

# ADVANTAGES OF DIGITAL PHOTOGRAPHY RECORD KEEPING IN ENT SURGERY VERSUS CONVENTIONAL PHOTO RECORD KEEPING

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## ABSTRACT

**Objective:** To introduce a duplicate digital photo image record keeping system by replacing old conventional photo-slides to avoid maintenance problems of conventional photo-slides library and establish a privacy policy to assure secure retrieval.

**Material and Methods:** This comparative study was conducted at E.N.T department of Khyber Teaching Hospital, Peshawar from June, 2004 to June, 2005. In this project, the photo slides (chrome film transparency) captured by a conventional camera were converted into digital data format on a compact disc (CD) by a process called Digitalization. A total of 60 photo-slides captured on Chrome-file were selected from our photographic record library.

**Results:** The digitized photo-image proved to be advantageous over conventional photo-slide management in record keeping, being easily manageable via computer for easy retrieval. All the environmental and handling losses of the conventional photo-slides can be avoided with this method of duplication.

**Conclusion:** It is concluded that digital photographs are useful tools for the evaluation of the patient's pre-operative and postoperative photo-images as a ready and reliable reference for the comparison.

**Key Words:** Medical Records, ENT Surgery, Digital Photography.

## INTRODUCTION

For patient education, case presentation and documenting the medical photography is almost as old as photography itself. Medical image libraries are a valuable source that can be used for education, research and maintaining of patients' record. All the aesthetic ENT surgical procedures are rare and interesting procedures require good quality photographs to be taken in a standardized manner to establish records.

Conventional photo-prints (photographs) or conventional color photo-slides are still used by surgeons to keep or evaluate their records and judge the result outcome of the procedures. These methods have the advantages of wider density range, richer graduation, deeper color saturation than negative films/prints; no printing differences, which can affect color balance, sharpness and size. Some of the disadvantages of conventional photo record keeping are;

- High temperature can damage film

transparency.

- Processed Film storage temperature need to be below 10 degrees centigrade (50 degrees Fahrenheit),
- Fading and discoloration especially to ultraviolet rays,
- Humidity and moisture control for processed film 30 to 50% RH,
- Repetitive handling can cause scratches and damage the quality of the photo-slide;
- Photo slides have limited shelf life and decreases if not managed properly,
- Larger file drawer cabinets are required to put them secure,
- They need to be kept in a sleeve, envelopes or mounts and placed in a dark environment with good ventilation.

Technological advancement has improved photographic equipment, techniques and materials.

### DIGITAL FORMATS SELECTED FOR SCANNING

Film	Recording Type	Pixel dimensions	Dimension size.(inch)	Compression ratio	Colors	Approx film size.
135mm	BMP 16 Base to CD	3360×2240	63×42.2	1.0	True color	22MB
135mm	BMP 4 Base to CD	1840×1232	25.6×17.1	1.0	True color	6.6MB
135mm	JPEG 16 Base to CD	3360×2240	46.6×31.1	6-8	True color	2.3-3MB
135mm	JPEG 4 Base to CD	1840×1232	25.6×17.1	8-10	True color	600-800 KB

Table 1

Digital imaging as well as video-taping are also on rise in record keeping of the patients. Scanning of photographs and CD-Rom are powerful educational tools,<sup>2</sup> and the evidence suggests that digital images under certain experimental conditions can be useful as slides.<sup>3</sup>

Digital photo images can be viewed with the help of computers, it has been shown that digital images can substitute for physical examinations; these images can be added in any database or any picture manipulation software.<sup>4</sup>

Because of the rapid advancement in technologies, the digital camera in future with high capturing option will be able to capture images, which will be well comparable to conventional photo-slide captured by conventional cameras. Digital camera image resolution still lags well behind that available with conventional film. Whereas on 35 mm film more than 100 million pixel are captured, a fairly high quality digital camera at present can capture just over 1 million (1000x1280 resolutions) or maximum 7.1 million pixel at 24 bit colors (64 million colors).<sup>5,6</sup>

This study was undertaken to introduce a duplicate digital photo image record keeping system by replacing old conventional photo-slides to avoid maintenance problems of conventional privacy policy to assure secure retrieval.

### MATERIAL AND METHODS

This study was conducted in ENT Department of Khyber Teaching Hospital, Peshawar. In this project photo-slides captured by a conventional SLR Camera were professionally converted into digital data format on a compact disc (CD) by a process called Digitization. A total of 60 photo-slides were selected from our photo-slides library, all captured by a conventional SLR camera on chrome film with 60mm lens using manual focusing techniques with a single flashlight attached.

All the preoperative and postoperative photo slides were included that were routinely used for ready reference. The digital formats selected for scanning were JPEG (Joint photographic experts group) and BMP (bitmap file

which is commonly used as window file system){Table1}.Each of the formats was scanned at 16 bases and 4 base and stored in the CD with 24 bit true color resolution. All the images were transferred and recorded on a compact disc (CD-R) using a CD writer so that they could be viewed on the computer monitor using computer software.

Compression of the images was done to reduce the file size. JPEG files were compressed with less amount of data loss to make the file size small for storage on the CD. The BMP format of 4-base and 16-base was in uncompressed form. For the purpose of easy access, the images were catalogued using serial number, date, patient's registration number and anatomical view. The photo images were evaluated by visual perception and viewed on monitors by a team of surgeons and graphic designers .These images were classified into 4 grades, excellent, good, fair, and poor to rate the photo images.

Manipulation and editing of images were done in software Adobe photo shop 5.5 or ACD see version and saved in the hard disk of the computer. They were also used to improve the digital image color, contrast, brightness and visual transformation. When the desired image was achieved after transformation the duplicate image was saved in digital data format. These images were further transformed, augmented or mastered and used for consultation. A magnification (scale factor) of 25%, 50%, 70% or 100% was used to view these images.

### RESULTS

The development of this new digital photo image database system proved to be advancement in the field of photograph-record keeping in a department of ENT.

Joint Photographic Experts Group (JPEG) format proved to be the best of all for the reason that it could compress image data in smaller size and stored more pictures on a single disk (CD having 600-MB space) and easy to access. A smaller file consumes less space on disk, and takes less time to download or display.

The images which were saved on CD and

its prints were well comparable with conventional photo slide (chrome file) prints. Chromic film permanent photo-slides can also be easily made from these digital images.

Using this digital image system all old photo-slides or transparencies could be digitized. Image manipulation in software photo shop Adobe was successful and the results were acceptable to modify the photo image and proved to be helpful and beneficial for image manipulation.

## DISCUSSION

The basic aim of photographic documentation of clinical cases is to compare these cases with each other, as well as evaluate the preoperative and post operative outcome of skills.<sup>7</sup>

The photograph taken for the purpose of record should be sharply focused and of suitable quality display which may need enlargement to make the display better for evaluation.<sup>8</sup> Photography must be a regular part of theater records as well as in every cosmetic and reconstructive procedure for teaching and clinical purposes and supplementing written operative notes but their medico legal use have been neglected.<sup>9</sup> The photo image quality depends on the type and resolution on which the images were saved.

The scanned images in JPEG format seem to be the best resolution even with compression. There were certain data losses while compressing only initially when the photo slide were scanned and transferred to the CD. The gross appearance on the computer screen was unaffected. It is said that sensible compression for routine mean, the file size is down to below 10% of the original and the reduction in overall quality is barely perceptible to human eye.<sup>10</sup>

Security of storage of CDs must be high considering the social, ethical and moral aspects. They should be kept in safe file cabinet. The compact Disc (CD) is of polycarbonate with one or more metal layers capable of storing digital information on it and care must be taken while handling it to avoid image data loss. The JPEG format is easily manageable in any software available for manipulation/transformation. The duplicate image is saved in different digital data format e.g. JPEG (Joint photographic expert group) or TIFF (Tagged image file format). The images in the above format can be further transformed augmented or mastered in many other soft wares successfully and can be used for consultation of the patient. Surgeons can perform precise and predictable operative planning from this digital photograph and interactive simulation of the

changes in the photograph which can make the patients understand the problem and their expectation with immediate aesthetic analysis.

The important thing is to clearly explain to the patient the purpose of recording.<sup>11, 12</sup> and ensure that the manipulation was just for the demonstration of an idea about the outcome of the results which would be near to it but “ NOT THE SAME”.

In this study we overcame all the disadvantages of the conventional photographic transparency slides record which will further improve with more advancement of technology.

## CONCLUSION

Medical workshops and appropriate training courses must be conducted for medical photography record keeping in ENT Surgery. The photo slides are still superior from digital camera image captured unless a standard comparable digital image- capturing device is available in future development and research in digital technology.

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