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Awareness, Attitudes, and Practices Regarding Tooth and Gingival Shade Selection Among Dental Practitioners: A Cross-Sectional Study

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Abstract:
Background: *The accurate gingival shade selection is important for achieving the optimal aesthetic outcome in dentistry. This questionnaire study evaluated the knowledge, attitudes, and clinical practices related to gingival and tooth shade selection among dental practitioners and clinicians of various specialties.*

Materials and methods: *A well-structured questionnaire comprising 15 questions was distributed to 200 dental professionals across multiple specialties. The obtained data were then statistically analysed using SPSS software (Version 25.0). Descriptive statistics and Chi-square tests were employed to evaluate associations between specialty and clinical practices.*

Results: *Based on the results, out of 200 respondents, 95 % were aware of various tooth shade guides such as VITA Classical and Vita 3D Master. VITA Classical was the most commonly used shade guide, with 52% using it, and only 3.5% using a digital shade device. 75% of respondents were aware of gingival shade guides, but only 31% reported clinical usage. The usage pattern and awareness about shade guides were significantly varied across specialities ($p < 0.001$). Most of the participants selected shades before or after tooth preparation, and 70% used a neutral background. 73.5% of respondents practiced communication with labs using photographs. Gingival shade matching was considered important by 58.5%.*

Conclusion: *While awareness of tooth shade guides is high among dental professionals, the use of the gingival shade guide is not common. Clinical training should emphasize comprehensive shade matching, including the gingival aesthetics, to enhance aesthetic rehabilitation outcomes.*

Keywords: *Tooth shade selection, Gingival shade guide, colour matching, Dental prosthetics*

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I. Introduction

The achievement of aesthetic excellence in dental restorations primarily depends on accurate colour selection for both teeth and gingival tissues.[1] While tooth shade selection has been widely adopted using standardized guides, the gingival shade selection remains unutilized despite its significance in dentistry, especially in implant and removable prosthesis cases.[2] Even though digital advancements and shade-matching technologies exist, their adoption among clinicians varies.[3] This questionnaire study aims to evaluate the knowledge, confidence, and clinical practices related to shade selection among dental surgeons from various specialties.

II. Material And Methods

Study Design: A cross-sectional questionnaire-based survey
Study Duration: January 2025 to March 2025.
Sample size: 200 dental professionals
Subjects & selection method: The study population was drawn from dental professionals practicing in and around Coimbatore who involved in the survey from January 2025 to March 2025.

A cross-sectional questionnaire-based survey was conducted among 200 dental professionals, including general practitioners, prosthodontists, and specialists in other disciplines. The questionnaire consisted of 15 closed-ended questions covering:

- Awareness and usage of tooth and gingival shade guides
- Confidence in shade selection
- Communication with dental laboratories
- Timing and methodology of shade selection
- Clinical situations necessitating gingival shade selection

QUESTIONNAIRE:

- 1. **Gender**
- Male
- Female
- Prefer not to say
- 2. **Years of clinical experience**
- <1year
- 1-5years
- 6-10 years
- >10 years
- 3. **Practice setting**
- Private practice
- Academic institution
- Government hospital
- Other:
- **4. specialty**
- General dentistry
- Prosthodontics
- Endodontics
- Oral and maxillofacial surgery
- Orthodontics
- Other:
- 5. **Are you aware of different types of tooth shade guides (e.g., VITA Classical, Vita 3D master)?**
- Yes
- No
- **6. Which shade guide do you use most frequently?**
- VITA Classical
- VITA 3D -Master
- Chromascop
- Digital shade matching devices
- Other:
- **7. How confident are you in selecting tooth shades?**
- Very confident
- Confident
- Neutral
- Not confident
- Other:
- **8. Are you aware of the existence of gingival shade guides**
- Yes
- No
- **9. Do you use a neutral background while performing shade selection?**
- Yes

- No
- **10. At what stage do you usually perform tooth shade selection**
- Before tooth preparation
- After tooth preparation
- During temporization
- Other:
- **11. Do you communicate shade information with the lab using photographs?**
- Yes regularly
- Occasionally
- Rarely
- Never
- **12. Have you ever used a gingival shade guide in your clinical practice?**
- Frequently
- Occasionally
- Rarely
- Never
- **13. In which cases do you consider selecting a gingiva shade (you may select more than one)**
- Gingival prostheses
- Pink ceramics in FPD
- Implant-supported restorations
- Acrylic-based removable prosthesis
- Other
- **14. How important do you think gingival shade matching is for aesthetic outcomes**
- **Very important**
- Important
- Moderately important
- Not important
- **15. Have you ever had to remake a prosthesis due to shade mismatch?**
- Yes, more than once
- Yes, once
- No

The questionnaire was validated by 10 dentists from different regions of Coimbatore to ensure that the questions were clear, simple, and relevant to the topic. An electronic version of the questionnaire link was devised using the Google Forms. Then the questionnaire link was sent to dentists in Coimbatore who were part of Indian Dental Association through Whatsapp and various social media platforms. Informed consent was taken from all the participants before solving the questionnaire. The study concluded approximately 3 months after the initial commencement, when all the responses had ceased. The collected data were entered into Microsoft Office Excel and analysed. The data were analysed using SPSS software (version 25.0). Chi-square tests assessed the association between dental specialty and responses.

Statistical analysis

All statistical analyses were done using the Statistical Package for Social Sciences (SPSS), Version 25, IBM Statistics, USA. Background information on the individual dentist was described in frequencies and the other results were mentioned in percentages using bar chart and tables. All tests for the relationship between two items in the questionnaire were based on the chi-square test.

III. Result

Of the 200 respondents, 53% were female and 47% were male. Practitioners with over 10 years of experience comprised 45.5% of the sample, while 34.5% had between 1–5 years of experience. The majority (77.5%) were engaged in private practice. Awareness of tooth shade guides was high, with 95% of respondents familiar with them; among these, 52% most frequently used the VITA Classical shade guide, followed by 42.5% who preferred Vita 3D Master. Only 3.5% reported using digital devices for shade selection. Overall, 66% of participants expressed confidence or high confidence in shade selection, with prosthodontists showing the highest confidence levels at 86.3%. Awareness of gingival shade guides was reported by 74% of respondents, although only 31% had used them in clinical practice, with the highest usage observed among prosthodontists and oral surgeons. Gingival shade selection was most commonly considered in cases involving gingival prostheses, pink ceramics, and implant restorations. In terms of clinical protocols, 70% of respondents used a

neutral background during shade selection, 75% selected the shade either before or after tooth preparation, and 73.5% regularly or occasionally used photographs to communicate with dental laboratories. When asked about the importance of gingival shade matching, 58.5% considered it important or very important, while 15% reported having to remake prostheses due to shade mismatch. Statistical analysis revealed significant associations between dental specialty and the type of shade guide used ($\chi^2 = 225.849$, $p < 0.001$), confidence in shade selection ($\chi^2 = 130.302$, $p < 0.001$), awareness of gingival shade guides ($\chi^2 = 50.238$, $p < 0.001$), and use of a neutral background during shade selection ($\chi^2 = 27.810$, $p < 0.001$).

Table no 1: Shows Summary of the questionnaire results:

Question	Key Findings	Chi-Square Value	p-value
Awareness of different tooth shade guides	95% aware	79.122	<0.001
Most frequently used shade guide	VITA Classical (52%), VITA 3D Master (42.5%)	225.849	<0.001
Confidence in selecting tooth shades	66% confident, highest in prosthodontists (86.3%)	130.302	<0.001
Awareness of gingival shade guides	74% aware	50.238	<0.001
Use of a neutral background during shade selection	70% use a neutral background	27.81	<0.001
Stage of shade selection (before/after prep)	75% select before or after prep	85.945	<0.001
Communication with the lab using photographs	73.5% use photos	228.317	<0.001
Use of the gingival shade guide in practice	31% have used	43.525	<0.001
Cases for gingival shade selection	Mainly pink ceramics, implant prostheses	129.414	<0.001
Importance of gingival shade matching	58.5% rated important or very important	169.23	<0.001
Remake due to shade mismatch	15% experienced remakes	48.253	<0.001
Gender distribution	53% female, 47% male	-	-
Years of clinical experience	45.5% with >10 years	-	-
Practice setting	77.5% in private practice	-	-
Specialty-based variations in responses	Statistically significant in most questions	-	-

IV. Discussion

Prosthetic dentistry evolves with a greater emphasis on aesthetics and patient-specific outcomes, and awareness regarding tooth and gingival shade matching becomes important. [5-8] In the present study, a representative sample of dental practitioners and specialists was assessed to understand their knowledge, attitudes, and practices concerning shade selection. It was encouraging to observe that a substantial proportion of respondents (95%) were aware of the use of tooth shade guides. However, despite this high level of awareness, only 52% of practitioners reported routine use of the VITA Classical guide, with 42.5% opting for the VITA 3D Master system. Digital shade-matching devices, despite their potential for precision and reproducibility, were used by only 3.5% of participants, indicating limited integration of advanced technologies in routine clinical practice.

When participants were asked about their confidence levels in selecting tooth shades, 66% reported feeling confident or very confident. This was particularly true for prosthodontists, of whom 86.3% demonstrated high confidence, likely reflecting their advanced training and greater exposure to aesthetic restorative procedures. Such findings reinforce the importance of specialty training in enhancing clinical decision-making and competence in shade selection. Interestingly, although the awareness regarding gingival shade guides was relatively high (74%), actual usage in clinical settings was reported by only 31% of respondents. This discrepancy suggests a disconnect between theoretical knowledge and its practical application, particularly in areas such as implantology and maxillofacial prosthetics, where gingival aesthetics are critical.

Gingival shade selection is commonly considered in the fabrication of gingival prostheses, pink ceramics, and implant restorations, suggesting the recognition of soft tissue aesthetics. [9-11] This selective application may reflect the gap between the complexity and time investment associated with gingival shade matching. A similar pattern was observed in the use of standardized clinical protocols, where 70% of participants reported using a neutral background for shade selection and 75% performed shade matching either before or after tooth preparation. While 73.5% regularly or occasionally used photographs to communicate with laboratories, the lack of standardized photographic techniques may still hinder the consistency and predictability of prosthetic outcomes.

The importance of gingival shade matching was acknowledged by 58.5% of clinicians, who rated it as important or very important. However, despite this perceived importance, only a minority had incorporated gingival shade guides into regular practice. This lag in clinical implementation may contribute to avoidable aesthetic failures, as supported by the 15% of respondents who reported having to remake prostheses due to shade mismatch. Such issues not only impact patient satisfaction but also increase clinical time and financial costs. The findings also highlight the role of clinical experience and specialization in influencing practice patterns.

Limitations and future directions:

These results suggest that while awareness is high, its translation into consistent and evidence-based clinical protocols is still lacking. The variability in shade selection practices underscores the need for continued education and hands-on training, particularly in soft tissue aesthetics. Incorporating modules on gingival shade matching into undergraduate and postgraduate curricula, as well as promoting the use of digital tools and standardized photographic protocols, could bridge this gap. Furthermore, inter-specialty collaboration and workshops may help disseminate best practices and improve overall clinical outcomes in restorative and implant dentistry. Overall, the study highlights not only the strengths but also the limitations in current clinical practices regarding aesthetic shade selection and provides a foundation for targeted educational and procedural interventions.

V. Conclusion

This questionnaire study reveals a strong awareness of tooth shade selection protocols among dental professionals, but an observable underutilization of gingival shade selection. There is a requirement to bridge the gap between knowledge and practice through continued education, practical knowledge, and integration into dental education. [12,13]

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