

# DENTAL TRIBUNE

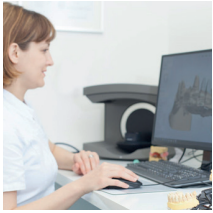
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# Polychromatic layering technique —full protocol: a case report

By Dr Neha Gupta

## Evaluation and mock up

Vanini described an anatomical stratification technique that goes beyond the typical three dimensions (hue, chroma, value) of color. The technique, especially useful when esthetic demands are high, enables dentists to predictably create life-like esthetic restorations that are indistinguishable from natural teeth.<sup>1,2</sup>

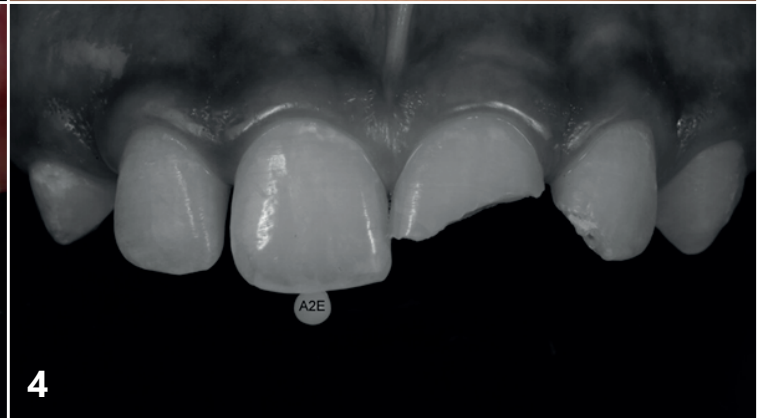
### Introduction

A 10-year-old male patient reported with a complaint of trauma to the upper left central and lateral incisors, involving the enamel and dentin. Direct composite was used in multi-layers and the smile was restored. This article explains detailed steps in the polychromatic layering technique with special emphasis on the finishing and polishing protocol. 3M Espe Filtek Z350 XT was used with a universal bonding agent.

**Fig. 1:**  
Intra-oral view of the initial situation (Class IV fracture with 11 and 12).

**Fig. 2:**  
A close-up smile view.

**Fig. 3:**  
Shade was evaluated with the "Button technique". A2 Dentin was used for inner layer and incisal halo, A2 Body for mid layer, Clear Translucent for opalescence and A2 Enamel for outer layer.



**Fig. 4:**  
A monochrome picture helps evaluate the value. Empress Direct Enamel A2 was chosen for this case.

**Fig. 6:**  
Occlusion was checked and adjusted accordingly.

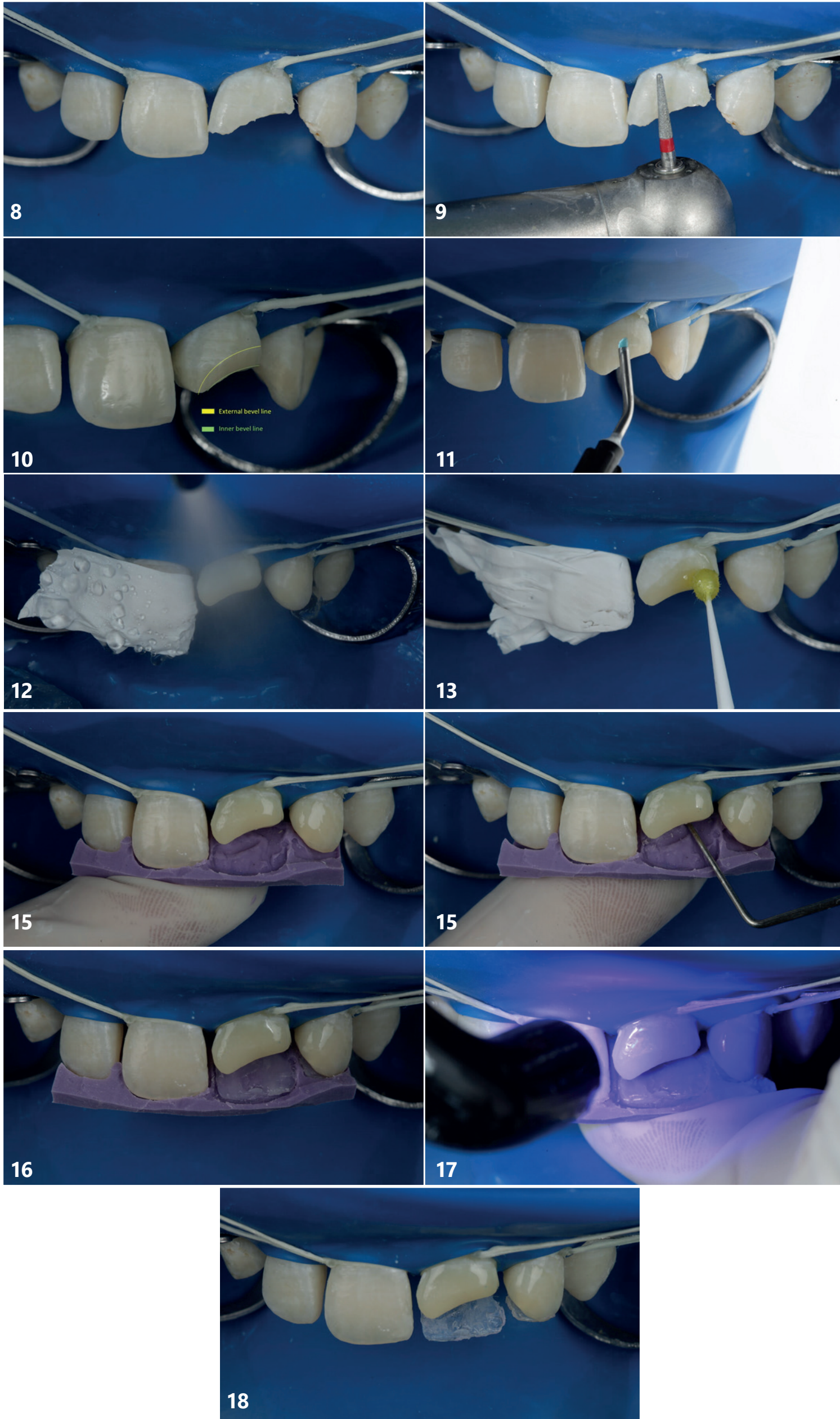
**Fig. 5:**  
Quick intra-oral mock-up was performed without etching and bonding. This can also be done with the chosen shades of composite to roughly evaluate the selected shade.

**Fig. 7:**  
Once verified, a putty index was made with A-Silicone to record the palatal surface.





## Bonding and palatal shell

**Fig. 8:**

After thorough prophylaxis, the concerned site was isolated with a rubber dam and further retraction of gingiva was achieved with the help of floss ties.

**Fig. 9:**

Using fine grit bur all unsupported enamel was removed and 2mm short bevel was given.

**Fig. 10:**

The bevel allows better integration between the composite restoration and the remaining dental tissue.

**Fig. 11:**

Selective etching with 37% Phosphoric acid was used to etch the enamel for 20 seconds.

**Fig. 12:**

After thoroughly rinsing for 20 seconds the tooth was dried completely.

**Fig. 13:**

A single bond universal from 3M was used as the adhesive. The bond was applied in scrubbing motion for 10 seconds and the excess was removed with a fresh applicator tip and light cured.

**Fig. 14:**

The silicone index was then used to build the palatal shell which served as the base to further layer composite.

**Fig. 15:**

The extent of the palatal surface was marked using a probe.

**Fig. 16:**

Clear translucent shade was used to build the palatal surface.

**Fig. 17:**

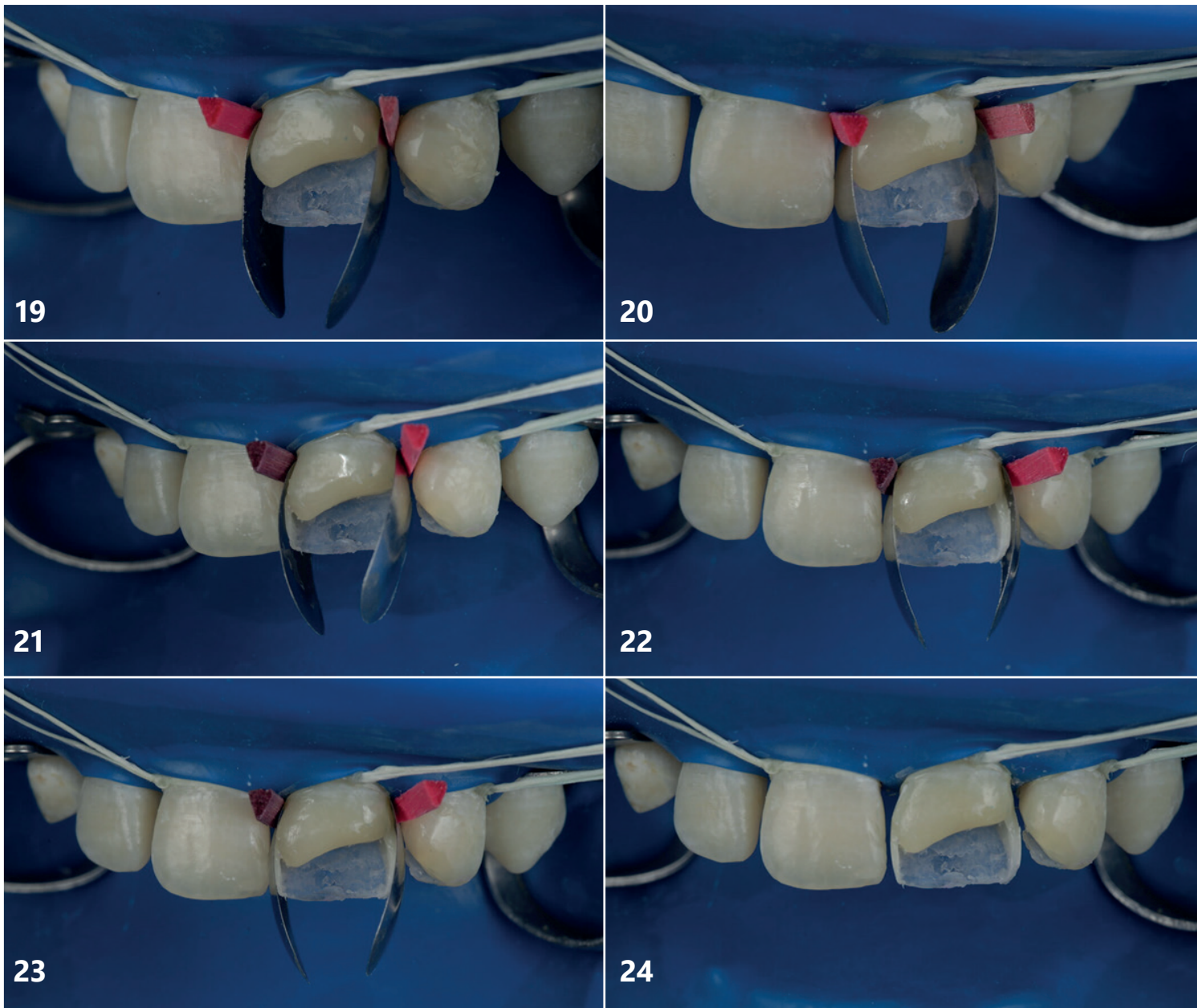
Light curing.

**Fig. 18:**

With the final palatal shape it is easy to foresee the final shape for the final composite resin restoration.



## Contact build-up with band and wedge



**Figs. 19 & 20:**

The sectional matrix for posterior teeth was used in a vertical direction and stabilized with wedge on both mesial and distal side.

**Fig. 21 & 22:**

Mesial wall was built with A2 body shade.

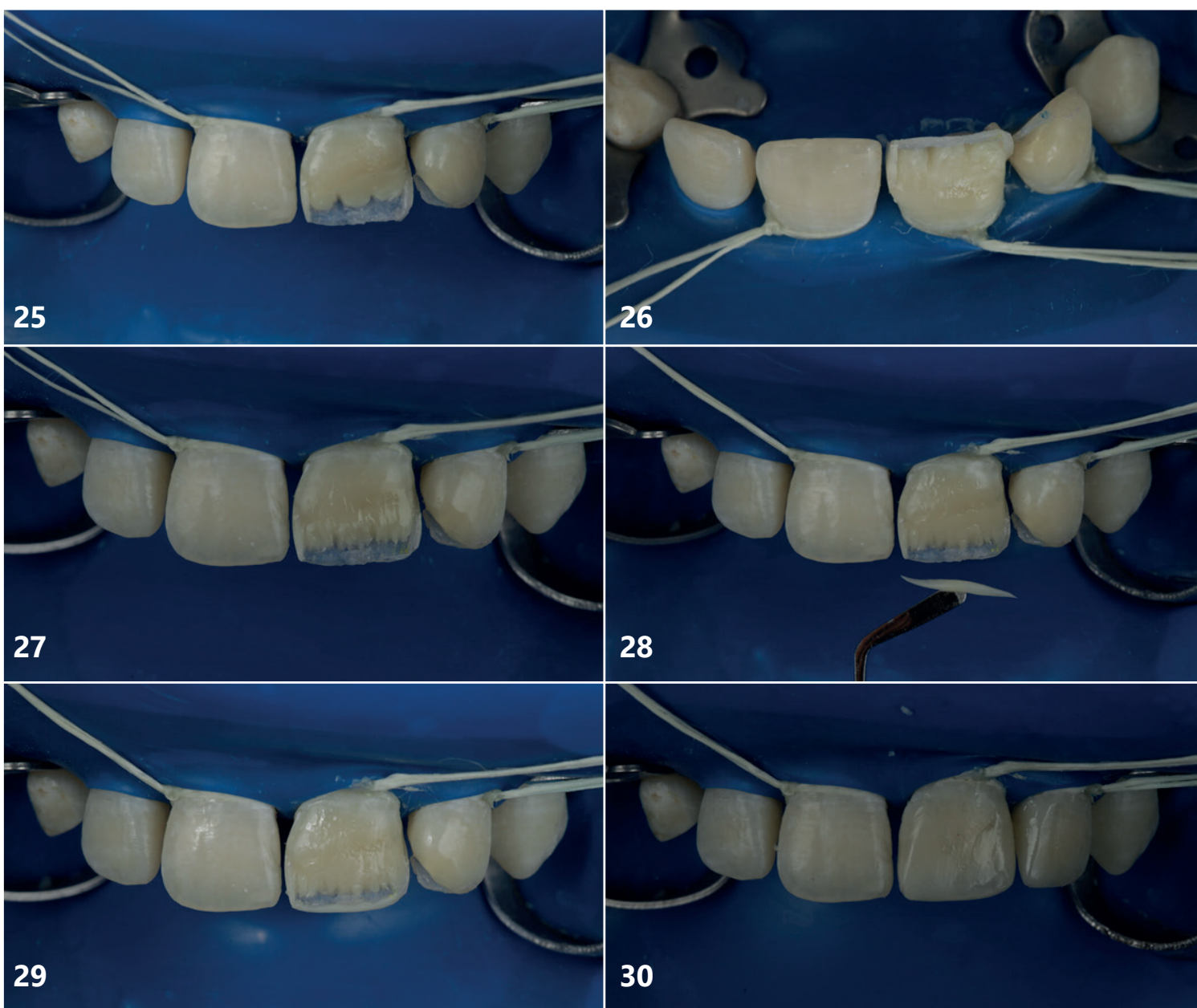
**Fig. 23:**

Interproximal build-up was done on both mesial and distal side.

**Fig. 24:**

After interproximal build-up, the band and wedge were removed, leaving behind the scaffold for further layering.

## Layering protocol step by step



**Fig. 25:**

A2 Dentin was used for the inner layer and dentinal structures were created using 3 well-defined lobes.

**Fig. 26:**

It was bulked up till the start of the bevel slightly covering the bevel.

**Fig. 27:**

A2 Body was used to build the mid layer and multiple lobes were created to mimic the adjacent tooth.

**Fig. 28:**

A2 Dentin which is opaque was used at the incisal edge to create an incisal halo.

**Fig. 29:**

Clear Translucent was used to fill the space between the incisal edge and the mamelons in order to increase the translucency at the incisal third.

**Fig. 30:**

Final A2 Enamel was used for outer layer giving it proper contour and final form.



## Polishing protocol and post-op



**Fig. 31:**  
Primary anatomy was marked using a lead pencil.

**Fig. 32:**  
Sof-Lex finishing coarse disc was used to define the mesial and distal line angle at slow speed without irrigation.

**Fig. 33:**  
Sof-Lex finishing medium disc was used to reduce the surface roughness at a slow speed without irrigation.

**Fig. 34:**  
Sof-Lex finishing fine disc was used to smoothen the surface at high speed with irrigation.

**Fig. 35:**

Sof-Lex finishing super fine disc was used for final finish and shine at high speed with irrigation.

**Fig. 36:**

The secondary anatomy was obtained using Shofu white finishing stone to create undulation often referred to as the "Eiffel Tower". It is always important to evaluate the depth and the extension in the neighboring tooth so as not to exaggerate its presence.

**Fig. 37:**

Diamond-impregnated polisher was used for surface refinement at high speed with irrigation.

**Fig. 38:**

Buff was used for the final glass-like finish and polished at high speed with irrigation.

**Fig. 39:**

Final composite resin restoration immediately after the polishing procedure.

**Fig. 40:**

Life-like appeal to final restoration.

**Fig. 41:**

Note the natural integration of the composite resin with the dental tissue.

## Conclusion

The article demonstrates how using the right protocols and armamentarium for composite materials can give life-like results in a short time in a minimally invasive way. No single layering technique can ensure a 100% success rate. Regardless of the technique, establishing good secondary and tertiary anatomy and thorough polishing are the key steps that make a restoration look more natural. Composite is the perfect material for allowing correction of mistakes or improvement.

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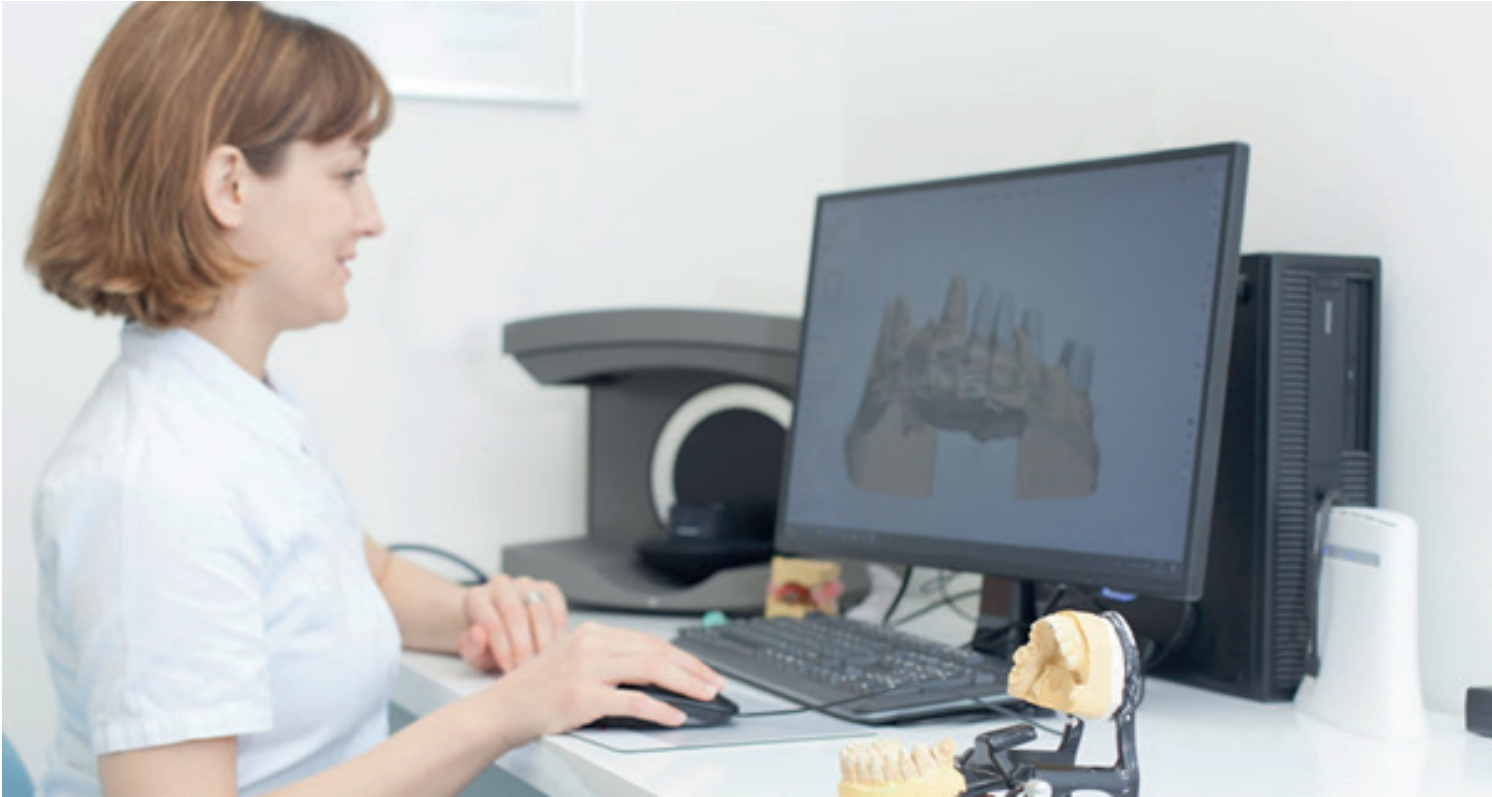
## About

Dr Neha Gupta graduated from D.Y Patil Dental College & Hospital, Navi Mumbai. Member of the Indian Academy of Aesthetic and Cosmetic Dentistry. Winner of Style Italiano talent and Podium Speaker at the 1st Style Italiano International Conference in India.



# Digital Dental Craftsman Convention for lab technicians

Interview with Drs. Pankaj Chivate & Vipin Mahurkar



Digital Dental Craftsman Convention 2023 aims to bring dental technicians and dentists under one roof of digital dentistry. (Image: Canva)

By Dr Rajeev Chitguppi,  
Dental Tribune South Asia

In this interview with Dental Tribune South Asia, Dr. Pankaj Chivate, the President of the Indian Society of Digital Dentistry (ISDD), and Dr. Vipin Mahurkar, the Organizing Chairman of the Digital Dental Craftsman Convention DDCC 2023 to be organized by ISDD in Oct 2023 in Mumbai explain the motivation behind founding ISDD and organizing DDCC, and their future plans.

**1. What was the motivation behind establishing ISDD, and who are its founders?**

**Pankaj Chivate:** The advent of digitization has brought about significant changes globally and has made a substantial impact in India. Digital technology is revolutionizing various fields of medicine, including dentistry, where tools like scanners, CBCT, CAD/CAM, 3D printing, and milling are transforming patient care. To keep pace with this rapid advancement in digital dentistry knowledge and technology in India, the "INDIAN SOCIETY OF DIGITAL DENTISTRY – ISDD" was officially founded in 2022 by a group of experienced and tech-savvy dentists. The founding members include Drs. Ratnadeep Jadhav, Vijay Tamhane, Pankaj Chivate, Sanjay Asnani, Suresh Ludhwani, and Kaustubh Patil. These founders, who are also multi-practice owners, share a deep passion for digital dentistry and are dedicated to promoting advanced, innovative training in digital dentistry in India, with the aim of enhancing the quality of dental work and creating new

opportunities for Indian dentists. Presently, we have been joined by 20 clinicians from various parts of India to expand ISDD's activities to different states.

**2. What is the current market size of digital dentistry, and how is it reshaping the dental industry in India?**

**Pankaj Chivate:** In terms of revenue, the global digital dentistry market was estimated to be valued at \$7.2 billion in 2023, and it is expected to experience a compound annual growth rate (CAGR) of 10.9% over the next five years, reaching \$12.2 billion by 2028. Furthermore, this market is projected to undergo substantial growth, with a value CAGR of 13.1%, ultimately reaching \$16.3 billion by the close of 2032.

Although digital dentistry's penetration in the Indian market is currently limited, we anticipate rapid growth over the next five years that will revolutionize the dental landscape in India. Presently, there are approximately 3,000 intraoral scanner users in India, and we foresee a remarkable tenfold increase in this number within the next five years. Digital dentistry will enable dentists to access expert opinions from specialists in various cities and receive high-quality lab work from different parts of India, thereby elevating the overall standards of dentistry in the country.

**3. What is the rationale behind organizing the Digital Dental Craftsman Convention (DDCC)?**

**Vipin Mahurkar:** The pace of evolution in digital dentistry is so rapid that both dental technicians and dentists face significant

challenges in keeping up with its advancements. DDCC is a sincere endeavor to bring together dental technicians and dentists in a single event. DDCC reflects our commitment to staying at the forefront of progress, embracing digital tools and technologies to create a transformative impact on the dental field. Dental lab technicians will get an amazing opportunity to gain awareness and training from innovative multinational companies, industry leaders, and accomplished speakers through lectures and demonstrations covering the latest developments in digital dentistry. The event is scheduled for October 21-22, 2023, in Mumbai. The venue Hotel Orchid is also very easy to reach as it is located just next to Mumbai domestic airport.

**4. What sets DDCC 2023 apart from other conventions?**

**Vipin Mahurkar:** DDCC stands out as the first-ever dental lab-focused event that offers technicians a much-needed platform to discover, learn, and network. It distinguishes itself by providing practical-oriented sessions for technicians who wish to embrace digital dentistry fully. The event encompasses all aspects of digital dentistry, including scanning, designing, milling, and printing, which will be demonstrated to attendees.

In addition to expert lectures and demonstrations, DDCC features a panel discussion on implant prosthetics and lab workflows, offering a troubleshooting session where participants can seek answers from industry experts. DDCC

offers a glimpse into the broader realm of dentistry, highlighting emerging trends and concepts that are poised to supersede current techniques and devices.

**5. Who would benefit most from attending DDCC? Who should consider participating in the event?**

**Vipin Mahurkar:** DDCC is highly beneficial for both dental technicians and dentists who aspire to master the art and science of dentistry by harnessing the power of technology and digital dentistry. The digital revolution has blurred the lines between dentists and dental technicians, requiring both to be well-versed in the latest changes in CAD designing, and fabrication through milling and printing. Digital Dentistry can elevate an average dental technician into a star performer who consistently delivers high-quality dental work. Therefore, attending DDCC and connecting with industry experts, innovators, and forward-thinking suppliers is an excellent investment in professional growth. This event provides a valuable opportunity for all dental professionals to learn from industry leaders and transform their mindset and approach.

**6. How can individuals register for DDCC 2023?**

**Vipin Mahurkar:** To register for DDCC 2023, visit the ISDD website to make an online payment. Alternatively, you can simply send your details via WhatsApp to +91 89839 34493, and our team will assist you with the registration process.

**7. What future events are planned by ISDD?**

**Pankaj Chivate:** After a highly successful convention in Pune last year, attended by more than 800 clinicians with 12 international speakers and 12 industry partners, we plan to hold such conventions bi-annually. Stay tuned for our next event scheduled for November 2024. Additionally, we are currently hosting the Digital Dental Craftsman Convention (DDCC), the first conference for dental technicians and dental practitioners, in Mumbai in October 2023. Furthermore, we are planning to host a digital dental conference for students in Gujarat early next year. Our aim is to continue fostering the growth and development of digital dentistry in India through these initiatives.

## About



Dr. Pankaj Chivate, the President of the Indian Society of Digital Dentistry (ISDD)



Dr. Vipin Mahurkar, Organizing Chairman, Digital Dental Craftsman Convention DDCC 2023

# How to handle complex endodontic cases

Interview with Dr Ruth Pérez-Alfayate



Dr Ruth Pérez-Alfayate will be a speaker at ROOTS SUMMIT 2024, which will be held from 9 to 12 May in Athens. (Image: ROOTS SUMMIT)

By Franziska Beier,  
Dental Tribune International

Registration for ROOTS SUMMIT 2024 is open, and the organisers would like to introduce some of the great speakers and their lecture topics for next year's event. One of them is Dr Ruth Pérez-Alfayate, an associate professor at the Faculty of Biomedical and Health Sciences at Universidad Europea in Madrid in Spain. In this interview, she introduces her lecture, titled "Complex diagnosis in endodontics", and explains why she decided to speak at the congress.

Dr Pérez-Alfayate, in some of the more complex endodontic cases, dental professionals have to use invasive tests in order to be able to make a clear diagnosis. For which cases are these invasive tests appropriate, and how do dental professionals keep a balance between invasive treatment measures and the desire to keep the treatment minimally invasive?

These tests might be appropriate when there is doubt about a vertical root fracture, when there is severe pulpitis, when more than one tooth is suspected of this pathology and is radiated, or when pulp necrosis needs to be identified in a patient presenting with a low pain threshold.

The balance, in my opinion, can be found when we understand

the expectations of our patients in the first instance. Patient safety, the concept of "do no harm" and minimally invasive treatment should prevail and must be a priority for us. All of these concepts can still be applied even when we need to use invasive tests for diagnosis.

In some cases, even after the use of diagnostic tests, the dental professional can be left with a high level of doubt. What is the reason for this?

The reality is that currently we do not have any test that is 100% objective. This means that one or two tests are not sufficient. We need to find a diagnostic protocol that gives us as much information as possible.

What are some of the endodontic diagnostic tests for complex cases, and why can they be challenging?

The diagnostic tests include exploratory surgery, selective anaesthesia and cavity testing. Deciding when or when not to use them is the challenge.

Are there any future developments in endodontic diagnostics that you can tell us about?

Some researchers are working on various devices, such as pulse oximeters, real-time ultrasound and ways to evaluate the actual pulp status before conducting treatment.

What will be the main learning objectives of your lecture at ROOTS SUMMIT 2024?

I will describe a diagnostic protocol for endodontists to enable them to understand which clinical situations require a complex diagnosis, and I will propose how they should act in these specific situations.

What made you decide to participate in the upcoming ROOTS SUMMIT?

I have attended this congress many times, and I have to say it is one of my favourites. Also, the organisers of ROOTS SUMMIT are three people whom I admire greatly, and when they ask you to come to their congress, it is impossible to say no—it is an immense privilege.

I know I will learn a great deal from the best and humblest endodontists in the world. I am sure this will be a great congress, and I hope to see as many people as possible there. Do not miss it!

## From the Editor's desk

For 20 years now, ROOTS SUMMIT meetings have been taking place around the world including Canada, the United States of America, Mexico, the Netherlands, Spain, Brazil, India, the United Arab Emirates and most recently Czech Republic in

2022. In 2024, ROOTS SUMMIT will be coming to Athens.

You can expect the great experiences that ROOTS SUMMIT participants always enjoy in addition to the same high-calibre level of clinical practice that members of the online endodontic study group have relied on for over 20 years.

This includes practical information provided by panelists from nine countries and technique tips that can be immediately incorporated into improving practice.

ROOTS SUMMIT 2024 will have participants joining from more than 50 countries,

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# Clinical trials begin for drug that regrows teeth



Japan pharma startup developing world-first drug to grow new teeth enters clinical trials. (Image:Toregem Biopharma & Canva)

By Dr Rajeev Chitguppi,  
Dental Tribune South Asia

Japanese scientists are on the brink of a dental revolution with their new drug that has sparked hope for growing teeth. Clinical trials are set to begin for Toregem Biopharma's drug that has successfully grown new teeth in animal test subjects.

In a remarkable breakthrough that could revolutionize dental healthcare, a team of Japanese scientists from the innovative pharmaceutical startup Toregem Biopharma are on the verge of introducing a groundbreaking drug that may enable the growth of new teeth. The development has garnered widespread attention and has raised hopes for individuals suffering from tooth-related issues.

At the forefront of this medical innovation is Dr. Katsu Takahashi, a distinguished researcher and the head of the dentistry and oral surgery department at the esteemed Medical Research Institute Kitano Hospital. Dr. Takahashi's tireless pursuit of a seemingly elusive dream – the regrowth of teeth – began in 2005 when he initiated extensive research at Kyoto University.

The foundation of their groundbreaking discovery hinges on a specific gene found in mice, known as USAG-1, which profoundly influences the development of their teeth. The scientists uncovered the gene's dual role, capable of either promoting or impeding dental

growth. The pivotal idea that emerged was to create a "neutralizing antibody medicine" designed to effectively block the adverse effects of the USAG-1 gene, thereby unlocking the potential for tooth regeneration.

Initial experiments conducted on mice yielded promising results as the new medicine induced the growth of fresh teeth, leaving the scientific community astounded. However, the team was not content to rest on their laurels; their ambition extended to validating their findings in animals whose dental patterns closely mirrored those of humans – ferrets.

The ferrets subjected to the experimental drug demonstrated remarkable tooth regeneration. It was a pivotal moment in their journey toward making tooth regeneration come true.

The upcoming phase in this extraordinary odyssey is nothing short of monumental – human trials. The Toregem Biopharma team is poised to commence clinical trials as early as July 2024, marking a critical juncture in their quest to make transformative medicine available to the masses. Their ambitious goal is to bring the drug to market by 2030, ushering in an era where individuals with dental issues can regain their smiles.

However, this story is not solely about adults seeking to replace lost teeth; it carries a message of hope for a select group of children. Those afflicted by anodontia, a rare genetic

disorder that results in the absence of six or more baby and/or adult teeth, may find solace in the fact that a clinical trial tailored to their specific needs is slated to commence in 2025.

In conclusion, the chronicle of Toregem Biopharma's relentless pursuit of dental innovation is nothing short of a scientific marvel. The prospect of regrowing teeth has shifted from the realm of dreams to the brink of reality, and it is a testament to the ingenuity and dedication of these visionary scientists. As we stand at the precipice of a dental revolution, the ability to regrow one's teeth may soon be within our grasp.

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# A rare variation in the root canal anatomy of a premolar



Sound knowledge of anatomical variations is essential for excellent endodontic outcomes. (Image: Canva)

morphology before initiating the treatment. Mandibular premolars are usually single-rooted. The present case shows a variant with two canals. A patient presented with a large draining buccal abscess that showed a large periapical lesion with an incompletely obturated canal on the pre-operative intraoral radiograph. The application of cone beam computed tomography (CBCT) in the diagnosis and management of endodontic cases is rising steadily.<sup>3</sup> The patient was sent for 3-D imaging (CBCT) for more details and a precise diagnosis.

The CBCT imaging revealed the following findings with tooth 34

- A partially endodontic treated 34.
- Single root with the canal bifurcating about 10.5 mm below the crown to form buccal and lingual canals.

By Dr Shail Jaggi

I start my editorial journey today as the editor of Endodontics & Biomimetic Dentistry with two topics in mind:

1. The exploration of biomimetic approaches, delving into the fascinating realm of mimicking nature to restore and enhance dental function! Quite excited and so looking forward.
2. The science of endodontics is witnessing interesting new developments, where lasers seem to be making a comeback. Should we be looking out for laser-empowered endodontics? I will cover this in one of my future editorials.

With this new role of writing, I look forward to promoting excellence in dentistry and optimal patient care.

Good endodontics is the foundation for any great dental work. The philosophy and techniques in endodontics have

evolved tremendously in the last 30 years, and thanks to more research and advanced CT studies carried out on large samples, we are now aware of the vast and complex possibilities of the internal anatomy of single-rooted as well as multi-rooted teeth.<sup>1,2</sup>

The Vertucci classification shows variations in the different anatomy configurations in premolars.

	Classification	Configuration pattern
a	Type I	1-1
b	Type II	1-2-1
c	Type III	1-2
d	Type IV	1-2-1-2
e, f, g	Additional types	1-3-2; 1-3; 1-2-3

(Table 1. Vertucci's classification for premolars)

Variant anatomy is one of the biggest challenges in endodontics that necessitates a better understanding of canal



Fig. 2: Pre-op radiograph.

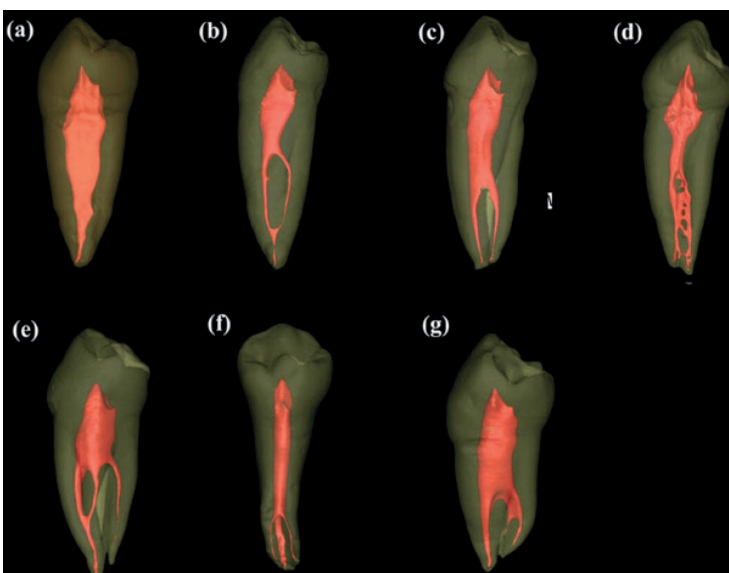


Fig. 1: Vertucci Classification-Premolars.



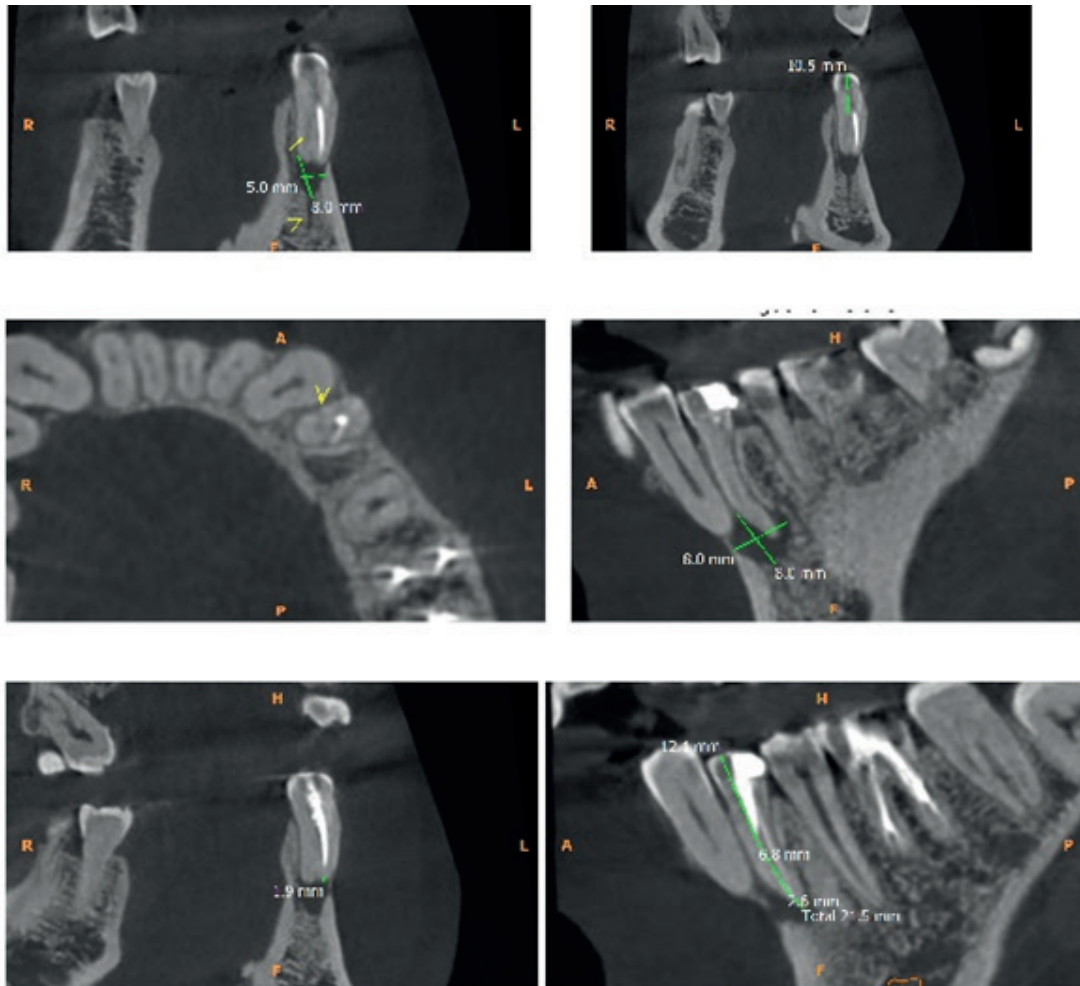


Fig. 3: Scan sections.

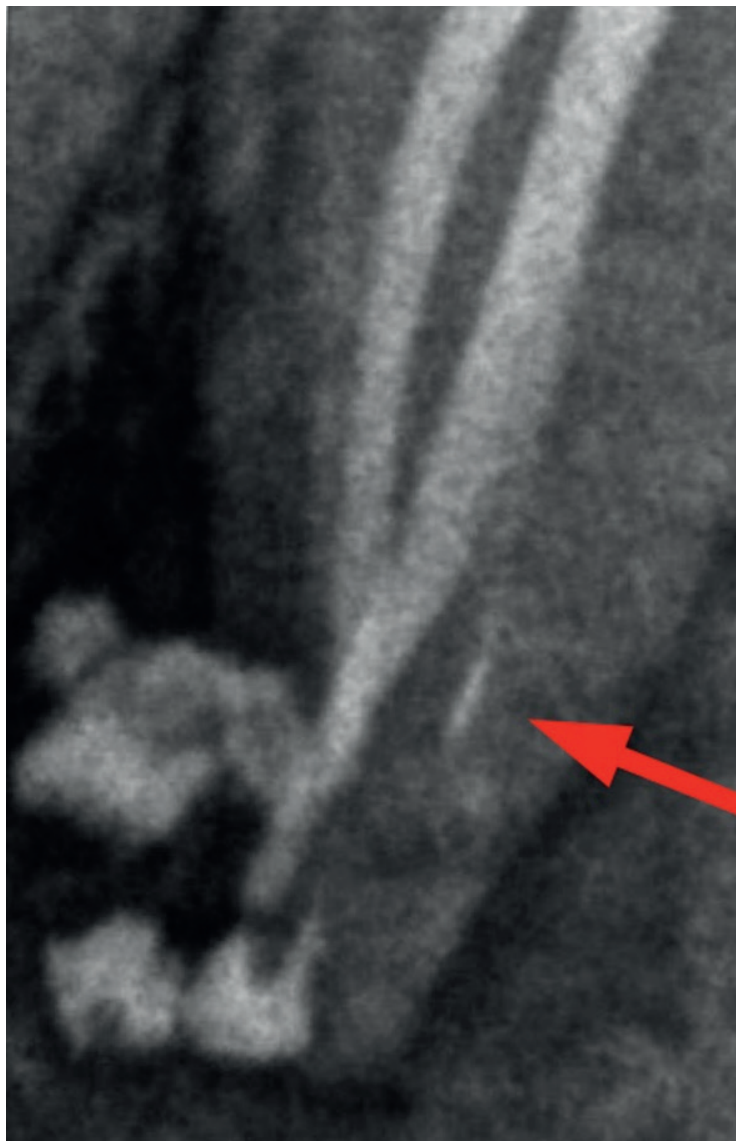


Fig. 5: Lateral exit.

- Buccal canal filling short of apex.
- Missed lingual canal space noted. A suspected perforation involving the mesial dentinal wall along the mid-canal region (near the bifurcation).
- Large periapical lesion measuring 8.0 x 8.0 x 5.0 mm perforating buccal plate along with mild external root end resorption. (Fig. 3)

#### Treatment plan

The use of magnification is becoming more common in endodontic practice, increasing precision and treatment success rate.<sup>4</sup>

Re-treatment was initiated under magnification with a Dental Operating Microscope that helped us locate the missing canal.

Close examination and canal exploration showed no perforation.

The canal was disinfected under isolation with a 5.5% sodium hypochlorite solution, and a calcium hydroxide dressing was placed for three weeks, followed by obturation with a bioceramic sealer by a 3-D obturation technique.

The case can be classified as type 1-3-1 of the Additional group of Vertucci Classification (Figs. 4 & 5).



Fig. 4: Post-op xray.

## Discussion

Literature has documented multiple variations in canal configurations of the lower bicuspid. The current case shows a variation in Vertucci Classification Additional type 1-3-1.

The case was treated and the lingual canal was missed out leading to a large periapical lesion and drainage. 3-D imaging revealed a single root and a missed lingual canal. The internal anatomy was complex, and if you observe the post-operative radiograph closely, it shows the presence of a small lateral canal with an independent exit.

This brings us to discuss the significance of good irrigation protocols during endodontic treatment. Successful filling and sealing of lateral canals depends on good irrigation and disinfection techniques.

## Conclusion

This clinical case shows a rare root canal configuration of 1-3-1 and highlights the importance of knowing the variant morphology of a mandibular bicuspid, reminding us that every endodontic case needs full attention to detail on close inspection of the radiographs before making the diagnosis and treatment plan.

Sound knowledge of anatomical variations in anatomy is essential for excellent clinical outcomes. A combination of knowledge, tactile sensation, good radiographic technique, 3-D imaging, followed by magnification, perfect isolation, and irrigation, along with adequate 3-D sealing of the canals lead to successful endodontic outcomes.

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## About

Dr Shail Jaggi, MDS is a micro-endodontist and restorative dentist practicing for over 25 years dedicated to advanced endodontics and cosmetic dentistry. Dr Shail has a multi-specialty 5-chair practice 'Dentalwiz' on weekdays, and her weekends are dedicated to training programs at Dentalwiz Smile Institute - her exclusive training center