

THE CUTTING EDGE

This column is compiled by JCO Technology Editor W. Ronald Redmond, DDS, MS. To help keep our readers on The Cutting Edge, Dr. Redmond will spotlight a particular area of orthodontic technology every few months. Your suggestions for future subjects or authors are welcome.

This month's column is the first in a series of articles describing the use of three-dimensional printing to enhance orthodontic treatment. To my knowledge, these authors are the first to explore the use of 3D-printed auxiliaries to assist tooth movement and improve on existing technologies.

Several aids to biomechanics are described, including retraction hooks, bite turbos, bondable retainer strips, and attachments for clear aligners. Such auxiliaries seem to be more accurate and efficient than those produced by previous techniques.

I believe this is merely the tip of the iceberg for 3D printing. Innovative minds will continue to push the envelope and create "aha moments".

WRR

3D-Printed Orthodontic Auxiliaries

S. FAYYAZ AHAMED, MDS

A.S. APROS KANNA, MDS

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Three-dimensional printing has quickly become one of the hottest areas of technology in orthodontics, thanks to its wide range of clinical applications.¹ Also known as additive manufacturing, 3D printing creates an object by depositing material in layers. It is considered faster and more precise in producing complex appliances than conventional manufacturing processes such as injection



Dr. Fayyaz



Dr. Apros



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TABLE 1
COMPARISON OF DIGITAL ORTHODONTIC AUXILIARIES

	Printer Type	Appearance	Material	Print Time (minutes)
Retraction hook	SLA	Esthetic	VisiJet FTX Clear***	90
Bite turbo	FDM	Nonesthetic	ABS	30
Lingual retainer	SLA	Nonesthetic	VisiJet FTX Green***	150
Aligner attachments	SLA	Esthetic	VisiJet FTX Clear***	120

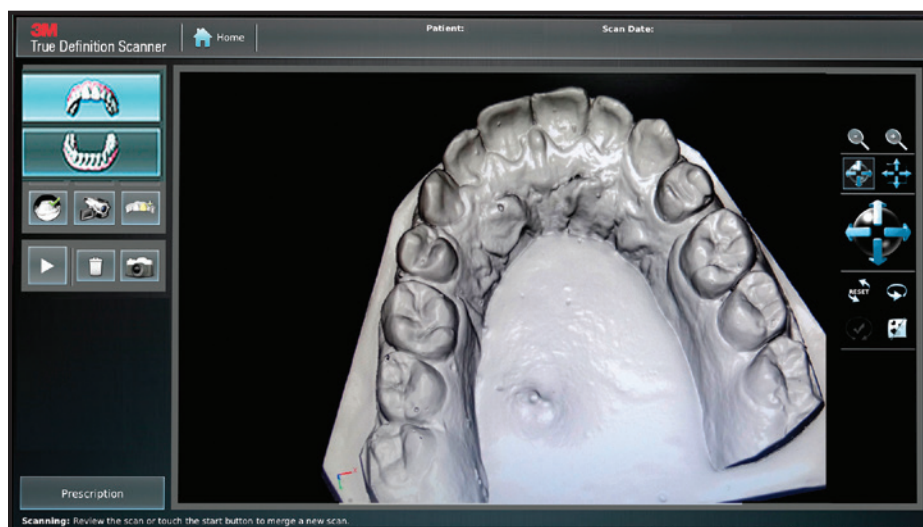


Fig. 1 Digitization of working cast using 3D model scanner.*

molding. With new-generation printers rendering accurate, affordable, and instant prototypes, 3D printing has proven to be economical and easy to use in an orthodontic practice. The present article describes the fabrication of various customized auxiliaries.

The 3D printing process starts with a digital scan of either the dental arches or the working casts, using an intraoral scanner or a 3D model scanner* (Fig. 1). An auxiliary is designed with a modeling software such as Netfabb,** which slic-

*True Definition Scanner, 3M ESPE, St. Paul, MN; www.3M.com.

**Netfabb, GmbH, Lupburg, Germany; www.netfabb.com.

***ProJet 1200, 3D Systems, Rock Hill, SC; www.3Dsystems.com.

†MakerBot Replicator, MakerBot Industries, LLC, Brooklyn, NY; www.makerbot.com.

es the digital model into thousands of virtual layers and translates the data into a numerical-control programming language called G-code. The specifications are then sent to a stereolithographic (SLA)*** or fused deposition modeling (FDM)† printer, which forms the auxiliary layer by layer from a plastic filament or resin material (Table 1).

Retraction Hooks

The customized retraction hook consists of a 1.5mm tube with an attached hook, 6mm long and 1.5mm thick at its curve (Fig. 2). This hook is designed to withstand a maximum 350g of force. A rectangular stainless steel archwire is inserted through the tube before being engaged in the

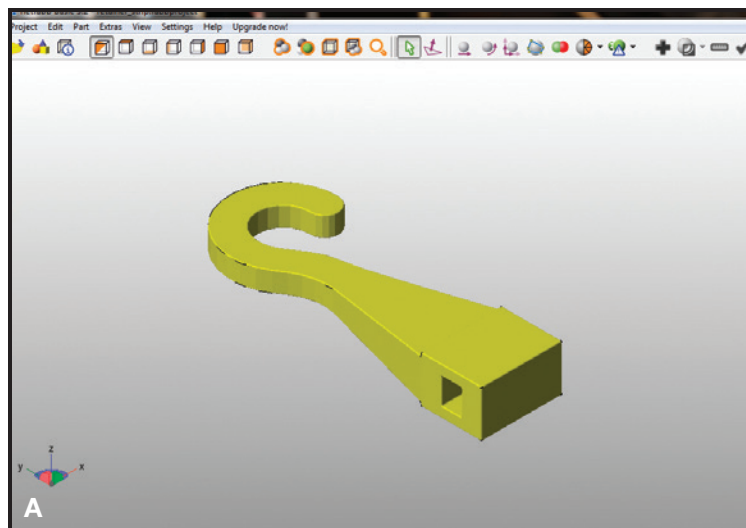


Fig. 2 A. Design of customized retraction hook for fabrication with SLA printer.* B. Placement of retraction hook on .019" x .025" stainless steel archwire.**

brackets. In the case shown here, the retraction hook was positioned between the lateral incisor and canine brackets. To place the hook exactly in the middle of the interbracket span, a rigid spacer can be crimped distal to the hook.

Commercially available crimpable hooks are less esthetic; moreover, if the crimping is insufficient to hold the hook in place, it must be welded or soldered to the archwire at the chair. The 3D-printed hook causes no patient discomfort and is held snugly by the fit of the rectangular archwire in the tube. It is sturdy enough to withstand retraction, with the distal end of the tube acting as a stop to the distally directed forces.

Bite Turbos

Customized bite turbos can be fabricated with a 3D printer for patients with severe deep bites (Fig. 3). After the palatal surfaces of the upper anterior teeth are scanned, the bonding bases of the bite turbos are designed to match the palatal contours. In this example, a 5mm x 5mm bite ramp was built to contact the lower incisors at an angle of 90°; the ramp dimensions can be increased in cases with palatally impinging, retropositioned mandibular incisors.

The 3D-printed bite turbos will conform pre-

cisely to the palatal surfaces of the maxillary anterior teeth. Each turbo has enough bond strength to withstand the forces of occlusion.

Lingual Bonded Retainer

A bondable retainer strip can be digitally designed to match the lingual contours of the anterior teeth after orthodontic treatment (Fig. 4). The retainer strip shown here was printed 1.5mm-2mm thick, with 4mm x 4mm bonding pads. In an extraction case, extensions can be added to incorporate the occlusal or lingual surfaces of the premolars. Bonding pads for each tooth facilitate easy and efficient bonding, although the flowable composite should be carefully applied so that the adhesive does not spread between the teeth or to the other surfaces of the retainer.

Commercially available prefabricated lingual retainers require accurate size selection and wire bending for proper adaptation before bonding. Digitally printed, metal-free retainers eliminate the need to make complex wire bends to achieve a precise fit.

Aligner Attachments

Modeling software can be used to design

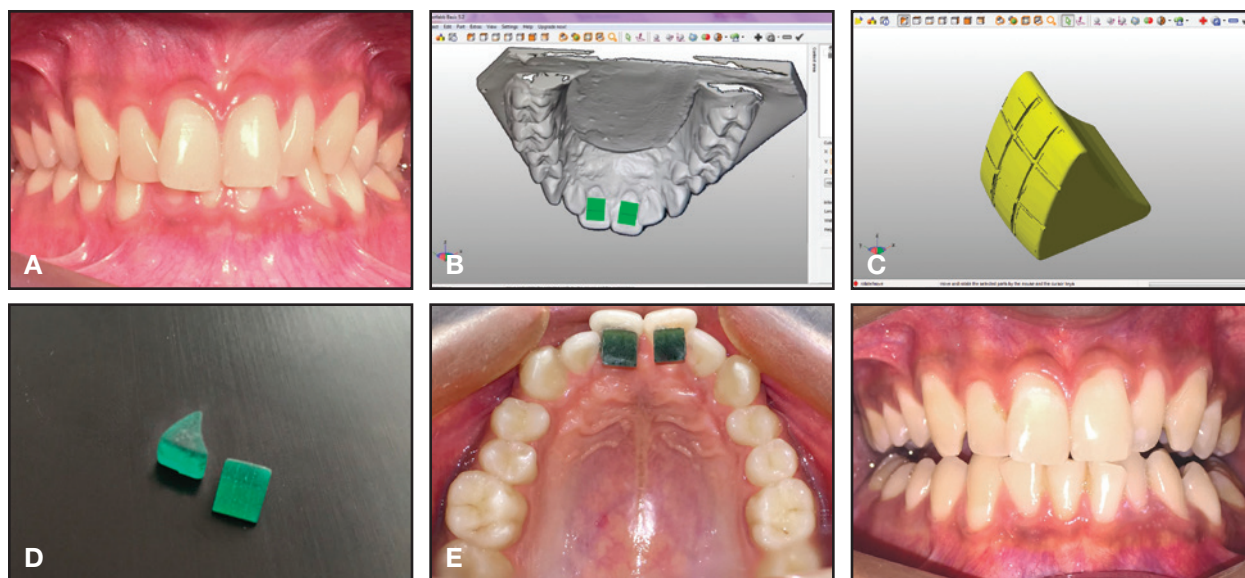


Fig. 3 A. Deep-bite patient requiring bite turbos before bonding of fixed appliances. B. Bite turbos customized to palatal surfaces of upper central incisors on scanned model. C. Retentive grooves designed on bite turbo's bonding surface. D. FDM-printed† bite turbos. E. Patient after bonding of bite turbos.

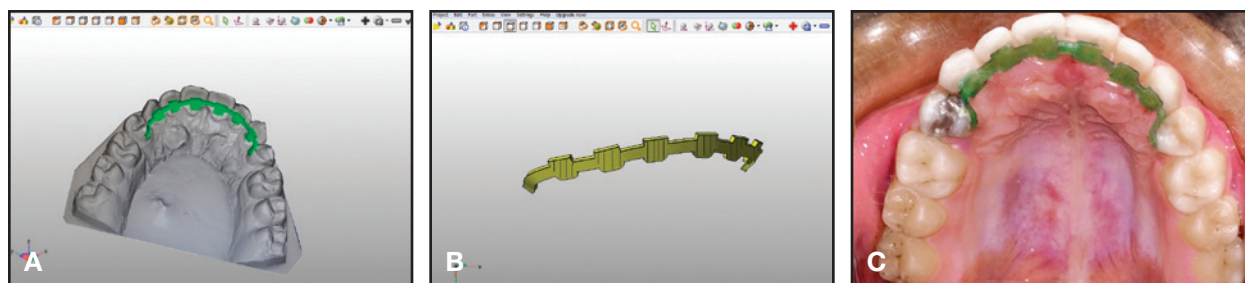


Fig. 4 A. Bondable retainer strip designed on digitized model. B. Retentive grooves on bonding-pad surfaces. C. Bonded retainer strip in place.

bondable ramps, bumps, and buttons as adjuncts to clear-aligner therapy (Fig. 5). An SLA printer was used to print the attachments shown here, with dimensions ranging from 3mm × 4mm × 1mm to 5mm × 1.5mm × 1mm.

The 3D-printed attachments are more easily and reliably debonded than composite attachments, and they eliminate the need for excess

flash removal. Companies that supply the aligner trays can also provide templates for SLA-printed attachments, thus improving the accuracy of clear-aligner treatment.

Discussion

The most important advantage of 3D printing is that everything is customizable. Therefore, this technology may be most useful when the clinician needs to create a new device or prototype for pre-

†MakerBot Replicator, MakerBot Industries, LLC, Brooklyn, NY; www.makerbot.com.

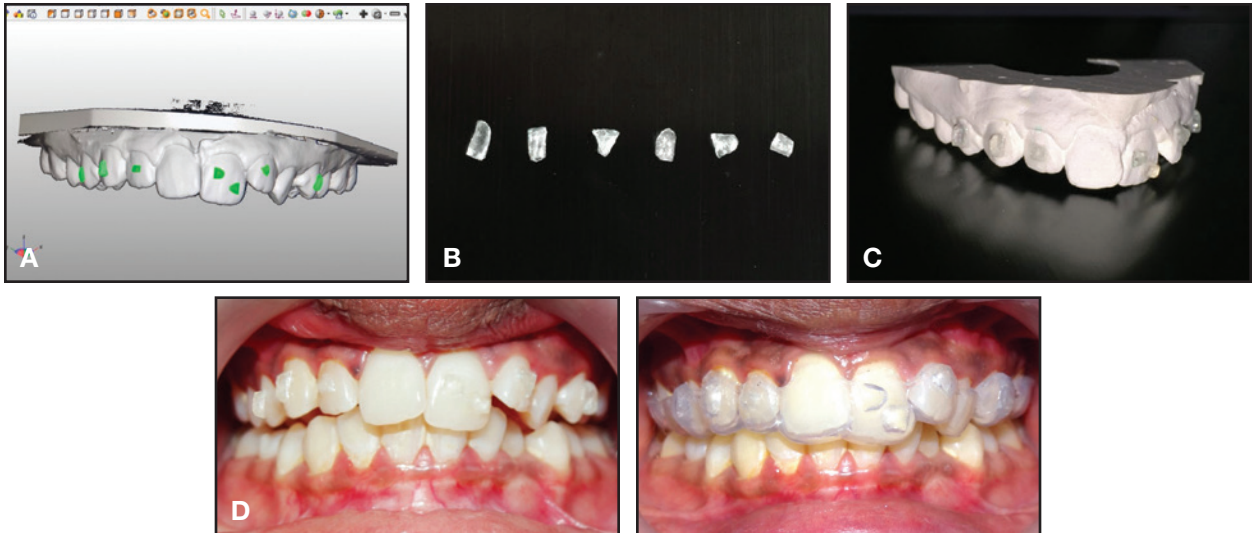


Fig. 5 A. Scanned model with digital attachments designed for various facial surfaces of teeth during clear-aligner treatment. B. Bondable aligner attachments fabricated from clear resin using SLA printer. C. Mock-up of bonded attachments used to check accuracy. D. Patient after bonding of attachments and placement of clear aligner.

cise treatment mechanics. We recommend direct intraoral scanning because it is faster and more accurate than cast scanning in transferring data to the modeling software.

FDM printers have recently gained popularity in the field of rapid prototyping and digital dentistry.² We prefer them over SLA printers for fabricating auxiliaries such as the bite turbos, since the additive manufacturing process is less wasteful, time-consuming, and expensive. Although the finished quality of an SLA-printed model is superior,¹ the finish of an FDM-printed model can be improved by trimming, buffing, and polishing. For maximum accuracy and esthetics of customized retraction hooks, retainers, and aligner attachments, however, we send our design files to a local research facility for fabrication with an SLA printer.

Conclusion

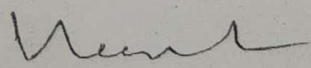
Considering that one size fits none, customized appliances enable clinicians to offer more efficient and effective orthodontic treatment. Three-dimensional printers are rapidly replacing previous technologies in the production of superior-quality, economical auxiliaries from biocompatible materials.

ACKNOWLEDGMENTS: The authors would like to thank Rathish Chidambaram, CEO, D Cube Studio, and Dr. Siraj, General Manager, Ortho One, Inc., for their contributions to this work.

REFERENCES

1. Groth, C.; Kravitz, N.D.; Jones, P.E.; Graham, J.W.; and Redmond, W.R.: Three-dimensional printing technology, *J. Clin. Orthod.* 48:475-485, 2014.
2. Fayyaz, S.A. and Apros, A.S.K.: A 3D-printed miniscrew insertion stent, *J. Clin. Orthod.* 48:650-652, 2014.

FORM 1 THE PATENTS ACT 1970 (39 of 1970) & The Patents Rules, 2003 APPLICATION FOR GRANT OF PATENT [See Section 7, 54 & 135 and rule 20(1)]				(FOR OFFICE USE ONLY)	
				Application No:	
				Filing Date:	
				Amount of Fee Paid:	
				CBR No:	
				Signature:	
1. APPLICANT'S REFERENCE/ IDENTIFICATION NUMBER (AS ALLOTTED BY OFFICE)					
2. TYPE OF APPLICATION [Please tick (✓) at the appropriate category]					
Ordinary(✓)		Convention()		PCT-NP()	
Divisional ()	Patent of Addition ()	Divisional ()	Patent of Addition ()	Divisional ()	Patent of Addition ()
3(A). APPLICANT (S)					
Name in Full		Nationality	Country of Residence	Address of Applicant	
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				City	Coimbatore
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				Pin code	641025
3B. CATEGORY OF APPLICANT [Please tick (✓) at the appropriate category]					
Natural Person (✓)		Other than Natural Person			
		Small Entity ()	Startup ()	Others ()	
4. INVENTOR (S) [Please tick (✓) at the appropriate category]					
Are all the inventor(s) same as the applicant(s) named above?		Yes ()	No (✓)		
If "NO", furnish the details of the Inventor (s)					
Name in Full		Nationality	Country of Residence	Address of the Inventor	
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				Street	6 th Floor, Avinashi Road
				City	Coimbatore
				State	TamilNadu

				Country	India
				Pincode	641018
5. TITLE OF THE INVENTION: "AN APPARATUS FOR MAKING DENTAL IMPLANT SURGICAL ANGULATION POSITIONING GUIDE"					
6. AUTHORISED REGISTERED PATENT AGENT(S)		IN/PA No.	384		
		Name	Dr. Sudhir Ravindran		
		Mobile No.	+91 9383152137		
7. ADDRESS FOR SERVICE OF APPLICANT IN INDIA		Name	Altacit Global		
		Postal Address	C2-A, Industrial Estate, Guindy, Chennai - 600032		
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		Fax No.	+ 91 44 42104341		
		E-mail ID	ip@altacit.com; info@altacit.com		
8. IN CASE OF APPLICATION CLAIMING PRIORITY OF APPLICATION FILED IN CONVENTION COUNTRY, PARTICULARS OF CONVENTION APPLICATION					
Country	Application Number	Filing Date	Name of the Applicant	Title of the Invention	IPC (as classified in the convention country)
NA	NA	NA	NA	NA	NA
9. IN CASE OF PCT NATIONAL PHASE APPLICATION PARTICULARS FILED IN CONVENTION COUNTRY, PARTICULARS OF CONVENTION APPLICATION					
International Application Number			International Filing Date		
NA			NA		
10. IN CASE OF DIVISIONAL APPLICATION FILED UNDER SECTION 16, PARTICULARS OF ORIGINAL (FIRST) APPLICATION					
Original (first) application No.			Date of filing of original (first) application		
NA			NA		
11. IN CASE OF PATENT ADDITION FILED UNDER SECTION 54, PARTICULARS OF MAIN APPLICATION OR PATENT					
Main Application Number			Date of filing of Main application		
NA			NA		
12. DECLARATIONS					
(i) DECLARATION BY THE INVENTOR (S)					
We, the above named Inventor (s) are the true and first Inventor (s) of this invention and declare that the applicant (S) herein is our assignee or legal representative.					
Dated this 12 th day of December 2017					
(a) DR. L.DEEPANANDAN		:	 G. Karthik		
(b) DR. G.KARTHIK RAJAN		:			

(ii). DECLARATION BY THE APPLICANT (S)

I am, the Applicant hereby declare that:-

- (a) I am in possession of the above-mentioned invention.
- (b) The Provisional Specification relating to the invention is filed with this application.
- (c) There is no lawful ground of objection to the grant of the patent to me.
- (d) I am the assignee or legal representative of true and first inventor (s).

13. Following are the attachments with the application:

(a) Form 2

Item	Details	Fee	Remarks
Provisional Specification	No. of pages:		
No. of Drawing(s)	No. of drawings and No. of pages:		

- (b) Statement and Undertaking on Form 3
- (c) Original Power of Attorney
- (d) Total fee [●] in Banker's Cheque bearing no. [●]
Date [●] drawn on Axis Bank, Chennai

We hereby declare that to the best of our knowledge, information and belief the fact and matters stated herein are correct and we request that a patent may be granted to us for the said invention.

Dated this 12th day of December 2017

Signature:

Name: Dr. Sudhir Ravindran [IN/PA-384]
Agent for Applicant

To,
The Controller of Patents,
The Patent Office,
At Chennai

FORM 2

**THE PATENTS ACT, 1970
(39 of 1970)
&
THE PATENTS RULES, 2003**

PROVISIONAL SPECIFICATION
(See section 10; rule 13)

**“AN APPARATUS FOR MAKING DENTAL IMPLANT
SURGICAL ANGULATION POSITIONING GUIDE”**

DR. L.DEEPANANDAN

An Indian National

Having address at

**1A/35, Sakthi Iswaryam,
Dr.Ambedkar Road, Venkitapuram,
Coimbatore – 641 025, Tamil Nadu, India.**

THE FOLLOWING SPECIFICATION DESCRIBES THE INVENTION

NAME OF THE APPLICANT: DR. L.DEEPANANDAN

**AN APPARATUS FOR MAKING DENTAL IMPLANT SURGICAL ANGULATION
POSITIONING GUIDE**

FIELD OF INVENTION:

The present invention relates to an apparatus useful in dental implant positioning. More particularly the invention relates to an apparatus useful in the manufacture of surgical stents which are used for precisely positioning and guiding the drills in pre determined location to make holes in a jawbone for drilling and installing dental implants.

DESCRIPTION OF PRIOR ART:

Dental implants are devices which are surgically implanted into the jawbone of a patient in the areas where the patient has missing teeth. The dental implants mimic the roots of teeth and serve to support prosthetic caps, crowns, bridges or dentures. Dental implants are typically made of material that doesn't cause bad effect to the user which include titanium metal-based and are generally cylindrical or screw-shaped in design.

It is very essential that Implants must be placed in a specific position and in alignment to the prospective teeth that they will eventually support. Therefore, the positioning of these dental implants is very crucial and must be precise so that the teeth it support will function properly and be esthetic in appearance.

The surgical guide templates are used for positioning of these dental implants. The surgical guide templates not only assist in diagnosis and treatment planning but also facilitate proper positioning and angulations of the implants in the bone. Moreover, restoration driven implant

NAME OF THE APPLICANT: DR. L.DEEPANANDAN

placement accomplished with a surgical guide template can decrease clinical and laboratory complications.

Placement of implants in the planned area needs precise planning and execution. CAD/CAM technology uses data from computerized tomography scan (CT) to plan implant rehabilitation. The CT images are converted into data that are recognized by a CT imaging and planning software which are used for the preparation of surgical stents.

By placing the surgical stents on the patient's mouth the surgeon makes the holes using the drills that pass through the guide bushes provided in the surgical stents. By and large the guide bush will accommodate number inner bushes with guide holes of different diameter to provide guide to the appropriate drill for incremental drilling by the surgeon by using a hand held drilling machine.

Placement of implants in the planned area needs precise planning and execution. The ideal placement of implants will be achieved when the angulations and abutments profile produces the natural dentition, which will provide less stress around the implants. The CAD CAM surgical stents provides the best solution with which the implant can be placed in predetermined positions. The major disadvantages of CAD CAM stents are they are bulky, need extended drill bits since in certain circumstances the guide bush could not support the drill bit as close as to the jaw bone making it difficult to make the drill at the desired location accurately. More over the CAD CAM stents are very expensive and its accuracy depend on the expertise and skill of the lab technicians

NAME OF THE APPLICANT: DR. L.DEEPANANDAN

The in lab stents are prepared inserting parallel pins, waxing up or duplicating removable partial denture, guidance with previously placed implant copings and using surveyor to attain parallelism and creating stent with heat or cold cure acrylic resin. All these methods are been planned using with intra oral radiographs, orthopantomogram, Conebeam CT, or computed tomography. The preparation of the stents in this method take long lab procedures consuming more time and need expertise.

It will be advantageous to develop an apparatus for the preparation of stents which will be economical and useful for the placement of the dental implants at the required angulations precociously without the need for CAD CAM.

Also it will be very advantageous to develop an apparatus for the preparation of stents useful for accurate placement of the dental implants without the dependency of lab.

SUMMARY OF INVENTION

One or more of the problems of the conventional prior art may be overcome by various embodiments of the present invention.

The primary object of the present invention is to provide an apparatus for the preparation of stents useful for the placement of the dental implants at the required angulations precociously.

It is another object of the present invention, wherein the apparatus for the preparation of stents comprises of:

a protractor;

NAME OF THE APPLICANT: DR. L.DEEPANANDAN

one or more threaded bushes;

one or more screw assembly;

locator;

a holder assembly, and

a clamp.

It is another object of the present invention wherein the protractor has a radial slot and 0 to 180 degree angle markings.

It is another object of the present invention wherein the base portion of the protractor comprises one or more leg portions extending in perpendicular direction.

It is another object of the present invention wherein the threaded bushes are rigidly fitted to the leg portions of the protractor such that their axis is arranged parallel to the protractor's base.

It is another object of the present invention wherein the screw assembly comprises a threaded portion for engagement with the threads of the threaded bush and a head portion for fixing and removing the device.

It is another object of the present invention wherein the locator comprises a cylindrical first portion and a cylindrical locating pin portion disposed to locate guide sleeve of the stent.

It is another object of the present invention wherein the holder assembly comprises a holder having cylindrical opening for the passage of cylindrical locating pin of the locator.

NAME OF THE APPLICANT: DR. L.DEEPANANDAN

It is another object of the present invention wherein the holder assembly further comprises threaded pin which are rigidly fitted to the holder in a direction perpendicular to its axis of the holder assembly.

It is another object of the present invention wherein the threaded pin of the holder assembly passage through the radial slot of the protractor such that the holder assembly can be retained at the required angled and clamped by the clamp which is provided with threads for engagement with the threads of threaded pin of the holder.

BRIEF DESCRIPTION OF THE DRAWINGS:

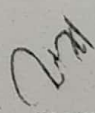
So that the manner in which the features, advantages and objects of the invention, as well as others which will become apparent, may be understood in more detail, more particular description of the invention briefly summarized above may be had by reference to the embodiment thereof which is illustrated in the appended drawings, which form a part of this specification. It is to be noted, however, that the drawings illustrate only a preferred embodiment of the invention and is therefore not to be considered limiting of the invention's scope as it may admit to other equally effective embodiments.

Figure 1: illustrates the perspective view of the apparatus according to the present invention

Figure 2: illustrates the front view of the apparatus according to the present invention

The apparatus as illustrated in the figure 1 and figure 2 depicts the following parts: protractor [1], threaded bush [1a], screw assembly [2], locator [3], holder assembly [4], and a clamp [5].

Dated this 12th day of December 2017


Dr. Sudhir Ravindran (IN/PA - 384)
Agent for Applicant

NAME OF THE APPLICANT: DR. L.DEEPANANDAN

TOTAL NO. OF SHEETS: 1
SHEET NO: 1/1

FIGURE-1

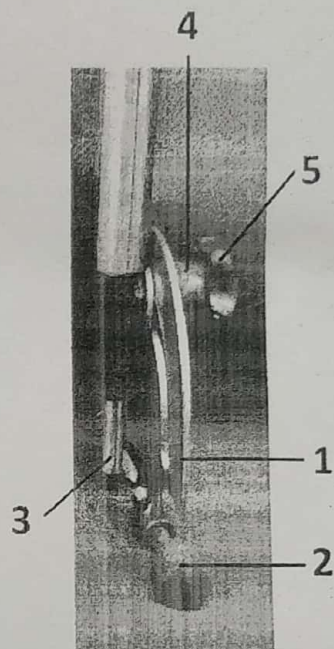
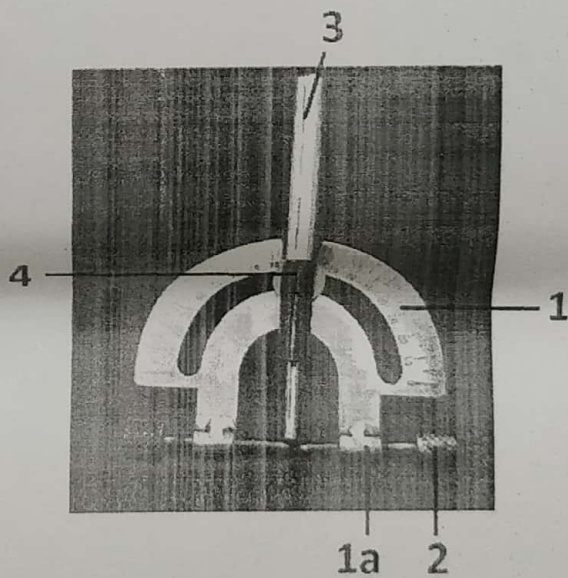


FIGURE-2



Dated this 12th day of December 2017

[Signature]
Dr. Sudhir Ravindran (IN/PA - 384)
Agent for Applicant

FORM 3

THE PATENTS ACT, 1970
(39 of 1970)

&

THE PATENTS RULES, 2003

STATEMENT AND UNDERTAKING UNDER SECTION 8

(See section 8; rule 12)

I, DR. L.DEEPANANDAN, an Indian National having Address at 1A/35, Sakthi Iswaryam, Dr.Ambedkar Road, Venkitapuram, Coimbatore – 641 025, Tamil Nadu, India, do hereby declare:

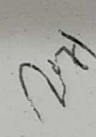
That I who have made this application No ----- dated ----- jointly with the Indian Patent Office made for the same invention application for patent in the other countries, the particulars of which are given below:

Name of the Country	Date of Application	Application No	Status of the application	Date of publication	Date of grant
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-	-	-	-	-	-
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That, I undertake that up to the date of acceptance of the Provisional specification by the Controller, I would keep them informed in writing the details regarding corresponding applications for patents filed outside India within six months from the date of filing of such application.

Dated this 12th day of December 2017


Dr. Sudhir Ravindran (IN/PA - 384)
Agent for Applicant

To
The Controller of Patents,
The Patent Office,
At Chennai

FORM 5

THE PATENTS ACT, 1970
(39 of 1970)

DECLARATION AS TO INVENTORSHIP
[See section 10(6); rule 13(6)]

I, Dr. L. DEEPANANDAN, an Indian National having address at, 1A/35, Sakthi Iswaryam, Dr.Ambedkar Road, Venkitapuram, Coimbatore – 641 025, Tamil Nadu, India, do hereby declare that the true and first inventors of the invention titled '**AN APPARATUS FOR MAKING DENTAL IMPLANT SURGICAL ANGULATION POSITIONING GUIDE**' as disclosed in the Provisional Specification are:

1. Dr. L. Deepanandan
Having address at
1A/35, Sakthi Iswaryam,
Dr.Ambedkar Road, Venkitapuram,
Coimbatore – 641 025,
Tamil Nadu, India
2. Dr. G. Karthik Rajan
Having address at
720-26 Pioneer Apartments,
B-Block 6A, 6th Floor, Avinashi Road,
Coimbatore – 641018,
Tamil Nadu, India

All Indian Nationals

Dated this 12th day of December, 2017



Dr. Sudhir Ravindran [IN/PA-384]
Agent for Applicant

To
The Controller of Patents,
The Patent Office,
At Chennai



தமிழ்நாடு தமில்நாடு TAMILNADU

Altacit Global

BM 265297

V. BEBHARAJAN
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Mobile No: 9710019475

FORM 26
THE PATENTS ACT, 1970
(39 OF 1970)

&
THE PATENTS RULES, 2003

FORM FOR AUTHORISATION OF A PATENT AGENT/OR
ANY PERSON IN A MATTER OR PROCEEDING UNDER THE ACT

(See sections 127 and 132; rule 135)

I, **DR. L.DEEPANANDAN**, an Indian National having Address at 1A/35, Sakthi Iswaryam, Dr.Ambedkar Road, Venkitapuram, Coimbatore - 641 025, TamilNadu, India

Hereby Authorize,

Dr. Sudhir Raja Ravindran, K. Subramaniam, V. Filma, A. Lakshminarayanan,
E.Shelley Anandavalli, Nikitha Rangarajan, Anitha Pyla, Nayantara Sanyal and Ponkavitha. A
(ALL INDIAN NATIONALS) of

ALTACIT GLOBAL
C2-A, Industrial Estate,
Guindy, Chennai - 600 032, India

To act on my behalf in connection with all patent related matters and request that all notices, requisitions and communications relating thereto may be sent to such persons at the above address unless otherwise specified.

I hereby revoke all previous authorization, if any made, in respect of the same matter or proceeding. I hereby assent to the action already taken by the said persons in the above-matter.

Dated this 11th day of December 2017

DR. L.DEEPANANDAN

To
The Controller of Patents,
Patent Office, Chennai

RECEIVED AND ACCEPTED

Altacit Global
C2-A, Thiru-vi-ka Industrial Estate
Guindy, Chennai- 600 032.

Controller General of Patents, Designs & Trade
Marks



सत्यमेव जयते

G.A.R.6
[See Rule 22(1)]
RECEIPT



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PATENTS | DESIGNS | TRADE MARKS
GEOGRAPHICAL INDICATIONS

Docket No 77741

Date/Time 2017/12/13
17:19:14

To
SUNDHIR RAJA RAVINDRAN

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Altacit Global C2-A, Thiru-vi-ka
Industrial Estate, Guindy

CBR Detail:

Sr. No.	Ref. No./Application No.	App. Number	Amount Paid	C.B.R. No.	Form Name	Remarks
1	201741044809	TEMP/E-1/45500/2017-CHE	1600	38346	FORM 1	AN APPARATUS FOR MAKING DENTAL IMPLANT SURGICAL ANGULATION POSITIONING GUIDE

TransactionID	Payment Mode	Challan Identification Number	Amount Paid	Head of A/C No
N-0000328584	Online Bank Transfer	02806341312201750700	1600.00	1475001020000001

Total Amount : ₹ 1600

Amount in Words: Rupees One Thousand Six Hundred Only

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INVOICE TO

DR. L. DEEPANANDAN
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INVOICE NO. DEC/17/1152

DATE 13/12/2017

DUE DATE 13/12/2017

PAN:

AOWPS9019K

DESCRIPTION	AMOUNT IN INR
Invention Titled 'An Apparatus for Making Dental Implant Surgical Navigation Positioning Guide'	
Preparation & filing of Patent Application with Provisional Specification	
Official fee in the name of Individual	1,600.00
Professional Fee	10,000.00
Disbursements	1,000.00
Printing, stationery, photocopies, communications, conveyances etc.,	

NET AMOUNT DUE NIL

PAYMENT

12,600.00

TOTAL DUE

INR 0.00

For Altacit Global

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Authorised Signatory

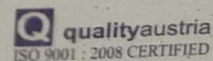
Service Recipient is liable to pay 100% of the GST for Legal Services under reverse charge.

Notification No 5/2017 of GST Act, 2017 exempts the Service Provider from obtaining registration.

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A patient with a missing anterior tooth who has completed orthodontic treatment is often unhappy that the flipper must be removed while eating. This is particularly true of an adolescent who eats lunch at school. Here is a method for pontic fixation and anterior tooth retention using a bonded retainer wire. Consider it in patients who refuse flippers or mini-screws with pontics, or when compliance may be a concern.

NEAL D. KRAVITZ, DMD, MS
Associate Editor for Pearls

Fixed Retainers with Bonded Pontics

The two main options for replacing a missing tooth in a young patient are prosthetic restoration and autotransplantation. Retaining the opened space for permanent replacement of missing teeth poses an esthetic challenge. Fixed retainers such as Maryland bridges require extensive lab procedures; removable dentures are uncomfortable

and unpopular with adolescents.¹ Sometimes the patient needs to be debonded before a removable retainer with a pontic can be fabricated by the laboratory.² This article describes an efficient method for securely attaching a temporary pontic to a fixed retainer immediately after debonding.

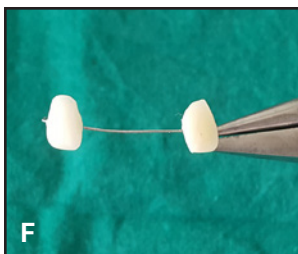
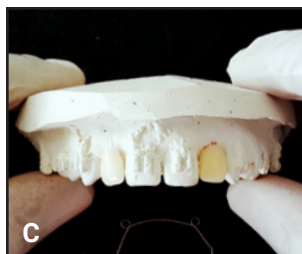
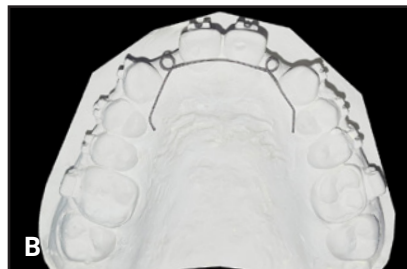
Procedure

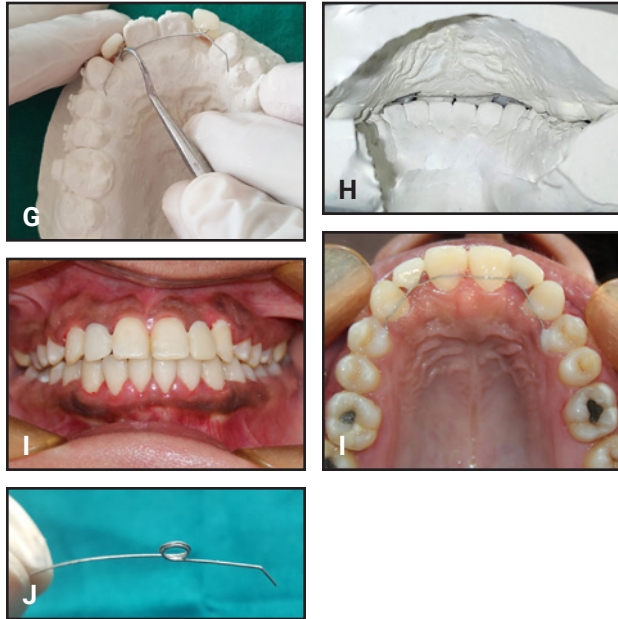
The technique is demonstrated in a 21-year-old female patient with bilateral missing lateral incisors (A). After spaces were opened for replacement with dental implants, a fixed retainer was fabricated from .017" multistranded braided wire. A helix was incorporated on each side of the cast where the retainer wire passed through the spaces of the missing teeth (B).

Either a prefabricated denture tooth or an instant pontic fabricated from flowable resin may be used. These instant pontics were trimmed to match the spaces of the missing teeth on the cast (C). Grooves were marked (D) and cut with a stainless steel disc (E) so that the pontics would bond securely to the helices.

After the pontics were bonded to the braided wire with flowable composite* (F), the retainer

*Filtek Z350XT Flowable Restorative, trademark of 3M Unitek, Monrovia, CA; www.3MUnitek.com.





with helices was adapted to the grooves (G). Clearance with the lower dentition was verified on the cast (H).

The braided fixed retainer with temporary pontics was bonded to the maxillary teeth, and the pontics were contoured with flowable composite to hide the visible black triangles (I).

The helices in the braided retainer wire can be made into double overlapping helices for stronger retention and to prevent any rolling of the bonded pontics (J).

Conclusion

This temporary pontic-fixed retainer is secure, cost-effective, and convenient for patients. Avoiding the need for lab work, it can easily be delivered in a single appointment with minimal chairtime.

REFERENCES

1. Wilmes, B.; Nienkemper, M.; Renger, S.; and Drescher, D.: Mini-implant-supported temporary pontics, *J. Clin. Orthod.* 48:422-429, 2014.
2. Kravitz, N.D.: Immediate pontic fabrication using flowable resin, *J. Clin. Orthod.* 50:177-178, 2016.



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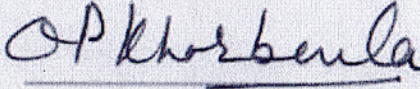
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Joint Secretary, MoHFW




Prof. O P Kharbanda
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Abstract - Under Graduates



Alternative Therapy for The Disease of The Diseased

Suchithra Sampathkumar

AIDS is a major dreadful seen in mankind. In India, it has been estimated that 2.1 million people are living with HIV. The most prevalent oral opportunistic infections of HIV are HIV associated Candidiasis and Periodontitis. Currently, Fluconazole 100mg once a day is considered the drug of choice to treat oropharyngeal candidiasis and local antimicrobial therapy, systemic antibiotics such as metronidazole and amoxicillin are the treatment for periodontitis. But these may lead to many side effects.

FIELD OF INVENTION: The innovation is related to the treatment of candidiasis, periodontitis using anti fungal drug (fluconazole) in combination with antibiotic (minocycline) in aqueous medium as a mouthwash which replaces conventional mouthwash which is just a surface cleaner.

ANTI FUNGAL DRUG: Currently, nystatin and amphotericin B were the drugs used locally. But they have unpleasant taste and compromised compliance by the patient. Moreover, nystatin has poor adherence to oral mucosa. Other drugs such as miconazole being more expensive, itraconazole has unpredictable absorption and clotrimazole effects were inferior to fluconazole. But, fluconazole has adherence property, better results in oral candidiasis treatment ,moreover it has better patient compliance.

ANTIBIOTIC: Tetracycline is the most common broad spectrum antibiotics, but is unstable in solutions. Doxycycline, a derivative of tetracycline has more tissue penetration whereas minocycline is stable in solution state so it's suitable to use as mouthwash.

COMBINED THERAPY: Patient at risk of fungal infections are also at risk for development of serious bacterial infections. Fluconazole is the drug of choice for candidiasis because of its high efficacy, low toxicity and cost. But the majority of clinical cases of antifungal resistance are reported in the azoles group of drug. Minocycline acts as a traditional lock to avoid fungal and bacterial infections when used in association with antimicrobial. A study proved from its invitro test that fluconazole acts synergistically with minocycline against fluconazole resistant candida species. Its very difficult for fluconazole to penetrate candida bio-film alone whereas the association penetrates significantly.

SO WE SUGGEST THAT THESE ARE THE PROMISING COMBINATIONS: At present, fluconazole is available as oral suspension & tablet and minocycline is available as gel, tablets and injection. Regarding the future research we now come forward with antibiotic and anti fungal drugs in mouthwash which may effectively used to treat these opportunistic infections in severe HIV patients and reduces the systemic side effects of fluconazole and minocycline.



DenTel-Teledentistry

Harini Chakrika M

"DenTel" Reaching Rural India through Teledentistry Data from Ministry and Family Health Welfare places the dentist-population ratio in India at 1:8000. Disparities in dental services available to urban and rural Indian population exist since 80 percent of the doctors practice in urban India. The National Oral Health Programme (NOHP) initiative by National Health Mission aims to provide infrastructure and manpower to enhance oral health services across the country and the main challenge this program has faced is the limited availability of personnel in rural India. Teledentistry has been found to be an effective tool for improving the last mile connectivity between the public health centre and nodal dental centres globally. Modern tele-dentistry systems support teleconsultation, Video conferencing, Graphical reporting and Scheduling. In India, telemedicine and tele-dentistry are emerging areas with limited success to connecting with rural India. Rural India has its own set of challenges including limited network connectivity, inadequacy of equipment, language barrier and poor patient follow-up. Geographically, some states in India have better resources compared to others and this has to be addressed in the design. This work proposes techniques to overcome the limitations faced in current teledentistry systems and provide a learning tool and repository for dental students to improve their knowledge. The proposed system redefines tele-dentistry using available low-cost Intra Oral Camera, Mobile phone camera and Artificial Intelligence. The system will be built on the cloud and designed to be highly scalable and will address the challenges of huge volume and multiple connectivity within the system so that the same platform can be used across multiple nodal centres simultaneously. Some of the unique features added in this system that will help address the last mile connectivity in rural India include a) Web-based responsive application to use any computing device including mobile phone for consultancy and data capture. b) Use of image processing techniques to enhance quality of dental images captured using Mobile phone camera or Intra Oral Camera. c) Support real-time and store-and-forward modalities for online and offline consultation using WebRTC protocol supporting chat, Audio and multimedia communication. d) Optimal & variable frame rate-based data capture on available bandwidth to avoid multimedia lag. e) Secure Electronic Medical Record to handle dental and personal history, clinical data including radiographs, intraoral and extraoral images, diagnosis and treatment plans. f) Multi-level data access settings to handle multiple nodal centres, primary health centres and end users ensuring proper organization of the system and ensuring data privacy. i) An artificial intelligence-based dental camp scheduling system as a means of dental care in regions with limited resources / transportation options. j) An Artificial Intelligence-based auto-screening system for caries, gingivitis and oral lesions whereby attention requiring areas in the images are automatically focused. k) Patient-in-loop system allowing patients to register and access their personal oral health record. l) An SMS-based reminder and notifications system for pre-visit preparation, appointments and recall. m) Localization of personal oral health record to regional language. n) Interaction with the patient on his diagnosis using pictorial representation. o) A pro bono module for expert consultation after registration in the application. p) Repository for dental students.



Abstract - Post Graduates/Researchers/Academicians

Geriatric Cardiac Monitor For Small Dental Offices

Dr M S Senthil Kumar MDS

Geriatric dental cardiac monitor will be a mobile app based device as small as a medical grade pulse oximeter that can be attached to the geriatric patients finger to monitor and alert the operator about the possible cardiac arrhythmic changes during an invasive dental procedure under local anaesthesia.

Why geriatric population ?

Changing demographics, advances in medicine and increased longevity is the present scenario in India. It's a big challenge for the practicing dentist to treat geriatric patients in small dental offices. Considering the medical conditions and duration of the procedure, most of the geriatric patients are referred to higher centres and dental college hospitals with adequate back up in case of emergencies.

According to India census 2001, older people were 7.7% of the total population, which increased to 8.14% in census 2011 which was published in Elderly in India 2016 by Ministry of statistics and programme implementation, Govt of India. The projections for population in India over 60 years in next four censuses are: 133.32 million (2021), 178.59 (2031), 236.01 million (2041) and 300.96 million (2051).

Present dental scenario:

Dental treatment requires more time for diagnosing, evaluation and counselling followed by waiting and treatment. The situation demands that patients are to be monitored continuously during surgical procedures under local anaesthesia and even in non surgical treatment where airway might be compromised by seeing the mouth open for longer period of time. Though the basic evaluation of vital signs and medical fitness is availed preoperatively, the need of the hour is to monitor them during the procedure. Presently geriatric patients are cared with multiple visits and giving adequate time in between during procedure.

Cardiac safety:

Hypoxic syncope in younger individuals are common and easily recoverable, however a hypoxic syncope or hypoxic induced arrhythmia in geriatrics is more harming to the patient even after the completion of the dental procedure.

SCAR- The Five-Point Geriatric Dental Assessment. and The Seattle Care Pathway (SCP) also helps practitioners evaluate their patients functional status and then consider the resultant risks to their oral health.

Innovative idea:

A device with medical grade quality to use in a small dental office that will be of great help to the practitioners to predict and avoid the possibility of cardiac and other relevant emergencies. In our institution we are conducting a study to support the device in determining the algorithm that will include the base line and cut off value of vitals and other parameters. The alarm incorporated in the device will alert the dentist of a possible cardiac emergency during and after the procedure.



The Flossy Brush

Thirupugaz Ramamurthy

Oral health, according to the WHO, is an essential component of general health and well-being. Seen in this light, the rate at which oral health problems affect the Indian society is indeed alarming. The Ministry of Health and Family Welfare reveals the 60% of the Indian population are affected by dental caries and 85% by periodontal disease. Oral hygiene is not just about brushing of teeth twice a day; there is also a component of cleaning inter-dental spaces i.e. flossing. Even in a developed country like the USA, the rate of flossing is estimated to be less than 40%. Hence a developing country like India with lower per capita income would be less likely to reap the dividends of regular flossing. Two major factors which deter Indians from regular flossing are low standard of living and lack of awareness. With the aim of taking flossing and thus oral hygiene to the masses in an economically feasible manner, an innovative device over and above the existing models, which combines both the regular tooth brush and floss should be introduced THE FLOSSY BRUSH™. Existing models of this combined device come with the inherent flaw of unergonomic design which promotes neither convenience nor hygiene. The floss pick is exposed to the external environment with no case for protection and considering the fact that the same piece of floss has to be used for the entire month, the question of hygiene gets redundant. The Flossy Brush aims to overcome these flaws and is both ergonomic and hygienic. The floss pick is replaced with regular floss will be placed at the base of the handle compartment with a provision to close it. Floss is placed at the base for convenience while brushing and since it is placed inside the compartment washing the brush becomes easy and microbes are kept at bay. The dimensions of an ideal tooth brush will be altered to accommodate the floss compartment and the cost of the combined device will be lower than the cost of purchasing a tooth brush and floss separately. Sufficient floss for 30 days can be comfortably accommodated into the brush which is also the ideal time period for usage of a toothbrush. The only identified downside is that this Flossy Brush is meant for the general population and is not a viable option for people with neuromuscular disorders and arthritis. The draft National Oral Health Policy, 2018 calls oral diseases in India as a silent epidemic. The Flossy Brush with its ergonomic, hygienic and economic design is perfect for the low income Indian society and a small step towards incorporating oral hygiene among the masses.

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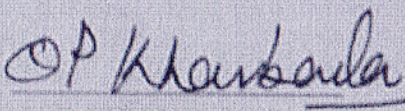


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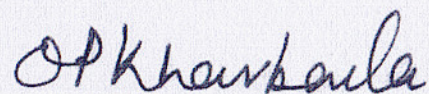


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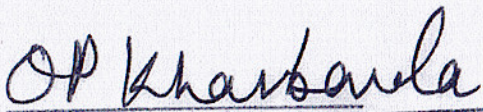


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