

Review Article

Dental implants identification system – From Radiographs to Web Database

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ABSTRACT:

Implants have been gaining popularity in dentistry, resulting in many types of implants in dental practice. Each new implant design has certain characteristics that differentiate it from others. As prosthodontists, we are faced with many patients whose implants may require our expertise and clinical skills. Dental implants identification is problematic due to many factors, and the difficulty in finding the specific parts for the dental implant itself. The contribution of digital dentistry is critical. With increasing number of implant manufacturers, dental tourism, and cost, it is difficult to detect and match dental implants by dentists during the chair side time. Clinical experience plays important role and detailed regulatory mechanisms are still needed for diagnosis and analysis.

Keywords: implant types identification by x-ray imaging, surface types, implant software.

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INTRODUCTION

Dental implants are often used for treatment for replacement of single teeth to complete rehabilitation. Implants have been gaining popularity in dentistry, resulting in many types of implants in dental practice. Each new implant design has certain characteristics that differentiate it from others. As prosthodontists, we are faced with many patients whose implants may require our expertise and clinical skills. Dental implants identification is problematic due to many factors, and the difficulty in finding the specific parts for the dental implant itself.

Mohammad Ali Saghir et al (2021). Dental implant therapy is an invasive, lengthy, and precise procedure. Each of the components used in this process are specific to the original implant down to the manufacturer, type and size since most implant companies have a unique library of implant designs, sizes, and platforms. The

amount of time it takes for an implant procedure from start to final restoration can be as long as a year in most patients. Since an implant contains many different components, it may be difficult to replace it without the knowledge of the implant type. Identification of the specific implants, without patient records based on radiographic or clinical observation is difficult because of a lack of identifying markers on implants. This problem doesn't just arise during the implant restoration process but is also a cause for concern when implant complications arise.

Sahiwal et al (2002) wrote three articles attempting to identify implants. Implants were categorized according to their radiographic appearance threaded vs non threaded, tapered vs non tapered etc. A chart indicating which implant had each of these various characteristics was made. The information presented lacked the integration of characterization into practice. It was

difficult for clinician with radiographs to search through hundreds of implants to determine what he needs to know.

With the latest information technologies, it is possible to present information in a format that would allow for quicker, easier radiographic identification of dental implants.

Whatimplantisthat (2020), The most current and frequently used method for identifying dental implants is a website that simply provides photos of hundreds of X-rays that clinicians must search through individually to try to their patient's implant after they input descriptive features of the implant to narrow down their help in identifying search field.

DISCUSSION

Developing innovative methods to identify the previously placed implants based on radiographic and clinical data, will spare millions of patients and clinicians the difficult task of deciding whether to proceed with the very invasive unpredictable procedures to remove and replace unidentifiable implants, restore and rehabilitate them with mismatched components.

Michelinakis et al. (2006) created a webpage and data was classified according to the implant type, body shape, implant design, abutment connection type, threaded or non-threaded, the surface type, polished collar, the diameter and length available for each system. The details of each implant system, according to each manufacturer, were then collected and stored . It made possible for the dentist and the lab workers to identify each dental implant system. The webpage was only updated during a limited time period, this system is no longer as beneficial as it was during that time.

Another study by Sahiwal et al. (2002a) documented For threaded implants, various x-ray photos with different horizontal rotations and vertical angulations to the x-ray beam for each implant system.

As for the non-threaded implants, Sahiwal et al. (2000b) documented the features of different types of non-threaded dental implants in which they used the same protocol as described in the threaded study.

Sahiwal et al. (2002c) also studied the Macro design and the morphology of endosseous dental implants. They examined each implant individually into 3 sections: coronal third, middle third, and apical third of the fixture. This comparative method gives the dentist a database feature for each design and help in the radiographic identification for each system. The limitation of all three studies by Sahiwal et al. was that identifying the implants was cumbersome.

Daher et al (2009) the identification of different dental implants and restorative components is difficult when dental records do not include an inventory of implant components. An implant record form is described. The form should be filled out and retained in the patient's chart for future use and implant maintenance visits.

whatimplantisthat open source search engines that allow identification of implants through its radiographic photos. The most current and frequently used method for identifying dental implants that simply provides photos of hundreds of X-rays that clinicians must search through individually to try to their patient's implant after they input descriptive features of the implant to narrow down their help in identifying search field.

Kent Howell 2013 A dental implant identification app was also launched three years after the conception of whatimplantisthat.com based on it. This app made its dental database easily accessible on the go to help better dental care provided by clinicians.

The problem in identifying an implant with a standard 2D X-ray is that 3D spatial information is necessary for identification . The unknown implant insertion angle inside the jawbone, the horizontal rotation, the vertical inclination, and the direction of the x-ray beam were also contributing factors that need to be accounted for while photographing and documenting the data as it is important for the interpretation and identification of the implant x-ray photo as shown by Sahiwal et al. (2002).

Choi JW et al. (2011) confirmed that for a 3D X-ray, the use of CBCT (cone beam computed tomography—diagnostic aid used when the conventional x-rays fail as a diagnostic tool should be preferred over a CT (computed tomography) image but it has a high radiation dose.

CONCLUSION

Due to significant increase of the implant manufacturer's design, the identification of different implant systems has become a critical issue. Not only the growth of different implant designs has been deemed an issue but also the global increase in patients in need of treatment. The development of a new and extensive database for implants is vital for successful implant therapies.

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