

## White Spot Lesions ICON Infiltration Prior to Fixed Orthodontics

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### Abstract

A 12 year old Caucasian girl was referred to the Department of Pediatric Dentistry, EUC, UAE before starting Orthodontics, due to extensive white spot lesions on the upper anteriors.

The patient's medical history was non-contributory and she was not taking any medications.

Intraoral clinical examination revealed gingivitis, heavy plaque deposits, caries crowding and space loss. Early caries, White Spot Lesions, was manifested in the buccal cervical area of upper anterior incisors, with a higher severity and extend at the laterals (Figure 1a-1c). Caries at the cavitation level were found for teeth #85, 16, 36, 45 and 24 and teeth 11 and 21 mesial (Figure 1d, 1e). There was crowding in the anteriors mostly at the upper and space loss at the lower right quadrant, due to caries for 85. The patient had bilateral posterior crossbite, open bite at the canine area right.

Orthodontic Department had concerns prior to bracket placement, due to the extensive decalcifications that they could advance to frank caries during the orthodontic treatment.

The management involved vigorous prevention, resin infiltration of the WSL and restoration of caries. Thus the patient was advised to brush twice daily with Duraphat 5000 ppm, use chlorhexidine mouth rinse 0,12% once daily for 2 weeks and in office Duraphat application, 2,26%. Carious teeth were all restored. After restoring 11 and 21 mesially, the WSL were infiltrated with Icon under rubber dam, as per the manufacturer's instructions. The technique is shown by steps in figure 2. The esthetics of the lesions were improved (Figure 3).

The patient was then referred to the orthodontist who placed the brackets. On the 3 months recall, the WSL seem to be controlled (Figure 4). On the 6 months recall the upper anterior WSL were stable, however new WSL have developed on the lower anteriors, cervically (Figure 5).

**Keywords:** *White Spot Lesions; ICON; Infiltration*

### Introduction

White spot lesions (WSL) are defined as the subsurface porosity of demineralized enamel that manifests itself as milk white opacities localized on smooth surfaces [1,2].

The main reason for the cause of WSL is poor oral hygiene. This means that there is plaque accumulation around the brackets which will lead to the increase number of bacteria.

White spot lesions are the initial phase of caries lesion formation on enamel. Gorelick, *et al.* [3] classified the lesions by into four groups: type 1 had no WSLs, type 2 had mild WSLs, type 3 had severe WSLs, and type 4 had observed cavitation. Type 1 and 2 are non-cavitated and hard to treat.

White spot lesion is a major problem faced by orthodontists especially if the patient has poor oral hygiene. If the patient has poor oral hygiene plaque accumulation increases around brackets.

There was a high prevalence of WSLs in patient with fixed orthodontic treatment (Siguard).

A new technique called caries infiltration has been used for non-cavitated lesions. The pore system of non-cavitated white spot lesion is filed with ICON (DMG, Chemisch-Pharma. Fabrik GmbH, Hamburg).

In this case report presented the treatment of WSLs localized on upper anterior with poor oral hygiene before treatment.

**Case Report**

A healthy 12 year old female referred from orthodontic department to the Pediatric Dentistry for clearance.

Icon® applied on labial surface of 12 11 21 22. Icon® helps to remineralize the white spot lesions. Icon® is a novel infiltration technique for managing white spot lesions in buccal and interproximal teeth surfaces. The rationale for its application is to infiltrate the decalcified enamel, so as to reinforce it and thus prevent the disintegration of the lesion and its further development up to cavitation. Several clinical studies have shown Icon® to be successful in the arrest of the Carious White Spot lesions development, as well as its use for white spot lesions after orthodontic treatment.

**Clinical Procedure**

All of the teeth were polished with a non-fluoridated prophylaxis paste. A rubber dam was placed from the upper left lateral incisor to upper right lateral incisor to provide a dry working field.

Icon® applied on labial surface of 12 11 21 22.

The teeth surfaces were dried with oil and water-free air. A 2-mm area beyond the WSL was etched with 15% hydrochloric acid (Icon-Etch- DMG, Chemisch-Pharma. Fabrik GmbH, Hamburg) for 120s.

Then, the HCl was evacuated with a surgical aspirator. The teeth surfaces were rinsed with water for 30s.

Next, 99% ethanol containing Icon-Dry (DMG, Chemisch-Pharma. Fabrik GmbH, Hamburg) was applied to the dry lesion sites and allowed to set for 1 minute.

Then, the lesion sites were dried with air for 30s.

Icon-Infiltrant was applied on the dry, solvent free lesion sites under daylight and set for 3 minutes. After 3 minutes in the affected surfaces were light-cured. The Icon-Infiltrant was applied again and allowed to set for 1 min and then light cured for 40s. The rubber dam was removed. Finishing and polishing was done to remove any excess. After this treatment, the WSLs were improved and progression of the early enamel lesions was prevented.

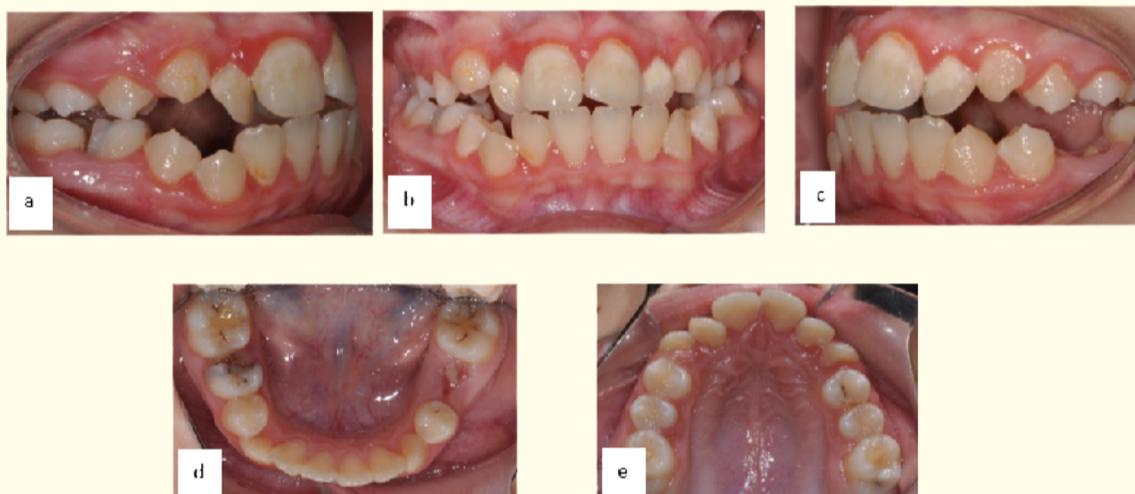


Figure 1(a-e): Pre-treatment intra-oral photographs.



Figure 2: Procedure.



*Figure 3: After treatment*



*Figure 4: 3 month recall.*



*Figure 5: 6 months recall.*



*Figure 6: 12 months recall.*

Tooth #24 PRR was done since it was a minimal cavity. Tooth# 26 and 46 Class I occlusal restorations since these were cavitated. Mesial of #11 and #21 were also cavitated so they were also restored by composite.

Icon® proved to improve white spot lesion can be used as a tool to manage non cavitated white spot lesions.

### Discussion

WSL or enamel decalcification result from the poor oral hygiene which leads to plaque accumulation. When plaque accumulates it increases the number of the bacteria. The two main bacteria that are present in the plaque are: *Streptococcus mutans* and *Lactobacillus*.

These bacteria will produce more acid that will also increase acidity of dental surfaces. These acids produced will cause enamel demineralization.

Enamel demineralization is the first stage of enamel demineralization which is characterized by opaque white chalky appearance.

WSL is the first sign of caries that can be observed by the naked eye (Gavin).

Orthodontists face a hard challenge with patients who have poor oral hygiene. They need to educate patients about proper oral hygiene instruction. Patients compliance is very important factor in developing WSL (Siguard) (Hamdan).

The best way of preventing of WSL is by maintaining good oral hygiene. Use of fluoride mouth wash enhance the prevention of WSL (KERBUSCH).

If WSL develops it becomes a great challenge to the dentist. Recent studies have showed that use of high concentration of fluoridated toothpaste like Duraphat (5000ppm) (Schirmermeister JF). The use of casein phosphopeptide-amorphous calcium phosphate complex (CPP-ACP)-containing, and functionalized  $\beta$ -tricalcium phosphate (fTCP)- containing toothpastes reduces WSL (Su-Yeon Jo).

A new technique is being developed called Resin Infiltration of non-cavitated caries.

The advantage of this treatment that there is cavity formed (Basaran).

In this technique 15% HCL etch is used instead of phosphoric acid. HCL etch enables more penetration of resin which eliminates the decalcified areas. This improves the esthetics of the lesion. The use of rubber dam is necessary to prevent any soft tissue ulceration that might be caused by HCL.

This treatment was done in one visit without and improvement of the WSL [4,5].

### Conclusion

This new caries infiltration technique may be an alternative for the treatment of noncompliant patients with WSLs in one visit.

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