CHAPTER 1

INTRODUCTION

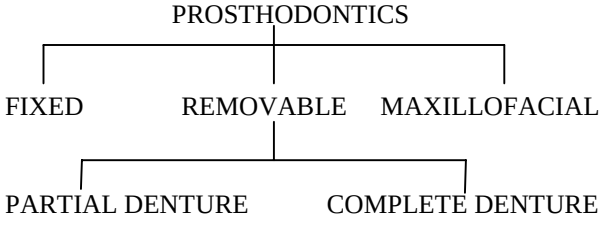
DEFINITIONS

PROSTHETICS is the art and science of supplying artificial replacements for missing parts of the human body and a PROSTHESIS is an artificial replacement for an absent part of the human body.

By supply the suffix -DONTICS, which connotes dentistry, the term prosthodontics is derived. PROSTHODONTICS or PROSTHETIC DENTISTRY is defined as the branch of dentistry pertaining to the restoration and maintenance of oral function, comfort, appearance, and health of the patient by the restoration of natural teeth and/or the replacement of missing teeth and contiguous oral and maxillofacial tissues with artificial substitutes.[1] More simply stated, prosthodontics is the restoration of natural teeth and the replacement of missing teeth and associated structures with artificial substitutes.

THE DIVISION OF PROSTHODONTICS

Prosthodontics has three major divisions: (1) fixed prosthodontics, (2) removable prosthodontics, and (3) maxillofacial prosthetics. Removable prosthodontics is subdivided into removable partial denture prosthodontics and complete denture prosthodontics.



FIXED PROSTHODONTICS is the branch of prosthodontics concerned with the replacement and/or restoration of teeth by artificial substitutes that are not removable from the mouth.[1]

REMOVABLE PROSTHODONTICS is the branch of prosthodontics concerned with the replacement of teeth and contiguous structures for edentulous or partially edentulous patients by artificial substitutes that are removable from the mouth.[1]

MAXILLOFACIAL PROSTHETICS is the branch of prosthodontics concerned with the restoration and/or replacement of somatognathic and associated facial structures by artificial substitutes that may be removed on a regular or elective basis.[1]

PROSTHODONTIC RESTORATIONS

RESTORATION is a broad term applied to any material or prosthesis that restores or replaces lost tooth structure, teeth, or oral tissue.[1]

Single tooth restorations include amalgams, composite resins, inlays, onlays, crowns, and veneers. The restoration of natural teeth with single tooth restorations is frequently referred to as RESTORATIVE or OPERATIVE DENTISTRY although this treatment is included in the definition of prosthodontics.

A DENTURE is an artificial substitute for missing natural teeth and adjacent tissues.[1] A PARTIAL DENTURE (PD) is a dental prosthesis that restores one or more, but not all of the natural teeth and/or associated parts (of a dental arch) and is supported by the teeth and/or mucosa; it maybe fixed or removable.[1] A FIXED PARTIAL DENTURE (FPD) is a PD that is luted to natural teeth or tooth roots and/or affixed to dental implants that furnish the primary support for the prosthesis.[1] The

term BRIDGE is a non- professional term for FPD which, although common in lay person's vocabulary, should be avoided. A FPD can not be removed from the mouth by the patient. A REMOVABLE PARTIAL DENTURE (RPD) is a PD that can be removed from the mouth and replaced at will by the patient.[1] A COMPLETE DENTURE (CD) is a dental prosthesis that replaces the entire dentition and associated structures of the maxillae or mandible.[1] The term APPLIANCE should not be used when referring to a denture. An oral appliance is a device worn by a patient to effect some sort of treatment such as moving teeth or radiating tissues. The terms restoration, prosthesis, and denture are synonyms.

THE DEVELOPMENT OF RPD PROSTHODONTICS

There is historical evidence that man has been replacing missing teeth since at least 2500 B.C. The first mention of a RPD in the literature was by Heister in 1711. He described making a RPD by carving a block of bone to fit the mouth.[2] In 1728 Fauchard described making a mandibular RPD by joining two carved blocks of ivory together by metal labial and lingual connectors.[3] Balkwell wrote of a maxillary RPD with a palatal connector in 1880.[4] Retentive clasps were first discussed by Mouton in 1746.[5] Delabarre referred to "hooks" (clasps) and the use of "little spurs" (occlusal rests) to prevent irritation around the abutment teeth.[6] In 1810, Gardette described the use of the wrought band clasp.[7] In 1899, Bonwill recorded his technics for clasping abutments with individually contoured gold circumferential clasps that were then soldered to "the plate" (major connector).[8] Bonwill also advocated the use of "lugs" (rest seats) so the prosthesis would be supported by the abutments . In 1913, Roach presented a wrought wire circumferential clasp as an improvement over the wide band clasp.[9] The first mention of a bar clasp or "infra bulge" clasp was by Henrichsen[10] in 1914, but the bar clasp did not gain popularity until Roach promoted this concept in 1930.[11] These early references in the literature concerning RPD prosthodontics recorded the technics of the authors and illustrate the ART of prosthodontics. UNTIL THE 1950'S, RPD CONCEPTS WERE MOSTLY DEVELOPED BY A SMALL GROUP OF AUTHORS WHO PRESENTED THEIR THEORIES, EMPIRICAL OBSERVATIONS, PHILOSOPHICAL BIASES AND CLINICAL/LABORATORY TECHNICS.

As a SCIENCE, RPD prosthodontics essentially began in the 1950's with cross-sectional population studies performed in England, Scandinavia and Switzerland that showed extensive pathologic changes in the periodontium and increased caries activity for patients who wore RPDS.[12-17] In 1956 the first attempts to evaluate RPD design theories through in vitro studies using partially edentulous arch/RPD analogs were reported.[18,19] Since about 1965 the science of RPD prosthodontic has expanded exponentially with in vivo and in vitro research reports.[20-45] CLINICAL RESEARCH HAS CONFIRMED THAT RPD TREATMENT IS VIABLE AND DOES NOT, IN ITSELF, CAUSE PERIODONTAL DESTRUCTION, CARIES OR TOOTH MOBILITY.[38-45] It is important to note that research results are less conclusive about the specifics of RPD design.

Recognizing the tremendous growth of knowledge which was occurring in dentistry, the American Dental Association established prosthodontics as a dental specially in 1950. In this way prosthodontics is divided into a DISCIPLINE studied and practiced by general dentists and a SPECIALTY studied and practiced by Prosthodontists.

A PROSTHODONTIST is a dental specialist engaged in the practice of

prosthodontics. To become a prosthodontist a dentist must successfully complete an accredited advanced education program in prosthodontics. In the United States, the Commission on Dental Accreditation of the American Dental Association (ADA) accredits advanced education programs.

Prosthodontic programs are thirty-three months in length and lead to a CERTIFICATE in Prosthodontics, or a MASTER'S DEGREE in DENTISTRY or a MASTER'S DEGREE in a basic science and a CERTIFICATE in Prosthodontics.

Accredited prosthodontic training programs are located in dental schools, hospital dental programs and dental clinics throughout the United States. Separate programs in maxillofacial prosthetics are available. They are usually of one year duration and require completion of a prosthodontic program for admission.

Prosthodontic training programs are very rigorous and time consuming. Dentists completing these programs will have advanced knowledge and experience in the basic sciences; dental materials; prosthodontic diagnosis and treatment planning; treatment planning preprosthetic oral surgery and implant placement; occlusion; esthetics; treatment of patients with TMD and facial pain; restoration of tooth structure; replacement of missing teeth with FPDs, RPDs, CDs and implant prostheses; the use of dental articulators; precision and semiprecision attachments; and the restoration of missing oral and facial structures with prosthesis and geriatric prosthodontics. Prosthodontists are indeed specialists in reconstructing teeth, mouths and faces with prostheses.

In the Untied States, a prosthodontist who has successfully completed an advanced education program, accredited by the ADA, is eligible to apply for examination by the American Board of Prosthodontics. This individual is termed an EDUCATIONALLY QUALIFIED PROSTHODONTIST.[1] A prosthodontist who's application for the examination has been accepted and is current, is termed a BOARD ELIGIBLE PROSTHODONTIST. One who has passed the examination is considered a BOARD CERTIFIED PROSTHODONTIST.[1]

A DENTURIST is a nondentist of limited dental knowledge and skills licensed to provide dentures for a patient.[1] DENTURISM is the often illegal procedure wherein a nondentist engages in the practice of making impressions and fabricating dentures for a patient.[1] Denturism is legal in Arizona, Colorado, Idaho, Maine, Montana, Oregon and Washington.

THE SCOPE OF RPD PROSTHODONTICS

Removable partial denture prosthodontics is a vast subject dealing with the following:

1. The evaluation of the patient for treatment.
2. Providing the dental treatment necessary to prepare the mouth for the RPD.
3. Constructing and fitting the RPD.
4. Educating the patient in the use, maintenance and what to expect from RPDs.
5. Maintaining the natural teeth and soft tissues.

RPD prosthodontics encompasses all disciplines of dentistry. The dentist providing RPD treatment must be knowledgeable in all aspects of dentistry and technically capable of providing the treatment he/she will render.

INDICATIONS FOR RPDs

A RPD should be a treatment consideration whenever the dental arch can not be restored with a FPD, implant FPD or implant-tooth FPD. The primary indications for RPDs are:

1. **FPD Not Possible**
   If a FPD is not possible because of the length of the edentulous space, lack of alignment of the abutments for a path of placement of the FPD, or inadequate length of the clinical crowns of the abutment teeth for retention and resistance form, a RPD may be the treatment of choice.**No**

2. **Distal Abutment Tooth**
   Absence of a distal abutment tooth precludes restoration with a FPD unless an implant FPD or implant-tooth FPD is possible.

3. **RPD Denture Base Is Necessary**
   When there is loss of considerable volume of the alveolus (mucosa and bone) a denture base is necessary for esthetics and self cleansing prosthesis design.

4. **Patient Can Not Afford More Desirable Treatment**
   A frequent reason for constructing tooth-supported RPDs is that the patient can not afford the more desirable FPD or implant supported FPD treatment.

THE OBJECTIVES OF RPD TREATMENT

The objective of RPD treatment is to restore the patient's mouth to an acceptable level of oral health in such a way that the RPD does not cause damage to the oral structures. The restoration should restore acceptable esthetics and masticatory efficiency as well as provide patient comfort and well-being. To achieve this objective dental treatment must be provided to professional standards by a knowledgeable and capable dentist.

THE NEED AND DEMAND FOR RPD TREATMENT

Data from Phase I of the Third National Health and Nutrition Examination Survey (NHANES III) show that in 1988-1991 30.5% of the population in the United States retained all 28 teeth and 10.5% was completely edentulous.[46] This means that 59% of the population was partially edentulous. Tooth loss increased with age. Mexican-Americans had the lowest rates of tooth loss.[46]

According to another study, one in five persons 18-74 years of age wears a removable prosthesis of some type.[47] Women wear removable prostheses more often than men and blacks more frequently than whites.[47] Mexican-Americans are less likely to use dentures than either of their non-Hispanic counter parts.[47] Approximately 60% of denture users have at least one problem with a denture.[47] THUS, DESPITE INCREASING TRENDS IN TOOTH RETENTION, DEPENDENCY ON REMOVABLE PROSTHODONTIC PROSTHESES IS STILL A REALITY OF LIFE FOR MILLIONS OF AMERICANS.[47]

The loss of natural teeth is directly related to age. Since the percent of elderly persons in society is increasing and the

number of completely edentulous persons has stabilized, the number of partially edentulous patients will likely increase.[47-55]

The demand for dental care from this healthier elderly population will increase. Since these elderly patients will most likely be on limited income and since partially edentulous patients are most likely from fixed income and lower socioeconomic groups, the demand for RPD treatment will increase because of the prohibitive cost of FPD and implant treatment. A significant portion of these patients will be complicated to treat.

Replacing missing teeth by surgically placing dental implants and restoring the edentulous space with a fixed-type implant prosthesis, thus eliminating the need for an RPD, is not always possible because of inadequate bone volume and the surgical risk involved in placing the implants. Frequently, treatment with implants is not possible because of the expense.

Thus, despite declining edentulism the need and demand for RPD treatment will remain high in the immediate future and the practitioner must be knowledgeable and competent to provide that treatment which will likely increase in complexity of services required.

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