White Balance

White balance is how the camera compensates for different light sources so the colors in the image look realistic. Light is said to have a "color temperature". Technically this term relates to the color of light produced by black body radiation at various temperatures. Lower temperature light is reddish and higher temperature light is blue. Light temperature for various sources are as follows;

incandescent light bulb	2600^0-3000^0,
daylight	5500^0,
electronic flash	6000^0,
overcast, cloudy day	9000^0.

Fluorescent lamps cause even more problems, besides color temperature variations, fluorescent lamps also have a high green. Our eyes automatically adapt to these variations so we perceive colors fairly accurately. Film on the other hand does not adjust so we must use a film that is balanced for the light source or filters to correct the differences. Thus the need for "daylight" or "tungsten" film. If the film does not match the light the colors are far removed from reality.

One of the real advantages of digital cameras is their ability to adjust their response to different color light sources. The cameras have a number of options; **AUTO, White preset, sunny, incandescent, fluorescent, cloudy and flash**. In the AUTO setting the camera measures the light and makes a light balance calculation for each exposure. It assumes certain conditions exist in the image and adjust its response based on those assumptions. My experience is that it is fairly accurate much of the time and what color balance problems do exist are minor and can be corrected in Photoshop. Each image will require a different correction however, which can be tedious if a lot of images are being processed. The other settings adjust the camera based on the characteristics of that light particular light source.

White preset uses a custom correction based on a sample of the light being used. It produces very accurate color balance at the cost of some hassle. This is the setting we recommend for the microscope. Its use automatically compensated for the microscope light source as well as the influence of the various lens systems. The AUTO setting cannot be used because of the abnormal balance of colors in dental pictures, especially surgical pictures.

For these reason White Preset will produce the most accurate and consistent colors. Refer to the manual to see how to do this. The target used should be a very white piece of paper like high quality inkjet papers so the paper does not influence the color settings. Once the custom setting is determined the camera will remember it so it doesn't have to be repeated.

There are two situations where this can be a problem. Both involve the use of transilluminated light from a fiberoptic light probe such as those used to locate fractures. If the fiberoptic light is a different color balance that the scope light the color balance will not be accurate. The other situation is using a strong transilluminated light and driving the light through the bone to locate a fracture deep in a canal. The light that eventually reaches the tooth is very red. In both of these situations AUTO will probably produce the best results.