Review Article

Picture Tells the Thousand Words: An Unexplored Path

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A B S T R A C T

Clinical photography is essentially an incalculable relieve in communicating a vast collection of information in a straightforwardly understandable form. It is a communiqué linked to written or spoken text can, when compared to text alone, markedly increase awareness to and recall of health culture information. Pictures can also perk up comprehension when they show relationships among thoughts or when they show spatial relationships. This review paper highlights the importance of photography on technological and clinical aspects of dentistry.

Key words: Photography; Dental; Oral Considerations

INTRODUCTION

Digital photography gives immediate feedback about exposure and can be used to rapidly communicate conditions in the mouth. A depiction can enlighten a thousand expressions and in dentistry, photography is a vital part and aids in treatment planning, presentation, pathology monitoring, specialist communication, and practice marketing.[1,2] For many decades, cameras were used in dentistry with similar technology to film-based radiography. In practice, digital camera sensors function in much the same way as digital radiography sensors. Differences in sensor design, lenses, flashes, and handling properties all affect how easy photography is to use in dentistry.[2]

PHOTOGRAPHY: A VALUABLE ASSET IN DENTAL OFFICE

The employ of taking photographs in the dental workplace is rapidly becoming as common as the employment of any regularly used dental procedure. Photographs are useful in the dental office for diagnosis, legal protection, patient education, teaching and as permanent before and after record of cases. Good photographic equipment alone, regardless of its not enough. It must be operated by a person who has knowledge of photography, if only to the extent that he or she knows what type of lens and light should be used to produce a quality image. The camera must be operated within its limits, and the dentist must train themselves to visualize the end result wanted.[3] In this day and age it is tough to visualize a dentistry treatment center without computerized patient registry, electronic invoicing, digital radiography, intraoral cameras and digital cameras. Teledentistry concerned with Networking, sharing digital dentistry information, distant consultations, workup and analysis.[4]

PRACTICAL OPTICS AND BASIC LIGHTINGS IN DENTAL PHOTOGRAPHY:

The first technical requirement is clarity and the major factors that influence photographic clarity are sharpness, depth of field, viewpoint and lighting. The photograph is formed by imaging and recording each tiny point element on the subject as nearly as possible in the same size, the same position and the same relative brightness and sometimes color.[3] Wee AG et al accomplished in their study that commercial SLR digital cameras when pooled with the proper calibration protocols showed prospective in the color imitation practice of clinical dentistry.[5]

Sharpness

The lens collects rays emanating from the theoretical point, refracts them, and brings them to another spot in the focal plane. The size of the spot is governed by the degree to which aberrations have been minimized in the design and manufacture of the lens. On the other hand, diffraction, which is a physical effect in optics that causes a tiny point of light to be imaged as a central spot surrounded circular " ripples" of light, also governs the size of the blur in the image plane.[3]

Depth of field

When the film (or ground glass) is moved closer to or farther from the focal plane; its surface intersects larger cross- sections of the converging and diverging cone of rays. The intersected blur is called as circle of confusion. The size of this circle will vary throughout the image of a three- dimensional subject. In photographing subjects of a size customary in oral photography, there are only two factors that govern depth of field- the final image size and the f/number.[3]

Viewpoint

It is axiomatic that the region of interest should be presented toward the camera. The photographer should make sure that all the information needed is recorded. A subject-lens distance of 60 inches is generally adopted as the working distance that produces normal perspective.[3]

Lighting

There are two principles to keep in mind 1- Small light sources or focused spot lights yield crisper detail than large diffuse lamps; 2- Angled lighting models the shape and glancing lighting reveals the texture of the subject better than diffuse lighting or axial lighting. The ring light is almost indispensable for lighting the entire oral cavity and architectural lighting is good for general purpose. Fill-in light should be about one third the intensity of the main light and should be placed as close to the subject- lens axis as possible in order to minimize the extra shadow. A direct frontal lighting from a single light source is usually best for perpendicular anterior views of the mouth and main natural lighting direction should be from the top of the subject toward the bottom.[3]

SOLITARY LENS IMPULSE CAMERAS WITH COUPLED APPARATUS EMPLOY IN DENTAL PHOTOGRAPHY

The number of cameras and lenses that are adaptable to dental photography has doubled several times in the past ten years and still growing and one of the problems facing the dentist is the selection and purchase of suitable camera equipment. Thirty five millimeter cameras are manufactured in two basic type rangefinder and single lens reflex. Generally single lens camera is useful in dental photography which is manufactured in two principal types: those with fully interchangeable lenses (the preferred type) and those without fully interchangeable lenses. Hetherington WI and Freeche CL et al suggested that where quality photographic work is required the user assemble a single lens reflex camera system with a 105-mm. automatic short- mount lens and a side- mounted illumination source.[3]

DENTAL RETRACTORS, MIRRORS AND ACCESSORIES

No matter how advanced the camera, it will not produce its best results if the area to be photographed is not sufficiently revealed. Therefore it is essential to have and the proper use of dental accessories like intra oral mirrors, cheek retractors and tongue depressors for all intraoral views.[6]

USES OF DENTAL PHOTOGRAPHY: PHOTOGRAPHY OF SPECIMENS, SMALL OBJECTS AND LARGER OBJECTS[7]

The texture and color are most important in selecting a background. White or buff typing paper or piece of brown wrapping paper can be used for a background to form a floor and a wall which is inexpensive and should be smooth, free of wrinkles and dull without any glossy finish. Velvet can be used, but it is expensive. To illuminate a small object on a paper background, use of flash at 12 0' clock over the lens to eliminate shadows and give general axial lighting. Wet or dry specimens should be on raised plate glass by 15 to 18 inches, with a background under it on the table and flash should be at a 45^0 angle to specimen and glass with the distance from the flash to the specimen must be the same as it was with the flash on the camera. The glass should be plate or crystal ¼ x 11x 14 inches and must be free of any scratches or blemishes.

ROLE OF PHOTOGRAPHY IN FORENSIC DENTISTRY[7,8]

Forensic dentistry refers to the application of dental sciences to legal matters. The photographic reproduction is one of the most valuable aids in the accurate documentation of perishable evidence. Fundamental visible brightness photography is passable in most dental recognition cases and full spectrum digital photography is best to collect evidence in cases of human abuse and bite marks. The following considerations apply for photography work intended for legal purposes:

1. Photographs should be made in duplicate, anticipating that one set may have to be surrendered as permanent courtroom evidence.
2. Bracketing the exposures is prudent and will buffer slight exposure errors due to mechanical failure or human miscalculation.
3. Using varied perspectives to make photographs is advisable, particularly because the electronic flash may produce unpredictable and often unpleasant reflections.
4. The recording of data (date, time, location, case

number, camera, lens, aperture, film, light source, subject distance) helps reconstruct cases.
5. Consistency and reproducibility of techniques and results are more important than artistic composition.
6. The use of Kodak processing laboratories for color film is an assurance of quality control, standardization, and legal acceptability.

PHOTOGRAPHY OF INSTRUMENTS, BANDS, METAL OBJECTS AND DENTAL CAST[7]

For black and white prints, casts should be photographed against black seamless background while if color film is to be used, a light pastel colored background can be used. The view of the cast should allow it to fill the picture frame in a sequence with same proportion and ratio. For lateral views, the flash should be from the side of the lens so that the light is directed into the front of the cast. Occlusal views can be made of a single cast with the light on the top of the lens and the cast standing on its heel. To show texture with great detail, direct flash at 45^0 or lesser angle on the object or instrument. The more oblique the light source, the greater the contrast. Instruments such as burrs and files whose contrast or texture is important should be placed on paper as a first choice or glass with camera directly over them (perpendicular) as a second choice. For less contrast of highlights on metal can be sprayed with a matte or dulling spray which lays a satin finish on the metal and eliminate glare.

PHOTOGRAPHY OF FLAT MATERIAL, ILLUSTRATIONS, CHARTS, BOOKS, AND TRACINGS[7]

The copying of all flat material is done best on a copy stand with two side-mounted flash units or flood lights. When holding a camera, it is best to crop illustration so that no borders or framing lines to be off the center, not on a glossy page or under glass and is not larger than 2 x 3 inches with flash should be at a 45^0 angle to the flat page for all size illustrations. An orthodontic tracing on a white background with bold lines should be exposed at approximately f/8.

ROLE OF MOTION PICTURES IN DENTISTRY[3]

The use of motion pictures for educational purposes is well accepted in this day of dynamic technology. It provides a versatile media that is interesting and attention gaining with planned combination of color, sound and motion. It has a greater impact on the human mind than any one of these factors alone. A dental motion picture should convey a single idea, a single technique, or a single procedure. Limit the running time of the film to 15 minutes, or approximately 600 feet. Generally there are four types of dental motion pictures:

a. Case presentation films
b. Films for demonstration of new dental techniques, materials, or equipment
c. Research findings
d. Teaching films
e. Patient education films.

PHOTOGRAPHY OF RADIOGRAPHS[7]

Place the radiograph to be copied on the view box and mask the radiographs at least 1 inch on each side to exclude the light around the sides with the camera directly over the radiograph by using a copy stand or a crank-up tripod or stand the view box on end and shoot directly into it. Adjust the bellows for an image ratio 1 to 1 or to the size of the radiograph and focus on it. The flash distance in back of the radiograph should be 6 inches for single films or 2 inches greater than the longest dimension of a full mouth survey or any other large film size. When any radiograph is darker or denser, open the lens's f-stop to f/9, f/8, f/6.3, and so on.

SELECTING AND PREPARING PHOTOGRAPHS FOR PUBLICATION AND POSTER / VISUAL PRESENTATION[7]

Good photographs tell the story quickly and create a good impression of the total presentation and its content. In addition, journal space is limited so all illustrations must be pertinent and effective. Photographs should be arranged in poster sequentially to attract attention and provide information and highlighted with arrows, ribbons, or borders. Reverse- tone titles (white lettering on dark background) attract attention as do colored elements. Use matte photographs to eliminate glare. Provide a continuous title strip in letters than one segmented into individual words at least 1 inch high, which contains the abstract number, subject title, and authors' names.

ROLE OF PHOTOGRAPHS IN THE TEACHING PROGRAM: EDUCATIONAL AND CLINICAL APPLICATIONS[7]

Photography is a priceless tool in graduate dental education. Clinical photography has its greatest applications as a record- keeping system and as an aid in conveying information. Follow-up of patients treated by residents of the specialty training program includes carefully completed serial photographic documentation and their role in the basic disease states helps students

develop a rational basis for therapy. Photographs of records, models, radiographs, and charts can be filed compactly and become a valuable aid to faculty and future residents in later years.

ADVANTAGES OF DENTAL PHOTOGRAPHY[9]

1. Patient communication
2. A medico-legal record
3. Patient monitoring
4. Postgraduate study
5. Clinical audit
6. Teaching
7. Patient referral
8. Communication with the dental laboratory
9. Telemedicine

PAYBACK OF DIGITAL PHOTOGRAPHS[1]

1. There is an on the spot illustration which can be reviewed and if not appropriate then it can be taken again.
2. Cost friendly in terms of film buying and storing and moreover no processing cost.
3. Atmosphere ecofriendly due to averting of inefficient and injurious processing chemicals.
4. Images are accessible to trade in to supplementary applications e.g. PowerPoint, Word, Practice management software, dental imaging software.
5. Duplicates can be easily prepared
6. Editing opportunity

DISADVANTES OF DIGITAL PHOTOGRAPHY[10]

If clinical photographs taken prior to, during and subsequent to treatment in the approved mode form an essential part of the patients' records which tender more functional information than any other clinical record. With both conventional and digital systems, many of the errors that is frequently seen and divided into two groups. The first group comprises errors due to unsuitable choice of equipment including the camera, lens, flash, retractors, mirrors or suction, or deficient in considerate of the digital technology resulting in scarce or out of place images. The second group of errors relates to any footage medium and involves inapt positioning of the subjects. Accurate camera point of reference is imperative while taking extra-oral photographs in portrait mode and intra-oral photographs in landscape mode. Two sizes of double-ended retractor are precondition to obtaining a set of high quality intra-oral photographs. The large ends of the larger retractor are used to get hold of retraction for the anterior intra-oral shot. Long-handled, front-silvered, glass mirrors are the supreme gizmo for clinical photography.

CONCLUSION

As up-to-the-minute in this digital era it is vital to incorporate clinical photography extensively into our everyday practice. It represents the synonym of contemporary photographic process which revolutionizing the clinicians to diagnose, treat, and exchange a few words with patients and contemporaries. Its relevance in dental practice is trouble-free, speedy and practical in documenting measures of work, effectuating the education of patients and pursuing clinical investigations. Smile design techniques expand the use of photography to analyze existing esthetic problems and communicate possible treatment alternatives.

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