ANNA SALAT

DIRECT POSTERIORS - CASES - TIPS AND TRICKS

POSTERIOR RESIN INFILTRATION AND DIRECT VISION

In the enamel proximal lesions, before cavitation, the initiation of the caries process, is characterized by a subsurface white spot formation, with a overlying pseudointact surface.

Once a tooth is cavitated because of a caries, the lesion tends to progress. (5)(6) So ideally before having a cavitated lesion some kind of intervention should be done: to invert the process of demineralization to a remineralization, or, at least,to arrest the demineralization process.

REMINERALIZATION of white spot lesions with an intact surface is possible. The arrest of the lesion may be achieved and it can rely on calcium and phosphate ions. The use of topical fluorides to enchance remineralization of demineralized proximal enamel has been advocated (7). For example one of the protocols that demonstrated some benefits is the application of fluoride varnish every third months. It significantly reduces the progression of proximal caries lesions in premolars and molars. The most obvious reduction of caries progression is observed among children with moderate caries risk, while children with high caries activity (more than 9 new proximal lesions) do not benefit from proximal caries reduction. (8)

CAVITY PREPARATION is nowadays considered destructive and outmoded in incipient proximal lesions because another less invasive techniques are possible.

A considerable number of professionals still tend to practice invasive techniques with lesions confined to enamel ranged from 19% to Norway (Tveit et al) to nearly 50% in Mexico and Brazil (Traebert et al).

The RESIN INFILTRATION TECHNIQUE in interproximal caries lesions is a less invasive technique compared to a cavity preparation and fits in the concept of minimal intervention dentistry.

THE INFILTRATION TECHNIQUE:

The infiltration technique should be an alternative to cavity preparation, thus at least postponing (if not avoiding) sacrifice of sound structures.

Resin Infiltration technique is contraindicated in cavitated lesions but instead is a treatment option in non cavitated incipient (interproximal) enamel lesions.

The problem in posterior teeth is the bitewing radiograph does not give any direct information on the surface integrity of proximal lesions.

Clinical studies (Bille et al) found comparably few cavitations in R3 lesions (radiolucency reaching the outer dentin on bitewings) lesions (22% to 52%), while several laboratory studies confirmed a considerably earlier cavitation with breackdown of surfaces in up to 100% of R3 lesions (Kielbassa et al).

The best solution should be to have direct vision to the tooth to be able to verify the presence/absence of cavitation and to be able to check the activity/inactivity of the lesion.

In this article we explain a tip that we use in our daily practice to achieve the direct vision to the lesions in the case of interproximal lesions.

Img. 1 - The incipient caries lesion mesial to the first inferior molar has easy access because the second premolar is not completely erupted. The white and brown spot means that we have demineralization in that area. Fluor and casein approch is useful in very superficial incipient caries which is not the case. In case remineralization with fluorides is not considered a viable approach the resin infiltration technique is an altenative. The resin infiltration is well accepted technique because it is less invasive than the conventional approach with a bur cavity preparation.

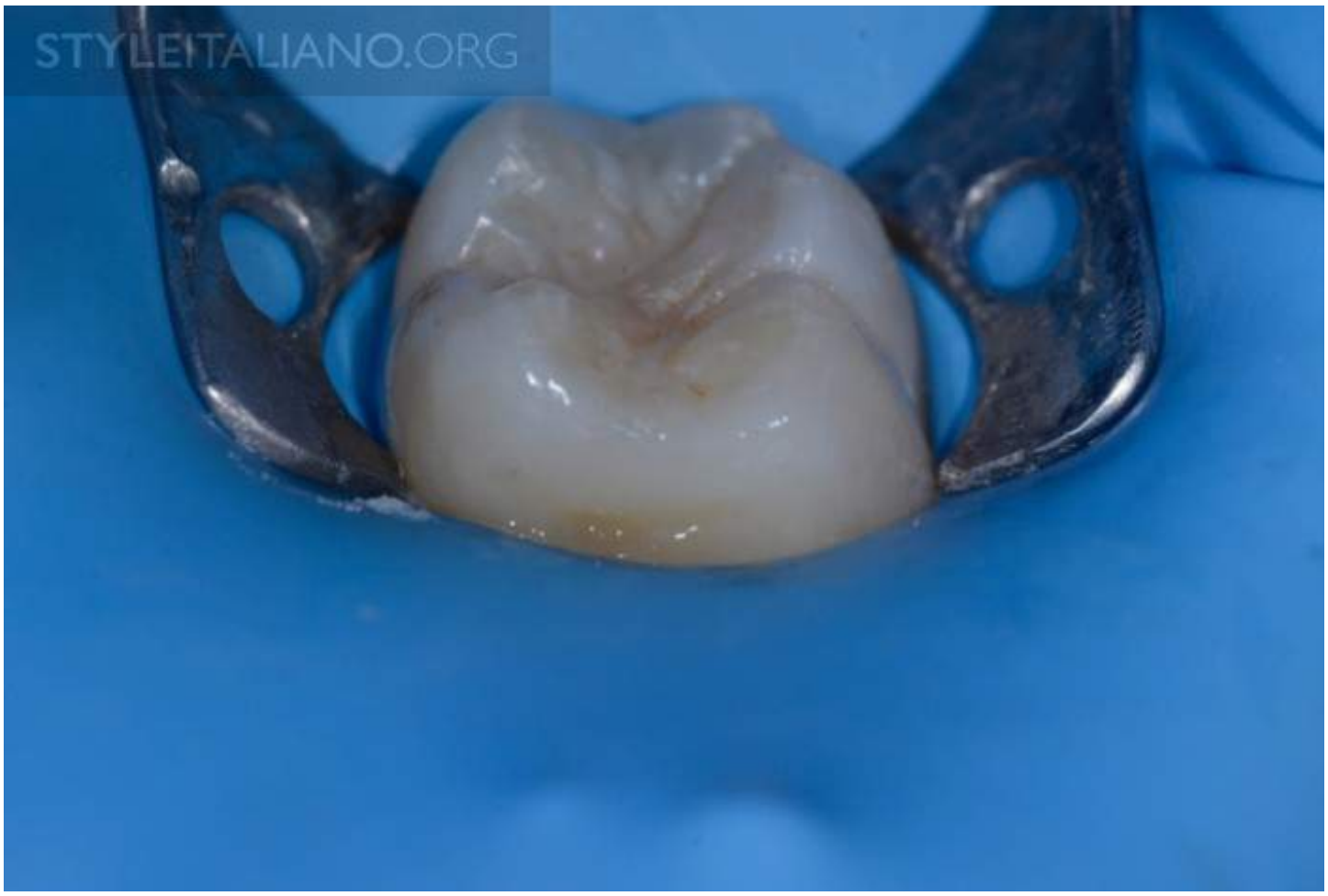
Img. 2 - The retraction cord (Ultrapack number 3 by Ultradent) inside the sulcus helps to completely expose the lesion.

Img. 3 - The lesion is now fully visible and ready to place the dental dam

Img. 4 - In that particular mixed dentition situation the single tooth isolation with the dental dam is the best solution.
Usually we use the 27N clamp for molars.

Img. 7 - The first mineralized layer is destroyed by means of the etching and now the demineralized area is accessible. We place the alcohol (alchol included in the Icon kit) and let it set for 1minute at least, which is considerably more than the manufacturer suggest. This procedure has the solely porpous of giving a preview of how the infiltration would look like at that point.

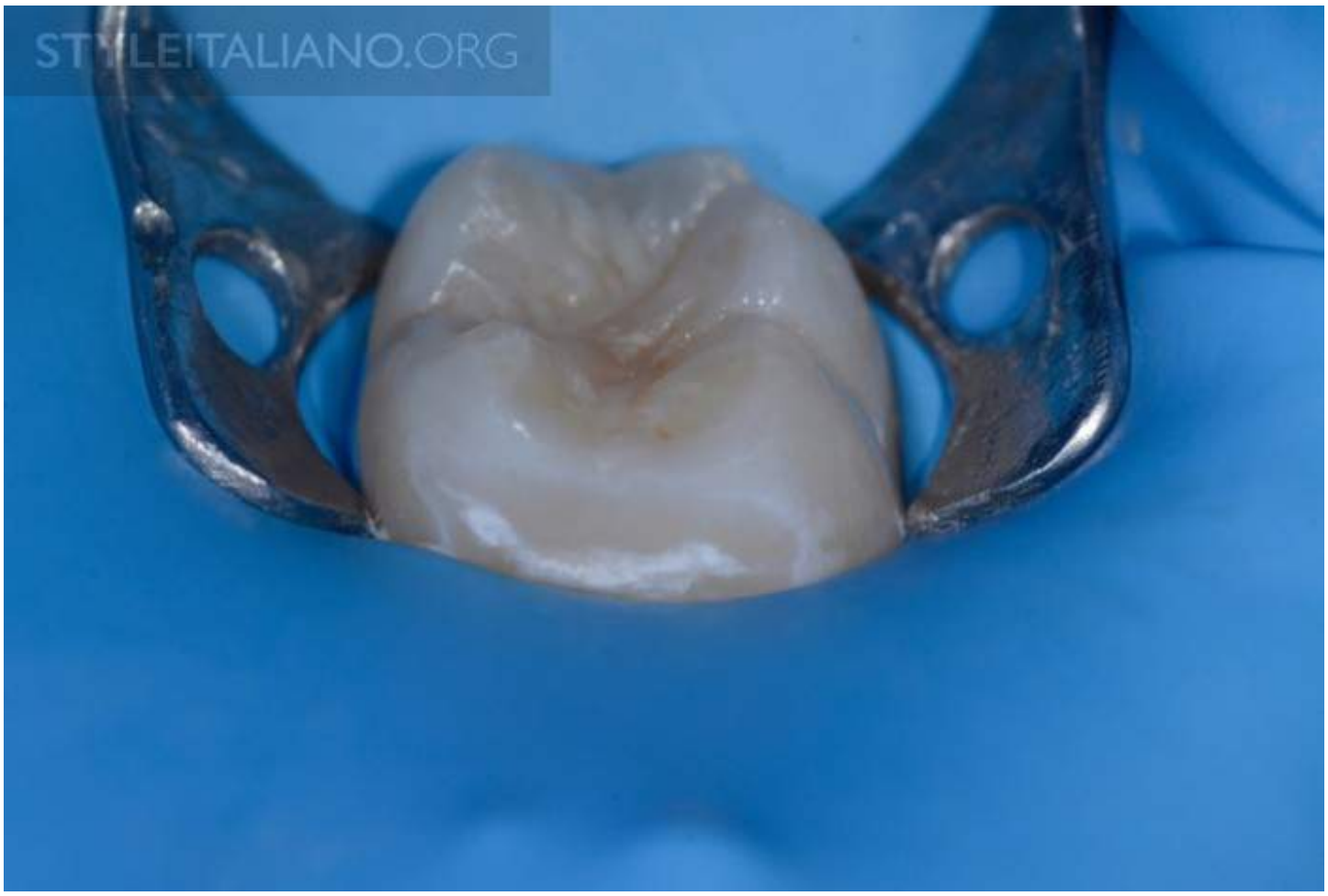
Img. 9 - Most of the demineralized tissue dissapered fast thanks to the abrasion. Two small white spots are still present.



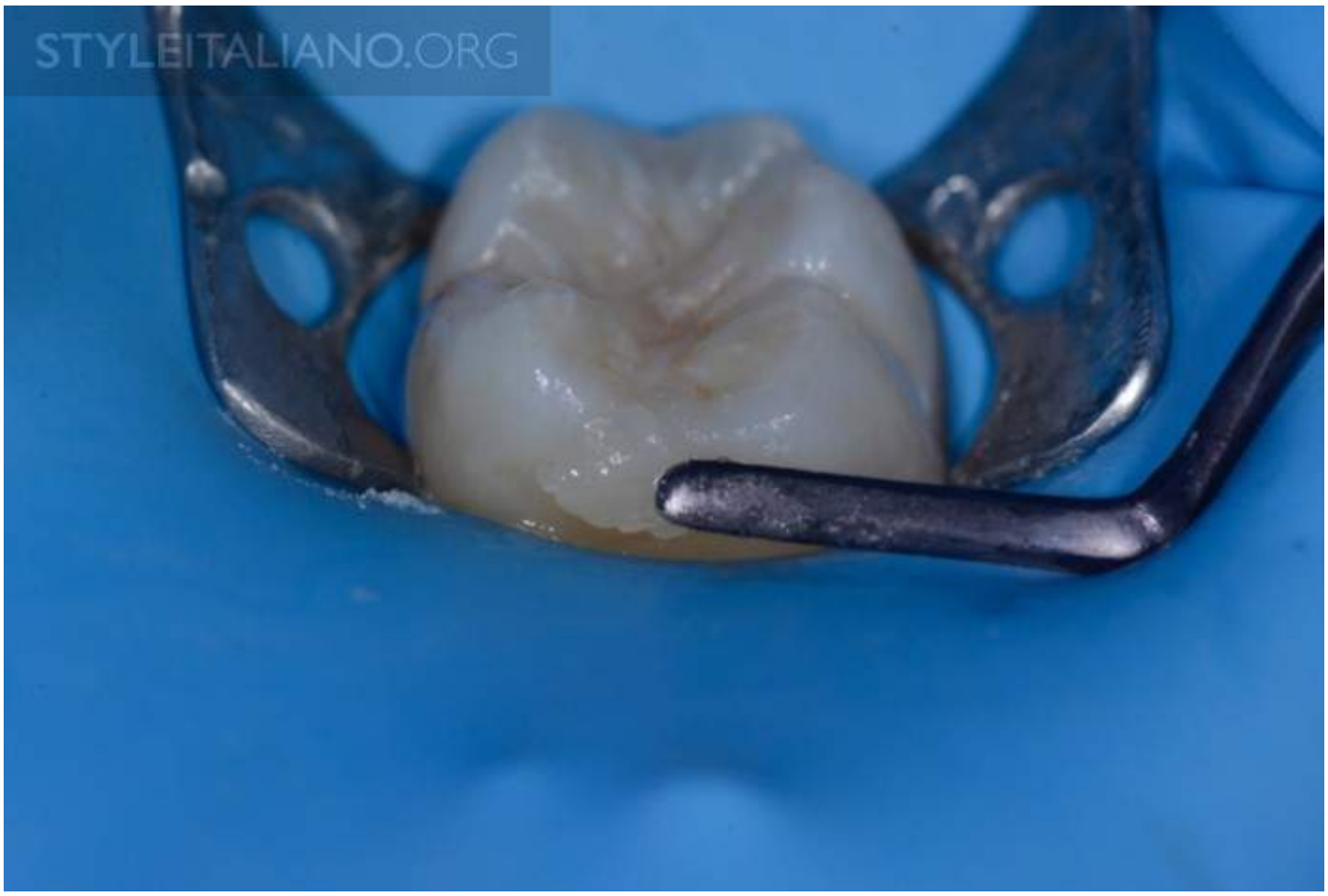
Img. 10 - When applying the Icon alcohol we can appreciate the small white spots still present disappear completely.
Resin infiltrant was applied. We let it set for 2 minutes and then we polimerize.

Img. 6 - We rinse with water spray to remove the etching for 30 seconds.

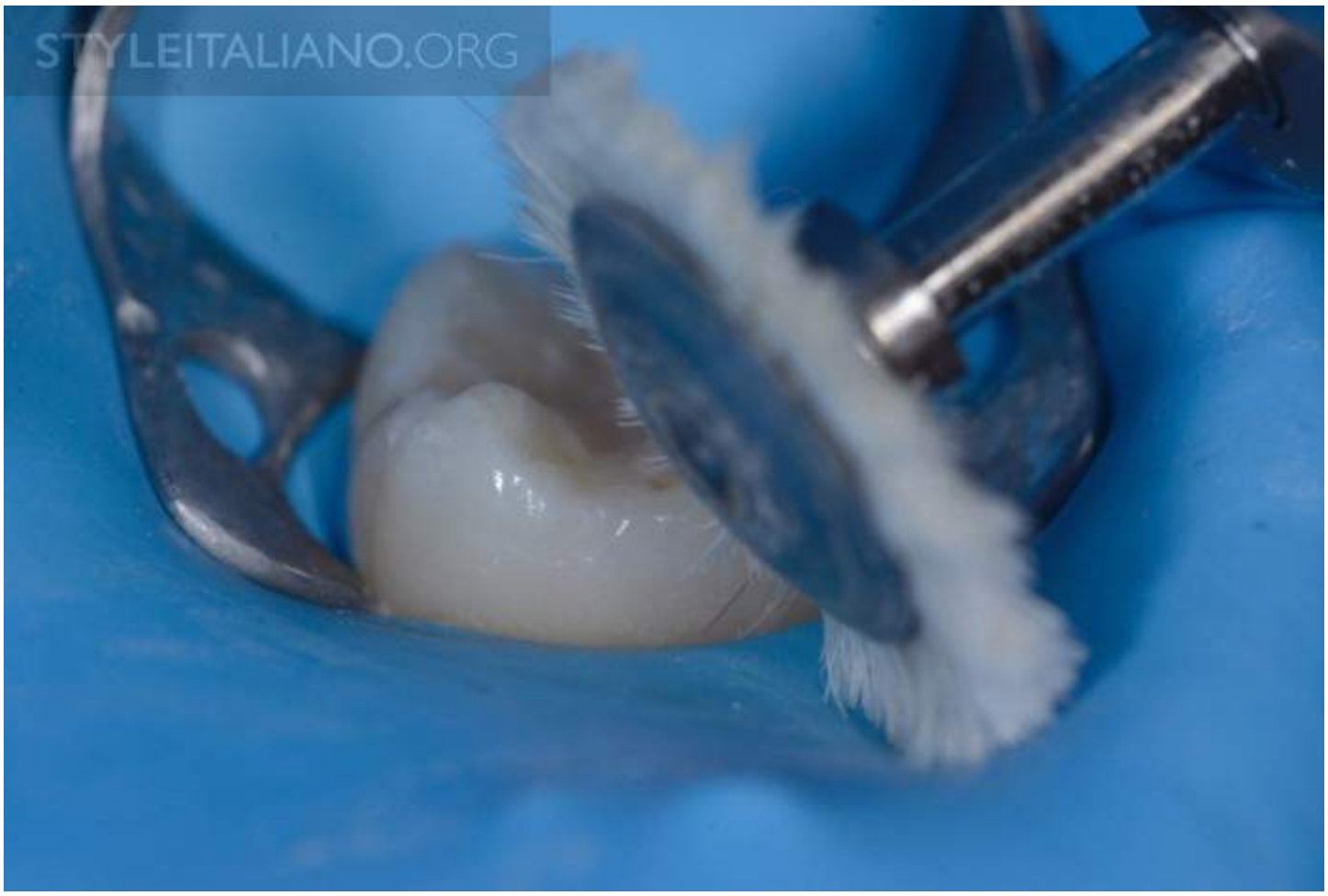
Img. 5 - After cleaning the surface from any possible debris or dental plaque we apply the hydrocloric acid (HCL) according to the Icon instructions for the resin infiltration, for 120 sec.



Img. 8 - As the lesion was still visible after alcohol application we repeated the steps (etch and alcohol) for 4 times. The aim of repeating 4 times the procedure is going deep into the lesion. If after repetition of these steps you see that the lesion is still visible you can think of combining Icon with some micro or/and macroabrasion. The microabrasion was done with the Oxide Aluminum 50 micrometers a 2 bar of pression for 10 seconds 1cm away from tooth.



Img. 11 - In the cases where there is a depression usually due to micro or macroabrasion or too much structure loss, a small amount of composite enamel should be applied. Resin infiltrants can be combined with conventional resin restorations in case needed.



Img. 12 - Finishing and polishing steps are mandatory in the resin infiltration technique with or without adjunctive composite.

Img. 13 - The case just after cord and dental dam removal

Img. 14 - Control appointment 2 weeks after.

Img. 19 - We removed dental plaque from the suface of the lesion with a small brush and prophilactic paste.

Img. 15 - Unfortunately the posterior caries are not usually accessible. Posterior caries are usually in the contact point area and not visible. Resin infiltration technique is contraindicated in cavitated lesions. The problem is that with bite-wing radiography we are not able to stablish if the lesion is cavitated. That´s why in our protocol we find convenient to place an orthodontic elastic (Ormco elastics) in the interproximal area, 5 days before the appointment with the main goal of opening the space and in this way be able to perform the right treatment.

Img. 16 - Space created with the orthodontic elastic is enough to have direct vision to the lesion.

Img. 17 - Dental dam in place. Buccal and vestibular demineralization.

Img. 18

Img. 20 - We can also clean with dental floss (Superfloss)

Img. 21 - Wedge squeezes the papilla and pushes down the rubber dam and gives the extra separation space.

Img. 22 - This appliance (approximal tip) inserted in the syringe (Icon etching) lets the etchant to be applied in the proximal area that we want thanks to a permeable membrane only in one side while the other side is protecting the wall that we don´t want to etch.

Img. 23 - We rinse with water spray for 30 seconds.

Img. 24

Img. 25 - With the icon dry syringe we applied a good amount of material onto the lesion and let set for a minute at least.

Img. 26 - We plan to repeat the icon etch and icon dry steps as we were not satisfied with the preview with the alcohol

Img. 27 - HCl application following the instructions

Img. 28 - After three applications of icon etch and icon dry we decided to infiltrate.

Img. 29 - Resin infiltration with the proximal tip. The material will dispense only on the green side of the proximal tip

Img. 30 - Using infiltrants with high penetration coefficients as it is Icon etch (penetration depth 60 micrometers) facilitated inhibition of lesion progression, thus showing that resin infiltration sufficiently occludes the acids' pathways and hampers demineralization.(Meyer-Lueckel et al)
The physical barrier is expected to give a protective function against exposure of acids from bacterial origin, and cutting off possibly remaining bacteria (within an advanced lesion) from a nutritional supply of fermentable carbohydrates. (Gomez et al)
Check ups of the lesions should be permormed. We expect reduced or inhibited caries progression.

Img. 31 - Occlusal vision

Img. 32 - Just after dental dam removal and polishing steps.

Img. 33 - The same protocol is applied in every interproximal enamel lesion: we place the orthodontic elastic 5 days before the appointment for the caries treatment. Thanks to the elastic we can see if the lesion is cavitated. Cavitated lesion would obligate us to proceed with a conventional cavity preparation and restorative procedure. So the decision is taked in situ and the patient is informed in advance about the treatment possibilites. If the lesion is not cavitated we would proceed with the resin infiltration technique with Icon.

Img. 34 - 5 days after the space created by the elastic.

Img. 35 - Occlusal view.

Img. 36 - Dental dam in place.

Img. 37 - Before the start of treatment we clean the tooth

Img. 38 - Dental floss with the sponge (Superfloss) helps to remove any residue

Img. 39 - We apply Icon etching following the instructions

Img. 40 - We rinse with water spray for 30 seconds following Icon instructions

Img. 41 - Dried lesion ready to receive the icon dry (alcohol) for the preview of the possible result.

Img. 42 - We apply icon dry following the instructions of the system

Img. 43 - Lesion appearance with the alcohol

Img. 44 - As we are satisfied with the preview with the alcohol next step is to infiltrate the resin.

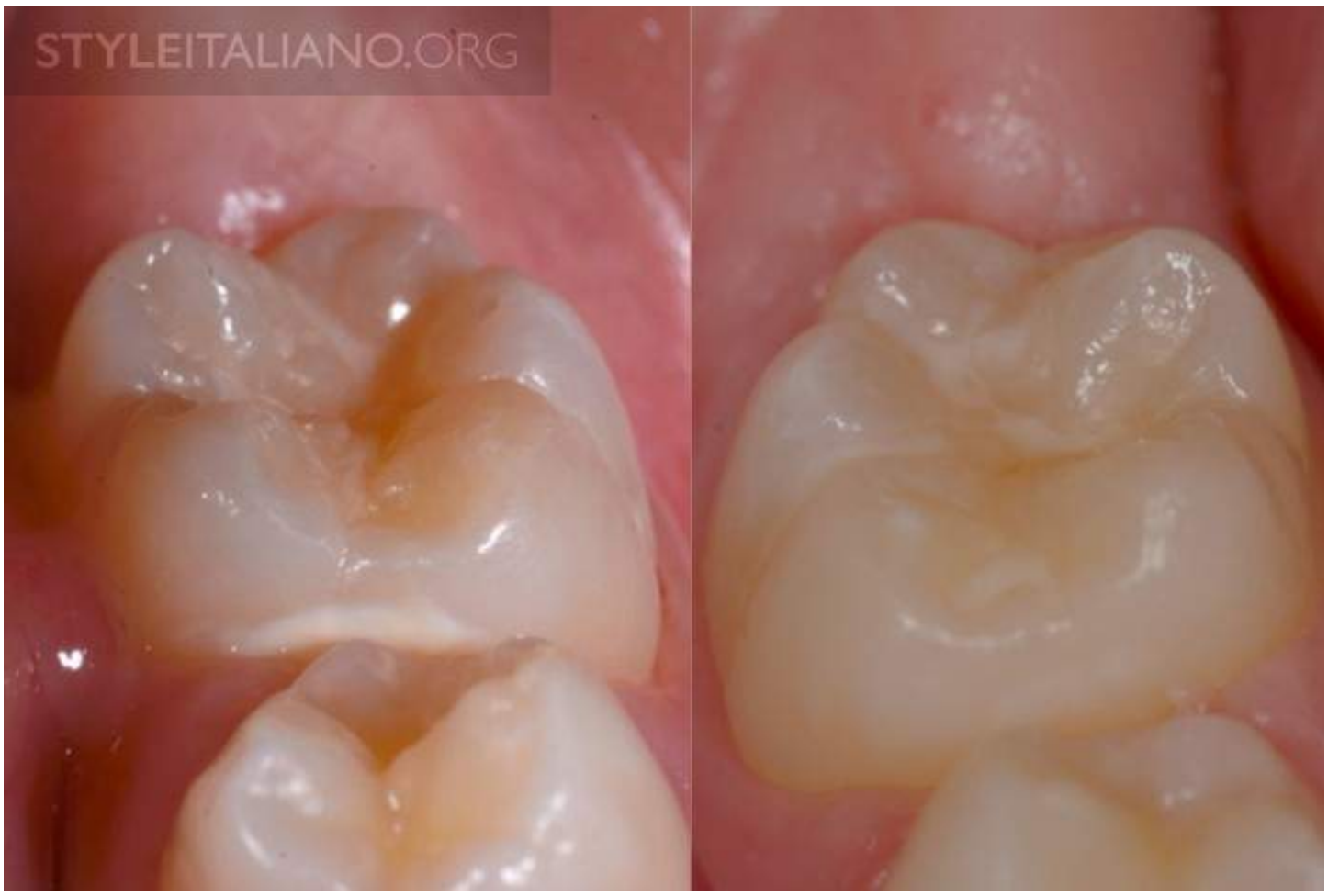
Img. 45 - We apply the resin. Let Icon-infiltrant set for 3 minutes and add material if necessary

Img. 46 - We polimerize the resin for at least 40 seconds.

Img. 47 - Glycerin to polimerize the final layer.

Img. 48 - Glycerin to polimerize the final layer.

Img. 49 - Appearance of the lesion after the treatment showing minimal spot which should be associated to a good penetration of the resin infiltrant.



Img. 50 - Before and after. We must monitorize the patient. At least, the application of infiltrating resins might significantly postpone the first invasive intervention.

Resin infiltration technique with Icon is a treatment option in incipient interproximal enamel caries. One limitation of the resin infiltration concept is that in interproximal posterior enamel lesions with a bitewing radiography is not possible to evaluate the presence of a cavitation. In cavitated lesions Icon is contraindicated. Neither another method like photoillumination lets you determine the integrity of the outer part of the lesion. Thats why in our protocol in interproximal caries with a contact point we open the space with an orthodontic elastic 5 days before the appointment. With the direct view we reevaluate the lesion and take the decision how to proceed to treat the caries lesion.

Note: All the cases from this article were performed together with Dr. Elisa Oneto, Chiavari, Italy

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