Clinical Photography

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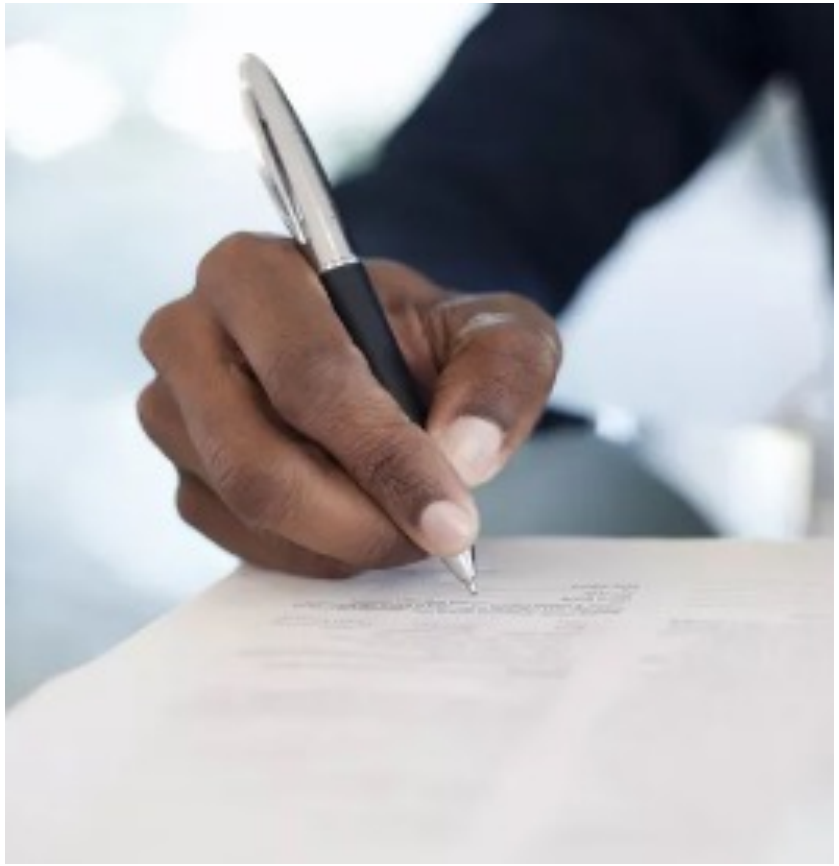
Learning outcomes

- Understand the levels of consent in clinical photography
- Describe the benefits of clinical photography in orthodontics
- Explain and understand the components of a DLSR camera
- Explain the photosets require for orthodontic records

Consent levels

- Written consent should always be taken
- 3 levels of consent
- 1. Confidential record: for use as part of patients confidential clinical records only
- 2. Restricted: Images will be shown to appropriate clinical eg for referrals
- For use on a restricted-access website
- For use on education/research



Consent levels

3. Open publication

- Images may be used for publication in a journal or textbook
- Images may be published on an open access website
- Patients should be informed that it may not be possible to withdraw consent following publication

Recommended documentation

- Signed photographic consent form
- Record in the clinical notes that photographs have been taken
- Record the date the images were taken
- Record of any discussion with patients based on the images

Dento-legal records

- Clinical images should be considered subject to the same dento-legal requirements as a radiographic image with regard to:
- Quality control
- Labelling
- Storage
- Reporting

Principal benefits of clinical photography

- Diagnosis and treatment planning
- Monitoring progress
- Communication with patients and colleagues
- Legal protection
- Education

DSLR photography

- Digital Single Lens Reflex mirror system (DLSR)

Advantages of DSLR

- Consistently high image quality
- Ability to focus quickly on specified area
- Predictable exposure, magnification and colour
- No distortion
- Standardised views

Components of camera

- Camera body
- Macro lens
- Ring Flash
- Ring flash power supply

Macro lens

- The lens is the most important piece of equipment
- A macro lens is characterized by the ability to produce 1:1 life-size images
- The ideal focal length for the lens is in the range: 90–105 mm
- This will enable photographers to remain at a comfortable distance from the patient, even when focusing for 1:1 close-ups of posterior teeth.

Macro flash

- This allows the camera to photograph oral structures in clear detail without the blurring or ghosting that is seen with continuous light sources.
- The two flashes are routinely used to fire together but, if desired, one side may be switched off, eg to reduce the risk
- The ring flash power supply slides onto the unit at the top of the camera body
- **LED flashes are not suitable for clinical photography as they are not bright enough**

Retractors

- Soft tissue retraction is essential
- Specialized cheek/ lip retractors must be used as fingers and mirrors are not suitable and will waste time.
- Equipment suitable for moisture control may also be used to control field of view

Mirrors

- Specialized wide mirrors are available in a range of sizes and shapes made from plated reflective glass or metal.
- The widest mirrors enable full-arch occlusal images to be captured
- Mirror images will be reversed, and JPGs should be flipped horizontally before viewing

Aperture and magnification

- Aperture: (F number): This is the width of the lens opening and it precisely controls the amount of light entering the camera to reach the camera's sensor for conversion into a digital image

- Magnification: Depending on the type of clinical view required, different magnifications will be needed and may be selected by rotating the lens barrel to the appropriate setting.

Guide to aperture

Aperture (lens opening) controls the amount of light recorded in the image

- The larger the f:number the smaller the opening of the lens
- A range between f:8 and f:32 is used for clinical photography
- f:22 will be suitable for the majority of clinical images
- Smaller f:numbers, eg f:8, will let more light in for extra-oral images, eg portraits

Aperture also controls the depth of field/depth of focus

- This controls the number of teeth that are in focus from the front to the back of the mouth
- The higher the f:number (eg f:32) the more teeth will be in focus

Options for dental photography

- Camera phones
- The British Dental Association's data protection advice states that '*mobile devices such as phones, tablets and iPads are not secure and should not be used for taking images of patients'*
- .The Data Protection Act of 2018 stipulates that appropriate security must be in place to prevent any confidential personal patient data from being compromised.
- Any images taken on a camera should be downloaded onto a password-protected computer system and not stored on the card or device.

Orthodontic photoset

- No set standard however national guidelines from Institute of Medical Illustrators suggest:
- Minimum of 9 photographs
- 4 extra oral and 5 intra-oral

Extra oral

- Frontal with soft tissues in repose
- Frontal smiling
- Profile in repose
- Profile smiling
- Three-quarter view in repose
- Three-quarter view smiling
- Three-quarter profile view smiling with eyes to the camera

Frontal with soft tissues in repose

- Ensure that the patient is sitting or standing upright, looking directly into the lens.
- The head should be in natural head position and the soft tissues relaxed and in repose.
- The median plane of the patient should be centred in the frame, typically with the interpupillary line level unless there is significant asymmetry present.
- The lens should be focused on the outer canthus of one of the eyes.

Frontal smiling

- Positioning should be same as for the frontal photo in repose.

- Patient should be smiling naturally with teeth visible to allow for assessment of incisor show. A reproducible posed smile should be captured.

Profile views

- Ensure the patient is standing or sitting with their eyes focused at a distant point on the horizon, or looking into their own eyes in a mirror placed at eye level.
- Ideally the whole side of the face being photographed should be visible.
- The patient’s ear and tip of their nose should be in frame.
- The lens should be focused on the outer canthus of the eye.

Three quarter views

- Ensure the patient is standing or sitting upright and their eyes are fixed horizontally, looking directly ahead.
- The median plane of face should be 45° to the camera axis. When positioned correctly, the outer canthus of the eye furthest from the camera should only just be in view.
- The outer canthus of the eye closest to the camera should be the point of focus.

Tips for extra oral photographs

- The background should be solid black or white in order to avoid any distractions. If a white background is used, ensure even lighting to eliminate any shadows.
- All views should be in portrait with the top of the head and the cervico-mental (chin–throat angle) in view.
- The head should be in natural head position, either by asking the patient to focus on a distant point on the horizon or having them look at their own eyes in a mirror.
- Glasses should be removed as they can be distracting and fashions may change, and so extra-oral photographs may be dated by their presence.
- Hair should not obscure the face or the ears.
- The photographer should be standing a few feet away from the patient and ideally at the same eye level as patient. This can be achieved through the use of steps, or with both the photographer and patient sitting on chairs.

Intra oral photography

- Frontal in occlusion
- Right buccal in occlusion
- Left buccal in occlusion
- Upper occlusal
- Lower occlusal

Frontal in occlusion

- Ensure the teeth are in occlusion in intercuspal position, unless intentionally otherwise desired.
- The midline should be centred in the frame.
- The photograph should be taken perpendicular to the facial plane.
- The occlusal plane should be horizontal.
- The lens axis should be level with the occlusal plane and focus should be on the lateral incisors.
- There should be equal and maximal view of the posterior dentition on either side.
- The lips should be retracted out of shot.

Right and left buccal in occlusion

- Ask the patient to fully turn their head to the side not being captured, so the side being captured is facing the clinician.
- Use the vertically wider side of the retractor on the side not being captured. This should be angled such that a ‘backdrop’ of mucosa, rather than retractor, is seen behind the teeth in the photograph.
- Use the horizontally wider end of the retractor on the side being captured and pull back along the occlusal plane until at least the entire distal aspect of the first permanent molar can be seen.
- The occlusal plane should be horizontal.
- The lens axis should be in line with the occlusal plane with the lens focused on the canine.
- There should be full exposure of the gingivae.

Upper occlusal

- The retractors should be out of shot and a mucosal ‘backdrop’ should be seen behind the upper incisors.
- The clinician should insert the wider end of the mirror into the mouth, as far posteriorly as necessary to capture the entire maxillary dentition.
- The mirror should be angled 45 degrees to the occlusal plane and the lens axis 45 degrees to the mirror. This will give a true ‘plan view’ of the dentition.
- The mid-palatal raphe should be in the centre of the photograph.
- Do not rest and lever the mirror against the upper teeth.
- Just before the photograph is taken, the patient should be instructed to open ‘twice as wide’ to gain a further few millimetres of opening.

Lower occlusal

- The retractors should be out of shot and a mucosal ‘backdrop’ should be seen behind the lower incisors.
- The mirror is placed in the mouth and angled upwards to ensure maximum visualization of the arch posteriorly.
- The angle should be at 45° to the occlusal plane, with the bottom of the frame parallel to the labial surface of the central incisor.
- Aim to capture the entire mandibular dentition.
- Instruct the patient to roll their tongue back behind the mirror and away from the teeth, unless it is already positioned in such a way that the teeth are not obscured.
- The midline should be in the centre of the photograph.

Tips for intra oral photography

- Use the largest retractors and mirrors possible. Virtually all but the very youngest patients can tolerate larger retractors.
- Instruct the assistant to pull the retractors laterally and away from the teeth. Apply a final retractive stretch to the tissues just before capturing the photograph to ensure maximum display.
- The soft tissues respond best to slow, gradual and purposeful manipulation.
- Rapid pulling in an effort to maximize retraction will not have the desired effect.
- Wetting the retractors aids in placement and minimizes patient discomfort.

Tips for intra oral photography

- The mirror should be warmed with hot water and dried to avoid condensation forming on it when it is placed in the mouth.
- For occlusal views, the mirrors should be angled 45 degrees to the occlusal plane and the camera should be angled 45 degrees to the mirror, which results in an image that gives a true plan view of the occlusal surfaces.
- For buccal photographs, avoid taking the photograph from closer to the midline in an effort to maximise capture of the molar teeth. This leads to an inaccurate representation of the buccal segment relationships.
- The teeth must be rendered dry through use of high-volume suction.
- The patient should be intermittently asked to hold the suction tip so that it is in reach of the clinician.

Practical exercise

Set of photographs of base trimmed study models

Questions?