

# Clinical Photography in Orthodontics

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## ABSTRACT

Clinical Photography has evolved as an important aid to become a very important aid and requirement for better clinical diagnosis, treatment planning and case documentation in modern Orthodontics and General Dentistry. The application of photography in dental practice is simple, quick and particularly useful in documenting of work, assisting in patient education and helping in clinical investigations, thus benefits dentists and patients. Its widespread application include self-checking of one's own results, illustration of lectures and publications, marketing and accomplishing electronic tele dental systems. This paperwork aims to assist practitioners to capitalize on the domain of digital dental photography in everyday practise thus making better quality treatment possible. This article attempts to give an overview of importance of clinical digital photography in day-to-day orthodontic practice, a moderate description of main equipment, present an outline of essentials and best-practices for maintaining high quality photographic records in a clinical setup.

**KEYWORDS:** Dental Photography, Digital Documentation, Clinical Photography, Photography In Orthodontics

## INTRODUCTION

The word photography comes from Greek word meaning "to write or draw with light." The word "photography" was coined by Sir John Herschel in 1839.<sup>1</sup> Photography is the process of making pictures by means of the action of light. Light reflected from an object forms a picture upon a material sensitive to light. This picture is then chemically processed into a photograph; which provides a representation of the object.

Photography has played a significant role in medicine from the very beginning. One of the first photographs taken over 150 yrs ago was a microscopic picture of human bone. Digital photographic technique has been available since 1981. Photography also plays a major role in orthodontics. The aims of dental photographs are documentation and evaluation of craniofacial and dental relationship, Assessment of soft tissue profile, Monitoring of treatment progress etc.<sup>2</sup>

## PHOTOGRAPHS IN ORTHODONTIC CLINICS

**Intra-Oral Photographs:** The major purpose of intra-oral photograph is to enable the orthodontist<sup>3</sup>:

- To review the hard and soft tissue at clinical examinations.
- To record hard and soft tissue condition as they exist before treatment

(Patient with white spot lesions of enamel, hyperplastic areas and gingival cleft are essential to document)

**American Board of Orthodontics Requirements for Intra Oral Photographs are<sup>4</sup>:-**

- Quality, standardized intra oral prints in color
- Patient dentition oriented accurately in all three

planes of space

- One frontal view in maximum intercuspation.
- Two lateral view right and left.
- Optional two occlusal view maxillary and mandibular
- Free of distraction - check retractors, labels, and fingers
- Quality lighting which reveals anatomical contours and makes image free of shadows.
- Tongue retracted
- Free of saliva and bubbles
- Clean dentition.

## GUIDELINES

- It is important to get permission from the patient before taking photograph
- Patient should be seated, leaning back slightly in the chair.
- Height of chair should be adjusted such that the patient's head is lower to that of photographer's
- All standard views should be done in horizontal frame
- A stable position of photographer is mandatory (since camera is handled and not placed on a tripod)
- The upper arm held against upper part of body with the left hand supporting front of lens
- The eye is not pressed against the eyecup but slightly in back of it. The other eye to be open
- Photographer leg should be supported by outside edge of the patient chair in order to find secure, comfortable position.
- Select magnification ratio according to the desired frame and focus by moving camera back and forth.

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- 20 cm is a good distance to start testing a camera's ability to take sharp anterior intra oral photographs on the manual setting.

## DIFFERENT VIEWS

### Frontal View (Fig. 1)

- The frontal view is important as it details the appearance of teeth as seen by patient, parent and general public.
- This view is preferable in particular for general purpose and orthodontics; this is taken in landscape orientation with the teeth in occlusion filling the frame with the occlusal frame horizontal and bisecting the picture.
- Large ends of larger retractor should be used
- Assistant should hold both retractors, pulling all the soft tissue laterally and forward; this makes it easier for the patient to bite together in occlusion and pulls the soft tissue away from the teeth.
- The midlines if they are should be at the centre of frame
- The dental light should always be shown directly into the patients mouth, adequate depth of field is required, so it is important to focus on lateral incisor or mesial of canine to ensure that maximum number of teeth are in focus.
- The center of the image is the contact point of the upper central incisors.
- The reproduction ratio is about 1:1.8
- The edges of the photograph are in vestibular oris.



Figure 1. Frontal

### Buccal Views (Fig.2, 3)

- Importance - useful in giving functional detail of malocclusion
- Patient told to close in maximum intercuspation
- Occlusal plane should be horizontal
- Mirror is always required. A sufficient wide lateral mirror is inserted distal to last tooth turned outside as far as lips and cheek will stretch should not rest on the gingiva. Patient can be asked to hold the mirror.
- Assistant should hold large end of large retractor
- Angle of the camera should be adjusted so that lens is perpendicular to the buccal surface of posterior teeth.

- The centre of photograph and focus point are around second premolars or first molars, depending upon framing of the image.
- In reproduction ratio of 1:1, side edges of photograph mesial to the first premolar and distal to the second molar.
- If canine to be photographed reproduction ratio of 1:2 selected.



Figure 2. Right buccal



Figure 3. Right buccal

### Occlusal View Maxillary (Fig.4)

- Importance - assessing space requirement
- In the absence of study models, photographs can be taken to carry out detailed and accurate space analysis.
- Image should extend from just in front of incisors to at least distal surface of first molars and ideally to include all erupted teeth. There should be no direct view of incisor
- Patient position - head tilted backward so that the photographer does not have to twist excessively, instruct patient fully open mouth.
- Palatal mirror - rests on distal aspect of the last molars and turned down until it touches the incisors.
- Small end of small retractors under the respective lips and rotates towards midline pulling forward and laterally. The pull is away from the teeth and in an upward direction.<sup>5</sup>
- Centre of the photograph is a cross-section of the sagittal plane with the connection line between

second premolars running horizontally in the middle of the image.

- Focus on fissure of side teeth.
- Reproduction ratio is 1:2



Figure 4. Maxillary occlusal

#### Occlusal View Mandibular (Fig.5)

- Palatal mirror inserted with the broader end so that mirror rests on distal aspects of last molars, it is turned upward with the mouth wide open until it touches the incisal edges of upper incisors. The patient is advised to raise the tongue and breathe through the nose.
- The pull of retractor is away from the teeth and in a down ward direction.
- Centre of the image should be at the intersection of the sagittal plane with the line crossing second premolars, positioned horizontal in the centre of image.
- Optimum focus is on side teeth
- Reproduction ratio - 1:2
- Photograph taken with mirror require aperture compensation of +1 to allow more light input.



Figure 5. Mandibular occlusal

#### Extra- Oral Photographs

As For The American Board Of Orthodontics Requirement Are:

- Quality, standardized facial photographs either in black and white or color

- Patient head oriented accurately in all three planes of space and in Frankfort horizontal plane
- One lateral view, facing to the right; serious expression lips closed tightly to reveal muscle imbalance and disharmony
- One anterior view serious expression
- Optional one lateral view and or one anterior view with lips apart
- Optional one anterior view, smiling
- Background free of distractions
- Quality lighting revealing no shadows in the background
- Ear exposed for purpose of orientation
- Eyes open and looking straight ahead, glasses removed.

#### Positioning of Patient<sup>6</sup>

Both patient and the clinician need to be positioned correctly in a standardized manner. If there is a height difference between patient and the clinician any one of them can stand on a platform to raise them to appropriate level camera level at the middle of the face.

In extra-oral photography, attempt should be made to focus on the patient's lower eyelid to ensure from tip of nose to ear of patient falls within the depth of field.

#### Frontal View

- Portrait view with the frame extending to just above the top of head and lower frame line around the larynx.
- Photograph should be symmetrical with the inter-pupillary line parallel to floor<sup>7</sup>
- A focusing screen with grid is very useful
- Patient assumes a natural head position and looks straight ahead into the camera.
- Camera position middle of the face and in portrait format.
- Space should be left on all sides of the photograph.
- Light should come diagonally from the front, leaving the patient shadow out of view of the camera. Three types of frontal photographs are usually taken.

#### Frontal at Rest (Fig.6)

Teeth in maximal inter-cuspatation with the lips closed



Figure 6. Frontal at rest

even if this strains the patient in case of lip incompetence. This photograph serves as clear documentation of lip strain and its esthetic affect.

#### Frontal Dynamic Smile (Fig.7)

Smiling picture demonstrates the amount of incisor smile (percentage of maxillary incisor display on smile) as well as excessive gingival display.



Figure 7. Frontal smile

**A close image of posed smile:** A close-up image of the posed smile is recommended now as a standard photograph for careful analysis of smile relationship.

#### Profile View (Fig.8)

Usually only one profile (right profile matching up with lateral cephalogram) is taken.

- For a patient with facial asymmetries both right and left profile should be taken.
- Frame extending to above the top of the head in front of the nose and below the chin.
- Back of head is not necessarily required, the remaining free space should be in front of profile
- Patient assumes a natural head position and look straight ahead in a relaxed manner keeping jaws closed, and lips also relaxed.
- Subjects with long hair should always be asked to tuck them behind the ear, so that Frankfort horizontal line can be assessed accurately.



Figure 8. Right profile

- Frank fort plane is horizontal and parallel to the horizontal frame of the photograph.

- Light should always fall on the patient profile (light always from point of nose) advantage: clearly showing mandibular margin and keeping patient shadow out of picture
- If portrait is lit from back of head the angle of jaw is not shown clearly, and the nasal labial line will be unflatteringly lit (pouchy cheek)

**Importance:** Profile can change during orthodontic treatment. Therefore, it is very important to have profile views both before and after treatment.

#### Three Quarter Profile (Fig.9)

Useful in examination of midface deformities, in surgery of jaw, prosthetics:

- Portraits should be taken in such a way that the sagittal plane of the patient and optical axis of the camera are approximately 45° to each other.
- Recommended that the patient turns his or her head away from the camera until the contour of eye furthest away from the camera appears to touch the lateral visible contour of orbit.



Figure 9. Three quarter profile

#### Submental View (Fig.10)

It is an optional view taken especially to document mandibular asymmetries. A self-made angled mirror (two folding mirrors with wooden frames), can be used which allows both frontal and lateral view to be photographed separately.



Figure 10. Submental

**Disadvantage:** It takes, longer to set up the mirror than it does to make three separate exposures.

## CONCLUSION

Digital photography assumes importance for diagnostic and treatment planning procedures as it is low cost and less technique sensitive when compared to cephalometry<sup>8</sup>. Though photography cannot be an alternative for cephalometry in orthodontic diagnosis, the paradigm shift towards soft tissue has elevated the status of photography in treatment planning. Photographs can be used advantageously for epidemiology, screening, initial consultations and also cases where irradiation to the patient is not recommended.

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