

# SOLVING AN ORTHO DISASTER

Lack of proper hygiene during orthodontic treatment spelled trouble for this young 16-year-old.  
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TV commercials touting teeth whitening or improving smiles often target patients in the 25 and above age bracket whose teeth have become stained or worn with age. Poor dietary habits or the lack of fluoride in the drinking water when growing up are among the factors that could have contributed to discoloration. Regardless of the cause, these patients and many others in the country become unhappy with the appearance of their teeth and want to improve their smiles. Today, there are many new and improved options for patients wanting to change the appearance of their teeth. In the case presented here, a young man found out how the lack of oral hygiene during orthodontic treatment can have disastrous results.

## THE PROBLEM

A 16-year old patient who, because of long-time, poor, overall hygiene during orthodontic treatment, developed white spot lesions throughout the surfaces of his teeth, obvious only after the appliances were removed. Normally, a patient this young would not be a candidate for a complete restorative make-over. But his situation was unique.

White spot lesions are the first readily visible evidence of tooth decay formation. The 16-year-old and his parents were unhappy with the esthetics of the teeth, but his clinician found something even more alarming. Radiographs revealed severe generalized and circumferential decalcification and decay. In addition, the tissue around the teeth was noted to be greatly inflamed, unusual in a patient this young. All were reasons for concern for the patient, his parents, and his dental practitioner.

Visible on the tooth surfaces was the outline of the cement holding his orthodontic brackets in place. The brackets protected the underlying enamel from the effects of the dental plaque that accumulated around the brackets. The surrounding tooth enamel, however, exhibited the effects of demineralization caused by the acid waste products naturally



The patient presented with severe de-calcification and was unhappy with the shape of the central incisors.



A "before" lateral view, showing decalcification and small lateral size

present in plaque. When dental plaque is permitted to lie continuously on the tooth's surface, the decay process progresses until finally a hole forms in the tooth that requires a filling. If the tooth's surface had been kept clean, the process would have been halted. Since the mineral content of the enamel had, in this case, been altered, the color remained bright white. As a result, this patient's enamel appearance changed and white spot lesions formed.

## TREATMENT CONSIDERATIONS

As professionals, we have to consider the possibility that the white spot lesions seen in this example might be only a cosmetic dilemma, as opposed to a structural one. It's possible that after removal of the braces, this patient's brushing technique effectiveness and overall home care would improve and bring the decay process under control. If so, the patient's teeth, while not attractive or esthetically pleasing, could actually be pronounced structurally stable.

Another possible solution might be to place white fill-



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ings in those regions where the worst white spot lesions formed and merely buff out the faintest lesions.

An important element in deciding upon a treatment plan for this young patient was the wide variation in the coloration of the teeth within different regions of the mouth. This alone would make it difficult for the dentist to strategically place white fillings that match well.

Another problem with this solution is longevity. Fillings, by nature, do not last as long as a veneer or a crown. Based on esthetic considerations, still yet another approach would be to fabricate and place porcelain veneers or crowns over the anterior teeth since either option would provide the best coverage and uniformly change the appearance of the entire front portion of each of his teeth.

The dentist, patient and his parents met and discussed all of the possible options to restore his healthy smile. The first suggested step was an aggressive oral hygiene solution. The patient was presented with home and office fluoride treatments. It was also decided that all posterior decay would be restored immediately with re-evaluation scheduled for anterior restorative options.

After a 6-month period, during which the patient's hygiene was monitored with marked improvements noted, the patient was re-evaluated for anterior restorations (Figs. A and B). Upon examination, it was decided that due to severe decalcification and decay full coverage porcelain crowns were the treatment of choice.

Patients always view esthetics by looking for tooth symmetry, especially on the centrals. In an ideal situation, the incisal edges should follow the contour of the upper lip. In most situations, however, the dental professional knows that asymmetry is what is actually achieved. When we look at a smile we expect to see that the teeth on one side are nearly mirror images of the teeth found on the other. In this patient's case, the discolored tooth on the left side is longer and more narrow-looking than the tooth on the right side.

**IMPLEMENTATING THE PLAN**

Impressions were taken and a treatment plan wax-up was completed to demonstrate the final outcome to the patient and his parents. The final result would be central anteriors that are as close to identical as possible in terms of size and shape from one side of the mouth to the other. Tooth shape and texture also were discussed.

The teeth were prepped and impressions sent to dental laboratory (Fig. C). The dental team decided to use GC Initial PC, a pressed ceramic with veneering porcelain (Fig. D). Pressed ceramics result in a metal-

free restoration high in translucency. Due to the patient's youth, a highly translucent restoration was needed (Fig. E).

Using the treatment plan wax-up as a shape and size guide, the approved contours were used to make a putty matrix. The dental

technician completed a shade map using a multi-colored layering porcelain application (Fig. F).

# TREATMENT PLAN

**C**



Occlusal view of master model, The preparations are designed with deep chamfer margins.

**D**



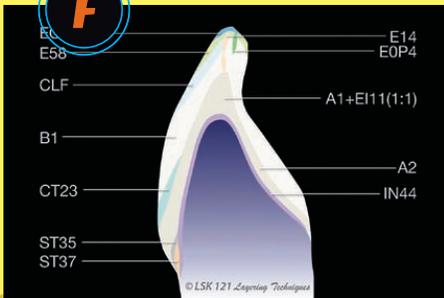
A natural tooth, porcelain to metal crown, and GC Initial PC crown are compared.

**E**



The teeth shown are shown under ultraviolet light.

**F**



Laboratory's computer-generated shade mapping is completed by the dental technician.

**G**



Porcelain labial margin is added using GC Initial porcelain. This helps control the translucency.

**H**



Fluorescent dentin porcelain is used as a foundation. Shade FD91 is applied at the incisal not showing too much translucency.

**I**



The fired crowns are checked with the putty matrix.

**J**



Bisque bake stage checks same symmetry, long axis, mid-line, and silhouette.<sup>1</sup>

**K**



Natural teeth\* always give a good hint for emergence profile and color blending. (\*Donated by Dr. David Schubert, Plainfield, IL)

**L**



Silhouette opens more toward the canine to give a natural looking appearance.

**M**



Finished GC Initial PC crowns with GC Initial LF Porcelain.

The technician fabricated the pressed ceramic copings and decided on porcelain labial margins for more control over the amount of translucency at the gingival area. Margins were creating using GC Initial LF. This specially developed shoulder powder allows the technician to control translucency and blend in with the framework shade (Fig. G). Other special powders in the GC Initial line such as Fluorescence Dentin help the technician provide the highest in esthetics by applying porcelain at the incisal in the light refraction area (Fig. H).

The multi-layered porcelain build-up of the restorations was completed. After the firing, the restorations were checked against the lab putty matrix (Fig. I) for length comparison to the treatment plan wax up. At this stage crown contours can be modified (Fig. J) to grant the patient's wish for symmetric centrals. By studying extracted permanent

# IN THE MOUTH

**N**



Immediate lateral view demonstrates color and shape harmony.

**O**



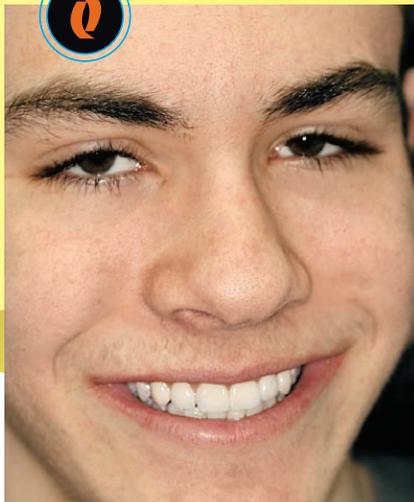
Occlusal view.

**P**



The centrals, #8 and #9, are symmetrical.

**Q**



"After" full facial view.

teeth (Fig. K), the technician can see the natural emergence profile and contour as well as the color blending.

The technician must use this knowledge in fabricating restorations, while respecting the requests of the dental team (dentist, patient, and technician). Silhouette also must be considered. This plays an important role in the tooth appearance since the spacing at the incisal edge near the contact area will vary from tooth to tooth (Fig. L).

## THE FINISHED CASE

The finished crowns (Fig. M) were highly esthetic. The technician was also able to control the value of the material due to its high translucency. Harmony in texture and color (Fig. N) also was achieved.

In addition, the dentist and technician were careful to add function to the equation, which helps aid in the longevity of the restorations (Fig. O). The patient's vision of his perfect smile was applied with beautiful results (Fig. P). Preoperatively, his forced smile hid his imperfections, but postoperatively a full and confident smile shines from his happy face (Fig. Q).

## CONCLUSION

Working together as a team – the dental clinician, the technician, and the patient, with his parents' approval, dramatic results were accomplished for this 16-year-old boy. The team communicated effectively, and the dentist was proud and pleased with the finished product. Going through the rigorous and expensive process of orthodontics with displeasing end-result esthetics was not something that any of them had envisioned. But by patiently and diligently following the treatment plan from start to finish, the patient now has a smile he can count on for years to come. Those are results we can all relate to! **lab**

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