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Evaluation Of Shade Matching In Anterior Restorations Using Two Single-Shade Composites: A Split-Mouth Clinical Study

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Abstract
Background: *The demand for simplified and esthetically reliable restorative procedures has led to the emergence of single-shade resin composites designed to blend with a wide range of natural dentition. This study evaluates the shade-matching ability of two such materials Omnichroma and Vittra APS Unique in anterior restorations using a split-mouth design.*
Objective: *To assess and compare the visual shade-matching effectiveness and blending ability of two unishade composites Omnichroma and Vittra APS Unique with surrounding enamel in anterior restorations.*
Methods: *A split-mouth clinical design was employed, restoring adjacent anterior teeth in the same patient with either Omnichroma or Vittra APS Unique. Standardized restorative protocols were followed. Visual assessments were conducted post-operatively by both patients and clinicians. Statistical analysis included the Mann–Whitney U test.*
Results: *Omnichroma demonstrated slightly superior shade adaptation and patient satisfaction compared to Vittra APS Unique, although the differences were not statistically significant ($p > 0.05$). Both materials showed acceptable esthetic outcomes suitable for clinical use.*
Conclusion: *Both unishade composites offered clinically acceptable esthetic outcomes in anterior restorations. Omnichroma exhibited marginally better performance, but further in vivo research is warranted for conclusive validation.*

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I. Introduction:

Restorative dental procedures demand precision in both function and esthetics. Traditionally, achieving an ideal shade match with resin composites requires layering multiple shades and opacities, an approach that is often time-consuming and technique-sensitive [1,2]. These challenges have prompted the development of single-shade, or "unishade," resin composites that aim to simplify shade selection while maintaining acceptable esthetic outcomes [3,4].

Unishade composites are engineered to match a broad spectrum of natural tooth shades using a single formulation. By adapting to the surrounding dentition, these materials eliminate the need for custom mixing and layering, reducing treatment time and inventory requirements [2,4]. Their utility is particularly evident in small anterior restorations or cases with uniformly colored dentition [3].

Despite their advantages, clinical data supporting the long-term esthetic performance of unishade composites in anterior restorations remains limited. Previous in-vitro studies have shown promising results, but

in-vivo evidence is still emerging [1,5]. This study aims to compare the shade-matching effectiveness of two single-shade composites—**Omnichroma** and **Vittra APS Unique**—in anterior restorations using a split-mouth clinical design.

II. Aim And Objectives

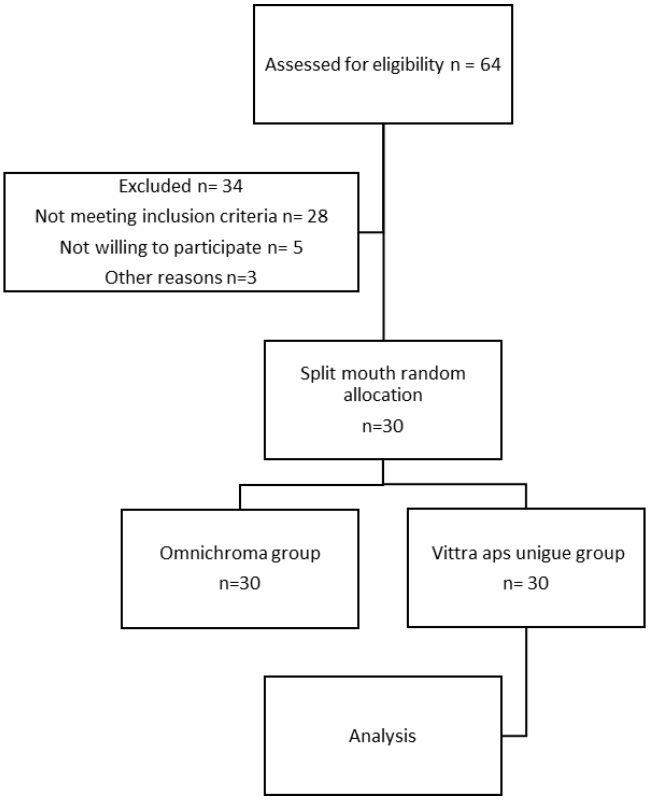
Aim:
To evaluate the shade matching of unishade composites in anterior restorations.

Objectives:
- To assess the blending ability of unishade composites with the surrounding enamel.
- To evaluate the visual shade matching of Omnichroma and Vittra APS Unique with adjacent natural teeth.

III. Materials And Methods

Study Design:

This study was conducted in the Department of Conservative Dentistry and Endodontics after achieving the institutional ethical clearance. The treatment protocols were explained and an informed consent was taken from all the participating patients. A split-mouth clinical design was used. Each patient received anterior restorations with both materials one material per quadrant to minimize interindividual variability.



Materials:
Omnichroma (Tokuyama Dental)

Vittra APS Unique (FGM Dental)

Inclusion Criteria:
- Teeth requiring anterior restorations
- Positive pulp vitality response
- Absence of pulpal inflammation

Exclusion Criteria:
- Symptomatic pulpal inflammation
- Cavities unsuitable for direct restorations

IV. Methodology:

Two adjacent anterior teeth were restored using two different unishade composite systems.

Restorative protocol:

The operating site is thoroughly examined and stains and plaque on the tooth surfaces were removed followed by rubber dam isolation. For For cavity preparation, caries excavation was initially performed using diamond burs (BR-31, BR-40, SF-S41) and a 45-degree bevel was added to help eliminate the marginal visibility. The cavity prepared was dried with a sterile dry cotton pellet for Acid etching, was performed using 37% phosphoric acid (restorative etching gel, prime dental) for 30 seconds and the cavity was dried again using a cotton pellet and bonding agent (Tetric n bond universal, Ivoclar) was applied and light cured for 30 seconds. A blocker (Tetric N ceram, Ivoclar, Vivadent) was applied as the lingual layer and light cured for 40 seconds. This layer was used to block light transmission through the composite shade and enhance the optical properties of the composite. The unishade composite material (Omnichroma in group 1 and Vittra aps unique in group 2) was applied as second layer on the blocker and light cured for 40 seconds. The finishing and polishing were done with finishing fine diamond burs (composite finishing burs, Dentmart), polishing system (Shofu composite polishing kit and Super-snap mini kit). Finally, the embrasures were checked with the dental floss for the contact and contours. The final outcome was evaluated.

1- preoperative photograph

2. Cavity preparation also adding bevel

3. Rubber dam isolation

4. Acid etching using 37% phosphoric acid

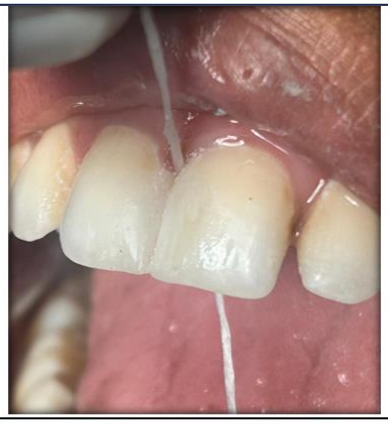
5. Drying using a cotton pellet

6. Application of universal bonding agent

7. Placement of blocker

8. Placement of unishade composite on the top of the blocker

9. & 10. FINISHING AND POLISHING



11. Final checking the contact using dental floss

Omnichroma

Vittra APS Unique

12. postoperative photograph

Visual Assessment:

Post-operative evaluation was conducted both by clinicians and patients. Shade match was categorized as Perfect, Close, Good, Poor, or Mismatch.

V. Statistical Analysis

Data were analysed using SPSS 21.0. Normality was checked using the Shapiro–Wilk test ($p<0.01$), indicating non-normal distribution. The Mann–Whitney U test was employed for intergroup comparisons. Statistical significance was set at $p<0.05$.

VI. Results

Table 1 [original] Visual Evaluation: Patient-Reported Shade Matching

Shade Match Level	Omnichroma (%)	Vittra APS Unique (%)
Perfect Match	23.3% (7/30)	20% (6/30)
Close Match	56.7% (17/30)	40% (12/30)
Good Match	16.7% (5/30)	30% (9/30)
Poor Match	3.3% (1/30)	10% (3/30)
Mismatch	0%	0%

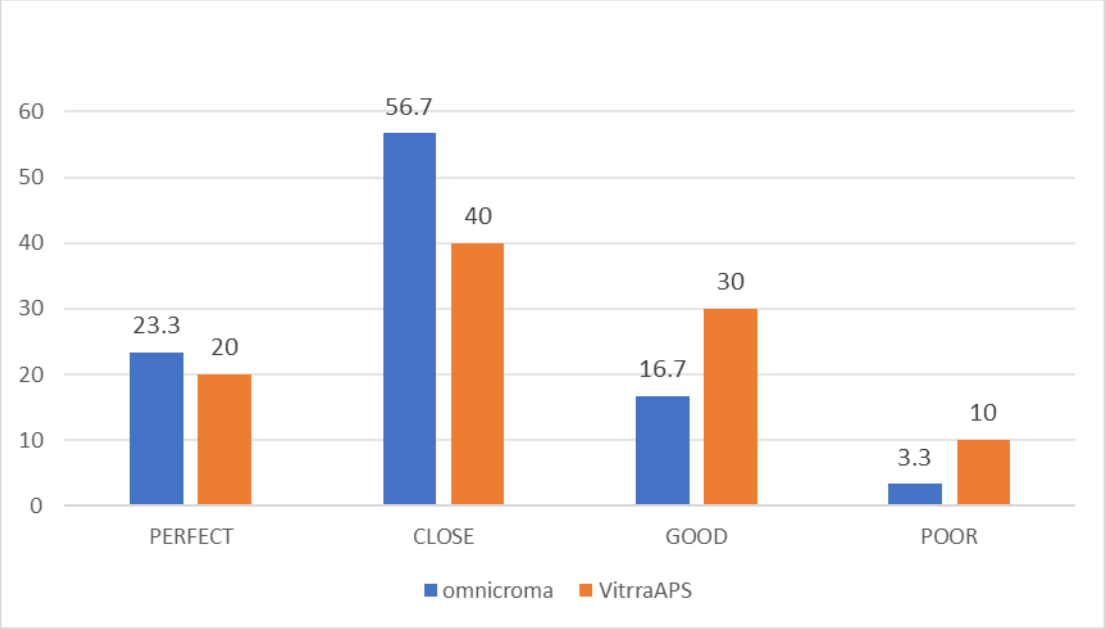
Interpretation: Omnichroma showed a higher combined percentage of "Perfect" and "Close Match" ratings (80%) compared to Vittra APS Unique (60%). This suggests better overall shade blending and patient satisfaction for Omnichroma.

Table 2 [original] Intergroup Comparison: Mann–Whitney U Test

Group	Sample Size	Mean Rank	Sum of Ranks	p-value
Omnichroma	30	27.70	831.00	p = 0.182
Vittra APS	30	33.30	999.00	

Interpretation: The p-value exceeds the threshold for statistical significance ($p<0.05$), indicating that the observed difference in shade matching between the two composites is not statistically significant.

Chart 1: Representing the Comparison of distribution of Shade match levels between Omnichroma and Vittra APS Unique [original]



From the results, it is evident that the OMNICHROMA has shown better match than the VITTRAPSUNIQUE with no statistical significance between the groups.

VII. Discussion

The evolution of esthetic dental materials has aimed to simplify procedures while enhancing visual outcomes. Unishade composites exemplify this goal, offering universal applicability through advanced optical mechanisms [1,2].

Shade Matching Mechanisms

Omnichroma uses Smart Chromatic Technology, relying on spherical fillers to generate structural color via light scattering, eliminating the need for pigments. This enables it to adapt to all 16 VITA classical shades [1]. In contrast, Vittra APS Unique uses high translucency and refractive index matching to achieve a chameleon effect by absorbing surrounding tooth color [2]. While effective in many cases, this method may struggle in masking darker dentin or deep restorations [5].

Clinical Performance

In this study, both materials showed acceptable esthetic results [table 1]. Omnichroma received more favorable ratings from patients [chart 1], aligning with studies that reported higher satisfaction with structurally colored composites [1,3]. However, the difference between the two materials was not statistically significant [table 2], consistent with findings from comparative studies [3,5].

Influence of Thickness and Background

Color adaptation of unishade composites depends significantly on restoration thickness and the underlying tooth shade. Thicker composite layers tend to enhance blending in lighter shades but may not effectively mask darker ones [4,6]. Omnichroma has demonstrated better adaptation in lighter shades (A1–A2), suggesting selective clinical use depending on the shade of the restoration area [1].

Surface Properties and Durability

Surface gloss and smoothness are vital for the longevity of esthetic restorations. Both Omnichroma and Vittra APS Unique show good polishability and wear resistance [3]. However, their appearance may degrade over time with exposure to acidic or alcoholic beverages [6]. Thermocycling studies confirm their stability under simulated intraoral conditions [4].

Fluorescence and Natural Appearance

Omnichroma's fluorescence properties mimic those of natural enamel, enhancing esthetic integration under UV or operatory lights [1]. This makes it especially suitable for anterior restorations where appearance under varying lighting conditions is important.

Limitations and Recommendations

While unishade composites simplify the workflow, they may require blockers or opaquer layers in darker or deeper cavities to optimize esthetics [5,6]. Case selection remains critical. Clinicians should consider the specific clinical context such as shade, cavity size, and location before selecting a unishade material.

Future Research

Further in vivo studies with larger sample sizes and longer follow-up periods are essential to evaluate long-term performance and color stability. Advances in filler technology and nano structuring may improve the optical behaviour and versatility of these materials [4,6].

VIII. Conclusion

Unishade composites like Omnichroma and Vittra APS Unique represent a significant advancement in restorative dentistry, offering simplified procedures and acceptable esthetic outcomes in anterior restorations. While Omnichroma exhibits a slight edge in blending ability, both materials demonstrate comparable performance within clinically acceptable ranges. Clinicians should consider individual case factors, including cavity size, tooth shade, and patient-specific needs, to optimize the use of unishade composites in practice. Continued research and innovation are essential to further enhance the capabilities and applications of these materials in esthetic dentistry.

IX. Clinical significance

Omnichroma may be preferred for highly esthetic anterior restorations. Vittra APS remains a strong option but may require the use of additional techniques such as opaquers in darker or deeper restorations. Both materials simplify clinical workflow while maintaining acceptable visual outcomes.

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