Tutorial

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Clinical Photography for the Myofunctional Therapist

James Cockerill

A major concern of the clinical photographer should be having the correct equipment necessary for accurate photographic reproduction. This equipment should be selected carefully with high quality the most important criterion.

With the right equipment, it is easy to set up an intra-oral photographic system that will achieve reproducible results. Good equipment will remain trouble-free and last for many years despite daily routine use. Extension tubes, extra lenses or an auxiliary light may work, but not for long; nor will they convey the image of a professional. A long focal-length macro lens, 35mm single lens reflex camera and a ring/side flash unit are the major components of a good intra-oral system.

The Panagor 90mm f 2.8 telephoto macro is the right lens for intra-oral photography. This lens can be used to photograph from full-face to life-size images without an extra extension tube. The barrel of the lens is marked for different magnification ratios so each dental view can be reproduced at the same magnification each time the view is photographed.

The four standard views are: 1:10 full face or profile; 1:2 full articulation of the upper or lower arch; 1:175 left or right quadrant; and 1:1 close-up to show one or two teeth or a cavity preparation. (See Table 1). These ratios result in photographs of the same size and exposure each time they are used.

To shoot a closeup, set the magnification at 1:1 and move the intra-oral system back and forth until the subject comes into sharp focus in the view finder. When the image is sharp, the size on the finished photograph will be the same as the last one shot at that magnification, so an easily reproducible system can be set up. The lens-to-subject distance will also be the same at each respective magnification. Once an exposure is established, it should never change.

Once all four ratios are mastered, a closer, twice life-size photograph can be taken by adding a 2X teleconverter to the lens system. The converter requires an exposure increase of two f stops, but since f 22 is usually used, a setting of f 11 will give the required amount of light.

Most 35mm single lens reflex cameras having an interchangeable lens and a flash X-sync can be used with the Panagor macro lens. The X-sync will trigger the flash when the shutter is fully open. Some newer, fully automatic cameras without a P.C. plug such as the Nikon EM or any other camera that only has a hot shoe flash connection, should not be used. Most automatic cameras can be used if they provide for a manually set X-sync shutter speed, usually 1/60th or 1/90th of a second. Automatic cameras must be set manually when taking intra-oral photo-

graphs. An automatic camera with manual override is a good investment for use at the office as well as for occasional personal use. Cameras are very much a personal choice, and one of the least important components of the entire system. The least expensive camera will work as well as the most expensive if a lens comparable to the Panagor is used in the intra-oral system.

The only source for the ring/side flash system is Lester Dine, Inc. The ring/side flash is a system used exclusively for close-up photography; it cannot be used for general photography. The ring flash is used intra-orally while the side flash is used for full face or profile photographs. The side flash can be used for intra-oral photographs, but the ring flash is easier to use and is recommended for 95% of all intra-oral photographs.

A.C. current or battery-operated versions of the ring/side flash are available. Both units have a variable output, so most films can be used with either. The A.C. unit can be used in the clinic setting however, in a hospital setting, the battery-operated unit is a better choice. The battery-operated unit may also be used as the main flash unit for upper torso or full body photographs.

Mirrors are used to photograph those areas of the oral cavity that cannot be conveniently observed. Metal mirrors do not break when dropped, but do require an additional f stop more light, or a darker photograph will be obtained. First surface glass gives a sharper image and does not require more light for a correct exposure but does break when dropped. Both sets of mirrors have advantages. I first used metal mirrors but now have switched to glass. If a glass mirror is broken, the metal mirror can be used as a backup until a new glass mirror can be obtained.

Slides or prints can be produced by the intra-oral system, but slides are less expensive and more easily shown to a large group. The film I recommend is ASA 64, either Kodachrome or Ektachrome. The dyes used in each film are different, so a slightly different image is obtained with each. Kodachrome is warmer, more reddish and gives the more stable image of the two films. Ektachrome is cooler and slightly bluer but can be processed quickly in a small lab if needed the next day for a presentation. If the slides from both films are stored correctly, 20 years should pass before a change of color is noticed. Prints can be made from the slides when they are required.

Before the first slides are shot, the system should be tested. Table 1 shows a good starting point. Shoot slides at each magnification, varying the f stop: 5.6, 8, 11, 16, 22. Keep a list of the f stops to check the results. As long as the same lens, film, light source, and lens magnification are used, the results should not change. Once a standard is established, the same f stop may be used for the magnification range of 1:1 to 1:2, assuming other variables are held constant. The four main magnifications listed

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in the table are only a starting point. Establish a standard magnification for each format and the results should be easily reproducible.

Table 1

Film — ASA 64 Ektachrome/Kodachrome
 Lens — Panagor 90mm f2.8 Telephoto Macro
 Light — Lester Dine Ring/Side Light Power "100"

1:10	Sidelight	Full Face/Profile	f8
1:2	Ringlight	Full Articulation	f22
1:2	Ringlight	Upper/Lower Arch	} Metal Mirror f16 Glass Mirror f22
1:1.175	Ringlight	Quadrant	
1:1	Ringlight	Closeup	f22
2:1	Ringlight	Extreme Closeup 2x Extender	f11

Slides too light drop power to "75"

Slides too dark open up one f-stop

The Panagor lens system ready for use with the Dine ring/side flash mounted on the front. The magnification is set at bracket "A", the f stops at "B", and the shutter speed dial at "C". All three must be set correctly to take a good photograph. The shutter speed is always set at x sync, usually 1/60-1/125 of a second. The f stop is set according to Table #1. These are set depending on which magnification ratio is used.

This is a 2x tele-extender used to achieve twice life size extreme close-up photographs when used with the Panagor macro lens. This extender can also be used to make the 90MM lens, a medium telephoto of 180MM, when focused at infinity.

Equipment Sources

Glass Mirrors

Evaporated Metal Films
 701 Spencer Rd.
 Ithaca, NY 14850
 (607) 272-3320

Ring/Side Flash, A.C. or Battery, Plastic Retractors, Set of Metal Mirrors, Carrying Case

Lester Dine, Inc.
 100 Milbar Blvd.
 P.O. Drawer "F"
 Farmingdale, NY 11735
 (516) 454-6100

Only Chicago Store for 90mm F 2.8 Panagor Lens
 Holiday Camera Co.
 1822 W. Roosevelt Rd.
 Broadview, IL 60153
 (312) 343-6339

The battery operated ring/side flash can be used anywhere an A.C. outlet cannot be found. The main flash can also be used to light larger subjects that small ring/side units can't be used for.

The full face photo is shot at a magnification ratio of 1:10 at f8. The side flash is used; the camera is held vertically with the flash on the top of the lens. Pull back the hair to show the ears; include the top of the head to complete the picture.

The full articulation photo is shot at a magnification ratio of 1:2 at f22 using the ring flash. When changing from full face to intra-oral shooting, the ring flash must be switched on to produce the correct exposure. The patient or assistant should use the large end of the retractors to pull back the lips. The area should be quickly suctioned to remove any excess saliva. The camera is focused with a rocking motion so that the canines are sharp.

The profile is shot exactly the same magnification and f stop as the full face. Include the top of the head and the tip of the nose in the photo. The ears are not quite visible. This is an important anatomical landmark

The upper or lower arch photographs are shot in this manner using a mirror. The small ends of the retractors are used for these photographs as well as the quadrant shots. The magnification ratio is set at 1:2, the proper f stop, film advanced, and the camera is held with one hand ready to shoot. The patient opens, retracts slightly, the mirror is inserted and positioned with the other hand while focusing through the camera. The angle to the mirror should be as perpendicular as possible and still include the full arch in the mirror.

To photograph the upper arch, the patient is seated in an upright position with a slightly downward angled head. The magnification ratio of 1:2, at f16 or f22, depending on the type of mirror used. The small ends of the retractors are used to pull apart the cheeks slightly while still allowing the mouth to open fully. Insert the mirror almost allowing it to rest on the lower arch. Focus at as close to a perpendicular angle to the mirror as possible in order to get the most depth of focus.

The lower arch is photographed by tilting the patient back in almost a reclining position. The magnification and f stop is the same as the upper arch. The patient should relax the tongue and retract the cheeks slightly. The lips cover the lower incisors when the mouth is fully opened. Pull the retractors slightly forward so the incisal edge of the lower anteriors can be seen. Remove the excess saliva, insert the mirror, allowing it to almost rest on the upper arch and shoot.

The left or right quadrant is shot using a mirror to retract the cheeks so the teeth can be better photographed. The mirror separates the lips so the occlusion can be also photographed. The magnification ratio is 1:1.175 at f16 or f22.

This quadrant shot shows only the mirror image which is the way it should be done. The fog on the right side is a problem with any mirror photograph. Warming the mirror first helps reduce the problem. Quick placement and withdrawal of the mirror will also help to control the fogging problem

The out-of-focus image of the real teeth should be avoided. The retractor opposite the mirror should be relaxed so more of the quadrant can be photographed. The tongue can be seen pushing against the anterior teeth.

This 1:1 life size close-up is used to show only a few teeth or special preps. The lens is fully extended usually using f22.

The 2x or extreme close-up is shot by adding a tele-extender to the lens system when fully extended. This is used to isolate one point you may wish to illustrate without any other details to interfere.