plane angle, anterior facial height and convexity of the profile; thorough diagnosis is mandatory while incorporating molar distalization as part of the treatment plan.

In this article, a case treated using the Pendulum appliance with a successful outcome is discussed.

NON-COMPLIANT THERAPY FOR CLASS II CORRECTION. KEEP IT SIMPLE: A CASE REPORT WITH A LONG TERM FOLLOW UP



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INTRODUCTION

Compliance, according to Haynes, as related to health care, is the "extent to which a person's behaviour coincides with medical or health advice.¹ hence, the patient is to strictly adhere to the regimen advised by the orthodontist. This will guarantee achievement of the desired result. Non-compliance of patients can result in a longer treatment time, destruction of the teeth and periodontium, extraction of surplus teeth, exasperated patients and additional stress for the orthodontist and staff.² Patients must comply with the plan for overall success of the orthodontic therapy in general with respect to maintenance of excellent oral

hygiene as well as dietary restrictions. Further compliance is expected specific to the treatment plan in therapies like change of elastics, wearing of removable appliances, wearing of orthopaedic appliances especially in class II malocclusion. Class II malocclusion is among the most frequently occurring Orthodontic problems. It is estimated that one-third of all orthodontic patients are treated for this condition.³

Treatment modalities customized for 'non-compliant' patients may have useful applications with 'compliant' patients as well. More anticipated results can be achieved by placing the treatment outcome under the purview of the orthodontist.⁴

According to the manner in which anchorage is derived, the appliances can be classified into; a) inter-maxillary b) intra-maxillary c) absolute anchorage manner (Table 1).⁴

Dean

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RESEARCH ARTICLE

Comparative Evaluation of Frictional Resistance of Three Different Types of Passive Self-ligating Ceramic Brackets Using Coated and Uncoated Stainless Steel and Nickel Titanium Arch Wires: An *In Vitro* Study

Aarti Balasab Madhaswar¹, VK Ravindranath², Vivek Patni³, Divij Joshi⁴, Amol Chandrakant Mhatre⁵, Prateek Navratan Daga⁶

ABSTRACT

Aim: The present study was aimed to evaluate and compare the frictional characteristics of three newly introduced passive ceramic self-ligating brackets (SLBs), Damon clear, Truklear, and Cabriolet, using coated and uncoated stainless steel (SS) and nickel titanium (NiTi) archwires.

Materials and methods: Fifteen maxillary right central incisor brackets of dimension 0.022" x 0.028" slot: five brackets, each of Damon Clear, Cabriolet, and Truklear brackets. Thirty coated and uncoated SS and NiTi archwires were part of the study.

Results: The frictional resistance (FR) with three different passive self-ligating ceramic brackets was studied using three different types of SS and NiTi archwires based on their coating. The Damon Clear bracket showed less FR, while the highest FR was observed for the Truklear bracket when using various types of NiTi archwires; the Truklear bracket showed less FR, while the highest FR was observed for the Cabriolet bracket.

Conclusion: FR with three passive SLBs when carried out with the Damon Clear bracket showed less FR, while the Truklear bracket showed the highest FR; and when the study was carried out using NiTi archwire, the Truklear bracket showed less FR, while the Cabriolet bracket demonstrated the highest FR.

Keywords: Ceramic, Damon clear, Friction, Self-ligating brackets.

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INTRODUCTION

Burrow defined friction as the resistance to motion when one object moves tangentially against another.¹ The term self-ligation in orthodontics implies that the orthodontic bracket has the ability to engage the archwire into itself, and is, therefore, assumed to reduce friction by eliminating the ligation force. These bracket systems have a mechanical device built into the bracket to secure the edgewise slot. The two commonly manufactured SLBs are the active SLBs, where they have a spring clip that presses against the archwire, and the passive SLBs where the self-ligating clip just closes the slot, creating a tube, and does not actively press against the wire.²

The present study was targeted to evaluate and compare the frictional characteristics of the newly introduced passive self-ligating ceramic brackets, Damon clear (Ormco INC. California), Truklear (Forestadent GmbH, Germany), and Cabriolet (Gestenco International Gothenburg, Sweden) with three different types of coated and uncoated SS and NiTi archwires.

MATERIALS AND METHODS

In this study, five maxillary right central incisor brackets of dimension and McLaughlin Bennet Trevisi system (MBT) prescription of 0.022" x 0.028" slot were taken from each of the three different groups (Fig. 1):

- Group A: Cabriolet (Gestenco International Gothenburg, Sweden)
- Group B: Truklear (Forestadent GmbH, Germany)
- Group C: Damon clear (Ormco Inc., California)

Each bracket was mounted on an acrylic block using a cyanoacrylate adhesive (Fig. 2). The acrylic blocks were custom made by Matrix Corporation, Govandi (Mumbai). The acrylic blocks

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Conflict of interest: None

offered a flat surface on to which the brackets were fixed. Horizontal and vertical laser markings (Fig. 3) were made on the acrylic blocks to facilitate accurate placement of the brackets. The dimensions of the acrylic block were as follows:

- Height: 70 mm.
- Length: 18 mm.
- Breadth: 18 mm.

While performing each test, new wires were used for evaluating FR. Straight lengths of 0.019" x 0.025" SS wire were cut into pieces of 40 mm in length; 30 such pieces were used for the study (Fig. 4). Each bracket was tested six times using SS uncoated (SSUC) archwire, SS partially coated (SSPC) archwire, SS fully coated (SSFC) archwire, NiTi

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Comparative Evaluation of Enamel Micro-cracks Observed before Bonding and after Debonding of Various Types of Ceramic Brackets: A SEM Study

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ABSTRACT

Introduction: Enamel integrity gets affected by the presence of micro-cracks in it and they can further create problems like stains and the accumulation of plaque on the fractured surfaces. Avoiding such iatrogenic damage to the enamel surface has been a constant challenge even with the use of metal brackets. Creating a fracture line in the base of the bracket leads to the formation of a 'weak zone'. This allows the bracket to collapse in a mesiodistal direction when debonding forces are applied rather than shattering the bracket into many multiple pieces. Thus, removal of the bracket having such a 'weak zone' created by making a groove in it before bracket removal arguably leaves the major amount of resin on the tooth and therefore causes less stress on enamel. This study plans to evaluate the expected beneficial effect of 'scoring' the base of the ceramic bracket before bracket removal.

Aim: To evaluate and compare the occurrence of micro-cracks in enamel observed before bonding and after debonding of various types of ceramic brackets.

Results: The difference between scored monocrySTALLINE ceramic brackets and unscored monocrySTALLINE ceramic brackets of both the AO and Ormco groups is not significant statistically ($p = 0.096$). There is a significant difference in scoring of ARI and enamel micro-cracks development. The difference of length and width between the groups (A and B) is statistically insignificant.

Conclusion: Post debonding, there was no difference significantly in the length or width of enamel micro-cracks between AO monocrySTALLINE ceramic brackets (group A) and Ormco monocrySTALLINE ceramic brackets (group B).

Keywords: Adhesive remnant index, Ceramic brackets, Debonding, Enamel damage.

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INTRODUCTION

In 1980s ceramic brackets were introduced because of high expectations of patients for esthetic and less visible appliances. Since then, to evaluate clinical characteristics and properties, a lot of research have been conducted for ceramic brackets.¹

Different types of ceramic brackets have been manufactured to meet the demands of adults who seek orthodontic treatment.² one of the advantages of ceramic brackets is fewer chances of staining and also less frequency of slot distortion, but the disadvantage is these brackets are very brittle and rigid too.³ These features lead to partial or complete bracket fracture due to the pressure of debonding on the base of the bracket. Enamel cracks and fractures have been reported after removal of brackets.⁴

Avoiding such iatrogenic harm to the surface of enamel has been a constant challenge even with the use of metal brackets. Since then, attempts have been made to develop debonding methods that cause minimal undesirable changes in the enamel structure.⁵ There are various techniques for modification of enamel surface and protocols have been described for etching and bonding to reduce the damage to enamel following bracket removal.⁶⁻⁹

Planned studies involving various aspects of enamel micro-cracks (EMCs): The region of their occurrence, the propensity of particular region of the tooth they occur in, whether the cracks are more along mesiodistal width or more along the occlusogingival height, the depth or width of the aforementioned cracks are some of the factors which need to be studied. All of the aforesaid needs to be studied for various types of commercially available ceramic brackets as well as known variations in the debonding techniques.

Micro-cracks in the enamel following debonding is a concern for many patients seeking orthodontic treat-

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Homeopathic *Arnica* to Control Orthodontic Pain: A Substitute to Conventional NSAIDs

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ABSTRACT

With pain being the major drawback and reason for patient dropouts in orthodontic treatment, its management becomes an essential part of orthodontics. Patients commonly use nonsteroidal anti-inflammatory drugs (NSAIDs) such as paracetamol, ibuprofen, Diclofenac-sodium, Acetylsalicylic acid, and Celecoxib to alleviate orthodontic pain. However, it has shown that the use of these drugs has a significant effect on the orthodontic movement of teeth.

Arnica montana is an accepted remedy in homeopathic medicine since concentrated extract of *Arnica* can be toxic, only homeopathic pellets which contain extremely diluted concentration of drug are considered appropriate for ingestion.

Arnica has shown efficiency in treating inflammation and associated pain. It has a wide scope in the field of dentistry and can be used as an alternative to NSAIDs in order to control intra-operative and post-operative pain without hampering orthodontic tooth movement. *Arnica* 30° C can be used for the treatment of dental pain.

Keywords: Homeopathic *Arnica*, NSAIDs, Orthodontics, Pain control, Tooth movement.

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Conflict of interest: None

INTRODUCTION

The experience of orthodontic pain is one of the significant disadvantages of orthodontic treatment.¹ The

incidence of pain is common in routine orthodontic treatments and is associated with procedures such as placement of the archwires or separators, including the follow-ups for activation of appliances.

The NSAIDs are commonly used for pain control.² However, the main disadvantage of NSAIDs is that it interferes with the inflammation process³ produced during the orthodontic movement of teeth.⁴

This allows one to explore other possibilities like the use of complementary therapies such as plant medicines, as a substitute. *Arnica* is one of the famous homeopathic remedies, used in the treatment of inflammation and associated pain.⁵ It is proposed that NSAIDs can be replaced with *Arnica montana* to counter orthodontic pain.⁶

DISCUSSION

Orthodontic Pain

Pain is an unpleasant feeling which may occur due to injury or illness.^{1,7} The incidence of pain is common in routine orthodontic treatments and is associated with procedures such as placement of the archwires or separators, including the follow-ups for activation of appliances.⁸ The pain associated with archwire placement is found to be more intense and long lasting than that associated with dental extraction.^{9,10} Also the pain produced by the fixed appliances is more than that caused by removable or functional devices.¹¹ When orthodontic forces are applied on the teeth it leads to inflammation of periodontal tissues and pulp, which release various biochemical mediators such as substance-P, histamines, enkephalins, serotonin, prostaglandins, and cytokines eliciting hyperalgesic response.¹² All of this results into the sensation of pain.¹³

Methods used to control Orthodontic Pain

The methods used to control orthodontic pain range from anesthetics, analgesics, low-intensity lasers to vibrations.¹¹ However, NSAIDs are more commonly used to alleviate orthodontic pain control. The most commonly used NSAIDs in dentistry are paracetamol, ibuprofen, diclofenac-sodium, acetylsalicylic acid, valdecoxib, and celecoxib.¹⁴

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Asepsis Measures Undertaken by Mumbai Based Orthodontists: A Survey Report

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ABSTRACT

Introduction: This study aimed to assess and evaluate Mumbai based orthodontists based on recommended (Centre of Disease Control) infection control procedures followed by them in their practice.

Materials and methods: A cross-sectional study was conducted through an online questionnaire of 24 questions which was sent by personal e-mail and communication through the phone to active orthodontic professionals in Mumbai (n = approximately 300) from January to February, 2018. The questionnaire was accessible for 2 months. The data generated were collected and analyzed.

Results: The results showed that 50.9% of respondents sterilized their instruments at the end of each day and 66.7% used a steam sterilizer. Twenty point three percent sterilized their instruments between patients and 56.4% used heat/self-sealed pouches to package instruments. Twenty-four point four percent stored them in a sterilized environment and 25.6% ran equipment maintenance every month. Eighty-two point two percent sterilized tried-in pre-formed molar bands before putting them back in storage and only 36.2% used steam sterilization for the same. Twenty-seven point five percent placed the bands in an ultrasonic cleaner before sterilization. Sixty six point five percent used pre-determined lengths of elastomeric chain. Ninety-two point two percent used pre-determined lengths of ligature wire. Twenty-nine point seven percent disinfected alginate impressions. Fifty-three point two percent used a plastic barrier on the dental chair's light handle while only 24.3% used a barrier around the anesthetic spray canister. Seventy five point nine percent followed standard hand scrub protocol between patients. Thirty-one point four percent had their offices fumigated on a regular basis. Fourteen point nine percent had sterilization efficacy tests done. Eighty-five point six percent had themselves and their staff vaccinated against Hepatitis B while 72.8% had received the booster dose. Sixty-seven point six percent have been vaccinated against Hepatitis A. Fifty-three point four percent underwent regular health check-ups.

Conclusion: The survey displayed a varying percentage of Orthodontic practitioners who follow recommended centres of disease control and prevention (CDC) infection control and aseptic core orthodontic clinical procedures in Mumbai. There is a need to increase knowledge and awareness regarding general aseptic dental procedures and maintenance of equipment. This demands a more proactive attitude towards knowledge acquisition and implementation of aseptic procedures by the orthodontists of Mumbai in a dental office.

Keywords: Clinical aseptic procedures, Infection control, Orthodontic office.

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Conflict of interest: None

INTRODUCTION

Most of the instruments used in an orthodontic office can be classified as semi-critical instruments according to Spaulding's classification. The incidence of transmissible diseases is high even in such a setting making the dental staff and patients prone to cross infections.¹ Cross infections result in high levels of morbidity and mortality around the world.² It is difficult to detect patients who are infected with bloodborne pathogens like the Hepatitis B virus through a clinical examination in a dental office.³ Hence, universal precautions have been recommended to minimize the incidence of cross infection.⁴ The aseptic procedures employed in an orthodontic office must meet the specifications of the CDC.⁵ This will ensure a high level of quality in both treatment delivery and aseptic management thereby reducing the chances of iatrogenic damage to the overall health of doctors and patients alike. Few studies have gathered information on the knowledge of orthodontists about clinical aseptic procedures.^{3,6,7} We surveyed orthodontists in Mumbai in 2018. The objective was to assess and evaluate Mumbai based orthodontists based on recommended CDC infection control procedures followed by them in their practice. Thus, we will be able to assess the need of creating awareness amongst orthodontists with respect to infection control in the dental office thereby ensuring the safety of the patients, doctors and auxiliary staff in day-to-day practice.

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Interproximal Reduction: A Twin Helix Device

¹Neeraj E Kolge, ²Vivek J Patni, ³Ravindranath VK, ⁴Divij Joshi, ⁵Amol Mhatre, ⁶Swapnagandha R Kate

ABSTRACT

Introduction: Interproximal enamel reduction dates back to 1944 when it was first advocated for correcting lack of tooth size harmony by stripping the proximal surfaces of the mandibular anterior segment. Despite convincing results, interproximal reduction (IPR) only became popular after the advent of bonding, as full-arch banding done previously completely deferred the use of this method for tooth material reduction. With the current status and ongoing development of new techniques of IPR, use of this method as a mean of gaining space has increased exponentially over the last three decades.

Procedure: A 12-inch length of 0.036" diameter wire is used for fabrication of the assembly. Helices of 2.5 mm diameter with two coils and the other according to finger grip are fabricated, and U-loops are prepared at the free ends for engaging the proximal strips. This assembly can be placed intraorally in the interdental region of our choice to cut the tooth material.

Conclusion: This assembly provides an effective grip rather than using hand held strips. It is also accessible in both anterior and posterior regions with a minimum requirement of armamentarium and can be sterilized and reused.

Keyword: Crowding, IPR, Slenderization, Twin Helix,

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INTRODUCTION

Various terms are used for the procedure of reduction of interproximal tooth material which in turn helps in attaining a good alignment and long-term stability of treatment goals. They are as follows:

- Interproximal enamel reduction¹
- Air-rotor stripping²
- Slenderizing³
- Reproximation⁴

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Historical Background

Interproximal reduction (IPR) dates back to 1944, when it was first advocated for correcting lack of tooth size harmony by stripping the proximal surfaces of the mandibular anterior segment.⁵ A few years later, the detailed technique was described followed by appropriate guidelines for remineralization of enamel.⁶ Increased posttreatment stability was also attributed when IPR was combined with circumferential supracrestal fiberotomy.⁷

Despite convincing results, IPR only became popular after the advent of bonding, as full-arch banding done previously completely deferred the use of this method for tooth material reduction. It was in mid 80s when ARS technique attracted orthodontists globally and soon became a viable method for space gaining in mild to moderate crowding cases as an alternative to expansion or extraction.^{8,9}

It was also used as a method to improve gingival esthetics by eliminating black triangles.¹⁰ With the current status and ongoing development of new techniques of IPR, use of this method as a mean of gaining space has increased exponentially over the last three decades.¹¹

PROCEDURE

- A 12-inch length of 0.036" diameter wire is used for fabrication of the assembly.
- Bending of helices (Figs. 1A and B) is followed by 90° vertical bends are given on either side of the horizontal arm at the free ends of the wire (Fig. 2).
- U-loops are prepared at the free ends for engaging the proximal strips, and the excess wire is cut.
- The vertical arms are activated by approximately 10° (Fig. 3), and a proximal strip is engaged. This helps in keeping the proximal strip taut.
- 2.5 mm radius helix (with two coils) is made at one end of the wire while a helix with a diameter approximating the finger grip (Figs. 4 and 5) is made at the other end.
- Assembly (Fig. 6) can be placed intraorally in the interdental region of our choice to reduce the tooth material (Figs. 7A and B).

Advantages

- More effective than using loose hand-held strips.
- Accessibility in both anterior and posterior regions.



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PROCEDURE

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- Assembly (Fig. 6) can be placed intraorally in the interdental region of our choice to reduce the tooth material (Figs. 7A and B).

Advantages

- More effective than using loose hand-held strips.
- Accessibility in both anterior and posterior regions.



A Comparative Study of Reliability and Accuracy of Manual and Digital Lateral Cephalometric Tracing

¹Alok Rajendra Shah, ²Girish Karandikar, ³VK Ravindranath, ⁴Manish Sonawane, ⁵Amol Mhatre

ABSTRACT

Objective: The aim of this study was to assess the reliability and accuracy of several types of lateral cephalometric attributes commonly used: Angular measurements, linear measurements, and ratio when using digital cephalometric software (Nemoceph) with manual tracing method.

Materials and methods: Sample size consisted of 26 lateral cephalometric radiographs. All cephalograms were subjected to both manual and digital cephalometric analysis by the same examiner. Digital analyses were performed on Nemotec digital imaging software. Cephalograms were assessed for a total of 17 cephalometric attributes. The results were assessed using Student's t-test.

Results: Six out of 17 measurements, i.e., sella, nasion, B point, ANB, incisor mandibular plane angle, mandibular plane angle, L1-NB, and Jarabak ratio, showed statistically significant difference between the manual and digital methods.

Conclusion: Digital measurements obtained with Nemotec digital imaging software were found to be comparable to the manual method for most of the variables used in clinical practice.

Keywords: Cephalometric measurements, Cephalometric tracing, Digital imaging.

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Conflict of interest: None

INTRODUCTION

The assessment of craniofacial structures forms an integral part of orthodontic diagnosis. In 1931, orthodontics ushered in the age of radiographic cephalometry by the historical work of Broadbent¹ in the United States and Hofrath in Germany, who simultaneously developed techniques for obtaining standardized radiographs of the head. Cephalometric radiography is a valuable tool in diagnosis, prognosis, treatment planning, and evaluation,

as well as in studies on the growth and development of the dental and craniofacial complex.²

Cephalometric analysis can be performed on cephalograms by a manual approach or a computer-aided approach.³ Cephalometric analysis performed manually using a tracing sheet is the oldest and the most widely used method. Radiographic film is quite stable and can retain its information for many years but it is not always a dependable archive medium due to its physical nature. Film deterioration has been the major source of information loss in craniofacial biology.⁴

Computerized cephalometric analysis involves direct digitization of the lateral skull radiograph using a digitizer linked to a computer, and then locating landmarks on the monitor.⁵⁻⁷ The computer software then completes the cephalometric analysis by automatically measuring distances and angles. Computerized or computer-aided cephalometric analysis eliminates the mechanical errors when drawing lines between landmarks as well as those made when measuring with a protractor.

Computerized cephalometric analysis may use either a manual or an automatic identification of landmarks. Automated systems at present are unable to compete with manual identification in terms of accuracy of landmark position. The landmarks lying on the poorly defined structures are difficult to automatically identify.⁸ For digital cephalometry to be a better tool in clinical orthodontics, the cephalometric analysis must be comparable and reliable, as it is on a conventional radiographic film.

The aim of this study was to assess the reliability and accuracy of several types of lateral cephalometric attributes commonly used: Angular measurements, linear measurements, and ratio when using digital cephalometric software (Nemoceph, Nemoceph is Software for orthodontics and orthognathic surgery and is manufactured by nemotec (the digital dentistry company)), with manual tracing method.

MATERIALS AND METHODS

Twenty-six pretreatment cephalometric radiographs of adequate diagnostic quality with identifiable craniofacial structures and landmarks were selected for the study. All of these lateral radiographs were obtained from the Radiology Department of MGM Dental College and Hospital and were performed with the patient's head

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Frictional Characteristics of the Newer Low-friction Elastomeric Ligatures

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ABSTRACT

Aim: The aim of this *in vitro* study was to investigate the efficiency of the new generation of elastomeric ligatures with innovative designs (Slide™ and AlastiK™ Easy-to-Tie) in reducing frictional resistance (FR) during sliding mechanics as compared with conventional ligatures.

Materials and methods: Sixty ligature samples divided into four groups were used for the study. Group A: QuiK-StiK™ (3M Unitek, Monrovia, CA, USA), Group B: AlastiK™ Easy-to-Tie (3M Unitek, Monrovia, CA, USA), Group C: Slide™ (Leone, Firenze, Italy), and Group D: SS ligatures 0.010" (Libral Traders, New Delhi, India). Universal Testing Machine, Instron was used for measuring FR at the bracket-wire interface.

Results: There was statistically significant difference in FR among all the four groups of ligatures tested ($p < 0.001$). Slide ligatures produced the least amount of FR followed by SS ligatures, Easy-to-Tie, and QuiK-StiK in the increasing order of the FR values registered.

Conclusion: Slide™ ligatures may represent a valid alternative to passive self-ligating brackets when minimal amount of friction is desired. Angulation introduced into the elastomeric ligatures reduces the friction in comparison to conventional elastomeric ligatures.

Keywords: Angulated elastomeric ligatures, Frictional resistance, Low-friction elastomeric ligatures, Slide ligatures.

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Conflict of interest: None

INTRODUCTION

Friction is defined as the resistance to motion when one object moves tangentially against another.¹ When sliding mechanics is used in orthodontics, friction occurs

at the bracket-wire interface. Some of the applied force is, therefore, dissipated as friction and the remainder is transferred to supporting structures of the tooth to mediate tooth movement. This reduces the effectiveness of the mechanics, decreases tooth movement efficiency, and further complicates anchorage control.²

In this context, one of the major goals of the orthodontic manufacturing companies is the search for new products that would generate less friction during sliding mechanics. Over the last two decades, major efforts have been made to develop the so-called low-friction brackets, wires, and ligatures.

Schumacher et al³ found that friction was determined mostly by the type and force of ligation. Ligation with stainless steel (SS) ties can lead to higher forces, as a range of ligating forces may be used by different operators and ligation forces cannot be precisely controlled.³ Also, incidents of injury to gingival tissues and to the operator have been reported. Although loose SS ligatures produce less friction compared with elastomeric modules,⁴⁻¹¹ and elastomeric ligatures are subject to permanent deformation with time and they also deteriorate in moist environment as a result of slow hydrolysis, the convenience and speed of application elastomeric rings are likely to ensure their continued popularity among clinicians.

To overcome the disadvantages of the conventional ligation techniques, self-ligating brackets were introduced.^{6,12-14} This is a ligature less bracket system with a mechanical device built into the bracket to close off the bracket slot.

Recently, new low-friction ligatures (Slide™, Leone, Firenze, Italy) have been introduced, similar to elastic ligatures, but with an anterior part that is more rigid and similar to the mechanical device of self-ligating brackets. According to the manufacturer, slide is constructed from a special polyurethane mix approved for medical use. Once the ligature is applied on the bracket, it simulates the labial cover of a passive self-ligating bracket, thus transforming the slot into a tube that allows the archwire to slide freely. Elastomeric ligatures designed with a 45° bend (AlastiK™ Easy-to-Tie; 3M Unitek, Monrovia, CA, USA) were also introduced recently. The manufacturer claims that the unique angle shape reduces the range of movement needed for bracket ligation that makes tying hooks easier and more efficient.

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Enamel Surface Evaluation after Removal of Orthodontic Composite Remnants by Intraoral Sandblasting Technique and Carbide Bur Technique: A Three-Dimensional Surface Profilometry and Scanning Electron Microscopic Study

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Abstract:

Background: The purpose of this thesis is to present a practical and efficient clinical method of returning enamel to as near its original condition as possible following removal of bonded orthodontic attachments. The main objective of this study is to evaluate and compare the iatrogenic enamel damage caused by use of two different remnant removal techniques – sandblasting technique and carbide bur technique.

Materials and Methods: 40 extracted premolar teeth were selected as sample. Premolar brackets were bonded on these teeth with two different types of light cure adhesive composite resin. The remnants present on these samples after debonding the brackets were removed with two different types of remnant removal techniques namely – Carbide bur technique and sandblasting technique. Then these treated surfaces were studied under Scanning electron microscope and three-dimensional profilometer for the damage caused to the enamel. Statistical analysis used: Student's *t*-tests.

Results: The enamel surface structure after remnant removal with intraoral sandblasting is better than that after removal with a low-speed handpiece using tungsten carbide bur.

Conclusion: Sandblasting can be an acceptable alternative to rotatory handpieces to restore the enamel surface to its near-original state and prevent permanent damage to the tooth.

Key Words: Enamel surface, composite remnants, intraoral sandblasting, three-dimensional profilometry

Introduction

The concept of bonding resins to enamel has developed applications in all fields of dentistry, including orthodontics.¹ Composite bonding of orthodontic attachments to enamel surfaces has had a significant, if not revolutionary, impact on clinical orthodontic treatment. Although the advantages of bonding clearly outweigh the disadvantages, some concerns remain. The primary orthodontic goal lies in returning the enamel surface to its original state after removal of orthodontic attachments.² Damage to enamel can be attributed to cleaning with abrasives before etching, acid etching, enamel fractures caused by forcibly removing brackets, or mechanical removal of remaining composite with rotary instruments.^{3,4} Introduction of the acid-etch technique for bonding orthodontic attachments has proven to be a landmark advancement in clinical orthodontic treatment and the literature is replete with related reports.⁵⁻¹⁰

The purpose of this study is to evaluate these concerns and to present a practical and efficient clinical method of returning enamel to as near its original condition as possible following removal of bonded orthodontic attachments. The main objective of this study is to evaluate and compare with three-dimensional (3D) profilometry the iatrogenic enamel damage caused by use of two different remnant removal techniques – Sandblasting technique and carbide bur technique using two different light cure composite resins (bracket bonding agents).

Materials and Methods

A total of 40 premolars extracted for orthodontic treatment purpose with healthy crown structure without any kind of dental treatment performed over it, no damage caused by extraction forceps and no caries were chosen.

They were separated into two groups – Group A and Group B with 20 samples each. The cleaned buccal surface was etched for 20 s by using 37% phosphoric acid (Viscous Etch red, OrthoSource, Cat. No. 557 415, USA). Teeth that do not appear dull and frosty white were re-etched.¹¹

Single layer of 3M Unitek Transbond[®] light cure adhesive primer was applied on the teeth in Group A. Minimal amount of 3M Unitek Transbond[®] light cure adhesive composite was applied on the base of the premolar bracket (0.022 MBT 3M UNITEK: GEMINI SERIES) having meshwork for retention

A New Simplified Metal Guide for Optimal Microimplant Insertion

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⁴Shaili Sanjay Shah, ⁵Hitesh Jagdish Burad, ⁶Azeem Sajjad Patel

ABSTRACT

Microimplants have become increasingly popular because they are small and easy to insert and remove, can be loaded immediately after insertion, and do not require patient compliance. They provide absolute skeletal anchorage for various orthodontic treatment modalities.

Precise positioning of microimplants is critical to their success. Insertion too close to adjacent tooth roots increases the risk of implant failure, especially in the mandible. Abnormal placement interferes with planned tooth movements.

Authors have developed a metal guide that can improve the accuracy of microimplant placement in the anterior or posterior segments of either arch. It is easily attached to the archwire and is then disengaged after drilling, without the need for arch wire removal and with no deformation of either the archwire or the guide. Its simple design permits easy fabrication, does not require construction of acrylic surgical stents. The guide can also be re-sterilized, thus the same one can be used for different patients.

Keywords: Microimplant placement guide, Metal guide, Miniscrew insertion.

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Conflict of interest: None

INTRODUCTION

Temporary anchorage devices (TADs), in the form of miniscrew or micro-screw implants, have become an accepted component of the day-to-day orthodontic armamentarium. TADs have become increasingly popular because they are small and easy to insert and remove, they can be loaded immediately after insertion, and they can provide absolute anchorage for various orthodontic treatment modalities, with no need for special patient compliance.

Precise positioning of microimplants is critical to their success. Insertion too close to adjacent tooth roots

increases the risk of implant failure, especially in the mandible. Poor placement may also interfere with planned tooth movements.¹

The use of a guidance apparatus can facilitate accurate microimplant placement. Infinitas Mini-implant System™ is a 3-Dimensional system introduced in 2009,² but is complicated, time consuming and expensive. Surgical stents³ have also been developed, which are precise. However, they require laboratory fabrication using acrylic and thus need an extra appointment. Also, these have to be customized for every patient.

We have developed a metal guide that can improve the accuracy of microimplant placement in the anterior or posterior segments of either arch. It is easily attached to the archwire to determine the ideal microimplant position and is then disengaged after drilling, without the need for arch wire removal and with no deformation of either the archwire or the guide. Its simple design permits easy fabrication, and as the guide can be re-sterilized, the same one can be used for different patients.

APPLIANCE DESIGN AND FABRICATION

The microimplant placement guide is fabricated from a straight length, rectangular 0.017" × 0.025" stainless steel wire. Adequate length of the wire is cut and bent in the form of a 'U' (Fig. 1A). Six pieces of 2.5 mm length wires are cut and welded at a distance of 1.5 mm to form a ladder like structure (Fig. 1B). Thus, the ladder comprises of 6 rectangles; each of width 2.5 mm and height 1.5 mm, and the total height being 9 mm. The ends are then bent into hooks which are to be engaged onto the archwire (Fig. 1C). The side view of the completed metal guide is shown in Figure 1D.

This guide can be fabricated in varying lengths of 4.5, 6, 7.5, 9, 10.5 and 12 mm owing to placement in various anatomic regions of the oral cavity. Due to the variation in the width of the attached gingiva and vestibular depths in different patients, this wide a range of lengths shall prove to be a useful aid.

APPLIANCE PLACEMENT

Initially the microimplant placement area is determined. The guide is then secured over the archwire. This can be

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An *in vivo* Study Comparing the Characteristics of Esthetic, Self-ligating and Metallic Brackets

Shashank Sharad Gaikwad, Ashwin Deshpande, Sachin S Doshi, Amol Mhatre, Manish Sonawane

ABSTRACT

The aim of this *in vivo* study was to compare the characteristics of esthetic, self-ligating brackets (SLBs) and metallic brackets, to find bracket bond failures with SLBs and manually ligating brackets (MLBs), bracket breakages with SLBs and MLBs and staining with the SLBs. Seven patients were compared in each group. Standard light curing bonding methods were used in both the groups. Chairside time saving, appliance efficiency and bracket bond failures were compared among the groups whereas staining was observed with the SLBs. Appliance efficiency was evaluated by peer assessment rating (PAR) scores. Results showed significant chairside time being saved in SLBs, whereas the appliance efficiency was not significant. Bond failures were found only in SLBs as well as breakages along with staining. Henceforth, we could conclude that though SLBs had advantage of saving chairside time but also had disadvantage of losing more time with bond failures.

Materials and methods: Two groups of seven patients were created: First group (seven patients) received treatment with OPAL SLBs (Ultradent products, USA) and second group (seven patients) received treatment with MLBs manually ligating metal brackets (Nu-Edge, TP Orthodontics, USA). Case selection was done for both the groups. Bonding procedure was done in both groups in which primer application was done on both tooth surface and bracket base in case of OPAL SLB's while in case of MLBs, primer was applied only on tooth surface. A questionnaire was evaluated for knowing patients comfort.

Results: Comparison of mean values of PAR scores in both the groups for pre-, post-treatment and in the reduction of PAR scores was done.

It showed that SLBs were 6.5 times quicker than the MLBs during the archwire changes, thus saving considerable chairside time. Treatment outcome after 120 days, in both groups was almost the same. The SLBs had many bracket bond failures while MLBs had none. SLBs had other shortcomings, such as bracket breakage, staining, cap opening, etc.

Keywords: Self-ligating brackets, Manually ligating brackets, PAR test.

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INTRODUCTION

Evolution of brackets is a field involving constant innovations with the aim of pleasing both the orthodontists and patients. New brackets are constantly being developed to make the treatment a more pleasing experience for the patient. Introduction of self-ligating brackets (SLBs) in 1935

by Dr Jacob Stolzenberg left many practitioners unfamiliar with the advantages of these revolutionary SLBs. The mechanism of ligation in these revolutionary brackets was in stark contrast to the traditional approach of tying steel ligatures around each bracket. Treatment was considerably more comfortable with shorter office visits and short overall treatment time. Perhaps because Dr Stolzenberg was ahead of his time, the concept of SLBs fell more or less in obscurity until the early 1970s.¹ In 1971, Dr Jim Wildman of Eugene, Oregon, developed the Edgelok bracket.² As in the process many a SLBs^{1,3-6} followed suite.

OPAL SLBs (Ultradent, UK) fabricated with glass filled (nickel free) polycarbonate were introduced in year 2004. To our knowledge, no study was carried out to evaluate this type of new SLB. Hence, the need for this study was felt.

Our study was, therefore, aimed at evaluating the chairside time saved, patients' comfort, appliance efficiency, bracket bond failures, breakages and bracket staining in the OPAL SLBs and comparing them with the conventional standard metal brackets of MBT system (TP Orthodontics, UK).

AIMS AND OBJECTIVES

Evaluate and compare:

1. Chairside time savings with SLBs and manually ligating brackets (MLBs)
2. Appliance efficiency in leveling and aligning of SLBs and MLBs
3. Patients' comfort with SLBs and MLBs
4. Bracket bond failures with SLBs and MLBs
5. Bracket breakages with SLBs and MLBs
6. Staining with the SLBs.

MATERIALS AND METHODS

All cases were selected from the Department of Orthodontics, PMNM Dental College, Bagalkot, Karnataka. Out of 20 cases, six cases (three in each group) were excluded from the study for discontinuation of treatment by the patients. This reduced the overall number to 14 cases (seven in each group).

Thus, 14 patients were included in the study. Two groups of seven patients were created: First group (seven patients) received treatment with OPAL SLB's (Ultradent products, USA; Fig. 1A) and second group (seven patients) received treatment with MLB's manually ligating metal brackets (Nu-Edge, TP Orthodontics, USA; Fig. 1B).

Nonsurgical Treatment of a Patient with Class III Malocclusion and Missing Maxillary Lateral Incisors: A Combined Orthodontic-Prosthodontic Approach

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ABSTRACT

Class III treatment is a considerable clinical challenge and commonly includes (a) growth modification involving a chin-cup to restrain mandibular growth or a facemask to protract the maxilla, (b) dentoalveolar compensation or camouflage involving dental extractions and (c) orthognathic surgery. Surgical treatment is the preferred and most stable treatment for adult patients with severe skeletal class III malocclusion. Patients with borderline dentoalveolar compensation who are not willing to accept the costs, risks and potential complications of surgery can sometimes be treated successfully with camouflage orthodontics. In more extreme cases, however, conservative orthodontic treatment may lead to adverse side effects, such as periodontal disease and root resorption as well as poor long-term stability. It is not clear which mechanics are most appropriate or which patients are most likely to benefit from an orthodontic approach to severe skeletal class III malocclusion. In this list of alternatives, orthodontic treatment is often seen as either a less-desirable alternative to surgery or a treatment reserved for milder skeletal problems. This report questions this hierarchy of treatment options.

Keywords: Class III, Camouflage, Mandibular prognathism, Multilooped archwire.

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INTRODUCTION

The frequency of class III malocclusions varies in different racial groups. The incidence among white people is 1 to 4%; among black people, it is 5 to 8%; in Asians, it ranges from 4 to 14%.¹ Skeletal class III problems are more common in the eastern countries than in the western world. More so, a high prevalence is seen in India particularly in the state of Kerala, where there is a hereditary predilection for class III malocclusion and also because of high frequency of consanguineous marriage customs which are practiced here.²

Patients with a class III malocclusion can have various combinations of skeletal and dental discrepancies. It is important to diagnose these to adequately treat the

underlying cause or causes of the problem. Critical factors to be evaluated include the sagittal positions of the maxilla, the mandible, the maxillary and mandibular alveolar processes and vertical development. Guyer et al, for example, found that 57% of patients with a normal or prognathic mandible also had a deficient maxilla.

Class III treatment is a considerable clinical challenge and commonly includes (a) growth modification involving a chin-cup to restrain mandibular growth or a facemask to protract the maxilla, (b) dentoalveolar compensation or camouflage involving dental extractions and (c) orthognathic surgery.³ In this list of alternatives, orthodontic treatment is often seen as either a less-desirable alternative to surgery or a treatment reserved for milder skeletal problems. This report questions this hierarchy of treatment options.

DIAGNOSIS AND ETIOLOGY

A 22-year-old female presented for an orthodontic consultation (Figs 1A to D). Her chief complaint was the unesthetic appearance of her maxillary anterior teeth, which were behind the mandibular incisors and also missing teeth in the upper arch. She was allergic to ampicillin. Other than this, there were no significant findings in her medical history. In her dental history, she has had treatment for mandibular mid symphyseal fracture 1 year back which was managed with a conservative approach. She also had Ellis class I fractures of 26 and 35 which were restored with composite resin. Clinical examination also confirmed mandibular protrusion, maxillary retrusion and a concave profile with relatively large nose and a prominent chin. When she smiled, only half of the maxillary incisors were seen, and there was no gingival display. The patient had complete dentition including third molars except missing maxillary lateral incisors on both sides. She had a CO- CR discrepancy. There was a class I molar relationship on the right side and an end-on tendency on the left side with class I and end-on canine relation on right and left sides respectively in habitual occlusion. Overjet was negative, and there was 3.5 mm spacing in the mandibular anterior region and 3 mm spacing in the maxillary anterior region. Upper midline deviates to the right by 1 mm and lower

Orthodontic Treatment: The Soft Tissue Paradigm

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Abstract

Since turn of the 20th century, orthodontic treatment has been considered ideal dental occlusion, natural harmony, and patient's aesthetic demands. Functional orthodontics, however, considers orthodontic treatment from the perspectives of functional and aesthetic aspects. It must plan treatment within the patient's limits, showing a well finished base as end point.

Paradigm, a universally accepted scientific truth which at any given time best explains a natural phenomenon.¹ A paradigm can be thought of as the foundation on which a scientific structure is erected, with each brick representing new findings and insights. This appositional phase of scientific progress is quite slow and proceeds until a new and revolutionary paradigm is proposed and accepted, replacing the old paradigm. Usually science advances incrementally by virtue of the cumulative effort of investigators, each adding knowledge by accretion to the currently accepted model or paradigm. In this progression the truth of today become the myths of tomorrow. Practitioners of scientific discipline are generally resistant to accept new paradigm. Nonetheless after a paradigm shift has occurred a veritable explosion of new ideas and information occurs, leading to rapid advances in the field.²

For 100 years orthodontic theory and practice has been based on the Angle's paradigm.³ This model is predicted on a belief system which assumes that nature intends for all adults to have perfectly aligned dental arches, each containing 16 teeth that should

mesh in ideal articulation with the teeth in the opposing jaw. When such "natural" dentitional state occurs, the face also should be in perfect harmony and balance and the stomatognathic system should function ideally.

Orthodontists have traditionally viewed structural discrepancies as the primary limitations of treatment. In reality, the soft tissues more closely determine therapeutic modifiability.² The boundaries of dental compensation for an underlying jaw discrepancy are established by several aspects of soft tissue relationships and functions:

1. Pressures exerted on the teeth by the lips, cheeks, and tongue⁴
2. Limitations of the periodontal attachment
3. Neuromuscular influences on mandibular position.
4. The contours of the soft tissue facial mask
5. Lip-teeth relationships and anterior tooth display during facial animation^{5,6}

Orthodontists have taken a century not necessarily to learn but to accept that the soft tissues largely determine the limitation of orthodontic treatment. As time passed, it became clear that even an excellent occlusion was unsatisfactory if it was achieved at the expense of proper facial proportions. Not only were there esthetic problems, it often proved impossible to maintain an occlusal relationship achieved by prolonged use of heavy elastics to pull the teeth together as Angle and his followers had suggested. Extraction of teeth was reintroduced into Orthodontics in the 1930's to enhance facial esthetics and achieve better stability of the occlusal relationships.

Many authors have suggested utilizing soft tissue analysis as a reliable guide for occlusal treatment and attendant soft tissue changes.⁷⁻¹⁸ Arnett and Bergman presented the Facial Keys to Orthodontic Diagnosis and Treatment Planning as a three-dimensional clinical blueprint for soft tissue analysis

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