ASTRA TECH IMPLANTS
DENTAL SYSTEM

Clinical Photography Manual

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Introduction

Welcome to the Astra Tech guide to clinical photography. We've all used a camera at some time in our lives, but clinical dental photography doesn't lend itself well to "point and shoot". The nature of the environment, the small sizes and distances involved, and the difficulty of access all conspire to make dental photography an art as well as a science. Like a science, there are rules that have to be obeyed: focus, exposure, composition. But like an art, results get better with practice and experience.

As an adjunct to the practice of dentistry, clinical photography brings rewards of satisfaction in a job well done, the ability to share one's work with colleagues and patients and can be a great practice builder.

Good luck with your clinical photographing!

Special thanks to Dr. Per Rehnberg – contributor and photographer!

Contents

The right tools for the job

By its very nature, this brochure cannot be comprehensive, but good results are much easier to achieve with the right equipment. Here are the Astra Tech recommendations:

SLR vs digital camera:

For consistently good results, the camera really must be an SLR (single lens reflex): the sort of camera in which you see through the viewfinder exactly what is in front of the lens. Anything else will lead to inaccuracies in focus and positioning. Digital cameras with LCD displays may look tempting, but they are notoriously difficult to position and focus accurately in the clinical environment. It is important to choose a camera on which the operator can control the aperture, as the "depth of focus" (the distance in front of and behind the point of maximum sharpness which is in acceptable focus) is very small at macro photography ranges. Using the smallest aperture you can achieve such as f 22 or f 32 (big number = small aperture) given the film speed, power of the flash and distance from the subject will help maximize your chances of avoiding disappointing "out of focus" shots.

Film vs digital:

Digital cameras just keep getting better, but given that we've already stipulated the use of an SLR, then the issue is one of cost and convenience. A 35 mm SLR kit can be bought very cheaply. SLR digital cameras that can accept macro lenses and ring flash are still at the top end of the range but are rapidly becoming cheaper. Digital cameras have the advantage that the result is visible immediately and can be re-shot if necessary. Digital images are also easier to manipulate (e.g. changing color balance, rotating, cropping) if you are prepared to learn to master the software involved.

Flash:

Always use a ring or a point flash that is intended for close up photography. Choose a flash/camera combination that permits TTL (through the lens) control of the flash, which will make perfect exposure easier to achieve. Use your dental operating light as a "modelling" light to get your composition and focus correct.

Lens:

Buy the best lens you can, preferably one designed specially for macro (close up) photography. On a 35 mm camera, a 55 to 110 mm macro lens is suitable and also most common. Zoom lenses give you more scope to alter composition, but make it more difficult to achieve consistency of content and add an

extra complication. Remember that the current generation of "high end" digital cameras that accept interchangeable lenses have a smaller sensor array than a 35 mm film frame, which means that a 60 mm lens on a 35 mm camera may behave like an 90 mm lens when placed on a digital SLR.

Autofocus lenses may actually make life more difficult for this type of macro photography. A better alternative is to set the focus manually, then move in and out slowly, bending from the waist to maintain that focus rather than attempting to focus (whether manually or automatically) while supporting a heavy camera in an uncomfortable position.

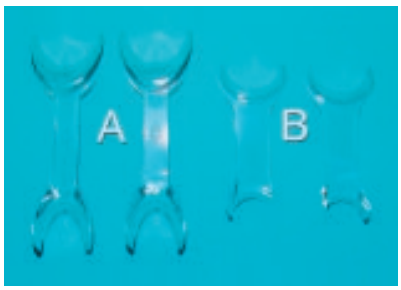
Film:

Not an issue with digital cameras, but with 35 mm, go for a film speed that allows you to use the smallest possible aperture with your particular setup. 100–200 ASA film gives a good balance between image quality and film speed. Transparency (slide) film still gives better results than color print film. Transparencies also scan better for incorporation into presentations or display on a computer screen.

Lip retractors:

There are two types of lip retractors in common use: those which have to be held in place by the subject or an assistant, and those which have a spring incorporated to keep them in position. The latter often leave the lips in buccal contact with the teeth, which is why they might not be the first choice for retractors.

With retractors (A) most situations that arise in clinical photography can be handled. The adjusted and cut down retractor (B) will add flexibility in photographing occlusal views.



Mouth mirrors:

The mouth mirrors that should be used in clinical photography are the "metal film plated glass mirrors". When purchasing mouth mirrors, do buy the best that you can to ensure good optical properties and freedom from distortion. Treat your mouth mirrors as precision optical instruments when handling them, avoid finger marks and ensure that your dental surgery assistant realises that they need to be handled carefully during the sterilisation process to avoid scratching.

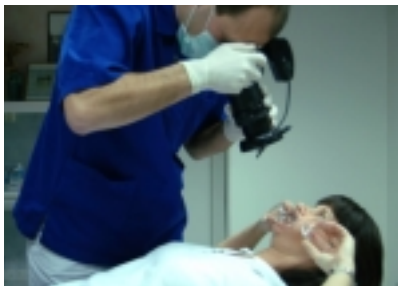
Using mirrors 1 and 2 will cover most clinical situations.

Before each use, wipe with pure alcohol and dry with a lint free cloth to remove drying marks, fingerprints and dust.

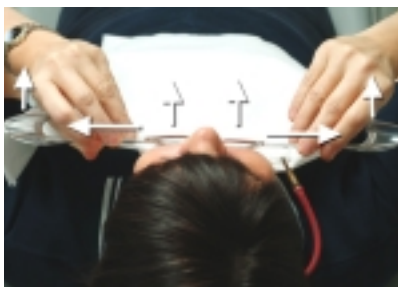
Remember that cold metal placed in a warm mouth will almost certainly cause misting of the mirror's surface. This can be remedied by warming the mirror before use. A steady stream of air from the syringe blown gently across the mirror's surface can help but only if it is gentle enough to avoid encouraging excess saliva production. Asking the subject to hold their breath just before taking the shot can also help avoid misting.

Frontal view

Although the subject can be asked to hold their own lip retractor while photos are taken, an assistant who understands the needs of clinical photography can be a great asset in positioning the retractors optimally and so achieving the best results for publication or education.



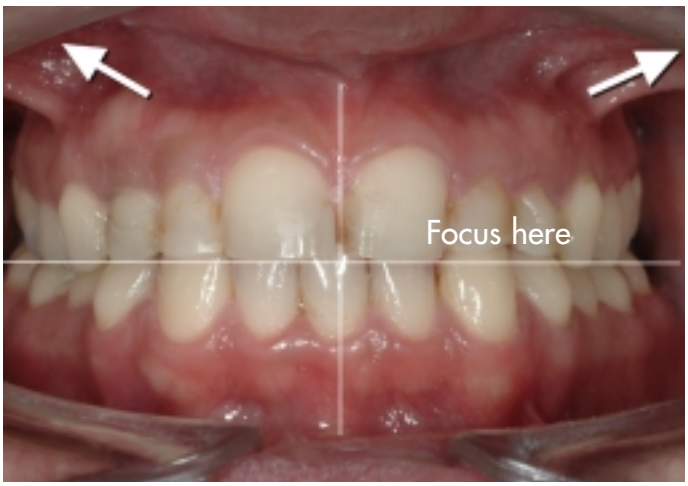
Viewed from the front, the assistant should be asked to pull the retractors (i.e. retractor A) not only outwards, but also forwards towards the camera. This ensures that the buccal surfaces of the posterior teeth are not obstructed by the soft tissue of the cheek.



Do remember to use suction and syringe to dry the teeth before each shot and to remove pooled saliva.

Lift the soft tissues upwards and outwards from the buccal surfaces of the teeth using a lip retractor. Focusing on the lateral incisor helps ensure an adequate depth of field that will have all teeth in acceptable focus.

Try to keep the occlusal plane horizontal (i.e. lined up with the top or bottom edge of the viewfinder) but remember that many alignment errors can be corrected at the printing stage if using digital or print film.



Take one shot of the intercuspal position and complement this with a second shot in the subject's resting position showing their "free space".

Occlusal view

The occlusal view requires the use of a mouth mirror. Use lip retractors to lift the soft tissues away from buccal tooth surfaces and focus on one premolar.

The photos below show the view before and after the mirror is put in place. Aim for a 45 degree angle between the mirror and the camera for occlusal shots although this may not always be achievable.

For optimal results with the occlusal view, the lips should be retracted before placement of the mirror. Ordinary lip retractors will put too much strain on the oral tissues to allow correct insertion and placement of the mirror. The best solution is either to use two mouth mirrors, held by an assistant, or to use two specially adapted lip retractors (i.e. retractor B), cut down and rounded for safety, as shown here in the upper arch and lower arch.

Positioning the mirror far enough back in the mouth to capture the upper second and third molars can elicit the "gag" response, so be prepared to use the same techniques you might use when taking radiographs or impressions. If this is a problem, the mirror can be placed to highlight the region of interest and rest on the occlusal area of, for instance, the first molar.

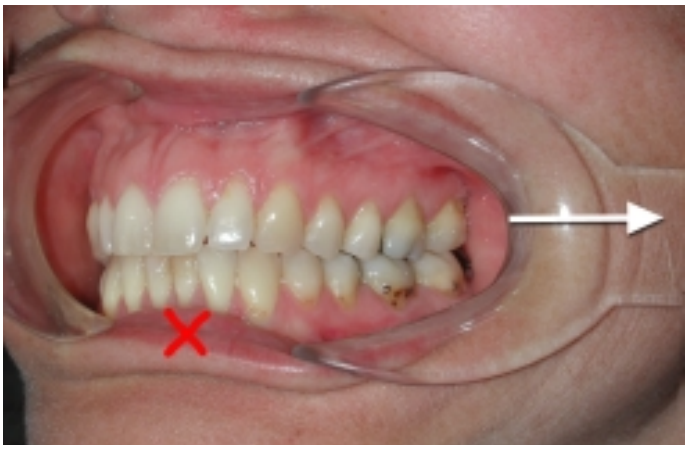
When photographing the lower jaw, ask the subject to relax their tongue and if possible, hold it behind the mirror.

Lateral views

Lateral views can be achieved either directly or with the use of a mirror. For direct views, use a lip retractor with a more acute angle between the upper and lower ledges (i.e. retractor B).

This puts less tension on the lip musculature and helps ensure that the lip can be drawn backwards as far towards the ear as possible. It will show buccal tooth surfaces clearly as far back as the second or third molars.

For the best esthetic result, watch for the lower lip escaping back over the cervical area of the lower incisors, marked with an "x" in this photo. Slight relaxation in pressure on the retractor and a request for the subject to relax their lips slightly can avoid this.



When using a mirror for lateral photos (i.e. mirror no 2), ask the subject to close their mouth slightly once the mirror has been inserted. This creates space for the cheek to be lifted outwards and permits a better angle between mirror and camera.

If positioning the mirror lingually, do remember that this can also trigger the "gag" reflex. Asking the subject to keep their tongue relaxed and central will create more space for the mirror in the sulcus than if the subject, trying to be helpful, moves their tongue to the other side and in doing so raises the floor of the mouth.

Pre- and post-operative comparisons

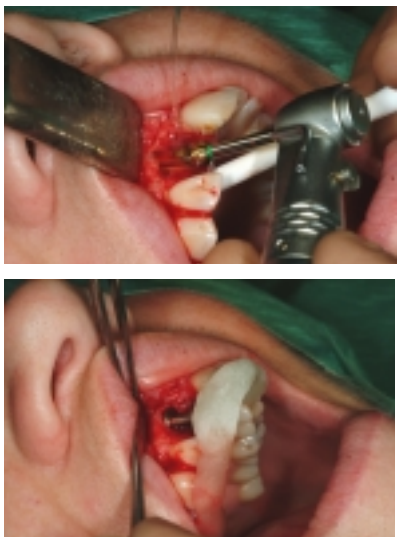
One of the most compelling reasons for taking intra-oral photographs is to provide a "before and after" comparison, or to demonstrate the stages in a surgical or restorative procedure. To make such comparisons effective and easy to follow, it is important that the viewer can move from one photo to the next in the sequence without having to re-orientate themselves. This means ensuring that all the photos in the series have the same content and are shot from the same angle.

Look at the sequence of photos below, in which perfect continuity is marred to a small extent by the appearance of the lower incisors in the first photo of the sequence but not the subsequent ones.

A useful technique for emphasizing the foreground in these anterior shots is to hold an opaque piece of matte (i.e. non-reflective) plastic behind the teeth and so remove the confusion of the background.

Photos used to illustrate a procedure in progress have the specific problem that the taking of photographs can interfere with or delay the procedure. But as with wedding photography, the only way to achieve satisfactory results is for the photographer to dictate the positioning, angles and content of each shot. Taking a little more time to stage manage each photograph and if necessary to take a number of shots of each stage is preferable to being rushed and ending up with photographs which are useless for their intended purpose.

The two sets of photos below show how the photographer has successfully used the same content and angle in consecutive shots.



Full face photos

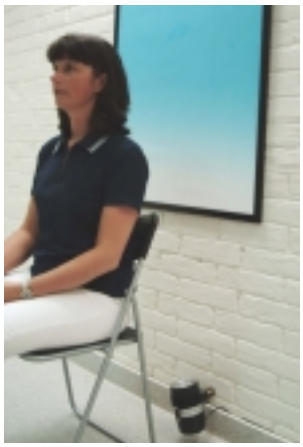
Extra-oral photos
Make sure that extra-oral shots are taken before the intra-oral shots to avoid the risk of redness and marking from lip retractors that can be seen here.

To record the subject's resting position, ask them to say "Emma" or "Mississippi" just before taking the picture.

Smiling and laughing views can be very useful in showing how the lip line relates to the tips of the teeth and gingivae.

Full face photos should always be taken against a background. Blue is a popular color, but can result in a yellowish tinge to skin tones. A gray background is more neutral.

Whilst a ring flash is ideal for close up work, using a ring flash alone for "portrait" shots could lead to somewhat "flat" looking results. The following setup could be an alternative, using a slave flash which is triggered automatically when the camera flash fires.



If you don't have a slave flash, shadows thrown on to the colored background can be minimized by placing the background as close as possible to the subject's head.

Shooting the subject with their head rotated horizontally at 45 degrees to the camera and looking slightly upwards (this improves chin definition) can make a much more interesting shot. As with the extra-oral shots already described, photos showing the subject smiling and laughing can also be useful.

If using a 35 mm camera, an 80–110 mm focal length lens is ideal for portrait keeping facial features well proportioned. With a digital camera, the equivalent focal length could vary but would be about 60 mm.

If you plan to publish your photos

The following guidelines will be useful in submitting your photographs for publication.

Before submitting photographs, contact the publisher to check their exact requirements, the financial and copyright terms on which they are accepting the photographs and if appropriate the arrangements for return of your material after publication. Obtaining a written statement from the publisher which clarifies these matters before you submit your work can save a lot of time and trouble should a dispute arise.

Requirements also differ in terms of the type and quality of material which publishers will accept. Here are some pointers:

Digital images

To ensure the highest possible quality of the original digital image, the camera must be set up for high resolution (which will reduce the number of photos you can capture in memory).

Remember that an image that looks fine on your PC screen may not be high enough quality for print reproduction. If you are manipulating original digital images on your computer (e.g. cropping, rotating, amending color balance), make sure that image quality is maintained when you re-save the amended file and that you do not overwrite the original files. Certain file types compress or otherwise degrade the data to save space, but in doing so sacrifice quality.

Check with the publisher before submission what file types they will accept, what size files they will allow and what type of image compression they will be happy with. Check too whether they prefer to receive your files by email or on hard media such as a CD, rather than just emailing them huge file attachments!

Transparencies

The rapid evolution of digital photography, reduces the importance of transparencies. However publishers of magazines and books usually still prefer to receive transparencies in preference to other media.

When submitting transparencies, ensure that they are in glassless mounts and are well protected. Ensure that your name and address are marked clearly on the mount using a small sticky label, and "spot" the slide to show which way up the image should be viewed (especially important with some dental subjects shot using a mirror!). To "spot" a slide, hold it in front of you the right way round, and right side up, and apply a small round sticker or equivalent felt pen mark to the bottom left corner of the slide mount.

Prints

Improvements in print technology have meant that an increasing number of publishers (but by no means all!) are now happy to accept prints for publication. Quality of reproduction is not as good as when starting with a transparency, but could be acceptable for some purposes.

Remember that not all film processing laboratories work to the same high standards, so have the film processed by a reputable laboratory. Photography magazines routinely run laboratory comparisons, and the difference can be staggering.

A Note on Copyright

The fact that you have treated and photographed a patient does not give you the right to use those photographs. Your patient may be grateful, impressed and very pleased with the work you have done for them, but you should of course treat their rights with respect. To do so, make it a habit to get a "model release" signed by each subject, even if you do not think at the time that those photographs will be published or shown in public. There are many variations on the Model Release document, and an internet search will reveal many which you can adapt to your own requirements, language and local laws.

78115-USX-0306

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