

“A Brief Chronological Review of Dental Implant History”

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Abstract

From ancient era to contemporary modern time's replacements of missing teeth with artificial teeth has been an aspiration of humankind. The history of implants goes back to Egyptian civilization where first copper stud was used in the mouth. Human skulls dating from 600 A.D showed man attempted to implant carved shells into the anterior mandible. In the beginning of the 1800s, in Europe the teeth were bought off from the resurrectionists which were collected from the poor or the corpses for purposes of allotransplantation which was later discarded due to secondary infections. In 1900s a revolution was seen in dental implants and various materials were used such as porcelain, cobalt-chromium –molybdenum, titanium etc. Prof Branemark in 1960s with the discovery his concept of osseointegration brought the defining moment in history dental implants. This article provides a brief chronological overview of history of dental implants.

Keyword: History, Dental Implants, Chronological order.

Introduction

Dental implants history goes back to centuries ago and people have attempted to replace the missing teeth with different ways to regain full, comfortable masticatory function and facial esthetics. Prior to the era of osseointegration there were various designs of dental implants and frameworks used to support dentures and partial dentures with different success rates. The various materials used in implants are porcelain, cobalt-chromium, iridioplatinum but the discovery of titanium changed the course of implant history.

Branemark has coined the term osseous integration and worked on circulation of bone marrow healing which greatly influenced the implant concepts¹. After this there was materials like titanium and numerous materials were used which were biocompatible with human body. In recent decades predictable dental implants were introduced and have revolutionized dentistry. Now, after thousands of years of trying, we have dental implants that in some circumstances (e.g., individuals with limited salivary flow who are especially prone to caries) may be used as an improvement over natural teeth. In present scenario different dental implant systems are commercially available worldwide for the restoration of partially or completely edentulous arches. This article provides an overview of contemporary concepts regarding the maintenance of modern dental implants

Chronological Review

Ancient Era: The history of the dental implant goes back to 3000 B.C., to the period when the Ancient Egyptian civilization prospered.

1600-1800: In 1687 according to Times of Allen's² report in 1800s period there was mention of dental replantation and transpalantion and it was where surgery was started in this era. The first person to publish a description of the technique of modern dental implants

was a French dentist, Maggiolo J, he describes a method to implant 18-karat gold alloy, with three branches into the jawbone, and to install a porcelain crown as a superstructure in his book: “Le Manuel de l'Art du Dentiste” (1809)³. In 1905 Scholl made a root-form, porcelain implant which consisted of corrugated structure. He also proposed a design in which a wire was initially incorporate within the superstructure for forming a connection with the remainder of the original tooth

1900-1950: New revolution was seen in materials in 1937, when cobalt-chromium-molybdenum alloy was developed and used on patients by Stock at Harvard University³ and showed great results in patients after years of follow-up. In 1940, Dahl was the first person to attempt subperiosteal implant, but this approach did not become common before being employed by Gershkoff and Goldberg in 1948.

1950-1980: In the 1950's, Dr. Bodine observed that holes for the screws were located in areas where the bone had the greatest strength and thickness and he found that fewer struts or girders were needed and frame work design were useful⁴. This decade also included the innovations of Dr. Lee who introduced the use of an endosseous implant with a central post. In 1951, the Academy of Implant Dentures was established, which is presently known as the American Academy of Implant Dentistry⁵

In 1956, Dr. Yamane established an independent institute to experiment on animals, which produced many experts in the field of artificial roots. The institute is currently known as the Japan Institute for Advanced Dentistry⁶. Implant designs saw a breakthrough in 1960's with the basic spiral design was modified by Dr. Leonard Linkow in 1963.⁷ The blade implant were introduced by Linkow, making it possible to place it in

either the maxilla or the mandible and is now recognized as an endosseous implant.

The concept of Osseo integration which was given by Brånemark in Europe 1950 said that titanium can be integrated with bone revolutionized the dental implant history.⁸ The Branemark technique utilized biocompatible titanium-alloy implants that were atraumatically inserted into the alveolar process. This has come to be known as Branemark's theory and the concept of osseointegration flourished rapidly in the 1980s, which brought about a defining moment in the clinical field of implants.

The first screw-type implant called Ventplant, which was completed in 1963 and currently referred to as self-tapping implant, which is covered with screw threads with an open-cage design. Cobalt-chromium alloy was used as the metallic material, but is said to have been replaced by titanium due to the results of Branemark's research.⁸ Therefore, the Ventplant disappeared before it saw the light of day. Although this trend was also seen in Japan, Kawahara and Kyocera Co. Ltd. succeeded in the formation of monocrySTALLINE alumina in 1975. Bioceram, which is the product name, became the first implant made in Japan for both domestic and overseas use.

It has been said that the Bioceram was implanted in over 60,000 patients and was the most pervasive and well-researched implant among the dental implants manufactured in Japan.

In 1978, the Harvard Consensus Conference was held to establish consensus on the use of implants at Harvard University, and the standard for a successful implant was settled on whether the implant remained embedded and functional for five years. This standard may seem extremely short, but it illustrates what the expectations of implant treatments were at the time.

In the 1980s, Professor Zarb of the University of Toronto played a central role in holding the Toronto Conference on Osseointegration in Clinical Dentistry, where Branemark presented the results of his research over 30 years and his clinical practice for nearly 20 years. With this Conference as a turning point, the Branemark Regimen spread over North America. The typical Branemark regimen during this period consisted of implanting four to six fixtures into the mental foramen of the lower jaw, with the subsequent placement of bilateral cantilever as the standard prosthesis and advocated surgical two-stage technique which became widespread throughout the world and many clones of this design were produced and are still in use today.

1980-2000: Towards the late 1980s, the revolutionary movement of the Branemark regimen swept over Japan in the same way, and a surge in implant research took place. This movement was a different kind seen with Linkow's Blade-type or the Bioceram that had its struggles, and has continued its uses to this day.

Professor Branemark published a paper covering all the data he had amassed regarding titanium implants in

1981. He followed his original group of dental implant patients for 20 years. The Toronto Conference on Osseointegration in Clinical Dentistry created the first guidelines for what would be considered successful implant dentistry was held in 1982. Dr. David Scharf in 1988 places his first dental implant. General dentists are being flooded with weekend courses enticing them to start placing dental implants and learn as they go on their patients. Dr. Scharf has been involved with modern day dental implants almost since their inception giving him a level of expertise few dentists achieve.

Dr. David Scharf publishes data in 1993 in the Journal of Oral and Maxillofacial Implants showing that implants can have the same high success rate when placed in a dental office setting under aseptic conditions as when they are placed in an operating room. This advancement clears the way to the routine practice of placing dental implants in the office rather than a costly hospital operating room setting.

2000 -2015: An ADA survey in 2002 showed wide acceptance of dental implants as the preferred method of tooth replacement. In 2004 Genget al.⁹ described four common thread configurations: v-thread, thin-thread, reverse buttress, and square thread. These were very significant regarding stress distribution and solving problems. Mehraliet¹⁰ in 2013 gave a significant design of implants for porous bone exhibits biological adaptation and are called functionally graded materials (FGMs). These are gaining a significant attention in dental implant applications.

In latest trends Fine Element Analysis¹¹ and Computer-aided design and computer-aided manufacturing technology¹² are used in manufacturing of implants. The computerized three dimensional models that have been extensively used to predict the characteristics of stress distribution in bone surrounding implants. The implant designs are influenced by both the implant dimensions and the biomechanical bond formed between the bone and the implant.

In the recent clinical studies Blaschke et al¹³ reported that dental implants made from zirconia are a feasible alternative to titanium dental implants. In addition to excellent cosmetic results, zirconia implants allow a degree of osseointegration and soft tissue response that is superior to that of titanium dental implants.

Conclusion

The dental implants history is a magnificent and fascinating journey through time. One can only stop and marvel at man's ingenuity over the developments and techniques of implants with time. As time moves on the patients get the very best in tooth replacement choices for their present and future needs.

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