Medical and dental photography – back to the future

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Abstract

Medical photography is a specialized area of scientific photography. Its main tasks are documenting a clinical case, medical and surgical procedures, monitoring, diagnostic and treatment processes. Today, digital medical photography is an approved method of documentation, interactive learning, an objective way of clinical research. Medical and dental photography have legal and evidentiary value in a in many countries. Often, compromise lighting and a sterile environment restrict the medical photographer, resulting in lower-quality photographs. Tthis problem has been solved today in medicine and also in dentistry, where appropriate protocols for sterile photodocumentation and informed consent forms have been created. In today's environment, accompanied by Covid-19 and the need for isolation, the use of medical and dental photography is a relevant, reasonable and supportive alternative method for diagnosis, consultation and treatment. Documentation and analysis are only a small part of what photography offers in medicine. Together with video recording and x-ray imaging, they plays an essential role in the training and postgraduate training of future and current medical doctors and dentists.

Keywords: telemedicine, telecommunications technology, photography, medicine, diagnosis, archiving, documentation, photo

Introduction

What is a photography? This is a technology for obtaining a „real image" of an object or a momentary situation on light-sensitive material. This process was actually discovered in the early 19th century. Since the discovery of technology, it has been applied in medical science and practice for various purposes [1,2,3].

Medical photography is a specialized area of scientific photography. Its main tasks are documenting a clinical case, medical and surgical procedures, monitoring, diagnostic and treatment processes. In the past and today, technology is an integral part of the educational process of scientific and medical research [3, 4, 5].

All the qualities of photography and especially the ability to present objectively and exactly what the eyes see, determines its objective and application in medicine, both practical and scientific-theoretical, in the past and today.

The main part

The technology in the past was presented on January 7, 1839 by Louis Daguerre at the Paris Academy of Sciences. A year later, Alfred Donne photographed sections of bones and teeth with a microscope at the Charité Hospital and applied it in medicine [1–5]. (Fig.1)

Only 41 years later, medical photography is used in all major hospitals in Paris. Medical photography is gaining in the USA, where daguerreotypes are more accessible. Gurdon Buck (1845y) published a preoperative portrait of a patient in the American

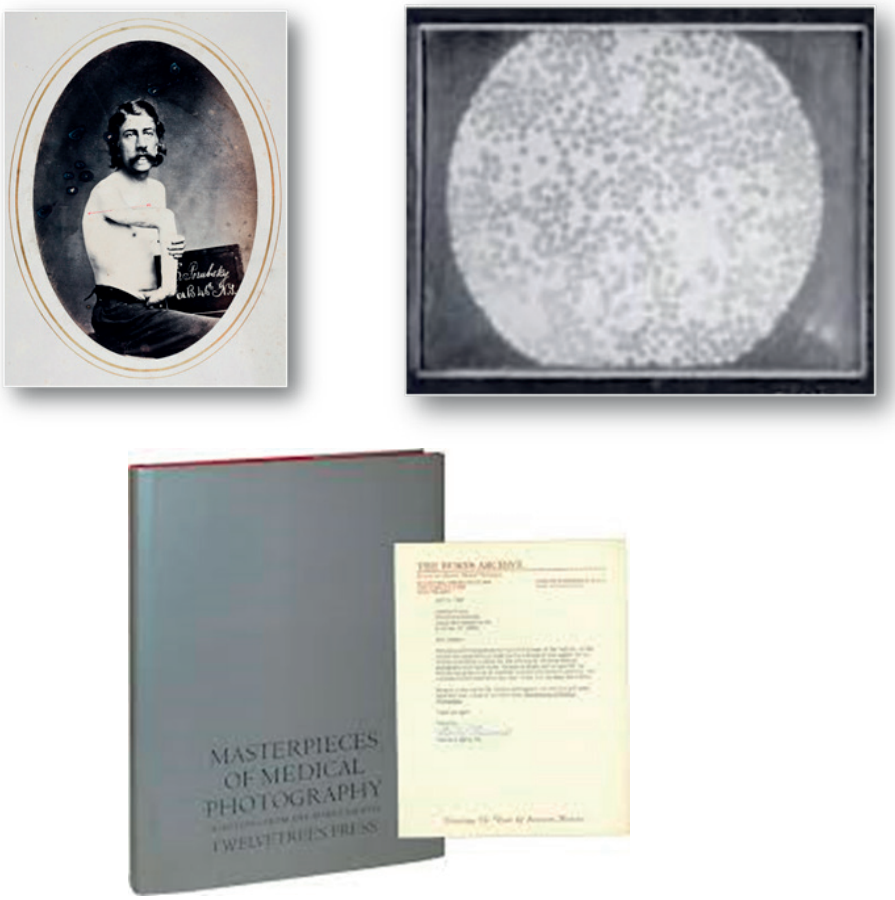

Fig. 1. Medical photography in the beginning.

Journal of Medical Science, which is considered the beginning of medical photography in the United States [2,3, 4, 5, 6].

In articles by the American publicist Burns, there are data on American doctors who used photography before documenting the disease and before information about surgical results. They use and impose medical photography not only for documentation but also as a clinical method of examination. In the middle and end of the 19th century, American physicians were ahead of their European colleagues. Data on changes in the methods of medical photo documentation after 1890 are available in the scientific literature. These include removing public information about the patient's social affiliation, respecting anonymity and documenting only parts of the body affected by disease processes. [2,3,4]

The first attempts to shoot inside the body have been known since 1883 by Emil Benke who uses carbon arc lamps, lenses and reflectors to shoot human strings with an exposure of 1/4 s. In 1890, however, Walter Woodbury issued "Photogastroscopy", in which pictures are displayed from the inside of the stomach. In 1894, Max Nitze published bladder photographies using cystoscopy. Subsequently, this is the beginning of the endoscopy that has been widely used in the diagnosis and the treatment of various diseases. In the more recent history, in 1945, Peter Hansel organized the first medical photographic service in a british hospital – at Westminster Medical School in London. After receiving a medical education, he realizes the need for audiovisual aids in the education of medical students and begin to teach [2, 7–9]. The first case of british medical photographers was published on May 27th 1948. The Association is engaged in training and registration of all practitioners of medical photographers, including dentists and medical nurses, and their activities are recognized by all hospitals and medical authorities. In January 1951, the British Medical Journal (BMJ) was the first to publish medical and biological illustrations. The magazine is devoted to all aspects of the medical illustration [2,7]. The technology is rapidly evolving: from daguerreotype, silver-halide photography

to digital photography, which is emerging at the beginning of the XXIst century [3–7].

Due to its rapid development, especially in the recent "digital" years, photography became an integral part of all field of life [2]. Today, digital photography is an established method of documentation, interactive learning, an objective method of clinical research. Medical and dental photography have legal probative value in a number of countries. The main problem in medical photography today is the correct light of documentation, proper color rendering and sterile conditions of photography. In dental medicine in Bulgaria, algorithms of behavior when using dental photography for sterile documentation, correct color determination in communication with a dental laboratory have been created, and clearly formulated forms for informed consent of patients for documentation when using photography for dental services have been presented. affect the facial area [10–18].

Medical and dental photography – also have a major application in telemedicine, which was created by the US Army's Total Dental Access Project in 1994, in order to improve patient care. Includes distance learning, consultations and communication between doctors, dentists, medical professionals, X-ray technicians, laboratories, equipment distributors, patients and more. The project has been proven to reduce overall costs, expand treatment and care to patients in remote areas, provide complete information for analysis and real-time treatment plan. Telemedicine in professionally digitized dental and medical practices, for example, allows the sharing of digital and X-ray images, video information, graphic statuses, applied therapies, prescriptions, etc. In telemedicine, when working with color images, the method of shooting, composition, delivery and display are essential. Interconnection of the used systems is required for correct data transmission. Color image capture, processing, distribution and storage at all stages require interoperability and coherence of hardware and software components across devices. They are often from different manufacturers and in order to achieve consistency, each component of the system must have a clear and accurate presentation of colors [19,20]. (Fig.2)

Fig. 2. Medical photography today

Conclusion

In today's environment, accompanied by Covid-19 and the need for isolation, the use of medical and dental photography is a relevant, reasonable and supportive alternative method for diagnosis, consultation and treatment. Documentation and analysis are only a small part of what photography offers in medicine. Together with video recording and imaging, they plays an essential role in the training and postgraduate training of future and current medical doctors and dentists. The knowledge and application of this objective method used in the past, today has turned it into a widely used method that will be used in the future.

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