



ISSN: 0975-833X

Available online at <http://www.journalcra.com>

INTERNATIONAL JOURNAL
OF CURRENT RESEARCH

International Journal of Current Research
Vol. 11, Issue, 03, pp.2575-2578, March, 2019

DOI: <https://doi.org/10.24941/ijcr.34916.03.2019>

RESEARCH ARTICLE

JEJUNE DIAGNOSTIC AID: PHOTOGRAPHY IN ORTHODONTICS

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ARTICLE INFO

Article History:

Received 03rd December, 2018

Received in revised form

20th January, 2019

Accepted 14th February, 2019

Published online 31st March, 2019

Key Words:

Royal Mausoleum, Place Identity, Local Community, Sultan Mahmud Shah

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Citation: Dr. Suresh Sharma, Dr. Ashish Gupta, Dr. Gaurav Sharma, Dr. Dinesh Choudhary and Dr. Garvita Dubey, 2019. "Jejune diagnostic aid: photography in orthodontics", *International Journal of Current Research*, 10, (03), 2575-2578.

ABSTRACT

For more than 170 years, silver halide films form the back bone of photography, eventually being replaced by film less photography, pictures on a chip, or call it by any name but this is the new phenomenon of technology. Applications of photography is popularizing in dental practice as it is simple, quick and includes self-checking of one's own results, illustration of lectures and publications, marketing and accomplishing electronic tele dental systems. Every practicing orthodontist should master the vital skill of clinical orthodontic photography to be successful at clinical diagnosis, treatment planning and case documentation in modern Orthodontics and General Dentistry.

INTRODUCTION

The word "photography" originated from a Greek word meaning "to write or draw with light" and was coined by Sir John Herschel in 1839 (Eliakim Mizrahi, 2004). In simple words it's a process of making pictures by utilizing action of light, when light reflects from an object it forms a picture upon a light sensitive material and Final photograph is obtained when this picture is processed chemically. The use of photographs in medical profession was introduced by Gurdon Buckin 1845. Almost after 90 years, In 1926, gnathophysiognomical photographs, a new and advanced system of photography was formed by Andreson. In this technique, photographs were composed of facial photograph along with photograph of study models (Andreson, 1926). Photography popularized in 1933 when B. E. Lischer made a review of requirements of diagnostic aids and placed Facial Photography next in importance after written records (Lischer, 1933). In 1946 Orthodontic photography was divided by Tauro M. Graber into two types, for diagnostic criteria and for record purpose (Graber, 1946).

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Lip retractor was developed by Dr. Brainerd Swain, but in 1974, Robert E. Binder described its uses in occlusal intra-oral photographs (Binder, 1974). Methods of taking extra-oral as well as intra-oral photographs in orthodontic practice was first styled by William F. Stutts, he also designed a method of duplicating the color slides as well as obtaining black and white negatives from color slides (Stutts, 1978). Dental photography standardizations which we use were given in 1985 by Wolfgang Bengel, He was the person who first proposed edge of frame, fixed distance, center of focus, center of frame, and orientation of occlusal plane for each photographic view (Bengel, 1985). After Wolfgang Bengel proposed standardization of dental photographs, In 1990, Lewis Claman, Daniel Patton and Robert Rashid proposed Standardization of portrait photography for dental patients. Smile analysis and smile design were presented using digital imaging and computer programs in 2002 by Marc B. Ackerman and James L. Ackerman, they established that "esthetic smile desi esthetic smile design is a multifactorial decision making process that allows the clinician to treat patients with an individualized and interdisciplinary approach (Ackerman, 2002)". In the same year a clinical survey was carried out by Jonathan Sandler and Alison Murray which quantified that a minimum data set of 18 pre treatment and post treatment, intra-oral and extra-oral photographs for each and every orthodontic patient is important (Sandler, 2002).



Figure 1. Extraoral Photographic Views



Figure 2. Intraoral Photographic Views

Various Views Used During Photography

- Extra Oral
- Intra Oral

Extra oral view: In extra-oral photography, focus should be on the patient's lower eyelid to ensure that the depth of field includes tip of nose to ear of patient.²⁰

Frontal View (Samawi, 2012)

- Portrait view with the frame ranging above the top of head and lower frame to the line around the larynx.
- Photograph should be symmetrical as the inter-pupillary line should be parallel to the floor
- A focusing screen with grid should be used
- Patient should be about 180cm away from the camera
- Patient adopts a natural head position and looks straight into the camera.

- Some space should be left on all four sides of the photograph.
- Light should come from the front, so that patient's shadow should out of view of the camera.

Two types of frontal photographs are usually taken.

- Frontal at Rest
- Frontal Dynamic Smile

Frontal at Rest (Fig I): With closed lips and maximal intercuspatation of teeth the photograph clearly documents lip stain and its esthetic/anesthetic affects.

Frontal Dynamic Smile (Fig I): Smiling picture institutes the amount of incisor smile that is the percentage of maxillary incisor display on smile along with excessive gingival display.

Profile View (Fig.I)

- Top edge of the frame should range from above the head to bottom edge in the area of larynx
- Not to include back of the head
- Area in front of the profile should be kept empty
- Patient's eye should be the focus point
- Top and bottom edge of the frame should be parallel to the Frankfort horizontal (FH) plane
- No hairs should cover the Ears
- Profile can change during orthodontic treatment. Therefore, profile views both before and after treatment should be taken.

Three Quarter Profile (Fig. I and Fig. I): Useful in examination of midface deformities, prosthetics and in surgery of jaw:

- While taking portraits, sagittal plane of the patient and optical axis of the camera should be approximately 45° to each other.
- Contour of eye furthest away from the camera should appear to touch the lateral visible contour of orbit.

Intra Oral

Frontal intra oral view (Fig.II)

- Taken in centric occlusion
- Lips should be retracted and pulled away in front away from teeth.
- Top and bottom edge of frame should be parallel to occlusal plane
- The midlines should be at the center of frame
- Adequate depth of field is required
- Focus should be on mesial of canine or lateral incisor to ensure that maximum number of teeth are in focus
- Contact point of upper central incisors should be the center of the image
- The reproduction ratio is 1:1.8

Buccal view (Fig.II and Fig.II)

- Second premolars or first molars should be the center of photograph
- Focus point should be the contact point of upper second premolar and first molar
- Reproduction ratio is 1:2 .
- Teeth should be in maximum intercuspation with horizontal occlusal plane
- While assistant holds the large end of retractor, a wide lateral mirror is inserted distal to last erupted tooth ,proper care should be taken so that gingiva , lip or cheek remains un hurt
- Lens should be perpendicular to the buccal surface of posterior teeth.

Occlusal View Maxillary (Manjunath, 2011) (Fig.II)

- It is used for assessing space requirement
- Detailed and accurate space analysis can be done in cases with no study models
- Image should range from front of incisors to distal surface of first molars and should include all erupted teeth.

- No direct view of incisor
- Patient's head should be tilted backward to avoid excessive twisting by the photographer
- Patient should fully open mouth.

Occlusal View Mandibular (Fig.II)

- Retractor should be pulled in a down ward direction, away from the teeth
- Centre of the image should be positioned horizontal in the center of image and is at the intersection of the sagittal plane and the line crossing second premolars,
- Optimum focus is on side teeth
- Reproduction ratio 1:2

Conclusion

Among many paradigm shifts Digital photography is leading emerging trends in dental profession with enormous advantages. With right knowledge and proper application an orthodontist will provide quality treatment with best results. Although photography can never replace cephalometry in orthodontic diagnosis and treatment planning but the paradigm shift towards soft tissue elevated the status of this diagnostic aid. Photography is advantageous not only for epidemiology, screening and initial consultations but also in cases where radiation cannot be given to patients.

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