ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

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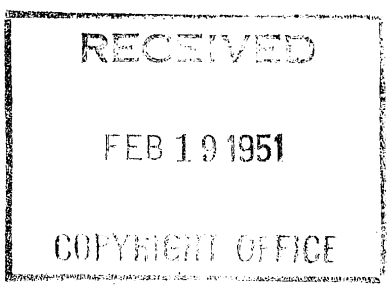

FUNDAMENTALS WHICH INFLUENCE THE RENDERING OF PARTIAL DENTURE SERVICE

I

Partial denture service should begin with the establishment of oral health so far as this is possible.

II

A major objective of partial denture service should be the preservation of the remaining oral tissues, which should take precedence over the re-establishment of an ideal status of dental functions.

III

Before mouth preparation is initiated, there should be a critical evaluation of each remaining tooth so that its relative strategic importance in the rehabilitation of the mouth may be determined and its retention or extraction justified.

IV

Partial denture design should be directed toward having the appliance as simple as is consistent with the basic biological, mechanical and structural principles which may be involved.

V

Since the physiologic tissue tolerance of individuals varies greatly, the stress load induced by the partial denture should always be directed toward the minimal in order not to exceed the individual tissue tolerance.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

FUNDAMENTALS WHICH INFLUENCE THE RENDERING OF PARTIAL DENTURE SERVICE

VI

The design, choice of materials and method of construction of the partial denture should be such as to render later correction and maintenance (particularly the relining of the base) possible and practicable.

VII

To insure the most satisfactory partial denture experience, the patient must be properly prepared psychologically to receive this type of service and must be trained to cooperate most fully in the care of the mouth and the maintenance of the appliance.

VIII

Partial denture service should be such that it can be rendered effectively by the largest number of dentists to the greatest number of patients consistent with the rendering of a true health service.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

TERMINOLOGY

1. What is the meaning of "prosthesis"?

   Prosthesis is the addition to the human body of some artificial part to replace a natural one which is missing.

2. How is the term "prosthesis" used in dentistry?

   Prosthesis should not be used in dentistry unless modified by a definite dental term, viz: partial denture prosthesis.

   Through general usage, the term has come to refer to:

   (1) replacement of the entire crown of a tooth, crown prosthesis;

   (2) replacement of one or more teeth by means of a fixed or removable bridge, bridge prosthesis;

   (3) replacement of several teeth by means of a partial denture, partial denture prosthesis;

   (4) replacement of all teeth in a dental arch, complete denture prosthesis.

   "Operative dentistry" is the term generally used in refering to prosthesis involving only a portion of the crown of a tooth, such as a filling or an inlay.

3. What are the divisions of dental prosthesis?

   There is a natural division of dental prosthesis, beyond operative dentistry, into three branches or fields:

   (1) crown and bridge prosthesis - a restoration which is entirely supported by a tooth or teeth;

   (2) complete denture prosthesis - a restoration which is entirely supported by the tissues (connective and the underlying bone) upon which it rests;

   (3) partial denture prosthesis - a restoration supported by both teeth and tissues, a composite support.

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TERMINOLOGY

4. What is a partial denture?

A removable prosthetic restoration which usually replaces several missing teeth and which derives its support principally from the tissues underlying its base and to a minor degree from some of the remaining natural teeth.

5. What is a removable bridge?

A removable prosthetic restoration replacing one or more missing teeth and which derives its support from two or more remaining natural teeth.

6. Is there a confusing use of the term "partial denture"?

Yes - some authors use the term "partial denture" to include tooth-borne restorations. In such a usage a cemented bridge would be referred to as "a fixed partial denture" and either a tooth-borne or a tissue-tooth-borne appliance which the patient could remove and replace would be called "a removable partial denture".

7. Are there sufficient points of difference between the removable bridge and the partial denture to justify different designating terms for these restorations?

Yes - the fundamental principles and techniques employed may be completely unalike. These may be more unalike than similar. Some points of difference are:

(1) the manner in which each is supported;

(2) the impression registration required;

(3) the need for indirect retention;

(4) the saddle material best suited for each

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CLASSIFICATION

8) Why is a method of classification of the partially edentulous dental arch desirable?

The number of different combinations of teeth in the dental arch from which one or more have been lost is very large. In writing or speaking of appliance design it is very cumbersome to relate the teeth which are present.

It is also very difficult to visualize the remaining combination of teeth from a written or verbal description. It is quite possible that a mastery of partial denture design may have been retarded by this difficulty.

Since many similar combinations of teeth require a very similar design of the prosthesis needed, it follows that design may be conveniently discussed in terms of groups or classes. A SIMPLE CLASSIFICATION METHOD IN PARTIAL DENTURE PROSTHESIS GREATLY FACILITATES A DISCUSSION AND COMPREHENSION OF THE TREATMENT WHICH MAY BE INDICATED IN A GIVEN CASE.

9) Upon what factors have some proposed methods of classification been based?

There have been several methods suggested and tried. These have been based upon various factors including: The type of retainers used to stabilize the appliance or the location of these; one took into consideration the type of saddle or base which the prosthesis had and still another system based classification on the condition of the ridge upon which it rested. These methods have not proven satisfactory enough that they have been widely adopted.

10) What advantages has the Kennedy method of classification shown?

Experience with the Kennedy classification over a number of years has shown that it is a workable system. It is simple and easily remembered. No partially edentulous case has been encountered yet that could not be classified. Perhaps, the most important advantage is that there has been found to be an association between the groups of cases in each Kennedy class and a practical application of the principles of partial denture design.

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CLASSIFICATION

11) What is the grouping of partially edentulous dental arches under the Kennedy method of classification?

According to this method there are four classes:

Class I: Those cases having bilateral edentulous areas located posteriorly to the remaining teeth.

Class II: Those cases having a unilateral edentulous area located posteriorly to the remaining teeth.

Class III: Those cases having a unilateral edentulous area with teeth remaining posterior and anterior to it.

Class IV: Those cases having a single, bilateral (crossing the median line) edentulous area located anteriorly to the remaining teeth.

12) What rules govern the application of the Kennedy method of classification of partially edentulous dental arches?

The use of this simple method of classification is made even more definite by following certain rules of procedure which have seemed to clarify points about which some uncertainty was found to exist.

1) Classification should follow mouth preparation, since further extractions would alter it;

2) If the third molar is missing, that edentulous area is not considered in making the classification since third molars are not to be replaced;

3) Third molars, if present and are to be used as abutments, ARE CONSIDERED in the classification;

4) Missing second molars are sometimes not replaced, when the occluding second molar is also missing and is not to be restored. In such cases, this edentulous area is <u>not considered</u>;

5) When there are additional edentulous areas in the same arch, the most posterior such area determines the classification;

6) Edentulous areas, additional to those which determine the primary classification, are indicated as MODIFICATIONS of that CLASS and are designated by their number, e.g. - CLASS I, MOD.II etc.

7) The extent of the modification area has no bearing - it is the number of such areas which is the determining factor;

8) Only classes I, II, III can have modifications, since any additional edentulous must lie posterior to the "single, bilateral edentulous area" of class IV.

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COMPONENT PARTS

13) Of what different units is a partial denture composed?

In the typical partial denture there will usually be found the following components:

1) One or more bases (or saddles);

2) One or more major connectors (lingual or palatal bars)

3) Usually several minor connectors;

4) Two or more occlusal rests;

5) Two or more retentive clasp arms;

6) Two or more reciprocal clasp arms (stabilizers);

7) One or more indirect retaining unit;

8) One to several replaced teeth.

14) What functions are performed by the partial denture base?

1) It supports the attached artificial teeth;

2) It transfers the stresses coming upon the supplied teeth to the subjacent tissue or in modification areas to the adjacent teeth;

3) It minimizes the stresses of torque and leverage upon the abutment teeth;

4) It stimulates the subjacent tissues, if the base is tissue-borne.

15) What principal functions do teeth perform?

1) Aid digestion by providing efficient mastication;

2) Preserve an aesthetic appearance;

3) Prevent oral disorganization caused by tooth migration which may follow the breaking of a dental arch by an extraction;

4) An aid to distinct enunciation.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

COMPONENT PARTS

16) What advantages has a resin tooth?

1) It possesses excellent aesthetic qualities;

2) It is readily adapted to an abnormally narrow or wide space;

3) A resin tooth unites with the resin base to provide greatest strength when the available vertical space is slight;

4) Easily repaired in case of breakage.

17) What is a major connector?

That part or parts of a partial denture joining the various units of one side of the appliance to those of the opposite side of the arch.

18) What is a minor connector?

That part or parts of the partial denture which unites the major connector with other units of the appliance (occlusal rests, retaining clasps, indirect retainers, etc.).

19) What are the chief functions of the major connector?

1) Unification of the appliance parts;

2) Distributes the applied stresses throughout the teeth and tissues of the dental arch;

3) Minimizes the torque or twisting stresses coming upon the abutment teeth.

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COMPONENT PARTS

20) What are the important requisites of a major connector?

1) In order to perform its functions properly, a major connector must be rigid; its bulk, however, should be kept minimal;

2) A major connector should not impinge the adjacent moving tissues or those which underlie it.

21) What is the most important function of the occlusal rest?

Several functions are so important as to make this selection difficult. Perhaps, the most important in the case of the partial denture is the division of the stress load applied to the supporting tissues. The occlusal rest makes it possible to share this stress between the tissue of the ridge and the abutment teeth.

22) What is a direct retainer and what function does it perform?

A direct retainer is one of several types of mechanical device so engaging an abutment tooth as to prevent vertical displacement and to minimize lateral movement of a removal dental prosthesis. A clasp is a commonly used type of direct retainer.

23) What is the principal function of the indirect retainer?

The free end of the partial denture base has a dual vertical movement - toward the supporting ridge tissue and away from it.

A principal function of the indirect retainer is to minimize that movement of the base away from the subjacent tissue.

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USE OF SURVEYOR

24) What is a model surveyor?

An instrument used for determining the relative parallelism of two or more surfaces of the teeth or other parts of the cast of a dental arch.

25) What are the parts of a surveyor?

The several makes of surveyors on the market at present vary as to construction. However, most of these instruments have the following parts:

1) Platform (upon which the base is moved to various positions);

2) Vertical arm (which supports the superstructure);

3) Horizontal arm (from which the surveying tool suspends);

4) Table (to which the cast or model is attached);

5) Base (upon which the table swivels);

6) Paralleling tool or guide-line marker (this tool contacts a convex surface to be studied as a tangent contacts a circle. The relative parallelism of that surface to another may thus be estimated. By carbonizing this tool a height of contour mark may be made on the tooth surface of the cast);

7) Mandrel (for holding other special tools).

26) What difficulties result when a surveyor is not used?

1) The finished appliance cannot be inserted or removed because of points of existing interference;

2) The removal and insertion may be so difficult as to cause injury to the supporting tissues and/or failure of the clasps;

3) The location of the retentive clasp may be incorrect so as to result in inadequate or excessive retention;

4) The amount of adjusting which the finished appliance needed was, frequently, excessive. This was costly and sometimes weakened the structure.

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USE OF SURVEYOR

27) What is meant by the "path of appliance insertion and removal"?

Path of insertion - the direction through which an appliance moves from the point of initial contact of its rigid parts with the supporting teeth to the point of final rest position (occlusal rests seated and the base in contact with the ridge tissue).

Path of removal - the direction of appliance movement from rest position to the last contact of its rigid parts with the supporting teeth.

PATH OF REMOVAL IS THE SAME AS THAT OF INSERTION EXCEPT THAT THE DIRECTION OF MOVEMENT IS REVERSED - the first part of the appliance to leave rest position being that part which was last to seat. It is important that the patient be instructed regarding this fact so that he may remove the appliance with less strain on the clasps and the abutment teeth.

28) Are there multiple paths of insertion and removal?

Yes. There are many possible paths of insertion of prosthetic dental appliances. There may be more than one possible path in a given case. The direction of movement may be:

1) Vertical (greater retention would be required to resist a sticky bolus of food - its pull will be vertical);

2) Vertical-right (the direction of movement diverges slightly to the right from true vertical);

3) Vertical-left (here the direction of movement diverges to the left from vertical);

4) Vertical-posterior (the vertical movement is modified slightly by a posterior angulation);

5) Vertical-anterior (the movement is very largely vertical but has a slight anterior angulation).

The vertical component in each of these last four movements is by far the greater portion - the angulation from vertical in each case will be slight.

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USE OF SURVEYOR

29) Why may one path of insertion and removal be preferred to other possible paths in a given case?

1) By one path of movement, a prosthesis might encounter less interference, at points of tooth or tissue which would be difficult to alter;

2) A tooth undercut, better suited to provide adequate retention, might be made available by one path and not by others;

3) One path, away from rest position, might provide an appliance with more evenly balanced retention at the various abutments;

4) By one path, less metal or base material may be displayed to mar the aesthetic result;

5) The anatomic form of a substitute tooth may be better when allowed to move into and out of position by a certain path;

6) A disabled patient might more easily remove a prosthesis by one path than others.

30) How may the position of the cast be altered during survey?

The table to which the cast is attached may be tilted in two planes. The following movements are possible:

1) Laterally (to produce either a right or left angulation);

2) Anteroposteriorly (either at a forward or backward angle).

31) What is the effect of changing the position of the cast?

CHANGING THE POSITION OF THE CAST DURING SURVEY ACTUALLY ALTERS THE PATH OF INSERTION AND REMOVAL BEING SELECTED.

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USE OF SURVEYOR

32) What factors determine the choice of a suitable path of insertion and removal for the partial denture?

1) INTERFERENCE (to insertion and removal might result from the appliance being built into areas of tooth and tissue undercut. By comparing different paths, one may be chosen by which the appliance can pass these points of eminence with least resistance);

2) RETENTION (of the appliance against dislodging forces is desirable. The path chosen to result in the least interference should also allow adequate and equalized clasp retention);

3) AESTHETICS (becomes a factor in choosing the path of insertion where anterior clasps need to be positioned in less conspicuous areas and where anterior tooth substitutes must be given pleasing form and alignment. In cases involving anterior teeth, the path becomes definitely more limited in its deviation from vertical);

4) GUIDING PLANES (opposing tooth surfaces of sufficient area must be found or made which bear a parallel relationship to each other so that they may positively determine the direction of appliance movement. Only by forcing the appliance to remove in a certain definite direction, different than that taken by the retentive clasp terminal, can clasp retention be made to become a positive force).

33) What requisites should be kept in mind in evaluating the factors which determine the choice of appliance path?

1) We desire a finished prosthesis which can be inserted and removed readily by the wearer;

2) It should be retained against reasonable forces which tend to dislodge it;

3) It must have the best possible appearance.

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USE OF SURVEYOR

33) What unfavorable effects may result from interference to appliance insertion?

1) Strain upon the teeth contacted;

2) Strain on the appliance parts;

3) Injury to underlying soft tissues.

EXCESSIVE INTERFERENCE would result from building the surfaces of a prosthesis into areas of tooth or tissue undercut;

When interference occurs, there is a momentary wedging apart or pulling together of the contacted teeth;

There results a tipping or twisting of certain teeth in their alveoli as the appliance is forced past or over a tooth or tissue eminence and into an area of undercut;

Frequent repetition of such impingement will result in injury to the supporting tissue;

The amount of interference required to produce tissue destruction will vary greatly with different individuals depending upon their respective tissue tolerance.

THE MOST FREQUENTLY OCCURRING DAMAGE TO THE APPLIANCE is the fracture of the retentive clasp;

A COMMON CAUSE of clasp failure results from its being flexed too nearly to its elastic limit with each insertion and removal;

Strain resulting from interference may also cause the fracture of porcelain tooth substitutes and other appliance parts.

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USE OF SURVEYOR

34) What determines the degree of existing non-parallelism encountered when choosing the path of insertion and removal of a partial denture?

The extent of the non-parallelism of tooth surfaces will depend upon:

1) Anatomic undercuts (due to the bell-crown shape of many teeth - the dimension of the crown is less at the cervical line than at some level toward the occlusal);

2) Existing inclination of the teeth contacted (convergence or divergence from parallel of those teeth which are used for appliance support);

3) Mal-arrangement of the supporting teeth (caused by the migration from normal alignment of the teeth remaining in a broken dental arch).

35) How may the amount of interference to appliance insertion be reduced during mouth preparation?

A PRINCIPAL USE OF THE STUDY CAST is to disclose (during preliminary survey) the existing degree of non-parallelism of surfaces to be used;

ONE IMPORTANT REASON FOR MOUTH PREPARATION is the correction of areas of tooth and tissue prominence by:

1) Discing of enamel surfaces (to reduce tooth contours at areas of slight interference);

2) Make parallel restorations using crowns or inlays (if considerable reduction is necessary or caries of the area exists);

3) Extraction (if the mal-position is excessive);

4) Surgery (where the connective tissue and bone present severe undercuts).

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

USE OF SURVEYOR

36) How may the remaining interference be eliminated following mouth preparation?

AFTER MOUTH PREPARATION some interference may still exist:

ANY REMAINING INTERFERENCE may then be eliminated by:

1) Changing the path of insertion and removal (find a path that directs the appliance past the point of greatest prominence DIRECTLY INTO the area of deepest undercut);

2) BLOCK-OUT areas of undercut which may still exist:

A MIXTURE OF CLAY AND WAX may be added in areas of remaining undercut and formed by the surveyor blade to parallel the chosen path of insertion and removal;

DUPLICATION OF A MASTER CAST (so prepared) will give a casting investment duplicate which is free from undercuts;

THE BLOCKOUT IS LIMITED to areas to be crossed by rigid parts of the appliance;

The undercut for the RETENTIVE CLASP TERMINAL should not be eliminated;

NO INTERFERENCE SHOULD BE ENCOUNTERED IN THE MOVEMENT OF AN APPLIANCE INTO OR OUT OF POSITION EXCEPT THAT INTENTIONAL INTERFERENCE TO MOVEMENT CREATED BY THE RETAINING DEVICES.

37) What forces tend to dislodge a removable prosthesis?

1) Adhesiveness of certain food substances;

2) Movement of tissues against the prosthesis;

3) Force of gravity (acting on maxillary appliances);

4) Certain abrupt involuntary actions (such as sneezing or coughing, where there is a sudden expulsion of air).

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USE OF SURVEYOR

38) How is retention developed by means of a clasp?

CLASP RETENTION RESULTS from placing two or more retentive clasp terminals on undercut areas of the tooth;

The metal clasp arm MUST THEN FLEX OR DEFORM to escape from this undercut area and over the bulge on the abutment tooth surface;

In being forced to flex or bend, the metal developes energy and thus offers resistance to dislodgement - this force is called "retention";

Clasp arms are retentive ONLY when they are forced to flex - the retentive terminal of the clasp must be made to move in a direction other than the path taken by the appliance itself;

TO PRODUCE RETENTION, the retentive clasp terminal must escape by a path which is not parallel to the path of appliance removal;

EMPHASIS is thus placed upon the importance of having adequate guiding planes on the supporting teeth.

39) What are the unfavorable effects of excessive clasp retention?

Excessive retention is developed when the retentive terminal is placed too far cervical to the height of contour (the crest of the tooth bulge) so as to cause:

1) The supporting tissues to be injured when the teeth are subjected to a descrutive traction during the insertion and removal of the prosthesis (this stress and its effect is like that of interference);

2) The clasp is strained with each flexure more nearly to its elastic limit (fracture then occurs sooner).

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

USE OF SURVEYOR

40) What are the requisites of good clasp retention?

1) Retention at each PRINCIPAL abutment should approach uniformity;

2) Each retentive clasp should provide adequate resistance only to reasonable dislodging forces;

IDEAL RETENTION APPROACHES THE MINIMUM REQUIREMENT FOR RESISTING REASONABLE DISLODGING FORCES - NOT THE MAXIMUM.

41) How may balanced (equalized) retention be obtained?

1) Change the path of appliance removal so as to:

a) Increase the cervical convergence (to make the clasp more retentive);

b) Decrease the cervical convergence (to make the clasp less retentive);

2) Alter the length, diameter, form or material of the clasp (in these ways its flexibility may be changed).

42) How may the relative cervical convergence of opposing retentive surfaces of the abutment teeth be varied?

The RELATIVE CONVERGENCE of a retentive surface changes as the relation of that surface to the surveying tool is altered:

1) To increase cervical convergence: lower that part of the cast toward or below horizontal;

2) To decrease cervical convergence: raise that part of the cast toward or above horizontal;

FOR THESE EFFECTS TO BE OBTAINED, IT IS NECESSARY THAT THERE BE GUIDING PLANES ESTABLISHED WHICH WILL CONTROL THE PATH OF THE APPLIANCE REMOVAL.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

USE OF A SURVEYOR

43) In what ways is the matter of aesthetics a determining factor in the choice of a suitable path of insertion and removal for a partial denture?

1) In replacing the missing anterior teeth in the modification spaces of Classes I, II and III and in Class IV cases, a more vertical path is required. Movement from a right-lateral or a left-lateral direction in these cases would result in the interference of these anterior tooth substitutes against the incisal corner of the tooth adjacent to the edentulous space. Considerable relief of the porcelain body might be necessary before the appliance could be positioned following these paths of insertion. Such mutilation would destroy the desired aesthetic effect;

2) Less metal may be exhibited, also, if the retentive clasp is located in a more disto-labial area of tooth surface and/or near the cervical line. This result may be effected by an alteration of the path of insertion and removal in some instances.

44) Why are "guiding planes" an important consideration in the selection of the most desirable path of insertion and removal?

For a clasp to produce retention, its retentive arm must be forced to flex or distort and thus generate resistance to movement of the appliance;

For this to happen, the path of escapement of the retentive terminal must be other than parallel to the path of removal of the appliance itself;

Hence, guiding planes on opposing parallel tooth surfaces are necessary to give a positive direction to the movement of the appliance into and out of position.

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USE OF A SURVEYOR

45) What is the relative importance of the four factors which affect the choice of a path of insertion and removal?

No one factor is consistently more important than all of the others but, in one instance, a factor might be given preference over the others. For example:

1) AESTHETICS might be favored at a reasonable sacrifice in RETENTION (as in the case of an anterior tooth replacement where tooth form and alignment is important);

2) RETENTION might take precedence over AESTHETICS and a retentive clasp be located in an area more conspicuous than would be desired (where the abutment tooth is of slight contour and offers limited retention);

3) RETENTION and AESTHETICS might be modified to accommodate for INTERFERENCE to insertion and removal (since the amount of reduction of points of tooth and tissue eminence is often limited).

46) How may the position of a cast (during survey) be recorded so that it can be returned to that position again?

One dependable method of recording survey position of the cast is to scratch a light line on the dorsal and lateral surfaces of the base or capital of the cast so that it is parallel to the surveying rod. Since the cast tilts in but two planes (laterally and anteroposteriorly), it can be returned to the exact original position by making the lines on the two surfaces again parallel to the vertical surveying rod.

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USE OF A SURVEYOR

47) What uses of the model surveyor are of particular assistance in the preparation of the mouth for partial denture service?

1) To determine the degree of existing interference to the insertion and removal of the prosthesis (the need to alter the tooth or tissue surface during mouth preparation is then established);

2) To estimate the retention which can be generated on an abutment tooth surface (it is then possible to decide whether or not the surface form must be changed to increase or decrease its retentivity);

3) To assist the alignment of abutment tooth surfaces so that parallel guiding planes are established (discing the enamel surface, if a slight reduction is needed, or by paralleling the surfaces of inlays or crowns when restorations are indicated);

4) To aid in the selection of the most favorable path of insertion and removal (paying particular attention to the factors of interference, retention, aesthetics and guiding planes).

48) What one use of the surveyor is of assistance at the time of registering the final impression of the prepared partially edentulous arch?

To locate the retention areas prior to the taking of the final impression (in order to determine whether or not the impression is accurate in this very essential area).

49) How can the surveyor be useful after the master cast is obtained?

1) To eliminate areas of unusable undercut (by paralleling suitable additions of wax-clay to the master cast before it is duplicated);

2) To delineate the height of contour and disclose the degree of cervical convergence of abutment tooth surfaces so that the correct placement of clasps can be determined.

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THE OCCLUSAL REST

50) What is an occlusal rest?

That unit of the partial denture which rests upon the occlusal surface of a supporting tooth in such a manner as to resist movement of the appliance in a cervial direction.

51) What are the functions of the occlusal rest?

1) To transmit a part of the functional stress load coming upon the partial denture to the abutment teeth;

2) To transmit all of the functional stress load coming upon the removable bridge to the abutment teeth;

3) To prevent the impingement by the appliance upon the gingival tissue adjacent to the abutment teeth;

4) To maintain the occlusal relationship of the partial denture (thereby maintaining masticating efficiency) adjacent to the abutment teeth;

5) To maintain the position of the retentive clasp;

6) To assist in preventing the extrusion of an abutment tooth (if the retentive clasp should be distorted so as to cause pressure against the infrabulge surface).

52) What is the effect of using an inclined plane as the support for an occlusal rest?

Vertical stress loads coming upon an appliance which is supported by a rest placed against an inclined surface, causes a lateral pressure on the tooth so as to result in the impingement of the supporting tissues on that side of the alveolus toward which the tooth is tilted.

53) What angle should the occlusal rest form with the minor-connector?

The angle formed by the vertical minor-connector and occlusal rest should be slightly less than 90 degrees.

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THE OCCLUSAL REST

54) How may the inclined lingual surface of the cuspid abutment tooth be altered to provide a proper rest support?

1) Prepare an occlusal rest seat of the proper form in the tooth enamel or in the restoration if one is present or to be placed (this method is applicable when the incline is not too steep);

2) Increase the height of the cingulum so as to eliminate the inclined surface by placing a restoration (this method is indicated when the cuspid tooth is thin labio-lingually and the incline quite steep);

3) Employ embrasure extensions which slightly engage the labial surface at the mesio-labial and disto-labial angles of the cuspid abutment (this method has the disadvantage of displaying metal but avoids the placement of a restoration).

55) What form should the occlusal rest seat be given?

1) The floor should concave or "spoon-shaped"; it inclines toward the tooth center;

2) The marginal ridge should be reduced to permit a sufficient bulk so that the needed strength is obtained and should be rounded;

3) Avoid a deep, angular or "dove-tailed" rest preparation which would allow the appliance to grip the abutment (the free-end base of the partial denture would then transmit a tilting leverage if any vertical movement were to take place).

56) Should silicate or gold foil be used to support a rest?

Silicate should not be used and it is better to use hard alloys so that the danger of wear is reduced. Settlement of the appliance must be avoided if impingement of the underlying tissues is to be prevented.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE DIRECT RETAINER

57) What is a direct retainer?

That unit of the partial denture which engages the abutment tooth in such a manner as to resist dislodgement.

58) What are two types of direct retainers?

1) Intra-coronal - a box-like receptacle built within an inlay or crown has a slotted outside lateral wall through which a split insert engages THE INSIDE WALLS of the box so as to create frictional retention;

2) Extra-coronal - clasps which engage the EXTERNAL surface of the abutment crown in an area which lies cervical to a bulge or convexity.

59) What forces tend to dislodge the partial denture?

1) Adhesive food substances (also, chewing-gum, etc.);

2) Tension of moving tissues against an appliance;

3) Sudden involuntary expulsion of air from the lungs (sneezing, coughing, etc.)

4) The effect of gravity on a maxillary appliance.

60) How can a clasp be placed so as to assure retention of a removable prosthesis against reasonable forces?

If the free terminal of the retentive clasp arm is located cervical to a bulge so that its path of escapement is along an inclined surface, it can be forced to flex or deform. It resists this deformation and so retention to displacement is generated.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE DIRECT RETAINER

61) What are the component parts of a clasp?

1) Occlusal rest - that portion which is located upon the occlusal surface which has been shaped to incline from the marginal ridge toward the center of the tooth;

2) Body - that portion formed by the union of the occlusal rest, the clasp arms and the vertical minor-connector;

3) Arms - the extensions (usually two) which project from the body of the clasp, the appliance base or from the major connector so as partly to enclose the abutment crown;

4) Terminal - the portion of the clasp arm at its free end;

5) Retentive terminal - one or more clasp terminals so located as to be cervical to the height of contour or in an area of infrabulge. The path of escapement of this retentive terminal is not parallel to the path of removal of the appliance and, since the retentive arm is less rigid, it is forced to deform and thereby generate a resistance to displacement;

6) Reciprocal terminal - a rigid arm so located on the tooth as to oppose any pressure which may be exerted by a retentive arm which may have been accidentally bent;

7) Auxiliary occlusal rest - one located opposite the primary occlusal rest and sometimes used instead of a reciprocal arm.

62) What are the functions of the reciprocal clasp arm?

1) To counteract any pressure generated by the retentive arm;

2) To stabilize the appliance so as to resist its movement laterally;

3) It performs a minor assistance as an indirect retainer.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE DIRECT RETAINER

63) What fundamental principles should be considered in the design of the clasp type of direct retainer?

1) More than one-half of the tooth circumference must be encircled within the clasp terminals;

2) At least three areas of the clasp must make contact with the abutment tooth;

   a) Occlusal rest and body area;

   b) Reciprocal terminal area;

   c) Retentive terminal area;

3) The occlusal rest should be located upon a surface which has been shaped so as to incline from the marginal ridge toward the center of the tooth;

4) To be retentive, at least one terminal contact of each clasp must be made cervical to the height of contour (on a surface which converges toward the cervical);

   a) In a bilateral appliance, only one terminal of each clasp need be retentive (since it is opposed by the retentive terminal of the opposite side of the arch);

   b) In a unilateral appliance, each clasp must have two retentive terminals which oppose each other (buccal versus lingual or mesial versus distal);

5) A retentive terminal should be opposed by a reciprocal arm capable of resisting any orthodontic pressure which might be caused by distortion;

6) Unless guiding planes can be developed which positively control the path of appliance removal, it is best in bilateral retention to have a left buccal oppose a right buccal and a left lingual oppose a right lingual (a lingual should not oppose a buccal or vice versa).

7) To resist dislodgement, the path of escapement of a retentive terminal must be other than parallel to the path of appliance removal;

8) A clasp should generate only an acceptable minimum of resistance to the forces of dislodgement.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE DIRECT RETAINER

64) What factors determine the amount of retention which a clasp is capable of developing?

1) The angle of cervical convergence of the infrabulge surface of the abutment tooth;

2) The distance cervical to the height of contour that the retentive terminal is placed;

3) How well the infrabulge contact of the retentive terminal is maintained (one function of the occlusal rest);

4) The flexibility of the retentive clasp arm;

5) The accuracy of adaptation of the retentive terminal.

65) What factors determine the flexibility of clasp arm?

1) The length - flexure is directly proportional to the cube of the length;

2) The diameter - flexure is inversely proportional to the fourth power of the diameter;

3) The form - flexibility is made equal in any direction by the use of a round form of retentive clasp arm;

4) A wrought structure will be more flexible than a cast (because of the greater toughness of the fibrous structure of the wrought clasp compared to the more brittle crystalline structure of the cast clasp, the former (wrought) can be used in smaller gauges);

5) Torsion - a clasp which lies in both the vertical and horizontal planes is capable of being twisted on its vertical portion as well as flexed in the horizontal part;

6) Composition - some alloys of metals are inherently more flexible than others.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE DIRECT RETAINER

66) What is "retention"?

Retention may be described as resistance to dislodgement; a dental prosthetic appliance remains in position until the forces tending to effect its removal become greater than the retention which has been developed.

67) What is the Prothero "cone" theory of clasp retention?

As a basis of understanding clasp retention, Prothero pointed out that crowns of bicuspids and molars (cuspids sometimes) were shaped, if retentive, so that two cones conformed to the surfaces. If a cone were applied from the occlusal direction and one from the cervical, they would meet in a common base.

68) What is the "height of contour"?

The plane where crown surfaces sloping toward the occlusal meet those sloping cervically; the crest of the crown bulge where its form reaches the maximum convexity and from which irregular line it converges occlusally and cervically. Kennedy called this line the "height of contour" and Cummer referred to it as the "guide line" to the proper location of the retentive clasp.

69) What is meant by "infra-bulge and supra-bulge" areas of an abutment crown?

DeVan added convenient terms to retention terminology when he called the surfaces sloping occlusally from the height of contour as "supra-bulge" and those inclined cervically as "infra-bulge."

70) Where is a crown surface retentive?

Clasp retention is only to be obtained on those crown surfaces which converge toward the cervical (on infra-bulge areas); or cervical to the height of contour. This cervical convergence may result from the "bell" form of the crown or from an inclination of the tooth away from vertical.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE DIRECT RETAINER

71) How may the degree of retentiveness of the crown of a tooth be determined?

How much retention an abutment can provide may be measured by a model surveyor. By this instrument the angle of cervical convergence may be seen and the clasp resistance to displacement estimated.

72) What are the functions of the retentive arm of the clasp?

1) To retain the appliance against reasonable dislodging forces;

2) To dissipate (by flexing) stresses which would tend to rotate or tilt the abutment teeth;

3) To assist in minimizing lateral movement of the appliance.

73) What are the functions of the reciprocal arm of the clasp?

1) Counteracts any pressure on the tooth exerted by the retentive arm;

2) Resists lateral movement of the appliance;

3) Assists (to a minor degree) as an auxiliary indirect-retainer.

74) What kinds of clasps are used?

On a basis of structure:

1) The cast clasp;
2) The wrought or formed clasp;
3) The combination clasp (wrought retentive arm, cast reciprocal arm).

On a basis of location and type:

1) Circumferential (cast or wrought);
2) Bar (almost always cast).

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE DIRECT RETAINER

75) What is a "bar" clasp (Roach)?

The bar clasp (introduced by Dr. Roach) is a cast clasp, the arms of which are extensions of the metal base, the framework or the major-connector of the removable appliance. These extend along the surface of the mucosa, cross the gingival free margin and contact the infrabulge tooth surface from the cervical direction.

76) What is meant by a "circumferential" retentive clasp?

This type of clasp has a retentive arm which arises at the body area, passes obliquely across the suprabulge surface of the abutment and over the height of contour to engage an infrabulge surface from the occlusal direction. It may be either cast or wrought in structure.

77) What is meant by a "wrought" clasp?

The arms of this type of clasp are made from metal which has been drawn into the form of wire of various gauges and shapes or rolled into sheets of varying thickness. This clasp almost always approaches the retentive area from the occlusal direction.

78) What is a combination clasp?

In this type of clasp, a flexible retentive arm is employed and this is opposed by a rigid reciprocal arm of cast structure.

79) How is a combination clasp constructed?

The wrought wire of a suitable gauge and form may be soldered to the cast framework in the desired position or, if a high fusing alloy is used, the metal may be cast around the wire which was properly positioned in the wax pattern.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE DIRECT RETAINER

80) What advantages has the cast bar clasp over the cast circumferential?

1) Since it can be longer, it is more flexible;

2) Much less tooth surface is covered;

3) The cervical approach makes it less conspicuous;

4) Does not increase the tooth dimension;

5) Applicable in cases of malposed teeth (by passing along the tissue to contact the tooth where an area of less undercut exists).

81) What advantages has the combination clasp?

1) Compared with the cast clasp, it more completely dissipates the stresses of torque and leverage since the retentive arm has maximum flexibility;

2) Since the wrought arm is readily adjustable, the amount of retention can be easily increased or decreased;

3) Tooth rotation is prevented by the rigid reciprocal arm, in case of an accidental distortion of the retentive arm (so as to cause an orthodontic pressure);

4) The rigid cast reciprocal arm resists lateral movement of the appliance more than the all-wrought clasp;

5) It is applicable where tooth and tissue undercuts prevents use of the bar type;

6) Interference to appliance insertion is more easily located, since the retentive arm is not adapted until after the casting has been relieved (any resistance still remaining must be interference).

82) Where is the combination clasp particularly indicated?

In tissue-tooth borne partial denture cases where control of the stresses of torque and leverage is most difficult, requiring maximum flexibility of the retentive clasp.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE DIRECT RETAINER

83) What are some disadvantages of the cast bar clasp?

1) Tissue crossed by the bar may become impinged (by a distorted arm or as a result of appliance settlement);

2) Movement of the retentive terminal cervically (to increase the retention) is practically impossible;

3) Not the most ideal type of clasp for the free-end, extension partial denture (being less flexible than the wrought clasp, it does not dissipate the induced stresses as well);

4) If it is broken, its replacement is difficult;

5) The locating of an interference to insertion in an appliance is more difficult (as with all cast clasps it is not easy to distinguish interference from the resistance of the retentive clasp).

84) What are the advantages of the cast circumferential clasp?

1) It is most useful where rigidity of the clasp arm is essential (as in a reciprocal or stabilizer arm);

2) Can be used to advantage in a tooth-borne, unilateral appliance (where less flexible clasps are an advantage);

3) Easy to construct.

85) What are the disadvantages of the cast circumferential clasp?

1) Too rigid for retentive arm (in extension type cases);

2) Too much tooth surface is covered;

3) Movement cervically (to increase retention) is difficult;

4) Greater tooth dimension increases functional load;

5) The locating of an interference to insertion, which may exist in a finished appliance, is more difficult.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE DIRECT RETAINER

86) What disadvantages of the wrought band clasp have made it practically obsolete in modern partial denture prosthesis?

1) There is excessive tooth surface coverage;

2) Complete adaptation is very difficult (debris held);

3) Its edgewise flexibility is negligible (stresses from the vertical movement of an extension case would not be sufficiently dissipated);

4) Cannot be adjusted edgewise (to increase the amount of retention developed);

5) There may be an objectionable display of metal.

6) A proximal undercut area makes its application difficult.

87) What makes the half-round wrought clasp less desirable than the round?

1) There is excessive tooth contact (since the flat side is placed in contact with the tooth);

2) Edgewise bending is very difficult (because of the tendency to nick the wire);

3) Adjustment to increase the amount of retention is not readily accomplished (this would require edgewise bends).

THERE ARE NO ADVANTAGES IN THE HALF-ROUND WIRE NOT TO BE HAD IN THE ROUND FORM.

88) What danger exists in the use of a clasp having both arms of wrought structure?

If one arm of such a clasp should exert more pressure against an abutment tooth than the other (as a result of inaccurate adjustment and/or accidental distortion) an orthodontic movement might result.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE DIRECT RETAINER

89) What disadvantages has the combination clasp?

1) It is possible to cause recrystallization of the wire if it is heated for too long a time or at too high a temperature (the resulting brittleness may cause fracture);

2) Careless use of adjusting pliers may nick the wire (this causes all flexures to centralize at this point and may result in an early fracture);

3) More metal may be displayed because of having an occlusal approach to the retentive area;

4) Unless a suitable alloy is chosen for the wrought arm, it may be deformed by careless handling (some alloys may be improved by heat-treatment; some not affected by heat-treatment, may be hardened by repeated flexing - "work-hardened");

5) Occasional structural defects in wrought wire may be encountered (this is another cause of fractures).

90) What is the purpose of tapering a wrought clasp?

1) By slightly tapering the outside surface (opposite the surface in contact with the tooth), the possibility of the retentive arm being deformed away from the tooth can be lessened;

2) Shortening some outside fibers makes them less flexible to a bend away from the tooth (somewhat more retentive).

91) How is the wrought clasp arm tapered?

1) The cut end of the wire is first rounded so that it will not irritate the tissue of the cheek or tongue (the location of the retentive terminal was determined during the survey of the cast);

2) The taper is made ONLY on the outside surface (opposite that side which contacts the tooth);

3) Only the terminal portion of the arm is tapered (about 20 or 30 percent of the arm at its free end);

4) The round form of the wire is retained with the outside showing a SLIGHT and gradual taper.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE DIRECT RETAINER

92) What are the requisites of a clasp for use in the extension type of partial denture appliance?

1) It should provide adequate retention against reasonable dislodging forces ONLY;

2) It should exert no pressure when at rest position;

3) The retentive arm should be flexible:

a) To dissipate stresses resulting from leverage and torque (it acts as a "stress-breaker");

b) To lessen the stress upon the abutment teeth during insertion and removal (this pressure of the retentive arm is not counteracted by the reciprocal arm since the latter will have left tooth contact);

c) To minimize clasp failure (from the retentive arm being flexed too nearly to the elastic limit of the metal);

4) The reciprocal arm should be rigid:

a) To resist any pressure from a distorted retentive arm (which might cause orthodontic movement);

b) To stabilize against lateral movement of the appliance;

5) It should be made of an alloy not easily distorted (one having a high proportional limit);

6) It should not be porous or brittle;

7) It should cover the minimum tooth surface;

8) Its position on the abutment tooth should be definitely maintained (by the use of an occlusal rest);

9) A clasp should be made of an alloy which possesses the desired qualities AFTER IT IS PROCESSED or one which can be made suitable by heat treatment or by work hardening;

10) It should be capable of retaining a high polish.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE DIRECT RETAINER

93) What are some specific indications for the use of the cast bar type of clasp?

1) Where the retentive area is near the cervical line and reduced flexibility is permissible (as in tooth-borne prostheses);

2) Where greater rigidity of the retentive arm is needed (as in a unilateral, tooth-borne appliance);

3) Where minimum tooth coverage is desired (but a more rigid arm than the wrought wire is wanted);

4) Where the abutment is tilted preventing the use of a circumferential arm (having an occlusal approach to the terminal area);

5) Where the cervical approach of the clasp would make possible less display of metal;

6) As a reciprocal arm (where rigidity of the clasp arm is desired but with the least tooth coverage).

94) Where would the use of a cast circumferential clasp be particularly indicated?

1) Where rigidity is needed for a reciprocal arm but where a deep infrabulge undercut exists (contraindicating the use of a bar clasp);

2) Where the abutment tooth form is but slightly retentive and rigidity of the clasp is permissible (as in a tooth-borne appliance).

95) Can clasp retention, which has proven insufficient, be increased without remaking the appliance?

Possibly - if the retentive terminal can be located more cervically from the height of contour. The wrought, round clasp can be so adjusted. With the half-round clasp this edgewise bend is more difficult and, when it is also cast in structure, such a change is practically impossible. TIGHTENING a clasp against an abutment provides temporary stability only - when the tooth moves, as a result of the pressure, the retention is again insufficient.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE DIRECT RETAINER

96) Where is the use of the combination clasp particularly indicated?

1) Where maximum flexibility is a requisite (as in a free-end, distal extension type partial denture which has a yielding tissue support);

2) Where a deep cervical convergence prevents the use of a clasp which approaches from the cervical direction (as the Roach bar clasp);

3) Where a tissue undercut precludes the use of the bar clasp (would have to cross the tissue undercut);

4) Where the precise retention requirement is not predictable and cervical adjustment of the retentive terminal is likely to be necessary (to increase retention);

5) Where minimum tooth coverage is necessary but with the maximum flexibility of the retentive arm.

97) Do partial denture clasps wear the enamel of the supporting teeth causing them to be lost sooner?

1) It is unlikely that any well finished clasp can actually cause enamel wear in the normal mouth.

2) However, in a mouth having a high acidogenic bacterial count, the carbohydrate debris retained upon an enamel surface may, because of acid formation, result in surface demineralization. Such a softened surface may then be readily abraded by contact with something.

3) Erosion of an enamel surface is commonly encountered. This process may continue after a clasp is placed and should not be mistaken for appliance wear.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE INDIRECT RETAINER

98) What is an indirect retainer?

That unit of the partial denture which rests upon suitable surfaces of teeth which are located as far as possible from the free end of the base so that the movement of the base away from the surface of the supporting tissue is resisted.

99) What is meant by the "fulcrum line"?

A line extended through the occlusal rest areas of the principal abutments (those supplying the major retention). These supports act as the fulcrums on which appliance movement occurs as the base extended in one direction tends to leave the supporting tissue and those units of the appliance on the opposite side tend to move toward the teeth or tissues.

100) What are the possible movements of the free-end, extension type of partial denture at its fulcrum line?

1) The base may move away from the supporting subjacent tissue (this is the movement which the indirect retainer resists);

2) The base may move toward the supporting ridge (this movement can be limited ONLY by having a base which is supported in a stable manner)

THESE TWO VERTICAL MOVEMENTS OF THE EXTENSION BASE TEND TO TILT THE ABUTMENT TOOTH IN ITS ALVEOLUS. THE REASON FOR DESIRING THEIR LIMITATION IS, THEREFORE, APPARENT.

101) Does this vertical movement around the fulcrum take place in all removable prostheses?

NO. If EACH TERMINUS of the base is supported by an occlusal rest (tooth-borne) preventing movement toward the tissue and retained by a direct retainer preventing movement away from the tissue, then no rotation takes place.

IN SUCH TOOTH-BORNE APPLIANCES, NO INDIRECT RETAINERS ARE REQUIRED.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE INDIRECT RETAINER

102) What forces cause rotation of the partial denture at the fulcrum line?

1) Adhesive foods or other sticky substances which may be taken into the mouth;

2) Contact of moving tissue against the peripheries of the appliance;

3) The force of gravity on maxillary prostheses;

4) Sudden, involuntary expulsions of air from the lungs (coughing, sneezing, etc.).

103) What factors influence the effectiveness of the indirect retainer?

1) The efficiency of the direct retainers at the fulcrum line (the direct retention must be sufficient to keep the occlusal rests seated or the movement of the appliance will be one of displacement rather than rotation);

2) The location of the indirect retainer in relation to the fulcrum line (the efficiency of the indirect retainer is directly proportional to its distance from the fulcrum line - the longest perpendicular erected to the fulcrum line which ends in a definite seat on a suitable tooth will locate the most effective indirect retainer);

3) The rigidity of the indirect retainer arm (it must not be flexible);

4) Must be located so as to prevent slippage (an inclined plane is not desirable);

5) A tooth rather than tissue support is more stable.

104) Is indirect retention more necessary in an upper or a lower partial denture?

Effective indirect retention is more necessary in a maxillary appliance because:

1) There is need of counteracting the constant force of gravity;

2) Involuntary actions such as coughing, sneezing, etc., tend to dislodge a maxillary appliance to a greater degree.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE INDIRECT RETAINER

105) What functions does the indirect retainer perform?

1) It restricts the movement of the base of the free-end, extension type of partial denture AWAY FROM THE SUBJACENT TISSUE;

2) It reduces the tilting leverage coming upon the abutment teeth (by lessening the appliance rotation at the fulcrum line);

3) It prevents impingement of the lingual bar type of major connector (by preventing its movement toward the underlying tissue);

4) It acts as an auxiliary stabilizer against lateral appliance movement;

5) It serves as a splint against the lingual movement of weakened, anterior mandibular teeth.

106) In what forms may the indirect retainer be applied?

1) As an auxiliary occlusal rest;

2) An embrasure hook on the anterior teeth;

3) As a secondary lingual bar in combination with a terminal rest;

4) A partial secondary lingual bar with a terminal seat;

5) A modification area base and the contiguous parts.

107) What objections are there to the use of an inclined plane as the locale of an indirect retainer?

1) Does not function efficiently (due to slippage);

2) Induces a tilting leverage on the supporting tooth;

OBTAIN A DEFINITE REST PREPARATION OR USE AN EMBRASURE HOOK OR USE A COMBINATION OF THE TWO

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE MINOR CONNECTOR

108) What is a minor connector?

That unit of the partial denture which joins the major connector with other parts of the appliance (occlusal rests, retaining clasps, indirect retainer, etc.).

109) What are the functions of the minor connector?

1) Unification of the integral parts;

2) Transfer of a portion of the functional stress to the abutment teeth;

3) To assist in stabilization, by transferring the effect of the retentive clasps, indirect retainer, occlusal rest and reciprocal clasp arm.

110) How may the minor connector be located to be least noticeable?

It should pass vertically through the lingual embrasure from the occlusal rest to the major connector (so as to be less likely to irritate the tongue).

111) What bulk and form should be given the minor connector?

1) It should conform to the interdental embrasure (thickening toward the lingual and tapering toward the contact point);

2) Its bulk should be adequate to be rigid and to have the needed strength (14 gauge or more, depending upon the type of alloy used);

3) On the abutment tooth, the minor connector may be extended bucally to provide support for the wrought retentive clasp arm;

4) In areas where it is exposed to the tongue, the minor connector should taper to the tooth surface upon which it rests so that it will be less noticeable and irritating.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE MAJOR CONNECTOR

112) What is the major connector?

That unit of the partial denture which joins the parts of the appliance located on one side of the dental arch to those of the opposite side.

113) What functions are performed by the major connector?

1) Unification of the appliance parts. It may connect:

   a) Right and left posterior bases to the retaining and stabilizing units (as in Kennedy class I cases);

   b) A single posterior base to the retaining and stabilizing units of that and the opposite side (class II or III cases);

   c) An anterior base to the posterior units (retaining and stabilizing) of the right and left sides (as in class IV cases);

   d) Primary base and other units to any secondary base unit (as in those cases where modification spaces are present).

2) Distribution of stresses which may come on one portion of the appliance to the other abutment teeth and subjacent tissue areas which are to give support;

3) Employing the principle of leverage, it aids in minimizing the twisting stresses (torque) which come upon the abutment teeth during use of the appliance (see the following statement).

STRESSES DEVELOPED BY THE CLINCHING, GRINDING OR GRIPPING OF THE TEETH (ESPECIALLY DURING SLEEP) ARE FAR MORE SIGNIFICANT AS DESTRUCTIVE FACTORS THAN ARE THE STRESSES DEVELOPED DURING THE NORMAL FUNCTION OF MASTICATION WHICH PRODUCES AN INTERMITTENT AND NOT A LONG SUSTAINED FORCE.

114) What are the types of major connectors?

1) Mandibular - primary and secondary lingual bar;

2) Maxillary - posterior and anterior palatal bar.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE MAJOR CONNECTOR

115) What are the requisites of a properly constructed major connector?

1) It should be rigid so as to:

   a) Properly distribute stress loads to various supporting structures;

   b) Assist in the reduction of torque coming upon the abutment teeth;

   c) Prevent the impingement of the underlying tissue which might occur at the point of flexure of a lingual bar;

2) It should be properly located so as to:

   a) Avoid any impingement of the gingival free-margins;

   b) Avoid contact with tissues which move during function;

   c) Avoid the impingement of a tissue eminence during insertion into an undercut area;

   d) Have the border of an anterior palatal bar end against the side and not on the crest of a ruga;

   e) Avoid contact with the incisal third of the lower anterior teeth by the secondary lingual bar (this bar should rest on the cingulum);

   f) Avoid contact with the tissue covering a bony eminence such as a toris or a prominent median raphe.

3) It should be properly contoured so as to:

   a) Avoid tongue irritation which might be caused by an angular form or sharp margins;

   b) Have the margins bevel toward the tissue.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

APPLIANCE SUPPORT

116) From what sources does the partial denture receive its support?

1) Part of this support comes from teeth (these have but slight yield normally);

2) The major support comes from an elastic, fibrous connective tissue pad overlying the alveolar process:

a) Some areas are firm with limited displaceability;

b) Some areas are very displaceable (depending upon thickness, structure of the tissue and the degree of hypertrophy which may exist);

3) The quality of the partial denture support (how stable) will determine its amount of movement in function;

4) The movement of the base will determine the degree to which the stress load is magnified (by leverage);

117) Upon what does the stability of the partial denture base depend?

Stability of the partial denture base depends upon:

1) The displaceability of the subjacent tissue;

2) Accuracy of the impression registration;

3) Control of volume changes during and after the construction of the base.

118) What is meant by the "subjacent tissues"?

The tissues underlying the units of a partial denture and from which its base derives its major support are referred to as the "subjacent tissues."

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

APPLIANCE SUPPORT

119) What is the "residual ridge"?

The residual ridge is the remnant of the alveolar process together with the fibrous connective tissue covering (and included structures) in an edentulous area of the dental arch.

120) Does the surface contour of the residual ridge vary?

Due to the great variability in the thickness, character of the structure and the displaceability of the tissue covering of the residual ridge it may be said to have two forms:

1) Anatomic form:

The surface contour of the residual ridge at rest (its shape before a functional load is applied;

2) Functional form:

The surface contour of the residual ridge upon the application of a uniformly distributed functional load (the more displaceable areas of tissue become altered in form);

121) Upon what factors does the difference between the anatomic and functional forms depend?

1) The structural character of the tissue (presence of included adipose deposits, mucous glands, etc.);

2) The amount of applied total load (functional load plus any amount added by magnification by leverage).

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

IMPRESSION REGISTRATION

122) What are the requisites of an impression registration for the construction of a partial denture?

1) Extremely accurate anatomic form registration;

Tooth form and tooth relationship must be perfectly recorded so that:

a) The prosthesis, at rest, will exert no pressure (to cause orthodontic movement);

b) Minute contours of crown form must be exactly reproduced to determine the correct location of the retentive clasps;

A MATERIAL WHICH WOULD BE PERMANENTLY DEFORMED IN REMOVAL FROM AN UNDERCUT WOULD NOT MEET THIS REQUISITE.

2) Accurate registration of the functional form of the subjacent tissues so that:

a) The firm areas are not over-worked (inducing resorption because of trauma);

b) The displaceable tissue is rendered more compact (to make such areas accept their proportionate work load and to give these areas functional stimulation);

A MATERIAL WHICH IS IN A SEMI-FLUID STATE AT THE TIME OF INTRODUCTION INTO THE MOUTH WOULD BE INCAPABLE OF DISPLACING TISSUE SO AS TO REGISTER THE SUPPORTING FORM OF THE RIDGE AND WOULD FAIL TO MEET THIS REQUIREMENT.

THERE IS, AT PRESENT, NO SINGLE IMPRESSION MATERIAL WHICH MEETS BOTH OF THE ABOVE REQUIREMENTS. TO COMPROMISE ONE OR THE OTHER, WOULD RESULT IN LESS PERFECT SUPPORT FOR THE PARTIAL DENTURE.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

IMPRESSION REGISTRATION

123) What materials are suitable for registering the impression of the anatomic form of the dental arch?

There are presently three materials which qualify:

1) Plaster of Paris; (Classified as a rigid substance);

2) Agar and alginate hydrocolloids (Elastic substances);

3) Thermoplastics materials are not accurate enough.

124) When and by whom was plaster of Paris introduced in dentistry?

Plaster was first used by the German dentist, Pfaff, about 1756 for the making of a cast from a beeswax impression.

125) When and by whom was plaster of Paris first used as an impression material?

Nearly one hundred years (1844) after Pfaff first used plaster of Paris for the making of casts, two American dentists (Dunning and Westcott) first used it for recording the impression of the dental arch.

126) What advantages has Plaster as an impression material?

1) Extreme accuracy (Volume change is slight; does not distort);

2) Can be quickly prepared; no special equipment needed;

3) Inexpensive; properly stored, it does not deteriorate.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

IMPRESSION REGISTRATION

127) What are the disadvantages of plaster of Paris as an impression material?

1) Disagreeable to use;

2) Too much chair time required (when locking undercuts exist because of irregularly arranged teeth);

3) Reassembly of the various pieces may require much time;

4) Small pieces from essential areas may be lost;

5) Plaster requires a separating media (causing some loss of detail);

6) Difficult to maintain a tidy office when using plaster.

128) What are the principal differences between agar and alginate hydrocolloids?

1) Agar converts from the gel form (as received) to a sol by the application of heat;

2) It may be reverted to gel form by the reduction of the temperature;

3) This physical change is reversible;

4) Alginate hydrocolloid becomes a gel via a chemical reaction as a result of mixing alginate powder (as received) with water;

5) This chemical reaction is irreversible.

129) Why are the hydrocolloids so valuable as impression materials in partial denture prosthesis?

1) Either agar or alginate hydrocolloid removes from an undercut area without PERMANENT DEFORMATION;

2) Minute surface detail is recorded with accuracy;

3) A one piece impression (no reassembling necessary);

4) No separating media required;

5) The chair and laboratory time required is reduced;

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

IMPRESSION REGISTRATION

130) What is "imbibition"?

Imbibition is the process by which a hydrocolloid, when exposed to water for long periods, may increase its water content with an expansion.

131) What is "syneresis"?

A hydrocolloid tends to give off a mucinous exudate. This process is known as syneresis and is accompanied by a volume change (shrinkage).

132) What factors affect the geling rate of alginate?

1) The water-powder ratio;

2) The water temperature;

3) The time elapsing from the start of the mixing to the positioning of the tray in the mouth.

133) What advantages has agar over alginate hydrocolloid?

1) Since the formation of a gel results from a temperature change only, its control is more definite;

2) Since gelation takes place last on the warm tissue surfaces, the development of internal strains from accidental tray movement is less likely (the release of such internal strains might deform the impression on removal);

3) Since agar hydrocolloid is a reversible material, the scrap supply may be used for the duplication of casts;

4) If an impression shows a defect, the hydrocolloid may be reheated and the impression retaken.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

IMPRESSION REGISTRATION

134) What advantages has alginate over agar hydrocolloid?

1) More economically used, since it does not require heating and tempering preparation;

2) No special equipment needed;

3) Since no heat is employed in preparation, there is no danger of tissue burns;

4) For the same reason, the patient may be more cooperative during the positioning of the tray;

(SINCE THE WARMTH OF BODY TISSUES HASTENS GELATION ON THOSE SURFACES, THERE IS MORE DANGER OF DEVELOPING INTERNAL STRAINS THAN IN THE USE OF AGAR HYDROCOLLOID.)

135) What are some important precautions to be observed in the handling of hydrocolloids?

1) Do not expose to air (there is a rapid dehydration accompanied by shrinkage);

2) Do not immerse in water for long periods (imbibition takes place and expansion results);

3) A Hydrocolloid should be protected from dehydration until it can be filled;

4) To avoid volume change, the impression should be filled at once;

5) The exudate from hydrocolloid has a retarding action on hydrocal and should be avoided (by pouring at once) to prevent a soft, chalky surface.

6) For use in duplication of casts, agar hydrocolloid should be thinned (equal parts water) and should be prepared in a double-boiler.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

IMPRESSION REGISTRATION

136) What are some important points to observe in the making of a hydrocolloid impression?

1) Select a tray which is large enough to provide an adequate thickness of hydrocolloid to avoid tearing in areas of severe undercut;

2) If the maxillary arch shows a high vault, the tray should be built up with utility wax to prevent the hydrocolloid from sagging away from the palate surface before it can gel;

3) Have the first layer of material lock THROUGH the perforations to prevent the pulling of the impression out of place when removing from undercuts:

4) In placing the material in the tray avoid the entrapment of air (add small portions and spread thin);

5) USE A MIRROR (NOT THE FINGER) to retract the cheek as the tray is being placed into the mouth;

6) The patient should be in an upright position so that the tray will be horizontal in order to keep the high palatal portion from sagging;

7) Position the tray first on the patient's left, gradually contacting the occlusal surfaces from left to right to let the air and saliva escape ahead of the hydrocolloid;

8) As the tray is settled to position, deflect the lips to permit the escape of air from the cul-de-sac region;

9) Do not seat the tray too far (leave room for material over the occlusal surfaces;)

10) As the excess hydrocolloid is extruded at the posterior border of the tray, remove it with small mirrors to prevent the impression from sagging in the palate.

11) Do not let the tray move (during geling) to avoid internal strains from being formed;

12) Allow ample time for gelation;

13) After breaking the surface tension, remove quickly in line with the long axis of the teeth with greatest undercut.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE STUDY CAST

137) What are the causes of an imperfect cast?

1) Distortion of the hydrocolloid impression:

   a) By partial dislodgement from the tray;

   b) Shrinkage (caused by dehydration);

   c) Expansion (caused by imbibition);

   d) During the making of the cast (pressing into partly set stone, etc.);

2) Volumetric change due to incorrect water-investment ratio;

3) Improper mixing (resulting in a weak cast);

4) Insufficient vibration to bring the entrapped water or air to the surface;

5) Cast has a soft or chalky surface due to:

   a) The retarding action of the hydrocolloid exudate;

   b) The water of crystallization of the slow setting hydrocal is lost to a dehydrating hydrocolloid; (To prevent immerse in water as soon as the impression is filled);

6) Removal of the cast from the impression too soon;

7) The surface of a cast may become roughened by immersion in water too long.

138) What is a "study" cast?

A study cast is an accurate replica of the teeth, adjoining tissues (including the palate in a maxillary arch) and the residual ridge of a partially edentulous dental arch.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE STUDY CAST

139) Is a thermoplastic impression material (wax or compound) suitable for the making of a study cast?

NO. These materials will permanently distort when they are removed from undercut areas. Accuracy of the study cast is essential in order:

1) That the actual tooth form and tooth relationship be known so as to plan the necessary mouth changes with accuracy;

2) To avoid faulty deductions which would lead to mistakes in planning the design of the appliance.

140) What are the requirements of suitable study cast?

1) The first requirement is accuracy;

2) Since the study cast will be used to demonstrate to the patient his oral condition, it should be neatly finished and preferably of a light colored stone;

3) To avoid abrasion of the cast, it should be made of a hard hydrocal;

4) The top of the capitol of the maxillary cast should be parallel to the base of the mandibular cast when they are related in centric occlusion;

5) The sides of the capitol and base should be uniformly reduced and properly smoothed.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

THE STUDY CAST

141) What are the uses of a study cast?

1) Examination of a study cast by means of a surveying instrument will disclose the presence of areas of tooth or tissue interference to appliance insertion or removal. These surfaces may then be changed during the preparation of the mouth;

2) Selection, in advance, of the most advantageous path of insertion and removal will make possible the paralleling of the surfaces of restorations being inserted so as to eliminate interference and to provide guiding planes;

3) The amount of clasp retention may be determined by a survey of the study cast before the mouth has been prepared. If necessary, the available retention may then be modified;

4) Study casts are most valuable for purposes of visual education to better inform the patient as to:

   a) His existing dental and oral condition;

   b) The need for and possibility of correction;

   c) Effect of present conditions on the future status;

5) A lingual view of occluded study casts will show:

   a) The degree of vertical closure;

   b) The amount of vertical opening indicated;

   c) Relief needed to accommodate occlusal rests;

   d) The existing and attainable occlusal efficiency;

   e) Adjustments needed to improve occlusal harmony.

6) Essential areas of the cast will be known in advance of taking the final impression. If a defect is present, then its importance may be determined correctly;

7) The interference from anatomic deformities may be determined more accurately;

8) An aid in selecting and modifying the tray for the final impression.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

MOUTH PREPARATION

142) What general treatment may be required before partial denture service is begun?

1) Thorough prophylactic treatment;

2) Treatment of parodontitis;

3) Reduction of acute stomatitis;

4) Treatment in cases of diffuse bone atrophy (assistance of an internist and clinical laboratory is indicated);

143) For what reasons might one tooth be extracted and another selected for use as an abutment?

1) Pulpal involvement (where the host should not retain a devital tooth)

2) Extensive caries (where the remaining portion of the crown does not possess sufficient strength);

3) Insufficient alveolar support remaining;

4) Extreme malposition;

5) Crown form or its occlusal relation unfavorable;

6) Root form unfavorable.

144) What surgical treatment of the remaining teeth may be indicated in preparation for partial denture service?

1) Surgical treatment of parodontal pathology;

2) Resection of the root apex (in some cases of root canal therapy where the apical bone is destroyed).

(IN THIS CONNECTION, REGARD MUST BE GIVEN THE RELATION OF LENGTH OF THE INTRA-ALVEOLAR AS COMPARED TO THE EXTRA-ALVEOLAR PORTION OF THE TOOTH. THIS WILL DEFINITELY INFLUENCE THE ABILITY OF THE SUPPORTING STRUCTURES TO RESIST THE INDUCED STRESS LOADS.)

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

MOUTH PREPARATION

144A) Is it advisable to use a devital tooth as a partial denture abutment?

Merely that a tooth is non-vital need not prevent its use as an abutment support. The use of such a tooth should be determined by weighing those factors which are considered when making this decision about any pulpless tooth:

1) The age and physical condition of the host;

2) The probability of restoring the tooth to a condition of health based on a consideration of:

   a) The extent of apical destruction existing;

   b) The accessibility of the tooth for treatment; Can the canals be opened to the apex?

3) The possibility of successful apicectomy if required.

A DECISION BASED ON THE ABOVE MAY BE INFLUENCED BY CERTAIN FACTORS TO BE CONSIDERED BECAUSE THE TOOTH IS TO SERVE AS AN ABUTMENT SUPPORT:

1) Would the loss of this tooth jeopardize the achievment of a satisfactory partial denture result?

2) Can the crown portion of the tooth be restored in a dependable manner and one economically possible?

3) If apical incision is necessary, will the remaining root give adequate support for the probable stress?

4) Would the probable service expectancy of the appliance be materially shortened by its use as an abutment?

IF A CAREFUL STUDY OF THESE POINTS RESULTS IN AN UNFAVORABLE PROGNOSIS, THEN THE TOOTH SHOULD NOT BE USED BUT NOT SIMPLY BECAUSE IT IS DEVITAL. HOWEVER, IT SHOULD BE REMEMBERED THAT NO TOOTH IS SO STRATEGICALLY IMPORTANT THAT THE HEALTH SHOULD BE IMPERILED BY ITS RETENTION.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

MOUTH PREPARATION

145) What surgery of the edentulous area may be needed before partial denture service is started?

1) The removal of root remnants;

2) The removal of foreign bodies (when there is evidence of a pathological condition);

3) Reduction of a "knife-edged" (spinous) residual ridge or of sharp points of interdental septa which sometimes occur after extractions;

4) Curettage of an area of residual infection;

5) To remove pathological oral tissues (cysts, tumors, carcinomas, etc.);

6) Removal of osseous growths (torus palinus, etc.);

7) Excision of hypertrophic or flabby soft tissue covering of the residual ridge.

146) What operative procedures may be required to condition the remaining teeth for partial denture service?

1) Elimination of caries in the teeth remaining in the dental arch (this should precede appliance design and construction in order that the retention of all remaining teeth is assured);

2) Increase or reduction of abutment tooth contours (to produce surfaces which will be parallel to the chosen path of insertion and will act as guiding planes);

3) The preparation of occlusal rest areas;

4) Placement of retention areas in the crowns of teeth which are non-retentive in form;

5) Adjustment of existing malocclusion by grinding or by the placement of restorations;

6) To increase the vertical dimension (lengthen crowns);

7) Splinting of weakened teeth by uniting restorations.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

MOUTH PREPARATION

147) In what ways may orthodontic treatment aid in the reconditioning of a mouth for partial denture service?

Orthodontics may be of important assistance in re-establishing a more normal alignment of the remaining teeth before starting partial denture service. This can be the means of reducing the stress loads which these teeth will have to support by obtaining a more normal vertical alignment and lessening the leverage factor. This may also reduce the occlusal trauma that is present. Some uses of orthodontics are:

1) Depressing extruded teeth to a normal occlusal plane;

2) Extruding partially erupted teeth;

3) Realignment of malposed teeth.

148) What general physical treatment may be advised to aid a mouth rehabilitation program?

The success of oral rehabilitation is influenced by the general physical condition of the patient. If this is evidently subnormal, the following may be indicated:

1) Reference to an internist for consultation:

   a) For assistance in diagnosis (the systemic condition might influence the retention of pulpless teeth, for example);

   b) For diagnosis and treatment in cases of evident systemic disease;

   c) For clinical laboratory tests;

2) Advice as to diet:

   a) Urging a balanced diet is desirable as an aid:

      - to improving the general physical condition;

      - maintenance of oral structures (especially bone);

   b) Use of a low carbohydrate diet for the caries susceptible patient.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

MOUTH PREPARATION

149) What difficulties are encountered in accurately positioning an indirect die for the survey of a wax pattern used in the making of an abutment restoration by the indirect method?

1) An accurate impression of the other teeth (to which the inlay or crown is to be paralleled) will require the use of hydrocolloid;

2) It is very difficult to keep a metal die definitely seated in either agar or alginate while the impression is being filled;

3) Another difficulty is that the banded modeling compound impression of the prepared cavity area does not include the convex buccal or lingual surfaces of the abutment (it must avoid areas of undercut to prevent a distortion when it is being removed);

4) In the survey of the cast, an abutment die made from a compound impression does not allow a consideration of the factor of retention (because the retentive contour of the tooth cannot be reproduced);

5) In addition to overcoming the above problems, the procedure suggested in (150) has these advantages to be gained:

   a) The stone study cast which has previously been made will suffice (making another hydrocolloid impression unnecessary);

   b) The cast can be surveyed in advance of the appointment for the operative work and the selected path of insertion be recorded;

   c) After marking the survey position, the abutment tooth (which needs operative correction) may then be cut off of the cast to prepare for the method outlined in (150).

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

MOUTH PREPARATION

150) How may a die be accurately positioned in relation to the other remaining teeth in the partially edentulous dental arch?

1) A hydrocolloid impression of the entire dental arch is taken before the abutment preparation is begun (a convenient time is while waiting for the novocaine anaesthesia to become fully effective);

2) From this impression, a stone cast is made and the sides of the base or capitol reduced and smoothed;

3) Place a copper band of wax over the PREPARED tooth;

4) Place a matrix of plaster over the cap of wax and the adjacent one or two teeth; ($\frac{1}{4}$ inch or more thick);

5) Survey the cast to determine the most suitable path of insertion and removal (with particular reference to adequate retention;

6) Record the survey position with lines on the lateral and dorsal surfaces of the cast;

7) Slice (sawing) and break the abutment tooth from the stone cast to produce sufficient room for the metal die;

8) Taper, polish and lubricate the metal die;

9) Place the metal die in the band of wax and wax securely to the plaster matrix;

10) Trim the edges of the matrix to sharp lines and wax it to position on the stone cast (the metal die projecting into the prepared hold where the abutment tooth was removed);

11) Saturate the stone cast and fill around the lubricated die to a level just below the cemento-enamel junction;

12) Remove the metal die by inserting a sharp pointed instrument into the root surface and prizing against the margin of the stone cast;

13) Carve the wax pattern for the restoration;

14) Return the stone cast to the original survey position. The wax pattern of the restoration may now be formed so as to harmonize with the predetermined path of insertion and removal.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

DESIGN

151) Why should the preliminary survey be made and the approximate design be determined before mouth preparation?

Probable areas of appliance contact with the tooth surfaces should be known at the time of mouth preparation so that:

1) Areas of tooth interference may be reduced;

2) Opposing tooth surfaces may be paralleled to give guiding planes;

3) No area of surface defect will be covered;

4) Any needed change in surface contour to provide suitable retention is planned and executed.

152) What are the possible appliance movements of a Class I partial denture?

1) Rotation at the fulcrum line with the base moving toward or away from the supporting tissue;

2) Lateral movement of the appliance free-end in a horizontal plane;

3) The appliance may tend to tilt laterally upon a fulcrum extending through the occlusal rest and along the crest of the supporting ridge.

153) What is the relationship of the number of remaining teeth in a Class I case and the effectiveness of the indirect retainer?

As more posterior teeth are lost, the fulcrum line moves anteriorly. This has the effect of increasing the power arm of the lever (the appliance from its occlusal rest to the free-end) and of shortening the resistance or work arm of the lever (the indirect retainer). The force generated may exceed the resistance of the direct retainer and the appliance will be lifted away from the supporting ridge.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

DESIGN

154) What is the relationship of the number of teeth remaining in a Class I case and

1) Adequate stabilization:

As more teeth are lost in the right and left posterior quadrants there are fewer to provide stabilization against lateral appliance movement. At the same time, the length of the occlusal table which must be supplied increases with the addition of each tooth. The situation has thus become one in which fewer teeth must resist more stress tending to lateral movement of the partial denture;

2) Control of torque:

With the increase in the length of the occlusal table, the power arm which produces appliance leverage is given more advantage. More cusps are being forced up more cuspal inclines and the tendency to lateral movement is magnified. Thus, the torque stresses in the long Class I appliance are much greater. To further complicate this situation, the form and length of the single bicuspid root is much less resistant to such twisting forces.

3) Aesthetics:

As the teeth which must serve as abutments become more anteriorly located, it becomes more difficult to prevent the display of metal when clasp retention is being used. This is particularly true of the maxillary antorior teeth in a case where the lip is very short.

FOR THESE REASONS, IT IS EVIDENT THAT IT IS WISE TO BE VERY CRITICAL IN THE EVALUATION OF EACH REMAINING TOOTH (EVEN THOUGH DEFECTIVE) BEFORE DECIDING IN FAVOR OF ITS EXTRACTION.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

DESIGN

155) In designing a Class I partial denture, how can the most effective indirect retainer be located?

Draw a line through the marginal ridge area of the occlusal rests of the principal abutment teeth (those which are to provide the major retention). To this fulcrum line, erect the longest perpendicular which ends on a tooth surface capable of providing a definite seat for the indirect retainer.

156) Is it possible to obtain adequate indirect retention in a Class I case in which the cuspids are the abutments?

Frequently it is not possible. Particularly is this true in the dental arch in which the anterior teeth present almost a straight line from cuspid to cuspid. In even a favorable arch form, the length of the indirect retainer in this type of Class I case will be so short as to render it impotent to resist the tendency of the long base to move away from the ridge. In the maxillary Class I to the cuspids, where gravity is added to the other forces which unseats the base, it may be advisable to entirely cover the palatal surface. In this way interfacial surface tension can be utilized to aid in keeping the base in contact with the tissue.

157) In the designing of a partial denture, which is preferable -- the retention of a relatively weak molar as a Class II abutment or the extraction of this tooth and reliance upon a Class I base for the needed support?

It is best to rely upon a careful consideration of all factors in each case before deciding this question. However, it frequently is possible to accomplish a better partial denture service for a longer time by extracting such a questionable tooth than by retaining it. Instances in which this would be true are: the molar has migrated out of normal alignment and nearly out of occlusion (requiring a complicated restoration to bring it back into function); where the tooth presents a fused, conical root form or where because of bone loss, the intra-alveolar portion of the root offers inadequate abutment support; or where the form of the crown is not retentive and a full crown would be required.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

DESIGN

158) What are the effects of the failure to replace missing posterior teeth?

1) In the first place, there is an impairment of masticatory efficiency. With the extraction of a tooth, its occlusal table is not the extent of functional loss because an equal amount of occlusal surface is rendered useless on the opposing arch. Thus, the extraction of a tooth means the loss of two teeth, so far as function is concerned;

2) A second effect is the migration of the remaining teeth, unless a broken dental arch is restored. This tooth disarrangement may lead to several unfavorable results:

   a) the tooth next to the edentulous area may tip out of normal vertical position (the stress upon the alveolar support is then magnified by leverage);

   b) normal contact and marginal ridge relationship may be lost (food impaction may follow, predisposing to caries and parodontal lesions);

   c) extrusion of the opposing teeth and alveolar process may follow (re-establishment of the normal occlusal curve is very difficult);

   d) un-aesthetic spacing of the anterior teeth may result from the loss of posterior teeth;

3) The loss of posterior teeth, which act as stops against interdental muscle pull, places an extra load on the temperomandibular joint (this may lead to a disturbance of the tissues of this area and eventually result in retrogressive change);

4) The work upon the remaining anterior teeth is greatly increased, possibly to the point of exceeding the tissue tolerance of that patient.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

DESIGN

159) What are the possible appliance movements of a Class II partial denture?

1) Rotation at the fulcrum line with the appliance base moving away from or toward the supporting tissues;

2) Lateral movement in a horizontal plane, of the free-end of the appliance base;

3) The appliance may tend to tilt laterally upon a fulcrum extending through the occlusal rest and along the crest of the supporting ridge.

160) Does the loss of additional teeth in a Class II case affect the indirect retention as adversely as in a Class I?

No. In a Class II condition, the fulcrum line will be posteriorly located on one side and the further loss of teeth on the partially edentulous side of the arch, while not desirable, will not shorten the indirect retainer sufficiently to render it ineffective. (See 153.)

161) Why should a Class II partial denture be bilateral in design?

As the free-end of the Class II appliance tends to move laterally, a twisting stress (torque) is transmitted to the abutment of the edentulous side. If the rigid major connector is passed to the opposite side of the arch and anchored by abutment attachment, it becomes an effective lever to resist torque. By increasing its length to the most posterior tooth suitable for this use, the advantage of this lever increases.

Also, in the bilateral design more teeth are employed to resist the lateral appliance movement and so better stabilization is accomplished. Stress loads are distributed to more areas of support, through this design.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

DESIGN

162) Is a unilateral loss of posterior teeth less objectionable than when the edentulous condition is bilateral?

No, in fact the contrary may be true. If a unilateral loss of posterior teeth has existed for a long time, the patient may encounter greater difficulty in becoming adjusted to the wearing of complete dentures than if he had been posteriorly edentulous on both sides:

1) Disuse atrophy of the unused edentulous ridge may tend to make the complete denture less stable;

2) The unused residual ridge may resorb more rapidly and cause the complete denture to become unstable;

3) The patient may have an unequal development of the muscles of mastication as a result of the long habit of unilateral chewing. This may not only produce a facial unsymmetry but also a complete denture unstability;

4) A posterior loss of vertical demension will generally have occurred on the edentulous side, resulting in lack of room for the positioning of the denture teeth so as to obtain occlusal balance;

5) A retrogressive change of the temporo-mandibular joint structures may have occurred on the edentulous side to a greater degree than would have been the case with teeth missing on both sides as in a Class I case.

163) Where the posterior abutment support for a Class III prosthesis is questionable, is a Class II preferable?

Frequently the support to be derived from a properly extended and adapted base of a Class II partial denture will give more satisfactory service with less maintenance than might be had from a questionable molar abutment. Form and length of the root, health of the pulp, vertical alignment of the tooth, degree of bone loss and the amount of the restorative work necessary to make the abutment usable for the support of a removable bridge would be factors upon which to base a decision as to the choice of prosthesis.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

PROBLEMS OF DESIGN

164) What are the reasons for preparing guiding planes on the surfaces (proximal) of the teeth which are to support a partial denture?

1) The principal reason is, of course, to produce opposing parallel tooth surfaces which will act to give a positive direction to the movement of the appliance into and out of position. Since the path of escapement of the retentive clasp arms are made to be OTHER than parallel to these guiding planes, then it follows that the clasps are forced to flex and retention will result;

2) Another important reason would be that the more positive path of insertion might reduce the hazard of tissue impingement, in an area of eminence, by the periphery of a base if haphazard placement by the patient were possible;

3) A third possible benefit of having well established guiding planes is that the restriction of an appliance insertion to a definitely selected path might avoid the excess stress on appliance and supporting tissue which could result from an extreme direction of placement.

165) For what reasons might a partial denture be recommended where only the anterior (cuspid to cuspid) teeth remain and where a maxillary complete denture is also required?

1) Since the retention of the lower complete denture is less perfect due to the reduced interfacial surface tension, it is often desirable to retain the few remaining anterior teeth to provide additional retention and stabilization during the transition period from natural to prosthetic dentures;

2) Even with its admitted defects, such a partial denture may be preferable until the patient becomes more adept in mastication and speech after the loss of his natural teeth;

THE DANGER FROM THE USE OF SUCH A TREATMENT PARTIAL DENTURE IS THAT IT MAY BE WORN TOO LONG AND THAT IT MAY CAUSE UNNECESSARY DESTRUCTION OF THE ALVEOLAR PROCESS THROUGH THE LEVERAGE STRESSES WHICH IT MAY INDUCE IF WORN AFTER A CORRECTION OF THE BASE WAS NEEDED.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

DESIGN

165) What logical division of the Kennedy Class III group of prosthetic appliances may be made?

1) That type of prosthesis which is entirely tooth supported having the terminus of each base supported and retained by an abutment tooth;

2) Those appliances which have a free-end base because the adjacent tooth is not capable of providing support and retention (viz: one with a short, tapered and round root such as the lateral incisor often has).

166) In what ways do the tooth-borne and tissue-borne types of Class III prosthesis differ?

When the appliance is entirely tooth-borne the following conditions are noted:

1) Since the base is supported at each terminus by the occlusal rest, the saddle can have only an anatomic relationship with ridge tissues;

2) Only an anatomic registration of the residual ridge tissues is necessary;

3) Since the base does not have a functional relationship, there will be no need of rebasing and it may be constructed of metal usually;

4) Because the base is retained, movement (during function) away from the tissue cannot take place and no indirect retainer is needed;

5) Since movement of the appliance toward or away from the tissue does not occur, flexibility of the clasp is not needed for stress-breaking and so the use of cast clasps is more common; (adjustability remains the one reason for using a wrought clasp in tooth-borne Class III cases)

6) Another reason for using cast clasps in tooth-borne Class III appliances is to accomplish more splinting effect and the transmission of stress to other supporting teeth.

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DESIGN

167) When should the tooth-borne Class III appliance be of bilateral design?

1) When the number of missing teeth exceeds two or three;

2) The functional stress load is very heavy;

3) The abutment root formation is unfavorable (short, conical or fused);

4) Evidence of bone atrophy susceptibility;

5) Another edentulous condition exists;

6) To splint weakened teeth elsewhere in the arch;

7) To accomplish the benefit of stress reduction through the use of the principle of leverage.

168) When is a tooth-tissue supported Class III design indicated?

1) The terminal tooth is incapable of furnishing complete support (root formation poor, stress load too great - as second molar to lateral incisor);

2) Strengthening of terminal tooth by splinting is not advisable;

3) Retention of terminal tooth (though unsuited for abutment use) is preferred;

169) What are some characteristics of the tooth-tissue supported type of Class III appliance?

1) The problems of design are comparable to a Class II (the free terminal of this Class III extends anteriorly, instead of posteriorly as in the Class II);

2) Its support is principally from the subjacent tissue (as in a Class II);

3) Indirect retention is required (unlike the tooth-supported Class III);

4) Registration of functional tissue form is needed (as in a Class II and unlike a tooth-borne Class III)

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

DESIGN

170) How do the probable appliance movements of a Class IV partial denture compare to those of other classes?

Compared to the type having a free-end base (Classes I, II or a tissue-borne III, the bilateral stabilization of the Class IV base:

1) Lessens its tendency to lateral movement;

2) Reduces torque stresses on the abutment teeth;

3) Being usually shorter, also, its base produces less leverage magnification of the stress loads;

4) Since vertical movement of this appliance type is most likely, emphasis is placed on the importance of maintaining base support and of obtaining the best possible indirect retention;

5) Aesthetic arrangement of the anterior teeth to be supplied, may necessitate their placement in a poor relationship to the supporting ridge (not at right angle), resulting in tilting leverage;

6) The act of incising and an over-jet tooth arrangement greatly augment this tilting leverage.

171) What are some other difficulties which may be encountered in Class IV design and construction?

1) More display of metal (particularly clasps);

2) Obtaining a good base support is often difficult, if accident or disease has destroyed the bone;

3) Good indirect retention may be impossible;

4) When the patient is a pipe smoker, the leverage generated in this way adds to the already severe tilting stresses induced by the Class IV appliance;

5) The desire to reproduce the natural tooth arrangement may frequently result in very unfavorable alignment from the standpoint of stress control.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

DESIGN

172) What is the relationship between the number of remaining teeth and the problems of Class IV design?

1) As in the case of Class I and II appliances, the loss of a greater number of teeth from the dental arch will result in a longer occlusal table and in the transmission by the prosthesis of greater stress;

2) With the increase of appliance length comes more stress magnification through leverage;

3) To further complicate stress control, there are fewer teeth to offer stabilization;

4) With fewer remaining teeth in the Class IV case, the fulcrum line moves distally, resulting in a shorter, less effective indirect retainer.

FOR THESE REASONS, IT IS EVIDENT THAT IT IS WISE TO BE VERY CRITICAL IN THE EVALUATION OF EACH REMAINING TOOTH (EVEN THOUGH DEFECTIVE) BEFORE RECOMMENDING ITS EXTRACTION.

173) Does analogy exist between the problems of design which are to be found in different cases belonging to the same classification?

Yes. In general, the same basic principles of design are to be applied in one Class II case (for example) as will be in another of the same class. One cogent reason for a dependable system of classification is that one will then need to know the application of only a few basic designs in partial denture prosthesis.

There will be variations in the designs for different cases of the same classification but this is in the matter of details which, of course, must be modified to meet the individual conditions.

One should concentrate on the application of principles in the designing of a partial denture. Never add a unit unless you can justify it as having a definite function to perform and then so design it that it may discharge that function most effectively.

A major consideration in the design of any partial denture is to so apply the basic rules of physics that stress magnification may be avoided and, if possible, stress minimization may be accomplished.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

STRESS CONTROL

174) What precautions are necessary to assure that the remaining oral tissues are not subjected to destructive stresses by a partial denture?

1) Each induced stress resulting from the wearing of a partial denture must be kept safely within the limits of the tissue tolerance of that individual;

2) Since individual tissue tolerance may vary from time to time and from one individual to another, induced stress loads should always be kept minimal:

3) One of the important reasons for regular, periodic rechecks as a part of partial denture maintenance is to detect evidence of stress overload and to correct this.

175) What is the nature and effect of a stress resulting from an inaccurate appliance?

1) A continuous pressure from an appliance which is either too large or too small;

2) Tends to disarrange the teeth contacted;

3) Traumatic occlusion may result from tooth movement;

4) Impingement of ridge tissues or the parodontal membrane is frequently caused.

176) What are some common causes of partial denture inaccuracy?

1) A faulty mouth or duplication impression;

2) Improper care of the hydrocolloid impression (resulting in expansion or contraction);

3) Incorrect proportions of water to investment;

4) Abrasion of casts;

5) Incorrect expansion of the casting mold;

6) Distortion (during soldering, heat treatment or polishing); or excessive polishing.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

STRESS CONTROL

177) What is the nature and effects of the stress caused by an interference to an appliance insertion and removal?

1) Intermittent (lasting only momentarily);

2) Causes temporary tooth disarrangement;

3) Impingement of ridge tissues or parodontal membrane;

4) Teeth involved may become loose.

178) What is the cause of interference during the insertion or removal of a partial denture?

1) Lack of parallelism of the tooth surfaces contacted by the appliance surfaces.

179) How may interference to partial denture insertion and removal be prevented?

1) Relief of enamel contours (during mouth preparation);

2) Reduction of tooth contour by inlays-crowns;

3) Surveying a block-out of the undercut areas to conform to the chosen path of insertion and removal;

4) Relief of the finished appliance.

180) What is the result of an impingement of the gingival tissues adjacent to the remaining teeth?

1) Produces a tissue inflammation;

2) Swelling follows the hyperemia to increase impingement;

3) Tissue destruction results in gingival pocket formation.

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STRESS CONTROL

181) What measures may be taken to eliminate or at least reduce gingival impingement?

1) Use of proper occlusal rests;

2) Avoid excessive polishing of the tooth surface of the occlusal rest;

3) Relieve appliance at gingival crossing;

4) Periodic recheck for need of further relief when settlement of the partial denture may have occurred.

182) What is the nature and effect of locating an occlusal rest upon an inclined surface of an abutment?

1) On such support, the partial denture may slip when a functional load is applied;

2) The molar or bicuspid abutment is forced in a proximal direction and the cuspid labially so as to impinge the parodental membrane;

3) The prosthesis is forced away from the abutment;

4) This movement of the mandibular appliance may cause an impingement of the subjacent tissue at the distal periphery, if the process slopes abruptly upward;

183) How may we prevent the stress resulting from the use of an inclined surface as the support for a rest?

1) Reduce the angle formed by the occlusal rest and minor connector to less than 90 degrees (have the floor of the rest preparation slope toward the abutment crown center);

2) Increase the height of the cingulum of an anterior tooth so as to eliminate the lingual incline;

3) When this change is not possible, employ an embrasure-hook to engage the labial angle;

4) When an acute angle preparation is not possible on a posterior tooth, use a secondary occlusal rest to prevent slippage of the primary rest.

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STRESS CONTROL

184) In what different ways may the major connector impinge the subjacent tissue?

1) If it is not rigid, the major connector may flex and impinge the tissue lying beneath it at the point of flexure;

2) A lateral shifting of the partial denture position may cause pressure impingement of the underlying tissue (usually near the abutment);

3) Under certain conditions the partial denture may settle, so as to bring pressure on the tissue crossed by its major connector.

185) Under what conditions is the major connector most likely to cause tissue irritation by flexing?

1) It most commonly occurs under the lingual-bar type of major connector;

2) As the bar flexes, it is forced into contact with the tissue which it crosses;

3) A mandibular Class II appliance, having a much longer lingual-bar, is most likely to produce this sort of pressure impingement (flexure is directly proportional to the cube of the length);

4) It is most frequent with the wrought lingual-bar.

186) How can flexure impingement be prevented?

1) Cast the lingual-bar, using less flexible alloy;

2) Increase the bulk of the connector (thicken);

3) Alter the form (use $\frac{1}{2}$-pear, instead of a flat form);

4) Some alloys may be made more rigid by proper tempering;

5) Add a secondary bar across the lingual surfaces of the anterior teeth;

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

STRESS CONTROL

187) Suggest ways of avoiding the impingement of tissue by the major connector in lateral movement of the partial denture.

1) Provide a slight space beneath the connector by blocking-out before duplication of the master cast;

2) Employ more rigid stablizing units (reciprocal arms);

3) Relieve the appliance in the area of impingement; (Care should be exercised not to make the connector flexible by lessening its thickness too much).

188) May tissue irritation be caused by a major connector because of settlement?

Yes - appliance settlement may result from:

1) Excessive polishing of the tooth surface of the supporting units of a prosthesis (occlusal rests principally);

2) The use of soft filling materials for the support of occlusal rests;

3) Intrusion of the teeth supporting the appliance may occur so as to cause pressure contact against the tissue:

a) When the abutment teeth have been out of occlusion for some time;

b) The patient exhibits a pronounced susceptibility to alveolar atrophy;

c) The increase in vertical opening has been excessive placing the jaws under a muscle strain.

189) When should a relief space under a connector be made?

1) In cases showing susceptibility to alveolar atrophy;

2) Where the abutments have been out of occlusion for some time and are extruded;

3) Where the lingual tissue slope is less vertical.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

STRESS CONTROL

190) How may impingement of the major connector because of appliance settlement be avoided?

1) Use only areas of enamel or hard alloy restorations for the support of occlusal rests;

2) Burnish, instead of grinding, the supporting surfaces of an appliance casting to obtain a finish;

3) If the teeth to be used as abutments have not been in occlusion or if, because of a tendency toward alveolar atrophy, there may be intrusion of the abutments, then a relief space should be provided before duplication of the master cast is done;

4) If the connector is sufficiently thick, it may be reduced in the area of impingement to give relief (it must not be made thin enough to become flexible).

191) What is the nature and effect of torque (twisting) stresses transmitted to the abutment?

1) Torque develops from the lateral movement of the free end of the partial denture base;

2) This destructive force is most common in Classes I and II cases;

3) Lateral movement results when the occlusal surfaces are contacted with force and is greatest when:

a) The cusps are high or the cuspal inclines steep;

b) The occluding surfaces are not harmonious;

4) Torque stress tends to turn the tooth in its alveolus; it is greatest when:

a) The stress load is heavy;

b) The abutment root is single, round and tapered;

c) The clasp is rigid throughout and with no provision for stress relief.

5) The ultimate result of torque is bone destruction.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

STRESS CONTROL

192) What measures may be applied to effectively reduce the amount of torque stress to which the partial denture abutment is subjected?

1) Reduce the cusp height and cuspal inclination;

   Adjustment of the remaining teeth should be done during mouth preparation;

   The supplied teeth are then harmonized to the jaw movements of the patient;

   The amount of torque is determined by the degree of occlusal harmony achieved in each case;

2) Increase the area covered by the base;

3) Improve the tissue adaptation of the base;

4) Employ a rigid major connector;

5) Carry the major connector to the opposite side of the arch for abutment anchorage so as to obtain the maximum effect of favorable leverage;

6) Utilize the "stress-breaking" effect of the wrought retentive arm of the combination clasp;

7) Resort to the rigid union of multiple abutments to provide better resistance to torque stress and to distribute it over more area of supporting bone.

193) What stress causes the proximal tilting of abutments?

1) The bilateral partial denture tends to rotate about its fulcrum line (see 99);

2) Since this vertical movement of the base of such an appliance may be either toward or away from the subjacent tissue, it follows that the tilting of the abutment tooth in its alveolus may be either toward the distal or the mesial, depending upon the direction of movement.

3) The location of the areas of impingement will be determined by the direction of the tilting force.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

STRESS CONTROL

194) Where are the areas of impingement when the base moves toward the supporting ridge?

Impingement occurs on two areas of the alveolus wall:

1) On the proximal surface crest of the alveolar process and adjacent to the edentulous area;

This is the more serious irritation because of the proximity of oral bacteria - a continued irritation near the gingival free margin may lower the tissue resistance, allowing bacterial invasion and pocket formation;

2) On the proximal wall of the alveolus toward the root apex and opposite the edentulous area;

This impingement usually causes a thickening of the parodontal membrane but does not lead to a bacterial invasion, because of its remoteness from the oral cavity flora;

There is a remote possibility of pulp devitalization if there is a lateral apical opening for nerve and blood supply;

195) In what ways may the movement of the partial denture toward the supporting ridge be limited?

1) Improve the subjacent support: (Surgical reduction of areas of hypertrophied, movable tissue);

2) Extend the base to include the maximum area of support;

3) Obtain and maintain the best possible tissue relationship of the base;
Loss of support may be detected by wax-bite test or by displacing the appliance with an instrument;

4) Dissipate the remaining leverage forces by the use of a flexible wrought retentive clasp arm.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

STRESS CONTROL

196) What is the nature and possible effects of the stress produced by the movement of the partial denture base away from the subjacent tissue?

Again, two areas of impingement occur on the proximal alveolus surfaces;

1) One area of irritation is near the crest of the alveolar wall which supports the root surface farthest removed from the edentulous area;

This impingement is lessened to some degree, if the abutment is in good contact with well supported adjacent teeth;

2) A second area of impingement is located toward the root apex and on the surface nearest the edentulous area;

This is usually less serious than the first, since it is more remote from the oral flora.

197) How may movement of the base away from the supporting ridge tissue be reduced to a minimum?

1) Shorten the peripheries of the base, if there is encroachment upon moving tissues;

2) Reduce the weight of the maxillary appliance to lessen the effect of gravity;

3) Finish the appliance so as to lessen the pull of food;

4) Employ complete palatal coverage in extensive Class I cases to obtain surface tension support as an aid to the less effective indirect retainer in these cases;

5) Utilize the best possible indirect retention;

6) Dissipate the remaining leverage stresses by the use of flexible retentive arms; and united multiple abutments.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

PRELIMINARY EXAMINATION

198) What considerations should be especially stressed in an oral examination preceding prosthetic service?

1) The complete oral examination should precede the execution of any restorative part of a mouth rehabilitation program;

2) Examination should not be limited to any single area of the dental arch in question;

3) An examination should be complete - most errors arise from a lack of sufficient information regarding the existing conditions;

4) The preliminary examination should be accomplished in the least time consistent with thoroughness:

a) To conserve the dentist's operative time;

b) To minimize the cost of such examination;

c) To have an early estimate of the cost of service.

5) During examination, the goal to be kept foremost in mind should be that of maintaining the remaining oral structures in the best possible condition for the longest possible time.

199) The decision to attempt partial denture service in the case at hand should be based upon the belief that what objectives could be reasonably achieved?

The following goals should be kept in mind and should pervade all considerations as to the choice of the prosthetic service to be rendered:

1) The elimination of infection from the dental arch then being considered;

2) The restoration, partially at least, of the impaired or lost dental functions;

3) To prevent the migration of the remaining teeth with its accompaning disorganization and possible retrogressive tissue change - "to preserve that which remains".

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

PRELIMINARY EXAMINATION

200) What factors should be given special consideration in making an examination preliminary to prosthetic service?

1) The patient's age and status of oral and systemic health;

2) The probably length of service which might be expected from the proposed partial denture;

3) How adequately dental functions might be restored by means of a partial denture;

4) The comparative cost of complete and partial denture services in relation to the patient's economic status.

201) In deciding for or against the retention of teeth which are questionable from a health standpoint, what points are to be particularly studied?

1) The age of the patient;

2) His present and probable future health status;

3) The presence and condition of pulpless (non-vital) teeth and the advisability of their retention (144A).

THE DECISION TO RETAIN TEETH WHICH ARE QUESTIONABLE FROM A HEALTH STANDPOINT CARRIES A GRAVE RESPONSIBILITY AND MEDICAL CONSULTATION FREQUENTLY MAY BE ADVISABLE.

202) What factors may influence the probable length of service which a partial denture may give?

1) The patient's susceptibility to alveolar atrophy;

2) The amount of alveolar loss already sustained;

3) The patient's caries susceptibility;

4) The oral hygiene habits of the patient;

5) The patient's cooperation in the maintenance of the appliance and the remaining teeth.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

PRELIMINARY EXAMINATION

203) What points, relative to the restoration of function, are to be considered in choosing between complete and partial denture service?

1) Can a reasonable degree of masticatory function be obtained by using a partial denture?

2) Can the teeth be positioned to give an acceptable function and still have a proper relation to the supporting ridge, so that a leverage magnification of the functional stress load will not result?

3) Are the opposing teeth in such abnormal alignment as to make it impossible to achieve balanced occlusion?

4) Are the remaining teeth so unaesthetic as to warrant their removal in order to improve the appearance?

204) Will partial denture service entail a greater cost than that by means of the complete denture?

VERY CERTAINLY, for these reasons:

1) In the first place, there may be several of the remaining teeth which require restorations because of caries or the presence of defective or unsatisfactory fillings or inlays. Not infrequently, this expense may exceed that of the partial denture itself;

2) Because of its exacting requirements, the cost of the construction of the partial denture will also exceed that of the complete denture. This is because of the additional time requirement, as well as the material cost of the mental used;

3) Lastly, the maintenance expense for the partial must, necessarily, be more than for the complete denture. The remaining teeth will require restorative attention no less after the placement of a partial denture than before - perhaps, this need may be even greater. Then too, the partial denture will require correction of the base whenever atrophic change of the supporting tissue has occurred. The urgency of this adjustment necessitates periodic rechecks to make sure that correction is made promptly before damage to the abutment supports has occurred (the appliance acting as a lever will magnify the stress load).

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

PRELIMINARY EXAMINATION

205) What are the divisions of an oral examination to precede partial denture service?

1) Prophylaxis and "treatment fillings" are necessary preliminary steps which should precede examination;

2) A radiographic survey of both dental arches;

3) A vitality test of each remaining tooth;

4) An exploration of the teeth and oral tissues;

5) A survey of accurate study casts.

206) Why is a prophylactic treatment necessary before an oral examination is made?

THE REMOVAL OF DEPOSITS FROM AND THE POLISHING of the surfaces of the remaining teeth are essential steps if a satisfactory exploration and accurate study impressions are to be made.

207) For what reasons are temporary "treatment" fillings indicated before attempting an oral examination?

1) The extent of the caries may be better estimated and the availability of the tooth more certainly determined;

2) The carious tooth is made comfortable, pulpitis reduced and caries arrested, pending more permanent restoration;

3) A reasonable degree of function is restored by the use of base-plate gutta-percha as the outside layer of the temporary filling;

4) Normal proximal relationship may be restored, where tipping has occurred, before final restoration;

5) More accurate study impressions are possible when the cavity undercuts are eliminated.

THE FOREGOING ADVANTAGES CANNOT BE HAD BY THE USE OF "TEMPORARY STOPPING" ALONE.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

PRELIMINARY EXAMINATION

208) What is meant by a temporary "treatment" filling:

THE FOLLOWING METHOD OF PLACING A "TREATMENT" FILLING IS SUGGESTED:

1) Isolate the tooth with cotton rolls and remove the loose carious dentine with spoon excavators;

2) Dry the cavity with warm air (desiccate);

3) Apply a very thin mix of eugenol and zinc oxide or Medi-Cement;

4) Add a thicker mix (thick cream) of these drugs;

5) Place a pellet of "temporary stopping;"

6) Fill the cavity with very hot base-plate gutta-percha;

7) Adapt gently to cavity walls and seal with a hot instrument;

8) Remove the excess and adjust to correct occlusion.

209) How would you justify the expense of a complete X-ray examination of a mouth requiring partial denture service?

1) In order to be more certain of fulfilling the most important objective of dental service - the elimination of dental foci of infection;

2) To better evaluate the probable resistance of the alveolar bone to induced stress loads - "how long may the partial denture be expected to serve?";

3) To more accurately appraise the remaining teeth as abutment supports (length, size, form and number of tooth roots; the amount of supporting bone, etc.);

4) To locate root remnants, foreign objects, cysts, areas of residual infection or sharp points of bone process in the edentulous area;

5) To aid in the discovery of beginning or recurrent caries and to more certainly determine the dependability of the restorations which may already be present in the teeth to be used as supports.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

PRELIMINARY EXAMINATION

210) How may the probable reaction of alveolar bone to stress loads, which a prosthesis may induce, be dependably predicted?

1) By a radiographic study of areas of the alveolar process which are known to have sustained, for a considerable time, stress loads greater than the rest of the dental arch under study;

The previous response of that individual's bone to a greater-than-normal stress can be taken as an indication of how it will most likely respond to an increased future stress which the partial denture might add;

Such "index" areas are to be found supporting teeth:

a) Which are subjected to more than normal stress by having to assume the functional work of adjacent teeth which are missing;

b) Which are being subjected to stress overloads from occlusal interference (traumatic occlusion);

c) Which have tipped out of normal vertical position so that the stress load is being magnified by the factor of leverage.

2) Some authors state that the reaction of the supporting bone to additional stresses can be predicted on a basis of its radiographic "density". Such prediction is open to criticism because:

a) Favorable response to such stress loads is seen in both "dense" and less dense bone structure;

b) There is lack of agreement as to whether dense or less dense bone assumes extra stress loads more favorably (without atrophic change occurring);

c) The apparent density of the alveolar process varies (radiographically) in the same specimen, when there is a change in the angulation of the film or in the exposure or processing time. Hence, the apparent density of bone as shown in the radiograph is a variable and as such is not a dependable measure upon which to base so important a prediction;

d) There exists a wide difference of opinion as to what is "dense".

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

PRELIMINARY EXAMINATION

211) Why should a vitality test supplement a radiographic survey in an oral examination preceding partial denture prosthesis?

1) To detect a degeneration of the pulp tissue which may not be decernible in the radiograph of that area;

2) To assure elimination (by treatment or extraction) of a pathologic condition which might then be or later become a foci of toxic or infective material;

3) To permit the planning of the appliance design so as to allow the later addition of a tooth which, if then permitted to remain, might be extracted at a later date.

212) What methods are most dependable for determining the vitality of pulp tissues?

1) Of the various types of electrical pulp testing instruments, the high frequency type (Burton vitalometer) has seemed to be particularly dependable;

2) A supplementary test utilizing cold (ice) and heat (as from a hot instrument) also may be used in cases in which results from the above test seemed less positive;

NOTE: A comparison of the vitality responses of the same tooth at different periods is of value in disclosing a slow degenerative process in the pulp tissues. Danger of systemic involvement from absorption of protein toxins thus liberated must be considered.

213) What are the requirements of a suitable study cast?

(See question #140, page #51)

214) What are the uses of a study cast?

(See question #141, page #52)

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

PRELIMINARY EXAMINATION

215) What data of particular significance in partial denture prosthesis may be obtained in a careful oral examination?

1) The form and firmness of the ridge tissues;

2) The presence of sharp, spine-like irregularities of the underlying bone decernible by palpation;

3) Anatomic abnormalities (such as a torus growth);

4) Inflammation of the mucosa or other deviation from the normal tissue tonus;

5) Abnormal form or alignment of the remaining teeth;

6) Relationship of the upper and lower dental arches and remaining teeth;

7) The presence of caries, demineralized areas of the enamel and the condition of tooth restorations;

8) The proximal relationship of the remaining teeth (particularly contact and marginal ridge height);

9) Teeth showing occlusal disharmony or extrusion which may require adjustment;

10) The reduction of abutment support as evidenced by a gingival recession or increased tooth mobility;

11) Oral hygiene habits of the patient as indicated by the mouth condition;

12) The presence of areas of localized irritation caused by calculus deposits, faulty restorations or food impaction should be noted and corrected.

Prepared at the School of Dentistry, University of Michigan
Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

PRELIMINARY EXAMINATION

216) Why should the partially edentulous dental arch be restored by prosthetic means?

1) To prevent the migration of the remaining teeth and the retrogressive changes which usually follow;

2) To restore to more nearly normal the impaired dental functions;

3) To prevent overwork and the possible traumatization of the structures supporting the remaining teeth;

4) To maintain the normal jaw relationship and to lessen retrogressive chances in the tissues of the tempero-mandibular joint area.

217) Would it not be more practical to extract the remaining teeth and have a complete denture at once?

Frequently this will be the decision. A careful evaluation of all of the factors involved should be the basis of the choice of the service given. The following points should be particularly noted:

1) For the patient showing a marked susceptibility to alveolar atrophy, extraction of the remaining teeth may be the most conservative treatment;

2) If there exists a pronounced susceptibility to caries with little desire on the patient's part to effect its control, retention and repair of the teeth might not be the wisest procedure;

3) How well can function be restored by means of the partial denture as compared to that obtainable by the use of complete dentures?

4) Does the probable length of service from a partial denture seem to warrant the additional cost of this service?

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

PRELIMINARY EXAMINATION

218) What differences, of a prosthetic significance, may be noted between the maxillary and mandibular ridges?

1) A maxillary ridge provides a greater area for appliance support;

2) A mandibular ridge terminates both buccally and lingually in tissues which may have functional movement but in the maxillary ridge there is muscular attachment only on the buccal side (except at the posterior portion of the palatal periphery);

3) The mandibular ridge tissue does not include adipose tissue or mucous glands (of any appreciable amount) as does the palatal slope of the maxillary ridge;

4) The vascular supply to the maxillary ridge tissues is more abundant than that to the mandibular;

5) The tissue covering of the mandibular ridge is normally more uniformly distributed and is less displaceable than is that of the maxillary ridge.

Because of these differences the following points should be noted in the construction of partial denture:

1) Because of its greater area of support (and perhaps a better vascular supply to the maxillary tissues), the base of the upper partial denture requires less frequent rebasing. The average mandibular appliance should be such as to allow easy and inexpensive correction when tissue change occurs;

2) The greater extent of periphery of the mandibular appliance adjacent to moving tissues requires meticulous care in the impression registration so that these tissues will not be encroached upon in their normal functional movement.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

APPLIANCE SUPPORT

219) From what sources does the partial denture receive its support?

(See question #116, page #42)

220) Upon what does the stability of the partial denture base depend?

(See question #117, page #42)

221) Does the surface contour of the residual ridge vary?

(See question #120, page #43)

222) What is the relationship of the quality of the support obtained for the partial denture base and the control of the stresses transmitted by the appliance?

1) The more definite the support given to the base, the less will be its lateral and vertical movement;

2) The less the appliance movement which takes place, the smaller will be the magnification (through leverage) of the induced stress loads to the supporting tissues.

223) Why is the attempt at uniform stress distribution over the area of supporting tissue an important factor in the adaptation of the partial denture base?

1) Because it is covered, the tissue of the endentulous ridge is denied the stimulation of various contacts which have the effect of massage (food, tongue, thermal stimuli, etc.), it, therefore, needs the stimuli to be had from supporting the base;

2) Unless functional stimulation is supplied, disuse atrophy may result;

3) The likelihood of overwork of the firmer areas and a possible pressure atrophy is decreased;

4) By preventing under-stimulation or overwork of ridge tissues, the frequency of rebasing is lessened.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

FUNCTIONAL IMPRESSION

224) What is meant by the "functional form" of the residual ridge (subjacent) tissues?

1) The term "functional" is used here to mean the shape of the residual tissue when it is functioning to uniformly support the partial denture base;

2) Subjacent tissues are displaceable to varying degrees depending upon their structure. The registration of their form must be obtained at the moment each unit of ridge surface begins to furnish support to the impression material;

3) Since this will vary according to tissue displaceability, it follows that such an impression must be made using a material which is readily correctible.

225) To what degree should the tissue supporting a base be displaced?

1) Only to the degree that it begins to offer support;

2) Short of this relation, the subjacent tissue may undergo disuse atrophy from lack of sufficient stimulation;

3) If displaced more than this amount, blood circulation in the tissue may be reduced (ischemia) which, if continued, would result in pressure atrophy.

226) What are the requisites of an impression registration for the construction of a partial denture?

(See question #122, page #44)

227) What is meant by "fluid-wax" impression material?

1) Simply that these special waxes are applied in a fluid or molten form to the individual tray which has been made to fit a cast of the patient's dental arch;

2) The waxes are not fluid when the impression is taken but, being thin additions to the surface, have congealed as the wax quickly cools to room temperature.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

FUNCTIONAL IMPRESSION

228) What are the objections to the use of plaster washes, pastes, etc., to record the ridge form?

1) Such materials, being semi-fluids, record more nearly the anatomic form of the tissues (these are not displaced to the point of furnishing support);

2) Since the flow of these materials varies, the amount of tissue displacement achieved is always uncertain. Too many variables influence this rate of flow:

a) Proportions used in the mix;

b) Temperature of the ingredients;

c) Time elapsing before placement of the impression;

d) Quantity of the mass in a given area;

e) How effectively the material is confined.

229) Can any wax be melted and used in the making of a functional impression?

VERY DEFINITELY, NO.

1) In order to eliminate variable factors, the physical properties must be carefully controlled;

2) These properties must vary to meet the requirements of special uses of each wax in the series;

3) The various waxes must be distinctively colored to make identification easy and positive.

230) How should the fluid waxes be heated?

1) To avoid over-heating and to maintain constantly a best working temperature, a waterbath is necessary;

2) Overheating may alter the physical properties and when the waxes are too cool the application of additional layers is made difficult;

3) If the melting vessel is heavy, a more uniform temperature is maintained.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

FUNCTIONAL IMPRESSION

231) What are the requisites of waxes suitable for use in the registration of functional tissue form?

1) There should be a series of waxes modified to meet the various needs;

2) The waxes should be distinctively colored to make identification easy;

3) Adhesiveness makes for secure binding of the successive layers;

4) One wax of the series should be sufficiently hard to serve as a temporary base or to strongly reinforce the extension of a periphery;

5) The wax surface should show a gloss when it is being supported by the underlying tissue;

6) It should record fine detail and have a smooth surface;

7) The wax should flow enough at body temperature so that any excess (which might cause ischemia) will be displaced to the periphery of the impression;

8) The flow of the wax should be high enough to displace movable tissue so that it will have some functional contact with the base.

232) How is the fluid wax impression supported?

1) After the metal casting is completely adjusted, cover the lubricated stone cast (in the saddle area) with #1 Kerr Korecta wax;

2) Heat the metal attachment lugs and quickly seat into the wax;

3) Add more wax to cover the metal frame and produce a smooth temporary base with rounded peripheries;

4) Place the appliance in the mouth the day before the functional impression is to be made (it should not be removed). BE SURE THAT THE OCCLUSAL RESTS ARE ADJUSTED AND THE BASE IS NOT TOO LONG.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

FUNCTIONAL IMPRESSION

233) Why should the partial denture casting and the temporary wax-base be worn before the functional impression registration is made?

1) The appliance will need to be removed and inserted many times during the impression procedure. After initial wear, this can be more easily done and so the hazard to the impression is lessened;

2) Slight tooth movement might have occurred in the interim between the hydrocolloid impression and the finished casting. In such case, the appliance will be more perfectly seated a few hours after insertion.

3) At the time of the impression it is most important that the appliance be positioned on the supporting teeth exactly as it will be during later wear because in this method not only is the form of the base recorded but, also, its precise relation to the rest of the appliance.

TO ACCOMPLISH THE DESIRED RESULT, THE APPLIANCE SHOULD BE KEPT IN POSITION UNTIL THE NEXT APPOINTMENT (AT LEAST TWENTY-FOUR HOURS LATER)

234) How prepare for the fluid-wax functional impression?

1) Remove the appliance and cleanse it and the ridge tissues to remove any debris;

2) Inspect the tissue for any area of irritation;

3) Arrange the following: master cast, bunsen burner, air syringe, SSW #7 spatula, Bard-Parker lancet, large spoon excavator, small paper clips, a side cutting plier, thumb forcep and cotton plier.

4) A supply of #1 and #4 Kerr Korecta wax shall have been prepared ready for use. Keep the water bath just below the boiling point for the best results.

5) Separate brushes should be available to prevent the mixing of the waxes;

6) Have the surface dry and clean.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

FUNCTIONAL IMPRESSION

235) What is the first objective to be attained in the making of a functional impression?

The impression surface is to be brought into a relation with the tissue so that it is supported throughout:

1) The #4 wax (orange) will appear glossy in areas which are being supported;

2) Areas not yet receiving support will appear dull;

3) A thin film of the impression wax (#4) is repeatedly added to the dull areas ONLY (have the surface dry);

4) The procedure should be one of building-up to a relation of support rather than reducing a surplus down to a relation which is free from over-displacement of the underlying tissue;

5) Each time an addition of #4 wax is made, the appliance is reseated completely to position against the teeth for about 1 minute only;

6) Compressed air must be used to thoroughly dry a surface before adding more wax (use of a chip-syringe wastes time and fails to properly dry);

7) If the #1 wax base or the metal structure should be so close to the surface as to show through the impression wax, cut some away to provide a greater thickness of #4 wax (failure to make this relief would result in an area of soreness because of impingement);

8) Be sure that there is ample thickness of the impression wax in the area near an abutment to avoid any tissue displacement (the tooth provides all support in this area of the base);

THIS OBJECTIVE SHOULD BE ACHIEVED QUICKLY - ONE MINUTE IN THE MOUTH AFTER EACH WAX ADDITION IS ENOUGH

Prepared at the School of Dentistry, University of Michigan
Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

FUNCTIONAL IMPRESSION.

236) What is the second objective step in obtaining a proper functional impression?

The #4 impression wax is extended to obtain the maximum coverage by the base:

1) Maximum coverage means that the peripheries have been extended to the line of extreme tissue movement;

2) To determine the line of maximum movement, the most extreme tissue action should be simulated;

3) The appliance must be kept completely seated as these tissue actions take place so that the margin of the wax is turned instead of the base being raised;

4) If no wax turn shows at the periphery, add an excess of #4 wax just inside the margin and repeat the action:

5) If the #4 wax extends beyond the temporary base of #1 wax, remove (with a sharp lancet) the outside film of #4 and add more of the hard wax to reinforce;

6) If much extension is needed, a portion of a small paper clip may be heated and put into the outside surface of the base wax;

7) No reinforcement metal should interfere with tissue movement at the periphery;

8) Additions of #1 wax should be chilled before another correction of the impression is attempted;

9) Tissue movements include: a) extend buccal or labial tissues as they would be moved in the act of yawning, b) open the mouth very widely, c) swallow repeatedly, d) press the tongue forcefully against the lower anterior teeth or project out of the mouth as far as possible, e) run the tongue along the lower muco-buccal fold;

BE SURE TO REMOVE ANY FILM OF #4 WAX ON THE OUTSIDE SURFACE OF THE TEMPORARY BASE BEFORE ADDING A REINFORCEMENT LAYER OF THE #1 WAX. IN LATER STEPS IT (#4) WOULD FLOW AND THE PERIPHERY WOULD DISTORT.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

FUNCTIONAL IMPRESSION

237) What is the third objective step of the functional impression procedure?

To effect the release of any tissue which may have been displaced beyond the point where it was giving support:

1) In obtaining a surface gloss, an excess of wax may have been added;

2) If a base were made from such an impression, it could cause a continuous ischemia because of the over-displacement of the tissue;

3) It is now necessary to allow sufficient time for any such excess of impression wax to escape to the periphery of the temporary base;

4) The time required for this to take place will depend upon the size of impression surface;

   a) If the impression is narrow, six or seven minutes is adequate;

   b) For a wide or extremely long impression, ten or eleven minutes is needed;

5) Since any excess wax will build up at the periphery, tissue movements should be repeated once each minute during this period;

6) It is important the appliance be kept seated during this period since, if the base were to lift even slightly, the flow of the wax would diminish or stop and the tissue adjustment would be incomplete;

7) Extreme care must be exercised to prevent any contact of the impression, during removal from the mouth, which would distort it;

   a) Caution the patient to completely relax the cheeks and tongue during the removal;

   b) The use of a small mouth mirror to retract the lips is very helpful;

   c) After the appliance is released, it can be picked up with a stiff thumb forcep to good advantage.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

FUNCTIONAL IMPRESSION

238) How should the appliance be positioned during an impression registration to insure exact relationship to the remaining teeth?

1) The abutment rests should be precisely seated;

2) Pressure should be applied to the appliance at another point as far removed from the abutments as possible (this will usually be the area of the indirect retainer);

3) This can be done best by placing the index finger of the right hand on the occlusal rest, minor connector and the base adjacent to one abutment. At the same time the third finger is pressing in the same relation on the opposite abutment area, while the second finger contacts the indirect retainer (equal force is applied in each area simultaneously);

4) For a mandibular impression, the left hand should be used to support the patient's chin to prevent unnecessary fatigue;

5) If the impression is extremely long, the finger pressure should be carried a little farther onto the base;

6) The appliance should not be seated during the impression procedure by pressure on the bases only because the bases might be depressed and the indirect retainer lifted. With the bases related in this position, functional stresses would always rotate the appliance and place the abutments under a leverage (tilting) stress.

239) How much pressure must be used in seating the appliance while making a functional impression?

1) Use enough pressure to seat the casting (See #238);

2) More pressure will be of no benefit, neither will it be harmful, except to tire the patient;

3) Note the exact relationship of the appliance and the teeth before starting the impression, then maintain it.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

FUNCTIONAL IMPRESSION

240) What factors determine the amount of flow which occurs in a wax used for a functional impression registration?

1) The rate of flow which that particular wax was given when it was compounded;

2) The temperature of the wax and the surroundings;

3) The pressure being exerted on the wax;

4) The time under which the pressure is maintained at a given temperature;

5) The degree to which the wax is free to escape; or the extent to which it is confined;

6) The distance which it must move before reaching the point of escapement.

241) Are all functional impressions kept in position the same length of time to allow the tissue to be released from any over-displacement?

No - it will depend on the distance which the wax must move to reach the periphery where it can escape from the base which confines it against the tissue.

242) For what reasons might the wax of a functional impression not show a turn at the periphery?

1) The periphery has not been extended to moving tissue;

2) There is no tissue movement in that area;

3) The periphery of the base is bending (not stable);

a) It is not reinforced strongly enough;

b) A film of debris, moisture, grease or #4 impression wax was left on the outer surface of the base before the #1 reinforcing wax was added, allowing it to become partially loosened later in the impression procedure.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

FUNCTIONAL IMPRESSION

243) How may the periphery of a temporary base be reinforced to prevent it from bending during the making of the functional impression?

1) When preparing the wax pattern for the appliance, add 18 gauge extensions near the anticipated peripheries and connect these to the appliance in enough places to provide the needed strength and to facilitate the casting process;

2) If the impression is found to extend too far beyond these supports, a portion of a small paper clip may be heated and allowed to melt into the outside surface of the temporary wax base. By allowing this to overlap the cast framework, adequate strength can be gotten.

244) When is a functional impression properly completed?

1) When all of the surface contacting the tissue presents a glossy appearance;

2) When the turn or roll at the wax periphery is continuous except where the tissue does not move during functional activity;

3) When the impression has been kept under continuous seating pressure for a long enough period (5-12 min.) to let any excess wax escape to the periphery and allow the tissue to resume a supporting form instead of the impinged contour caused by over-displacement;

4) When any of the base or framework, which shows through the impression wax, has been relieved, covered with a greater thickness of impression wax and returned to the mouth for correction of the area;

5) When the impression has been removed from the mouth without having the periphery coming in contact with tongue, cheek, teeth or anything which would cause it to be marred or distorted.

6) When the outside surfaces of all extensions of the impression have been reinforced with #1 wax to protect with a hard surface while the cast is being made.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

FUNCTIONAL IMPRESSION

245) What is the best way to remove a functional impression from the mouth?

1) Have the patient relax the tongue and cheeks completely for EVERY REMOVAL, then, by the time of the last removal, good cooperation can be expected;

2) Retract the cheek with a small mouth mirror instead of using the index finger;

3) Lift the appliance enough to release the retention;

4) Firmly grasp the appliance on a rigid part (connector) with a stiff serrated tweezer or forcep (thumb);

5) Carefully remove without touching anything which might bend or marr the periphery of the wax.

246) After the functional impression is COMPLETED is the film of #4 impression wax removed before adding the #1 reinforcing wax?

NO - for these reasons:

1) The finished impression might be distorted;

2) The impression is not to be returned to the mouth, hence the temperature will not be raised again so as to accelerate the rate of flow of the wax;

3) No more pressure is to be brought against the periphery to cause it to deform, since the impression is not to be returned to the mouth for more muscle trimming;

4) This last addition of reinforcing wax is simply to provide a hard surface for added protection during the final pouring of the impression.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

FUNCTIONAL IMPRESSION

247) Why must the tissue movements be repeated during the final 5 - 10 minute period that the functional impression is retained in position?

1) If any excess of wax has been added to the impression surface it will escape to the impression periphery during this final period that the impression is seated;

2) This excess of wax will be collecting at the margins and causing them to lengthen;

3) By having the tissue movements intermittently repeated, the peripheral turn in the wax impression is retained at the length that gives the maximum base coverage but short of impingement on moving tissues;

4) Failure to observe this precaution is the most common cause of tissue soreness resulting from the wearing of a partial denture base.

248) What causes soreness of the subjacent tissues?

1) Over extension of base peripheries (See question #247);

2) The impression periphery was bent toward the tissue surface as it was being removed the last time;

3) A nodule was formed in the base material by being processed into a defect in the cast (burnish to remove);

4) The resin base is not smooth because it was not cured against cellophane or its substitute;

5) There may be malocclusion of the teeth supplied;

6) The functional stress load exceeds the tissue tolerance of the patient (reduce the occlusal table);

7) The excess of impression wax (see #235 -4) was not allowed to escape (see #237) and an area of subjacent is impinged by the base;

8) The appliance is not properly seated as the impression is being made (see #233) - settling later causes the base to impinge.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

PRELIMINARY EXAMINATION

249) What are the characteristics and the individual uses of each of the present (1950) Korecta-Wax series?

#1 is tissue-pink, very hard, has practically no flow at body temperature, lacks toughness and is somewhat brittle. It has these special uses:

1) To serve as a temporary base (will not distort at body temperature but will need metal reinforcement to prevent fracturing);

2) Principally to reinforce the outside surface of a wax extension at the periphery of an impression;

3) Since this wax congeals very quickly, it is useful to attach teeth during setup procedure. Its shrinkage being less than that of ordinary setup wax, the problem of tooth disarrangement because of wax contraction is much reduced.

#2 is yellow, has slight flow at body temperature. Uses:

1) As a thin lining for a temporary base which may not be completely accurate in some area;

2) Since it will adapt slowly to the tissue form it will prevent injury and soreness;

3) An appliance which is lined with the #2 wax cannot be immediately seated to position, unless the wax is warmed in a water bath.

#3 is red, it has more flow than #2 but less than #4.

The use of this wax is very limited - it was intended for the correction of an area of limited discrepancy in a temporary base before the addition of the impression wax (such as the area of a recent extraction).

#4 is orange, it has a high flow at body temperature:

1) This wax is used to record the supporting form of the subjacent tissues - the impression wax;

2) It displaces sufficiently to gain support from all areas covered by the base;

3) It flows enough to prevent over-displacement.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

FUNCTIONAL IMPRESSION

250) What are the advantages of the method of functional impression registration using the resin-tray manner of supporting the waxes instead of the cast appliance?

If the base is to be made of resin, there are none.

If the base is to be of metal construction, there are the following advantages:

1) It permits a single-unit casting of the base and other parts of the appliance;

2) Saves the time and expense of the assembly and soldering of the base to the rest of the appliance, if they were cast separately

3) Eliminates the danger of warpage which might occur during the soldering operation.

251) Where is the resin-tray method of supporting the functional impression contraindicated?

1) When the cast-metal base is not to be used;

2) When the abutment teeth have been out of function and are, therefore, in an extruded position (here the wearing of the cast appliance and temporary base for a period would reposition them before the impression is made);

3) When too few teeth remain in the arch and the supporting teeth are not widely enough separated to give a positive positioning of the tray (as a Class I to the cuspids).

252) What are the requisites of a resin-tray for the functional impression registration?

1) It must not flex or warp; 2) It must seat on the teeth in the mouth and on the cast exactly the same; 3) The resin must fit precisely on the tooth stops without alteration of the contacting surfaces.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

FUNCTIONAL IMPRESSION

253) Is the fluid-wax functional impression procedure too time consuming to be practical?

If so, it would not be used and recommended after nearly thirty years. Like any other method, it must be mastered to be done expediently. In deciding this question, the following should be considered:

1) It is not the time required for any one step in a procedure that is important - but, rather, the over all time which is consumed;

2) If this impression is done well, the post-insertion adjustments because of subjacent tissue soreness are negligible;

3) Time spent in taking an impression is construction time for which you are paid, as for any other step;

4) Time spent in relieving sore spots caused by a base made from a short-cut impression method are adjustments of something wrong with the prosthesis, FOR WHICH YOU USUALLY ARE NOT PAID;

5) Then too, there is the economic consideration of the patient favorably impressed with a satisfactory service on the one hand and perhaps disgruntled by an unhappy result on the other;

6) Finally, the maintenance of the partial denture with a base made from such an impression may be very much reduced - it is given a tissue relationship which may eliminate both the problems of under-stimulation and its resultant disuse atrophy as well as over-work with the pressure atrophy which is likely to follow.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

BASE OR SADDLE

254) What are the requisites of an IDEAL denture base material?

1) It should be dimensionally stable to prevent volume change or warpage during processing, usage or repair;

2) Be inert, not to irritate the oral tissues;

3) The taste and odor should not be offensive;

4) Should possess sufficient strength, with minimum bulk, to resist the normal stresses encountered;

5) Sorption of oral secretions should be minimum to prevent fouling or volumetric change;

6) It should harmonize with the oral tissues in color and should retain this property in or out of the mouth;

7) Both the resilience and impact strength should be sufficiently high to permit the base being made thin;

8) The base should be constructed so as to permit repair or correction following a resorptive change in the subjacent tissues;

9) It should receive and retain a high polish;

10) Its hardness should be sufficient to resist wear in normal polishing or cleansing;

11) It should not soften or warp during cleansing with water at less than the boiling temperature;

12) Added advantages are low specific gravity and high thermal conductivity;

13) Its fabrication should not entail a processing technic so complicated as to reduce its wide usage;

14) The original material cost and that for the processing should be such as to make it available in the average practice.

THE SEARCH FOR THE IDEAL DENTURE BASE MATERIAL HAS CONTINUED SINCE THE USE OF BONE AND IVORY IN THE PROSTHETIC EFFORTS ANTEDATING CHRIST - IT IS EVIDENT FROM THE ABOVE THAT THE SEARCH IS NOT YET ENDED.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

BASE OR SADDLE

255) What are the advantages of resin as a denture base?

1) Its color harmonizes beautifully with oral tissues and is satisfactorily retained;

2) Resin can be easily repaired or rebased to correct for tissue resorption;

3) Its cost is not prohibitive;

4) The water sorption of resin is low so that it does not become fouled;

5) Resin polishes easily and retains a good finish;

6) It is easily the choice of available base materials on the basis of aesthetic quality;

7) The light weight of resin adds much to its value.

RESIN IS DEFINITELY THE FINEST BASE MATERIAL YET DEVELOPED AND STILL OFFERS THE CHANGE OF MUCH FURTHER REFINMENT - IT MIGHT BECOME THE IDEAL BASE.

256) What are some of the disadvantages of resin?

1) Resin is not dimensionally stable during processing, later wear or repair;

2) It shows abrasion in cleansing, polishing, or wear;

3) Resin possesses poor thermal conductivity;

257) What are the advantages of the cast-metal base?

1) Metal rates very high because of its conductivity - due to its transmission of thermal stimuli in and body heat out, the metal base ranks first in the maintenance of a fine tissue tonus;

2) It presents maximum strength with the minimum of bulk so as to allow the most tongue room possible;

3) Metal has no volume change or warpage in use;

4) It resists abrasion and its water sorption is nil.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

BASE OR SADDLE

258) What are the disadvantages of a cast-metal base?

1) The chief objection of cast-metal as a base for the partial denture is that it is not possible to rebase it;

2) Unless covered with acrylic, its appearance (in the anterior of the mouth) is objectionable;

3) Due to the effect of gravity, the weight of metal (particularly gold) is a disadvantage in upper cases;

4) If metal is adapted to the functional or supporting form of the tissue, its construction is more complicated than resin and the cost is greater.

259) After the base is processed, how should the periphery be finished?

1) The length of the base flange should be just short of the line where the moving tissue began the turn in the impression;

2) Reduce the thickness of the lingual flange to provide the maximum tongue room (the bucco-lingual width of the teeth may also be reduced);

3) At the periphery, the lingual flange of the mandibular base may be as thin as two m.m. or a little less to cause the least tongue interference;

4) The margins should not be drawn to a knife-edge or left square with sharp edges but should be slightly rounded;

5) The thickness of the buccal flang is made sufficient to properly support and contour the facial tissues;

6) The buccal and labial contour of the basal material should simulate the form of these tissues in the natural state - this adds to the aesthetic result and also lessens the tendency for food lodgement along the periphery.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

BASE OR SADDLE

260) Where is the use of the cast-metal base particularly indicated?

1) In modification areas of the partial denture, where the appliance is entirely tooth-borne;

2) In the small removable-bridge type of prosthesis, which obtains its support entirely from teeth;

3) In carefully selected cases which present an usually good picture of bone support, where the need for rebasing the saddle is less likely;

4) Where a base must cover the anterior palatal region, the use of the cast-metal type has the advantage of maximum strength with minimal bulk, an aid in reducing speech interference.

261) Can a base which is tooth-retained at EACH TERMINUS also receive support from the underlying tissue?

If the appliance has abutment support at each end of the base and is definitely retained at each abutment by means of a clasp or other device, its support must PRACTICALLY ALL be derived from the abutment teeth:

1) Surface circulation in the supporting tissue is restricted during moments of stress support;

2) If the base has one FREE-END, a slight rebound occurs when the functional stress is removed and then normal circulation resumes;

3) In other words, when a base bears a relationship of being supported the subjacent tissues are blanched (ishcemia exists);

4) If this contact of the base was maintained by clasps or other means, the tissue would atrophy enough to let the surface circulation resume;

5) After such atrophy, the base would not be tissue supported;

6) For these reasons, the partial denture must be tooth supported in the area adjacent to the abutment (all displacement should be avoided in this area in making the functional registration).

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

REGISTRATION OF OCCLUSAL PATHS

262) What is meant by the "registration of occlusal paths" in the construction of a partial denture?

A bite-rim of special wax is attached to the appliance base and is worn by the patient, except during eating. By biting and grinding into this wax-rim, a record is made of the exact excursions of the opposing teeth in all jaw movements. This registration includes the excursive movements resulting not only from voluntary efforts of the patient but also those occuring during sleep and involuntary grinding habits. The pattern made will resemble very closely the teeth which once occupied that ridge area except that the occlusal surface is larger. This is because, it represents the several teeth in their various extreme lateral, protrusive and retrusive positions.

263) Why is the recording of the occlusal paths of particular advantage in partial denture prosthesis?

1) It eliminates the problem of reproducing the mandibular movements of the patient on an articulating instrument. In partially edentulous cases, these jaw movements would necessarily be more complicated than in the completely edentulous, because of the effect of the remaining teeth which will be in various stages of malposition;

2) To make possible the obtaining of jaw relations under more nearly actual working conditions, that is, the opposing teeth retruded or opposing denture reseated to position before the centric jaw position is recorded;

3) It makes possible the recovery of some of the posterior vertical opening where abnormal closure has occurred, instead of perpetuating an abnormal position of the condyle head;

4) To simplify the obtaining of more complete harmony in the occlusal functioning of teeth supplied by the partial denture.

Prepared at the School of Dentistry, University of Michigan, Department of Partial Denture Prosthesis.

ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

REGISTRATION OF OCCLUSAL PATHS

264) What are the requisites for an accurate registration of the occlusal paths occuring in jaw movement?

1) The wax bite-rim should be supported by a temporary base having maximum stability (it should be made on a cast resulting from an impression of the functional or supporting form of the ridge);

2) The wax used for the occlusal-rim should be hard enough to support the biting stresses and should possess toughness so that it will not fracture (Peck's hard, purple inlay wax has proven ideal);

3) The temporary wax base must be securely attached to the appliance frame (the auxiliary framework used during the functional impression registration should be retained for this step);

4) The wax-rim should be wide enough to record completely the lateral movements of the mandible (indicated by a turn in the wax on the buccal and lingual sides);

5) The occlusal surface should show a gloss indicating a functional contact with the opposing teeth;

6) The wax-rim should be worn constantly (including periods of sleep) except when eating;

7) The patient should grind and champ upon the wax during periods of wear;

8) Increase the posterior vertical opening by the addition of a thin, uniform film of wax to each facet;

9) The anterior teeth should be slightly opened (up to 1 m.m.) after each daily addition of wax;

10) Continue these additions 2 - 4 days depending upon the existing degree of posterior closure;

11) The remaining teeth should be in centric relation when the wax registration is finally accepted;

12) If the bite remains open after wear, warm the wax-rim by blasts of hot air blown with a chip syringe from a gas flame and have the patient bite forcefully.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

REGISTRATION OF OCCLUSAL PATHS

265) What is the purpose of adding to the wax registration rim at intervals of twenty-four hours while the paths are being recorded?

1) So that extruded opposing teeth will be intruded as their periodental membranes are reduced again to a normal thickness;

2) An opposing maxillary complete denture will have become displaced when not under occlusion and will be reseated as the fluids of the distended tissues are reduced to the normal amount;

3) The vertical opening in the molar region will be increased some as the height of the wax-rim is increased thus tending to reposition the condyle head and let the displaced temporo-mandibular tissues resume more nearly a normal position and contour;

4) Reducing the displacement of the joint tissues may prevent the development of or lessen the existing degree of a Costen's syndrome.

266) What are the reasons for having the registration of the occlusal paths continued during sleep?

1) The occlusal contacts made during bruxism (night-grinding) often occur with the mandible displaced to an extreme lateral position as a result of a sleeping habit (head lying upon a folded pillow etc.). This occlusal contact may be impossible in a voluntary effort - hence, the relief of such malocclusion by "spot-grinding" cannot remedy this type of interference. By wearing the occlusal wax-rim during sleep, however, a complete adjustment in the wax is recorded;

IN THIS WAY, ONLY, CAN THE TRAUMA RESULTING FROM BRUXISM BE REDUCED TO THE MINIMAL.

2) The intrusion of extruded teeth and the repositioning of the condyle cannot be interrupted or else all gain to that point will be lost;

3) Since the occlusal pressure exerted in bruxism is frequently greater than in a voluntary effort, the forming of the paths in the wax-rim may be more effectively accomplished during sleep.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

REGISTRATION OF OCCLUSAL PATHS

267) When is the registration of the occlusal paths completed?

1) When the maximum degree of posterior vertical opening has been attained;

2) When the wax-rim shows a buccal and lingual turn at its margins;

3) When the wax-rim surface shows a gloss in areas of occlusal contact;

4) When the remaining teeth are in occlusal contact when the patient closes in centric position.

268) After completing the registration of the occlusal paths, how may it be used?

1) The appliance is seated on the cast and retained with sticky wax (be sure that the appliance and the base are both perfectly seated);

2) A boxing of clay is added around the wax-rim beginning at the marginal turn - the occlusal of the adjacent abutment also is included in this inclosed area (this will act as a stop);

3) A sheet of soft, thin wax may be arched from the clay on the right side to that on the left to keep the stone up, so as to provide better vision of the lingual occlusion when the teeth are being set;

4) The surface of the exposed abutment tooth is treated with Microfilm and a mix of very hard stone (such as Duroc) is carefully placed in the wax registration and on the abutment by using a spatual instead of vibrating it to place (arch the stone across from one side to the other to form a sturdy connection);

5) If the base is to be cured on the master cast, it will be necessary to have the cast keyed so that it can be repositioned on the articulator exactly, so as not to lose its relationship to the stone template (see #269).

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

REGISTRATION OF OCCLUSAL PATHS

269) Why is it necessary to have the master cast keyed before it is attached to the articulator?

1) The occlusion of the supplied teeth is altered during the curing of the resin and it is necessary to be able to return the appliance to its original relation to the template so as to recover the occlusal harmony;

2) To assure the accuracy of this step, the acrylic base is not removed from the master cast after the base is cured until the occlusal adjustment has been finished;

3) Also, to be sure that the cast is repositioned exactly on the articulator, the split-cast technic is used:

   a) Have the base or capitol of the cast reduced before keying it so that it will not have to be cut down in order to flask it;

   b) Bevel the margins of the base or capitol so that it will seat in a definite box-like support where it attaches to the articulating instrument;

   c) Crossed grooves may be cut in the surface of the cast to further assure the exactness of its return to the former position;

   d) The cast should be treated with Microfilm to make its removal from the articulator mounting easier;

   e) After de-flasking, following the resin cure, be certain that all traces of investment have been removed before attempting to replace it in the keyed mount;

4) Before adjusting the occlusion, be certain that no traces of investment or resin remain on the abutment tooth stop;

5) Extreme care must be exercised to avoid the slightest abrasion of the template during occlusal adjustment - the use of typewriter ribbon instead of carbon paper is preferred, since the porcelain tooth is less likely to cut through and mar the template surface;

6) Readjustment is complete when the abutment stop is properly related in exact contact with the template.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

REGISTRATION OF OCCLUSAL PATHS

270) How can occlusal interference occur in a partial denture in which the teeth have been occluded by the method which employs the registration of the patient's occlusal paths?

1) Definite stops were not used to record the precise relation of the cast to the template bearing the occlusal paths;

2) Adequate precautions were not taken to protect the template from abrasion while the porcelain teeth were being occluded against it (the use of red typewriter ribbon instead of carbon paper is an aid);

3) The base was not supported in a stable manner so that, instead of the opposing teeth cutting paths in the wax-rim, it simply shifted its position;

4) The patient did not grind or champ vigorously on the wax-rim;

5) The exact relation of the cast to the template was lost when it was removed to cure the base;

6) The occlusion was not corrected after the curing to compensate of the volume change which occurred in the resin during its processing;

7) The wax-rim was not worn continuously after the registration was begun (for instance, leaving it out during periods of sleep).

271) Will the patient be able to close the remaining teeth together (in centric relation) when the appliance is first inserted, if the teeth were occluded to a wax-rim registration of the grinding paths?

No. The adjustments accomplished by the wax-rim, which had been corrected at intervals, will have been lost. As an example, the opposing teeth will be extruded again.

If none of the errors cited in #270 have been committed, then the patient should be closed in normal relation in a period about equal to that in which the corrections were accomplished. ADJUSTMENTS BY THE SPOT GRINDING METHOD SHOULD BE DELAYED FOR AN EQUAL PERIOD.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

REGISTRATION OF OCCLUSAL PATHS

272) What are the advantages of the wax-rim method of registering the occlusal paths over the usual method of "taking the bite"?

1) Complicated methods and instruments for reproducing the mandibular movements are rendered unnecessary;

2) Extruded teeth, which have been out of occlusion, are retruded before the inter-arch relationship is recorded;

3) Instead of accepting and perpetuating a closed vertical relation of the arches in edentulous areas, an effort is made to re-establish a more nearly normal opening before the centric position is recorded;

4) Since the patient's teeth opposing the edentulous area develope the facets in the wax-rim, it follows that teeth related to these occlusal facets will be in a harmonious relation in ANY MANDIBULAR POSITION;

5) Not only the voluntary, but also the involuntary movements are all recorded in the registration of the occlusal paths (particularly the extreme eccentric positions of the jaw in night-grinding);

6) However, in the "spot-grinding" method of correcting occlusal relations, only the points of interference can be marked which the patient is able to engage during his VOLUNTARY MOVEMENTS of the mandible - all the others remain UNRELIEVED;

7) While the remaining teeth retain the same centric relationship, the vertical opening in the posterior edentulous segment is increased. This has the effect of positioning the condyle more normally and of lessening the retrogressive tissue changes of the joint area due to closure. Compared to the old method of "taking the bite," the new procedure of registering the occlusal paths, while successively increasing the opening, tends effectively to prevent future or to lessen the existing symptoms of Costen's syndrome;

8) Since malocclusion may be prevented, the adjustments to relieve irritated subjacent tissues are reduced;

9) It should be the rule, not the exception, to eliminate the post-insertion adjustment of the occlusion.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

PATIENT INSTRUCTION

273) When should the removable partial denture be cleansed?

1) If acid formation is to be avoided, the fermentable carbohydrate debris would have to be removed before the enzyme reaction upon it takes place. This obviously is not possible in most instances;

2) Oral cleanliness, since it is usually "too little and too late," is only a relative aid in caries control. Good oral hygiene is none-the-less an important personal habit. Periods of debris retention should be made as brief as is possible;

3) Clean the mouth and partial denture after eating and before retiring. Brushing before breakfast may also be effective in reducing bacterial counts. This may help to lesson acid formation in the caries susceptible patient after eating.

274) With what and how should a partial denture be cleansed?

1) A prosthetic appliance may be effectively cleansed by the use of a small, stiff bristle brush;

2) A brush-water method of removing debris may be aided by the use of soap or dentrifice;

3) Household cleaners should not be used, in order to avoid abrasion of appliance surfaces;

4) Damage may be lessened by brushing over a basin partly filled with water to break the force of any accidental fall;

5) Effective cleansing may be accomplished by use of a solvent cleansing solution;

6) For those with impaired eyesight or manual dexterity, the solvent cleansing is the method choice (perhaps for all).

275) How can the patient who does not dine at home carry out an acceptable cleansing regime?

1) When patients know of the risk from retained food debris, many will provide the means for carrying out at least a partially effective midday oral hygiene;

2) Rinsing the partial denture and the mouth would be of considerable help.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

PATIENT INSTRUCTION

276) Should the partial denture be worn at night during sleep?

1) Opinion is divided on this question. Conditions in the case at hand should determine the advice to be given on this matter;

2) Without the partial denture in place, any stress generated during "night grinding" would be concentrated on fewer teeth and, hence, might be more destructive;

3) Evidence of "night grinding," coupled with a marked tendency to alveolar atrophy, would indicate the advisability of wearing the denture during sleep;

4) When the control of caries is proving difficult, the removal of a partial denture during sleep might be a further aid. An immunity to bone atrophy is frequently found in this type of patient, making this practice less hazardous.

277) Should a complete denture be worn when the opposing parcial denture is not in place?

1) If the partial denture is to be removed at night, the opposing complete denture MUST NOT BE LEFT IN THE MOUTH.

2) Neither should the complete denture be used, except for brief periods, without the support of the opposing partial denture.

3) THERE IS NO MORE CERTAIN WAY TO DESTROY THE ALVEOLAR RIDGE WHICH SUPPORTS AN UPPER COMPLETE DENTURE THAN TO HAVE IT OPPOSE A FEW LOWER ANTERIOR TEETH.

278) How should the denture be cared for when out of the mouth?

1) A patient should not allow a resin denture to become dry. (This is equally true of a new one before it is delivered to the patient.)

2) For safe storage, the denture should be placed in a SPECIAL container and covered with water or a cleansing solution.

3) When traveling, an ointment jar serves as a watertight container as well as a protection against distortion or breakage.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

PATIENT INSTRUCTION

279) How often should the mouth and appliance of the partial denture patient be inspected by the dentist?

1) This will depend upon the oral and physical condition of each patient, these factors should receive special consideration;

2) If the patient is caries susceptible or exhibits a very marked tendency to alveolar atrophy, his mouth inspection should be frequent. Six months should be the maximum if conditions are normal;

3) This same rule should apply to the patient who persists in careless oral hygiene habits;

4) Alveolar atrophy may accelerate during climacteric periods and certain illnesses. Under these conditions a more frequent inspection is needed.

5) At least once yearly, an X-ray examination should supplement the prophylaxis and careful clinical inspection.

280) May the retaining clasps be adjusted so as to make the partial denture less movable?

1) This will depend upon the type of clasp which has been used. The WROUGHT WIRE clasp may be adjusted toward the cervical to provide more retention;

2) The patient should be told that both the abutment tooth and the clasp will serve longer if the retention is kept at an acceptable MINIMUM - just enough to resist any reasonable dislodging forces;

3) Some of the appliance movement may be due to a change in the form of the supporting ridge tissue instead of lack of retention.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

PATIENT INSTRUCTION

281) Can the patient detect the need for correction (by rebasing) of the partial denture base?

1) The loss of tissue support is usually so gradual that the patient may be unaware of the change;

2) If the partial denture is opposed by natural teeth, the loss of saddle support causes occlusal inefficiency and may be detected by having the patient grind upon a strip of soft wax;

3) If a complete denture is in occlusion with the partial, the loss of ridge support is shown by the indirect retainer leaving its seat when the base is depressed. The wax-bite test is not dependable here, occlusal contact having remained, unsupported because the opposing denture is not completely seated.

282) Is there any application which may be made to the enamel surface to prevent caries of the teeth supporting the partial denture?

1) No application is now known that will "prevent" caries but the clinical experience of many would indicate that the reduction of silver nitrate does inhibit a carious breakdown of decalcified areas. The application must be repeated often;

2) As yet, the topical application of sodium fluoride has not been shown to increase the immunity of the ADULT tooth enamel. This study does warrant more attention, having been most encouraging in arresting caries in the young mouth.

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ESSENTIALS OF PARTIAL DENTURE PROSTHESIS

PATIENT INSTRUCTION

283) What can the patient do to assure the maximum service from his partial denture?

1) Avoid appliance distortion or breakage resulting from careless handling when removing, cleaning or inserting the partial denture;

2) Protect enamel surfaces by an adequate caries control and by preventing enamel demineralization from debris retention - be orally CLEAN;

3) Have regular prophylactic treatments together with X-ray and mouth examinations. The patient should be called or notified;

4) Prevent destructive leverages by the prompt correction of the base when the supporting tissue undergoes change in form;

5) Accept partial denture service with the understanding that it cannot be "permanent" but must receive regular and continuous care from both the patient and dentist.

284) Under what conditions is it advisable to replace the partial denture with a complete denture?

1) When alveolar atrophy reaches an extent that the induced leverage may exceed the limit of tissue tolerance of the supporting structures;

2) When the patient's physical condition is such that the retention of pulpless teeth is no longer advisable from a health standpoint;

3) When the number of sound remaining teeth are too few to make the proper construction of a partial denture possible.

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