

History

The subject of restoring human dentition has long been of interest to man. Commonly in the past and for various reasons, people lost their teeth while still quite young. Probably vitamin deficiency played a significant role.

As can be seen from the following photographs, aesthetics was considered important in the early



Fig. 1: Female maxilla
From: Raudales Malpaso Dam, Chiapas/Mexico

stages of human development. In many cultures it was customary for people to alter and re shape their teeth by re shaping them in various ways. Also, decorative features such as gemstones were fixed to the labial of anteriors as depicted.



Fig. 2: Male maxilla preclassical period,
From: Tepalcates/Mexico

Those from the upper echelons of some societies even had crude prostheses fabricated for themselves. These were mainly for cosmetic reasons and not suitable as functional dental prostheses.

In Etruscan times a broken natural tooth was attached to adjacent natural teeth by means of a gold band in order form a bridge and close the gap.

In Roman times loose teeth were secured by splinting them to adjacent teeth with gold wire.



Fig.3: A "denture" carved from ivory.



Fig.4: Carved ivory "denture" showing the separation of teeth likely accomplished with the aid of a small fret saw.



Fig.5: The fitting surface contouring and finishing required a high degree of skill.



Fig.6: A full upper denture in vulcanised rubber with porcelain teeth.

Of all the old “dentures” in museums around the world, probably the most famous is that made for George Washington. In 1789 at the age of 57 he became the first President of the United States with just one remaining natural tooth in his head! His subsequently fabricated dental prosthesis was made of ivory, human and hippopotamus teeth. It served to address a cosmetic purpose.

The use of such materials continued to be used for cosmetic tooth replacement until about the end of the eighteenth century.

Around the turn of the nineteenth century, Nicolas Dubois de Chemant, (1753 – 1824) a Parisian dentist, developed the first dental prosthetic appliance from porcelain powder. This was a significant step towards the development of the modern denture.

Gradually the techniques developed and refined and led to the introduction of single fired porcelain teeth which could be setup and finally attached to vulcanised rubber denture base material. Vulcanised rubber was difficult to work with, it gave off a pungent odor in processing and was not particularly aesthetic. However, it ushered in the era where fully functional dentures could be made.

The pioneering work began in 1924 when VITA Zahnfabrik was founded by the industrialist Heinrich Rauter and Dr Carl Hildebrandt, a dentist. It was located in the city of Essen in the north of Germany. Amongst the earliest goals of the enterprise was to significantly improve the aesthetic appearance of artificial porcelain teeth



Fig.7: A vulcanised rubber denture from about 1920. The porcelain teeth were retained with gold coated metal pins.

as they were less than lifelike at that time. VITA developed the famous VITA layering scheme which revolutionised the aesthetics and manufacture of porcelain teeth at the time.

Dr Carl Hildebrandt was not only a pioneer in aesthetics but also the first to recognise that mandibular guidance is purely neuromuscular and not tooth guided as was the accepted philosophy. He certainly can be mentioned in the same breath as a luminary like Prof Dr Gysi and others.



Fig. 8: Posterior teeth fused to platinum pins from around 1870



Fig. 9: Dr Carl Hildebrandt

In addition and resulting from his observations of intact natural dentition, no tooth – guided excursions occur at all. Hildebrandt also noted that the individual patient carries out small regulatory control movements and if the teeth contact their antagonists at all during mastication, they do so without force. Dr Hildebrandt practised prosthetics according to the law of form and function. i.e.: form adapts to functional disturbance.

Hildebrandt was no stranger to the setting of anterior teeth according to the requirements of aesthetic and phonetic principles. In this regard he was avant – garde – and many years ahead of his time. In the fields of both prosthetics and ceramics, new worldwide standards were set by VITA.

In 1929 VITA reported for the first time that by closely studying the natural, they had identified the 24 most frequently occurring tooth shades. It was then decided to arrange them in groups according to their hue in a VITA tooth shade sample guide.

Until this time shade taking had been based on the single parameter of lightness. With the addition of a second parameter, grouping shades also according to hue, made shade determination easier.

VITA's shade sample guide was rapidly accepted and became a standard in dentistry and dental technology. As early as the 1930's, atmospheric firing of VITA porcelain for produc-

ing jacket crowns was taught in a programme of VITA professional training courses which were attended by dentists and technicians.

In the same period research into the field of tooth colours and various materials resulted in the discovery/development of the Lumin Effect. This was also applied and used to further improve the aesthetic appearance of porcelain denture teeth particularly under natural and artificial light conditions.

Porcelain denture teeth traditionally and prior to Hildebrandt were made of quite opaque, monochromatic porcelain and had a quite different appearance under incandescent light and day-



Fig. 10

light. (VITA museum / Luminoscope Re: Mr H Rauter) The VITA production method required at least two layers of porcelain, enamel and dentine, in order to achieve a natural shade effect.

The VITA LUMIN shade concept of the 1930's formed the basis for the VITAPAN classical shade guide which was vacuum fired and introduced in 1956. It remains in use today.

In the 1940's the company moved from Essen to its present location of Bad Sackingen in the far south of Germany close by the Swiss border. A decade on, the VITA LUMIN Vacuum Teeth and VITA LUMIN Ceramic were developed. With the introduction of the LUMIN VACUUM Shade Guide, the VITA A1 – D4 shades were increasingly accepted and became entrenched worldwide from the 1970's onwards.

In the early 1960's VITA introduced the first European developed, porcelain fused to metal system, VMK (Vita Metall Keramik). Around the same period came the introduction of VITADUR, a porcelain jacket crown material with increased strength characteristics (due to the inclusion of Alumina Oxide particles). These developments were decisive in improving the quality and range of individual restorations.

Initially the LUMIN VACUUM shade guide was used only for ceramics and porcelain tooth selection. However in 1983 VITA succeeded in integrating acrylic resin and acrylic teeth into this one shade system. With the introduction of the VITAPAN system, it then became possible to determine and reproduce tooth shades with both materials using the one shade guide.

The next milestone was the introduction of the VITA SYSTEM 3D-MASTER in 1998, which is not based solely on the observation of tooth shades.

For the first time in the history of tooth shade determination, Dr Neil Hall from Sydney Australia succeeded in identifying and defining the precise three dimensional "colour space" occupied by normal human dentition from the young to the elderly. This made possible the development of the 3D-MASTER shades which in addition to observation of the natural, are firmly grounded in colour science (Physics).

The VITA Toothguide 3D-MASTER is the corresponding shade selection instrument. With the introduction of the VITA Linearguide 3D-MASTER in 2008, the shade selection procedure was simplified even further.

With this new level of quality, tooth shade determination is no longer left to chance – it is a systematic procedure which when understood and followed with use of the corresponding materials, produces accurate and reliable shade reproduction.

Decades of experience and expertise in tooth shade determination were further augmented with the introduction of the digital shade measuring device, the VITA Easyshade. Its successor, VITA Easyshade Compact and Advance, offers the user a cordless, mobile shade measuring unit and which records up to 25 different measurements.

Acrylic denture base resins were developed during the second world war. Due to their eminently suitable physical properties they have replaced all other previously used materials. In their modern formulations they are still the material of choice today.

Notes
