

Dentistry – from the craftsmanship of the craftsmen to precise machine technology

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Recently, archeologists have reported the earliest evidence of a dental procedure practiced on dental caries dating back to the Late Upper Paleolithic (over 14,000 years BC) – an occlusal carious cavity on a lower molar, partially cleaned with flint tools, practiced on a modern human specimen originating from a site in Northern Italy (Villabruna).

With this recent discovery in mind, a discovery which shows that dental interventions have a long history, let us follow the steps taken by dental practice since the dawn of human history until today.

Since then dental practice has taken huge strides in its development. Archeological finds suggest that Neolithic people had dental skills – for instance, the eleven human molars with drill holes made by a flint tool in a cemetery in Pakistan (7,500 to 9,000 BC) or evidence of dental treatments performed with a spring-operated drill on a site in the Indus Valley (7,000 BC).

The oldest beeswax dental filling, dating back 6,500 years, was discovered in Slovenia.

In modern times, Pierre Fauchard, the French surgeon (1728) known as the “father of modern dentistry” used dental fillings as treatment for tooth decay and discovered ways of replacing lost teeth with ivory or bone blocks.

Gradually, technology made its way in dental practice – from the first foot-operated drill used by the American dentist James B. Morrison (1871), working at 2,000 rpm, to the electric dental drill first patented by the American dentist George F. Green (1875) which can reach 3,000 rpm, and the air turbine handpiece developed by the New Zealander John Patrick Walsh (1949) which worked at 400,000 rpm. They were handpieces used by practitioners to perform restorations of stainless steel crowns and stamped-metal crowns, as well as ceramic crowns, amalgam fillings, or gold inlays and onlays.

There followed successive contributions and improvements to dental practice made by the craftsmen of the past, such as Beverly B. McCollum, Harvey Stallard, Charles E. Stuart, Peter K. Thomas, to name but a few or by contemporary masters, such as Rudolf Slavicek, Julian B. Woelfel, Jean-François Roulet. We are now in the age of precise CAD / CAM technology, when dentists are faced with a variety of challenges posed by the development of digital technology.

While in the 1960s, CAD / CAM was typical of aeronautics and automobile industries, for the last 30 years it has become available to dentistry, shifting from the dental technician’s laboratory to the dentist’s dental office.

The first to use CAD / CAM concepts in dental applications was a French dentist, Dr. François Duret, who defended his graduation paper on “l’empreinte optique” (the digital impression) at the University of Lyon (1973), while a Swiss dentist, Dr. Werner Mörmann, from the University of Zürich, developed CEREC-1 -the first digital impression system, combined with a milling machine. Designed to manufacture ceramic inlays and onlays, by the doctor or members of his/her staff, CEREC-1 was commercially available for the first time in 1985.

A fundamental change requires a paradigm shift. If one is satisfied with one’s current practice, there is no incentive to modify it. Let us remember how long a time we needed to accept the computer as a management tool of our dental office activity. Now, digital dentistry allows us to collect and store accurate patient data, which was not possible before, while X-rays and digital photography have become the norm.

CAD / CAM have generated a number of benefits, providing durable restoration services conducted on the same day without any laboratory intervention.

Yet, there were also some difficulties related to the need to have ideal dental preparations, which doubled the dentist’s working time on each tooth and last but not least triggered double costs and limited accessibility to CAD / CAM technology.

The new trends pertaining to the CAD / CAM applications were formalized at the First Annual Meeting of the International Academy for Digital Dental Medicine (IADDM) on November 13, 2015 in Zürich under the following heading: “Digital Technology Embraces Teamwork in Dentistry”. We are now waiting for manufacturers of equipment and materials to allow our patients easier access to digital technology.

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