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History of dental implants, in memoriam: Dr. Per-Ingvar Branemark, the man who made people smile

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ABSTRACT

Dr Per-Ingvar Branemark, the father of modern implant dentistry died unexpectedly on December 20, 2014, in his birthplace Gothenburg, Sweden at the age of 85 by a heart attack. He was a Swedish professor of anatomy who accidentally discovered an intimate bone-to-implant contact with titanium, the phenomenon that he called it "osseointegration". Few scholars and even fewer individuals in the world haven't heard his name due to his valuable innovation and noteworthy favour to humanity. This article is written in order to appreciate his invention and asking God for forgiveness at his first death anniversary.

Keywords— *Dental implants, Dr Per-Ingvar Branemark*

1. INTRODUCTION

Dr Per-Ingvar Branemark, the father of modern implant dentistry died unexpectedly on December 20, 2014, in his birthplace Gothenburg, Sweden at the age of 85 by a heart attack. He was a Swedish professor of anatomy who accidentally discovered an intimate bone-to-implant contact with titanium, the phenomenon that he called it "osseointegration". Few scholars and even fewer individuals in the world haven't heard his name due to his valuable innovation and noteworthy favour to humanity. This article is written in order to appreciate his invention and asking God for forgiveness at his first death anniversary.

1.1 History and background of dental implants

The desire for replacing missing teeth dates back thousands of years. Excluding dental extractions, teeth replacements by means of dental implants are the oldest practices in the history of dentistry. Amazing methods of implanting has been discovered by archaeologists from ancient civilizations of the world. 4000 years ago ancient Chinese used to carve bamboo sticks in the form of natural teeth and insert them into the jaws like dental implants. 2000 years later, the Egyptians used precious metals for implant construction with a similar shape and design. Incas from Central America took pieces of seashells and, similar to the ancient Chinese and tapped them into the bone to replace missing teeth [1, 2].

Before the introduction of real osseointegration, different materials with various designs have been used as dental implants. Although some of them worked well for several years, they had an unpredictable success rate because of poor integrations to the alveolar bone. For example Drs. Goldberg and Gershkoff described the subperiosteal implant framework in 1949. The framework was made by impressing edentulous jaws and used beneath a full-thickness flap and in direct contact with the bone of maxilla or mandible. The framework had some posts projecting through the mucosa into the oral cavity and provided the support for the complete or partial dentures [3].

The high-frequency rate of complications such as bone exfoliation, frame exposure and low survival rate, the subperiosteal implant frameworks are no longer used today [4, 5].

Another concept of dental implants called transosseous (or transmandibular) implants designed by Dr Small 25 years later in 1968. The implants transversed the anterior part of the mandible from the bottom to the top and were fixed via a bone plate at the inferior and superior borders of the mandible. Two to four of the posts projecting into the oral cavity were used to fixate the denture prosthesis. This type of implant is no longer used today because of invasiveness surgical procedures, frequent bone loss and prevalent peri-implant mucositis [6, 7].

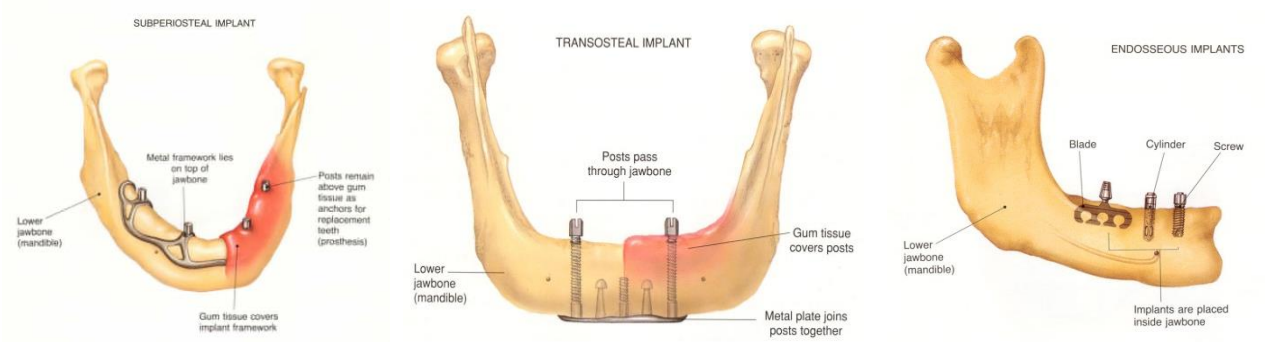

Fig. 1: schematic drawings of various types of dental implants. (Thomas D. Taylor and William R. Laney. *Quintessence Publishing Co.*)

1.2 Modern implant dentistry

The history of modern implant dentistry began in the 1950s with the introduction of osseointegration by the well-known Swedish professor; Per-Ingvar Brånemark (peace be upon him). He discovered that commercially pure (CP) titanium integrates well with bone during orthopaedic experiments on the healing process of rabbit fractured bone by installing optical devices encased in titanium into the lower legs of rabbits in 1952. In order to confirm titanium biocompatibility, Branmark inserted titanium instruments into upper arms of about 20 students working in his lab including Dr Tomas Albrektsson's older brother while they found no adverse reaction except the remaining scar on their skins. He described osseointegration as a direct structural and functional connection between living bone and the surface of a load-bearing artificial implant.

Although he was a Swedish physician and research professor but not a dentist, his ongoing researches on osseointegration led to the development of dental implants and reconstruct edentulous jaws by fixed prosthesis with long-term successful results. Since then, millions of patients have used modern endosteal dental implants for replacing their missing teeth based on Branmark's theory of osseointegration all around the world. This major discovery in dentistry librated periodontists from monotonous routine procedures such as scaling and root planning, crown lengthening or common periodontal flaps and librated edentulous patients from painful, ill-fitting unstable dentures for just use of a soft diet forever [8- 11].

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