

*A minimally invasive
treatment for white
spots on teeth*



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Minimally invasive dentistry and the millennial generation

The practice of minimally invasive dentistry is a relatively recent change in approach for dental professionals, with a significant amount of positive evidence becoming available on the subject, especially in the last ten years.¹ Novel techniques and materials are fast being developed for dentists to keep up with the demands of a patient population who are increasingly concerned about the appearance of their teeth. With a rise in social media many patients wish to not only preserve their dentition but enhance it. As a young dentist, it's not difficult to see that our current population's expectations of dental treatment are vastly different to what our predecessors who graduated 20-30 years ago faced. With this in mind, it is vital that we as dental professionals stay up to date with new dental innovations.

So what is ICON?

The ICON (Infiltration CONcept) was designed as a minimally invasive resin infiltration system for treating incipient caries in patients of all ages.² The low viscosity unfilled resin, developed by the company DMG (Germany) camouflages white spots by means of optical manipulation, and no tooth tissue removal is strictly necessary.

The clear resin flows into the demineralised enamel, and has similar optical properties (similar refractive index) to the enamel, therefore reflecting light to match the tooth's natural shade.^{3,4,5}

What is a white spot?

White spot lesions are white opacities seen on teeth after the subsurface layer of enamel on a tooth becomes demineralised, often due to poor oral hygiene and plaque, bacteria and

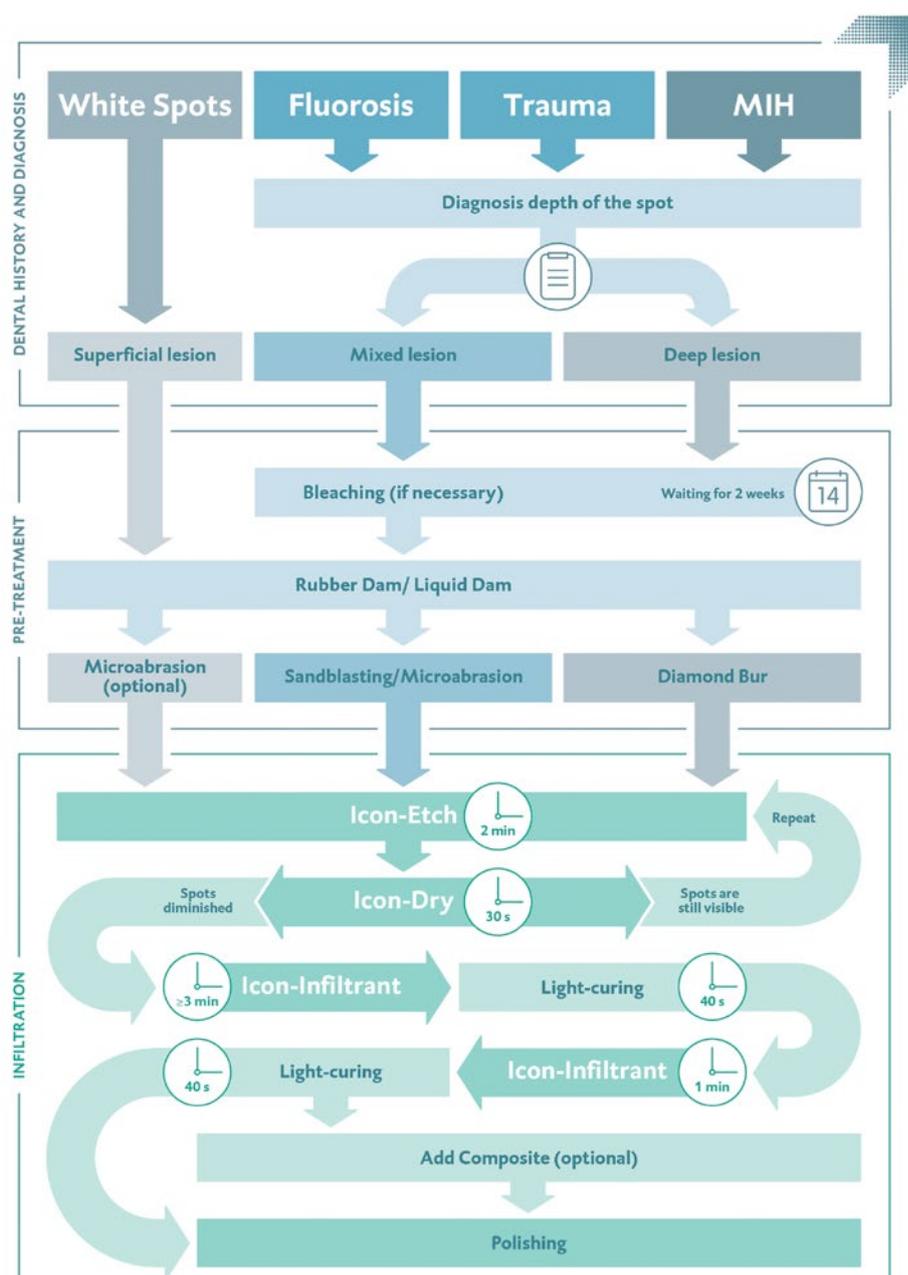


Fig. 1 Flow chart outlining the ICON process, produced by DMG Dental

'White spot lesions are white opacities seen on teeth after the subsurface layer of enamel becomes demineralised, often due to poor oral hygiene...'

acid accumulation on teeth. The decalcified inner enamel remains trapped underneath remineralised surface enamel. The inner demineralised enamel scatters the light due to its irregular microstructure and the result is an opaque white appearance of the tooth.

White spots can also occur on the teeth due to:

- Dental fluorosis (a high fluoride intake as the adult teeth are developing)
- Congenital hypomineralisation of teeth, due to infection or trauma as infant

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- Molar incisor hypomineralisation (lack of enamel development during its maturation stage, which affects the molar and incisor teeth)
- Decalcification of enamel due to fixed braces (inadequate oral hygiene around the plaque retentive orthodontic brackets).

Working in a dental hospital, white spot lesions on anterior teeth are a common presentation that I see on the paediatric department. However, patients will usually present to their primary care practitioner first. Patients of any age can attend your surgery wishing to hear the options for treatment of their white spots, and it is important to be able to distinguish the cause of the white spot, in order to provide the best treatment outcome. If uncertain, a referral for specialist opinion is recommended.

Aesthetic treatment of white spots

- ICON resin infiltration

| Table 1 Title | |
|---|---|
| Positives of ICON | Negatives of ICON |
| Minimally invasive, does not require any drilling | Not suitable for demineralised spots which have progressed to cavitation |
| Immediate results | Usually fades white spot but sometimes does not completely mask the area |
| Usually takes one visit | Not appropriate for use in patients with sensitivity of teeth due to repeated use of HCL etch |
| Does not require local anaesthetic | Occasional 'Touch-ups' may be needed if effect 'fades' |
| Can be used in children under 18 years of age as an appropriate alternative to bleaching or veneers | Little evidence on the long term effect on clinical performance and stability |
| Usually less expensive for the patient compared to direct or indirect veneers | |
| In the future, if teeth are whitened, the treated white spot will lift in colour similar to the natural tooth | |

'A common misconception by dental professionals and patients is that some white spots may be successfully treated with bleaching alone.'

- Tooth bleaching*
- Enamel microabrasion
- Direct composite resin bonding/veneers
- Indirect composite/porcelain veneers*
- In severe cases indirect porcelain crowns may be indicated*.

*These treatments are not suitable for children under age of 18 years of age, due to the developing dentition, and the EU regulations for dental bleaching.

A common misconception by dental professionals and patients is that some white spots may be successfully treated with bleaching alone. However, although the overall colour of the tooth will improve, the white spot will remain unchanged and can sometimes even look worse compared to the whiter natural tooth.

A substantial thickness of composite may be required to fully mask a larger white lesion, which can leave the tooth looking bulky. Furthermore, composite and porcelain veneers may require tooth surface preparation which is irreversibly destructive to the tooth.

How is ICON used?

The resin is applied as part of three-part technique.² The use of rubber dam is essential to protect the soft tissues. Pre and post-operative photographs are important as part of your record keeping process.

1. Apply Icon-Etch (HCL gel)

- Directly onto white spot for two minutes
- Agitate, remove with water, gently air dry

2. Apply Icon-Dry (ethanol)

- Directly onto white spot
- Air dry after 30 seconds
- This can be repeated up to five times, until the patient is happy with the appearance of the tooth

3. Apply Icon-Infiltrant (unfilled resin)

- Directly onto white spot
- Remove excess material and allow to set for three minutes
- Light cure each surface for 40 seconds
- Repeat infiltration once more with a new tip, remove excess and allow to set, then light cure
- Polish as necessary.

The flow chart in Figure 1, produced by DMG Dental, outlines the process for ICON.

Discussion

ICON has shown in cases that aesthetic results can be delivered on white spots in a minimally invasive way.^{3,4,5,6} This technique



Fig. 2 Enamel opacities on the upper central incisors of an eight-year-old girl treated with ICON

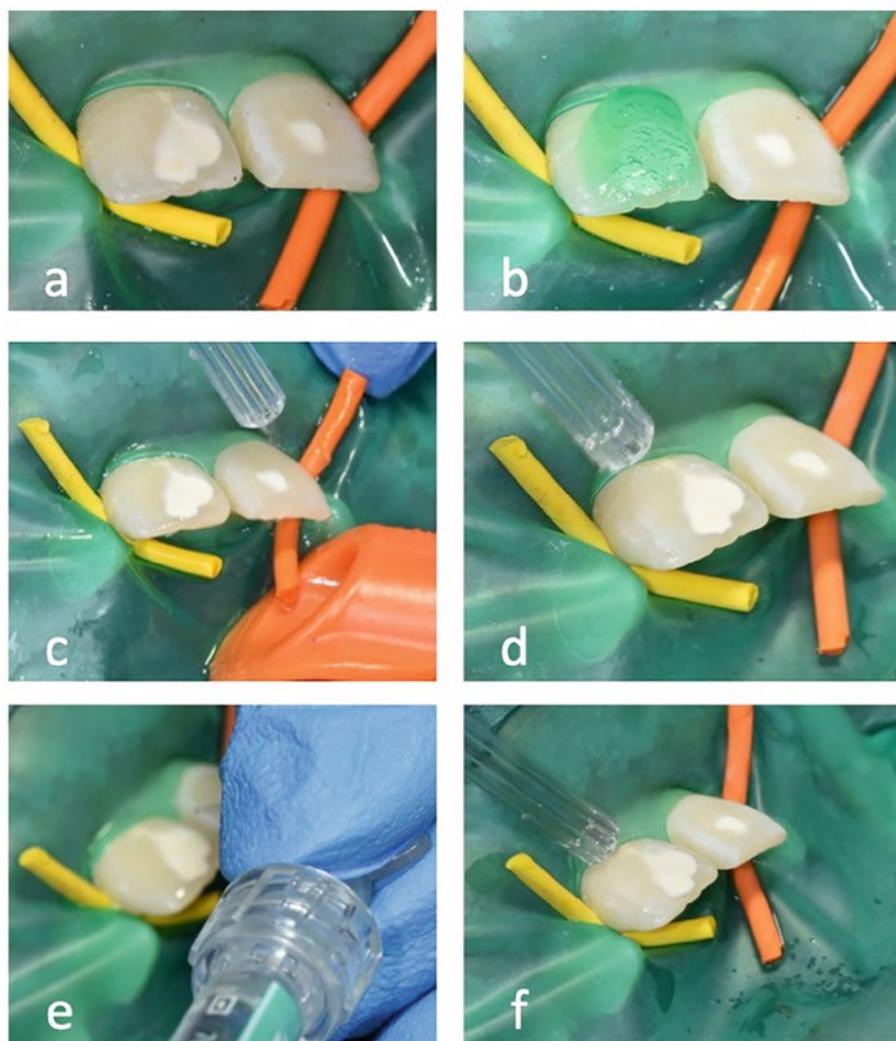


Fig. 3 Stages of ICON application a) Rubber dam application; b) Icon-Etch application; c) Washing; d) Drying; e) Application of Icon-Dry (ethanol); f) Drying; g) Application of resin infiltration (Icon-Infiltrant); h) Flossing between teeth; i) Light-curing; j) Immediate post-operative appearance

‘This should always be used in conjunction with a prevention plan including oral hygiene and diet advice, fluoride varnish placement and review’

should always be used in conjunction with an intensive prevention plan including oral hygiene and diet advice, fluoride varnish placement and regular dental review. Although long term clinical data on this product are limited in the literature, use of this technique is a step forward in allowing patients of all ages to access aesthetic treatment of their white spots, which can significantly impact on their confidence and

wellbeing. See Table 1.

Dental professionals should continue to strive for clinical excellence and improving patient experiences by means of keeping up to date with current and new research in the dental field.

Case example

Enamel opacities on the upper central incisors of an eight-year-old girl treated with ICON

(Fig. 2). The opacities were visibly reduced following treatment (Fig. 3) and continued to be at six-month review visit.

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