Complete Denture Prosthodontics: An nsight into Past, Present and Future

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Abstract

The loss of teeth can be an extremely traumatic and an upsetting experience. The art science of denture therapy has beenespoused and debated for almost a century. This paradigm has been repeatedly passed from ?tutor-to-pupil?, with modifications amalgamations of various philosophies. The ?pupil-in-time-becomes-the-tutor? the process continues as such. One cannot deny that various procedures involved in making of complete dentures have advanced through keen observation, experience, empiricism, anecdote, artistry science. The dental profession has come far in terms of better materials, tools techniques. Newer materials technologies are driving newer, more efficient successful clinical treatment yet there is so much left to do.

Index terms—

1 Current Demographics

The truth about edentulism is that it has not disappeared nor is it disappearing. India has a large geriatric population of 77 million, comprising 7.7% of its total population. One of the major handicaps in the elderly is loss of teeth, affecting their mastication, dietary intake and nutritional status. According to Govt.

2 III.

3 Clinical Implications

IV.

4 Complete Denture Impressions

Beeswax, used by a German surgeon, is the first referenced material used to make dental impressions. Although a poor impression material by today's standards, it was capable of being removed I from undercut areas in the mouth. Other materials were Dr. Sharad Vaidya ? , Dr. Mahesh Suganna Golgeri ? & Dr. Charu Kapoor ? he future success of edentulous patient care is dependent on the development of shared goals for both the edentulous patient and the clinical team. This requires careful exposition of a goal and strategies to lessen or eliminate edentulism. Success will be achieved when therapeutic success is similarly viewed by the clinician and the patient. The selective use of technology to improve denture fabrication should be guided by factors that improve the process and outcome of denture fabrication and use as viewed by the denture wearer **??**1,2 The causes of edentulism are many. While largely the result of genetic or microbial diseases that have strong individual and behavioral influences, total tooth loss can be the result of iatrogenic, traumatic, or therapeutic causes. Unfortunately, in addition to patient neglect and poor oral hygiene, the failure of prostheses is a real issue facing individuals and populations with comprehensively restored dentitions. 3,4 Statistics b/w 12-30% Indians over the age of 60 years are suffering from complete tooth loss so the prevalence of edentulism is increasing in India. Nearly 19% of the population aged between 65-74 years is edentulous. [5][6][7][8] The clinical skills required to deliver excellent complete denture care are also paramount to successful prosthodontics, and esthetic dentistry. Even so, the opportunities to develop these skills and the interest appear to be decreasing at the same time that the need is projected to increase. In service to our patients, the profession must examine this trend closely.

The dental profession has come far in terms of superior materials, gears and techniques. Advances in both methodologies and therapeutic agents have been remarkable. The restoration of the completely edentulous patient's dentition through the use of dental implants, for example, has turned patients' lives around. Newer restorative materials and technologies are driving newer, more efficient and successful clinical treatmentand yet there is still so much left to do. **??**,2 , 9-15 a) Materials and Techniques introduced in the 1800s, including guttapercha and plaster of Paris. [16][17][18][19][20][21][22][23][24][25][26][27] In the early 1960s, silicone impression materials that cured through condensation were introduced. These materials also had dimensional changes occurring after removal from the mouth because of the evaporation of the ethyl alcohol by-product, but their use was justified because the changes were less than was seen with alginates. The dimensional stability grew worse the longer the delay in pouring the impression (sufficient stability was maintained only for about 6 hours). This created a problem in sending the impression to the laboratory by mail. [23][24][25][26][27][28][29][30][31][32] A more dimensionally stable impression material (polyvinyl siloxane) that set by an additional cured polymerization reaction was introduced in the 1970s. This impression material does have a by-product from the polymerization reaction (hydrogen gas) but has a dimensional change of nearly zero during the reaction. Both types of silicones have good elastic properties but were very hydrophobic.

Recently in 2006, Joseph Massad introduced a novel impression technique. The procedure demonstrates a building, or layering, method of impression making that maintains the integrity between layers of the impression materials of varying viscosities. To provide a more detailed and customized impression of the edentulous patient, this procedure utilizes both the static and functional concepts of impression making. [32][33][34][35] The name, plaster of Paris, was coined from a large gypsum deposit found at Montmartre in Paris, France. It was commonly used up to the 1900s, and was often fractured in order to remove it from undercuts, then reassembled outside the mouth. In England in 1857, Charles Stent combined guttapercha with an animal fat (stearine) and talc to develop a modeling compound. This became a popular impression material, especially when used with copper bands. A colloid made from seaweed (agar-agar) was the main ingredient of reversible hydrocolloid, and was patented by an Austrian named Alphons Poller. This was the first flexible material that could be removed from undercut areas and retain its memory. It was used only for complete dentures until 1935, when AW Sears advocated its use for impressions for fixed partial dentures. Since most of the agar-agar material came from Japan and became scare during World War II, irreversible hydrocolloid, known as alginate (salts of alginic acid), was developed. The agar (reversible hydrocolloid) and the alginate (irreversible hydrocolloid) impression materials are both elastic and hydrophilic but they have two disadvantages: (1) they must be poured immediately since the loss of water, if left in a dry environment, would cause dimensional instability; and

(2) they have poor tear strength, which is a problem when recording thin areas such as the gingival sulcus. These two hydrocolloid materials were used exclusively until the introduction of polysulfide material in 1953. First developed as an industrial sealant for gaps between sectional concrete structures, this polysulfide material gained popularity quickly because it reduced the two main problems associated with the hydrocolloids. [18][19][20][21][22][23] In late 1965, polyether impression material was introduced. This material had the necessary feature of being hydrophilic and, therefore, is more forgiving in a wet environment. An additional advantage to the polyether material is that it undergoes a cure polymerization reaction upon setting, which has no unstable molecular by-product, resulting in good dimensional stability. The elastic modulus of the polyether is high, resulting in a very rigid material, which is why it can be more difficult to remove from the mouth and the stone cast.

Prior to 1600 era, complete denture replacement were not made due to lack of understanding of retention and replacement. Closed mouth impression technique was introduced in 1900s. Release/escape vents within the final impression trays to prevent build up of excessive pressures was advocated. In 1950s emphasis was given to the biologic factors affecting complete denture impression making i.e. on flanges, border molding and denture extensions. More attention was given to posterior palatal seal area and to esthetics. [35][36][37][38][39] Esthetic restorative dentistry has broadened the awareness of smile design; however, dentists and technicians have long replaced missing anterior teeth with a focus on esthetics. Tooth size, shape, color, position, arrangement and display have been classically taught to dental and laboratory technician students for decades. Clinicians and technicians both seem to forget that the process of selecting and arranging artificial teeth in space-as required in complete denture construction-is really the best venue for studying the esthetic ceramic and polymeric materials used for individual teeth. [39][40][41][42] Thermoplastic materials for dental prosthesis are not a recent invention. They were first introduced in 1950's and consisted of different grades of polyamides (nylonplastics). Rapid injection systems originated in 1962 introducing Flexite thermoplastic material which was a flouropolymer (Teflon like). Next introduced nylon based resin was Valplast, a flexible, semi-translucent thermoplastic resin. While the material was not strong enough to allow for conventional tooth borne rest seat, the flexibility added to patient comfort in wearing the appliances. BPS denture meets the esthetic demand of patients with its unique Ivoclar teeth, which replicate anatomy of the natural tooth. Ivoclar teeth are made up of 3 layers of cross-linked acrylic resin that contribute to a life-like appearance and resistance to wearing. BPS system uses a controlled heat/pressure polymerization procedure during which time the exact amount of material flows into the flask to compensate for shrinkage, which ensures a perfect fit. This pressure also optimizes the physical properties of the denture.

Ivoclar Vivadent has released the latest in their line of top quality removable prosthetic teeth in Phonares NHC. The new Nano-Hybrid Composite teeth are hardened to a level that can only be compared to traditional porcelain denture teeth and they're available at a much more competitive price point. Phonares teeth include new moulds that show amazing aesthetics and lingual definition unmatched by any other tooth in the industry.

Few reports have described the use of computer-aided technology for complete dentures. Maeda et al, a group of Japanese investigators, are credited with the first published scientific report on the concept of using computer-aided technology to fabricate complete dentures. The clinical and laboratory protocols for both systems (Dentca and Avadent) incorporate many principles previously described in the literature on digital dentures. Both commercial manufacturing systems allow fabrication of complete dentures in 2 clinical appointments. The first clinical appointment is for systematic data gathering (impressions, occlusal vertical dimension (OVD), maxillo mandibular relationships (MMR) and tooth selection), and the second appointment is for denture insertion and adjustments. There is a dire need for clinical trials on computer-aided dentures that can affect individual patient care, dental education, research and health around the world. The ability to manufacture complete dentures using computer-aided technology has myriad educational, investigational, and clinical possibilities for the future. VII.

5 Conclusion

Given the demographic data on population ageing, it is likely that the need to rehabilitate edentulous patients will remain considerable for many more decades. Complete dentures are and will remain the mainstay of treatment for the vast majority of edentulous patients; most are satisfied with their dentures but some others are unable to adapt. Complete dentures will continue to play a central role in the rehabilitation of edentulism thus, research, teaching and specialist training in complete denture prosthodontics must continue, and in fact be intensified rather than reduced.

Figure 1:

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