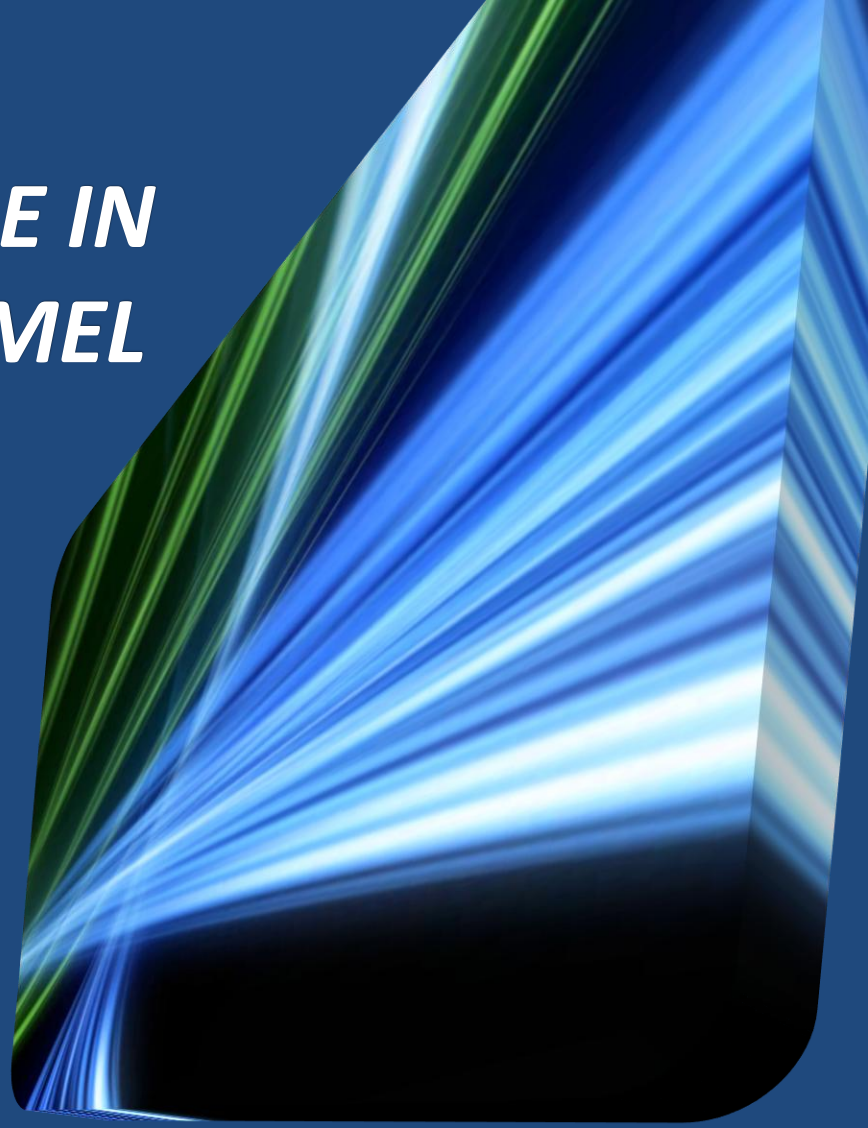
EVALUATION OF COLOR CHANGE IN WHITE SPOT LESIONS OF ENAMEL FLUOROSIS USING A RESIN INFILTRATE



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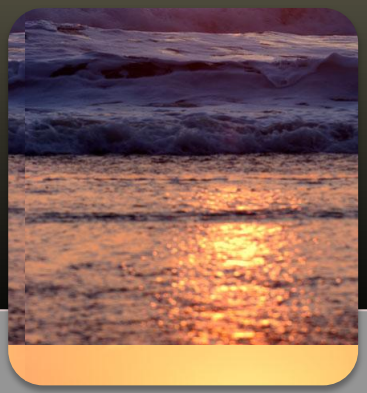
Dental fluorosis

Dental fluorosis is a condition of enamel hypomineralization because of the effects of excessive fluoride on ameloblasts during enamel formation resulting in surface and subsurface porosities and subsequent optical and physical changes

CONVENTIONAL APPROACHES FOR TREATMENT OF WHITE SPOT LESIONS OF ENAMEL

Remineralizing Therapy

Bleaching Therapy



Micro-abrasion

Conventional Bonding Techniques

Veneers

Remineralizing Agents

- CPP-ACP (CASEIN PHOSPHOPEPTIDE AMORPHOUS CALCIUM PHOSPHATE)
- Fluoride Therapy

Limitations

- Takes Considerable time
- Needs to be implemented early
- Results rely on Patient's Compliance
- Fluoride varnishes might be untolerable among smaller children

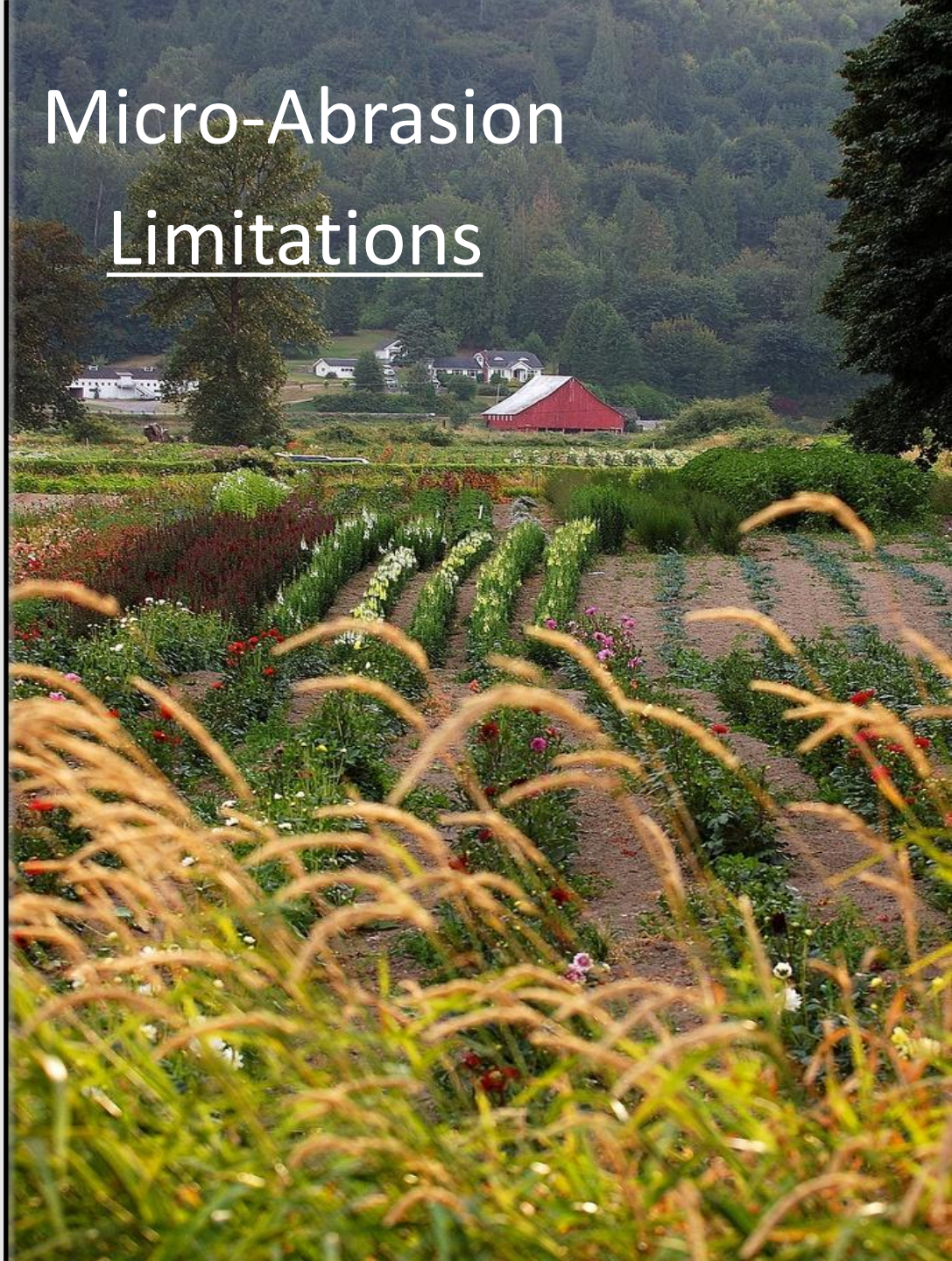
“Bleaching Therapy” Limitations

- **Limited Esthetic effect**
- **Post-treatment Sensitivity**
- **Reduced Micro-hardness of Enamel**

Micro-Abrasion

Limitations

- AGGRESSIVE REDUCTION OF ENAMEL
- EFFECTIVE IN SHALLOW LESIONS ONLY
- REQUIRE MULTIPLE SITTINGS



conventional bonding and various types of veneers- Limitations

- Invasive Procedure
- Excessive sacrifice of tooth material

DMG-ICON

- A new minimally invasive technique, DMG Icon, occlude the micro porosities within the lesion body with low-viscosity light-curing resins that have been optimized for rapid penetration into the porous enamel.

Mode of Action

- **The resin infiltrated enamel has been reported to loose its whitish opaque color and recover the healthy enamel color and translucency.**

Paris S., Quint Int. 2009; 40: 7133-718

Armamentarium

Etchant

Alcohol

Infiltrate

COMPOSITION

- **Icon-Etch:** **15 %Hydrochloric acid, pyrogenic silicic acid, water, additives.**

- **Icon-Dry:** **99% ethanol**

- **Icon-Infiltrant:** **Methacrylate-based resin matrix, initiators, additives**

Caries Infiltration System : ICON- Advantages

- Stops Caries Progression
- Masks the opacity immediately
- **‘Refractive Index’ equal to Enamel**

AIMS AND OBJECTIVES

Aims & Objectives

- To clinically assess the masking of white spot lesions of fluorosis using resin infiltration technique.
- Assess the pre-treatment and post-treatment l*A*B values of fluorosed Enamel

INCLUSION CRITERIA

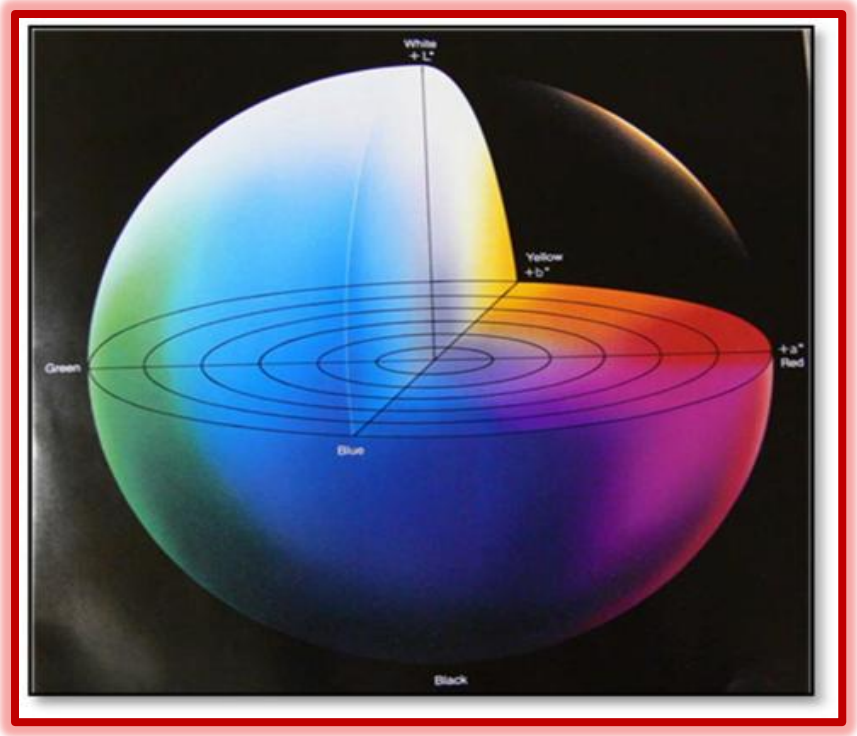
- 6-12 years age
- Non pitted mild white spot lesions of fluorosis on maxillary and mandibular permanent anterior teeth.
- 0.5 - 2 classification of Dean's index.

MATERIALS AND METHODS

“Methodology”

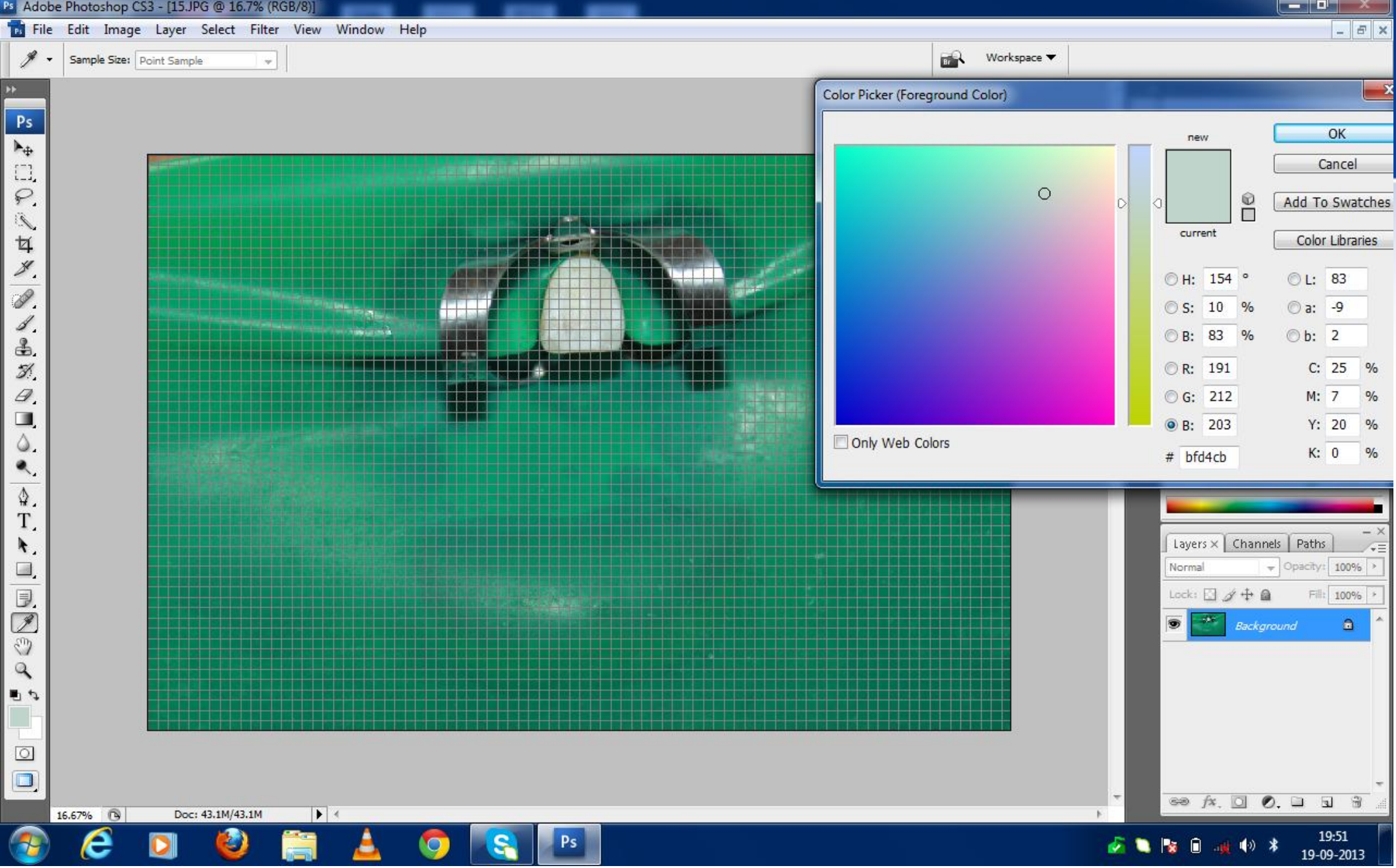
- **30 samples** of maxillary and mandibular permanent anterior teeth as per inclusion criteria were treated for resin infiltration with DMG-Icon.

- **The CIELAB** space was applied in this study, which is an international system for color measurement.



“Methodology”

- **Pretreatment l*a*b values of tooth and white spot lesion were noticed with image analyzing software of standardized clinical photographs (EOS 500 D Canon Camera, Macro-lens Tamron 90mm F/2.8 Di 1:1, with camera settings 1/200, F29, ISO 400, Auto white balance)**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TECHNIQUE OF APPLICATION OF DMG-ICON

1. Affected tooth was cleaned and isolated with rubber dam.

“Procedure”

2. Ample amount of Icon-Etch was applied onto the lesion site for 2 minutes.
- Rinsed Icon-Etch with water for at least 30 seconds.
- Dried with water-free air

“Procedure”

3. Icon Dry was applied onto the lesion site for 30 seconds.

- **Dried with water free air.**

“Procedure”

4. **Icon-Infiltrant was applied on the etched surface and left for 3 minutes .**

- **Light-cure Icon-Infiltrant for 40 seconds.**

- **After curing the application was repeated once for 1 minute and cured for 40 seconds**

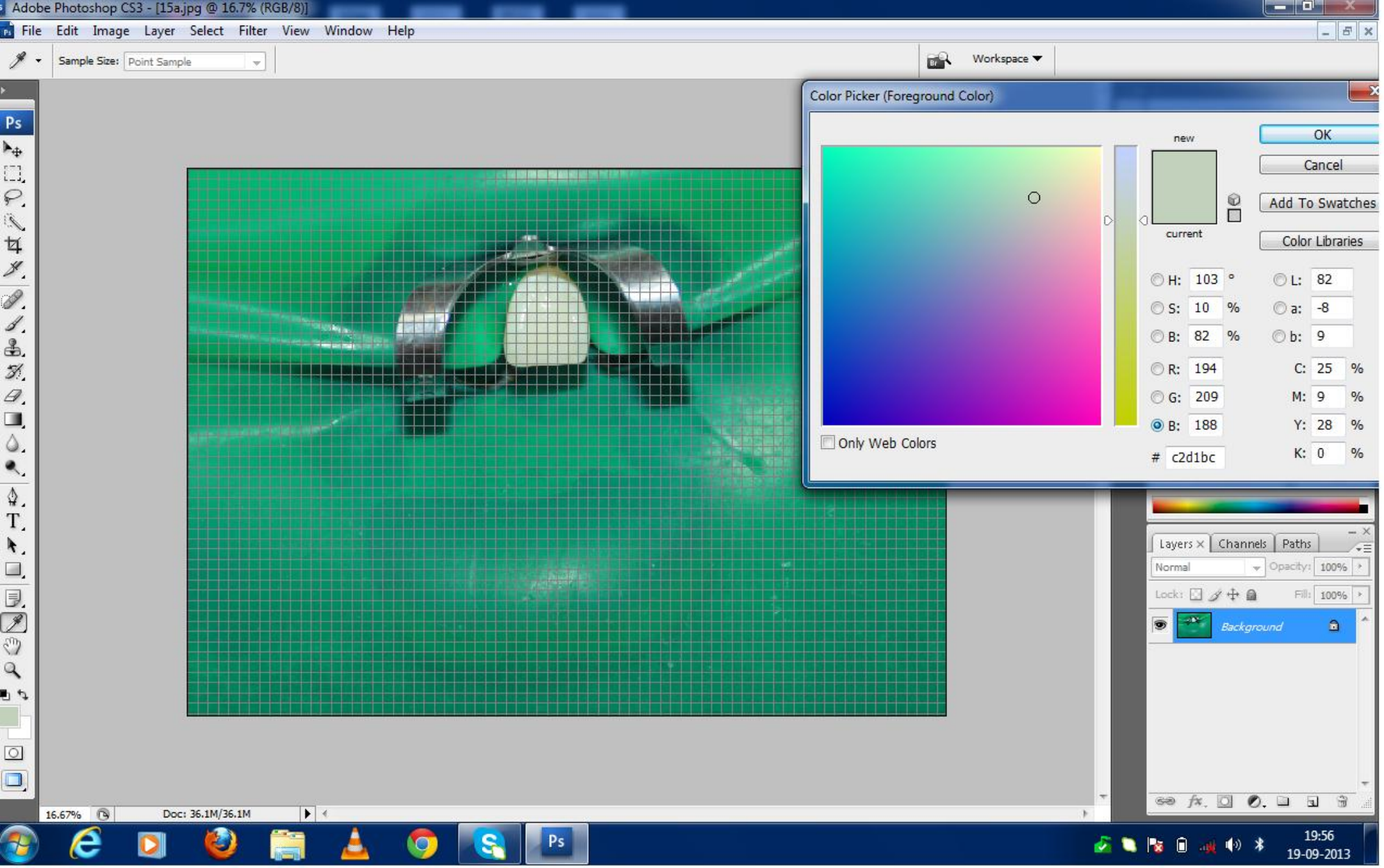
- **Remove the rubber dam.**

PRE-TREATMENT

POST-TREATMENT

“Procedure”

- **Post treatment l*a*b values of tooth and white spot lesion were again recorded with software analysis of post treatment photograph.**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H: 103 °
S: 10 %
B: 82 %
R: 194
G: 209
B: 188
L: 82
a: -8
b: 9
C: 25 %
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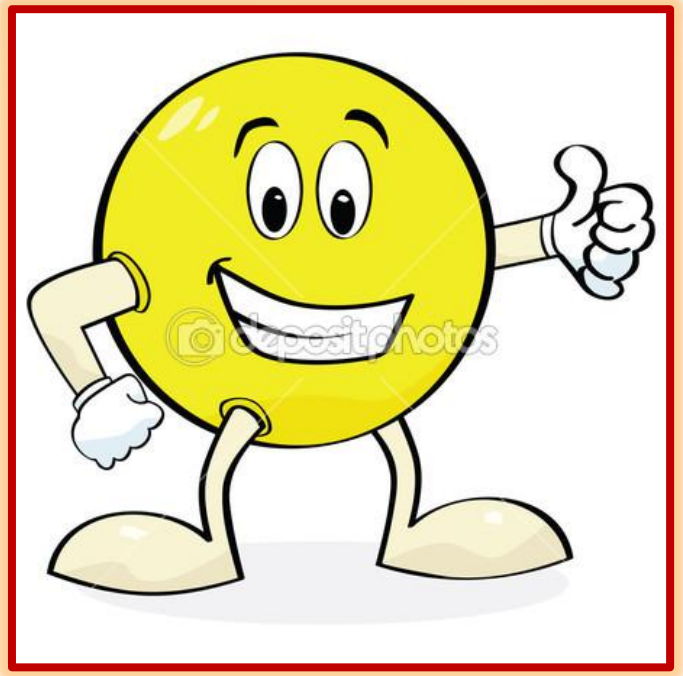
RESULTS



“Results”

- **Pre treatment and post treatment Color differences (delta E) of different samples were calculated using the following equation:**

$$\Delta E = (\Delta l^2 + \Delta a^2 + \Delta b^2)\ ½$$

l*-lightness /darkness
a*-red / green shade
b*-yellow or blue shade

“Results”

- **Students t test was performed to determine statistical significance (using $p<.05$) of color difference using delta E values of different samples.**

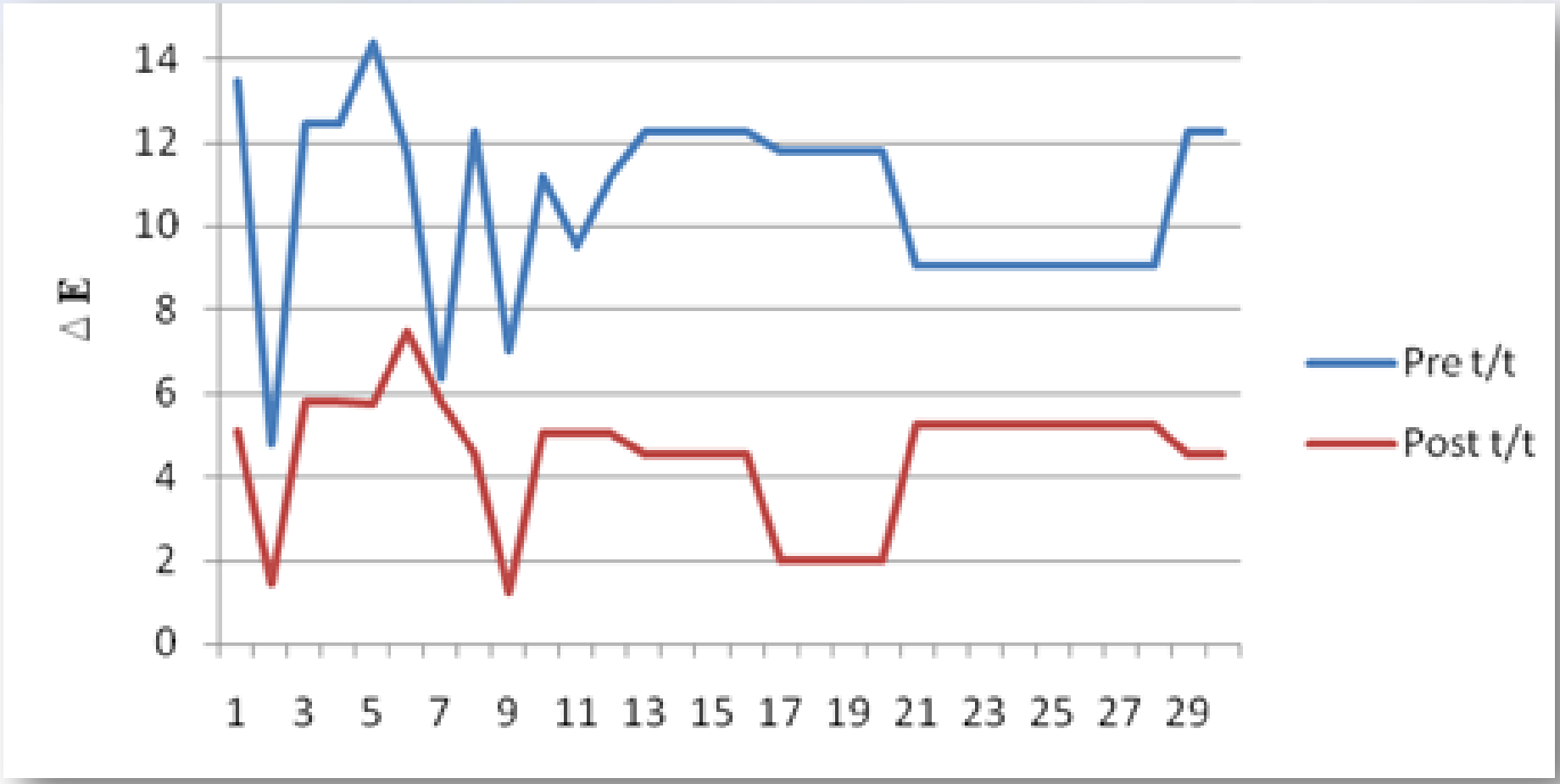
“Results”

- 17 subjects (56.66%) had ▲E >6 ,i.e. a very obvious change noticeable to human eye
- 11 subjects (36.66%) had ▲E = 3.5-5 i.e. An obvious difference.
- 2 subjects(6.66%) had ▲E= 2-3.5 i.e. medium difference
- None of the patient had negative ▲E value

Results

- Overall color difference between sound enamel and white spot lesion decreased significantly after resin infiltration and showed significant post treatment results ($p<.05$) on color change of white spot lesion.

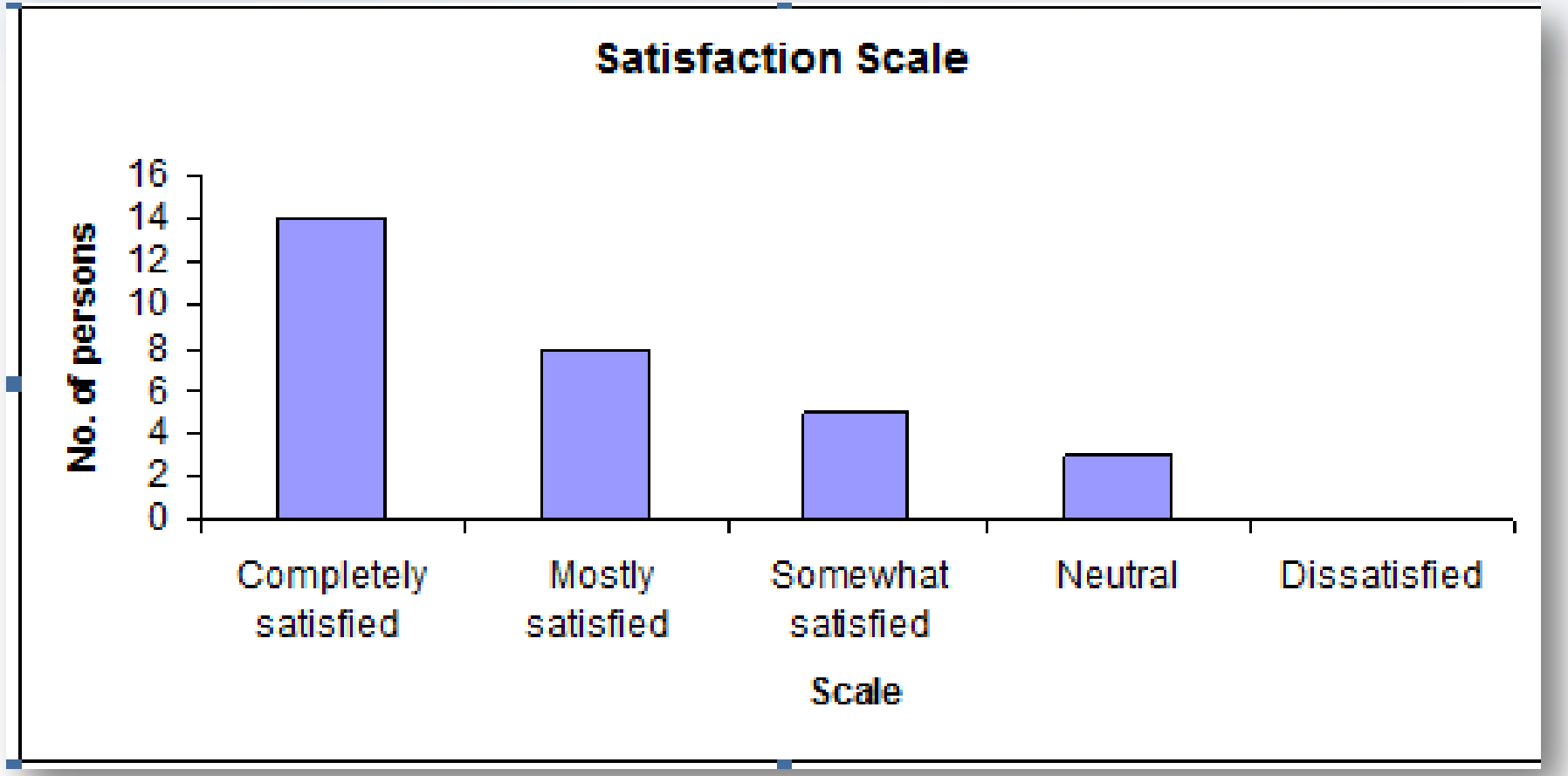
E VALUES OF L, A, B BEFORE AND AFTER TREATMENT



Patient satisfaction scale

- 7 point Likert scale was used to evaluate the patient satisfaction after resin infiltration with DMG-Icon.

Graph showing patient satisfaction level of 30 samples according to 7-point Likert scale



Likert scale

- 14 samples (46.66%) found to be completely satisfied
- 8 samples (26.66%) found to be mostly satisfied
- 5 patients (16.66%) found to be somewhat satisfied
- 3 patients (10%) found to be neutral
- None of the patients were unsatisfied

Discussion

Discussion

The present study evaluated the results from l*a*b values and ΔE unit of digital photographs using software analysis, which quantifies the discrepancy between the two colours

Discussion

- **In 30 subjects significant decrease in ΔE and L values with Increase in B value was found ,showing masking of white spot lesions of fluorosis towards normal tooth color.**

Discussion

- In contrast to remineralization using CPP–ACP, infiltrant resin can improve the colour, even in deeper lesions.
- Resin infiltration is much less invasive than micro-abrasion or restoration.
- An infiltrant resin shows very low viscosity, high surface tension, and low contact angle with the enamel. These properties are important for penetration of resin into the deeper layer of lesion.

Conclusions

Conclusion

The masking effect of resin infiltration was dramatic in some cases.

The long-term colour stability of this technique will be followed up through continuous clinical studies.


“Thank you for your Undivided Attention ”