Successful whitening always requires:

1) removal of as many “color molecules” as possible from the teeth.
2) breaking apart the magnetic chromophore bonds within remaining color molecules.

Tetracycline staining has been particularly difficult to whiten successfully due to:

1) tetracycline color molecules cannot be removed from teeth.
2) tetracycline chromophore bonds are extremely strong.

Tetracycline chromophore bonds act just like strong magnets, and it is very difficult to pull these bonds apart. And like strong magnets, they have a tendency to reach out and grab each other to re-connect (regression) after being pulled apart.

Regardless of how mild or intense the tetracycline discoloration, we never know exactly how strong these chromophores are. Also, we never know how much regression can be anticipated after treatment, or how much “Accelerated Maintenance” and “Long Term Maintenance” will be required to maintain an acceptable result. Of course what is “acceptable” depends on the patient’s desires and expectations.

You must make sure your patient understands that they have a problem which, prior to KöR Whitening, had no solution short of many thousands of dollars for porcelain restorations of upper and lower teeth, as well as aggressive “tooth grinding” for those porcelain crowns or veneers. If your patient demands perfection, we recommend you inform them that KöR Whitening followed by porcelain restorations is the only way to assure approaching perfection. And even with porcelain restorations to cover tetracycline stain, often there are shortcomings of results.
IMPORTANT - Prior to accepting patients for treatment, we recommend you should have a candid, straightforward discussion with your tetracycline stained patient regarding the following, and document it in the patient’s chart, ideally with the patient’s signature:

1) With the KöR Ultra-T system, patients should always have a very significant improvement if all instructions are followed.

2) Tetracycline cases are impossible to predict. KöR Whitening is science - not magic. Patients should expect improvement, not perfection – and that is a miracle in itself!

3) Discuss the entire tetracycline whitening protocol in the following order:
   a. In-office conditioning visit – do not expect to see any visual improvement from this procedure.
   b. As a rule, 8 weeks of at-home whitening, but never less than 6 weeks.
   c. Certain cases may appear to respond more quickly, however if the full protocol is not completed, patients will regress very quickly.
   d. In-office whitening procedure – Do not expect for the results after this visit to remain as white as initially.
      The color will settle over the following days and weeks.
   e. 10-14 nights of at-home whitening immediately following the final in-office whitening procedure.
   f. Always recommend “Accelerated Maintenance” – at-home whitening in a “tapering off” fashion.
   g. If remaining portions of stain are a concern, it may require areas of cosmetic bonding, or even possibly porcelain veneers, at an additional cost.
   h. Long Term maintenance indefinitely to maintain results.

Proper Treatment of a Tetracycline Stained Case

Everything was done correctly on the following case. The patient was made to understand she could expect significant improvement, but not to expect perfection. All steps of the KöR Impression technique were followed. The KöR-Seal Whitening Trays were fabricated by the KöR Lab. After the in-office conditioning visit was completed, the following protocol was followed: eight weeks of at-home whitening; followed by the final in-office whitening visit; 14 more nights of at-home whitening; then the patient was placed on Accelerated Maintenance, to be followed by Long Term Maintenance.

Though the final result was far from a perfect cosmetic result, it was still a miraculous result nonetheless. Previous to KöR Whitening, this result would have been virtually impossible. The patient was overjoyed with the results and said that KöR Whitening had entirely changed her life for the better. Though further cosmetic restorative treatment could improve the appearance even more, the majority of tetracycline patients are extremely happy with the very significant improvement.
1. Tetracycline Banding in the Cervical – Cases that may not “Appear” Very Difficult

In the above photos, the cervical areas will become lighter, however the rest of the tooth structure will lighten significantly more. It is possible that the final result will be somewhat uniform, but just as often there will still be some remaining cervical discoloration. There may even be more contrast after whitening. Depending on the patient’s desires and enthusiasm, if any cervical darkness remains, occasionally cosmetic bonding may be used in the cervical areas after KöR Whitening.

Completing the full 8 weeks of at-home whitening and Accelerated Maintenance will provide the best possible lightening of the cervical areas.

2. Tetracycline Banding in the Cervical – Cases with More Significant Cervical Discoloration

In these cases, the patient may still see significantly dark areas in the cervical, although the overall appearance will be lighter. These cases always require more intense Accelerated Maintenance. For the occasional patient wanting more uniformity, cosmetic bonding in the cervical areas may occasionally be necessary after completion of whitening.
3. Cases with Horizontal Grooves

Tetracycline does affect the secretory ameloblasts, resulting in little to no enamel thickness in the cervical areas, and sometimes even horizontal grooves. These cases will routinely require heightened Accelerated Maintenance, cosmetic bonding of the horizontal grooves, and occasionally cervical cosmetic bonding.

4. Tetracycline Banding In the Middle and Incisal Thirds of the Teeth

Banding in the middle and incisal thirds typically responds better than staining in the cervical areas; however the patient should still be aware that some banding may still remain, with the occasional option of cosmetic bonding procedures over the bands.
5. Diffuse Tetracycline Staining

Diffuse tetracycline staining will most often have the best results, however the cervical areas will sometimes not respond quite as well, with the infrequent option of cosmetic bonding procedures in the cervical.
6. Mild-Appearing Tetracycline Cases

Do not be fooled. Regardless of how mild the staining is, even mild tetracycline staining still requires the full protocol as discussed on the following pages.

Six to eight weeks of at-home whitening is absolutely necessary for all tetracycline cases. In the vast majority of cases eight weeks should be performed for the best possible results.

An excellent KöR whitening tray is very important with any whitening case, but even more critical when treating a tetracycline case. And a very detailed impression is essential. Crisp, sharp gingival margins must be seen throughout all facial and lingual areas in both anterior and posterior. It is also strongly recommended that the KöR Lab fabricate the KöR-Seal Whitening Trays to ensure a precision fit and seal.
Translucency in Tetracycline stained cases.

Translucency is a common finding in tetracycline stained cases. Determining the level of translucency, and explaining and showing any translucency to your patient before accepting whitening treatment is highly recommended. Otherwise, after treatment, the patient may believe you caused the translucency. The “Cotton Roll Test” to determine translucency is therefore important prior to whitening any case, and even more important for tetracycline stained cases. For information see the “Translucency” section in the “Things to Look for During the Exam” chapter of the Getting Started Guide. Also see the “Translucent Teeth - Restorative Options” section of the “Treatment and Restoration of Uniquely Difficult Cases” chapter in the KöR Reference Manual.

About the First In-Office Visit (“Conditioning Visit”).

The first visit is performed using the KöR 13% Hydremide® Peroxide in the patient’s KöR whitening trays. This visit will typically not result in a visible lightening of the teeth. Your patient should know not to expect color improvement after this visit. The 13% Hydremide Peroxide is highly accelerated specifically to cleanse the microstructure of the teeth (the Oxygenation Phase of whitening) to increase the effectiveness of the at-home whitening procedure.

If the patient responds very quickly – for example, if the teeth appear uniformly white after only 4 weeks of at-home whitening.

Do not stop whitening prematurely even when the patient appears to respond quickly. Many tetracycline patients have slightly more porous enamel. Bleaching factors enter the enamel, creating millions of microscopic bubbles. Light reflects off these bubbles, giving a uniformly white appearance. But over several days post-operatively, these bubbles exit out of the enamel, and the uniform bright white appearance is gone. Do not be fooled if the patient achieves this white appearance quickly. You still need at least six, and almost always eight weeks of at-home whitening prior to the in-office visit.

To prevent disappointment of the patient, they should be aware prior to treatment that the intense whiteness they may see early during the process is only an optical illusion. Explain about the bubbles in enamel reflecting light so that the patient understands what is happening.

Treating mild-appearing tetracycline stained cases.

Regardless of how mild a tetracycline case may appear, six to eight weeks of at-home whitening is always required prior to the final in-office whitening. Remember that tetracycline staining is difficult to successfully treat because of how exceptionally strong the magnetic chromophore bonds are within the molecules. Regardless of how many chromophore bonds are present, each chromophore bond will require full treatment to enable the possibility of breaking the bond.

The challenge of Tetracycline staining in the cervical portion of teeth – even when, visually, the case appears less difficult.

Remember that tetracycline affects the secretory ameloblasts, routinely resulting in extremely thin (and sometimes almost a total lack of) cervical enamel covering the discolored dentin. This means that whitening will be less effective in the cervical portion of the teeth.

Even though, in most cases of cervical tetracycline staining, the staining is significantly improved, the enamel of the rest of the teeth will be far more improved. This may result in even more contrast than seen prior to whitening. Occasionally a patient may insist that the teeth have not whitened at all, and may even believe the teeth have gotten worse. This is one more very important reason to: 1) take pre-op and post-op photos with shade tabs in the photos, and 2) “inform before you perform,” to educate the patient about these possibilities.

Management of patients requesting continued whitening after completion of 8 weeks of at-home whitening, followed by the final in-office visit.

Sometimes tetracycline patients become so enthusiastic about the initial results that they want to do even more whitening after their treatment is completed. At this point you should inform the patient that they may have reached the maximum whiteness possible in their case.
However, if the patient understands that the maximum whiteness may have already been achieved, yet still wants to continue whitening after the final in-office visit, the patient may start nightly whitening again for six weeks, again followed by another KöR 34% Hydremide Peroxide in-office visit.

Most often we do see a small additional improvement by extending the treatment.

**After the final in-office whitening.**

It is imperative that you take steps to stabilize (set) the color of the teeth after the final in-office whitening as much as possible. Remember that after whitening, the strong tetracycline chromophore bonds may tend toward “snapping” back together (regression).

You should always have your tetracycline patients whiten nightly for 10-14 nights after the final in-office whitening. This will help stabilize the color after the in-office visit.

**Accelerated Maintenance.**

With many cases, and especially ALL tetracycline stained cases, even after having the patient whiten for 10-14 nights following the final in-office visit, it is still advisable to recommend Accelerated Maintenance to further stabilize the whiteness as much as possible. It’s up to the patient whether they want to accept your recommendation or not, but you will protect yourself by recommending the Accelerated Maintenance, even if they refuse it. It is VERY important to read the entire “Maintenance” chapter of the Getting Started Guide.

**Management of darker areas or bands remaining after KöR Whitening treatment – restorative options.**

Occasionally there may be darker areas or bands that remain to some degree. With patients desiring more perfection, of course you can offer porcelain crowns or veneers, however you may also consider composite restoration of the darker or banded areas. When masking darker areas with composite restorations, consider the use of a paper-thin layer of genuine composite “opaquer” prior to placement of composite. Most restorative material companies offer composite opaquers and may be able to provide tips/articles/videos on proper technique.

With tetracycline cases, we urge you to contact your KöR Clinical Specialist and email photos, case description and patient expectations to your Specialist. He or she will be happy to consult with you regarding your case, and provide you with suggestions.

Please also read about treating tetracycline cases in the “Treatment and Restoration of Uniquely Difficult Cases” chapter in the KöR Reference Manual.