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Grade 11 students build AI tech to detect oral cancer

Two grade 11 students have developed an AI-based device called the MouthScope to screen oral cancer and precancerous lesions & conditions, which has demonstrated 86% accuracy.

By Rajeev Chitguppi
Dental Tribune South Asia

Every year, 4th February is observed as World Cancer Day with the primary goal to reduce illness and death caused by cancer significantly. The new World Cancer Day 2022-2024 campaign theme, Close the care gap, is about identifying and addressing the barriers that exist for many people worldwide in accessing the care they need.

On this occasion, we thought it was best to highlight the work of two young Grade 11 students in Mumbai, who have developed an AI-based solution to make oral cancer detection accessible and affordable in India.

Kudos to you both, Maanav & Aditya! What is your innovation all about, and what problem does it solve?

Oral cancer, the third most prevalent cancer in India, is easily treatable if diagnosed early. In rural India, 60% of oral cancer cases are diagnosed in advanced stages. The solution for this is mass early-stage screening, which is not easy to implement as it requires experienced doctors and healthcare personnel in large numbers.

We have designed a device that scans the entire oral cavity for potentially cancerous lesions without professional intervention. Our Invention - the MouthScope - uses Artificial Intelligence (AI) to make oral cancer screening more accessible by automating it.

MouthScope works on the principle of autofluorescence: it emits low-wavelength light, which excites fluorophores in normal mucosa and not cancerous tissues, causing cancerous tissues to have a darker colour. The phone camera captures this and sends it to the machine learning model, which predicts with 86% accuracy.

By using a smartphone and classifying images through machine learning, MouthScope eliminates the need for extensive infrastructure for mass screening of oral cancer, making it more attainable for rural India.

What was the problem with the existing techniques that made you develop this innovation?

In India, there is a mismatch between people susceptible to oral cancer (those who fall into risk categories like tobacco consumers and smokers) and infrastructure available for diagnosis, especially in rural areas: close to 80% of tobacco consumers live in rural areas. The gold standard for diagnosis is biopsy, which requires trained professionals and laboratory facilities. Moreover, the process of biopsy is an invasive procedure. Hence, we need screening protocols and devices for such susceptible patients. Only the patients with suspicious and potentially cancerous lesions are shortlisted from the susceptible population ad subjected to further diagnostic tests.

Screening is a practical solution, and we have several devices available.

However, the screening devices (Velscope, Vizilite, OralID) available in the market have one or many of the following shortcomings

- extremely expensive
- not accurate
- not automated
- not AI-based

Our device "MouthScope" aims to solve this by eliminating the need for expensive diagnostic tools and trained personnel. You require only one affordable device (target price set at Rs.15,000) for mass screening of such susceptible patients (target accuracy set at 80%) in a non-invasive manner.

The MouthScope also addresses the problem of follow-ups. Follow-ups are essential after treatment, as the recurrence rate of squamous cell carcinoma is 32.7%. However, there is a lacking medical infrastructure, especially in rural areas, to facilitate the recommended number of follow-ups. Being a device that can attach directly to a smartphone, the MouthScope can also be used for follow-ups without requiring much infrastructure.

How long did it take for you to conceptualize the idea?

We both connected on this topic during the lockdown in April 2021.

Maanav: "I saw my dentist parents unable to attend to their patients during the lockdown, and that got me thinking."

Aditya: "Our entire family was in shock when an unsuspected mouth ulcer was diagnosed as an advanced stage of oral cancer for my grandfather."

We then decided we needed a device to help oral screening, especially suspicious and potentially cancerous lesions, for earlier diagnosis.

How long did it take to build the prototype? What was the process?

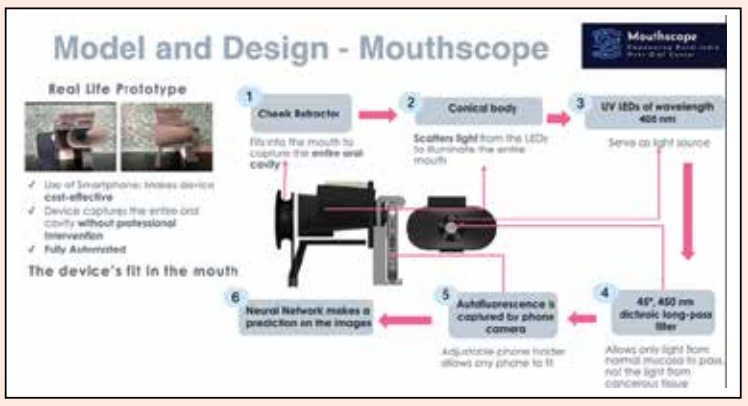
We took about seven months to build the present prototype with six different designs evolving and making it accurate at every stage. From getting the correct light source to procuring the proper lens to generate autofluorescence, using different cameras for image capturing, and programming the accurate AI model for image processing.

Can you describe the features of your product/ technology in simple terms?

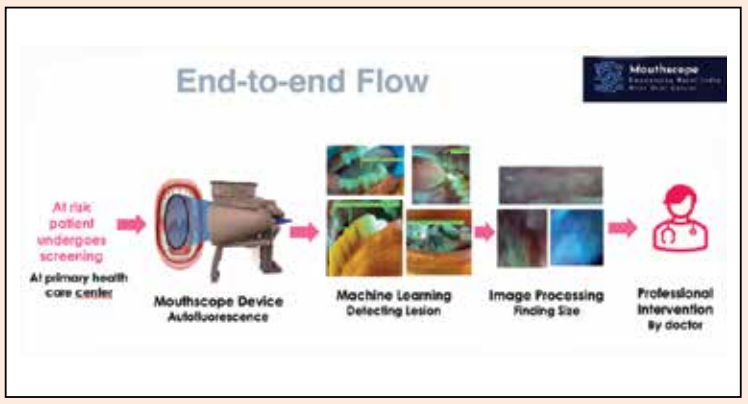
The MouthScope involves two components:

- a hardware component (a physical device with short-wavelength light and filters), and
- a software component (computer vision and web-app).

The hardware component consists of a 3-D printed attachment for a mobile phone. The attachment houses a dichroic long-pass filter placed directly on top of the phone's camera and a light source of wavelength 405 nm attached in a circular arrangement around the lens. The light from this source is directed towards the mouth. Inside the mouth, due to the short wavelength of the light, fluorophores in the normal mucosa are excited and emit light of different wavelengths than the cancerous or potentially cancerous



Mouthscope design



Workflow

lesions. On re-entering the device, this light is also incident on the dichroic long-pass filter, which only allows light above 450 nm to pass through, resulting in potentially malignant lesions having darker color than the normal oral mucosa. This light is directed to the mobile phone's camera.

How can patients make use of MouthScope?

We have also designed a web app that allows patients to view the YOLOv5 model's predictions in real-time, focusing on self-diagnosis- the web-app inputs information about the patient. The device stores the images and uploads them to the cloud, where the resnet_v2 model makes a binary prediction (classifying as cancerous or non-cancerous). These images and the patient's information are presented to a doctor, who verifies the predictions. If the predictions are incorrect, the model is retrained based on this, and (unless it fails an accuracy test) the model is updated.

How big is your team? What were their roles and contributions?

We are a team of two, Aditya and Maanav but were mentored and supported by many professionals from different fields. The technical support and lab support were from OMOTECH lab, Mumbai.

We were guided and mentored by Reetu Jain, Founder and Chief Mentor - On My Own Technology (OMOTEC), Dr. Deepa Nair, Oncologist, Tata Memorial Centre; Dr. Vivek Borse, DST INSPIRE Faculty, Centre for Nanotechnology; Edmund Optics; Dr. Jigna Pathak, Professor, MGM Dental College, and Hospital; Dr. Tejas Mhatre, Oral Surgeon; Dr.Arjun Singh, Research Fellow at Tata Memorial; Dr. Rajeev Chitguppi, Periodontist & Dental researcher; Mr. Sharan with Mantle Labs.

Did you conduct any study with this? What were the results?

Yes.

We tested our device with four potentially cancer patients to see the efficacy of our solution. The four patients had previously been tested with early squamous cell carcinoma, erythroplakia, and 2 cases of oral submucous fibrosis. They were tested positive by biopsy for cancer.

With our device, we were able to see a visible color difference between the normal tissue and the potentially cancerous lesions in the patients mouths. As expected, we observed that in the case of the normal oral mucosa, the image captured by the device had a bright green hue. At the same time, the potentially cancerous lesion did not undergo autofluorescence and was visibly darker. The machine learning models we trained were also able to detect these lesions.

Our neural networks had an accuracy of 86%, and in the future, we hope to capture more images with our device and increase our dataset size. This will allow us to improve precision and carry out multi-class classification in place of the current binary classification, resulting in more detailed screening.

Did you present your work anywhere? How was the response?

We have presented our work and research at competitions like the IIT Tech Fest and IRIS national science fair, where we won the GRAND AWARD in the biomedical engineering category and will now represent India. The Regeneron International Science and Engineering Fair (ISEF) will be held in Atlanta, Georgia, USA. At ISEF, finalists will compete with 1800+ participants from over 80 countries, regions, and territories worldwide.

Have you published your work in any journal?

Not as yet. We are working on it.

What are your further plans with this innovation?

- Our vision is to empower rural India to fight against oral cancer.
- Our immediate goal is to deploy MouthScope in at least ten villages in rural India in 2022.
- We are discussing with subject experts, oncologists, technology institutions to help us strengthen our product.
- We have to get the final product ready for production. We also understand that it requires ICMR Clearance.

About:

Maanav Kothari is currently studying in grade 11 at Dhirubhai Ambani International School for IBDP. He is highly passionate about robotics and has participated in various national and international robotics competitions. He is also a part of the school FRC team and enjoys CAD, designing devices and cars, and bringing them to life with technology.

Aditya Mehta is currently studying in grade 11 at Dhirubhai Ambani International School and has a keen interest in Programming and Artificial Intelligence. He believes that we need to leverage technology to solve and simplify our country's challenges - MouthScope is one such initiative.

Ad

Interview: “eLAB helps you follow new paths; digital try-in is a game-changer“ - Sascha Hein

Sascha Hein

By Dr. Nisha Deshpande

As we usher in the new year, India is on the brink of a digital dentistry revolution. With intraoral scanners becoming commonplace, we have begun integrating digital dentistry into our daily workflow. For our very first interview of 2022, we welcome Mr. Sascha Hein, the Managing Director of eLAB, who is leading the next revolution in shade management to service dental patients better while eliminating costly re-dos.

Nisha Deshpande: I wish you a very Happy New Year, Mr. Hein. Thank you for agreeing to do this interview with us. First off, can you tell us a little about yourself?

Sascha Hein: I commenced my training in dental technology in Munich, Germany, in 1994 and graduated in 1997. In 2001, I completed further studies in dental ceramics under Masahiro Kuwata in Tokyo, Japan. After graduating (2005) from Master School in Freiburg, Germany, I was inducted (2007) into the international Oral Design group by founder Willi Geller.

In 2012, I was also inducted into the Bio-Emulation group, an international think tank that has come up with many innovations and novel treatment concepts in dentistry. I served as president of Bio-Emulation from 2014 - 2016.

Together with Dr. Panaghiotis Bazos and Dr. Javier Tapia Guadix, I developed the eLAB system from 2013 - 2016. From 2013 to 2017, I furthered my education in color science and optical physics under the mentorship of Professor Jaap ten Bosch, with a special focus on tooth fluorescence.

I am a published author and a reviewer for several peer-reviewed journals. I live and work in Freiburg, Germany, and I am the managing director of Emulation S.Hein.

What exactly is the eLAB system?

The *eLAB system* transforms your digital camera into an easy-to-use shade matching system, resulting in better shade matching and improved relations between the dental office and the dental laboratory.

Using artificial intelligence and advanced image processing algorithms, eLAB_prime transforms a digital camera into an easy-to-use shade matching system.

How does it work?

The clinician needs to take a standardized photo using a standard DSLR or MILC (Mirrorless Camera) together with our polar eyes filter and grey reference card. This image is then sent to the laboratory, which can process it with our eLAB_prime software to measure the target tooth color and obtain a patient’s personal mixing recipe. Moreover, the software allows for a digital try-in to preview how the restoration integrates clinically before delivering it to the surgery and at a time when it can still be adjusted and optimized.

What has been the driving force behind your innovation? What problems were you encountering before this?

The eLAB system was born out of necessity - from servicing referral-based prosthodontic practices over the last twenty years. It is a true innovation that fixes a long-standing problem: reliable shade communication and shade matching in dentistry. However, true innovation also requires a change of behavior. In this particular case, it requires strict adherence to protocols, and

this is true for the clinicians as much as for the dental lab.

It is also worth mentioning that the eLAB system has been designed to complement the skills and experience of a well-trained dental technician instead of replacing them. The radical nature of the eLAB system requires you to let go of established ideas and follow new paths.

What do I need to learn before integrating the eLAB system in my practice as a clinician?

The eLAB system is centered around a strict protocol for standardized dental photography that needs to be followed. There is a free photographic protocol that can be downloaded from our webpage https://elabprime.com/photo-protocol . You can also a tutorial that you can watch on my YouTube channel: https://www.youtube.com/c/SaschaHeineLAB

What are the common errors that I should avoid in this regard?

The most common mistakes that routinely occur in the dental practice are

- the failure to switch off TTL (through-the-lens),
- to use the manual flash mode instead with flash output set to maximum (1:1 – Full) to prevent underexposed images, and
- the tendency to underestimate the effects of tooth dehydration during the shade determination.

Clinical studies have shown that the threshold for tooth dehydration lies below 2 Minutes of continuous exposure to air. Remember to take the shade image before you commence treatment or a few days afterward, but not in between treatment, as tempting as that may be.

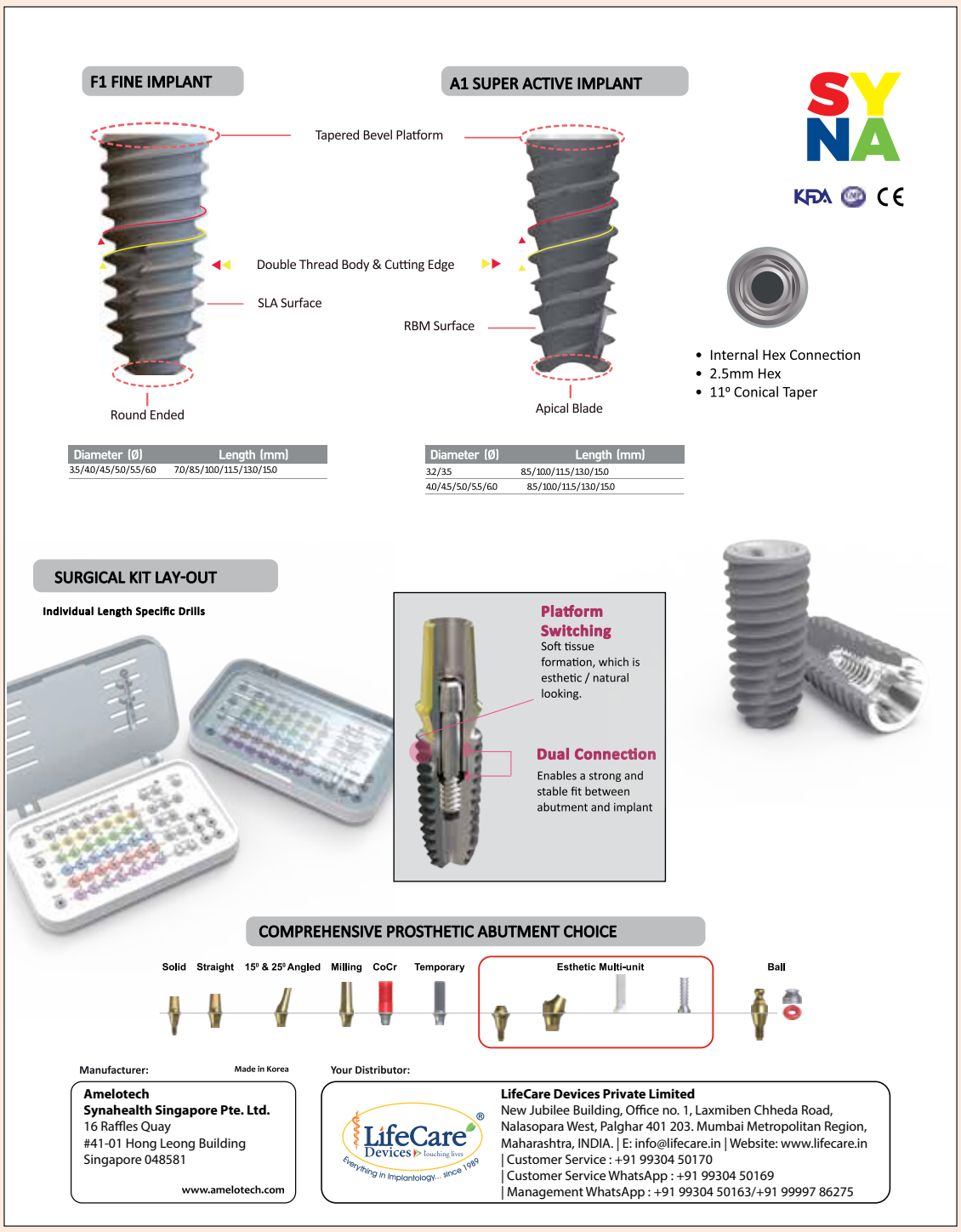
How does this system help dental ceramists worldwide?

The eLAB system helps to remove the guesswork for shade selection and allows for reliable shade communication over large geographic distances. The scientific nature of the eLAB system provides for accurate shade quantification using an established color appearance model such as the CIELAB system instead of relying on stock shade guides for which there are no industry uniform standards.

For me, as a dental ceramist, the digital try-in is a game-changer. To preview the final result before delivering the restoration to the surgery is a massive advantage that gives you peace of mind.

Above all, however, the eLAB system helps the dental lab to maintain good relations with the dental office by minimizing the threshold for complications.

Ad



An epidemic within the pandemic- Dr. B.M. Rudagi

International OMFS Day celebration

By Dr. B. M. Rudagi

COVID-19 is still an ongoing pandemic that has put the world in gridlock since 2020. In the mortifying second wave of COVID-19, India witnessed rattling cases of post-COVID Mucormycosis, putting the medical facilities into turmoil. Jawahar Medical Foundation, ACPM Medical College, and the OMFS department of ACPM Dental College, Dhule, have set up a center dedicated to treating and managing post-COVID mucormycosis cases. This editorial comes from Dr. B. M. Rudagi, Prof & Head, Dept of OMFS, ACPM Dental College, Dhule, Maharashtra.

During the COVID-19 pandemic, post-COVID mucormycosis became an epidemic in the country, affecting a majority of the population. As an institute, we have been witnessing & treating 2-3 cases of mucormycosis annually. The graph reached its peak in the 2020 Pandemic, treating 6-7 cases daily. We operated over 150 cases in nearly less than three months. The mycotic infection was rapidly killing people within a day of its possession.

When most medical schools were shut, our department worked every day during those dire circumstances. Most of the patients we treated were in active stages of COVID-19. People were dying more from the deadly fungus than from COVID-19. It seemed like a race between two of the deadliest diseases.

It is a cascade of multiple reasons during COVID-19, such as low immunity, cytokine storm causing an extreme inflammatory reaction and micro thromboembolism, heavy dosage of steroids, increased blood sugar levels, poor oral and upper airway hygiene. This leads to an opportunistic fungal infection that rapidly spreads from the paranasal sinuses cephaly.

To celebrate the occasion of International Oral and Maxillofacial Day on 13th February, we organized workshops on Basic Life Support (BLS), basic suturing, and IV & IM catheterization for the undergraduate and post-graduate students. Keeping the theme 'Metamorphosis of face – Combating Mucormycosis and transforming lives' in mind, we put forward various ways of rehabilitating post-COVID mucormycosis patients.

Post-mucormycosis, the major challenge is rehabilitation, due to its extensive facial defect. We have currently started rehabilitating the patients with patient-specific, sub-periosteal titanium implants. These implants distribute the occlusal force along all the vertical buttresses. Extensive facial defects can be reconstructed using PSI subperiosteal titanium implants. We operated two cases with orbital floor reconstruction with these implants and further continue to help post-mucormycosis patients get their lost smile.

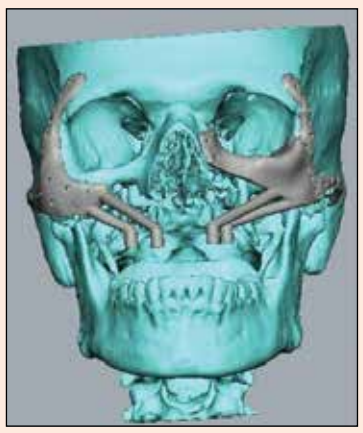
Dr. B. M. Rudagi

Dr. B. M. Rudagi, Prof and Head, Department of Oral and Maxillofacial Surgery (OMFS), ACPM Dental College, Dhule, Maharashtra.

IV catheterization workshop

Basic life support workshop

Basic suturing workshop



3D planning with patient specific subperiosteal implants

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DENTAL TRIBUNE
The World's Dental Newspaper • South Asia Edition

Geo-mapping Early Childhood Caries (ECC) in India

Geo-mapping of prevalence and predictors provides a quick visual overview of specific areas vulnerable to caries and aids in designing tailored services. (Photo: Canva)

By Dr. Isha Rao
Dental Tribune South Asia

Early Childhood Caries (ECC) is a significant concern. Geo-maps have been extensively used abroad for presenting epidemiological data based on caries risk. However, there has been little use of Geo-maps in dentistry across India. The present study aimed to geo-map the spatial distribution of caries risk in Lucknow pre-schoolers and identify associated predisposing factors.

Early Childhood Caries (ECC) is an aggressive and rampant form of dental caries that presents in children aged three to five years with

- one or more decayed (non-cavitated or cavitated)
- missing (due to caries), or
- filled tooth surfaces in any primary tooth.

Geographic Information Systems (GIS) help link various determinants of health, and their spatial representation enables primary care physicians and public health specialists in their decision-making in planning for future care.

GIS maps are an excellent utility tool that can simplify complex information about common oral health diseases and present it to dental researchers and physicians in an easy-to-understand way. GIS maps can estimate oral disease patterns, resource allocation, etc., as per the population density, thereby facilitating oral health advocacy.

The study highlighted that children from low-income families get more tooth caries than children from families with medium or good financial conditions.

This paper by KGMU Dental College in Lucknow, India, titled, Geo-Mapping of Early Childhood Caries Risk: A Community-Oriented Preventive Oral Health Promotional Approach' used geo-mapping to track early risk childhood caries in children across different demographics.

Geo-mapping was used to understand better the spatial distribution of early caries risk to better plan and deliver health promotion and preventive programs.

Study:

A cross-sectional study was conducted on 1000 preschool children aged 3 to 5, chosen using systematic random sampling. Each child's residential address was geo-coded. They were clinically examined for dental caries and issued a Decayed Missing Filled Tooth (DMFT index). To obtain socio-demographic data, a pre-tested questionnaire was used. Mann-Whitney and Kruskal-Wallis tests were used to compare median DMFT values.

Caries were discovered in approximately 76% of the participants. DMFT indices differed by gender, income level, and ward— wards closer to the district's center had a higher prevalence of caries.

Gender:

Of the 1000 study subjects, 57% were male, while 43 were female. The maximum DMFT scores observed in males was 5 and in females was 6.

Family Income:

The majority of the participants were in the age group 4+ and from families with an average monthly income of less than Rs 10,000. The maximum DMFT score observed was significantly lower in children from families with an average monthly income of more than Rs 20,000.

The take-home points from this study:

The paper recommends cost-cutting and improved access to health care to improve primary care and preventive health services.

GIS helps assess patterns of healthcare utilization and community-level attributes to identify geographic regions most in need of primary care access.

Geo-mapping of prevalence and predictors provides a quick visual overview of specific areas vulnerable to caries and aids in designing tailored services.

Geo-mapping of prevalence and predictors provides a quick visual overview of specific areas vulnerable to caries and aids in designing tailored services.

References:

Geo-Mapping of Early Childhood Caries Risk: A Community-Oriented Preventive Oral Health Promotional Approach

About:

Dr. Isha Rao

Dr. Isha Rao (BDS) graduated from MGM Dental College, Navi Mumbai in 2020. She currently works as an assistant editor (Public Health) at Dental Tribune South Asia and covers various areas in public health. She is interested in pursuing research in the domain of public health policy and financing.

Ad

“Nitin Doshi, gem of a person“ - Dentists pen heartfelt tributes

By Dental Tribune India

After his untimely demise this morning, tributes are pouring in from dentists for their highly admired and respected dental dealer Nitin Doshi of Doshi Marketing Corporation, Mumbai.

Heartfelt tribute to Nitin Doshi, who was highly admired and respected by the dental community. (Photo: Doshi Marketing)

Dr. Aswatha Kumarswamy

In 1981 when Jaysukhbhai Doshi supported my clinic with materials, a young boy in shorts escorted him sometimes. In a few years, he started assuming responsibility for catering to the needs of dentists across the city of Mumbai. He established a very high brand of authenticity, dependability, and patronage in the minds and hearts of clinicians across the country in a short span of time. Nitin Doshi became synonymous with supplies of dental materials and equipments. Doshi marketing corporation was established with his elder brother Jitin under the guidance of the lovable and watchful eyes of the patriarch Jaysukhbhai.

He always had a cool demeanor, a ready solution for any and every problem, and a blessing for a young dentist starting out in private practice. He represented leading global industry partners and serviced over 25000 dentists across the globe.

Known for his eternal offer to the newly graduated dentists “payable when able“ ..not once would he call for payment.

The dental fraternity has lost a tentpole in Nitin’s shocking demise.

Dr. Ajay Kakar

Nitin Doshi was the nicest person one could ever find. Always smiling and very helpful to one and all. The word “No” did not exist in his vocabulary. He would find a solution to any problem one might be having. He kick-started the careers of so many dentists, and it is impossible to keep count of the number. There is absolutely nobody in the world who could ever harbor any ill-feeling towards Nitin bhai. May he rest in peace.

Dr. N. K. Doctor

Irreparable loss to the dental community of industry & profession.

Dr. Raman Gohil

Most popular, well-known personality among the dental fraternity. A person with a big heart who helped lots of junior & senior dentists all over Mumbai, India. May his soul rest in peace.

Dr. Ali Tunkiwala

He was a gem. What an irreplaceable loss.

Dr. Jayanto Mukherji

Rest in peace, Nitin bhai! You will be missed beyond what mere words and eulogies can express! I’ve lost a friend, and a person, whom I could rely on 24/7/365!

Dr. Sarita Subramaniam

I have known Nitin since the nineties. Always pleasant, cheerful, and affable. He helped us a lot when we started our practice and continued our association. We will miss him. May his soul rest in eternal peace.

Dr. Sanket Sheth

Extremely saddened by the sudden demise of our popular dental supply owner Nitin Doshi. Death ends a life, not a relationship.

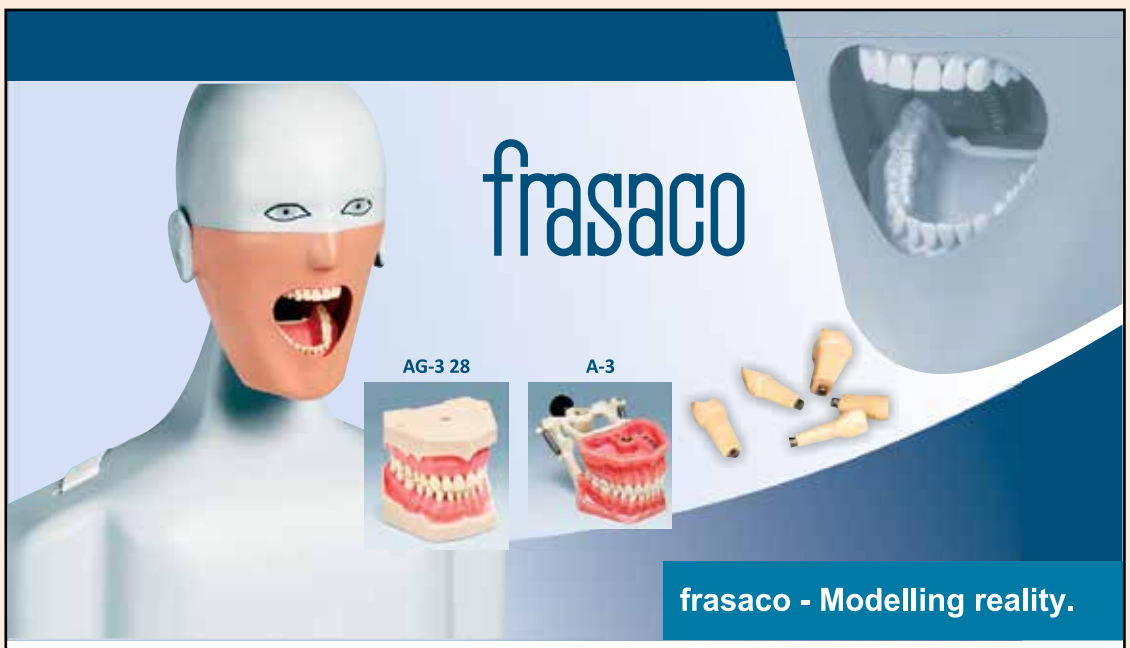
Dr. Nikhil Churi

R.I.P Nitin bhai!! Mumbai mein shayad hee aisa koi clinic hoga jisme Nitin Bhai se liya hua koi equipment ya material NA ho !!! (There will be hardly any clinic in Mumbai that does not have any equipment or material taken from Nitin Bhai)

Dr. Ashish Mittal

Very sad. I had sourced 100% from Nitin bhai at the start of my clinic in 2001... such was the trust … gem of a person.

Ad



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DENTAL ARTICULATORS AND ARTIFICIAL TEETH

SERIES AG-3

Part Nos. of Dental Articulators:
AG-3 DA 28 & AG-3 DA 28 ET OZ

Dental Articulators made of hard thermosetting plastic material

Artificial Teeth: Individual gnathologically contoured Artificial Teeth.

Part nos. of individual Artificial Teeth - AG-3 Series

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AG-3 ZE 21 to AG-3 ZE 27
AG-3 ZE 31 to AG-3 ZE 37
AG-3 ZE 41 to AG-3 ZE 47

AG-3 ZPUK-21
AG-3 ZPUK-24
AG-3 ZPUK-26
AG-3 ZPUK-46

AG-3 ZPUR-21
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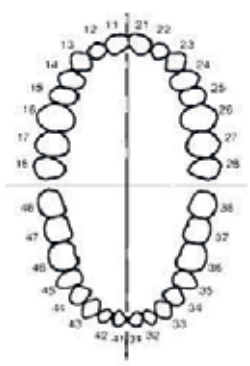
AG-3 ZPUR-46



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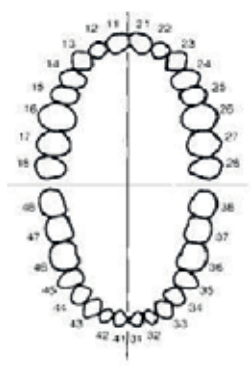
A-3 ZE 41 to A-3 ZE 48



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Digital-first economy, blockchain, tech-mediated edu - Union budget 2022 highlights

By Dr. Bhavdeep Singh Ahuja

The key themes that stand out from the budget announcements are a big focus on capital expenditure, promoting a greener economy, leveraging the impact of the digital world & creating a more conducive environment for businesses.

Every year, swords & daggers come out as early as the afternoon of 1st Feb with media & parties taking sides conveniently on the outcome of the budget as per their allegiance. There is always a big hype on the union budget, but the build-up was particularly enormous this year when people under COVID-19 trauma expected some 'COVID' relief.

How the paradigm shifted in 365 days –

Last year, just before the budget, vaccination drives had just started (16th Jan 2021) & the bid to invest in the world's most extensive vaccination program warranted some 'covid' tax. When the hoi polloi (read: Aam Junta) was spared from such 'tax' in Budget 2021, in the next 365 days, the expectation increased to a 'WFH' (Work From Home) relief in Budget 2022 plus a host of other wannabes (human mind is greedy, indeed).

Let us analyze Union Budget 2022:

Broadly, the significant announcements included digital currency, e-passports & a slew of infrastructure projects with edible oil, wearable electronics, imitation jewelry, polished diamond - all set to be cheaper. Tax relief was announced to persons with disabilities while no change in personal income tax rates.

So what is there for us – education & health-wise?

A Digital University has been proposed to provide supplementary education in all regional languages to make up for the loss of formal education due to Covid & is to be made in different Indian languages, based on the networked hub model. One Class, One TV channel will be expanded from 12 to 200 TV Channels and a National Digital Health Ecosystem to be rolled out. On the health front, a National Tele Mental Health program to be set up to focus on mental health, citing so many mental health issues arising due to Covid. Twenty-three tele mental health centers of excellence have been proposed along with integrated benefits to women & children through Mission Shakti, Mission Vatsalya, Saksham Anganwadi & Poshan 2.0.

One of the biggest pitfalls after 75+ years of independence is that clean water has been addressed by allocating Rs. 60,000 crore to cover 3.8 crore households in 2022-23 under Har Ghar, Nal se Jal.

The COVID-19 pandemic has taken a heavy toll on the mental health of individuals, which has been recognized as a threat and received more focus. Many companies have already implemented a variety of steps to assist employees and their families with stress and other mental health difficulties, such as 1-on-1 counselling sessions, webinars, round-the-clock helplines, peer group support, and grief counselling (particularly during the second wave). Money to be pumped into safeguarding the mental health of the Indian workforce is a welcome step towards embracing mental well-being with dignity & compassion.

Apart from health & education – the standout point for me in this budget was the sudden parachuting of India in the exclusive club of a handful of countries to have their sovereign digital currency. The shock & awe of this development has not been internalized enough: a digital currency built on the latest blockchain technologies will unleash a tsunami of innovation & efficiency gains throughout the economy. Blockchain will be the future by 2030, and a developing country like India going ahead with this is seen as a bold step.

I like that we are not just limiting ourselves to 'first' providing the basics to the poor and the BPL but also taking giant steps towards digitalizing the growth and matching the world step by step (or going one step ahead of the majority of them). The digital-first economy is being encouraged already on the school education platforms. The budget's thrust on bringing technology-mediated education to all students irrespective of the urban-rural or income divides is like setting alight a billion dreams.

Dr. Bhavdeep Singh Ahuja presents a balanced review on the union budget 2022 (Photo: Pix4Free.org)

The budget has also announced that PSU banks will make the intergenerational leap & set up at least 75 digital banking units. Freeing the banks of brick & mortar confines puts infinite possibilities in the hands of each Indian citizen, making each mobile phone a fully functioning bank, education outlet & health access system. When we add the security layer of the digital rupee to that, it becomes a bonus.

On the flip side, yes, direct taxpayers and various industries were left high & dry. However, as a relief, despite being ahead of 5 state elections, the budget did not have any significant populist measures, anticipating which many investors were nervous.

The Indian economy is still in a recovery phase, given the recent challenges posed by Omicron. On the other hand, the future is already showing bright spots by positioning India as one of the fastest-growing economies globally. Encouragingly, like last year, Budget 2022 estimates are realistic, believable, & transparent, making international investors look at India with a different lens compared to China.

The key themes that stand out from the budget announcements are a big focus on capital expenditure, promoting a greener economy, leveraging the impact of the digital world & creating a more conducive environment for businesses. The next step towards growth has been taken by laying down the foundation for the next 25 years because the budget attempts to strike a balance between fiscal prudence and economic growth, and given the COVID-19 shadow for two years, that is a big step.

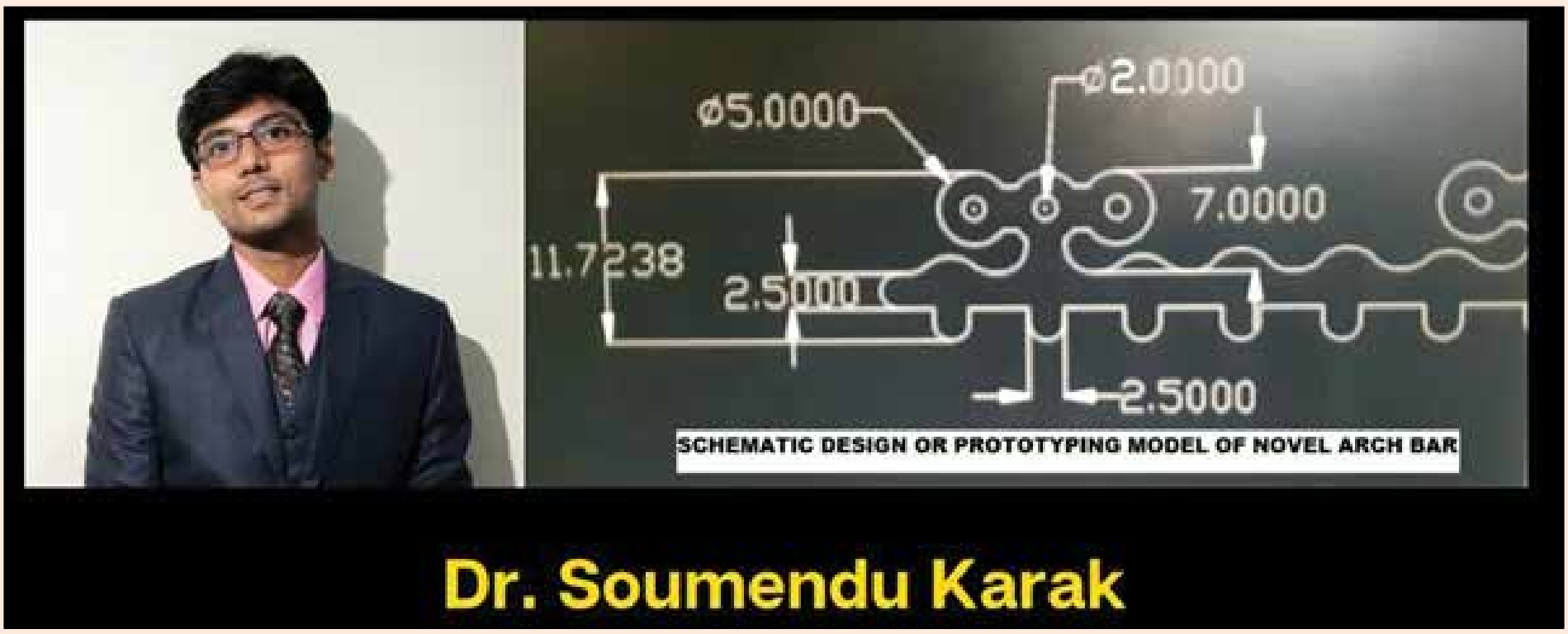
The best outcome would still be a timely implementation of the above announcements. In this scenario, the key is to ensure that the growth journey that India has started should continue its momentum & the budget appears to have aimed to do just that.

About:

Dr. Bhavdeep Singh

Dr. Bhavdeep Singh Ahuja graduated in 1998 from Punjabi University, Patiala. He has specialized in Implants from BioHorizons Inc. USA in 2004-05 & in Advanced Course from LACE-ICOI, USA in 2006. Apart from Dentistry, he holds a Triple M.B.A. in Hospital Management, Finance/Human Resources (dual) & Marketing from three premier Institutes/Universities of India viz. the IIMM Pune, IGNOU Delhi & Annamalai University, Chennai respectively. He also holds Post Graduate Diploma's in Medical Law & Ethics (NLSIU - Premier LAW School of India), Clinical Research, Cyber Law, IPR's (Intellectual Property Rights), Disaster Management, Financial Management, Bioinformatics amongst many more from different Universities. He is a Certified Health Care Waste Manager from IGNOU & is qualified in Consumer Law as well. He is an academically oriented dentist & has more than 75 Original Scientific Publications to his credit in many International & National journals. He lectures all over India extensively on the topics of Practice Management, Medical Law, Ethics and Consent and Finance for Dentists and he is writing a series on all these topics in multiple journals simultaneously. He has been the Past Editor-in-Chief, L.E.D. E-Journal & PAGE 3 OLA-D E-Newsletter, the twin Publications of IDA Ludhiana Branch. Presently, he is into his 22nd year of Clinical Private Practice in Ludhiana, Punjab.

Novel Arch Bar patent by Dr. Soumendu Karak, OMFS



The Novel Arch Bar designed and patented by Dr. Soumendu Karak offers several benefits over the traditional methods. (Photo: Dr. Soumendu Karak)

By Rajeev Chitguppi
Dental Tribune South Asia

Dr. Soumendu Karak, OMFS practicing in Phuleshwar, West Bengal, has patented his innovation "Novel Arch Bar" that offers benefits with its ease of use, user safety, versatility, and advantages over the current standards of care.

What is your innovation all about?

The treatment of mandibular fractures has traditionally involved the re-establishment of functional dental occlusion with various types of maxillo-mandibular fixation. Intermaxillary fixation (IMF) is also used before and during open reduction and internal fixation of fractures to achieve temporary stability of fracture site. IMF with this innovative arch bar, i.e. "NOVEL ARCH BAR," is more efficacious compared to the conventional method (Erich Arch Bar, IMF Screw). It also improves the surgeon's and patient's acceptance to a satisfactory level.

Figure 1: Post-op radiographic view of Novel Arch Bar

Figure 2: Clinical view of the Novel Arch Bar after intraoral placement

What problem with the existing arch bar made you come up with this innovation?

The most common method used in IMF is Erich Arch Bar and IMF Screw, but it has its disadvantages. Some shortcomings of the Erich Arch Bar are increased surgical time, trauma to the periodontium, compromised oral hygiene, movement of teeth in lateral and extrusive direction, risks of penetrating injury to the surgeons that subsequently increase the risk of blood-borne pathogen transmission. Loosening of the screw and disturbance of occlusal stability after a few days of placement often limit the application of the IMF screw.

Our innovative arch bar 'Novel Arch Bar' can overcome the disadvantages and improve clinicians' and patients' acceptance levels in the perusal of a better technique.

How big is your team?

Our team consists of me, Dr.Shishir Mohan Devki, the head of the Oral and Maxillofacial Department, and Dr. Shaivy Ambuj, prosthodontics and super-specialist in dental rehabilitative oncology. We had discussions about the concept, design, and making it a reality.

Can you describe the features of your arch bar and how to place it?

After taking the detailed history, patients and radiograph of patients are thoroughly examined; "Novel Arch Bar" is placed in maxillary and mandibular arch individually and stabilized with an interlocking screw. In each arch, three 2mm diameter, 6mm length interlocking screws are placed through the attached gingiva and inserted until the head of the screw is flushed. Two screws are placed bilaterally in the posterior region, and one is placed centrally using a 1.5 mm drill under copious normal saline irrigation. Three segments are extended from each arch bar. Each segment contains three holes for screw placement. Screws can be placed in any hole among the three to bypass the fracture line that may cause loosening of a screw or bypass the root of the tooth to prevent tooth injury. After close fracture reduction, intermaxillary fixation was done with 24 gauge wire.

Figure 3: Official IPR details of the Novel Arch Bar

Can you give the official IPR details of the arch bar?

The arch bar is accepted by Indian Intellectual Property India. Patent no-201831012950

Have you published it anywhere?

Yes, we have published it as a case report in University Journal of Dental Sciences 2018; Vol 4, Issue 2

"NOVEL ARCH BAR," is more efficacious compared to the conventional method (Erich Arch Bar, IMF Screw). It also improves the surgeon's and patient's acceptance to a satisfactory level.

About:

Dr. Soumendu Karak, MDS Maxillofacial Surgeon, is currently working at Sanjiban Hospital, Phuleswar, W.B as a consultant. He completed his post-graduation from K.D.Dental College and Hospital, Mathura, 2020. He has around 10 National, International publications to his credit. Presently he is more inclined towards Head and Neck Oncosurgery.

Dental start-up Smiles.ai raises $23 million in series A round

By Dr. Priyanka Bansode

The venture capital industry in India is growing by leaps and bounds. Gone are the days when entrepreneurs and their venture capitalists were bound only to Silicon Valley. Smiles.ai – a dental care start-up- has raised $23 million in Series A funding.

The co-founders of Smiles.ai Hitesh Kakrani and Jatin Kakrani believe that the Indian dental industry, which is growing at 20% year on year, will become a $15 billion market by 2023.

Smiles.ai will utilize this funding to build innovative tech-driven dental care solutions, strengthen its leadership team and expand its operations nationally.

Series A round was led by Alpha Wave Incubation, managed by Falcon Edge Capital, along with their existing investors Sequoia Capital India and Chiratae Ventures. Angel investors like Lens-kart co-founders Piyush Bansal and Amit Chaudhary, Mosaic Wellness's Revant Bhate, CRED's CSO Miten Sampat, Haptik's co-founder Aakriy Vaish, and WTW MD Sambhav Rakhyan have also invested in the start-up.

The chief investor of Alpha Wave, Mr. Aniruddha Singh, said, "Given the massive opportunity in the dental care space in India and abroad, we were very impressed with Smiles.ai's approach in establishing a comprehensive offline base of dentists and building an aligners business on top of that. Using technology as a key driver and differentiator, Smiles.ai is poised to disrupt the market and establish itself as a market leader while maintaining its capital efficiency."

Smiles.ai was started in 2019 with the idea of amalgamating technology with expert professional dental healthcare advice to provide high-end quality dental service to patients. The start-up offers clinic networks, an online consultation platform, and at-home services across Bangalore, Delhi- NCR, Pune, and Indore.

Around 2,975 health tech start-ups in India focus on enhancing healthcare facilities. The advent of AI, machine learning, IoT, 3D printing has made drastic changes in how healthcare is delivered now. The right blend of technology, innovation, and healthcare has created new milestones in India in health-tech start-ups.

Smiles.ai will use technology as a key driver and differentiator to establish itself.

Dr. Jatin Kakrani of Smiles.ai said, "With technology as the backbone of our operations, we are able to provide pre-purchase clarity, best-in-class care, and billing transparency to consumers with end-to-end support during the entire process. We will continue to invest in newer surgical technologies and skilled doctors to provide world-class treatment and experience to our consumers."

According to the India Brand Equity Foundation (IBEF), the Indian healthcare industry, which reached $190 billion in 2020, is expected to reach $370 billion by 2024-2025 because of increasing demand for specialized and higher quality healthcare facilities. [2]

Editorial note:

References can be obtained from the publishers on request.

About:

Dr. Priyanka Bansode

Dr. Priyanka Bansode has graduated from the prestigious Nair Hospital & Dental College, Mumbai. She also has completed her Fellowship in Microdentistry from Govt. Dental College, Mumbai and P.G. Dip. in Forensic Science & Related Laws from Mumbai University (distinction). She has experience of 12 years in clinical dentistry. With an inclination towards dental academics and research, she is active in dental blogging and content creation. She has published over 140 dental blogs on a variety of dental topics on various platforms.

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