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EDSA

Magazine



edsa

European Dental
Students' Association

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FROM THE EDITOR TEAM



Dear EDSA Family,

Since our last meeting in Coimbra, I was thinking about how I will feel when the term ends and unfortunately, here we are. It was a very productive and successful year with our lovely Board Members. My first thank you goes to them. I'm so grateful about our journey together.

And this issue you are reading now is a masterpiece from the students who are passionate about dentistry. I want to thank all of the authors for their excellent work and interest to be a part of this issue. And of course to my Co-Leads, for their hard work and dedication. Let's raise our voice together even more and always keep working! Hope you enjoy our magazine and gain new knowledge about dentistry. I wish you all a wonderful meeting and a great week in Dublin!

Buse Saraç, TR
EDSA Vice President of Public Relations



Dear EDSA Readers,

This magazine came together through shared ideas, long conversations, and the excitement of creating something that speaks to who we are—not just as future dentists, but as students eager to learn, connect, and grow. Each piece in this issue comes from someone who chose to stand up—to contribute, to question, and to be heard. And that, to me, captures the spirit of EDSA. We promise this magazine contains zero leprechauns, but plenty of golden ideas. (Still, if you see one in Dublin, let us know.) We hope these pages remind you that every idea shared can lead to new questions, new friendships, and new beginnings.

Warm Regards,
Enes Istanbul, TR
Co-Editor



Dear Readers,

The creation of this magazine has been a rewarding collaborative effort, drawing on the expertise of our distinguished contributors and the dedication of our editorial team. Each article has been carefully selected to reflect the latest advancements, challenges, and innovations in dentistry, ensuring that our readers stay informed and inspired in an ever-evolving field. This particular edition serves as a platform for collaboration and shared learning. Dive in, explore new perspectives and stay engaged with the latest advancements in dentistry.

Kind Regards,
Darja Gostilo, LV
Co-Editor



Dear Readers,

It is with great pleasure that we present to you the EDSA 2025 Summer Edition – Dublin Series. In this issue, you will find a diverse collection of articles that reflect both the scientific and social spirit of our community—combining up-to-date dental knowledge with engaging and accessible content. I am sincerely grateful to be part of such a dedicated editorial team and to have had the guidance whose professionalism and generosity continue to inspire me. We hope that this issue informs, inspires and connects you—wherever you may be reading from. I look forward to meeting many of you in person at the next EDSA meeting.

Kind Regards,
Furkan Sarp Tavukçuoğlu, TR
Co-Editor

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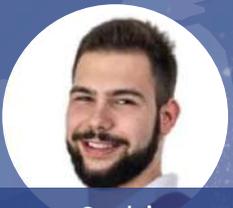
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PRESIDENT OF EDSA

My Dearest EDSA Family,

As I write these lines, I find myself on an emotional rollercoaster. If you're here in the beautiful city of Dublin – welcome to a week full of learning, laughter, and unforgettable memories! And if you're reading from afar, I hope this message brings you a little piece of the warmth we're sharing here together.

This meeting marks a very special chapter in my life. It is not just another stop along the way – it's the culmination of a six-year journey that began when I joined EDSA as a first-year dental student. From that moment, EDSA became more than just an organization – it became my second home, a place where I felt safe, supported and inspired. I'm someone who values belonging deeply and from the very beginning, that sense of belonging was rooted in this association. And today, I feel nothing but joy and pride to serve as the President of this incredible family.

Before I even knew the ABCs of dentistry, I had already found myself here – surrounded by people who made me feel seen and valued. What began as simple participation at the EVP Zagreb in 2020 – and continued with my first General Meeting at EDSA Košice in 2021 – grew into something far beyond my imagination. There, I met the people who were leading EDSA at the time – some of whom would later become Presidents themselves. I was so inspired by their passion, their confidence, and the way they created space for others. That *spark of this is where I want to grow* was lit then and there. Now, standing at my ninth meeting – and my last as a Board member – I can't help but feel a deep sense of gratitude. From the first moment on, EDSA – every peer, mentor, and teammate – helped shape not only my professional path, but also the person I've become. Many of the people who once inspired me have now become my closest friends. More than that – they've become my family. Among them were also the ones who saw something in me long before. To the friends who encouraged me and have walked beside me on this journey – thank you.

To my incredible team – my dearest Board, thank you! Your energy, ideas and unwavering support made this year truly special. Because of you, EDSA continues to thrive. Thank you for being by my side through every challenge and every success. Your dedication, teamwork and friendship were the foundation of everything we built together this year. I couldn't have wished for a better team to share this chapter with.

To our amazing delegates and members – thank you for believing in this association, for showing up, for sharing your voices and for shaping EDSA into the vibrant, welcoming and ever-evolving community it is today. Our passion and commitment are the heartbeat of this family. You are the keystone. And thank you for trusting me with this role – it's been a great honour.

A heartfelt thank you to the Local Organizing Committee here in Dublin. You've brought this meeting to life with remarkable work, dedication and care. You created not just a meeting – but a memory we'll carry with us forever. Thank you for your energy, patience and generosity throughout this journey.

And finally, to Saule – my teammate, my sister. Thank you for the past three years of working side by side. It's been a privilege to witness your strength, dedication and heart firsthand. I'm incredibly proud to see you step into this role and I have every confidence that you will lead EDSA with the same grace, heart and calm determination you've always shown.

Though this chapter closes, the people, lessons, and memories will remain with me always, close to my heart. Saying goodbye is never easy – maybe that's why I'll just say... *see you soon*.

I know that EDSA will continue to grow, to dream, and to lead with purpose. I leave with a full heart and unshakable belief in all of you – and in all that's yet to come. Here's to the memories we've made, the legacy we continue to build, and the bright future ahead.

With all my heart,

Ezgi Yeşiltan
EDSA PRESIDENT



PRESIDENT-ELECT OF EDSA

Dear EDSA Family,

I am truly honoured to address you for the first time as President-Elect of the European Dental Students' Association. It feels surreal to be writing these words, knowing that soon I will have the privilege of leading an organisation that has given me so much.

What began as a simple curiosity to explore something new has grown into one of the most defining journeys of my life. My EDSA experience began in 2022, when I attended EDSA Summer Camp in Dubrovnik. What started as just another event turned out to be the beginning of one of the most meaningful experiences of my life. Soon after, I became the Vice President of External Affairs of the Lithuanian Dental Students' Association, which opened the door for me to represent my country as a delegate to EDSA. From there, I took on the role of Social Media CoLead, working closely with our then Community Manager, Ezgi. In Liverpool, I was elected Community Manager, where I had the opportunity to lead EDSA's digital rebranding. Later, in Strasbourg, my passion for advocacy and representation led me to apply for my current position as Vice President of External Affairs. In this role, I have worked tirelessly to expand our international partnerships, improve transparent communication, and strengthen EDSA's presence at the European level.

Like many of you, I joined EDSA without fully realising how deeply it would impact my life. Once you experience the joy of working together with such passionate people, creating projects that matter, and building connections across Europe, it becomes hard to imagine your student life without it. EDSA has shaped my skills, my vision, and my future. It has shown me that students can be powerful advocates for change, that our voices matter in shaping dental education, and that together we can drive meaningful projects in research, dental education, mobility, and representation. One of my proudest memories so far is standing in front of all of you in Coimbra, Portugal, where I was entrusted with the responsibility of becoming the next President of EDSA.

In the coming year, I will work hand in hand with the current Executive team to ensure a smooth transition while preparing to lead our organisation into its next chapter. My priorities as President will focus on advocacy, student involvement, the improvement of dental curricula, and research - empowering delegates to take the lead in meaningful projects, strengthening our international collaborations, and ensuring that EDSA remains a strong and united voice for all European dental students. I am incredibly excited to meet my new team, and I am confident that together, we will achieve great things for EDSA.

I wish you all a productive meeting and a successful academic year. See you in Dublin!

Kind regards,

Saulė Skinkytė
EDSA PRESIDENT-ELECT



CONTROLLING THE FLOW : HEMOSTASIS STRATEGIES IN ORAL SURGERY

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Bleeding is one of the most things that makes many of us nervous in dental school. Whether during a simple scaling session or a complicated extraction, bleeding can feel intimidating but it doesn't have to be. With the right knowledge, tools and mindset; stopping the bleeding becomes a manageable process, even a routine part of dental practice. This article explains the essential techniques and principles of achieving hemostasis in dental care, from everyday procedures to unexpected emergencies.

WHAT CAUSES BLEEDING?

Did you know the oral cavity is one of the most vascularized regions in human body? This means even a minor trauma can lead to significant bleeding. Routine procedures like tooth extractions or deep scaling, disturb gingival tissues and blood vessels and trigger the natural hemostatic process.

However, not every patient has the same bleeding process. Local factors such as inflammation or infection can increase vascular permeability and the risk of bleeding. Systemic issues also play a role. Patients with platelet problems, coagulation disorders or excessive fibrinolysis -inherited or acquired- or the ones under medication, like warfarin or DOACs are more likely to bleed excessively and for longer durations. [1]

COMMON SITUATIONS

Some dental procedures are more prone to bleeding than others. Tooth extractions, for instance, are among the most common causes. It includes 3 types of bleeding phase which are primary bleeding (during surgery), reactionary, which happens 3 hours after due to vasoconstriction stop and secondary, happening 7-10 days after the procedure due to infection.[2] So while extracting teeth special attention should be given to patients with conditions like hemophilia or von Willebrand Disease or patients who are under medication.[3] Periodontal surgeries also come with significant bleeding, especially in inflamed tissues. Also accidental oral trauma can result in extensive soft tissue bleeding, particularly in the lips, cheeks, or tongue.[4]

METHODS

When it comes to hemostasis, there are three general strategies: mechanical, chemical and thermal. When making our clinical decision we should consider the surgical location, the site of bleeding, the size of the wound, the accessibility, timing and last but not least the potential of systemic diseases of the patient.[5]

1)MECHANICAL METHODS

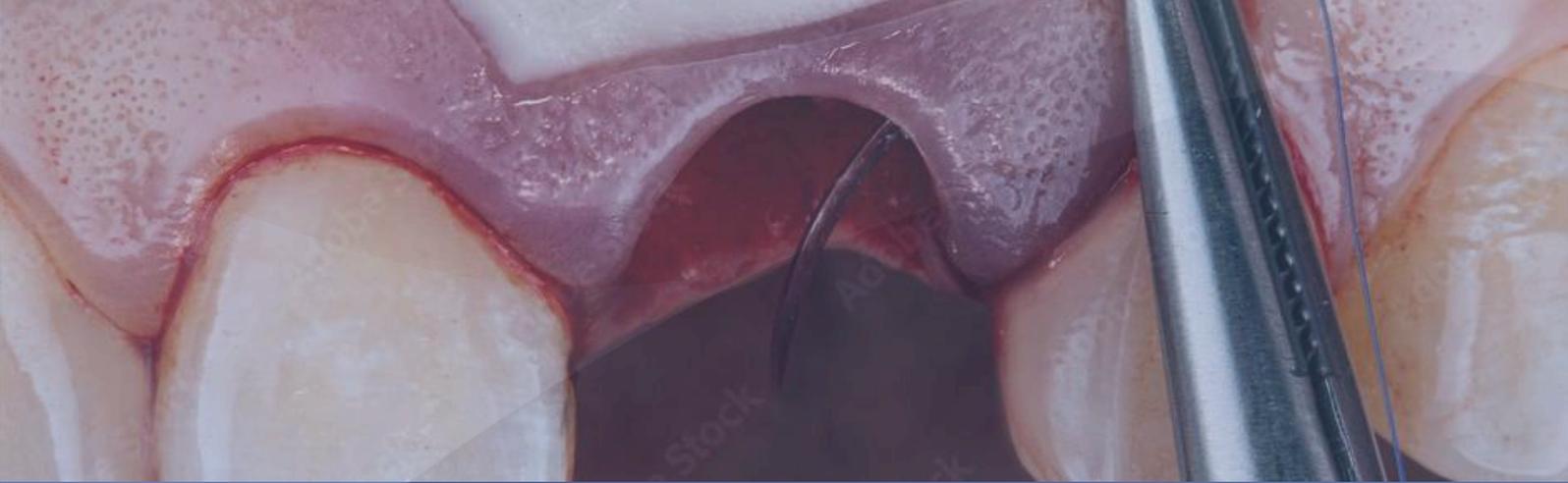
The simplest and often the most effective method is applying pressure with gauze on the surface in the region of the socket or trauma, compressing buccolingual plate, putting sterile gauze and asking the patient to bite down firmly for 15 minutes on average. In many cases, this is enough all alone.

Suturing is another mechanical method that helps approximate tissues and compresses blood vessels, encouraging clot formation.[6]

2)CHEMICAL AGENTS

There's a wide array of topical hemostatic agents designed to support clotting. Epinephrine-soaked gauze not only helps by vasoconstriction but also keeps the area dry. Ferric sulfate is also commonly used in pediatric pulpotomies or during crown preparations. Oxidized cellulose (e.g. Surgicel) and collagen sponges can be placed into sockets or wounds, promoting clotting and acting as a scaffold too.[7] More advanced agents like tranexamic acid, as an antifibrinolytic, often being used as a mouthwash post-operatively in anticoagulated patients.[8]





3) THERMAL METHODS

Cauterization is less common in general practice but can be life-saving in surgical settings. Devices like electrosurgical units are used to coagulate small bleeding vessels quickly and efficiently.[9] Also a publication in BioMedicine states that laser assisted tooth extraction can decrease the bleeding during the operation. [10]

BLEEDING RISKS TO WATCH OUT FOR

As previously referred, there are some patients that require special attention. Patients under medication may bleed longer or more heavily than expected. However, recent researchers ensure that anticoagulant therapy should not be stopped before dental procedures, as the risk of a thromboembolic event usually outweighs the bleeding risk.[8] Additionally, antifibrinolytic agents, such as tranexamic acid, are very beneficial. Patients with inherited bleeding disorder need collaboration with their doctor. A thorough medical history is the best tool to prevent surprises.[3]

BLEEDING AT HOME: WHAT'S NORMAL?

Post-operative bleeding can be worrying for patients - and stressful for students answering the phone. Slight oozing for a few hours is normal, but if bleeding after clot dislodgement (especially if they rinse, spit or smoke), the patient should apply firm pressure with gauze for 20 minutes. If bleeding persists, they must return to the clinic.[2,5] It's important to give clear instructions on what to expect and what to do. Patients should avoid hot food, vigorous rinsing and physical exertion for at least 24 hours. It helps to reassure them that some saliva-tinged blood is normal and looks worse than it is.[4]

STUDENT SURVIVAL TIPS

For students, dealing with bleeding can be stressful. But with a little preparation and experience, it becomes manageable.

Here are a few tips:

Always review the medical history.

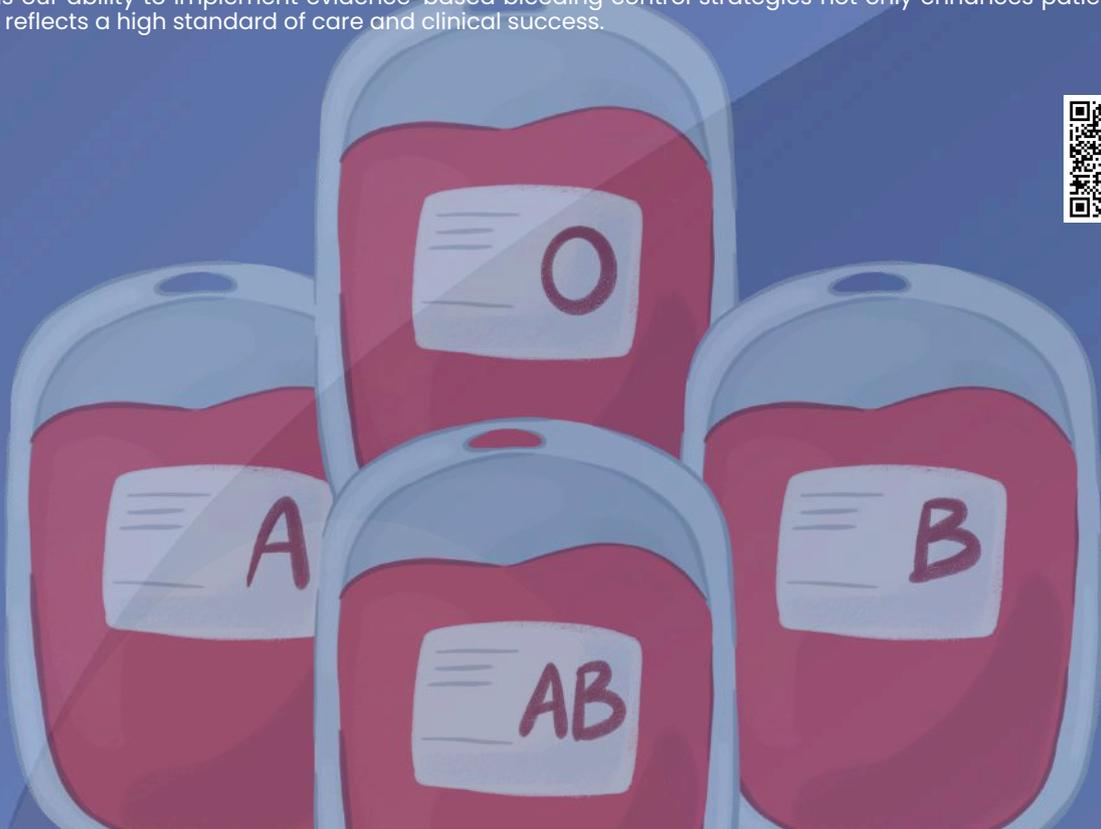
Keep hemostatic agents ready.

Stay calm. Even if it seems dramatic, remember most bleeding can be controlled with pressure and time.

Do not be afraid to ask for help.

CONCLUSION

Taking everything into account, stopping the bleeding is more than a clinical skill, it's a confidence builder. The ability to stay composed and choose the right technique in each case is essential. After all, as future dental clinicians our ability to implement evidence-based bleeding control strategies not only enhances patient safety but also reflects a high standard of care and clinical success.



HYALURONIC ACID : AS REVOLUTINARY FOR DENTISTRY AS IT IS FOR DERMATOLOGY?

Cocian Maria-Alexandra

Iuliu Hatieganu University of Medicine & Pharmacy, Romania
4th Grade



Given the rise in popularity of achieving a perfect face and the constantly rising beauty standards on social media, hyaluronic acid fillers have become a popular topic and their effects have mainly been recognised, especially when it comes to maintaining a youthful appearance. However, hyaluronic acid has also been used in treating pathologies in the field of dentistry, assisting oral surgeons and periodontologists. The ever-evolving competitive field has maintained a high demand for quality dental care; therefore, hyaluronic treatments are subject to ongoing research and testing in hopes of achieving the best results. (11)

WHAT IS HYALURONIC ACID? HOW IS IT MADE?

Hyaluronic acid is a complex sugar molecule naturally present in the body, such as in the eyes, skin and joints. Various cell types, including fibroblasts, keratinocytes, synoviocytes and chondrocytes, produce it using specialised enzymes to help retain moisture (it can hold up to 1,000 times its weight in water, acting as a molecular sponge) (1) and provide tissue structure by helping maintain shape and volume. It also plays a part in wound healing, cell migration and proliferation.(10) Given the decrease in natural production as we age and its involvement in numerous biological processes, hyaluronic acid has applications of interest to multiple fields and is subject to increased artificial production to support therapeutic supplementation. This molecule has a wide distribution in nature, thus providing multiple possibilities for extraction and production. The industry relied primarily on animal sources such as shark cartilage, pig skin, synovial fluid (2) and rooster combs. However, the complex protocols required for the success of this technique, combined with the rise of ethical concerns, have prompted scientists to pursue alternative approaches, including microbial fermentation, the utilisation of agricultural waste and synthetic production methods.

DENTISTRY APPLICATIONS

As previously mentioned, hyaluronic acid also demonstrates significant efficacy in dental applications.

Notably, its benefits in post-extraction procedures have been well-documented. Complications and accidents such as bleeding from the alveolar socket, osteomyelitis, alveolar osteitis, and oro-antral fistula emphasise the importance of good post-extraction healing, primarily when associated with comorbidities. HA plays a significant role in wound healing, offering structural support by integrating with the fibrin clot. Marin S and her friends reported, in a study examining how well HA promotes wound healing after tooth extraction in patients with uncontrolled type 2 diabetes, a statistically significant improvement in wound closure rate where HA was applied. (3)

Another study, conducted by Mostafa and his friends reported that HA applications boost the socket healing rate. (4) Pain, swelling and trismus have also been shown to be reduced due to HA applications in a study conducted by Yilmaz and his friends, which showed significant improvements in the treated groups. (5)

Considering that aesthetics in dentistry heavily depends on symmetry, periodontology also benefits from the HA fillings in "Black Triangles" from papilla loss and gingival recession. The loss of the interdental papilla disrupts the natural contour between the teeth, giving an unesthetic look. In a study aimed at assessing the effect of injecting hyaluronic acid gel for the reconstruction of deficient interdental papilla, Abdelraouf and his friends revealed the effectiveness of HA. (6)



In a clinical case presentation, Corte Sánchez reported favourable results when using HA to regenerate papilla on a 24-year-old female patient. (7) When it comes to gingival recession, a trial conducted by Pilloni, showed a significant increase in complete root coverage in the test groups where HA was utilised.(8) A systematic scoping review acknowledges the improved clinical outcomes on the gingival recession when HA is used. However, it recognises the limitations created by short-term follow-up periods. (9)

While recent breakthroughs indicate potential clinical benefits of HA fillings, certain limitations must be acknowledged. Notably, in most cases, HA effectiveness was enhanced through combination with other adjuvant substances and integrated treatment protocols, making it difficult to isolate and validate the independent efficacy of HA alone. Additionally, the limited long-term data in many studies and variability in application protocols and follow-up periods should serve as an indicator of the need for further research.

CONTRAINDICATIONS

As with any medical intervention, HA carries the potential for adverse reactions. Patients with documented severe allergic reactions or hypersensitivity to any components should be advised to consider alternative therapeutic approaches. The most common reactions are pain, bruising, redness, itching, and swelling. A key clinical consideration is that HA toxicity is reversible through administration of hyaluronidase, an enzyme that degrades the injected product. This reversibility significantly reduces procedural risk and enhances acceptance among both medical professionals and patients.

THE FUTURE OF HA

The use of HA fillers in dentistry is promising, especially when integrated into complex treatment plans. Identifying the optimal molecular weight for specific tissues, as well as developing more effective synthesis methods, represents promising future research directions that could significantly impact dental practice advancement.

In conclusion, although further research is needed to fully understand the benefits and potential of this molecule, it should be considered as it offers a more pleasant treatment option compared to existing procedures and represents a step forward in this rapidly advancing field. Investing in the development of new techniques is a moral duty and demonstrates dedication and passion for the well-being of patients.

MINIMAL RISK FACTORS

If the patient is a suitable candidate, hyaluronic acid (HA) fillers should be considered due to their superior safety profile and minimal preparation requirements. Unlike surgical procedures, HA treatment does not involve invasive techniques such as incisions, sutures or flap elevation, thereby eliminating the need for local anaesthesia. Another significant advantage is the biocompatibility and reversibility of HA. As a substance naturally present in the human body, HA carries a low risk of immunologic rejection. Furthermore, its biodegradable nature allows for flexible treatment adjustments through follow-up injections. Moreover, patients often exhibit greater acceptance of non-invasive approaches, which helps reduce pre-procedural anxiety and may eliminate the need for anxiolytic premedication.



ESTHETIC DENTISTRY : COMBINING DENTAL TREATMENTS WITH SOFT TISSUE FILLERS

Arta Kasami

Ss. Cyril & Methodius University, North Macedonia
2nd Grade



WHAT ARE SOFT TISSUE FILLERS?

Soft tissue fillers are gel-like substances, mostly made of hyaluronic acid, a naturally occurring molecule in the body. This substance attracts and holds water and helps to restore volume and shape to soft tissues that have lost fullness due to aging, trauma, or diseases [1]. While soft tissue fillers are well-known in cosmetic dermatology for facial rejuvenation, their application in dentistry has become increasingly popular. Dentists now use fillers to improve the appearance of oral soft tissues such as gums and lips, which play a crucial role in smile aesthetics [2]. The treatment is minimally invasive, with quick results that usually last between six and eighteen months, depending on the filler type and injection site [3].

WHY COMBINE FILLERS WITH DENTAL TREATMENTS?

Traditionally, aesthetic dentistry has focused on the teeth themselves—through whitening, restorations, implants or orthodontics. However, a smile's overall attractiveness depends equally on the supporting of soft tissues [4]. Common problems like gum recession, loss of interdental papillae (the small triangular gum between teeth), thin lips and facial volume loss can affect how the smile is perceived. These soft tissue issues may be resulted from periodontal disease, trauma, aging or tooth loss [5]. Soft tissue fillers complete dental treatments by restoring volume to gums and lips, reshaping contours and providing better facial support. For instance, after dental implant placement, fillers can help recreating natural gum shapes around the implant and improving esthetic integration [6]. In orthodontic cases, fillers can address gaps caused by gum tissue loss. The combined approach enhances the final outcome and patient's satisfaction [7].

HOW DO FILLERS WORK?

Hyaluronic acid-based fillers work by physically filling spaces and attracting water molecules. This hydrates and plumps soft tissues where volume has been lost [1]. Dentists inject the filler precisely into targeted areas, such as the interdental papilla to close black triangles, around implant-supported crowns to improve gum contour, or into lips to restore fullness and improve facial harmony [3]. Since hyaluronic acid naturally breaks down over time, results are temporary. Most patients require maintenance treatments every six to eighteen months to sustain the benefits [2]. Dentists use various injection techniques, including linear threading and bolus injections, tailored to the treatment area to ensure that there are smooth, natural-looking results [8].

CLINICAL APPLICATIONS IN DENTISTRY

CLOSING BLACK TRIANGLES

These dark spaces between teeth appear when the interdental papilla is lost or receded. Black triangles are unaesthetic and can lead to food trapping and hygiene difficulties. Fillers restore the volume of the papillae, improving the smile's appearance and oral health [6].

GUM CONTOURING AROUND RESTORATIONS

After dental implants or crown replacement, gum recession or uneven tissue can compromise the natural look. Fillers are used to sculpt the gingival margin, creating smooth and symmetrical contours that blend restorations make seamlessly to natural tissues [7].

LIP AND VESTIBULAR SUPPORT

Tooth loss and aging often reduce lip fullness and the depth of the oral vestibule—the space between lips and gums. This reduction affects facial support and denture stability. Injecting fillers restores volume, improving facial aesthetics and comfort, especially for denture wearers [5].



MANAGING GUMMY SMILES

Excessive gingival display (gummy smile) can be distressing. In selected patients, fillers can subtly support and lift the upper lip, decreasing the amount of gum shown when smiling [9].

REJUVENATING PERIORAL SOFT TISSUES

Age-related volume loss causes soft tissues around the mouth to get thinner, leading to wrinkles, fine lines and a fatigued appearance. Fillers restore lost volume and improve skin elasticity, complementing dental rejuvenation treatments and providing a youthful, harmonious smile [3].

SAFETY AND SIDE EFFECTS

When administered by trained dental professionals, soft tissue fillers are generally safe. Common side effects include mild swelling, redness, bruising or tenderness at the injection site, usually resolving within a few days [10]. Although rarely, serious complications such as infections, allergic reactions, or vascular occlusion can occur. Therefore, a thorough understanding of facial anatomy and proper injection technique is critical [11]. Patient screening is essential to identify contraindications such as active infections, autoimmune diseases, allergies to filler components or other health concerns [12]. Educating patients about possible side effects, risks and aftercare instructions ensures informed consent and improves patient confidence [10].

COMMUNICATION AND TREATMENT PLANNING

A successful outcome depends heavily on clear communication. Dentists should discuss patients' expectations, aesthetic goals and explain the nature of fillers—including their temporary effect and the need for repeating treatments [9]. A detailed medical and dental history is necessary to avoid complications. The dentist and patient should collaboratively develop a treatment plan that integrates fillers with dental procedures like implants, crowns or orthodontics for optimal results [8]. Informed consent must be obtained after patients fully understand the benefits and risks of combined treatment [12].

FUTURE PERSPECTIVES

The use of soft tissue fillers in dentistry is rapidly growing and evolving. New filler materials and injection techniques continue to improve safety, durability and aesthetics [13]. Future dental care is increasingly combining fillers with restorative and orthodontic treatments to produce more natural, balanced smiles [6]. Dental education is also adapting with more emphasis on facial aesthetics and soft tissue management becoming integral parts of the curriculum [14]. This ensures future dentists are well-prepared to offer comprehensive aesthetic treatments. Overall, combining dental treatments with soft tissue fillers represents a holistic approach that prioritizes both function and appearance, enhancing patient confidence and satisfaction [4].



BRUSH SMARTER : TACKLING WITH PERIODONTAL DISEASES WITH INTERDENTAL BRUSHES

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Dicle University, Turkey
2nd Grade



INTRODUCTION

Many dentists encounter a wide range of oral health issues among their patients, including infections, cavities, gum bleeding, tartar (calculus), bad breath (halitosis) and especially periodontal diseases. Periodontal diseases are typically diagnosed through clinical examination using periodontal probing, observing signs such as red or receding gums and with radiographic imaging like panoramic or retroalveolar X-rays. Prevention and protection are essential to maintain oral health and avoid various diseases and conditions. Periodontal diseases are chronic inflammatory conditions caused by microbial biofilms and influenced by the immune system's response. They give damage to the supporting structures of the teeth such as the gum, periodontal ligaments and jawbone. Common symptoms include gum inflammation, bleeding while brushing, gum recession, bone loss and in severe cases loss of teeth.



The most common forms of periodontal diseases are gingivitis and periodontitis. Gingivitis is a reversible inflammation of the gum that does not involve tissue destruction. However, if they are being left untreated, they may progress to periodontitis, an irreversible condition that destroys the attachment between the teeth and their supporting structures. Periodontitis is also linked to the systemic health conditions such as diabetes, leukemia and Down syndrome. Proper toothbrushing, reducing sugar intake and avoiding alcohol, smoking, or vaping can help preventing the progression of periodontal diseases. However, regular brushing alone is often not enough. This is where interdental cleaning tools become essential. This article explains how interdental brushes can help to manage periodontal diseases effectively.

WHY ARE INTERDENTAL BRUSHES SO EFFECTIVE?

Interdental brushes are especially effective in cleaning teeth affected by periodontal diseases because they reach to the areas where gum problems tend to develop. Interdental brushes remove plaque and food debris from the tight spaces between teeth that toothbrushes and even flosses fail to reach. If they stay uncleaned, these spaces become a breeding ground for harmful bacteria such as *Porphyromonas gingivalis* and *Tannerella forsythia*, which thrive in oxygen-poor environments and contribute to inflammation, periodontal pockets and bone loss. As gum recession progresses in periodontal diseases, the gaps between teeth become wider, making dental floss less effective due to its uniform shape and limited contact surface. Interdental brushes, available in various sizes, can be selected to fit each unique space, offering more comprehensive cleaning and greater surface coverage.

Over time, regular use of interdental brushes can lead to reduce bleeding, shallowing periodontal pockets and improve gum-to-tooth attachment. For patients with periodontal diseases, consistent use can significantly reduce discomfort and slow disease progression.



HOW TO USE INTERDENTAL BRUSHES?

An interdental brush is a small, cylindrical brush designed to clean the areas between the teeth, that a regular toothbrush can't reach. It looks like a tiny pipe cleaner and comes in different sizes to accommodate various interdental spaces. These brushes help removing trapped food, plaque and bacteria, reducing gum inflammation and preventing periodontal diseases' progression. Interdental brushes are especially recommended for patients with gum diseases, recessions or orthodontic appliances. Compared to dental floss, they are easier to handle, more effective in removing plaque and better suited for individuals with larger interdental gaps.

ARE THEY MORE EFFECTIVE THAN FLOSS?

Interdental brushes are proven to clean as far as 2–2.5 mm below the gumline. According to the 2015 consensus from the European Federation of Periodontology, "cleaning with interdental brushes is the most effective method for interproximal plaque removal and consistently shows better results than flossing or wooden sticks." [1]. In periodontally healthy individuals, the additional use of interdental brushes or rubber picks significantly lowers plaque scores compared to brushing alone. In patients with filled embrasures (the triangular space between teeth), interdental brushes are superior in reducing bleeding. For patients with mild to moderate periodontitis, bleeding on probing was significantly reduced after one month of interdental brushing which is a result not seen with only flossing. [2]

HOW TO USE AN INTERDENTAL BRUSH CORRECTLY?

A study published in the *Journal of Periodontology* outlined an effective technique for using interdental brushes to improve periodontal tissue health as below explained [3].

- Select interdental brushes in a range of sizes from largest to smallest.
- Bend each brush slightly to form a curve before using.
- Start with the largest size and test it gently between teeth; if it doesn't fit, move to the next smaller size.
- Insert the brush from the buccal (cheek side) to the lingual (tongue side) in the lower arch, and from buccal to palatal (roof of mouth) in the upper arch.
- Gently push and pull the brush through the interdental space, allowing the bristles to reach below the gumline.
- Apply with a curved brush to guide the bristles beneath the gumline as possible, using controlled finger movements.

CONCLUSION

Interdental brushes are a simple yet powerful addition to any oral care routine, especially for those managing or at risk of periodontal diseases. By reaching areas that toothbrushes and floss often miss, they reduce plaque build-up, inflammation and bleeding. With proper technique and consistency, interdental brushes help maintaining gum health, preventing diseases' progression and improving overall oral hygiene. When in doubt, consult a dental professional to ensure you're using the right tool for your specific needs.



EDSA LECTURE COMPETITION : ORIGINAL RESEARCH CATEGORY WINNER



CRITERIA AND PROGNOSTIC FACTORS OF SURVIVAL AND SUCCESS RATES FOR AUTOTRANSPLANTATION OF IMMATURE THIRD MOLARS TO THE AREA OF FIRST AND SECOND MOLARS



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Mentor : Prof. Gundega Jakobsons, RSU, Department of Orthodontics

INTRODUCTION

Autotransplantation of immature third molars to the first and second molar regions has emerged as a viable treatment option, offering significant benefits in occlusal function, dental aesthetics, and cost-effectiveness compared to implants or fixed prostheses. The success of this procedure is influenced by various prognostic factors, including the stage of root development, surgical techniques, and post-operative stabilization. While previous systematic reviews have assessed autotransplantation outcomes, most have focused on premolars or fully developed teeth. This study aims to systematically review and analyze the survival and success rates of autotransplanted immature third molars in the first and second molar regions, identifying key prognostic factors that influence treatment outcomes.

MATERIALS & METHODS

A systematic literature review and meta-analysis were conducted following PRISMA 2020 guidelines. Studies were sourced from Elsevier Journals (ScienceDirect), MEDLINE (PubMed), and Dentistry & Oral Sciences Source (EBSCOhost) databases, covering research from May 2004 to May 2024. Inclusion criteria required studies to report on the survival and success rates of immature third molars transplanted into first or second molar sites. Nine studies met the eligibility criteria and were assessed for risk of bias using the CASP guidelines. Quantitative data on survival and success rates were extracted and analyzed using MedCalc statistical software, employing a random-effects model for meta-analysis.

RESULTS

The pooled survival rate of autotransplanted immature third molars was 91.9% (95% CI: 85.1%–96.7%), while the success rate was slightly lower at 90.2% (95% CI: 79.8%–97.1%). Key prognostic factors influencing outcomes included the developmental stage of the donor tooth, with superior results observed in teeth with open apices, likely due to enhanced potential for pulp revascularization and continued root growth. Innovative techniques such as computer-aided rapid prototyping (CARP) and platelet-rich plasma (PRP) were identified as potentially beneficial in optimizing healing and integration. Stabilization methods during early healing also played a crucial role, as excessive rigid fixation was associated with a higher incidence of ankylosis and inflammatory root resorption.

CONCLUSION

Autotransplantation of immature third molars in the first and second molar regions demonstrates high survival and success rates, making it a promising alternative to dental implants, particularly in young patients. However, variability in reported success criteria and follow-up durations limits definitive conclusions. Standardized protocols for assessing success, longer-term follow-ups, and further research on recipient site characteristics are needed to enhance the predictability and long-term outcomes of this treatment modality.



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EDSA LECTURE COMPETITION :CASE REPORT CATEGORY WINNER



PRECISION & STABILITY GUIDED IMPLANT SURGERY FOR MAXILLARY BAR-RETAINED OVERDENTURE



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INTRODUCTION

Complete dentures rely entirely on mucosal support, which leads to gradual bone resorption over time and reduced functionality. On top of that, not all patients can tolerate them, mainly due to complete palate coverage and lack of stability. As a result, implant supported overdentures are proposed in exchange. Implant-supported overdentures not only optimize functionality, but they also help preserve alveolar bone structure. In the maxilla, the best option regarding an implant supported overdenture consists of a bar-retained overdenture supported by four implants. This case report details the full rehabilitation of an edentulous maxilla using guided implant surgery and a bar-supported removable complete overdenture, achieving excellent functional and aesthetic outcomes.

MATERIALS & METHODS

A 70-year old male presented in the clinic with a partially edentulous maxilla, retaining 18, 17, 16 and 17 and a mandibular arch with only 34 and 35 existing alongside with a removable partial denture. Treatment plan was formed in consultation with the prosthodontist and the periodontist. It included the placement of four maxillary PALTOP implants (3.75 x 11.5 mm), connected by a metal bar to support a removable complete maxillary overdenture. A CBCT scan was performed to evaluate bone's condition and determine the optimal implant location for placing. Guided implant surgery was performed to guarantee precise placement and minimize post surgical complications. Lastly, bone graft was also placed in the buccal area to enhance buccolingual bone thickness, ensuring long-term implant stability.

RESULTS

The patient had a regular follow up post surgically to ensure the avoidance of any potential post operative complications. Proper osseointegration around the implants and the alveolar ridge was achieved. 6 months post surgically, the definitive removable complete maxillary overdenture was delivered, significantly improving the quality of the patient's oral health, reporting high satisfaction, comfort and masticatory efficiency of the prosthesis.

CONCLUSION

This case points out the effectiveness of a guided implant surgery to support a removable bar-retained overdenture for the rehabilitation of a fully edentulous maxilla. The combined use of CBCT planning, guided surgery, and bone augmentation contributed to optimal 1 implant placement and long-term prosthetic success. The success of the prosthetic rehabilitation is evident in the patient's satisfaction, with restored masticatory function and stability. Furthermore, the improved aesthetics contributed to enhanced self-confidence, underscoring the functional and psychological benefits of the treatment.



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BATTLE OF THE BRUSHES : MANUAL ONES OR ELECTRIC ONES?

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BRUSH BATTLE: MANUAL VS. ELECTRIC

One of the most frequently discussed topics in modern dentistry is the choice between manual and electric toothbrushes. With so many opinions, experiences, and sources of information available, identifying the most reliable guidance can be challenging both for patients and professionals. As dental students and future practitioners, understanding this topic is essential. It not only helps us improve our approach to preventive care but also allows us to offer well-informed, practical recommendations to those who seek our advice. The question we hear time and time again is simple, yet significant: Which type of toothbrush should we use; manual or electric?

WHAT'S THE DIFFERENCE?

Manual and electric toothbrushes share the same goal, removing the plaque and maintaining good oral hygiene. However, the way they achieve this goal and how patients interact with them can differ significantly. As dental professionals, it is our responsibility not only to understand these differences and recommend the most suitable option based on each patient's individual needs, but also to educate them simply and memorably on the best brushing techniques. Manual toothbrushes come in a variety of styles and bristle types. They are simple, affordable and widely accessible. That's why they give users full control over brushing technique, speed, and pressure. They require proper brushing habits to be effective. For many people, especially those who have grown up using them, manual brushes feel familiar and easy to use.

Electric toothbrushes, on the other hand, offer a more automated experience. Technologies such as side-to-side motion, counter oscillation, circular rotation, and even ultrasonic vibration allow these brushes to produce thousands of movements per minute, far more than any person can replicate manually. Studies have shown that electric toothbrushes can be more effective at reducing plaque and gingivitis, especially in individuals who struggle with manual dexterity, such as elderly patients, children, those with disabilities or people under orthodontic treatment.

In addition to their brushing technology, electric toothbrushes often come with built-in features like timers, pressure sensors and various brushing modes. These functions aim to improve brushing consistency and compliance. However, electric toothbrushes are generally more expensive, require regular charging or battery replacement and need new brush heads every few months. These are the factors that may affect long-term accessibility for some patients.

LET'S GET TO KNOW MANUAL TOOTHBRUSHES

Manual toothbrushes have been a cornerstone of oral hygiene for decades and despite the rise of electric alternatives, they continue to serve as a practical and effective option for many users. Their straightforward design allows complete control over brushing speed, pressure and movement, making them ideal for individuals with established brushing habits. One of the key strengths of manual toothbrushes is their wide variety. Soft-bristled brushes are designed for those with sensitive gums or enamel erosion, providing a gentle yet effective clean. Medium-bristled brushes offer a balance between comfort and deeper cleaning, ideal for individuals with healthy gums. Hard-bristled toothbrushes, while effective for removing stubborn plaque, are not recommended for daily use as they may cause damage to the gums and enamel over time.

Orthodontic toothbrushes, with their unique V-shaped bristles, are tailored for patients with braces or other fixed appliances, making it easier to clean around wires and brackets. Eco-friendly toothbrushes made from bamboo or biodegradable materials are also increasingly popular, offering a more sustainable alternative to traditional plastic designs. Still, for users who are confident in their habits and prefer simplicity, manual brushes remain a reliable, affordable and environmentally conscious option.





LET'S GET TO KNOW ELECTRIC TOOTHBRUSHES

Electric toothbrushes were first introduced in the 1940s, beginning as motorized versions of manual brushes with simple back-and-forth motions. Since then, major design developments such as improved brush head architecture and motion patterns have significantly increased their plaque removal effectiveness. There have been various modes of action designed for electric toothbrushes over the years, including ionic, side-to-side action, counter oscillation, rotation oscillation, circular, high-frequency sonic and ultrasonic. Today, most electric toothbrushes use either oscillating-rotating or high-frequency sonic technology. Among these, oscillating-rotating models have been shown to produce greater plaque score reductions in clinical studies (1). Modern features, including mobile app connectivity and smart sensors, make it easier for users to improve their brushing habits and access oral health guidance. These benefits are particularly helpful for individuals with limited dexterity, orthodontic appliances or inconsistent technique.

However, electric toothbrushes are not without drawbacks. They are more expensive than manual brushes and require regular replacement of brush heads. Battery life may decline with long-term use and their production and disposal carry a greater environmental burden. If used incorrectly, especially without pressure sensors, they may even contribute to gingival recession. Regular charging and maintenance can also be a barrier for some users. Overall, electric toothbrushes offer strong advantages, particularly when brushing habits need support but they also come with important limitations that should be considered.

WHICH ONE IS THE BEST?

In the manual versus electric toothbrush debate, there's no one-size-fits-all winner, but the evidence points toward some clear advantages for electric options, particularly those with specific motion technologies. The effectiveness of electric toothbrushes depends heavily on their motion type. According to a Cochrane systematic review, rotation-oscillation brushes consistently outperformed manual toothbrushes in reducing both plaque and gingivitis in the short and long term (2). In contrast, side-to-side and counter-oscillation brushes showed no significant short-term advantage, with the latter only slightly better in long-term plaque reduction. Circular-action brushes showed no evidence of superiority at any stage (2). Interestingly, ionic brushes showed short-term improvements in plaque control but not in gingivitis. However, long-term trials revealed significant improvements in both (2).

In a clinical study conducted in Istanbul, powered toothbrushes were found to remove 29% more plaque than manual ones after a single brushing session (3). The same study noted that powered brushes were also more effective in stain removal, a benefit often appreciated by esthetically-conscious patients (3). From an environmental perspective, manual toothbrushes—especially biodegradable bamboo options—may have a smaller carbon footprint compared to battery-operated or rechargeable electric brushes, which involve electronic waste and energy consumption (4). However, new developments in recyclable brush heads and reusable handles are aiming to improve the sustainability of electric options.

INSIGHTS FROM FUTURE DENTISTS

To better understand the mindset of tomorrow's dental professionals, I conducted a short survey among 1st to 5th year dental students. A total of 50 students participated, offering interesting perspectives on the manual vs. electric toothbrush debate. When asked which type of brush they believed to be better overall, 58% chose electric toothbrushes, while 42% preferred manual ones.

Interestingly, when imagining their future children's oral hygiene, 64% of students said they would recommend electric brushes, suggesting that while some still prefer manual brushes for themselves, they see more long-term value in electric options for future generations. However, cost and accessibility remain important factors. 66% of students found manual brushes to be more appropriate when considering both price and preventive effectiveness, an answer that reflects awareness of socio-economic diversity in patient care. On a more personal level, daily brushing habits still favor manual brushes: only 10% of students used electric toothbrushes exclusively, 26% used both, and the majority 64% still preferred manual brushes. These results suggest that students may not be fully aware of the clinical advantages of electric toothbrushes, or that the accessibility and simplicity of manual brushes continue to appeal to a wide audience.

SHORT MESSAGES

While electric toothbrushes show clear clinical advantages, the ultimate choice depends on the individual's habits, needs and access. As future dental professionals, we must fully understand the differences between brush types, especially the various electric technologies, so that we can recommend the most suitable option and effectively teach the proper technique customized to each patient's specific needs.



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BIOACTIVE MATERIALS IN ENDODONTICS

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Endodontics focuses on treating the dental pulp and the periapical tissues. The field of dental materials has undergone significant evolution over the years. One of the most transformative developments in both these fields has been the introduction and growing use of bioactive materials. They have redefined the therapeutic goals of root canal treatment, shifting from mechanical debridement and obturation to biological healing and regeneration. Bioactive materials promise to seal the interface between the material and the tooth structure more effectively, reducing the likelihood of microleakage that could otherwise lead to secondary caries, marginal staining and dislodgement (3).

Bioactive compounds are defined as materials that actively engage with surrounding tissues and cells to encourage repair, sealing and in some cases, tissue regeneration (1). Their mechanism of action typically involves the release of ions such as calcium and phosphate, which support mineralisation, promote cell attachment and create a biologically favourable environment for healing. Although many bioactive materials possess relatively low mechanical strength (2), they are highly biocompatible and instrumental in regenerative endodontic procedures. The main endodontic treatments where these materials are used include perforation repair, root-end filling, apexification and apexogenesis.

COMMON BIOACTIVE MATERIALS USED IN ENDODONTICS

Several materials are classified as bioactive in endodontics. The most notable include calcium hydroxide, mineral trioxide aggregate (MTA), Biodentine and Calcium silicate-based sealers.

CALCIUM HYDROXIDE

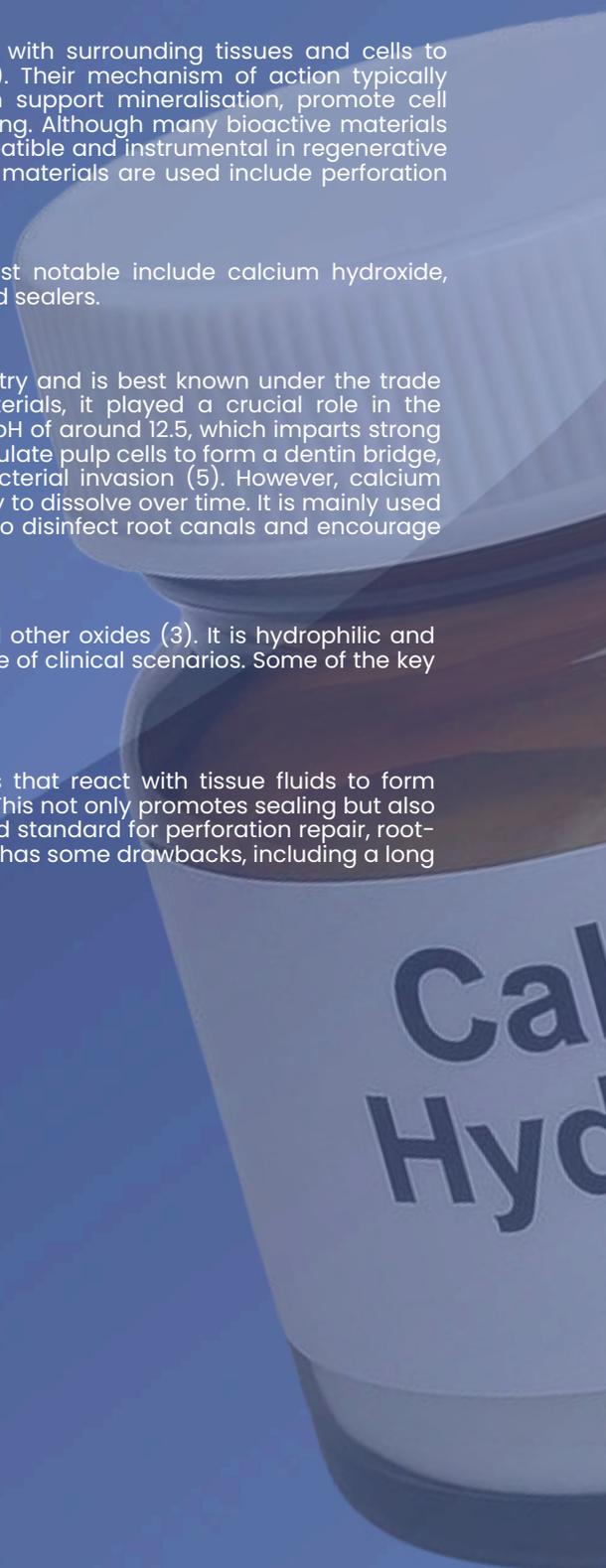
Calcium hydroxide was the first bioactive material introduced in dentistry and is best known under the trade name Dycal (5). Though considered less advanced than newer materials, it played a crucial role in the formation of dentinal bridges over exposed pulp tissue (1). It has a high pH of around 12.5, which imparts strong antibacterial properties. This alkaline environment and ionic release stimulate pulp cells to form a dentin bridge, providing a natural protective barrier against further irritation and bacterial invasion (5). However, calcium hydroxide has limitations, including poor sealing ability and the tendency to dissolve over time. It is mainly used in direct and indirect pulp capping, and as an intracanal medicament to disinfect root canals and encourage healing of periapical tissues.

MINERAL TRIOXIDE AGGREGATE (MTA)

MTA is a bioactive material composed primarily of calcium silicate and other oxides (3). It is hydrophilic and sets in the presence of moisture, which makes it suitable for a wide range of clinical scenarios. Some of the key properties of MTA include:

- Biocompatibility
- Dimensional stability
- Insolubility in tissue fluids

When MTA comes into contact with moisture, it releases calcium ions that react with tissue fluids to form hydroxyapatite, a naturally occurring mineral found in teeth and bones. This not only promotes sealing but also encourages osteogenesis and cementogenesis. MTA is considered a gold standard for perforation repair, root-end fillings and vital pulp therapy (4). Despite its many advantages, MTA has some drawbacks, including a long setting time, high cost and difficult handling characteristics.



BIODENTINE

Biodentine has emerged in recent years as an innovative bioactive dentine substitute. It is a calcium silicate-based material like MTA but designed to overcome several of its limitations. Biodentine has a shorter setting time, improved handling properties and offers comparable or superior bioactivity (4). It releases calcium ions that facilitate hydroxyapatite formation upon contact with phosphate-containing body fluids. This enhances sealing of the tooth-material interface, reduces microleakage and promotes reparative dentin formation.

Biodentine can be used in both dry and wet conditions, making it versatile in clinical practice. It is recommended for use as a temporary enamel and permanent dentin substitute in deep carious lesions, cervical or radicular lesions, and in vital pulp therapy, including pulp capping and pulpotomy (6). Its superior performance in biological healing has made it a popular alternative to MTA.



CALCIUM SILICATE-BASED SEALERS

A newer generation of endodontic materials includes calcium silicate-based sealers, which combine traditional sealing functions with bioactive properties. These sealers are hydrophilic, release calcium ions and form hydroxyapatite at the dentin interface, enhancing long-term sealing and reducing microleakage (3). They are commonly used in conjunction with gutta-percha for root canal obturation.

Supplied in premixed syringes, these sealers offer ease of use and superior penetration into dentinal tubules, promoting micromechanical bonding upon setting. Their antibacterial properties, dimensional stability and bioactivity have made them a favourable choice for obturation, especially in cases involving compromised periapical tissues.



CLINICAL IMPORTANCE AND FUTURE OUTLOOK

The success of endodontic treatment hinges on effective disinfection, sealing, and tissue response. Bioactive materials are particularly valuable when pulp vitality needs to be preserved or when healing of periapical tissues is critical. In vital pulp therapy, for example, MTA and Biodentine can stimulate dentin regeneration, allowing long-term maintenance of a vital pulp.

In regenerative endodontic procedures (REPs), these materials play a critical role by providing both a biological scaffold and a source of signalling molecules that promote continued root development in immature teeth. Their ability to seal root ends, repair perforations and encourage cementum formation also makes them essential in endodontic microsurgery.

As dental research progresses, bioactive materials are expected to take on an increasingly central role in the biological era of endodontics. These materials embody the shift from invasive techniques to minimally invasive, biologically driven treatment approaches, ensuring better outcomes and preserving more of the natural tooth structure.



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BLUEPRINTS OF A SMILE : FROM WAX TO MOUTH

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INTRODUCTION

With the growing interest in aesthetic dentistry and the increasing popularity of natural-looking materials and composites, mastering techniques such as mock-up and wax-up has become an essential skill within the portfolio of every dentist, technician or even student aiming to achieve high-quality, lifelike restoration. My mentor once said to me that our patients should never leave our chair with just "new teeth". They should leave with new smiles and new-found confidence. In order for us to be able to restore what they once lost, we must dedicate ourselves to attending each and every single detail, no matter how small they are, because those are what define their unique selves. And for that, we must learn, we must commit every ounce of effort, craftsmanship and knowledge we possess because only through this we will be able to accomplish our mission of making people want to smile once again.

Although mock-up and wax-up techniques have been foundational in restorative dentistry for a long time, whether we are talking about traditional prosthodontics, including fixed, partial or removable prostheses or in an implant-supported restoration, they have consistently proven their value across all domains. With the continuous advancement of digital dentistry and the rapid development of dental design software and CAD/CAM systems, we are now witnessing a new era in mock-up fabrications and aesthetic planning.

WHEN TO WAX?

When should I wax? The question of when to wax should be central to our decision-making as dental practitioners. When do we determine that a case is complex and aesthetically demanding enough to warrant a detailed wax-up. And how do we communicate this need to our dental technicians? Ideally every case, regardless of their region, tooth type or structure involved, should be approached with the highest aesthetic standards in mind. Whether restoring molars, premolars, or central incisors, the goal should always be to ensure that our patients receive restorations of the highest quality and lifelike appearance.

However, since clinical reality does not always align with utopical scenarios, not all cases may require full aesthetic protocols. At the very least, any restoration involving teeth visible in the smile line, whether anterior teeth, premolars or even first molars in patients with wide smiles, should receive special attention. In such cases, it's critical to involve the technician early and clearly communicate the need for heightened aesthetic consideration, as these restorations directly impact the patient's smile, confidence and overall their satisfaction.

TECHNICIANS, 'LAB-RATS' OR CHAIRSIDE BUDDIES?

Over the past year, I have had the unique opportunity to work closely with some of the most talented dental technicians our university has to offer. One of the most valuable lessons I learned from them is that they are far more than "lab workers" who simply sculpt wax or adjust plastic teeth. They are skilled professionals, true experts in oral anatomy, dental esthetics, occlusion, and functional design, whose insight and craftsmanship are fundamental to the success of any restorative treatment. We should never treat dental technicians as inferior simply because they do not hold the title of "doctor". In the professional world, there are many individuals whose knowledge, experience, and skills are invaluable, regardless of academic title. True collaboration in dentistry comes from mutual respect and the understanding that we can always learn from one another.

Bringing the dental technician out of the lab and into the consultation room, especially in highly demanding aesthetic cases, is a proven recipe for success. The patient gains confidence by interacting with both key figures involved in their treatment, while the doctor-technician duo can collaborate in real time, making immediate adjustments to achieve optimal results. The dentist can guide the technician toward the desired outcome while also receiving valuable feedback on technical aspects and limitations. At the same time, the technician benefits from seeing the patient firsthand, which allows for a more accurate and personalized approach, ultimately ensuring high-end, individualized restorations.





MOCK-UP & WAX-UP - MASTERING THE TECHNIQUES

A study by Harrell Simon and Pascal Magne, published in the Journal of the California Dental Association, highlights the essential role of wax-up and mock-up techniques in achieving functional and aesthetic dental restorations. These procedures are critical tools in restorative dentistry, aiding in treatment planning, communication, and outcome predictability. The wax-up technique is divided into two types: Traditional wax-up: performed by the dental technician in a laboratory, based on clinical instructions, without patient presence. Clinical wax-up conducted chairside, with both patient and clinician present, allowing the technician to observe and receive immediate feedback for more personalized outcomes. [1]

The primary benefit of the clinical wax-up lies in the real-time exchange of information, reducing miscommunication and enhancing precision. Both methods aim to create accurate, lifelike restorations that meet the patient's functional and aesthetic needs. Wax-ups involve adding dental wax to a study model to simulate the final restoration. This requires knowledge of dental morphology and occlusion to ensure anatomical and functional accuracy. Core materials include dental wax, waxing instruments, and a full-arch study model. Consistency in tooth shape, size and occlusal harmony is essential to avoid compromising the final result. In contrast, the mock-up technique uses tooth-colored composite materials applied directly onto the patient's teeth. This chairside procedure enables the patient to preview and evaluate the proposed outcome. The mock-up serves both diagnostic and communicative purposes, guiding the fabrication of the final restoration. Materials needed for mock-ups include silicone impression material, composite resin and a mold based on the wax-up or diagnostic model. Alternatively, the restoration can be sculpted directly using aesthetic composites. Both techniques play a vital role in enhancing treatment predictability, clinician-patient communication and the overall success of aesthetic dental procedures.

GOING DIGITAL - THE NEW AGE OF RESTORATION

Digital Smile Design (DSD) is becoming an increasingly popular approach in modern dentistry, especially in prosthodontic treatments where both function and aesthetics matter. With over 15 dedicated software programs developed so far, DSD helps design a beautiful, natural-looking smile by digitally aligning the teeth with the patient's facial features. What makes DSD so valuable is that it allows patients to preview the final result before treatment even begins. This not only improves communication between the dentist, patient and dental technician but also builds trust and makes the treatment process more collaborative. DSD uses tools commonly found in today's dental practices—DSLR cameras, smartphones, intraoral scanners, CAD/CAM systems and 3D printers. A set of standardized photographs and videos is essential to capture the patient's face and smile from different angles, both at rest and in motion (such as when talking or smiling). The biggest advantage of DSD is the ability to visualize and adjust the treatment plan early on. It helps the patient make informed decisions and gives the dentist better control over the outcome, ensuring a smile that looks good, feels natural and functions properly.

CONCLUSION

Restorative dentistry today combines precision, aesthetics and modern technology. Techniques like wax-up and mock-up remain essential for planning and communication, giving both patients and dental teams a clear preview of the final result. Digital Smile Design (DSD) adds even more accuracy and involvement, making treatments more personalized and predictable. A successful restoration means more than fixing teeth—it means restoring confidence and individuality. This is achieved through attention to detail, teamwork with skilled technicians and openness to new digital tools. Together, these elements lead to long-lasting, functional and truly transformative results.



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THINK LIKE A DENTIST, PLAN LIKE AN OWNER – EVEN BEFORE YOU GRADUATE

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4th Grade



Every student wonders during dental school, “*What happens after this? How do I motivate myself to succeed? Where do I even start on this path?*” Especially when personal life, decisions and uncertainty about the future all come into play – and no one seems to have a clear answer to the big question, “*What’s the road to success in a dental career?*”

This is **not** about being a dentist **versus** being a practice owner – it’s about learning to be both. There are countless opinions in the dental field that approach this topic from opposite ends. Some will tell you that dentistry is purely a business where financial gain is everything. Others will say it’s a branch of medicine where restoring a patient’s smile can truly transform lives. Even though the internet is full of advice, coaching videos, books and success formulas, the most important thing is to develop **your own perspective** – one that’s grounded in the information you gather, your understanding of what dentistry means to *you* and the realization that in today’s world, being a dentist often goes hand in hand with being a clinic owner. [1]

SUCCESS DOESN'T COME OVERNIGHT

No one is going to hand you success after graduation. Just like in any other field, in dentistry you need to work hard to see results. And those results show over time. So, start building your path toward your dreams **while you’re still in school!**

START WITH A MIND MAP

Be organized and clear about your vision. Reflect on your goals and make sure that small steps are truly the beginning of your big dream.

A list always helps to put your thoughts in order and give you a place to start.

SO WHERE DO WE BEGIN? STUDENT LIFE, OF COURSE.

If you invest in your personal development early, you’re saving time – and as we mentioned earlier, time is one of your greatest tools. Attend business and marketing workshops to better understand how to build a practice. Also, take part in hands-on workshops to improve your clinical and manual skills in dentistry.

COMFORT ZONE VS. GROWTH ZONE

Entering the job market is something new and unfamiliar – which automatically means stepping outside your comfort zone. But that’s also where growth happens.

Spending longer periods in this zone teaches you what your real desires are, what sacrifices you’re willing to make, and which compromises you’re not. [2]

Your **self-esteem** and **mindset** are crucial when you’re just starting out. The first steps in your medical career depend a lot on how you see yourself and the confidence you’ve built. Maybe you’ve had setbacks in school – disappointments and failures that knocked you down. But those moments are the bricks that now form the foundation of the person who’s about to start their journey.

Be mindful of what kind of “material” you use to build yourself – because it will reflect in your clinical practice.

IF YOU WANT A SHORTCUT, HERE’S A QUICK SUCCESS CHECKLIST:

MIND MAP: THE FUTURE DENTIST’S GUIDE

1. EDUCATION & KNOWLEDGE

It’s important to take extra courses such as practice management and healthcare marketing to expand your skill set. Attending medical entrepreneurship events and conferences will also broaden your perspective. In addition, reading books on business, leadership, and communication can enhance both your personal and professional growth.

2. NON-MEDICAL SKILLS

Mastering effective patient communication is crucial for success in the dental field. Time management, emotional intelligence and empathy are also essential skills for building strong relationships with your patients and colleagues. Learning to work efficiently in teams, whether with assistants, technicians or other professionals is key to creating a positive clinic environment.

3. FINANCIAL PLANNING

Understanding how to save and budget is vital to ensuring the financial stability of your future practice. You should also familiarize yourself with startup loans and funding options available to medical professionals. Explore different financial resources, such as EU funds, banks and partnerships, to help finance your clinic.

4. PERSONAL BRAND & PROFESSIONAL NETWORK

Building a professional online presence through platforms like LinkedIn and Instagram can help you connect with colleagues and patients alike. Gaining hands-on experience through internships or shadowing in private clinics will give you invaluable insight into running a practice. Volunteering or participating in student initiatives is another way to build your network and improve your professional skills.

5. VISION FOR YOUR FUTURE CLINIC

Take time to reflect on what your ideal clinic would look like. What services will you offer? Consider the target audience, the location and the style of communication that will align with your values and the patient experience you want to create.

6. COMMON MISTAKES TO AVOID

Starting your career without a clear plan can lead to unnecessary obstacles. It's essential to understand the real costs involved in running a practice to avoid financial surprises. Additionally, neglecting personal development can hinder your growth, both as a dentist and a business owner. [4]

Yes, it's a fast-track list – but maybe a bit superficial. What really makes the difference when it comes to *Starting a Successful Dental Practice – Tips & Tricks* is the **personal value** and **authenticity** you bring to it.

So here's the simplest (and maybe most valuable) advice:

Choose carefully who you take advice from.

Stay informed.

Work hard for what you want.

Don't rely on other people's checklists.

And believe that even if your path doesn't look perfect at the beginning, it's the one that will take you exactly where you need to be.

Dream Team – because environment matters.

Volunteering is a step toward success and new opportunities.

Reflect on the subtitles – they carry meaning.

Be yourself.

And never forget: medicine is about people. [5]

FINAL PIT STOP ? CONCLUSION

Your journey toward becoming a successful dentist and future clinic owner doesn't start after graduation – it starts now. While there's no single roadmap to follow, the most important steps are the ones you take with intention, curiosity, and clarity. Invest in your skills, build your mindset and shape your vision early. Surround yourself with people who inspire you, but trust your own process.

Success in dentistry isn't just about clinical excellence or business acumen – it's about knowing who you are, what you value and staying committed to your growth, one step at a time. Start small, start now and stay true to your own version of success.



DIGITAL DENTISTRY : COMPARING TODAY'S LEADING INTRAORAL SCANNERS

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EMBRACING THE DIGITAL SHIFT IN DENTISTRY

Intraoral scanners (IOS) are at the forefront of dentistry's digital transformation. They have largely replaced traditional impression techniques, offering clinicians improved accuracy, greater efficiency and a more comfortable patient experience. As digital workflows become standard practice in clinics and labs alike, understanding the landscape of IOS technology is increasingly essential for dental professionals. This article compares five of the most popular intraoral scanners in 2025, each with distinct advantages and limitations, offering insight into how they shape clinical workflows and decision-making.

WHAT TO CONSIDER AS IMPORTANT IN AN INTRAORAL SCANNER?

Choosing the right scanner goes beyond just image quality.

Here are the key features to evaluate:

- Accuracy and Speed: A fast scanner must still produce precise, detailed images.
- Ease of Use: Ergonomics and intuitive software influence daily operation.
- Compatibility: Open-source systems offer greater flexibility in lab and treatment integration.
- Hygiene and Sterilization: Autoclavable or disposable tips are vital for infection control.
- Cost and Value: Initial purchase price and ongoing subscription fees must be weighed against features and return on investment.

THE CONTENDERS: TOP INTRAORAL SCANNERS OF 2025

3SHAPE TRIOS 5 WIRELESS

Pros:

- Wireless and ultra-lightweight (only 299g), ideal for extended use
- AI-powered "ScanAssist" guides for improved accuracy
- Autoclavable tips and built-in LED UV-C disinfection
- Long battery life with hot-swap batteries for continuous scanning
- High patient engagement tools via integrated apps

Cons:

- High purchase price (~\$25,900)
- Limited compatibility with some orthodontic platforms (e.g., Invisalign)
- Dependence on periodic software upgrades for full functionality

MEDIT I700

Pros:

- Cost-effective option (~\$15,000) without compromising scan speed or detail
- Plug-and-play USB system with no external power source
- Open software system compatible with most CAD/CAM workflows
- Regular software updates with new features at no extra cost
- Ergonomic design and reversible tip

Cons:

- Lacks advanced imaging features like NIRI or caries detection
- Fewer automated tools compared to premium scanners
- Slightly less refined imaging in extremely complex cases

ITERO ELEMENT 5D PLUS

Pros:

- Integrated NIRI (Near Infrared Imaging) for early caries detection without radiation
- TimeLapse tool allows monitoring of oral changes over time
- Exceptional integration with Invisalign and other Align products
- Proven track record in orthodontic and restorative workflows

Cons:

- Very high cost (\$50,000), plus ongoing monthly software fees (\$300–\$400)
- Bulkier than other models, may be less ergonomic
- Disposable scanning tips increase long-term consumable costs

DENTSPLY SIRONA PRIMESCAN

Pros:

- Unmatched speed: captures over 50,000 images per second
- One of the highest resolutions on the market
- Excellent for full arch scans and complex cases
- Seamless integration with CEREC and Dentsply's CAD/CAM suite
- Autoclavable and disposable tip options are available

Cons:

- High initial investment (~\$40,000)
- Larger and heavier handpiece than most competitors
- Primarily closed ecosystem; best used within the Dentsply Sirona environment

PLANMECA EMERALD S

Pros:

- Compact, lightweight design with color-coded autoclavable tips
- Compatible with Planmeca's full digital workflow
- High scanning speed and excellent color rendering
- Real-time visualization and bite registration support

Cons:

- Best performance within Planmeca's CAD/CAM systems
- Lacks some AI and diagnostic features offered by competitors
- Smaller global support and training network compared to bigger brands

CONCLUSION: PRECISION MEETS PRACTICALITY

Intraoral scanners are no longer optional—they're central to the modern digital workflow in dentistry. Whether for restorative, prosthodontic, orthodontic or diagnostic applications, choosing the right scanner can significantly impact your clinical outcomes and efficiency. While the TRIOS 5 and Primescan offer cutting-edge features for high-volume practices, more budget-friendly models like the Medit i700 and Planmeca Emerald S make digital dentistry more accessible. The iTero Element 5D Plus stands out in orthodontics but comes at a premium. Ultimately, the "best" scanner will depend on your clinical needs, budget, software preferences and future practice model. Staying informed on these technologies ensures you are well-equipped to deliver quality care in the era of digital dentistry.



DIAGNOSIS OF CYSTIC LESIONS IN PANORAMIC RADIOGRAPHY & COMPUTED TOMOGRAPHY

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INTRODUCTION

Cystic lesions in the maxillofacial region include developmental, inflammatory, and neoplastic types, posing significant diagnostic challenges for clinicians. Precise diagnosis is vital for suitable treatment planning and patient management, as approaches vary widely among different cystic lesions. Advances in imaging technology have revolutionised diagnostics, with panoramic radiography serving as the primary screening tool and multi-slice computed tomography providing detailed three-dimensional anatomical insights. (1) The differential diagnosis of jaw cysts encompasses odontogenic cysts such as radicular cysts, dentigerous cysts, and odontogenic keratocysts, as well as non-odontogenic lesions including nasopalatine duct cysts, globulomaxillary cysts, and various pseudocysts. Each entity exhibits specific radiographic features that, when accurately interpreted, can guide clinicians towards correct diagnosis and treatment planning. This review discusses current methods for diagnosing cystic lesions using panoramic radiography and computed tomography (CT), exploring their diagnostic strengths, limitations, and complementary roles in clinical practice. Recent developments in imaging techniques and interpretation criteria are examined, alongside evidence-based recommendations for optimal diagnostic protocols.

PANORAMIC RADIOGRAPHY IN CYSTIC LESION DIAGNOSIS

DIAGNOSTIC CAPABILITIES & LIMITATIONS

Panoramic radiography remains the cornerstone of initial imaging assessment for suspected cystic lesions in dental practice due to its accessibility, relatively low radiation dose and ability to provide a comprehensive overview of the entire maxillofacial region in a single image. (2,3) This two-dimensional imaging technique is particularly effective in detecting well-defined radiolucent lesions, which usually manifest as round to oval areas of reduced density with clear corticated borders. The panoramic view enables clinicians to assess the relationship between cystic lesions and important anatomical landmarks such as the mandibular canal, maxillary sinus, and tooth roots.

The radiographic features of cystic lesions on panoramic images often offer valuable diagnostic clues. However, panoramic radiography has inherent limitations that can affect diagnostic accuracy. The two-dimensional nature of the image results in the superimposition of anatomical structures, potentially obscuring small lesions or making it difficult to determine the exact extent of larger cysts. (4) Magnification and distortion artefacts can influence size measurements, while the inability to evaluate the buccolingual dimension hampers assessment of cortical plate involvement. Additionally, panoramic images cannot adequately reveal the internal structure of complex cystic lesions or distinguish between fluid-filled cavities and solid masses with similar radiographic densities.

COMPUTED TOMOGRAPHY AND CBCT IN CYSTIC LESION EVALUATION

ADVANCED IMAGING CAPABILITIES

Computed tomography has emerged as an invaluable adjunct to panoramic radiography in the comprehensive evaluation of cystic lesions. CT imaging provides superior anatomical detail, precise localization of lesions, and assessment of cortical bone integrity. Modern multi-detector CT scanners offer submillimeter resolution, enabling the detection of subtle anatomical changes that may be imperceptible on conventional radiography. (5) Recent advancements in technology, particularly cone-beam computed tomography (CBCT), have made three-dimensional imaging more accessible for dental and maxillofacial applications. CBCT has emerged as an invaluable tool for the comprehensive evaluation of cystic lesions, offering three-dimensional visualization with significantly higher spatial resolution than medical CT scanners. (6) This technology provides multiplanar imaging capabilities, allowing clinicians to examine lesions in axial, coronal, and sagittal planes, as well as generate cross-sectional views that reveal the true extent and morphology of cystic pathology. (13) This enhanced visualization is particularly beneficial for surgical planning, as it enables precise assessment of cortical plate integrity, proximity to vital structures, and the likelihood of complications during treatment.

Despite its advantages, CBCT imaging has its limitations. The technology is less effective than medical CT in soft tissue differentiation, which may limit its ability to assess the inflammatory status of surrounding tissues. (7) Although the radiation dose associated with CBCT is lower than that of medical CT, it remains significantly higher than conventional radiography. (8) This necessitates careful consideration of the risk-benefit ratio for each patient.

COMPARATIVE ANALYSIS OF IMAGING MODALITIES

The selection of appropriate imaging modalities for cystic lesion diagnosis requires careful consideration of multiple factors, including lesion characteristics, patient factors and treatment objectives. Panoramic radiography serves as an excellent screening tool and may be sufficient for diagnosing straightforward cases such as small radicular cysts or typical dentigerous cysts. (9) However, its limitations become apparent when dealing with complex lesions requiring precise localization or when surgical intervention is planned. (9)

CBCT imaging represents the optimal choice for most odontogenic cysts requiring surgical treatment, as it provides the necessary three-dimensional information for treatment planning while maintaining reasonable radiation exposure and cost-effectiveness. (9,12) The technology is particularly valuable for evaluating the relationship between cysts and critical anatomical structures such as the inferior alveolar nerve, maxillary sinus or nasal cavity. CBCT is also superior for assessing cortical plate integrity and determining the likelihood of pathological fracture

Medical CT becomes the modality of choice when soft tissue assessment is critical, such as in cases of suspected infection, malignant transformation, or when systemic disease processes are being evaluated. CT imaging is preferable for exceptionally large lesions that reach beyond the area of CBCT scanners, as well as for differential diagnosis that requires contrast enhancement. (7) The ability to perform dynamic contrast studies makes CT invaluable for assessing the vascularity of lesion walls and identifying areas of active inflammation or neoplastic change.

CLINICAL IMPLICATIONS AND TREATMENT PLANNING

Based on current evidence, a systematic approach to cystic lesion imaging has been proposed. Initial panoramic radiography should be performed for all suspected cystic lesions, followed by CT imaging in specific clinical scenarios, including multilocular lesions, lesions with irregular borders and cases requiring precise surgical planning. (12) The differentiation between cystic and solid lesions can be particularly difficult on conventional radiographs, as both may present as well-defined radiolucencies. This distinction is crucial because treatment approaches differ significantly between these pathological entities. Cross-sectional imaging with CBCT or CT is often necessary to make this differentiation reliably.

CONCLUSION

The diagnosis of cystic lesions in the maxillofacial region requires a comprehensive understanding of the capabilities and limitations of available imaging modalities. Panoramic radiography serves as an excellent screening tool and primary diagnostic modality for most cystic lesions, while CBCT provides essential three-dimensional anatomical information for complex cases and surgical planning. Medical CT is a valuable adjuvant in cases requiring detailed soft tissue assessment or when contrast enhancement is necessary for differential diagnosis. (14) The optimal approach to cystic lesion diagnosis involves the judicious selection of imaging modalities based on individual case requirements, always considering the principle of ALARA (As Low As Reasonably Achievable) regarding radiation exposure. (12) The integration of clinical findings with appropriate imaging studies enables accurate diagnosis, effective treatment planning, and optimal patient outcomes. Recent advances in imaging technology, including improved CT resolution and cross-sectional CBCT imaging, continue to enhance diagnostic capabilities. The evidence supports the selective use of CT imaging based on specific clinical criteria rather than routine application, balancing diagnostic accuracy with cost-effectiveness considerations.

Future research should focus on developing standardized imaging protocols, validating AI-assisted diagnostic tools, and investigating emerging imaging technologies. The integration of clinical, radiographic, and potentially molecular markers, along with histologic evaluation, may ultimately provide the most comprehensive approach to cystic lesion diagnosis and management. Healthcare providers must stay current with evolving imaging technologies and evidence-based diagnostic criteria to provide optimal patient care. The continued refinement of imaging protocols and interpretation guidelines will further enhance the accuracy and efficiency of cystic lesion diagnosis in clinical practice.



ARTIFICIAL INTELLIGENCE IN DENTISTRY

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INTRODUCTION: THE CONVERGENCE OF AI AND DENTISTRY

The intersection of artificial intelligence (AI) and dentistry represents one of the most significant technological convergences in modern oral healthcare. As AI systems evolve beyond simple automation into decision-support frameworks capable of analysis, prediction, and even personalized patient management, their potential in dentistry is expanding exponentially. Yet, as with any profound shift, the integration of AI into dental science brings both promise and peril. This article traces the roots of AI in dental practice, analyzes its current and potential roles, addresses concerns and proposes guidelines for ethical, effective integration—particularly in dental education.

HISTORICAL BACKGROUND AND TECHNOLOGICAL FOUNDATIONS OF AI IN DENTISTRY

Artificial intelligence, defined as the capacity of computer systems to emulate cognitive functions such as perception, reasoning and learning, dates back to mid-20th-century computing research. AI in medicine was first realized in systems such as MYCIN in the 1970s, which diagnosed infectious diseases using rule-based logic. Dentistry, although slower to adopt AI technologies, now finds itself rapidly advancing, particularly due to the digitalization of patient records, diagnostic imaging and treatment planning tools.

Fundamentally, AI in dentistry relies on subsets of machine learning, including artificial neural networks (ANNs), convolutional neural networks (CNNs) and support vector machines (SVMs). These models are trained using large datasets—such as radiographs or clinical records—and learn to identify pathologies, suggest interventions, or classify conditions based on complex, nonlinear patterns of input data.

CLINICAL APPLICATIONS ACROSS DENTAL SPECIALTIES

Today, AI applications span nearly all dental disciplines: endodontics, periodontics, orthodontics, prosthodontics, pediatric dentistry and maxillofacial surgery. In periodontology, AI assists in classifying periodontal diseases, localizing alveolar bone loss and predicting progression risk based on clinical and radiographic indicators. Cariology has witnessed the rise of predictive algorithms capable of identifying carious lesions invisible to the human eye, thereby aiding in preemptive interventions.

Orthodontics benefits from AI-driven cephalometric analysis and 3D tooth movement simulations, allowing for precise treatment planning. In prosthodontics, CNNs interpret intraoral scans to design and manufacture restorations via CAD/CAM platforms. Dental implantology similarly employs AI for analyzing CBCT scans, optimizing implant placement and simulating postoperative outcomes.

Beyond diagnostics and treatment, AI is instrumental in operational management. Intelligent virtual assistants handle appointment scheduling, manage patient histories and even guide decision trees in diagnostic software.

ADVANTAGES OF AI INTEGRATION: ACCURACY, PERSONALIZATION, AND EFFICIENCY

The benefits of AI integration in dentistry are multi-fold. First, diagnostic accuracy increases substantially, especially in radiology-based tasks. For instance, CNN-based models demonstrated precision rates surpassing seasoned professionals in detecting oral plaque and root canal treatments on radiographs. Second, AI enables the personalization of care. Algorithms analyzing genetic, behavioral and imaging data can produce bespoke treatment plans based on patientspecific risk factors.

Moreover, the efficiency of clinical workflows improves dramatically. AI not only reduces human error in routine tasks but also provides continuity of care through real-time data capture and longitudinal tracking. This predictive capability is particularly crucial for managing chronic dental conditions such as periodontitis and for identifying children at risk of early childhood caries.

CHALLENGES, ETHICAL CONCERNS, AND EDUCATIONAL INTEGRATION

Despite these advances, significant limitations hinder the seamless deployment of AI in dentistry. A primary concern is data quality and generalizability. Most AI models require massive datasets to be trained effectively; however, data heterogeneity, especially across diverse ethnic and socioeconomic populations is lacking. This renders models vulnerable to bias and reduces their applicability in varied clinical settings.

Another issue is the opacity of AI systems. Deep learning models often function as "black boxes," where the logic behind a decision remains unintelligible to the clinician. This lack of interpretability poses profound implications for clinical accountability and patient trust. Ethically, concerns around data privacy, consent and security are paramount. Many dental datasets include sensitive personal and health information. Without proper encryption, anonymization and adherence to legal frameworks such as GDPR or HIPAA, these systems risk serious breaches of confidentiality.

Ethically, concerns around data privacy, consent and security are paramount. Many dental datasets include sensitive personal and health information. Without proper encryption, anonymization, and adherence to legal frameworks such as GDPR or HIPAA, these systems risk serious breaches of confidentiality.

To responsibly embed AI in dentistry, its inclusion must begin at the undergraduate level. Traditional didactics should be supplemented with AI-specific curricula encompassing theoretical foundations, algorithmic logic, ethical use and hands-on experience with AI platforms.

Virtual simulation platforms powered by AI are already revolutionizing pre-clinical education. These immersive environments allow students to repeat surgical and diagnostic scenarios, receive real-time feedback and refine techniques without risking patient harm. Intelligent tutoring systems provide personalized learning trajectories by analyzing students' strengths and deficiencies, thus optimizing competency development.

Interdisciplinary collaboration must also be fostered. Dental professionals, data scientists, ethicists, and engineers need to work in tandem to ensure that AI tools are both scientifically valid and aligned with ethical obligations. Moreover, clinicians must retain ultimate decision-making authority. AI should function strictly as an augmentative tool rather than a replacement for clinical judgment.

The path forward necessitates the implementation of several strategic imperatives:

1. Data Governance: Strong frameworks must be established to handle patient data securely. This includes data encryption, controlled access and clear patient consent protocols.

2. Model Explainability: Future development must focus on interpretable AI. Clinicians should be able to audit AI decisions and understand the rationale behind outputs.

3. Bias Reduction: AI models must be trained on ethnically and demographically representative datasets. Global data-sharing initiatives can support this by pooling diverse patient records while maintaining privacy.

4. Continuous Validation: AI systems require ongoing refinement. Periodic re-training on updated datasets ensures adaptability to evolving diagnostic criteria and technological advances.

5. Regulatory Oversight: National dental associations and medical boards should define scope-of-practice boundaries and liabilities concerning AI-assisted decisions.

6. Public Awareness: Engaging patients in AI literacy can foster transparency and trust. When patients understand the role AI plays in their care, acceptance and satisfaction improve.

CONCLUSION: THE FUTURE OF AI IN DENTISTRY

Artificial intelligence heralds a paradigm shift in dentistry, with the potential to elevate diagnostics, personalize therapies, streamline operations, and democratize care. Yet its implementation must be cautious, evidence-based, and ethically grounded. By embedding AI education in dental curricula, ensuring inclusive and transparent algorithms, and upholding human oversight, we can transform AI from a disruptive novelty into an indispensable pillar of dental care. Dentistry stands at the precipice of a new digital age; with vigilance and vision, AI can be the instrument that redefines oral health for generations to come.



BITING INTO INEQUITY : WHY ORAL HEALTH DEMANDS PUBLIC HEALTH ACTION?

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INTRODUCTION: THE BROADER MEANING AND IMPACT OF ORAL HEALTH

The World Dental Federation (FDI) defines Oral Health as the ability to speak, smile, smell, taste, touch, chew, swallow, and show many emotions with confidence and without pain, discomfort or disease in the head, face, or mouth (1). Maintaining healthy teeth, gums, and jaws is crucial for clear speech, efficient food consumption, and effective social interaction. Problems such as cavities, missing teeth or bleeding gum can steal comfort and confidence, dragging down self-worth and daily living. Due to this connection, oral health significantly impacts overall well-being and daily functioning. The World Health Organisation notes that oral disease is one of the most widespread health issues worldwide, affecting more than 3.5 billion adults and children (4). Tooth decay, severe periodontal disease and tooth loss rank among the most prevalent non-communicable diseases (NCDs) worldwide (2, 3, 4). Even though most of these troubles can be prevented, they keep showing up, causing pain, making everyday tasks hard and weighing on mental health (2,5). The fallout extends beyond clinics; oral disease leads to missed school and work days, lower productivity and rising treatment bills, especially in low- and middle-income countries with limited access to Oral Care (4,5,6).

ORAL HEALTH INEQUITIES AND GLOBAL CHALLENGES

Furthermore, apparent social gaps show that low-income and marginalised groups suffer the heaviest toll from oral disease because they face barriers to care, limited healthy food and everyday risks like smoking, sugary snacks and non-fluoridated water (5). Therefore, treating oral health as a global public health goal extends beyond clinics; it encompasses fairness, job stability and long-term national budgets (6).

RETHINKING TRADITIONAL DENTAL MODELS

Traditionally, care has revolved around a repair-only model focusing on single dental appointments and quick fixes. Although the hands-on approach is practical when a tooth hurts, it is not a long-term, cost-effective solution for maintaining the health of entire communities. It often overlooks the social, environmental and behavioural determinants of health (5). In contrast, the public health approach emphasises prevention, early intervention and systemic changes. It shifts the focus from individual responsibility to collective action by implementing strategies at three levels: upstream (policy and structural changes), midstream (community and organisational programs) and downstream (individual care) (6, 7,8). This broader lens enables the development of equitable, cost-effective and sustainable solutions to reduce oral health disparities and promote lifelong oral well-being (6,8).

PILLARS OF A COMPREHENSIVE PUBLIC ORAL HEALTH APPROACH

The elements that might be framed as a comprehensive public health approach to oral health might be seen as made up of several interlinked elements:

- Health education and promotion: Public awareness campaigns, school-based programs and community workshops can help promote good oral hygiene and raise awareness of risk factors, such as excessive sugar intake and tobacco use (5,6).
- Access to care and care coordination: Ensuring accessibility to preventive and primary oral health services, particularly in underserved regions is crucial. This involves integrating oral health into primary care, broadening the responsibilities of non-dental professionals and embracing innovations such as teledentistry and mobile dental units (6-8).
- Preventive interventions: The foundation of contemporary prevention is evidence-based practices, such as fluoridating water, using fluoride toothpaste, applying dental sealants to children and implementing risk-based care models like CAMBRA (3,9, 10, 11).
- Policy and environmental action: Creating a healthier environment for oral and general health can be achieved through regulating the marketing and availability of sugary foods and beverages, enacting laws to restrict alcohol and tobacco, and supporting taxation policies (such as sugar taxes) (6,12).

TARGETED STRATEGIES FOR VULNERABLE POPULATIONS

Various demographic groups have distinct oral health issues that require particular strategies. For children and adolescents, early interventions are helpful. These include supervised brushing programs, regular school-based screenings and nutrition education to prevent early childhood caries (5,7). Mobility difficulties, medication-induced dry mouth and tooth loss are just a few of the problems that older persons frequently face. Community-based interventions, home care visits and particular geriatric oral health strategies are required to preserve function and dignity in this population (5,6). In the meantime, systemic hurdles to care are often faced by vulnerable and disadvantaged populations, including low-income families, rural communities, individuals with disabilities and ethnic minorities. Customised outreach programs, culturally aware instruction and the creation of accessible, reasonably priced service models that guarantee inclusivity in oral health care are all necessary to address these disparities (5,6).

INTERSECTORAL COLLABORATION AND POLICY INTEGRATION

Coordinated efforts across disciplines and sectors are necessary to improve oral health at the population level. More comprehensive and easily accessible care may result from cooperation between dentists, doctors, nurses, community health workers, educators and social service providers. The integration of oral health into general health systems is facilitated by interprofessional education and shared care models (5,6,8). The "Health in All Policies" (HiAP) framework encourages governments to integrate oral health and other health factors into policy decisions across various areas, including taxation, urban planning, education and water management (12). With this alignment, the World Health Organisation (WHO) encourages shared accountability and increases the overall impact of oral health measures (4,12).

FUTURE DIRECTIONS AND POLICY RECOMMENDATIONS

The public health strategy regarding oral health continues to face numerous challenges, despite gaining increased recognition. One significant financial obstacle still exists: dental care is often not covered by universal health insurance in many nations, which drives up individual costs (6,8). Consistent data collection, impact assessment and economic studies that demonstrate the long-term cost-effectiveness of preventive measures are also lacking (5).

Furthermore, to improve access and continuity of care, digital techniques such as teledentistry and mobile health apps, whose importance was highlighted during the COVID-19 pandemic, need to be progressively integrated into public health systems (6). In the future, nations must prioritise oral health on their national health agendas, provide the necessary funds, and enact laws that acknowledge mouth health as an essential aspect of overall well-being (5,6,8). Oral health is substantially more than just the condition of one's teeth; it is a crucial component of general health, life quality and social justice (5,6). The most efficient strategy to lower disease burden, address inequities and encourage lifetime wellness is through a public health approach to oral health (6,8). To create a future in which dental health is a right rather than a privilege, governments, healthcare providers and communities can work together to shift from reactive to proactive, population-level interventions. It will take strong laws, long-lasting structures and a shared dedication to inclusion and prevention to realise this vision (6,8,12).

For References



SUSTAINABILITY IN DENTISTRY : HOW TO DECREASE CARBON FOOTPRINT AS A DENTIST?

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In this day and age, environmental sustainability has become a significant responsibility for the global population. Unfortunately, despite being in 2025, global warming is still an issue that we can no longer ignore. It manifests itself through the hottest months on record, melting ice, ocean heat waves, intensifying storms and ecosystem collapse. It's inevitable that sooner or later, all these issues will negatively affect Dental services in numerous ways, such as disruption of supply chains, power outages and water shortages — leading to interruptions in consistent dental care. To avoid these things from happening, the least we can do as thoughtful individuals and dental professionals is to reduce our carbon footprint.

WHAT IS A CARBON FOOTPRINT?

A carbon footprint refers to the total amount of greenhouse gases released by human activities. It is measured in units of carbon dioxide equivalents (CO₂e) and is a major contributor to global warming. In dentistry, this footprint is produced directly and indirectly from various activities that are part of practices that are often not environmentally friendly.

SOURCES OF CARBON IN DENTISTRY

The dental industry is one of the most rapidly evolving fields in healthcare. Its carbon footprint mainly comes from excessive energy use, water consumption, waste production, and travel. Though these factors aren't equally harmful, each contributes to carbon emissions to some degree; the most problematic ones are energy use and patient travel.

According to a study conducted within the NHS dental services in the UK, energy use in dental settings consistently contributes 15.3% of total emissions of dental practices. (1) Interestingly, recent studies in Egypt have shown that water consumption has a relatively low carbon footprint, accounting for less than 1% of total emissions (2). However, it still matters in terms of water conservation and local impact.

It is crucial to note that patient and staff travel is the most significant contributor, based on 2022 research, it makes up 61.4% of dentistry's total carbon emissions (3). Although this data is UK and Egypt-specific, it offers insight into similar patterns likely present in European countries.

PREVENTION: A WIN FOR PATIENTS AND THE PLANET

There are many ways to address the issues mentioned above. However, before diving into practical steps, it is essential first to consider the topic from a clinician's point of view. Every dentist and healthcare professional understands that the most effective way to treat a disease is to prevent it in the first place. It might not be a revolutionary statement, but diseases such as caries, gingivitis, or periodontitis are among the most preventable, though half of the world's population suffers from them. Therefore, if every clinician made prevention a core part of the treatment, it would be easily achievable to decrease the carbon footprint as a dentist.

Fewer check-ups and complications mean fewer visits. Consequently, dentists would resolve multiple issues at once: on the one hand, they would provide long-lasting oral health, and on the other, reduce dental carbon emissions, including energy use, waste production, and most importantly, carbon emissions from travel. While focusing on prevention, we can also implement teledentistry into our workflows. Although still an emerging area, especially in terms of technology and dental product design, it has enormous potential to reduce in-person visits. It is undeniable that complex procedures will always require manual intervention; nevertheless, remote tools can be practical for initial consultations, routine check-ups, and follow-ups. Despite this, for teledentistry to truly evolve, alongside individual efforts, dental associations and institutions must take an active role in supporting the development of reliable, patient-friendly digital tools.

MAKING IT HAPPEN: PRACTICAL STEPS TOWARD ECO-FRIENDLY DENTISTRY

Dentistry is a demanding profession, both physically and mentally, yet this very discipline equips us with the resilience to embrace change. Despite daily challenges, dentists are well-positioned to adopt sustainable habits, improve workflows, and support organizational efforts by integrating appropriate green technologies.



SUSTAINABLE ENERGY PRACTICES

Nowadays, the majority of dental clinics worldwide run on a traditional energy source, that is, electricity from the local grid, usually generated from a mix of fossil fuels, which have contributed to environmental degradation since the Industrial Revolution. In the 21st century, there has been a possibility to experiment and innovate. Thus, the transition towards greener alternatives, such as solar panels and waterless vacuum systems, has become increasingly important. Solar panels convert sunlight into electricity, offering clean and renewable options. Apart from environmental benefits, they provide cost-effective solutions for dental clinics aiming to reduce their carbon footprint while lowering their long-term energy expenses. Traditional dental vacuum systems consume large volumes of water to create the suction needed for saliva and debris removal. This poses a challenge in areas with limited water resources. Waterless vacuum systems eliminate this need, conserving both water and the energy required to pump and treat it, thereby supporting more eco-friendly dental practices. Closed-loop water systems recirculate and reuse water, reducing waste by up to 90%. (4) Though dental-specific studies are limited, this technology benefits large clinics and water-scarce areas, promoting sustainability.

WASTE MANAGEMENT

Reducing the use of single-use plastics by replacing them with biodegradable or digital alternatives is critical. For instance, instead of using regular plastic suction tips that must be discarded after each procedure, dentists can opt for reusable stainless steel suction tips, which can be sterilized and used multiple times. Similarly, digital impressions offer a sustainable alternative to traditional impression materials, reducing the need for plastic trays and silicone-based waste, and streamlining the workflow.

GREENER MATERIALS FOR HEALTHIER PRACTICE

The choice of materials significantly affects dentistry's environmental footprint. Therefore, dentists should prioritize sustainably sourced materials with minimal impact throughout their lifecycle—requiring less energy and water to produce and generating fewer greenhouse gases. For example, titanium is widely used in implantology for its durability, strength, and biocompatibility. However, its production is energy-intensive. An alternative with similar properties but lower environmental impact is zirconia.

CHALLENGES

One of the main obstacles in promoting sustainable energy solutions like solar panels and water-saving systems is the lack of comprehensive scientific research focused explicitly on dental clinics. While general healthcare facilities have been studied more extensively, dental practices remain underrepresented. Existing evidence comes from industry reports, such as DESS Dental's solar panel installation in Spain (5), which indeed provides a valuable example for other clinicians to follow. Still, unfortunately, in this case, our field lacks peer-reviewed research. Moreover, these technologies are costly; as a result, dental clinics refrain from investing in them. There can be logistical issues, too. For example, not every clinic has suitable positioning for solar panels. Not to mention weather dependency and other legal and regulatory matters.

While the adoption of eco-friendly technologies in dentistry is essential, it is neither practical nor fair to place the whole responsibility on individual clinicians, whose workloads are already demanding. Given the complexity and cost of implementing sustainable infrastructure, this challenge must be addressed at a systemic level, through governmental support, policy incentives, and institutional investment. Based on recent articles, Countries like Sweden and Germany have strong regulatory frameworks that promote sustainability; therefore, it's easier for them to implement eco-friendly technologies. (6)

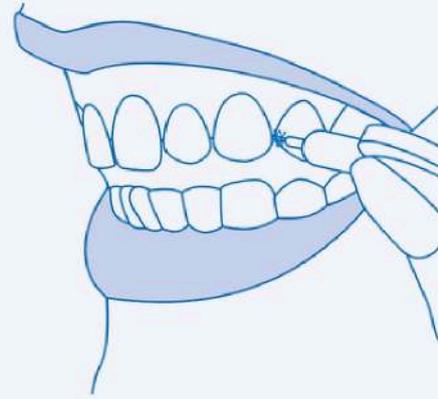
CONCLUSION

Environmental sustainability is an urgent responsibility for dentistry as global warming continues to impact healthcare services. By understanding the sources of carbon emissions, especially energy use and patient travel, dentists can adopt prevention-focused care, embrace emerging digital tools like teledentistry, and implement practical eco-friendly technologies. However, meaningful progress requires systemic support beyond individual efforts, including government policies and institutional investment. Together, these actions can help transform dentistry into a more sustainable profession, benefiting both patients and the planet.



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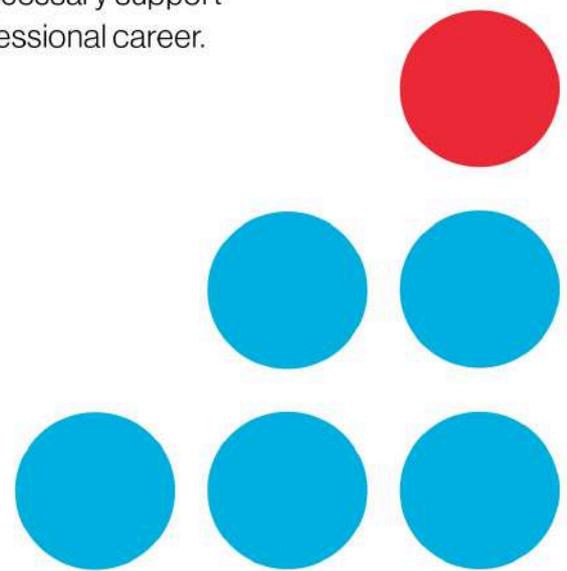
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A photograph of an Amsterdam canal scene. In the foreground, several bicycles are parked on a bridge or walkway. In the middle ground, a canal with a houseboat is visible. In the background, there are multi-story brick buildings with many windows. The image has a blue overlay and white decorative lines.

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