



YOUR DENTAL LAB PARTNER

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ClearMatch™

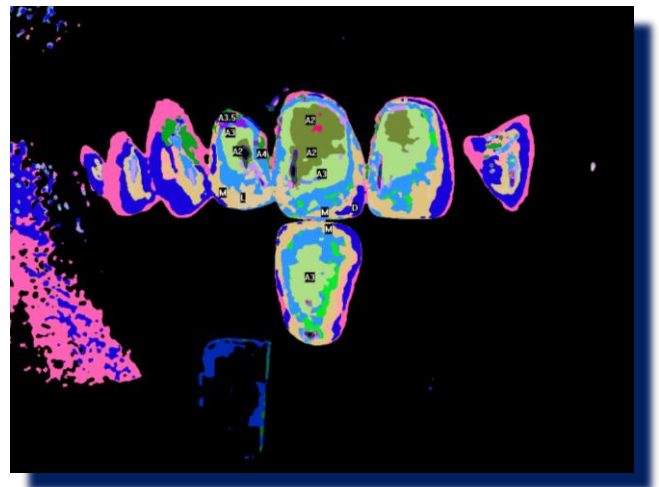
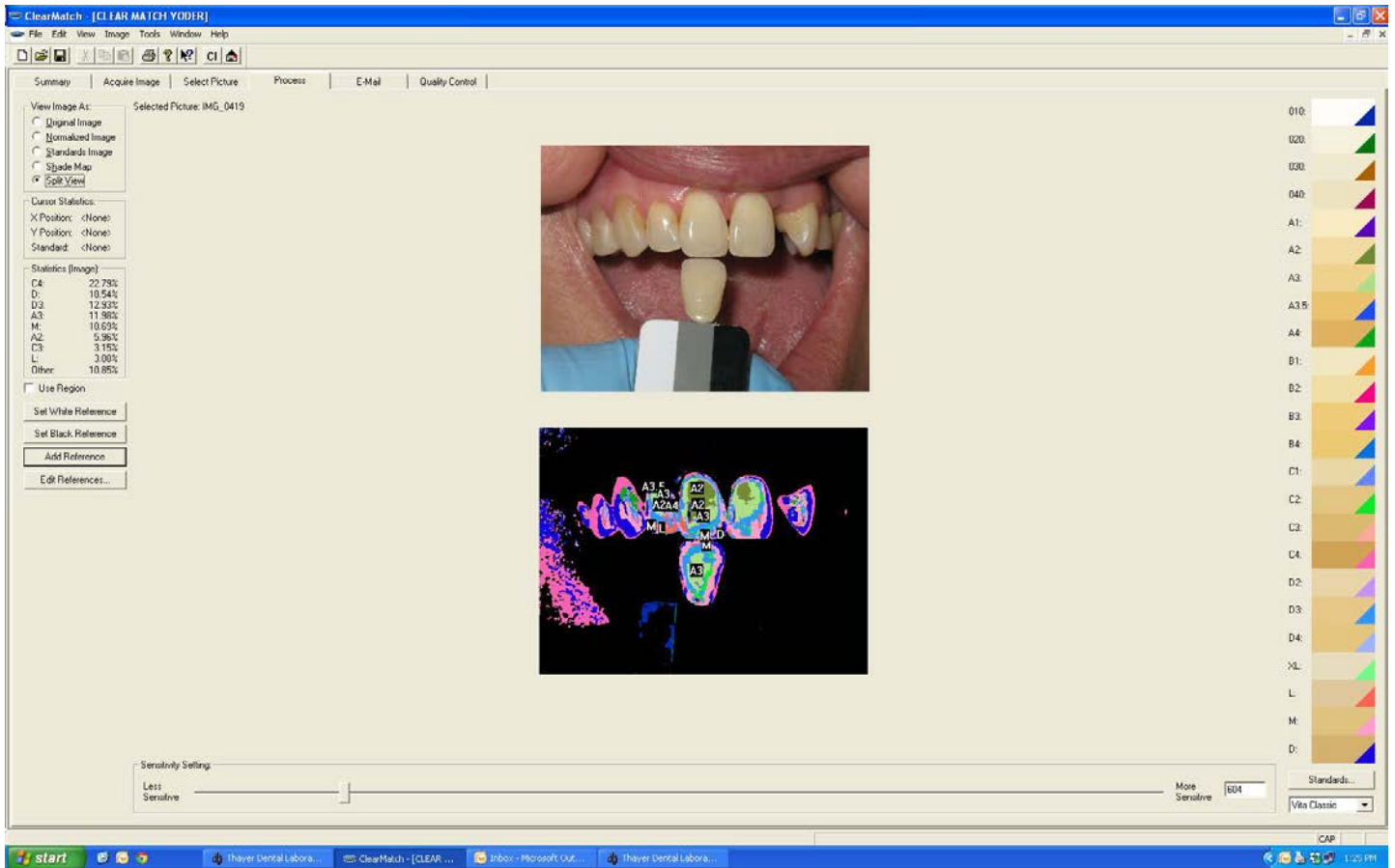
Precision Tooth Shade Matching Software

Modified User Guide



Email Address: cosmetics@thayerdental.com

CLEAR MATCH PROGRAM SCREEN WITH IMPORTED PHOTOGRAPH



ENLARGED PHOTOGRAPH AND SHADE ANALYSIS FROM ABOVE

OVERVIEW

The power of ClearMatch™ is its ability to find a perfect shade match for teeth, despite problems caused by different cameras, light sources, and light colors. ClearMatch™ accomplishes this through a process of normalization. Simply put, this means comparing shades in an image to known shades. By including a white, grey, and black reference, with a dental shade guide in the patient photo, ClearMatch™ can precisely determine tooth shades. For example, certain factors can cause a white reference to appear red, though they are not. Since we know white reference is really white, ClearMatch™ removes the added red to show the correct color of the teeth. Using all three references, ClearMatch™ can understand the color scheme of a tooth in millions of shades, far exceeding the capability of the eye or even the shade guides currently in use. ClearMatch™ then expresses the results in terms of the shade guide you select, providing greater accuracy than through hardware dependent or analog color detection, or educated guesses.

ORIENTATION

The Digital Camera

You are probably eager to get started if you've read this far. The first thing you need to do is establish that you are able to take good, consistent digital photos of patients. Let's discuss what makes pictures appropriate:

Size: Your goal is to achieve a corner-to-corner of the mouth picture. Deviation from this is usable, but not ideal. Some cameras can achieve this result without a close-up lens, while others will need an additional lens. If the subject is too small, it is more difficult for the eye or the camera to differentiate characteristics. This leads to an extra step to crop the picture, and often results in less picture resolution than is desirable.

Exposure: Under or over-exposure can be tolerated to a point. Generally, if the picture looks poorly exposed to the eye, ClearMatch™ will view it poorly. So we first want to establish proper settings and conditions for consistent exposures. This is different from camera to camera and model to model. Our review of your initial case picture will assure you that your photographic conditions are suitable. Camera LCD view panels may show a poorly exposed picture even though the actual picture looks good on the computer.

Lighting Influences: Normally a built-in flash is best for ClearMatch™ purposes. We find that ring flash and ring light products introduce unwanted reflections for shade matching purposes. A flash that is centered over the lens tends to produce more even lighting, though various cameras with the flash to one side work fine. It is best to take pictures in a consistent location when possible, with the patient standing (or sitting), but not leaning back in a dental chair. The influence of a large light source (such as picture window or overhead fluorescent lights) can create large reflections on the teeth and overpower the light from the flash. Some camera kits include “diffusers” which essentially turn a point source of light into a large square light, which also creates a large reflection.

Orientation to the Subject: Positioning is important with any shade technology. Take your pictures with the camera horizontally and vertically perpendicular to the teeth you wish to match. Or take two pictures from a distal or mesial angle. The point is to not be so far from the teeth you are matching that most of the light and color information is lost. Good information is obtained from a three to four teeth anterior segment when shooting perpendicular to the tooth being matched. Since canines are typically darker, they should not normally be the match teeth unless the canines are being restored.

TAKING PHOTOGRAPHS

What the picture must include:

In order to determine correct shades, ClearMatch™ needs at least four pieces of information. It needs to determine white, grey, and black along with one other reference (normally a shade tab from the shade guide that is closest to the desired shade). The image below shows how to take the picture in every key aspect.



Inclusion of white / grey / black reference:

Simply slide the shade tab into the white / grey / black reference as pictured above. ClearMatch™ is calibrated to the proprietary white / grey / black reference that can be obtained from NDX Thayer.

Inclusion of a shade tab:

You must have at least one shade tab in the picture that relates to the materials system that will be used. More than one tab may be used, and in some cases, you may use simultaneous tabs from different shade standards (e.g., Chromascope® and Vita) for compatibility between you and NDX Thayer. The tab you select for the picture should be the shade you think is dominant. Please remember that the shade tab used in the photo reference should also be used on the prescription. ***It is important to note that the patient's shade should fall within the range of the shade guide you intend to use. If not, ClearMatch™ will report no information, or may try to report the next closest shade.***

TIPS FOR BEST RESULTS

1. Always zoom all the way in with your digital camera to take patient photos.
2. Use “*center metering*” rather than “spot metering” on your camera (if applicable).
3. Use the lowest ASA setting i.e., 100 (if applicable). Maximum depth of field is NOT helpful.
4. Hold the reference shade guide at enough of an angle to minimize reflection. If your black reference looks gray when you take the picture, it is too perpendicular to the camera’s lens.
5. Hold the reference shade guide with the incisal edge up to help minimize reflection.
6. Take several pictures, so you can choose one with the best focus and least reflection.
7. Crop your pictures (if you have imaging software) to the smallest size practical (keep the shade tab and white / grey / black reference in the picture, but crop out excess lips, teeth, etc.). This leads to the largest shade map when printed, which is advantageous for ClearMatch™ processing.