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INDIRA JOURNAL of INTEGRATED HEALTH SCIENCE AND RESEARCH

ABOUT THE JOURNAL

Indira Journal of Integrated Health Science and Research (IJIHSR), an official publication of Indira Educational and Charitable Trust, Thiruvallur. It is a peer-reviewed journal that allows free access to its contents. The journal does not charge article processing charges (APCs), manuscript submission fees, or publication fees, including fees for colour photographs.

VISION

To be recognised as a distinguished scholarly journal of global standing, dedicated to advancing excellence in medicine and dentistry through research, innovation, and the dissemination of knowledge worldwide

MISSION

Our mission is to promote progress in medical and dental sciences by publishing high-quality, ethical, and meaningful research, encouraging innovation, and providing a platform for knowledge sharing within the global academic and clinical community.

INDIRA JOURNAL of INTEGRATED HEALTH SCIENCE AND RESEARCH

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INDIRA JOURNAL of INTEGRATED HEALTH SCIENCE AND RESEARCH

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ADVANCING KNOWLEDGE, INSPIRING INNOVATION
CHIEF PATRON'S VISION

Thiru. V.G.Raajendran

Chief Patron, Indira Journal of Integrated Health Science and Research (IJIHSR)

As the Chief Patron of the *Indira Journal of Integrated Health Science and Research (IJIHSR)*, it is my privilege to share my vision and unwavering commitment to advancing health sciences, education, and research. One of the fundamental objectives of our Trust is to provide high- quality, accessible health and dental care to the people of Thiruvallur, one of the socioeconomically disadvantaged districts of Tamil Nadu. Observing the widespread prevalence of oral diseases and the limited awareness of health and hygiene in the community, I felt a profound responsibility to take action. This commitment led to the establishment of the Priyadarshini Dental College and Hospital in Pandur, Thiruvallur, under the aegis of the Trust. Today, the institution has grown into a state-of-the-art centre of excellence, serving as a beacon for dental education, research, and community health initiatives.

We firmly believe that education is most effective when knowledge is coupled with mentorship, human engagement, and personal guidance. The expertise, dedication, and character of faculty members are central to nurturing students' academic growth and professional development. Accordingly, we have instituted a rigorous process for recruiting and retaining highly qualified educators, ensuring that every student receives an exceptional learning experience.

A truly ideal academic environment encompasses more than just infrastructure and resources; it integrates thoughtfully designed spaces, access to educational aids, learning resources, and platforms for knowledge exchange. We have consistently strived to cultivate such an atmosphere, fostering innovation, collaboration, and excellence in health science education.

As Chief Patron, I am proud to witness the *Indira Journal of Integrated Health Science and Research* serve as a distinguished platform for interdisciplinary research, knowledge dissemination, and professional growth. The journal embodies our vision of advancing health sciences holistically—bridging dental, medical, and allied health disciplines—and inspiring the next generation of healthcare professionals and researchers

Thiru. V.G.Raajendran

Chairman

Indira Group of Educational Institutions

FOSTERING EXCELLENCE IN HEALTH SCIENCE EDUCATION: A PATRON'S VISION

Tmt. Indira Raajendran
Patron, Indira Journal of Integrated Health Science and Research (IJIHSR)

It gives me immense satisfaction to present this message for the ***Indira Journal of Integrated Health Science and Research (IJIHSR)***, a publication dedicated to advancing scholarly excellence across the Medical, Dental, and Nursing disciplines. The journal reflects our unwavering belief that quality education and meaningful research are the foundations of progress in healthcare.

IJIHSR provides an enriching platform for academicians, clinicians, and students to express their scientific curiosity, share their findings, and engage in academic dialogue that strengthens the fabric of our health science community. By supporting interdisciplinary research and encouraging the pursuit of innovation, the journal contributes significantly to building a culture of continuous learning with our institutions.

I sincerely appreciate the editorial board for their meticulous effort, commitment to high standards, and dedication to producing a publication that upholds the values of ethical research and academic integrity. Their hard work ensures that each issue of the journal serves as a valuable resource for readers and contributors alike.

As Patron, I am proud to witness the evolution of this journal and the enthusiasm with which our institution embraces research- driven growth. I am confident that IJIHSR will continue to inspire young minds, promote scientific inquiry, and contribute meaningfully to the advancement of integrated health sciences.

My best wishes to the editorial team, authors, and reviewers whose collective efforts shape the success of this journal.

May this publication continue to flourish and serve as a beacon of knowledge for our academic community.

Tmt. Indira Raajendran
Managing Director

Indira Group of Educational Institutions

EMPOWERING ACADEMIC EXCELLENCE AND RESEARCH

DR. SIVAPATHASUNDHARAM B

Advisor, Indira Journal of Integrated Health Science and Research (IJIHSR)

It is with immense pride and academic responsibility that I present this message for the inaugural issue of the Indira journal of Integrated Health Science and Research, a multidisciplinary peer-reviewed journal in Health Sciences, launched under the aegis of Indira Educational and Charitable trust.

Over the past 18 years, our institution has steadily evolved into a center of academic excellence, clinical service, community engagement, and research advancement. Guided by structured quality benchmarks and a culture of continuous improvement, we have consistently strengthened our research ecosystem. The launch of this journal represents a strategic and forward-looking step aligned with national academic accreditation frameworks such as NAAC and NIRF, which emphasize research productivity, citation impact, innovation, and societal contribution.

Globally, it is estimated that more than 30,000 peer-reviewed scholarly journals are currently in circulation, with thousands dedicated to health sciences and allied disciplines. In India alone, a substantial and growing number of journals contribute to the scientific landscape, reflecting the expanding research output of the academic institutions. While this growth is encouraging, it also presents significant challenges, particularly in ensuring visibility, attracting high-quality original research, maintaining ethical publication standards, and sustaining editorial excellence in an increasingly competitive environment.

Establishing a new journal in such a scenario requires vision, perseverance, and academic integrity. One of the foremost challenges is achieving visibility in reputable indexing databases and earning the trust of authors and readers. Another is consistently attracting well-designed, methodologically sound, and ethically conducted research manuscripts. Sustaining a journal demands not only financial and administrative support but also a committed editorial team with scholarly experience and professional dedication. I am confident that our Editorial Board comprising experienced academicians and reviewers possess the expertise and commitment necessary to guide this journal toward academic credibility and long-term sustainability. Their collective experience in research, publication, peer review, and mentorship shall form a strong foundation for maintaining high editorial standards.

The vision is to establish this journal as a respected scholarly platform with progressive indexing in recognized databases such as DOAJ, Scopus, PubMed/MEDLINE, and Web of Science. Through rigorous peer review, transparency in editorial processes, and strict adherence to international publication ethics, we aspire to build a journal that enhances research visibility and contributes meaningfully to institutional and national academic metrics.

This journal also reflects the strengthening research culture within our institution characterized by faculty guidance, student research initiatives, funded projects, scientific presentations, and a steady rise in scholarly publications. By providing a credible and ethical publication platform, we aim to further nurture inquiry, innovation, and interdisciplinary collaboration across the health sciences.

I extend my sincere appreciation to the members of the Editorial Board, reviewers, and the entire team, whose dedication has transformed our vision into reality. I warmly invite researchers, academicians, clinicians, and students from across the country and abroad to contribute their original work and join us in building a sustainable, high-impact scholarly forum. I wish this journal grow in strength, integrity, and influence, contributing meaningfully to scientific advancement and improved healthcare outcomes

Dr. Sivapathasundharam B

Director,
Priyadarshini Dental College and Hospital

SHAPING THE FUTURE OF INTEGRATED HEALTH SCIENCES

DR. R. VEERAKUMAR

Patron, Indira Journal of Integrated Health Science and Research (IJIHSR)

It gives me immense pleasure to note that **Priyadarshini Dental College & Hospital** is releasing the **first issue of the Indira Journal of Integrated Health Science and Research**. With the objective of achieving and promoting excellence in academic publishing and applied research, the college has taken a pioneering initiative to launch this journal, providing an exclusive platform for staff and students to publish their research papers and scholarly articles. This initiative reflects the institution's dedication to fostering a strong research culture.

The college has made remarkable progress in all academic and non-academic along with significant advancements in capacity building for both staff and students. I sincerely congratulate all the contributors and the editorial board for their dedicated efforts in bringing out this well-curated and impressive issue of the journal. This enviable position has been achieved through the collective and concerted efforts of our students, alumni, faculty members, and supporting staff. Let us continue to work together with the same enthusiasm and commitment, striving to maintain this momentum and scale greater heights in the years to come.

DR. R. VEERAKUMAR

Principal

Priyadarshini Dental College and Hospital

STRENGTHENING THE GOALS OF INDIRA JOURNAL OF INTEGRATED HEALTH SCIENCE AND RESEARCH

Dr R. GANESH

Editor in Chief, Indira Journal of Integrated Health Science and Research (IJIHSR)

It is an honour to serve as the **Editor-in-Chief** of the *Indira Journal of Integrated Health Science and Research (IJIHSR)*. This journal represents a broad and dynamic platform dedicated to all branches of health sciences, emphasising the integration of oral health with general health, medical sciences, and community well-being.

IJIHSR is committed to showcasing research that reflects the true spirit of integrated health science. The journal encourages studies that explore how oral health interacts with systemic health, how social determinants influence disease patterns, and how multidisciplinary approaches can strengthen the prevention and management of noncommunicable diseases (NCDs). By bringing together insights from dentistry, medicine, public health, nursing, allied health sciences, and biomedical research, IJIHSR aims to promote a comprehensive understanding of human health.

The growing evidence linking oral conditions with systemic diseases reinforces the need for collaboration across health science disciplines. While curative and aesthetic treatments have their place, the global burden of disease demands a shift toward preventive, interdisciplinary, and team-based healthcare delivery. Many populations still lack access to essential health services, and the exclusion of oral health from major healthcare policies further highlights the importance of integrated health science research. As health science professionals, it is our responsibility to look beyond the boundaries of individual specialities and contribute to holistic care.

Integrated health science provides the framework for such collaborative action. There are still too few health policy leaders who can translate scientific evidence into effective public health strategies. IJIHSR strives to serve as a scientific meeting point for researchers, clinicians, academicians, and policymakers who are committed to advancing integrated health science and improving population health.

With the support of the editorial board and the health science community, I am confident that IJIHSR will continue to strengthen its role as a leading platform that unites oral health, general health, and all allied health sciences for the benefit of society.

Dr R. GANESH
Professor and Head
Department of Public Health Dentistry
Priyadarshini Dental College and Hospital

A NEW BEGINNING IN ACADEMIC EXCELLENCE

DR. ARTHILAKSHMI UTHIRAAPATHY, MDS

Joint Editor, Indira Journal of Integrated Health Science and Research (IJIHSR)

It is with great pleasure and pride that I welcome you to the inaugural issue of the Indira Journal of Integrated Health Science and Research. The launch of this first issue marks a significant milestone in our institution's academic journey and reflects our strong commitment to promoting high-quality research and scholarly excellence.

This journal has been established with the vision of creating a dynamic platform for researchers, academicians, clinicians, and students to share innovative ideas, evidence-based practices, and interdisciplinary research in the field of health sciences. We believe that meaningful research not only advances knowledge but also enhances clinical practice and patient care.

The successful release of this first issue is the result of the collective efforts of our dedicated editorial board, reviewers, authors, and institutional leadership. I sincerely appreciate their hard work, commitment, and enthusiasm in bringing this initiative to reality.

We are confident that this journal will continue to grow as a respected forum for academic exchange and scientific advancement. We look forward to receiving valuable contributions in the upcoming issues and to building a strong research culture together.

I extend my heartfelt thanks to all contributors and readers for their support and encouragement. With best wishes for the continued success of the journal.

Dr ARTHILAKSHMI UTHIRAAPATHY MDS

Associate

Professor Department of Public

Health Dentistry Priyadarshini

Dental College and Hospital

ORIGINAL ARTICLE

A COMPARATIVE STUDY ON CYTOMORPHOLOGICAL CHANGES IN BUCCALMUCOSAL CELLS OF TYPE 2 DIABETICS AND NON-DIABETIC SUBJECTS

Gnanambigai .K,[1] Rajeswari M.R.C[2] , Prem Karthick .B[3], , Raghu Dhanapal[4], Nandhini Priya .B[4], Lekha Priyadharshni[5].

Reader,[1] Professor and Head[2], Professor[3,4] ,Senior Lecturer[5], Lecturer[6], Department of Oral Pathology and Microbiology, RVS Dental College and Hospital, Coimbatore[4], Priyadarshini Dental College and Hospital, Tiruvallur, Tamilnadu.

ABSTRACT

AIM: To evaluate cytomorphological changes in exfoliated buccal mucosal cells of type 2 diabetic patients in comparison with healthy non-diabetic individuals.

MATERIALS AND METHODS: This comparative study included 20 outpatients from Priyadarshini Dental College and Hospitals, Tiruvallur district. Of these, 10 participants were diagnosed with type 2 diabetes mellitus, while 10 were healthy non-diabetic controls. Smears were collected by scraping the buccal mucosa and vestibule of each participant. The specimens were fixed in ethyl alcohol and stained with Papanicolaou stain. Quantitative parameters such as nuclear diameter, cytoplasmic diameter, and nuclear–cytoplasmic (N/C) ratio were measured and analysed.

RESULTS: The cytological evaluation demonstrated significant differences between diabetic and non- diabetic individuals. Diabetic patients showed an increase in nuclear diameter, a decrease in cytoplasmic diameter, and a higher nuclear–cytoplasmic ratio compared to healthy controls.

CONCLUSION: The study highlights distinct cytomorphological alterations in buccal mucosal cells of type 2 diabetic patients, suggesting that exfoliative cytology can serve as a simple, non-invasive, and valuable tool in assessing cellular changes associated with diabetes.

KEYWORDS: Type 2 diabetes, Exfoliative cytology, Papanicolaou stain, Cytomorphological changes

INTRODUCTION:

Diabetes mellitus (DM) is a metabolic disease in which blood glucose levels are not adequately controlled. The primary kinds of diabetes mellitus are type 1 and type 2; each has a unique pathogenesis, presentation, and treatment approach, but all can result in hyperglycemia. Type 2DM has a more insidious beginning, with a functional deficit of insulin resulting from an imbalance between insulin levels and insulin sensitivity. Although there are several contributing factors, obesity and ageing are the main causes of insulin resistance [1]. An estimated 77 million adults over the age of 18 in India have type 2 diabetes, and almost 25 million are prediabetics, meaning they have a higher chance of getting the disease in the near future [2].

Diabetes can cause the nucleus to enlarge and the nuclear cytoplasmic ratio to decrease, which can make cells more vulnerable to cancerous alterations [3]. In the normal physiological process, the epithelial cells move from basal layer to the surface and ultimately shed or exfoliated. The exfoliative oral cytology can be defined as the obtention and characterization of cells from the surface of the oral mucosa [4]. Cytomorphological features includes changes in both nucleus and cytoplasm like nuclear shape, size, chromatin pattern, nucleoli and nuclear membrane, cytoplasmic qualities and overall shape of the cell [5]. The Papanicolaou (PAP) staining method used to study the nuclear features such as chromatin arrangement, intranuclear invaginations, and membrane abnormalities are revealed by this stain and are crucial for making a cancer diagnosis. It contains three cytoplasmic dyes: light blue, eosin Y, and orange G. It can stain cells in ambiguous (gray-blue), pink (eosinophilia), orange (orangeophilia), or blue (basophilia). The cytoplasm of squamous cells changes from blue- green to pale orange to vividly orange as they keratinise. Compared to a basic H&E stain, this stain is significantly more sensitive and more selective for keratin staining in cytology [6]. A couple of investigations have looked at alterations in diabetic patients' oral mucosa and documented the replacement shift in epithelium cytology method. Thus, using exfoliative cytology, the current study aims to investigate the quantitative and qualitative features of the buccal mucosa epithelium in patients with type I diabetes and compare them to those in healthy individuals.

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MATERIALS AND METHODS:

The study was commenced after obtaining clearance from the Institutional Ethical Committee. Twenty outpatients from the department of Oral Medicine in Thiruvallur participated in a comparative study. The inclusion criteria include Ten of these individuals had type 2 diabetes, while the remaining ten were in the control group. Type 1 diabetes group was named as group 1 and healthy group was named as group 2. Patients who were older than eighteen were included in the research. Participants who were younger than eighteen were not allowed to participate. Furthermore, to guarantee the validity and correctness of the study results, patients with weakened immune systems were not included, as they may have an impact on the course of the disease or undermine the quality of cytomorphological evaluation. Demographic details like name, age, sex and relevant medical history were collected. Written informed consent was obtained from all the participants. The participants were instructed to rinse their oral cavity with water to remove any debris, after which smears were obtained from the buccal mucosa using a wooden spatula. The collected material was transferred onto clean, dry, and sterile glass slides that had been pre-labelled with the patient's reference number. Each smear was evenly spread across the slide in a single, one- directional motion from one end to the other. The prepared smears were immediately fixed in 95% ethanol and subsequently stained using the Papanicolaou (PAP). The slides were mounted in the DPX (Di-N-butyl phthalate in xylene).

PAP-stained smears were examined systematically, moving vertically downwards from left to right to prevent repetition in cell counting. An average of 20 well-defined epithelial cells from each sample were selected and projected onto a monitor via a camera at 40× magnification, where images were captured. Morphometric analysis of individual cell images was performed using Image Analysis Software (AP view software A delta Optec.India) under a Binocular Research Microscope (DELTAPLAN) at 40× magnification. The unit of measurement for the cell area was square micrometres (µm². The cytoplasmic-to-nuclear ratio (CNR) was computed after the nuclear area (NA) and cytoplasmic area (CA) were evaluated. The statistical software program SPSS [IBM Corp. IBM SPSS Statistics for Windows, version 22.0, IBM Corp. USA] was used. Student's t-test and one- way ANOVA were used to compare the mean values between the type 2 diabetes (group 1) and healthy subjects (group 2). P values less than 0.05 were considered significant.

RESULTS

This study involved 20 participants in total, including 12 male and 8 female participants. The mean values of the cytoplasmic area (CA), nuclear area (NA), and cytoplasmic-to-nuclear ratio (CNR) for both the Type 2 diabetes and healthy control groups are presented in **Table 1**. The mean NA values was found to be higher in the type 2 diabetes group compared with the healthy controls, whereas the mean CNR was greater in the healthy group. The mean CA values were same in both healthy and type
2 diabetes group. The mean nuclear area was significantly higher in Type 2 diabetic subjects (75.30 ± 3.96 µm²) compared with healthy individuals (60.47 ± 3.60 µm²; $p < 0.001$). Conversely, the cytoplasmic area showed no statistically significant difference between the two groups ($p = 0.896$).

Table 1: Comparison of cytomorphometric parameters between Type 2 diabetes and healthy groups

Parameter	Group 1 (Mean±SD)	Group 2 (Mean±SD)	t-value	p-value
Nuclear area (NA) µm²)	75.30 ± 3.96	60.47 ± 3.60	8.759	**0.001***
Cytoplasmic Area (µm²)	355.33 ± 28.70	353.89 ± 18.89	0.132	0.896
Cytoplasmic-to-Nuclear Ratio (CNR)	4.64 ± 0.56	7.02 ± 0.42	−10.628	**0.000***

The P value ≤ 0.005* is statistically significant, Group 1- Type 2 diabetes, Group 2- Healthy subjects cytoplasmic-to-nuclear ratio (CNR) was markedly reduced in diabetic samples (4.64 ± 0.56) compared to controls (7.02 ± 0.42; $p < 0.001$). These findings indicate prominent nuclear enlargement and altered similar to the studies done by Sravani et al [8], Joy s et al [9] and Rivera et al [10]. The increase in nuclear area (NA) observed in diabetic patients may be attributed to prolonged hyperglycemia, which promotes the formation of advanced glycation end products involving proteins, lipids, and nucleic acids. These products accumulate in the walls of large and small blood vessels, leading to progressive narrowing, reduced tissue perfusion, and impaired cellular metabolism. As a result, epithelial cell turnover slows down, delaying keratinization and normal differentiation processes. This disruption in cellular maturation contributes to the presence of cells with enlarged nuclei and altered nuclear morphology [9-11]. In contrast, the cytoplasmic area

showed no statistically significant difference between the two groups, suggesting that the cytoplasmic volume remains relatively unaffected in the early or moderate stages of Type 2 diabetes. The stability of cytoplasmic dimensions, despite nuclear enlargement, points to the possibility of cellular adaptation rather than overt cytoplasmic degeneration [8]. The results were contradictory, where few studies showed increased Cytoplasmic area [12, 13] and few studies showed decreased cytoplasmic area. This can be the result of dehydration-induced cell shrinking [14] (Figure 1). Numerous factors contribute to the reduction in cytoplasmic size in diabetes. The primary cause of the reduction in cytoplasmic size in diabetes patients is the relative insulin deficit, which impedes the uptake of glucose by growth-promoting epithelial cells. In addition to this in diabetic individuals, vascular lesions cause oral epithelial cells to age prematurely, which lowers the number of cellular organelles and reduces the production of proteins and nucleic acids. The size of the cytoplasm eventually decreases as a result of these modifications [15]. The cytoplasmic-to-nuclear ratio (CNR) was markedly lower in diabetic samples (4.64 ± 0.56) than in controls (7.02 ± 0.42; $p < 0.001$). A reduced CNR is indicative of an increase in nuclear size relative to the cytoplasmic area, which may represent early cytological manifestations of cellular stress, oxidative damage, or metabolic imbalance in diabetic individuals. Such morphometric alterations are consistent with previously reported findings that hyperglycemia and advanced glycation end-products can induce nuclear changes and impair cellular homeostasis in oral epithelial tissues [16]. These findings were similar to the studies by Shareef et al [17, 18]. It is thought that the inflammation causes the oral mucosa cells' nuclear size to increase and their cytoplasmic size to decrease. However, this only applies to the immature cells. Due to hormonal defects and/or abnormalities in their function, diabetic individuals' epithelial cells age more quickly [10]. Overall, the differences seen between various studies are likely due to many factors. These include how long the person has had diabetes, whether their diabetes is well controlled or not, their level of glucose control, their age, the number of people studied, and how long it has been since they were first diagnosed. Differences in the software used to measure the cells, the microscope magnification, and the lack of a standard method for examining the smears can also lead to different results. The limitations of the present study include a small sample size.

In addition, important factors such as blood glucose levels, obesity, and salivary flow rates were not assessed, which may have influenced the findings.

CONCLUSION

The present study demonstrates that people with Type 2 diabetes have notable cytomorphometric changes in their buccal epithelial cells. Diabetes causes both quantitative and qualitative alterations in oral mucosa cytomorphometry. Significant nuclear enlargement and disruption of normal cellular proportions in diabetic people are indicated by a notable increase in nuclear area and a significant decrease in the cytoplasmic-to-nuclear ratio. On the other hand, there was no discernible difference between diabetics and healthy people in the cytoplasmic area. These findings imply that cytomorphometric examination of exfoliated oral epithelial cells could be a helpful, non-invasive way to detect cellular alterations linked to Type 2 diabetes. To support these findings and determine their diagnostic utility, more research with bigger sample sizes and the addition of more clinical factors is advised.

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ORIGINAL ARTICLE

The Impact of Social Media and Online Reviews on Patient Choice of Dentist Among the General Public in Tiruvallur- A Cross-Sectional Study

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Dental Surgeon[1,2], Professor and Head of the Department[3], Senior Lecturer[4,5], Department of Public Health Dentistry, Priyadarshini Dental College and Hospital, Tiruvallur.

ABSTRACT

Aim: To evaluate the impact of social media and online reviews on patient choice of dentist among the general public in Tiruvallur.

Methods and Materials: This cross-sectional study utilized a Google Form questionnaire, which was designed to evaluate the impact of social media and online reviews on patient choice of dentist. The questionnaire consisted of 22 questions. Additionally, it had information like age and gender of the respondents. The questionnaire was distributed via Gmail and social media platforms, including WhatsApp and Instagram. The target audience included patients aged 10 and above. A total of 318 responses were collected over a period of 4 weeks. The responses collected from the Google Form questionnaire were exported to a Google Sheets document for further analysis.

Results: An analysis of the collected data from 318 participants suggests that social media platforms are popular among respondents with 81% using it on a daily basis. Nearly 49% have searched for a dentist online and 59% of them reported having a positive experience with a dentist they found. 51% of participants tend to base their decisions on less than 5 online reviews. While 34% of respondents believe that dentists should respond to online reviews sometimes, 63% have not left an online review for a dentist. The data revealed that 49% of the participants rated the online presence of a dentist as moderately important suggesting that an online presence is not the most critical factor in choosing a dentist. 58% of respondents have not avoided a dentist based on their online reviews.

Conclusions: In conclusion, social media and online reviews are significant factors that influence patients' decisions in choosing a dentist. While reputation, qualifications, and credentials remain crucial, a positive online presence through social media can provide dental practices with a competitive edge, especially among younger generations. However, patients should not rely solely on online reviews, and dental practitioners must find a balance between traditional and modern marketing strategies to appeal to a wide range of patients. This study highlights the importance of social media and online reviews as a game changer in dentistry, and dental practices that embrace this trend are likely to thrive in the digital age.

Key-words: social media, dentistry, digital, online reviews.

The definition of "social media" is broad and constantly evolving. In a practical sense, it is a collection of software-based digital technologies usually presented as apps and websites. It is a very active and fast-moving domain that allows sharing of ideas and information through its platforms. However, social media also has its drawbacks. It is a double-edged sword. It has the potential to provide information and can also contribute to the spread of misinformation. Users may also experience social isolation or anxiety as a result of their online activities. As with any technology, it is important to use social media mindfully and understand its potential risks and benefits can weaken the tooth structure. [2] social media can be used to improve or enhance professional networking, education, patient care, and patient treatment choices and to attract a diverse group of people that we may not have thought would be interested in oral health. It is increasingly utilized by patients to educate themselves on a disease process and to find hospitals, physicians, and physician networks most capable of treating their condition. Social media and online reviews have become a significant part of the patient-dentist relationship. Patients are not passive consumers of health information anymore. hey are increasingly relying on online platforms to find a dentist, with many feeling that they can trust the information provided by other patients more than what is stated by the dentist in person or on their website. This has led to an increase in competition between dentists who want their practice to be seen as the best option for patients looking for treatment.

The use of social media platforms has enabled dentists to reach out to patients beyond their physical location and offer oral health education and advice. Patients can now interact with dentists, ask questions, and get answers in real time, creating a more collaborative relationship. Social media platforms provide an avenue for dentists to exhibit

their expertise, display their work, and offer a glimpse into their dental practice, which includes patient reviews and testimonials. Dentists from various fields, such as orthodontics, periodontics, cosmetic dentistry, dental surgery, and dental implants, rely on social media to showcase their cases by sharing pictures and videos. As a result, many dental clinics and dentists use social media to promote their services. 6 In this study, we aimed to investigate how social media usage and online reviews affect the patient's choice of dentist among the general public in Thiruvallur.

SUBJECTS AND METHODS

This cross-sectional study utilized a Google Form questionnaire, which was designed to assess the impact of social media and online reviews on patient choice of dentist. The questionnaire consisted of 22 questions regarding the impact of social media and online reviews on patient choice of dentist. Using a chain referral approach, the questionnaire was distributed to a wide range of non-dental Indian professionals and individuals via Gmail and social media platforms, including WhatsApp and Instagram. The initial link was sent to a group of friends and contacts, who were encouraged to forward it to their own networks. This process continued until the questionnaire reached a diverse and extensive audience. The chain referral approach proved to be a quick and effective method for distributing the questionnaire. The target audience included patients aged 10 and above. A total of 318 responses were collected over a period of four weeks.

INCLUSION CRITERIA

Patients who responded were considered in the inclusion criteria.

EXCLUSION CRITERIA

Patients who did not respond were considered in the exclusion criteria.

RESULTS

Among 318 respondents in the study, 56% (178) were females and 44% (140) were males. The respondents age ranged from 10 years to more than 50 years. An analysis of the collected data from 318 participants suggests that social media platforms are popular among respondents, with 81% using them daily. Facebook (7%) and Instagram (37%) were the most popular platforms for searching for dental services and dentists. Reputation (24%) and qualifications/credentials (22%) were considered the most important factors in choosing a dentist. Regarding gender, there was a significant difference between males and females in terms of their use of social media to search for dentists, with females being more likely to use social media for this purpose ($p = 0.000072$). There was also a significant difference between males and females in terms of the importance they placed on online reviews when choosing a dentist, with females rating this factor as more important than males ($p = 0.03$).

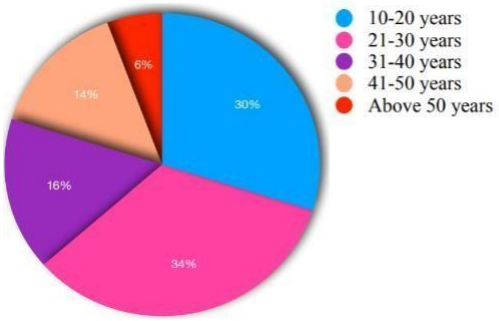

Figure 1: Age distribution of the respondents

In terms of age, there was a significant difference between age groups with respect to the frequency of social media use to search for dentists. Specifically, younger individuals were more likely to use social media for this purpose compared to older individuals ($p = 0.000001$). Additionally, there was a significant difference between age groups in terms of the social media platforms used to search for dental services and dentists. Younger individuals were more likely to use Instagram, while older individuals were more likely to use Facebook ($p = 0.009$). Overall, these results suggest that gender and age may play a role in how individuals use social media and online reviews to search for dentists and choose dental services. Regarding the impact of online reviews, 39% of respondents reported that they were moderately important in their decision-making process, with 18.5% reporting that they had chosen a dentist solely based on their online reviews. However, only 33% of respondents reported that they would definitely recommend a dentist based on their online reviews [Table 1]. In terms of negative experiences, 58% of respondents had never had a negative experience with a dentist they found online, and 41.5% reported having avoided a dentist based on their online reviews. Furthermore, 78% of respondents reported that their preferences for choosing a dentist had somewhat or significantly changed over the last few years due to social media and online reviews.

DISCUSSION

In our "e-society," social media are pervasive, rapidly evolving, and increasingly influencing the healthcare landscape. In fact, it is becoming more important that all healthcare providers understand the basic function of social media processes including what they are, who uses them, what they can be used for, and how they might affect one's practice.7 Adapting to modern dentistry, changing consumer demographics, attitudes, and preferences

is crucial for dental practitioners to maximize their income. Social media is one of the marketing strategies that can enhance their efforts, along with their clinical skills. Social media creates a forum for patient participation that extends beyond the reach of the hospital or the local clinic. Such resources can help empower and uplift patients when they read the experiences of other patients[9]. This study aimed to evaluate the impact of social media platforms and online reviews on patients' decisions when selecting a dentist. 49% of the participants believe that online reviews are mostly or completely reliable when choosing a dentist. This is comparable to the study conducted by Taneja, et al 10 wherein 62.9% of participants reported trusting the information they get from social media about dentistry and treatment options. The reason behind this could be that online reviews provide valuable insights into the quality of services provided by a dentist, and people rely on the opinions of others to make informed decisions. Additionally, online reviews are easily accessible and readily available, making it convenient for people to check them before choosing a dentist. The present study revealed that (n=185) 58% of respondents reported that their preferences for choosing a dentist have changed somewhat due to online reviews. Furthermore, a pronounced difference in preferences based on both age (P=0.014) and gender (P=0.0403) was observed. Respondents aged 21-30 were the most likely to be influenced by online reviews, with 33.6% of them stating a significant change in their preferences. Furthermore, 43% of women have reported that they use Instagram to look for a dentist. This is in accordance with the study conducted by Abdullah Alalawi et al.11 Therefore, in today's social media era, a positive online reputation is no longer a bonus for dental practices, but a necessity to attract and retain young patients. Of the participants, 24% identified the reputation of the dentist as their top priority when selecting one, with qualifications and credentials (22%) and personal recommendations (21%) following closely behind. This is in accordance with the study conducted by Alalawi et al [11] wherein (56.4%) reported that the qualification of the dentist is very important while looking at a social media Account for a Dental Practice. This finding is also comparable with the study conducted by Taneja, et al [10]. This may be due to the reputation being built on clinical expertise, quality of care, and patient satisfaction, which are important indicators of high-quality care and can help to build trust with patients. Additionally, reputation may be particularly important for patients who are anxious about dental treatment or have had negative experiences with previous dentists.

The study indicates that "Information on dental procedures and treatments" is the most desired content (25%) on a dentist's social media page across all age and gender groups. This may be due to the fact that many individuals have queries or reservations regarding dental procedures and treatments, and are seeking more information before finalizing their decision. The second most preferred content (21%) is educational content on dental health, which suggests that people are interested in gaining knowledge on maintaining good oral health. According to the study conducted by Al Awdah et al [12]70.9% of the respondents were not attracted to the advertisements with special offers suggesting that individuals prioritize the quality of dental care over cost. Overall, this study contributes to the growing body of literature on the impact of social media and online reviews on patient choices of healthcare providers, specifically in the field of dentistry. Possible future research directions for this study include conducting a longitudinal study to track changes in patients' preferences and behaviour over time and investigating the impact of different types of online content (e.g., videos, photos, testimonials) on patient engagement and conversion rates. Additionally, researchers could examine the effectiveness of targeted advertising and search engine optimization, in attracting and retaining patients. Finally, it would be valuable to explore the potential ethical implications of using social media and online reviews in the healthcare industry, such as issues related to data privacy and information accuracy.

CONCLUSION

In conclusion, social media and online reviews play a significant role in shaping patients' decisions when it comes to selecting a dentist. While the reputation, qualifications, and credentials of a dentist are still vital factors in a patient’s decision-making process, having a positive online presence through social media can give dental practices an extra edge, particularly when appealing to younger generations. However, it's important to note that patients should not rely solely on online reviews as they may not always be reliable or unbiased, and considering multiple sources of information is crucial. Dental practitioners need to strike a balance between traditional offline methods of recommendation and modern online marketing strategies to adapt to the changing times and appeal to a wide range of patient populations.

LIMITATIONS

The study's small sample size makes it challenging to generalize the results to larger populations. The study relied on self-reported data, which could be influenced by social desirability and recall bias. Furthermore, the study did not investigate the accuracy and reliability of online reviews, which could have an impact on patients' decision-making. Future research is necessary to validate and broaden

these results, as well as to overcome the limitations of this study.

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ORIGINAL ARTICLE

IN VITRO ACTIVITY OF ETHANOLIC AND WATER EXTRACT OF GUAVA LEAVES AT VARIOUS CONCENTRATIONS AGAINST STAPHYLOCOCCUS AUREUS AND CANDIDA ALBICANS

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ABSTRACT

AIM: To evaluate the antibacterial and antifungal efficacy of guava (Psidium guajava) leaf extracts (aqueous and ethanol) at 15% at 25% against Staphylococcus aureus and Candida albicans.

METHODOLOGY: Staphylococcus aureus and Candida albicans were used in the study. The strains were passaged in the nutrient agar environment and incubated for 24 h to have live and fresh strains for the test. Ethanolic and water extracts of guava leaves were prepared using a Soxhlet extractor. Two concentrations of 15% and 25% weight/volume of both extracts were prepared. Antimicrobial testing of extracts was done using the Agar well-diffusion method. Two plates each were prepared for both extracts. Chlorhexidine (0.2%) served as a positive control and distilled water as a negative control.

RESULT: Mean zone of inhibition produced by 15% and 25% ethanolic extract was 14 mm and 17.3 mm respectively against S. aureus and 14 mm and 17.6 mm respectively against C. albicans. Similarly, 15% and 25% water extract mean zone of inhibition was 12.6 mm and 14.6 mm respectively against S. aureus and 12.6 mm and 15.6 mm respectively against C.albicans. Statistical analysis of results using one-way ANOVA and post-hoc Tukey's test revealed that antifungal activity of 15% ethanolic extract and 15% water extract was significantly less than that of 0.2% chlorhexidine. But 15% ethanolic extract has similar antibacterial activity as that of 0.2% chlorhexidine. There was no statistical difference in efficacy of 25% ethanolic, 25% water extract of guava and 0.2% chlorhexidine in both organisms.

CONCLUSION: The ethanolic and water extract of guava leaves possess antibacterial and antifungal activity against S. aureus and C. albicans with 25% ethanolic and water extract being as efficacious as 0.2% chlorhexidine in both organisms. 15% ethanolic extract is as efficacious as 0.2% chlorhexidine only against S. aureus.

KEYWORDS: Antibiotic resistance, guava leaves, Staphylococcus aureus, Candida albicans

INTRODUCTION:

Antimicrobial resistance can be described as the ability of a microorganism to resist the action of antimicrobials, which regularly occurs through continuous exposure to them. The level of resistance of a mutant strain can vary widely depending on the mechanism of resistance resulting in its evolution, either by spreading between similar or dissimilar strains. [1] Overuse of these agents has caused the worldwide emergence of drug-resistant pathogens that pose serious life-threatening issues.[2] The improper use of antimicrobials stimulated the emergence of genetic modifications that contributed to circumventing the mechanism of action of drugs. Therefore, the expansion of resistant strains results in damage to public health as it leads to infectious conditions that require difficult treatment. [3] Bacterial pathogens such as S. aureus and fungal organisms like C. albicans are notorious for causing both superficial and systemic infections, with severe implications for immunocompromised individuals.[3] C. albicans is a commensal fungus that colonizes the oral cavity, vagina, and gastro-intestinal tract in most humans.[4] In immunocompromised individuals the infections due to bacteria and fungi may occur concurrently.[5] Conventional antimicrobial drugs, though effective, are increasingly losing their efficacy due to the rise in resistance, thereby necessitating the search for novel and sustainable antimicrobial agents. Chlorhexidine, a broad-spectrum antimicrobial agent, has been a cornerstone in infection control practices. Chlorhexidine is commonly used in oral rinses, skin disinfectants, and wound care products due to its efficacy in preventing biofilm formation and reducing microbial load. However, its prolonged use has been associated with side effects such as staining of teeth, taste alteration, and, in rare cases, hypersensitivity reactions. Additionally, the emergence of microbial resistance to chlorhexidine has prompted the exploration of alternative natural agents that can complement or replace its usage. [6]

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Medicinal plants have gained attention as potential sources of bioactive compounds with antimicrobial properties. Among these, Psidium guajava (guava) holds a prominent place in traditional medicine due to its broad spectrum of pharmacological activities. Guava leaves, in particular, are rich in secondary metabolites such as flavonoids, tannins, saponins, alkaloids, and phenolic compounds, which contribute to their antimicrobial, anti-inflammatory, and antioxidant effects. [7] The application of guava leaf extracts in combating microbial infections is a promising avenue, as they are not only natural and cost-effective but also associated with lower risks of adverse effects compared to synthetic drugs. [8] Furthermore, previous studies have demonstrated the potential of guava leaves in inhibiting the growth of pathogenic microorganisms. However, limited research has focused on comparing the activity of these extracts at varying concentrations against both bacterial and fungal pathogens, specifically S.aureus and C. albicans. [7] This study aims to bridge this gap by evaluating the in vitro antimicrobial efficacy of ethanolic and aqueous guava leaf extracts against these clinically relevant pathogens. The research seeks to identify and provide a scientific basis for the development of plant-based antimicrobial agents, which could serve as complementary or alternative therapies in the management of microbial infections.

MATERIALS AND METHODOLOGY

TEST ORGANISMS

The microorganisms used in the present study were standard C. albicans (ATCC No 10231) and S. aureus (ATCC No 23235), which were provided from Saveetha Dental College and Hospital, Chennai, India. Fungal strains were passed through a Sabouraud dextrose agar environment for 24 hours to obtain live and fresh strains for the test. The pure cultures of S.aureus were subcultured on nutrient agar slants. About 18-hour broth culture of the test bacteria isolate was suspended into sterile nutrient broth and kept at 4 degrees Celsius until ready for the study.

PREPARATION OF EXTRACT

This preliminary study considered only the qualitative analysis of activity of Guava leaves extract against S.aureus and C.albicans. Therefore, the two higher concentrations, that is, 15% and 25% w/v were tested for antimicrobial activity. The plant specimen (Leaves of P. guajava Linn.) for the proposed study was collected in the month of December 2024. Leaves of P. guajava L. (Myrteceaae) were cleaned and dried in an oven at 60°C for 5 hours. The dried leaves were then grounded to powdered form. Preparation of the extract was done using Soxhlet extractor. The extracts were filtered using Whatman no. 4 filter paper and then dried in a rotary evaporator for 5-6 hours at 60°C. The dried extract was converted into a powder form which was utilized for the preparation of desired concentrations of the extracts. The required concentrations of 15% and 25% ethanolic extract were prepared by adding 1.5 g and
2.5 g of powder respectively in 10 ml of ethanol. Similarly for the water extract the same amount was added in the distilled water. The extracts were stored at 4°C in sterile bottles.

ANTIMICROBIAL TEST

The antibacterial and antifungal activity of guava extracts was checked by agar well-diffusion method which was performed on the next day of preparation of the extract. Antibacterial and antifungal testing was carried out in laminar airflow to avoid contamination by other organisms. Two groups of plates were prepared: antibacterial test group (S.aureus) and antifungal test group (C.albicans). In each group, there were 3 plates. In all the plates, 6 wells were punctured in agar with the help of well borer. The 6 wells prepared in both groups were filled carefully with 0.08 ml of 15% ethanolic extract of guava, 25% ethanolic extract of guava, 15% water extract of guava, 25% water extract of guava, 0.2% chlorhexidine (positive control) and sterile distilled water (negative control). All the plates were kept in an incubator at 37°C for 48 hours. After 48 hours zones of inhibition were measured.

STATISTICAL ANALYSIS

Statistical analysis was conducted using IBM SPSS Statistics 20.0 (Chicago). An ANOVA test was used to determine differences between groups, including 15% and 25% ethanolic extract, 0.2% chlorhexidine, and 15% and 25% water extract. Post-hoc analysis was performed to identify which specific groups showed significant differences. A p-value of less than 0.05 was considered statistically significant.

RESULTS

This study was conducted to assess the efficacy of Guava leaves on S. aureus and C. albicans using agar well-diffusion method. Mean zone of inhibition shown by 15% and 25% ethanolic extract, 15% and 25% water extract ,0.2% chlorhexidine and distilled water against S. aureus [Table 1, Figure 1] and C. albicans [Table 2, Figure 2] are shown. The antibacterial efficacy (against S. aureus) of ethanolic extract of guava leaves at 15%, 25% concentration and 0.2% chlorhexidine was compared using one-way ANOVA ($F = 4.136$, $P = 0.074$). Results that showed a significant difference were further analyzed for statistical significance between specific groups using Tukey post-hoc analysis. There was no significant difference between the efficacy of 15% (14 ± 1 mm) and 25% (17.3 ± 1.527 mm) ethanolic extract and 0.2% chlorhexidine (17 ± 2 mm) ($F =$

4.136, P = 0.074). There was a significant difference in the activity of 15% (12.6 ± 0.577 mm) and 25% (14.6 ± 0.577 mm) water extract and 0.2% chlorhexidine (17 ± 2 mm) (F = 9.071, P = 0.015) [Table 2]. Post-hoc analysis revealed that the activity of 0.2% chlorhexidine (17 ± 2 mm) was significantly higher than 15% water extract (12.6 ± 0.577 mm) of guava leaves. There was no significant difference between 0.2% chlorhexidine (17 ± 2 mm) and 25% water extract (14.6 ± 0.577 mm) of guava leaves [Table 2]. The antifungal efficacy (against C. albicans) of ethanolic extract of guava leaves at 15%, 25% concentration and 0.2% chlorhexidine was compared using one-way ANOVA (F = 25.75, P = 0.001). Results that showed a significant difference were further analyzed for statistical significance between specific groups using Tukey post-hoc analysis [Table 3]. There was a significant difference between the efficacy of 15% (14 ± 0 mm) and 25% (17.6 ± 0.577 mm) ethanolic extract and 0.2% chlorhexidine (17 ± 1 mm) (F = 25.75, P = 0.001). On post-hoc analysis, it was revealed that the efficacy of 25% ethanolic extract (17.6 ± 0.577 mm) was not significantly different than 0.2% chlorhexidine (17 ± 1 mm) (P = 0.483). However, the efficacy of 15% ethanolic extract (14 ± 0 mm) was significantly lower than 0.2% chlorhexidine (17 ± 1 mm) (P =0.003) and 25% ethanolic extract (17.6 ± 0.577 mm) (P =0.001) [Table 3]. There was a significant difference in the activity of 15% (12.6 ± 2.309 mm) and 25% (15.6 ± 0.577 mm) water extract and 0.2% chlorhexidine (17 ± 1 mm) (F = 6.65, P = 0.030) [Table 4]. Post- hoc analysis revealed that the activity of 0.2% chlorhexidine (17 ± 1 mm) was significantly higher than 15% water extract (12.6 ± 2.309 mm) of guava leaves. There was no significant difference between 0.2% chlorhexidine (17 ± 1 mm) and 25% water extract (15.6 ± 0.577 mm) of guava leaves [Table 4].

DISCUSSION

Leaves of Psidium guajava contain essential oil, Flavonoids, and saponins combined with oleanolic acid, Nerolidiol, β-sitosterol, and avicularin. Avicularin and its 3-l-4-pyranoside have been reported to have strong anti-bacterial action.[9] The flavonoid and tannic fractions from dried P. guajava leaves presented a relevant antifungal capacity. The study by Bezerra et al. reported that the combination between natural product and anti-fungal drug is efficient as it potentiated the action of the antifungal (Fluconazole), reducing its concentration and increasing its effectiveness. [10] Razak et al., reported that early plaque settlers were treated with 1 mg/ml of Psidium guajava leaf aqueous extract, which decreased the cell-surface hydrophobicity of Actinomyces sp., Staphylococcus mitis, and Staphylococcus sanguinis by correspondingly 54.1%, 49.9%, and 40.6%.[11] The antibacterial properties of guava leaf extracts were also documented by Vieira et al. in 2001, who reported that they prevented S. aureus from growing. [12] In 2012, Beatriz et al. in their research reported the activity of P. guajava leaf extracts (50 mg/mL) against various fungi. [13] This study aimed to assess the effectiveness of guava leaves, known for their high antibacterial and antifungal compounds, against S. aureus and C. albicans. The agar well- diffusion method, which has been shown to be more sensitive than other techniques like the disc diffusion method,[14] was used in this study for the microbiological assay. Staphylococcus aureus and Candida albicans are cultured in nutrient agar. Results of this study shown that 25% ethanolic and water extract is as efficient as 0.2% chlorhexidine in both organisms. 15% ethanolic extract has similar efficacy as 0.2% chlorhexidine only against S. aureus. It was discovered that the ethanolic extract at 15% and 25% was more effective than the water extract at 15% and 25%. The ethanolic and water extracts are not the same. While ethanolic extract has both flavonoids and tannins, water extract only has tannins or none. The varying solubility of different guava leaf components in water and organic solvents is the reason for the compositional discrepancy between the ethanolic and water extracts.[15] In this study, the antimicrobial activity of guava leaf extract against S. aureus and C. albicans was qualitatively assessed. However, more quantitative studies are required to determine the minimal inhibitory concentration and assess the safety and efficacy of guava extracts in vivo.

CONCLUSION

The ethanolic and water extract of guava leaves possess antibacterial and antifungal activity against S. aureus and C. albicans with 25% ethanolic and water extract being as efficacious as 0.2% chlorhexidine in both organisms. 15% ethanolic extract is as efficacious as 0.2% chlorhexidine only against S. aureus.

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CASEREPORT

Revisiting Walking Bleach- A Case Report

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ABSTRACT

Internal post-eruptive discoloration of teeth commonly results from pulp haemorrhage, necrosis, infection, or trauma, and often presents an esthetic concern, particularly in young patients. Conservative treatment approaches that preserve tooth structure are preferred over invasive restorative procedures. The walking bleach technique is widely used intracoronal bleaching method for endodontically treated teeth. The case report describes the management of discoloration in a 14-year old female patient who presented with greyish-black discolored maxillary left central incisor following a history of trauma five years earlier. Clinical and radiographic examination revealed a non-vital tooth with a periapical lesion. Endodontic treatment was performed followed by surgical intervention and intracoronal bleaching was initiated after confirmation of periapical healing. Sodium perborate mixed with distilled water was used as the bleaching agent. Significant improvement in tooth shade was achieved within 9 days, resulting in satisfactory esthetic outcomes. The walking bleach technique proved to be a simple, effective, and minimally invasive method for managing discoloration in endodontically treated teeth.

KEYWORDS: Non- vital bleaching, Sodium perborate, Walking bleach.

INTRODUCTION

Internal post-eruptive discolouration of teeth is most frequently brought on by pulp bleeding, necroses, infections, and iatrogenic reasons[1]. This kind of discolouration is commonly treated using veneers, bleaching or full coverage restorations. The foundation of contemporary dentistry is the idea of minimal intervention, or the preservation of dental tissue. The treatment for tooth discolouration is specifically discussed in this idea.

In 1961, Spasser recommended the use of sodium perborate and water inside the pulp chamber[2]. In 1967, his technique was modified by Nutting and Poe, who substituted the water by 30% hydrogen peroxide and suggested the term "walking bleach" be used to refer to the technique[3]. It is called as Walking Bleach procedure because bleaching happens between visits outside the clinic. The procedure is also called as sealed bleach technique as the chemical is placed inside the tooth making it safe to use and requiring less chair time.

CASE REPORT

This case report was prepared in accordance with the guidelines of the CARE (CAse REport) checklist. A 14-year-old female patient reported with the chief complaint of discoloured tooth in the upper front region. (Figure 1) History reveals that patient had trauma before 5 years. On, visual examination, greyish- black discoloration was noted in proclined 21 with Ellis Class IV fracture. The intraoral periapical radiograph revealed matured tooth with closed apex, widening of PDL space, discontinuity of lamina dura and a well circumscribed periapical radiolucency in relation to 21(Figure 1). Endodontic treatment was planned followed by bleaching through walking bleach method.

After obtaining informed consent, root canal treatment was commenced. Adequate healing was not obtained by conventional root canal treatment and hence surgical approach was carried out. (Figure 1) Bleaching was started 2 months post endodontic treatment once periapical healing was complete. The colour of the tooth was noted before commencement of treatment using vita shade guide (classic) and the treatment was planned (designed) to quit (stop) when appropriate colour matching with adjacent teeth was obtained. After rubber dam isolation, the access cavity was re-established.

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Gutta percha was removed upto 2mm apical to cemento-enamel junction and the orifice was sealed upto 2 mm with Glass ionomer cement as intra- coronal barrier. Sodium perborate powder was mixed with distilled water to form a thick paste and was filled in the pulp chamber covering the entire facial surface and the access cavity was again closed with Glass ionomer cement. (Figure 2) The patient was recalled after 48 hours and significant improvement in color was observed. By 9 days, the shade of the tooth was significantly lighter and similar to adjacent teeth. The access cavity was re- entered and a paste of calcium hydroxide and sterile water was placed in the pulp chamber for 1 week after which permanent restoration was done with composite.

DISCUSSION

Restoring the dental aesthetics has been considered one of the chief purposes of modern dental medicine especially in younger individuals because it causes an impact on social interaction. Novel materials and treatment methods are being developed every day to reach this goal.

Dental bleaching is a conservative treatment compared to other treatment methods used for treating discoloration; such as, laminate veneers and full crowns. The intracoronal bleaching procedure uses oxidizing agents within the coronal portion of an endodontically treated tooth to treat tooth discoloration[5] (American Association of Endodontists, 2003). The bleaching of endodontically treated teeth is based on dentin permeability, allowing the oxidizing agent to penetrate directly into the pigment in the dentin, and eliminate or alleviate the problem of discoloration. The oxidizing chemical agent removes intrinsic stains via chromogenic degradation, and by breaking down the larger pigments into smaller ones, the colour of the teeth is lightened. Sodium perborate is an oxidizing agent available as a powder. It is stable when dry; however, in the presence of acid, warm air, or water, it breaks down to form sodium metaborate, hydrogen peroxide, and nascent oxygen. Friedman, et al. (1988) reported the incidence of external cervical resorption in 6.9% of the 58 non-vital teeth after intracoronal bleaching with sodium perborate and 30% hydrogen peroxide for a period of 1-8 years[5]. However, Holmstrup, et al (1988) did not verify external cervical resorption in pulpless teeth after intracoronal bleaching with sodium perborate mixed with water after evaluation of 3 years[6]. Rotstein, et al. (1991) verified that sodium perborate with water presented similar effectiveness of bleaching compared to other bleaching materials, and prevented or minimized the occurrence of external root resorption7. Hence, Sodium perborate mixed with water was opted for bleaching in the present case. The patient was on follow up for the 3 months and no signs of cervical resorption was observed. Excellent colour matching was observed which motivated the patient for pursuing fixed mechanotherapy for correction of proclination.

CONCLUSION

In the modern era where individuals demand for immediate results, bleaching technique is vanishing. Hence, our intention was to obtain the same promising results of the immediate alternatives but in a more physiological way.

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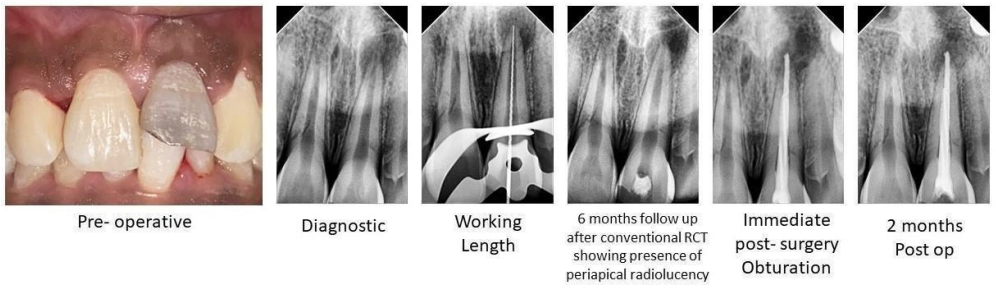

Figure 1: Pre- operative photograph and radiograph and endodontic management

Figure 2: Procedure of walking bleach

Figure 3: Follow-up after Bleaching Procedure

CASE REPORT

Endocrowns an Ultimate Approach for Severely Damaged Tooth – Case Report

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ABSTRACT

Post endodontic restoration is the final and foremost step in determining the prognosis of the tooth with severely loss of hard tissue. Over the development in the material aspect and technology aspect the most ultra conservative approach is to save an endodontically treated teeth with extreme tissue loss is endocrowns. Due to its monoblock effect like advantages, it stands tall than the traditional post and core followed by crown. In this case report we are going to see about the two cases of endocrowns which are prepared and delivered to the patients.

KEYWORDS: Endocrowns, Post endodontic restoration, Monolithic lithium disilicate

INTRODUCTION

Metal ceramic, metal, zirconia and all ceramic type of full coverage restorations were the regular indications for the severe tissue loss in an endodontically treated tooth over the years. [1] The importance of the post endodontic restoration is to restore the tooth's form, function and aesthetics, because the endodontically treated tooth could have under gone major to minor tissue loss depending on the caries, which can weaken the tooth structure. [2] Post endodontic restoration is based on the residual tooth structure after an endodontic procedure and type of tooth whether it is an anterior or posterior.

[3] Apart from the aggressive approach of tooth reductions for the post endodontic restorations, the recent material technology and concepts over the tissue conservation had led a way to alternate type of approach for the tooth with extreme tissue loss.

[4] An endocrown would be a wonderful approach in the cases with short clinical crown height and insufficient intraocclusal clearance and also it has sufficient tissue for adhesion. [5] The macro mechanical retention and adhesion properties of the monolithic endocrown were first researched and introduced by Bindle and Morman in 1999. Followed by the fabrication of the endocrown is by two methods either by heat pressing or CAD/CAM technology. [6] This paper discusses about two case reports of endodontically treated mandibular molar which received monolithic endocrowns as the post endodontic restoration.

CASE PRESENTATION

Patient aged 23years reported to the Department of conservative dentistry and endodontics with the chief complaint of pain in the lower right back tooth region. After diagnosis it reveals symptomatic irreversible pulpitis, symptomatic apical periodontitis in 36. Once root canal treatment was completed in the 36. This tooth had limited interocclusal clearance and short clinical crown which was not suitable to place conventional full coverage crowns {fig 1a, b}. Hence endocrowns were planed based on the remaining tooth structure and thickness of walls. Once the orifice had been sealed with composite resin, the preparation was done using TF 12 bur [MANI, japan]. The pulp chamber space was prepared by creating flat floor about 3.5 mm of depth and axial walls were prepared which were divergent {fig: 2}. Shoulder finish line was given to obtain the resistance from the ferrule. Then the impression was made using polyvinyl siloxane material using putty was technique and then sent to laboratory for endocrown fabrication. Temporisation was done using acrylic crowns. Monolithic lithium disilicate crowns were fabricated through the CAD/CAM technology {fig: 3}

After receiving the crown from lab then try in was done in 36. While try-in the prosthesis was good in marginal integrity, shade and occlusion and then proceeded for cementation. The tissue surface of the

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Figure 1

Figure 2

endocrown was etched with 10% hydrofluoric acid for 20 seconds, washed with water, then air dried. After air drying, silane coupling agent was applied for 45 seconds. The tooth preparation was done by application of acid etchant of 37% of phosphoric acid for 15 second then washed and air dried. Then bonding agent was applied to the etched tooth surface with applicator tip air dried. Fusion pro [PREVEST, INDIA] dual cure cement applied on to the tooth surface and the crown was placed over the tooth. Excess flash was of cement was wiped of the cured for 20 seconds. No occlusal discrepancy was noted and the marginal adaptation was good {fig: 4}.

CASE PRESENTATION 2

Patient aged 34years reported to the department of conservative dentistry and endodontics with the chief complaint of pain in the lower right back tooth region. After diagnosis it reveals symptomatic irreversible pulpitis; symptomatic apical periodontitis in 36. Once root canal treatment was completed in the 36. This tooth had limited interocclusal clearance and short clinical crown which was not suitable to place conventional full coverage crowns {fig:5}. Hence endocrowns were planed based on the remaining tooth structure and thickness of walls. Once the orifice had been sealed with composite resin, the preparation was done using TF 12 bur [MANI, japan]. The pulp chamber space was prepared by creating flat floor about 3 mm of depth and axial walls were prepared which were divergent and remaining cervical thickness was about 2mm. Shoulder finish line was given to obtain the resistance from the ferrule {fig: 6}. Then the impression was made using polyvinyl siloxane material using putty was technique and then sent to laboratory for endocrown fabrication. Temporisation was done using acrylic crowns. Monolithic lithium disilicate crowns were fabricated through the CAD/CAM technology {fig: 7}.

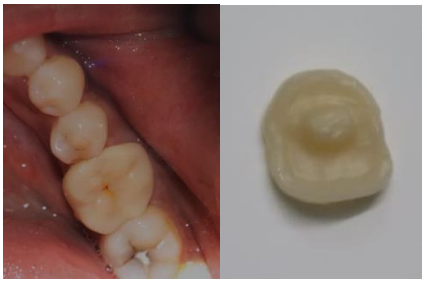

Figure 3 **Figure 4**

After receiving the crown from lab then try in was done in 36. While try in the prosthesis was good in marginal integrity, shade and occlusion and then proceeded for cementation. The tissue surface of the endocrown was etched with 10% hydrofluoric acid for 20 seconds, washed with water, then air dried. After air drying, silane coupling agent was applied for 45 seconds. The tooth preparation was done by application of acid etchant of 37% of phosphoric acid for 15 second then washed and air dried. Then bonding agent was applied to the etched tooth surface with applicator tip air dried. Fusion pro [PREVEST, INDIA] dual cure cement applied on to the tooth surface and the crown was placed over the tooth. Excess flash was of cement was wiped of the cured for 20 seconds. No occlusal discrepancy was noted and the marginal adaptation was well {fig: 8}.

DISCUSSION

A complete success of the root canal treatment relies not only on the endodontic part but also in the post endodontic restoration in the severely damaged tooth. For that a clinician must have enough decision-making skills andtechnical skills toachieve good post endodontic restoration. [7] Endocrowns offers numerous advantages than the traditional post and core-based restorations because of its monoblock nature, bonding capability, no need of ferrule, ease of preparation, conservative approach, can bear more occlusal stress and time saving. [8] Hence the use of endocrowns is an innovative approach for a post endodontic restoration of severely destructed tooth.

Figure 5

Type of tooth also plays an important role in the success of the endocrowns. However clinical failure rate of endocrown in premolar is greater than molar because the molar has large surface area when compare to the premolar. [9] The clinical survival rate and fracture strength of endocrowns were compared to traditional restorations utilising intraradicular post. It found that endocrown cemented on molar performed on par with or better than restorations using resin composite and inlay/onlay restoration. [10]

Figure 6 **Figure 7**

As an alternative to the traditional metal post and core procedure, Pissis presented a unique technique in 1995 called the monoblock technique, which integrated the porcelain core and crown into a single unit. The goal of this invention was to improve the dental restoration. [11] Dartora et al. then looked at the biomechanical reaction of teeth repaired with different endocrown extensions inside the pulp chamber after receiving endodontic therapy. According to their research, larger endocrown extension led to enhanced mechanical efficiency. In particular, a 5 mm extension showed less stress intensity and a more advantageous distribution pattern than a 1mm extension, which showed decreased fracture resistance and greater potential for rotation during function. [12] About the preparation, no variations in fracture resistance were noted whether the endocrown was produced with or without a ferrule. [13] However, given the complexity of the preparation, prudence is advised. The ferrule's addition or the rise factors that can worsen the disparities and reduce the restoration's adaptation in the prepared cavity are the depth of the cavity and intraradicular extension. No variations in fracture resistance were noted whether the endocrown was produced with or without ferrule. [14]

CONCLUSION

By all the consideration, it's all in the hands of a clinician in terms of decision making and skills to provide better post-endodontic restoration for a tooth with severely damaged state. Factors that are need for the success and longevity of the endocrown are correct preparation of the tooth, material selection, margin location and treatment planning.

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CASE REPORT

Idiopathic Lenticular Pigmentation – A Case Report with Differential Diagnosis

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ABSTRACT

Pigmentation of oral mucosa is very common which can present in different clinical patterns and colour depending on the underlying cause of pigmentation. It may be physiological or clinical manifestation of any underlying systemic disorder or due to medications or adverse habits. Here, we present a case report on lenticular pigmentation with emphasis on differential diagnosis.

KEYWORDS: Oral pigmentation, lenticular pigmentation, Addison's disease, Peutz-Jegher syndrome, Laugier- Hunziker syndrome

INTRODUCTION:

The normal oral mucous membrane is of varying shades of red. When the pigmentation area is noticed by the patient or the clinician, there is an element of increased concern. [1] Usually, an in-depth examination is required for focal lesions to exclude melanoma and a comprehensive examination for diffuse lesions. Some lesions show signs of diseases with systemic implications like adrenal insufficiency. [2] Any pigmented lesion on the oral mucosa will be considered as melanoma until evidence to the opposing. Due to possibility of similarities, histological examinations are necessary for any pigmented oral mucosa lesion to confirm or disprove the clinically suspected diagnostic hypothesis. [3]

CASE REPORT:

A 23-year-old male patient came to the Department of Oral Medicine and Radiology with a chief complaint of broken tooth in upper front teeth region of the jaw for past 10 years with a history of trauma. The patient's medical history was not significant. Personal history reveals usage of smokeless tobacco in labial mucosa of upper and lower lip for the past years, with a frequency of 3 times per day. General, systemic, and extra-oral examinations were not significant. On intraoral hard tissue examination, dental caries in 17, 27, 37, 47 and 48; fracture of enamel in 21 was noted. Soft tissue examination reveals multiple, discrete, lenticular, blackish-pigmented macules in upper labial mucosa (fig 1) and white non-scrapable lesion with wrinkled surfaces in the upper labial mucosa and related labial vestibule. Diffuse blackish pigmentation is seen in the left lower labial mucosa (fig 2). Based on the chief complaint, history, and clinical examination it was provisionally diagnosed as Ellis class 1 fracture in 21 and other diagnosis of Idiopathic pigmentation in upper and lower labial mucosa with a differential diagnosis of Addison's disease, Peutz-Jeghers syndrome, Laugier-Hunziker syndrome.

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Fig 1: Multiple, discrete, lenticular blackish pigmented macules in the upper labial

DISCUSSION:

The differential diagnosis of oral pigmentations includes Laugier-Hunziker syndrome, Peutz- Jeghers syndrome, Addison's disease, and Pigmentation due to smoking and medication. PEUTZ-JEGHERS Syndrome (PJS) shows mucocutaneous pigmentation macules around the cheek and mouth, multiple hamartomatous polyps in the gastrointestinal tract, and family history (inherited autosomal dominant disease). Incomplete PJS is a condition with either mucocutaneous pigmentation or gastrointestinal polyps, which usually presents only typical pigmentation or enterorrhagia or symptoms of intussusception. The relation between PJS and STK11 gene has been confirmed by researchers. Jenne and Hemminki colonized a PJS-related gene, in 1998, and named it STK11. In Hungary, Papp J found about 21 cases from 13 families with the STK11 mutation. The patient did not have any family history. [4] ADDISON'S DISEASE is an autoimmune disease. This shows a specific sign of hyperpigmentation of It occurs due to inadequate production of cortisol and aldosterone as a result of destruction of the adrenal cortex skin and mucosal surfaces.

Fig 2: Diffuse blackish pigmentation in the lower labial mucosal region and gingiva

It affects all age groups and has no gender predilection. The pigmentation macules can be found diffusely on the gingiva, buccal mucosa, hard palate, and tongue. The macules tend to be blue- black or brown and can be spotty or streaked in the configurations. [5, 6] Recognizing the early signs of Addison's disease is critical because the condition can be fatal if not treated. The diagnosis involves exogenous ACTH stimulation testing with subsequent measurement of plasma ACTH and serum cortisol levels. Treatment involves steroid replacement therapy that usually resolves the hyperpigmentation. [7] There is no history of increased levels of ACTH. LAUGIER-HUNZIKER (LHS)syndrome is an idiopathic macular hyperpigmentation of skin. It is characterized by brownish-black spots on oral mucosa, including lips associated with longitudinal melanonychia of nails. [8] Oral hyperpigmentation may be the only presenting sign or may co-exist with skin and nail pigmentation. The most commonly involved site is the buccal mucosa and lower lip. They occur in a form that measures about 1.5 mm in size as smooth-surfaced brown, black, or slate-colour macules. Pseudo-Hutchinson sign when hyperpigmentation of the nail bed and matrix reflects through the transparent nail folds simulating Hutchinson's sign, a marker of sub-ungual melanoma, has also been reported in a few cases of LHS. [9] This condition is excluded as it did not show nail and skin pigmentation.

CONCLUSION:

Dentists should be aware of the various lesions to aid in the proper treatment plan. Although clinical suspicion is strong, the only way for a final diagnosis of a pigmented oral lesion is through a comprehensive intraoral examination during any consultation with the dental surgeon, complemented by a full dermatological examination as and when needed and to decrease the rate of mortality, and morbidity prompt treatment is required.

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REVIEW ARTICLE

Socket Shield Technique– A Review Article

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ABSTRACT

To replace missing teeth, dental implants have become the norm. While single teeth replacement has increased in popularity in recent years, especially in the aesthetic area, dental implants were originally primarily utilised to attach complicated multi-unit prostheses. This has resulted in a necessity to preserve buccal hard and soft tissues, coupled with an ever-increasing desire to generate cosmetically acceptable results. Resorption of buccal bundle bone following tooth extraction and implant insertion can be a serious issue with sometimes extremely poor cosmetic outcomes. Grafting procedures are commonly carried out to reduce the loss of bundle bone. After tooth extraction, there is a reduction in the buccal bone, resulting in both vertical and horizontal bone loss. In such cases, advanced techniques for repairing both hard and soft tissues are essential to achieve aesthetically pleasing outcomes. One such technique is the socket-shield technique (SST), where the tooth's root is split in half, with the front two-thirds left within the socket to safeguard the periodontium, bundle bone, and buccal bone.

Keywords: Preserving alveolar bone, handling bone, handling extraction sockets, immediate implant placement and implementing socket shield techniques.

INTRODUCTION:

One of the primary goals of prosthetic rehabilitation is to create and sustain a harmonious relationship between the gingival (pink) and dental (white) components, with a special focus on achieving aesthetics in the treatment. A rapid implant implantation after an atraumatic tooth extraction caused the interproximal bony scallop to flatten and lose vertical and horizontal buccal bone, necessitating a challenging rehabilitation. [1] The presence of unattractive gaps or black spaces between teeth often results from the loss of underlying bone support, which leads to the downward shift of the surrounding soft tissue. This presents a considerable challenge for clinicians, particularly when it comes to replacing missing teeth with aesthetically pleasing restorations, especially in the front upper part of the mouth. To address this bone loss, various preventive and post-bone loss techniques have been employed, including ridge preservation methods and interventions for post-ridge collapse like bone augmentation, soft tissue enhancement, or a combination of these approaches. Conversely, the Socket-Shield Technique (SST) is employed as a predictable therapy with little need for surgery, a shorter length of time for the entire course of treatment, and the best possible aesthetic outcome.[2] Achieving natural-looking prosthesis emergence relies on the creation of appropriate hard and soft tissue dimensions, which can be accomplished through techniques like socket preservation or alveolar ridge preservation [3]. In the mid-1980s, the concept of "alveolar ridge preservation" emerged as a means to retain ridge volume. This technique involves the placement of graft material into a tooth socket after extraction, with or without the use of a barrier membrane or soft tissue. Due to its conceptual appeal, technical simplicity, and ongoing assessment, this preservation method is commonly employed in dental practice [4]. There is a growing demand for placing implants in the esthetic region of the upper jaw immediately after tooth extraction. The front part of the maxilla, being prominently visible, demands a high degree of precision in implantology to meet long-term patient expectations. The loss of teeth leads to alterations in the natural volume of the alveolar bone[5,6]. Following implant placement, it is crucial to not only ensure successful osseointegration but also to maintain the aesthetics of the adjacent area,

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especially in the anterior maxillary region. Implants are often placed Alveolar bone resorption tends to be more pronounced in the buccal plate compared to the lingual plate [9]. Approximately 56% of horizontal resorption in buccal bone dimension occurs within the first 4 months following tooth extraction, while the lingual/palatal bone wall experiences a 30% reduction in width during this period [10]. The loss of the periodontal ligament and subsequent changes, especially in the buccal bone plate, are responsible for the noticeable alterations that occur after tooth extraction. Alveolar bone resorption can pose challenges for implant placement, particularly in areas where aesthetics are crucial, such as the anterior maxilla. Various methods have been proposed to mitigate the adverse effects of tooth loss, including immediate implants, socket preservation with biomaterials, and alveolar ridge preservation with bioabsorbable membranes [11,12].

HISTORY OF SOCKET SHIELD TECHNIQUE

Utilizing a dental implant to replace a missing or damaged tooth in the aesthetic zone poses a significant challenge for the dentist. Achieving the best possible aesthetics requires careful planning of the entire treatment process, starting from tooth extraction to the placement of the definitive implant-retained prosthesis. Hurzeler and colleagues [2] introduced the "socket-shield technique," a clinical approach in which the buccal portion of the root is preserved to safeguard the periodontal ligament and bundle bone. Subsequently, an immediate implant is positioned adjacent to this remaining root segment. This method effectively mitigates the adverse consequences of retaining only part of the root after extraction. It acts as a protective shield against buccal bone resorption, leading to improved tissue contour and enhanced aesthetic outcomes [8].

CLASSIFICATION

Since the inception of the socket-shield technique by Hürzeler et al. (2010), numerous modifications have been proposed to standardize its clinical execution and classification. Kumar and Kher (2018) initially proposed a positional framework that categorized the technique according to the location and extent of the retained root fragment, and later refinements by Kher and Tunkiwala (2020) and Sethiya et al. (2023) integrated morphological and biomechanical considerations. These systems have collectively evolved to define six principal types of socket-shield designs, each suited to specific anatomical, esthetic, and functional requirements.

BUCCAL SHIELD – TYPE I

The buccal shield configuration is the most commonly employed form of the socket-shield technique and is primarily indicated for single anterior teeth with intact buccal bone and adjacent natural dentition. In this design, the facial or buccal portion of the root is retained, extending from the mesiolabial to the distolabial line angle. Its primary objective is to maintain the mid-facial soft-tissue contour and prevent buccal bone resorption following extraction. By preserving the periodontal ligament complex along the buccal plate, this design sustains vascular supply to the facial bone, thereby

(Figure1–BuccalShield)

maintaining alveolar ridge morphology and esthetic harmony. Long-term studies by Gluckman et al. (2018) and Bäumer et al. (2017) have validated the buccal shield as a predictable and biologically stable modification for immediate implant placement in the esthetic zone. (Figure 1)

FULL C BUCCAL SHIELD – TYPE II

The full-C buccal shield extends beyond the facial surface to include both proximal aspects of the root, thereby forming a continuous C-shaped fragment. This modification is primarily indicated when preservation of both mesial and distal papillae is essential, such as in maxillary central incisor or

(Figure 2 – Full C Buccal Shield)

premolar regions where adjacent natural teeth or implants are present. The continuous curvature of the shield supports the interdental bone and papillae, enhancing pink esthetics and reducing the risk of black triangles. This design ensures three-dimensional stability of peri-implant tissues, making particularly suitable in high-esthetic-demand cases.

HALF C BUCCAL SHIELD – TYPE III

(Figure 3 – Half C buccal shield)

The half-C buccal shield design involves retention of the buccal and only one proximal aspect—either mesial or distal—of the root fragment. It is indicated when one side of the socket is edentulous or where adjacent bone support is deficient. This design provides localized soft-tissue and bone preservation, ensuring stability of the interdental papilla on the supported side while allowing flexibility for implant placement and prosthetic design. Clinically, it balances esthetic preservation with surgical accessibility, especially in cases with asymmetric ridge anatomy or single missing teeth bordered by one natural tooth and one edentulous space**.**

INTERPROXIMAL SHIELD – TYPE IV

The interproximal shield is retained solely at the mesial or distal surface of the extraction socket and serves to protect the interdental papilla and interproximal bone crest. It is particularly beneficial in scenarios where the buccal bone is compromised or thin but the interproximal bone remains intact. By retaining the root fragment adjacent to the papilla, the technique maintains soft-tissue height and contour, preventing the collapse of the interdental architecture. This approach is often adopted in multi-unit anterior cases, especially when papillary preservation is prioritized for esthetic continuity.

(Figure 4 – Type IV- Interproximal)

MULTIPLE SHIELD – TYPE V

This type involves the intentional retention of two or more root fragments, such as a combination of buccal and interproximal or buccal and lingual shields. It is primarily indicated in multi-rooted or vertically fractured teeth where ridge preservation is essential across multiple aspects of the socket. The multiple-shield design provides superior three- dimensional tissue stability, helps preserve the inter- implant papillae in multi-unit restorations, and minimizes ridge collapse following extraction. Execution of this technique is surgically complex and demands precise CBCT-based assessment, meticulous sectioning, and stabilization of each fragment to ensure immobility. When properly performed, it offers exceptional esthetic and functional outcomes, maintaining both the horizontal and vertical ridge dimensions over time.

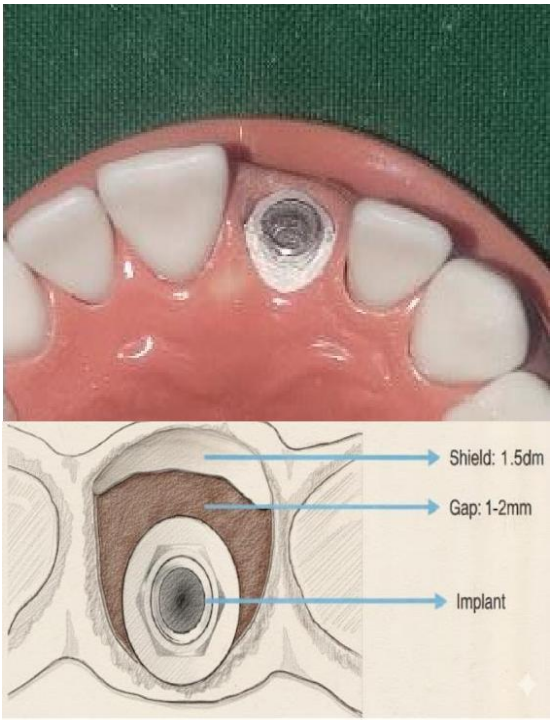
(Figure 5 - Type V – Multiple Shield)

LINGUAL SHIELD – TYPE VI

The palatal or lingual shield design involves preserving the palatal segment of the root and is typically indicated in posterior maxillary teeth or premolars where buccal bone integrity is maintained. This configuration focuses on preserving the internal

ridge form and palatal soft- tissue thickness, contributing to an optimal prosthetic emergence profile. In addition, it aids in maintaining the three-dimensional ridge contour and provides resistance against palatal bone resorption. Although less commonly utilized than buccal shields, this type expands the versatility of SST to posterior and multi- rooted regions.

(Figure 6 - Type VI – Lingual Shield)



(Figure 7) Placement of Graft

PROCEDURE

The primary goal of the socket shield technique, a surgical procedure employed in implant dentistry, is to safeguard the buccal plate of the alveolar socket. The key steps in the procedure are outlined as follows:

PREOPERATIVE EVALUATION AND PLANNING

A comprehensive preoperative evaluation is critical to achieving a successful outcome. This includes detailed assessment of the patient's dental and medical histories, thorough clinical examination, and acquisition of diagnostic radiographs such as cone-beam computed tomography (CBCT). Radiographic analysis helps determine the thickness of the buccal plate, root morphology, proximity of adjacent teeth, and the feasibility of retaining a partial root fragment. The presence of a thin or compromised buccal plate, vertical root fractures, or periapical pathology may contraindicate the technique. Before surgery, local anesthesia is administered to ensure complete patient comfort. Atraumatic extraction protocols should be followed to minimize damage to the surrounding alveolar bone and soft tissues. The use of **periotomes and micro- elevators** is recommended for gentle tooth mobilization. Maintaining the integrity of the socket walls is essential for long-term success of the implant and soft-tissue profile.

TOOTH EXTRACTION

After decoronation of the tooth to the level of the gingival margin, the root is sectioned vertically along its long axis using a long-neck diamond bur or, preferably, a **piezosurgical device** such as *Mectron Piezosurgery®, Acteon Piezotome®, or NSK VarioSurg®*. These piezoelectric systems allow precise, vibration-controlled sectioning while minimizing the risk of heat generation and bone microfracture. The tooth is divided into buccal and palatal fragments, and the palatal portion is carefully removed, leaving the buccal fragment intact. This retained portion forms the "socket shield." The ideal shield should extend from the apical aspect to the crestal level, maintaining a thickness of approximately 1.5–2.0 mm to ensure structural rigidity while preserving the periodontal ligament attachment.

IMPLANT POSITION

Osteotomy is prepared palatal to the retained buccal fragment following the standard sequence recommended by the selected implant system. Surgical kits such as *Straumann®, Nobel Biocare®, or BioHorizons®* may be used, depending on the clinical preference.The implant should be placed in close proximity to the palatal wall, ensuring there is no direct contact with the inner surface of the shield.

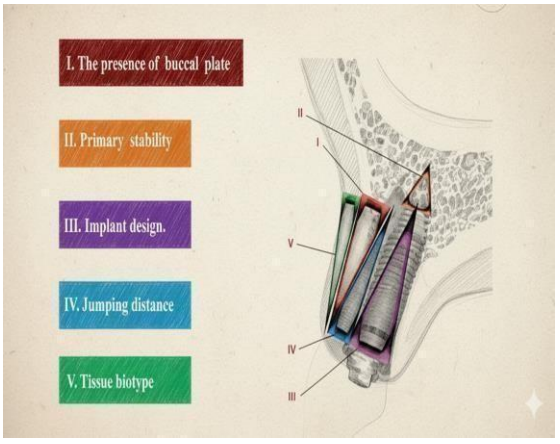
Maintaining primary stability and ideal occlusal alignment is critical. Use of **guided-surgery templates** can enhance precision and angulation, particularly in esthetically sensitive zones. Throughout the osteotomy preparation, intermittent irrigation should be maintained to avoid thermal trauma to the bone.

SHIELD GRAFTING AND STABILISATION

Once the implant is placed, the shield may be refined and polished using specialized burs from the **Socket-Shield Preparation Kit (Bredent Medical®)** or **Versah® Osseodensification Burs**. These systems provide smooth diamond and tungsten-carbide burs that allow precise trimming and shaping of the retained root surface. If a gap exists between the shield and implant, it can be filled with a fine-grained xenograft or alloplastic bone substitute material to promote osseointegration and maintain the buccal contour. The use of a resorbable collagen membrane over the shield is optional but can aid in stabilization during early healing. Proper adaptation of the shield ensures that it remains immobile throughout the osseointegration phase.

FLAP CLOSURE AND POSTOPERATIVE CARE

After implant placement, the soft tissues are repositioned and sutured using fine monofilament sutures such as 5-0 or 6-0 to achieve tension-free



primary closure. A healing abutment or cover screw is attached depending on the desired protocol. The patient is prescribed antibiotics, nonsteroidal anti-inflammatory medication, and a 0.12% chlorhexidine mouth rinse twice daily for one week. Postoperative care instructions include maintaining oral hygiene without disturbing the surgical area and avoiding mechanical trauma during the healing period. Sutures are generally removed after seven to ten days.

FOLLOW-UP AND RESTORATION

Regular follow-up appointments are scheduled to monitor soft-tissue healing, bone remodeling, and implant stability. Radiographic evaluation using periapical or CBCT imaging is recommended to assess integration and peri-implant bone levels. After sufficient osseointegration, typically three to four months post-surgery, prosthetic restoration is initiated. A screw-retained or cement-retained crown is fabricated, designed to follow the natural emergence profile preserved by the socket shield. The integration of advanced instrumentation—such as piezosurgery units, osseodensification burs, and dedicated socket-shield preparation kits—enhances surgical accuracy, preserves the buccal bone plate, and supports long-term esthetic and functional outcomes.

CLINICAL STUDIES ON SOCKET SHIELD TECHNIQUE

Bäumer et al. conducted retrospective research on patients who underwent immediate implant implantation using the socket shield approach and discovered that all implants healed normally. During follow-up, the volumetric analysis revealed minimal contour alterations and mucosal recession at the implant restoration, which were equivalent to those at the adjacent teeth.[14] Gluckman et al. assessed 123 immediate implants that were placed in the maxilla and mandible using the socket-shields approach, and they discovered that they had an osseointegration success rate of 96.1% after 1-4 years of follow-up.[15] In their study with a 12- to 48- month follow-up, Zhu et al. [16] evaluated the clinical outcome of the socket shield technique in the anterior region of the maxilla in nine patients who had immediate implant placement. They discovered no implants were lost during the observation period and discovered good aesthetic results. To assess the marginal bone level, survival rate, and aesthetic outcome of dental implants implanted in a high aesthetic zone, Bramanti et al [17] conducted a randomised controlled experiment. When compared to the conventional insertion approach, implants put using the socket shield technique had improved values for the pink aesthetic score and marginal bone level. In their investigation, Hinze et al [18] discovered that the socket-shield approach, fast implantation, and providing all contributed to the stability of the volume of mucosa adhering to the implant. No matter what, there was no effect on the buccal mucosa, the apical height of the bone, or the gingival width. By keeping the 1.5 mm thick buccal

region of the root with the most coronal portion at the bone crest level, Han et al. provided a "modified" socket shield approach. Patients received immediate implant insertion, resulting in a 100% survival rate.[19]

DISCUSSION

The success of implant placement in the aesthetic zone is influenced by various interrelated factors, including the timing of implant placement, the biological characteristics of the alveolar socket, the harmony between soft and hard tissues, the surgeon's level of expertise, implant design, precise three-dimensional positioning, and the degree of patient compliance [8]. Each of these parameters directly impacts both the biological integration of the implant and the overall aesthetic outcome. Understanding the indications and contraindications for selecting appropriate roots is therefore crucial to minimize the failure rate of the socket shield approach and to ensure long-term peri-implant stability. The socket-shield technique is primarily recommended in cases involving vertical root fractures, unsalvageable teeth indicated for extraction, immediate implant placement in the esthetic zone, and ridge preservation procedures aimed at preventing buccopalatal collapse and maintaining papillary height and soft-tissue contours [20,21]. From an esthetic standpoint, both the hard- and soft-tissue characteristics play a decisive role in the final result. Ideal outcomes depend not only on osseointegration but also on the preservation of the peri-implant mucosa, papilla integrity, and facial gingival levels. However, achieving favorable soft- tissue aesthetics remains a clinical challenge due to potential complications such as soft-tissue recession, loss of interdental papillae, or mucosal color mismatch. These issues are commonly associated with bone remodeling and the loss of the periodontal ligament following traditional extractions. The socket-shield technique mitigates these limitations by maintaining the natural periodontal attachment apparatus, thereby preserving the blood supply to the facial plate and ensuring stable gingival architecture [22]. Key parameters for evaluating the success of the socket- shield technique include implant survival rate, incidence of biological complications (such as infection or shield mobility), and prosthetic complications (such as misfit or esthetic discrepancy) [23]. These outcomes can be monitored through regular clinical and radiographic examinations, including cone-beam computed tomography (CBCT), which assists in assessing bone volume, implant integration, and shield stability [24]. In the literature, an implant is considered “survived” when it remains functional and free of mobility one year after loading [22]. Studies have consistently reported high survival rates for implants placed using the socket-shield technique, with minimal marginal bone loss and superior soft-tissue preservation compared to conventional immediate implant placement. The socket-shield concept demonstrates particular promise in preserving both “pink” and “white” aesthetics by maintaining the entire attachment system, thus allowing complete alveolar ridge preservation. This approach not only minimizes the need for grafting materials but also supports a natural emergence profile, critical for long-term esthetic harmony. However, patient-specific factors must always be considered, as complex clinical scenarios—such as two adjacent root stumps, a root stump adjacent to an edentulous space, or the presence of a neighboring implant—pose significant challenges to surgical precision and shield stability. Each of these cases requires a tailored treatment strategy based on anatomical considerations, soft- tissue thickness, and prosthetic requirements. Overall, the socket-shield technique represents a paradigm shift in implantology toward biologically driven tissue preservation rather than post-extraction reconstruction. When performed with careful case selection, precise instrumentation, and adherence to established clinical protocols, the technique provides predictable, long-term results with enhanced esthetic integration

CONCLUSION:

The socket shield technique is a valuable method in implant dentistry for preserving peri-implant soft tissues and safeguarding the buccal bone structure. This approach presents a feasible treatment option for enhancing facial bone and gum architecture stability. Nonetheless, it is important to note that preparing the root fragment during the procedure can be challenging. This comprehensive examination provides a detailed exploration of the rationale, clinical procedure, outcomes, and potential complications associated with the socket shield technique. It is essential to exercise caution when employing the socket shield approach in clinical settings, and long-term monitoring is imperative.

CONFLICT OF INTEREST: NIL

AKNOWLEDGEMENT: NIL

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