A Guide To

Complete Denture Prosthesis

By

Professor Dr. Wahib G. Moussa

Professor of Prosthodontics

DAR-AL-MAAREF

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- Restoration of Smile to Egyptian face (Arabic)
- Please Do not loose your teeth (Arabic)

Alexandria Govenorate, City and University (bilingual)

- The art of Congress management

Foreword

The publication of a new textbook in complete denture prosthodontics is an important event, I do not know of anyone more qualified to write such a book than Dr. Wahib G. Moussa, Chairman of the Department of Prosthodontics at Alexandria University, School of Dentistry.

I first met Dr. Moussa in 1979 at the State University of New York at Buffalo School of Dentistry. Dr Moussa had come to the United States to learn the latest techniques in ceramometal technology. I was impressed with Dr. Moussa's dedication to dentistry and his desire to go anywhere to upgrade his knowledge for the benefit of his patients and students.

Dr. Moussa accepted my invitation to come to Temple University School of Dentistry as a Visiting Associate Professor of Removable Prosthodontics in 1980, where he continued his research in dental ceramics and taught undergraduate dental students.

Since returning to Egypt, Dr, Moussa has visited Temple University School of Dentistry almost every year. When in the United States, Dr. Moussa avails himself of all possible educational opportunities and spends time at Temple University.

Dr. Moussa's desire to provide the best dental treatment for his patients and to teach his students the latest concepts in prosthodontics is commendable.

Dr. Moussa is a credit to Egypt, to Alexandria University School of Dentistry, to his family, his students, and his patients.

I am proud to call Dr. Wahib G. Moussa my friend.

Sheldon Winkler, D.D.S.
Professor and Chairman, Department of Prosthodontics
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A Word to the Author

I congratulate Prof. Dr. Wahib Moussa for his edition of his book:

" A guide To Complete Denture Prosthesis. "

This guide is very helpful to dental students.
The second edition is a promotion which is always needed.
I wish him all success and more scientific progress in our beloved profession.

Prof. Dr. M. El-Hadary
Ex-President Of Alexandria University
Professor, Faculty Of Dentistry Alexandria University

PREFACE TO THE SECOND EDITION

Years Ago when I wrote This book I have intended to simplify the complete denture procedures, My objective was to provide A Guide which I Would have liked to have during my years of study in the dental school. The Book was very well received by dental community, sold out completely but continued to be handled by our students in the form of photocopied reprints, which made me happy. Dar Al-Maaref Publishing house kindly offered establishing the second edition, contract was signed years ago but only materialized shortly. prosthodontics has changed especially in the field of esthetics and implants. This Guide still handles the basic prosthetic knowledge with the simplicity and clarity required for a freshman dental student. I Have depended mainly on an illustrated step by step principal for both clinical and laboratory procedures mentioned in the guide. I Sincerely hope that this guide will be beneficial to the reader and motivate the ambitious dental student to like the subject and start knowing more about it.This Guide is the student first step to read more about complete denture prosthodontics.

WAHIB G. MOUSSA.

"I Keep Six Honest Serving Men
They Taught Me All I Knew
Their Names Are What and Why And
When
and How and Where and Who"
"KIPLING"

Contents

An A-Z of Human Dentures

The interrelation between the human being and the tooth starts at the age of six months by appearance of the deciduous set of teeth in the oral cavity.

This set will function for a few years, they will then be replaced by the permanent set of teeth starting from the age of six years. this permanent set is supposed to function for the rest of the person's life.

The physiological functions of the teeth are numerous and varied for example mastication and speech. they also contribute to the person's esthetics.

At any age, teeth may be subjected to several pathological changes such as caries, periodontal disease, trauma and others; these may lead to the loss or malfunction of some teeth. At this stage the person is known to be partially edentulous. He will then require a partial denture prosthesis.

Loss of teeth may continue and the person will reach the stage of complete edentulousness. Such as edentulous patient will suffer from complete loss of masticatory function, together with impaired facial appearance.

An artificial substitute will then be mandatory and a complete denture prosthesis will be essential.

Complete Denture Schedule

First Patient Appointment (2 hours)

Clinical Work: Diagnosis which includes

1. Personal History (interview).
2. Mouth examination.
3. Maxillary and mandibular primary impressions (compound).

Laboratory Work:

1. Casting of the primary impressions.
2. Construction of special trays.

Second Patient Appointment (90 minutes)

Clinical Work:

Maxillary and mandibular final impressions (i.e.plaster impression).

Laboratory Work:

Casting and construction of recording occlusal rims (bite blocks).

Third Patient Appointment (1:30-3:00 hours)

Clinical Work

1. Recording maxillo-mandibular relations (i.e.bite registrations.)
2. Selection of teeth.
3. Face bow transfer, gothic arch tracing if recommended.

Laboratory Work

1. Mounting of occlusal rims on an articulator.
2. Setting of artificial teeth, and waxing up.

Fourth Patient Appointment (1:30 hours)

Clinical Work

1. Try in of waxed up denture trial bases.
2. Correction of any deviation in either, jaw relation or arrangement of teeth.

Laboratory Work:

Performing correction or modifications required during try in stage.

If there is no need for further trial in the patient's mouth, the waxed up trial bases are then flasked and packed with acrylic resin, curing, deflasking Finishing and polishing are then performed.

Fifth Patient Appointment (1:30 hours)

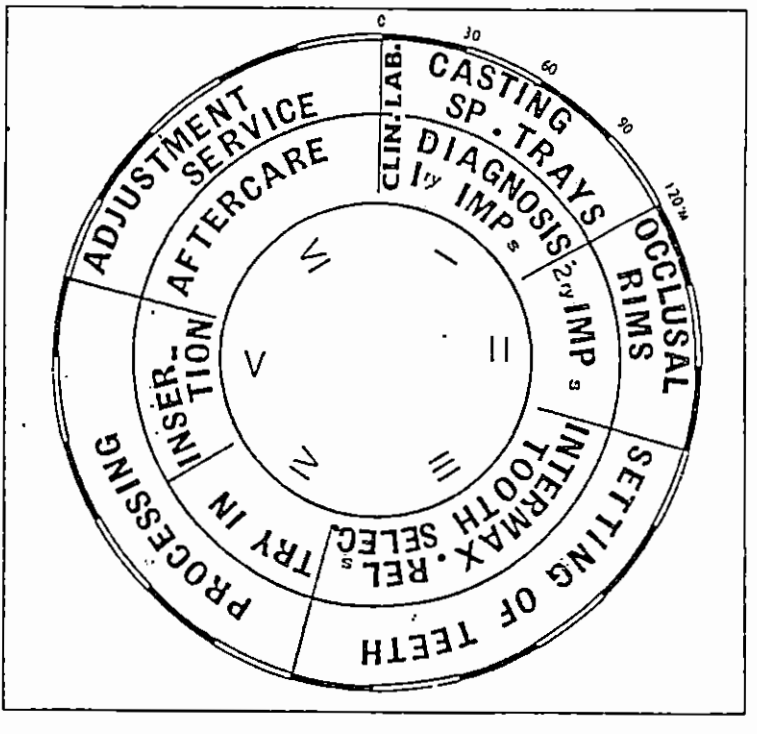
Clinical Work :

1. Delivery of dentures.
2. Instructions to the patient.

First Return Visit for Adjustment (aftercare)

- Dealing with patient's complaints.
- Checking for areas of soreness in the mucous membranes, and carrying out any necessary adjustments.

The above mentioned stage of aftercare may continue for a variable period of time which differs from one patient to another but it must continue till all the patient's complaints are dealt with.



A Complete Denture Schedule †

Part I:
Clinical and Lab Procedures

Clinical Stage
Diagnosis
Primary Impressions

Laboratory Procedures
Casting of Primary Impressions
Construction of Special Trays

Diagnosis

Definition

It is cardinal first stage in complete denture treatment. The aim of this stage is the evaluation of the oral, physical and psychological conditions of the complete denture patient. It is accomplished by various clinical investigations.

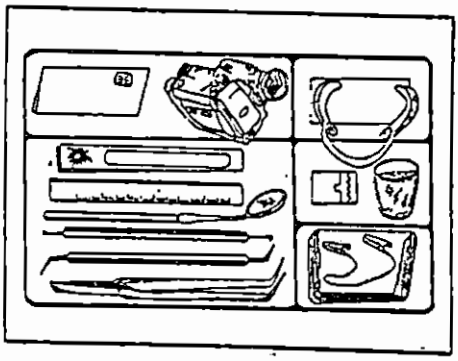
Objectives

1- Evaluation of the conditions of the oral tissues prior to denture construction.

2- Assessment of the patient's general health.

3- Evaluation of the patient's psychology and mental conditions.

4- Assessment of the possible difficulties expected for the case, and the degree of success to be achieved from the treatment.



Instruments (Fig.2) ↑

Clinical Procedure

See Instruments (Fig. 2)

Personal Information

In the patient's chart, record the following data:
patient's name.
Address Telephone No.

- *Patient's age.*

You must take in consideration that elderly patients need more experience and care.

- *Patient's sex*

You should always expect that ladies will be very sensitive as regards their appearance.

- *Patient's occupation*

The denture design may be modified in certain cases to satisfy the patient's profession; for example, shape of the palate and its thickness should be given particular attention in case of public speakers and singers.

History

patient's history can be taken during a friendly conversation. the following points are of importance:

- *The patient's attitude to dentures:*

Certain-attitude-will have been formed by the patient's own past experience of dentures if any, or from his observation of friends or relatives who wear dentures. If this past experience was successful, he will expect the same from his new dentures.

- *Information regarding the loss of natural teeth:*

A history of difficult extractions will necessitate a radiographic examination of the jaws to verify the absence of roots.

Information regarding an old denture:
Questions are directed to obtain information regarding the duration of use of previous dentures. How many sets have been made since the teeth were extracted, success of existing or old dentures and the attitude of the patient to their appearance.

General Health

This can be evaluated through:
History given by the patient.

General appearance of the patient for example, a pale face may indicate a severe nutritional deficiency:
If you suspect any undetected systemic disease, you should refer the patient to a specialist.

Psychological State

It is important to estimate what type of mentality the patient has; for example, he may have philosophical mind, exacting mind, hysterical or indifferent mind.

Facial Appearance

Patient's Profile

It indicates either a decrease or an increase in the vertical dimension.

Jaws relationship

A maxillary protrusion (class II) or mandibular protrusion (class III) can be evaluated by viewing the patient from the side.

Denture Area

Arch relationship:

This is either normal which indicates a favorable prognosis, or there may be maxillary or mandibular protrusion which lessens the chance of success .

Arch size and from:

A large arch would mean that a greater surface area is covered by the denture, and a greater retention would be expected.

The arch size provides an estimation of the tooth size. For better appearance arch size and tooth size must be in harmony.

Vault form affects the retention of the upper denture; rounded or U-shaped vault provides the most favorable prognosis because it resists both lateral and vertical displacement.

Ridge form

It affects retention and stability. U-shaped ridge is the most favorable form. its height resist lateral displacement and its parallel sides resists vertical displacement. Flat ridge provides little lateral stability.

Under cuts of the ridge are unfavourable if they oppose each other.

Inter - maxillary space

Check the inter - maxillary space by asking the patient to relax the jaws while the lips are kept apart by the operator's two fingers.

A small space may cause some difficulty in setting the artificial teeth.

Mucous membrane

Any variation from normal color must be investigated. Change of color may be due to local irritation usually caused by á prosthesis or systemic disorder. If the mucosa is thin, relief must be done to prevent any ulceration. If thick, and flabby, occlusion may best be affected by using nonanatomic teeth. If the mucosa is inflamed, it must be treated before any procedure.

Tongue and Floor of the Mouth

Small tongue facilitates impression taking but leads to lack of peripheral seal in the lower denture, if the floor of the mouth is near to the ridge crest retention and stability are impaired.
Mandibular tori interfere with the peripheral seal of the lower denture.

Saliva

Copious and thick saliva interferes with the impression procedures, while scanty or thin saliva interferes with the seal of complete denture.

Tempro-Mandibular Joint

Dislocation of condyle can be elicited from the history, in which case special care should be given to the impression procedure and to the vertical dimension. Arthritis of tempro-mandibular joint may limit impression procedures.

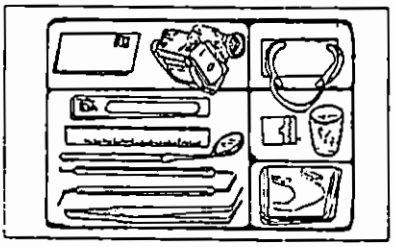
Pathological Lesions

The oral tissues should be inspected for the presence of any pathological lesions such as ulceration in the mucous membrane, tissue hyperplasia and bony irregularities.

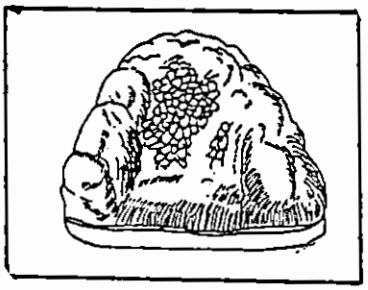
X-ray examination will aid in the detection of buried roots, cystic cavities, sinuses and neoplasms. Pathological lesions should be investigated and treated before starting denture construction procedures.

Old Dentures

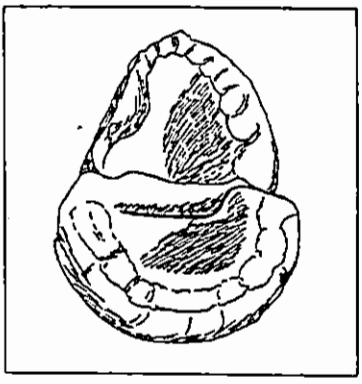
If the patient has previously, worn dentures one must know his opinion about complete dentures, about previous dentures. Old dentures should be carefully examined for fitness, occlusion and appearance.



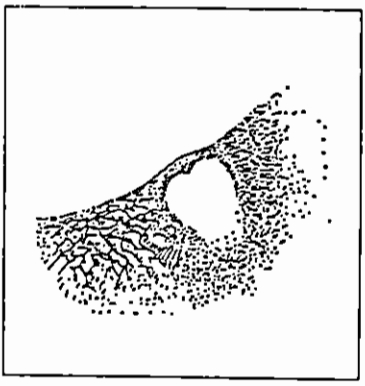
† Fig 2: Instruments for mouth examination: Patient's chart, clean towel, mirror and probe, cheek retractor and water syringe.



† Fig 3: Model for the upper jaw showing a case of chronic inflammation resulting in a granular type of hyperplasia of the palatal mucosa. This is of diagnostic value in spotting the continuous denture wearer.



† Fig 4: Casts of mandible and maxilla few days after extraction of teeth showing partial healing and irregularity of alveolar processes



† Fig 5: An X-ray film showing an unerupted tooth in an edentulous mandible. X-ray examination assists the diagnosis of buried roots, sinuses, painful areas and unilateral swellings.

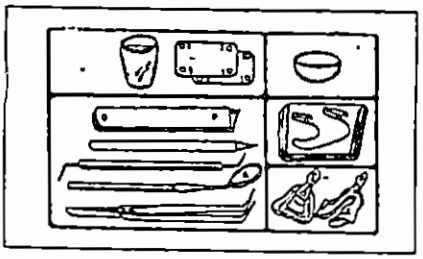
Primary Impressions

Objectives

1. To obtain an impression of the whole of the denture supporting area of each jaw.
2. To record the full extent of the sulcus or sulcii.
3. To obtain an impression recording the anatomical landmarks of the edentulous jaw.

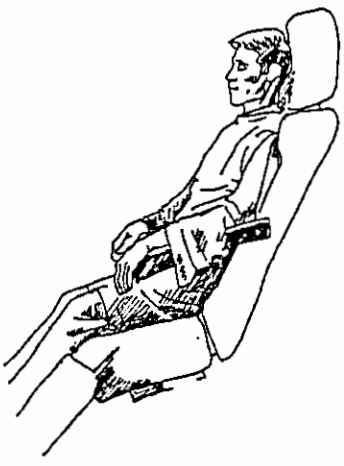
by achieving these objectives a model can be obtained upon which a correctly designed tray can be constructed in order to make the secondary impression.

Clinical procedure



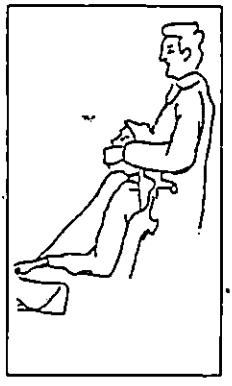
↑ Fig. 6: Instruments and material

1. Edentulous trays.
2. Impression compound.
3. rubber bowl for hot water.
4. Clean towel.

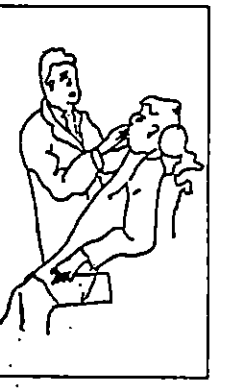


← Fig. 7 Adjustment of patient's position

The patient should be seated upright with the head in line with the body, back rest and head rest should be adjusted to give support.

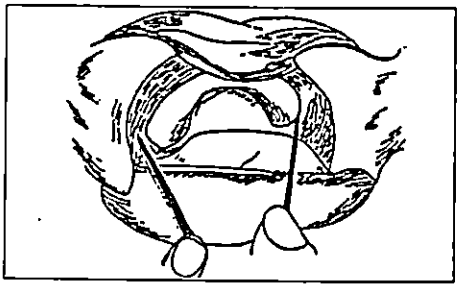


Position of the operator

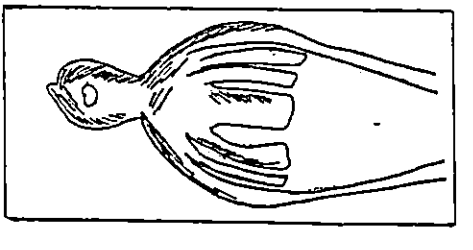


† Fig. 8 For the upper impression, operator should be to the right and a little behind the patient.

Selection of the tray

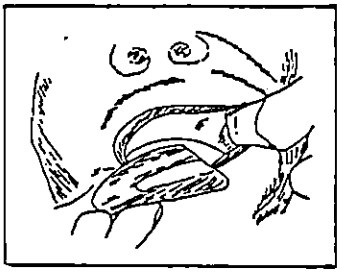


† Fig. 10 Callibers are used to measure the distance between the buccal surfaces of the maxillary tuberosities.

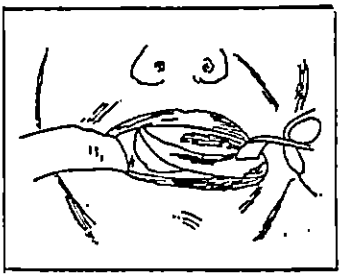


† Fig. 11 Selecting an upper tray by comparing the measurement obtained with the distance between the buccal flanges.

Insertion and checking of an impression tray into the mouth.

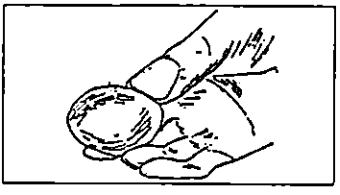


† Fig.12 Insert the selected upper tray in the patient's mouth check that the back edge is covering the tuberosity area.

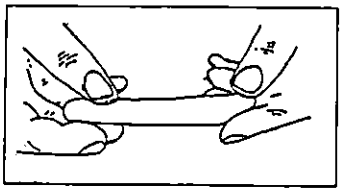


† Fig. 13 Insert the lower tray into the mouth and position it and check that the heals are covering the retromolar pads.

Manipulation of Compound.

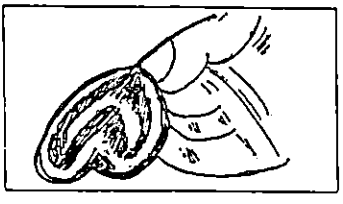


← Fig. 14: For an upper impression, soften the compound in hot water and mould it in the form of a ball

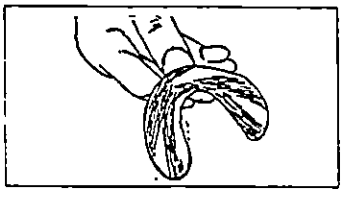


← Fig. 15: For a lower impression knead the compound into a rope 1.5 cm in diameter and long enough to reach around the tray.

Loading the tray



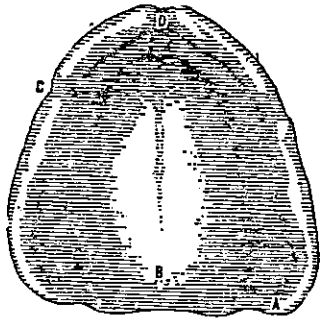
← Fig.16: Warm the inside of the tray, to ensure the adhesion of compound, position the ball of compound in the center of the tray and adapt it to the ridge form. insert the tray in the patient's mouth.



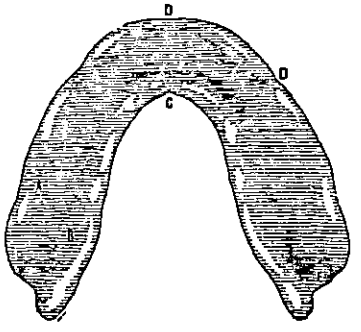
←

Fig. 17: Place the compound in the tray after warming it,mould the compound to ridge form, tray now is ready for insertion.

Landmarks of the impression



← Fig. 18: Upper impression
A. Hamular notch.
B. Fovea palatini.
C. Notch for buccal fraenae.
D. Notch for labial fraenum.



← Fig. 19: Lower impression
A. The groove formed by external oblique ridge.
B. The depression formed by the mylohyoid muscle.
C. The notch caused by lingual frenum.
D. Notches for labial and buccal fraenae.
E. Depression for retromolar pad.

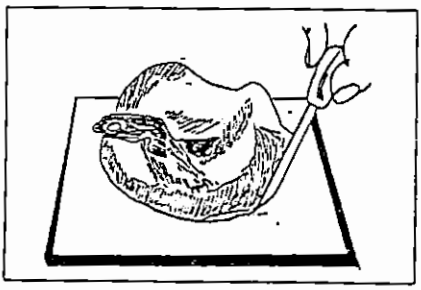
Laboratory Procedures

Objective:

The laboratory preparation for the second visit at which secondary impressions will be made, includes the construction of casts from the primary impressions and the construction of special trays on these casts.

Casting of the primary impressions:

Instructions and Materials:



- Plaster of Paris
- Water for mixing
- Rubber bowl and spatula
- Plaster knife
- vibrator
- Model trimmer.

↑ Fig.20: Trimming a lower cast by the use of a plaster knife.

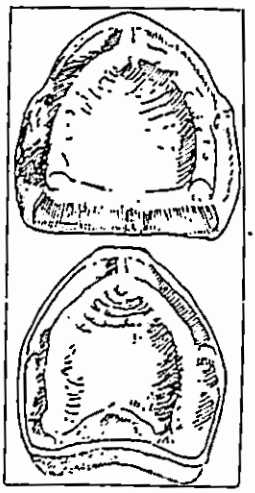


Fig. 21: Upper and lower casts showing typical outline and the following anatomical landmarks.
←

a. Incisive papilla.
b. Maxillary tuberosity.
c. Posterior palatal border.
d. Vestibular sulcus.
e. Lower buccal frenum.
f. External oblique ridge.
g. Mylohyoid ridge.
h. Retro-molar area.

Construction of Special Trays Using Shellac Base Plate.

A special tray is constructed especially to suit the case in order to be used for taking the final or secondary impression.

Advantages

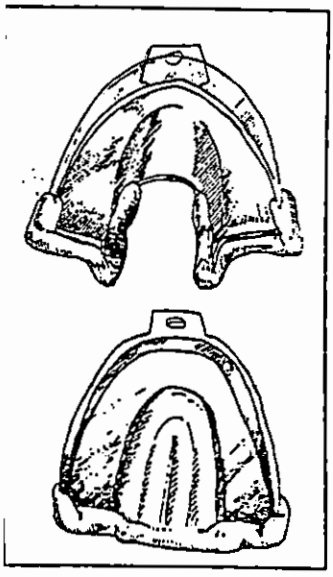
1. Even thickness of impression material.
2. Less chance for dimensional changes.
3. Comfortable to the patient and more economic.
4. Less bulk of impression material.
5. Accurate adaptation to the tissues.

Types of Special Trays:

1. Shellac base plate.
2. Acrylic resin.
3. Metallic either casted or swaged.
4. Composition.

Instruments and Materials:

1. Casts from primary impressions.
2. Shellac base plate.
3. Bunsen burner.
4. Wax knife.
5. Crown scissors.
6. File.



← Fig 22: Cast for the lower jaw and a lower shellac base plate.

Fig. 23: Shellac base plate is thermoplastic, it can be softened on the Bunsen flame and adapted to the cast. ←

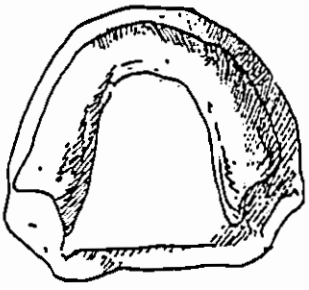


Fig. 24: The shellac base plate is partially trimmed to the desired outline. trimming is done by softening the base plate and cutting by crown scissors. ←

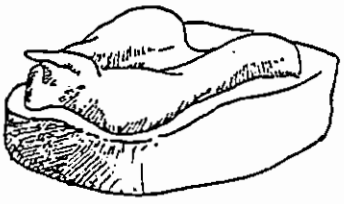


Fig. 25: A finished lower shellac special tray. → All peripheries should be smooth. The tray is ready to be tried in the patient's mouth.

Construction of a Special Tray Using Self Curing Acrylic Resin:

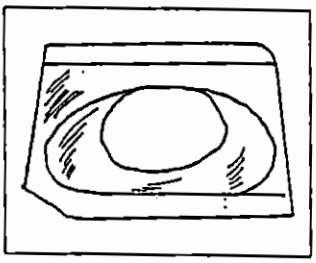
← Fig. 26: Equipments and materials:
1. Metal spatula.
2. Sheet of glass.
3. Brass plate former.
4. Cellophane paper.
5. Liquid and powder of self curing acrylic.
6. Jar for mixing.

Preparation of the Cast:

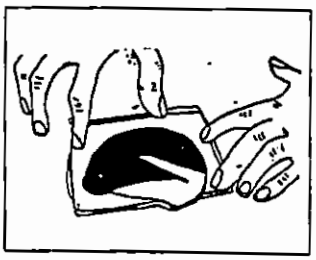
Spaced Special Tray:

Adapt a sheet of modeling wax over the outlined area of the cast, in order to provide a space between the cast and impression tray to be occupied by the impression material; e.g. plaster impression.

Close fitting special tray: before making the fitting tray, block with wax or plaster all undercuts, fitting tray is used with impression paste, e.g. zinc oxide eugenol paste.



← Fig 27: Preparing the Acrylic Dough: Adapt a soft ball of acrylic dough between the brass plate former and the sheet of glass, use the wet cellophane sheets as separating medium.



← Fig. 28: The acrylic dough is sandwiched between the former and the sheet of the glass, press down the glass plate until it contacts the former. This process will form a sheet of 2 mm, thickness of self curing acrylic resin. Adapt this soft sheet to the prepared cast to cover the outlined area, trim the excess.

← Fig. 29: A finished upper tray with an attached handle. Acrylic tray should be properly trimmed and polished.

PART II:

Clinical Stage

Secondary Impressions

Laboratory Procedures

Casting of Secondary Impressions

Construction of Record Blocks

Secondary Impressions

To construct a retentive denture base the base should satisfy the following.

Requirements:

1- The border must fit in displayable tissue where a seal can be developed.

2- Muscles related to the border must not be prevented from free activity.

3- To ensure retention, the base should extent to provide maximal coverage of the jaw.

4- The base should have the closest possible contact with the surface of mucous membrane.

The objective is to obtain a secondary impression which fulfills these aims.

This will vary according to the type of impression material, and the technique applied.

The following table gives an account about nature, indications, features and manipulations of the above mentioned materials.

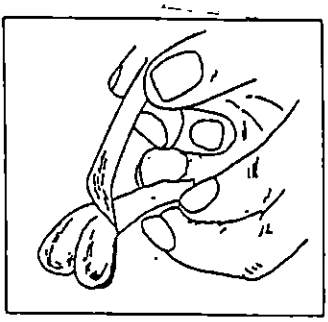
Manipulation:

The techniques for plaster impression, zinc oxide eugenol paste and alginate will be mentioned here. the rubber base impression procedure is similar to that of zinc oxide paste.

Clinical Procedure:

1- Adjust the patient's position.

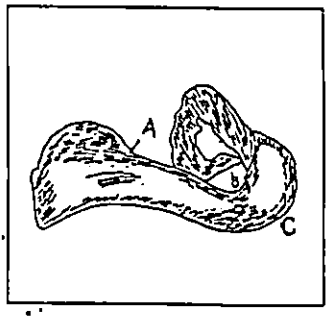
2- Examine the tray for extension, adaptation, and fitness.



Adjustment of the special tray:

←

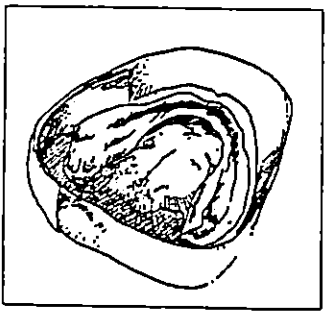
Fig. 30: The tray should be adjusted for accurate extension into the sulcus. Tracing the periphery with low fusing tracing compound or modelling wax, will give the functional contour of the sulcus.



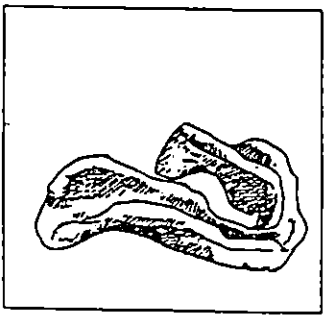
←

Fig 31. A lower acrylic tray with correctly trimmed periphery.
a. Indicates the position of mylohyoid muscle.
b. The lingual frenum.
c. Labial frenum with the reflection of vestibular sulcus.

Landmarks of the impression:



← Fig 32. An upper secondary impression.
A. Labial frenum.
B. Reflection of labial sulcus.
C. Buccal frenum.
D. Tuberosity area.
E. Posterior palatal border.



← Fig 33. A lower secondary impression.
A. Lingual pouch.
B. Retromolar area.
C. Lingual frenum.
D. Labial frenum.
E. Buccal frenum.

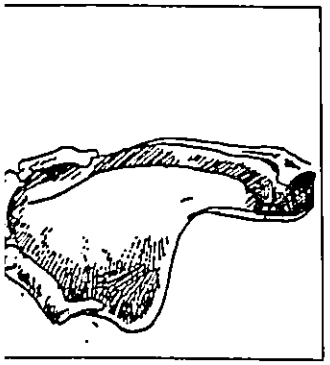
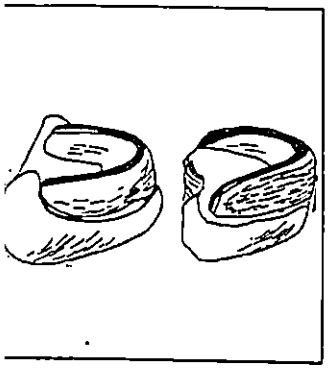


fig 34. A method of boxing a lower secondary impression. This method has the following advantage:
1. It is possible to vibrate all the plaster into the impression; this will increase the strength of the cast and reduces air bubbles.
2. Material is not wasted.
3. Thickness of cast is uniform.
4. Time is saved because the cast so produced will be of reasonable shaped and needs tittle trimming.
←



←

Fig 35. Upper and lower record blocks. each consists of a trial base and wax rim. the record block should have:
1. The occlusal plane perfectly flat and meets the labial surface in a clearly defined angle.
2. Smooth and rounded periphery with the wax blended to form a continuous surface with the palatal part of the base.
3. The occlusal rim should not extend to the end of the base posteriorly.

PART III:

Clinical Stage

Recording the Intermaxillary Relations

Selection of Teeth

Laboratory Procedures

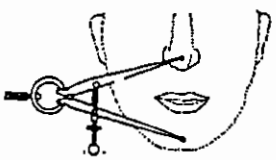
Setting of Teeth

Recording the Intermaxillary Relations

The previous clinical and laboratory stages has resulted in two models which are accurate reproductions of the denture bearing area of the patient's mouth.

Whilst the natural jaws bear certain relations to each other, the two models do not. It is the purpose of this stage to explain how the two models can be related to each other in the exact manner of their natural counterparts.

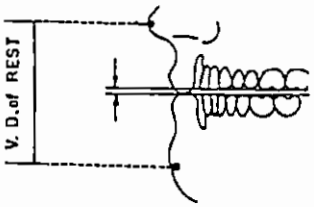
Intermaxillary Relations



Vertical dimension

←

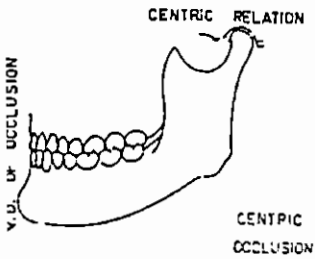
Fig 38: "A vertical measurement of the face between any two arbitrarily selected points which are conveniently located one above and one below the mouth"



Vertical Dimension of Rest:

←

Fig 39: "It is the vertical dimension of the face with the jaws in rest relation".



Vertical Dimension of Occlusion:

←

Fig 40: The vertical dimension of the face when the teeth or occlusion rims are in contact in centric occlusion."

❶ Inter-occlusal Distance: Free way space

It is the distance between occluding surface of the teeth when the mandible is in its physiological rest position.

❙ Centric Relation:

It is defined as the most retruded relation of the mandible to the maxilla when the condyles are in the most posterior unstrained position in the glenoid fossa from which lateral movements can be made, at any given degree of jaw separation.

❙ Centric Occlusion:

It can be defined as the position at which vertically the jaws are at the vertical dimension of occlusion. Horizontally the head of the condyle is in the most retruded position in the glenoid fossa (centric relation) and teeth are in maximal contact.

Importance of Proper Restoration of Intermaxillary Relations:

Proper restoration of the vertical dimension is vital for the fulfillment of aesthetics, and functional aspects of a satisfactory denture service.

Decreased vertical dimension will result in an aging appearance, loss of muscle tone and function, reduction of biting force, joint disturbances and defective speech.

Increased vertical dimension will give a stretched appearance around the mouth, excessive trauma and increased resorption of the underlying supporting bone, inefficient chewing and temporary mandibular joint disturbances.

Methods of establishing vertical dimension

Methods of Establishing Centric Relation:

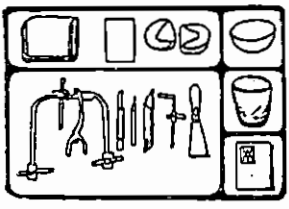
1. Tongue retrusion.
2. Swallowing.
3. Gothic arch tracing.

Clinical Procedure

III. Record vertical dimension of occlusion.

IV. Record (horizontal) centric relation.

V. Seal the upper and lower record blocks in centric occlusion.



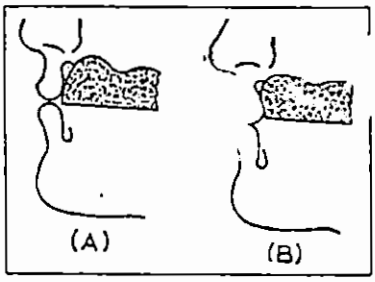
← Fig 41: Instruments and materials.

1. Patient's record card
2. Upper and lower record block.
3. Pink or modelling wax
4. Wax knife and Bunsen burner.
5. flat metal surface or spatula.
6. Willis gauge or divider and rulers.
7. Indelible pencil.
8. Clean towel.
9. Face bow and gothic arch tracer if recommended.

Testing the Upper Record Block for Extension; stability and retention:

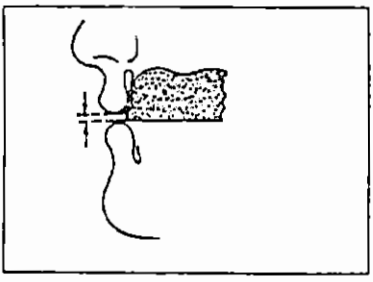
The base plate should extend to include all the denture bearing area and allows free movements of all muscle attachments.

Retention can be tested by pushing and pulling the base plate in place, suction will indicate good retention stability of the base can be estimated by alternate finger pressure on the occlusal rim on either side of the mouth, if the base remains stationary on its bony support this is an indication of good stability.



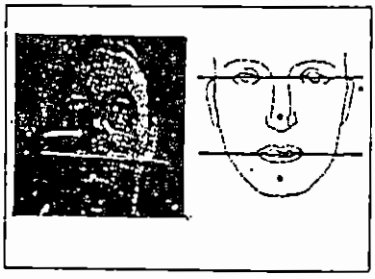
Adjustment of the labial fullness (lip support):

← Fig 42: Trim the labial surface of the occlusal rim either by adding or removing layers of wax, check by observing the profile of the upper lip.
A natural appearance indicated the right fullness and the correct position of anterior teeth- A: indicates correct fullness. B: defective fullness.



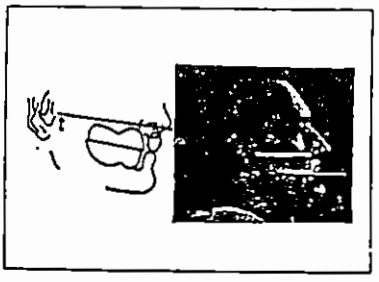
Adjustment of the height of the occlusal rim:-

← Fig.43: Trim the occlusal rim, keep only 2mm showing below the relaxed upper lip. Provided that the lip has a normal length.



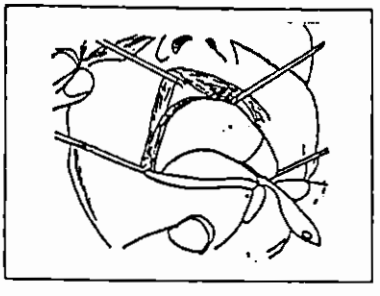
Adjustment of the anterior occlusal plane

← Fig 44: The anterior plane should be made parallel to an imaginary horizontal line passing through the pupils of the eyes. This can be estimated by observing the direction of two rulers, one seated on the occlusal rim and the other passing through the interpupillary line.



Adjustment of the Anteroposterior Occlusal Plane:

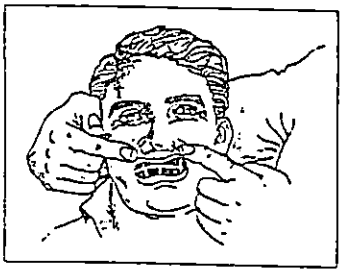
← Fig 45: The plane should be parallel to the ala-tragal line (a-t). This can be verified by the use of rulers and by marking this line on the patients' face using leucoplast.



Location of the Position of the Posterior Palatal Border

← Fig 46: Ask the patient to say "ah" with the mouth widely opened, mark with an indelible pencil the line from which the soft palate moves (vibrating line). adjust the posterior border of the base plate to be just anterior by:

1. Palpation. 2. Change of color of the mucous membrane.
3. Change of direction of the palate. 4. Position of foveae palatini.



Marking the guidelines

← Fig 47: With the wax knife mark on the Labial surface of upper record block.

a. The center line which bisects the face.

b. The high lip line: in contact with the lower border of the upper lip when it is raised high as possible, as in smiling.

c. Corner lines: they coincide with the tips of upper canine teeth.

II. Trimming and Adjustment of Lower Record Block.

Insert the lower record block, test for extension, retention and stability.

Adjust the occlusal surface of the rim either by reducing or adding wax till you establish an even contact with upper record block. occlusal place of the lower rim should be slightly below the level of the tongue to assure denture stability.

III. Recording the Vertical Dimension:

The method which is mentioned here includs firstly the registration of the vertical dimension of rest, then subtracting 3mm which is the average free way space (interocclusal distance).

1. Put a mark on the tip of the patient's nose and another one on the chin.

This can be done by adapting small squares of adhesive tapes(leucoplast).

2. Check that the patient is comfortably seated, free from head rest. Ask him to relax his whole body as completely as possible and allow his jaws to rest with the lips closed. Measure the distance between the two marks with a divider and record it (relaxation method).

3. Ask the patient to repeat the letter (M) several times. check the nose-chin measurement. (Phonetic method).
4. Ask the patient to swallow and relax.
5. Insert the record blocks and trim the occlusal surface of the lower until it occludes evenly with that of the upper at the height measured by the previous methods.
This represents the vertical dimension of rest. So we need now to remove the amount of interocclusal distance (free way space) to obtain the vertical dimension of occlusion.
6. Remove 3mm. from the lower wax rim, ask the patient to close, check the even contact between the two record blocks. The height obtained now represents the vertical dimension of occlusion.

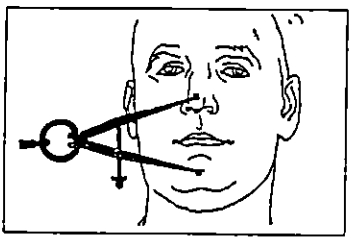


Fig 48: Recording the vertical dimension.

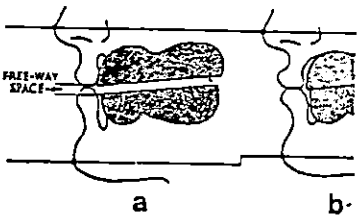


Fig 49: a. Represents the vertical dimension of rest.
b. Represents the occlusal vertical dimension, after reducing the amount of interocclusal distance (free way space).

IV. Recording the Horizontal Relationship (Centric Relation)

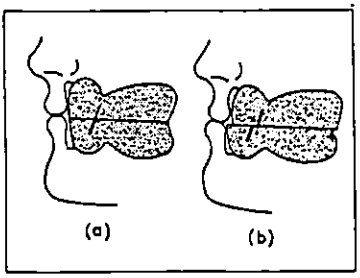


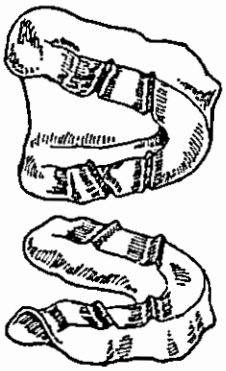
Fig 50: Guide line to check the retrusive position of the mandible.
a. The line on upper and lower blocks coincide.
b. Mandible is protruded, lines no longer coincide.

The aim of this step is to get the mandible backwards, so that the condyles will regain their most retruded position in the glenoid fossa.
Proceed by:

1. Asking the patient to place the tip of his tongue as far back on the palate as possible, to keep it there and close the blocks together until they meet.
2. With your wax knife mark guide lines on the lateral aspect of the upper and lower record blocks.
3. Ask the patient to close again and check, if the lines coincide or not if they do not coincide this means that the mandible has moved arteriorly.
4. Repeat this procedure till you obtain the same closure repeatedly with the guide lines coinciding. This indicates the correct horizontal relation.

V. Sealing upper and Lower Recording Occlusal Blocks in Centric Occlusion:

The aim is to fix the two record block together at the exact vertical dimension in the correct centric position.



1. Make two V- shaped gloves on each side of the occlusal aspect of the upper occlusal rim, this is done at the premolar and molar regions. The direction of the grooves, illustrated in the figure assures lateral stability of the record blocks.
2. On the lower occlusal rim, at the premolar and molar regions, put a strip of soft carving wax.

↑ Fig. 51: The 'V' Shaped grooves

3. Insert record blocks in the patient's mouth. Ask him to retrude tongue and close. Check the guide lines. Check the even contact between upper and lower wax rims.

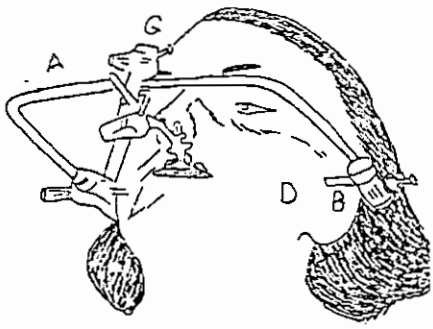
4. Check that no change has occured in the pre-determined occlusal vertical dimension. If you suspect any deviation you should repeat the procedure.
5. Remove the sealed upper and lower recording blocks from the patient's mouth, chill in water, re-examine them and be sure that posteriorly the heels of upper and lower record blocks are not in contact.

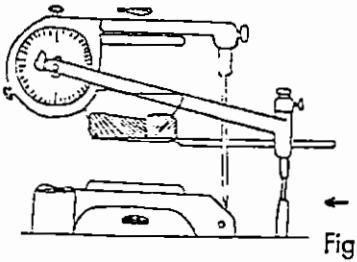
Face Bow

The face bow is a caliper-like device that is used to record the relationship of the jaws to the T. M. J., in order to orient the casts in the same relationship to the axis of the anatomical articulator.

→

Fig 52. Face bow assembled position on the patient's face. The face bow consists of: (A) A metal bow carrying in channels at its extremities two graduated rods (B) Which slide inwards and outwards for adjustment, it can be fixed by tightening the finger screws (C) The rods end by two cusps (D) which contacts lightly the determined position of the condyle. A flat metal fork (E) is attached eccentrically to a rod which is united to the bow through a universal joint(F).This joint can slide along and rotate around the bow, and can be fixed by tightening the finger screw G.





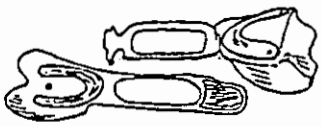
←

Fig. 53. Method of positioning the upper cast and record block on the anatomical articulator by means of the face bow.

Gothic Arch Tracing

Objective

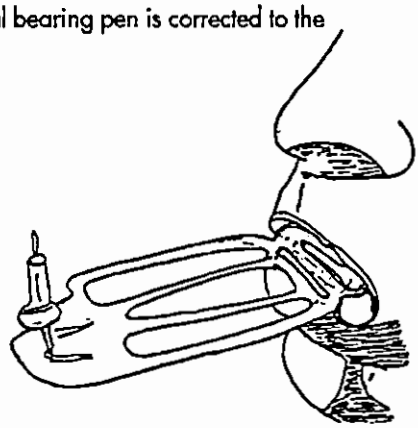
This method is the most reliable assessment of centric occlusion. The technique illustrates the horizontal movement of the mandible in the form of a tracing made by a pointed attachment fitted to one block an a recording plate fitted to the other. Types: an extra-oral tracer and an intra-oral type. Both have the same principle.

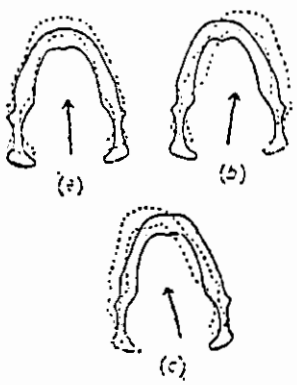


← Fig.54: Components of an extra-oral gothic arch tracer. Stylus attached to upper record block. Recording plate attached to lower record block. Central bearing pen and plate.

← Fig 55: After establishing the correct vertical dimension. Mount the record block on an anatomical articulator. Tracing units are then attached to the rims and central bearing pen is corrected to the determined vertical height.

Fig 56: Place the record blocks in the mouth → with the tracing point contact with the recording plate, should be covered by a black carding wax. Instruct the patient to perform lateral and protrusive movements. Examine the tracing produced by the stylus. A clearly defined arrow-head indicates the most retruded position of the mandible.





← Fig 57: The figure illustrated how the gothic is produced. The above diagram is a typical form of a completed tracing. The pointed head of the arch represents the most retruded position of the mandible: a. The arrow represents the direction of the movement of the stylus when the mandible is protruded. b. When the mandible is moved to the right. c. When the mandible is moved to the left.

Selection of Artificial Teeth

Definition

This is a stage in complete denture construction which depends mainly on the skill and judgment of the operator. Certain rules and guidance have been given by authors that will help in the choice of artificial teeth which are suitable in shape, size and color for complete denture patients. the most pleasing result can always be obtained by applying the scientific rules together with the operator's artistic outview.

Objectives

Two main objectives are required

1. Esthetic requirement this means that shape, size and color of the chosen teeth will satisfy the patient appearance.

2. Functional requirements: Artificial teeth must fulfill all the functions performed by the natural teeth including mastication and speech. This objective can be achieved with varying degrees of easiness or difficulty, depending on the condition of the patient at the first visit. Three main alternatives can be met with.

a. Pre-extraction records

When the patients present to the clinic with his natural teeth existing before extraction. A record can be obtained for shape, color and arrangement for his natural teeth.

b. Old dentures

If the patient is satisfied with his old artificial teeth, this can be copied or modified according to his desire, in the new dentures.

C. Edentulous patient

When extraction of teeth has been performed by another dentist, then a selection of suitable teeth for this group will be considered according to the following plan.

1 Selection of Tooth Material

Early artificial teeth were made of wood, stone, animal teeth and human teeth. prior to the nineteenth century, little effort was given to the articulating surfaces of artificial teeth.

Ash of England was the inventor of the first artificial teeth designed to occlude properly. for the purpose of study, artificial teeth for complete dentures are divided into two main segments:

I. Anterior teeth: primary related with esthetics.

II. posterior teeth: primarily related to masticatory function.

I Anterior teeth

It is manufactured from either porcelain or plastic(acrylic) materials. both fulfill the esthetic and functional requirements. so, the choice depends mainly on personal preference.

Porcelain Teeth

- Indicated if there is sufficient intermaxillary space.
- Has a good appearance and stable color.

. Anchored to denture base by mechanical means, e.g. holes, pins.
. Has hard glazed surface which is not affected with solvents and acids.
. Cannot be repolished.

Plastic Teeth

. Indicated in small intermaxillary space.
. It has very good appearance.
. Anchored to denture bases by chemical union.
. Has a resilient surface which can be easily abraded and stained.
. They are easily altered, ground and polished.
. Ideal for immediate denture cases.

II Posterior Teeth

Both plastic and porcelain teeth have been used in the manufacture of posterior teeth. The choice between both depends on the clinical conditions of the patient.

Porcelain Teeth

It will maintain the vertical dimension for a long time because of their abrasion resistance.

Plastic Teeth (Acrylic)

. Acrylic teeth are resilient, this will decrease the masticatory forces on the ridge by acting as a cushion. So, they are preferred for the use over chronically inflamed ridges.
. They wear faster than porcelain and leads to loss of vertical dimension.
. Indicated in small intermaxillary space.

Other Types of Posterior Teeth

1. In certain cases, plastic teeth may be used against porcelain teeth to lessen abrasion and improve function.
2. Cast gold occlusal surface may be fixed on top of plastic posterior teeth, to combine hardness of gold and resiliency of plastic.
3. Metal cutting blades may be embedded into plastic teeth to increase their cutting effect.

2 SELECTION OF SHAPE

I For Anterior Teeth

Anterior teeth are primarily concerned with the aesthetic function. So, a great care has to be given to their choice. three guides can be used in respect.

a. Shape of Arch.

We have three basic outlines square, tapered and ovoid.

b. Shaped of Face

Again we have three possible outlines, squared type of face, tapering and ovoid.

c. Personal Factors

e.g. Age, sex and type of person.

II For Posterior Teeth

a. Anatomical Teeth: (Cuspid)

these have cusps similar in form to the natural ones. it has the disadvantage that the interlocking of their cusps causes the displacement of the lower denture, and with possible damage to the underlying tissues (used mainly with the anatomical articulator).

b. Modified Anatomical Teeth

(e.g. shallow cuspid teeth) Used with plain line articulator, patients adapt themselves easily to their use successfully.

c. Cuspless Teeth

This type is now replaced by the modified anatomical types posterior teeth.

3 SELECTION OF THE SIZE

I Length

Two main anatomical landmarks can be taken as a guide to determine the cervicoincisal length of the upper six anterior teeth.

a. The ridge

Normally the necks of artificial teeth overlap the anterior ridge by 2-3 mm. This stands for the cervical extension.

b. Upper lip

Normally the incisal edge of the centrals are shown below the relaxed normal upper lip. This visible part varies by age but in the average from 2 to 3 mm.

Also it varies with the length of the upper lip, mobility, vertical height of occlusion and degree of overbite.

II Width

1. The distance between the tips of the left and right canine measured in a straight line nearly the same as the width of the nose. This distance ranges from 28 to 45mm.

So, the width of the nose + 3-4 mm (to compensate for the arch from arrangement of six front teeth) = Width of six front teeth.

2. It is always advisable to mount the canines on their original places i.e. on the canine eminence.

Harmony

The relationship between the length and the breadth of the face and that of the selected tooth should be studied.

Face length is measured from the supra-orbital ridge line to the inferior border of the chin. Face and tooth measurements should have the same pattern.

4. SELECTION OF THE SHADE (COLOR)

The selection of a suitable shade for any edentulous person is a matter of individual judgment.

The following facts can help in this respect:

I The Individual Tooth

a. The neck of the tooth has more pronounced color than the incisive edges.

b. The incisive edge in the young is more translucent than the body of the tooth and is of a bluish shade; this is because it is composed entirely of enamel.

II The Dental Arch

a. 1/1 Are lightest teeth in the mouth.

b. $\frac{2/2}{21/12}$ Slightly darker.

c. $\frac{3/3}{3/3}$ Are more darker.

d. Posterior teeth are lighter in color.

III Personal Variations

a. Yellow is dominate with fair hair, blue eyes and fresh complexion.

b. Opal is dominant with a clear, pale complexion.

c. Dark shades with pronounced color are dominant in persons with a strong build and large teeth.

d. Small, pearly white teeth are rare and they always look false.

e. Teeth darken slightly with age.

CLINICAL APPROACH

*I*nstruments

1. Shade and mould guide.
2. Willis gauge or ruler and divider.

Procedure

1. Selection of the shade is always done in the day-light.
2. It is better always to look to the face as a whole rather than focus to the teeth.
3. Always moisten the shade guide, because the teeth are always moist in the mouth.
4. Always place the tooth which is under consideration in the shade of the upper lip., i.e. in the position it is to occupy.
5. When it is difficult to decide the right shade, try to select a tooth which is obviously too dark and view it in position, then try a very light one, gradually merging these to extremes till a pleasing shade is found.
6. Always obtain the assistance of the patient and any friend or relation who may be available.
7. Always remember that the lighter the shade the more artificial the tooth look.
8. After selecting the suitable mould and shade, record their data in the patient's chart for future reference.

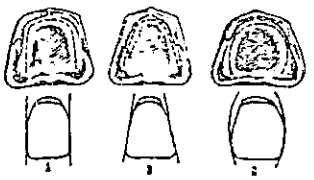


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Fig 58. The three basic arch shapes: A. square, B. tapering, C. ovoid.

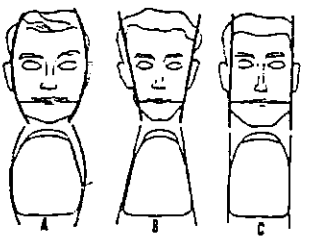

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Fig 59. Teeth contoured to correspond to face forms. A. Ovoid, B. Tapering, C. Square.

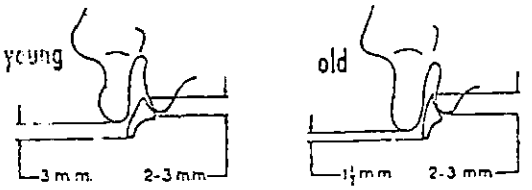

Fig 61. Shade guide.

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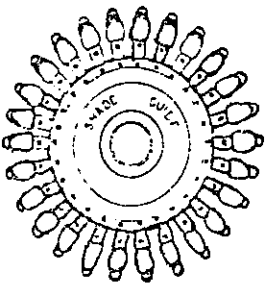
← Fig 60. Amount of tooth showing below the upper lip in a young and an old patient.



Laboratory Procedures

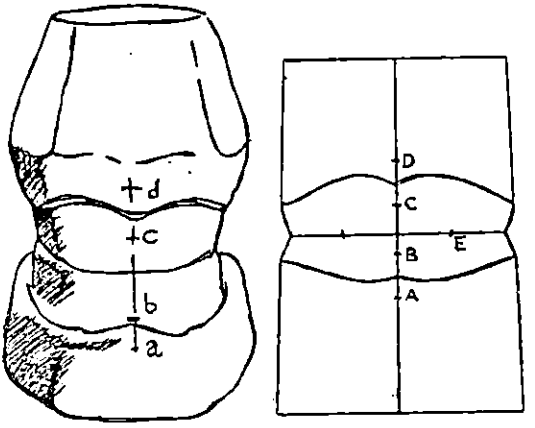
Setting The Teeth

Objective

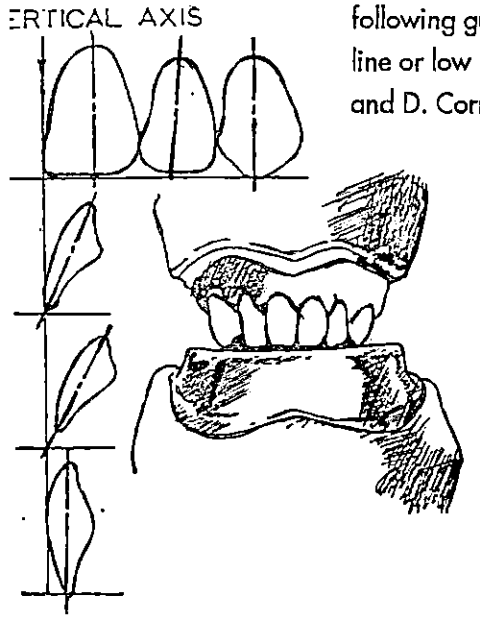
The last clinical stage has resulted in two record blocks related together in the same way as the patient's jaws, they represent the position of centric occlusion.
Now we need to mount these record blocks on an articulator to simulate the condition existing in the oral cavity.
Setting the selected teeth, in other words the replacement of occlusion rims with artificial teeth will result finally in a trial denture base carrying the teeth in the correct arrangement.

Instruments

1. Mounted casts on the articulator. the illustrations given in the part deals with the use of a simple articulator.
2. The selected artificial set of teeth.
3. Modelling wax.
4. A glass slab or flat metal surface to be used for adjusting the occlusal plane.
5. Bunsen burner.
6. Wax knife.



↑ Fig 62. Mounted casts on a starting line articulator. The following guide line should be marked: Center line. Lower smile line or low lip line A and B. Upper smile line or high lip line C. and D. Corner line or canine line E.



← Fig 63. The upper anterior, their inclination and positioning in relation to: 1- Horizontal plane and lower record rim. 2- Vertical plane.

The Upper Anterior Teeth

Relation to the ridge

The neck of the upper six front teeth should be set on the labial aspect of the ridge.

Central

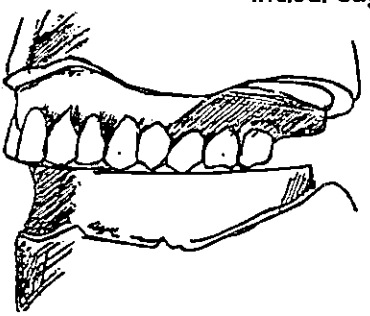
Front view: Long axis vertical or with slight distal inclination to make the incisal edge horizontal.
Side view: Incisal edge inclined forward slightly.
incisal edge: parallel and touching lower bite rim.

Lateral

Front view: Neck distally inclined slightly.
Side view: Incisal edge inclined forward slightly more than central.
Incisal edge: parallel to, but not quite touching, lower bite rim.

Canine

Front view: Vertical.
Side view: Vertical.
Incisal edge: Touching the lower bite rim.



← Fig 64. Upper anterior and posterior in relation to the horizontal plane.

The Upper Posterior Teeth

Relation to the ridge

Should be slightly set over the crest of the ridge.

First bicuspid

Buccal cusps only, Touching lower bite rim or the horizontal plane. Long axis: parallel to canine.

Second bicuspid:

Both cusps touching lower rim, long axis parallel to the first bicuspid.

First molar:

Mesio-lingual cusp, only touching lower rim with both buccal cusps slightly higher than the lingual.

second molar:

Nocusps touching the bite rim, but with the mesio-lingual one the nearst and about two mm away from the bite rim. The distal cusps being higher than the mesial,conform to the curve of spee. The buccal cusps, being higher than the lingual, conform to the curve of monson.

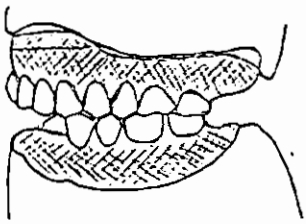


Fig 65. Upper and lower posterior teeth in articulation.

The Lower Posterior Teeth

First molar:

Articulates With the distal slopes of cusps of upper second bicuspid and mesial two-thirds of first molar.

Second molar:

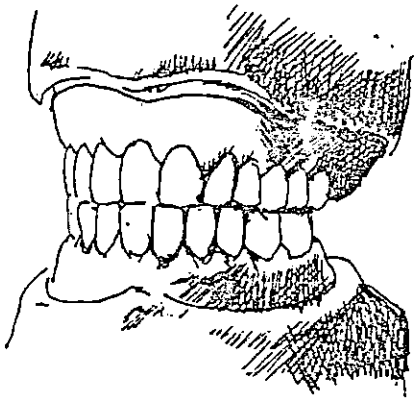
Articulates with distal slopes of distal cusps of upper first and mesial two-thirds of upper second molar.

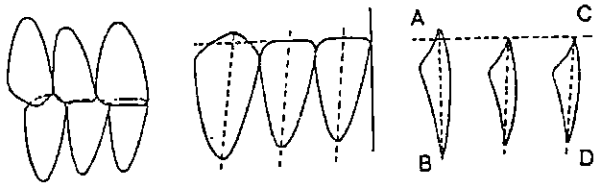
Second bicuspid

Articulates with mesial slopes of cusps of upper second bicuspid and distal slopes of first bicuspid.

First bicuspid

Articulates with mesial slopes of cusps of upper first bicuspids.





← Fig 66. A. The complete setup. B. Relative position of upper and lower anterior teeth to show over bite. C. Front view of lower anterior. D. Side view for lower central, lateral and canine.

The Lower Anterior Teeth

These are positioned lingually to the upper anterior and slightly higher than the occlusal plane. The lower anterior may be positioned either canine or central first.

Canine

Front view: Slight distal inclination at the neck.
Side view: Slight lingual tilt at the incisal edge.

Lateral

Front view: Slight distal inclination at the neck and little lower to the adjacent canine.
Side view: Very slight forward at the incisal edge.

Central

Front view: As for lateral but the same height. side *View*: As for lateral.

Part IV:

Clinical Stage

Trying in the Dentures

Laboratory Procedures

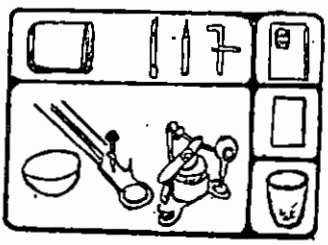
Processing

Trying in the Dentures

Objectives

Check the following

1. The accuracy of all previous stages in denture constructions such as jaw relations and arrangement of teeth.
2. That the arrangement of teeth is such that speech and masticatory function will be restored.
3. That the chosen, and arranged artificial set of teeth will ensure pleasing appearance.



↑ Fig. 67. Instruments: 1. Patient's record card. 2. Articulator with waxed up dentures. 3. Bowl of cold water. 4. Clean towel. 5. Divider. 6. Wax knife. 7. Indelible pencil. 8. Ruler. 9. Bunsen burner. 10. Sheet of modelling wax.

Check for

A. Lower Denture

1. Peripheral outline

The entire periphery should be checked to ensure that it is not over or under-extended. Particular attention should be paid to the back edge of the lower denture which should cross the retro-molor pad.

2. Stability under occlusal stresses

This set is used to determine if occlusal stresses will be transmitted outside the ridge, if upon applying pressure with the ball of the finger in the premolar region on each side alternatively, the denture tilts and rises from the ridge. This indicates instability of the denture. Instability is due to mounting the teeth outside the ridge on the side of pressure.

3. Tongue space

Natural teeth occupy a position in the mouth where the inward pressure of the cheeks and lips is equal to the outward pressure of the tongue.

Artificial teeth must be placed similarly in the same place. This position is known as the (Neutral zone).

If the artificial teeth is mounted to the lingual side of this zone the tongue will be restricted in its mobility and will tend to unstabilized the lower denture during movement. This can be checked by asking the patient to raise his tongue. If this results in upward movement of the seated denture, then the tongue is cramped.

4. Height of occlusal plane

Normally the height of lower occlusal plane is just below the level of the tongue; this will help in keeping the bolus of food on the occlusal surfaces of pre-molars and molars thus aiding the masticatory function. In artificial denture, the tongue will help to stabilize the lower denture by resting on the occlusal surface of teeth.

B. The Upper Denture

1. Peripheral outline: The posterior edge should be situated on the soft palate, with the post dam area correctly defined.
2. Stability to occlusal stresses .

C. Both Dentures Together

1. Jaw relations

a. Check the occlusal vertical dimension

1. Measure the occlusal vertical dimension and compare it with the rest vertical dimension.
2. If an error exists this must be corrected. If it is a small one, in case of anatomical articulator it can be adjusted within the range of plus or minus 3mm by raising or lowering the articulator pin and re-articulating the teeth to the correct vertical dimension.
3. If the error is greater than 3mm, it is necessary to take a new recording and to remount the casts on the articulator. This can be done in the following way:

- Determine the amount by which the occlusal vertical dimension should be increased or decreased.
- The teeth should be removed from the lower denture.
- The upper denture and the lower base plate are re-seated on the models on the articulator.

- Adjust the pin to the required dimension and construct new occlusion rim to this height.
- Return the upper denture and the lower occlusion rim to the patient's mouth and establish a new centric jaw relationship.
- Re-articulate the lower model in the new position.

b. Check the antero-posterior jaw relationship:
Check that the teeth have been correctly set up on the articulator in centric occlusion (maximum cuspal interdigitation). When the denture is inserted in the mouth, if the opposing cusps fail to interdigitate, this will indicate that the previous centric jaw relation record was incorrect. In such a circumstance, a new centric jaw relationship record will have to be recorded. Same procedure should be adopted here as that already described for vertical record taking.

C. Check for the evenness of occlusal pressure
As the teeth close, they should occlude evenly with equally distributed pressure all around.
Sometimes, teeth on one side occlude slightly before those on the other or the molars before the pre-molars. This may be due to uneven pressure on the occlusion rims during jaw relation record, or warpage of the base plate. If a minimum space is detected between occluding surface which allow the passage of celluloid strip; This can be corrected by adjusting the articulation. If the space is larger and the blade of a wax knife can be introduced between the occluding surfaces. A new jaw relation record has to be established.

2. Appearance
With the upper and lower waxed-up dentures in position

1. Check the lip to ensure that the upper and lower anterior teeth are in their correct positions.
2. Check the center line.
3. Check the occlusal plane to ensure that it is not running down on either side, and that the posterior teeth are arranged parallel to the naso-auricular line.
4. Check that the shade and mould of teeth are satisfactory.
5. Check the arrangement of teeth to given a pleasing appearance.
6. When you are satisfied with the appearance and arrangement of the teeth, the patient should be given a mirror and invited to comment on the appearance of the denture.

3. Speech

The teeth, tongue, the lips together with the roof and walls of the oral cavity play a great part in production of sounds. If the teeth are placed in incorrect positions defects in speech sounds may arise. In order to defect whether or not the patient is able to enunciate all speech sounds clearly, it is necessary to engage them in conversation and to listen for any abnormal sounds.

Fig 68. Component parts of the flask. →

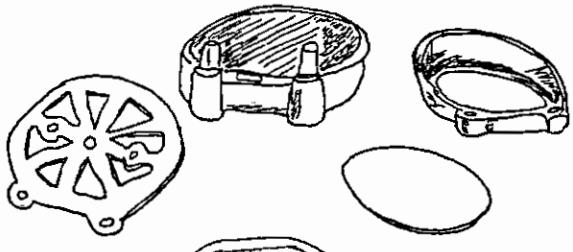
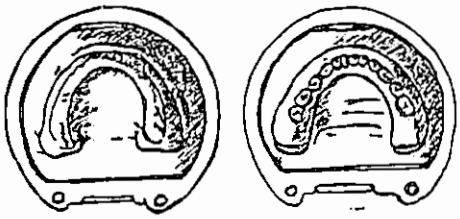
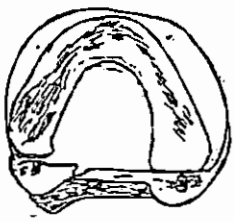


Fig 69. Plaster laid down on the → occlusal surface of lower teeth.

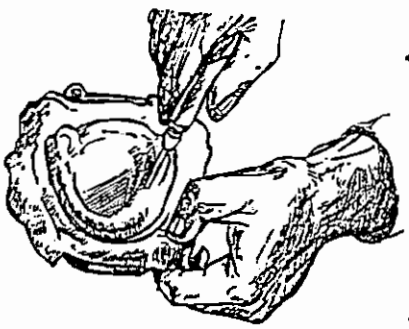
← Fig 70. Lower half of the flask, with the lower model, and denture trail base seated on plaster.



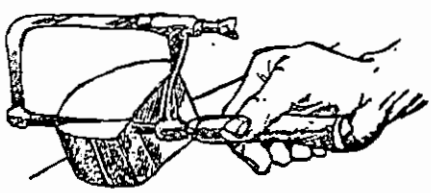
↑ Fig 71. Two halves of the flask after removal of the wax, they are ready for packing with acrylic.



← Fig 72. Uncured acrylic dough is placed in position with cellophane paper covering the surface, before the first trail closure.



← Fig 73. Removal of the excess after trail closure.



↑ Fig 74. The processed dentures have been removed from the flask totally embedded in investing plaster. Sectioning of investing plaster is performed by the saw.

← Fig 75. The processed dentures completely separated from invested plaster.

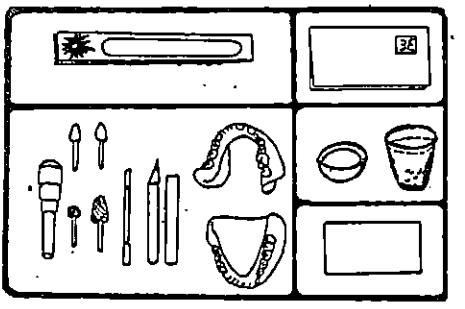
Part V:

Inserting the Completed Dentures

Inserting The Completed Denture

Objectives

1. To check the retention and the accuracy of the jaw relations of the completed dentures, and to adjust where necessary.
2. To instruct patients in the correct use of their dentures.
3. To advise patients on the proper care of their dentures and of the denture supporting tissues.
4. To advise them on the limitations to be expected of artificial dentures.



↑ Fig 76. Instruments and materials: 1. Completed dentures properly finished and polished. 2. Bowl of cold water. 3. Burs and stones. 4. Laboratory motor and hand piece. 5. Ruler and divider or Willis gauge. 6. Articulating paper. 7. Modelling wax.8. Mouth wash, or glass of water. 9. Clean towel for bracket table. 10. Patient's record card.

Procedure

I Inspect The Dentures:

1. Fitting surface:

Ensure that there are no projecting nodules of acrylic or sharp edges which may injure the mucous membrane. Ensure that all traces of plaster-of-Paris or other foreign materials have been removed from the fitting surfaces.

2. Denture border

Ensure that there are no sharp or angular margins.

3. Polished surface

Examine the polished surface of the denture to ensure that they have been adequately finished and there are no plaster contained in the gingival crevice.

II Check The Following

a. Retention of dentures:

1. Seat the upper denture with a firm upward and backward pressure.
2. Allow the tissues of the lips and cheeks to settle around the dentures.
3. Grip the buccal surface of the upper denture between the thumb and the forefinger in the pre-molar region. Apply a firm downward force and assess resistance to it.
4. Test the retention of the lower denture, applying an upward force, bearing in mind that the extent to which retention can be developed in the lower denture is commonly less than that of the upper.

b. Check the occlusal vertical dimension.

c. Check the antero-posterior jaw relationship: (See checking jaw relation in the try in stage)

d. Check the evenness of occlusal contact: If slight unevenness occurs, this can be detected and corrected by the use of either:

1. Articulating paper.
2. Wax templates.
3. Dentures re-mounting by means of wax check records.

If the unevenness is gross, or the antero-posterior relation is wrong, the denture is remade.

1. Articulating paper

Place a piece of blue articulating paper between the occlusal surfaces of the upper and lower teeth, ask the patient to chew up and down in centric occlusion. Remove the denture from the mouth and examine them. Blue areas will appear on the occlusal surface, they should be evenly spread and coloration should be uniform. Areas of uneven pressure (high spots) will show darker and broader blue spots. Areas with low pressure or no contact will show lightly colored spots or not colored at all. To equalize pressure aimed to alleviate the interlocking cusps grind, with a carborundum stone the darker areas, from the Buccal Upper (BU) and Lingual Lower (LL) cusps. (BULL) Wash the denture to remove the dye and retest with articulating paper till the blue areas are uniform.

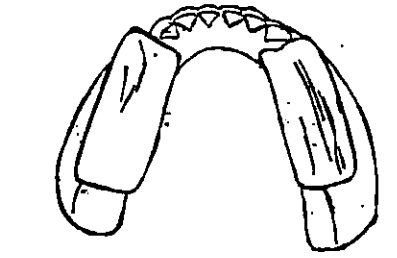
2. Use of wax templates

Two strips of pink wax 6mm wide are softened and put on either side of the lower posterior

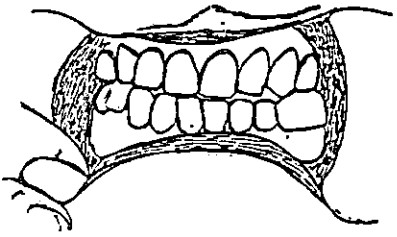
teeth. Put the denture in mouth and tell patient to close slowly till teeth are nearly touching each other. Remove denture, take wax template, chill in water, then examine this wax template by transmitted light, areas where occlusion is hard will be very thin or even performed; Then put it on denture and the exact area which requires grinding is detected where the wax is perforated.

3. Dentures re-mount

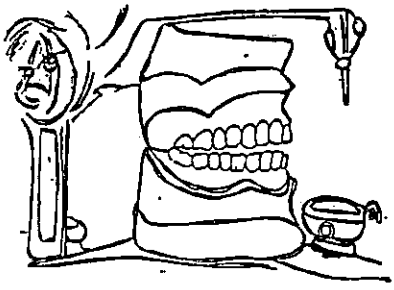
This is done to achieve perfection of occlusion. Dentures can be remounted by the aid of wax check record. On the articulator any error can be evaluated and corrected.



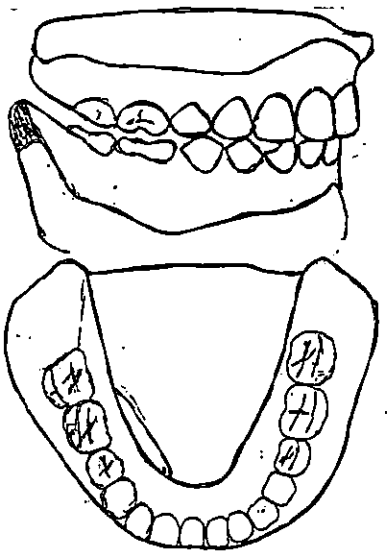
← Fig 77. Two strips of double thickness pink wax are laid on the occlusal surface of the lower denture. They should cover the premolar and molar area.



← Fig 78. Wax strips were softened, lower denture was inserted. Patient is allowed to close in centric position and to stop before tooth contract occurs



← Fig 79. Wax record for the centric relation ship, obtained from the last stage were used to mount the lower denture in the articulator. The upper denture was mounted by the face bow



← Fig 80. A case mounted in an articulator. It demonstrates pre-mature contact points in the premolar area.

← Fig 81. Blue articulating paper was applied on the occlusal surface of the lower teeth, articulator was closed with pressure to record the first contact areas. Areas of pre-mature contact were recorded on the lower denture. It is indicated in the figure, by the heavy occlusion in 45 in comparison with the complete lack of contact on the opposite side.

Errors Detected at this Stage May be Due to

I Incorrect registration of centric occlusion

Uneven pressure due to premature contact of the record rims on one side of the denture. Slight movement of record block on the ridge during centric registration due to imperfect fit and inadequate retention. Error of occlusion during mounting on the articulator.

II Irregularities in setting the teeth

Some teeth are put slightly out of occlusion. In the try in stage as wax is resilient it permits slight movement of teeth. In waxing up, teeth can move slightly due to contraction of wax during cooling, causing irregularities in articulation.

III Tooth movements in flasking and packing

After boiling out wax and base plate, if teeth are not correctly repositioned it will lead to malocclusion. During packing.

IV Incomplete flask closure

This may lead to: Increased vertical dimension. Upset of balanced occlusion.

V Articulator wear

Articulators are subjected to wear, the older the articulator the greater will be the errors in occlusion and articulation.

III. Instruction To The Patient

1. Wearing dentures at night

Dentures give always discomfort to the patient in the first hours or days. So, to reduce this period, he has to wear it at night. thus allowing the tongue, cheeks and lips to become accustomed. Once the patient has become accustomed, it is not necessary to be worn at night.

2. Cleaning: It is preferable to clean the denture after each meal specially the fitting surface to prevent stagnation of food and irritation of the tissues. At least, once a day clean the denture with a soft brush and soap. If not worn at night, put in water or a mild antiseptic solution. Avoid hot water as it may cause warpage.

3. Eating: All full denture wearers have to pass through a period of learning before they can eat with comfort.

Some Suggestions may help the patient: a. Food should be cut into small pieces and only a little placed in the mouth. b. Commence by chewing in the premolar region on one or both sides. c. Soft and non-sticky food are easier to eat. d. Chewing with posterior teeth should be mastered before biting with the incisors.

4. Talking: It is a little bit different in patients who have been edentulous for a long time. With the insertion of dentures, the tongue may be cramped Temporarily by the bulk of the lingual flange of lower denture. This may lead to difficulty in forming some letters and sounds until the tongue adapts itself. Patients are advised to read aloud and practice any word which causes trouble.

Part VI:

Aftercare Complaints

Aftercare

After the patient has worn his dentures for a short period, preferably not longer than 48 hours, he should be asked to return to the surgery. You will then ascertain whether his dentures are causing him any discomfort and detect if there is any sings of injury. It is of great importance to deal carefully with all the patient observations and complaints. Most of the patient complaints will fall under one of the following:

Complaints:

1. Pain

A. Due to the denture base

1. Over extension of the periphery

It is the most common cause of pain with new dentures; it is due to:

a. Incorrect molding of the impression.

b. Incorrect outlining of the denture on the model.

It appears as hyperaemia or ulcers depending upon:

- How continuously the denture has been worn.
- How gross the over-extension.

Treatment:

a. Mark with the indelible pencil on the sore spot, insert the denture with pressure this spot will be copied on the fitting surface. relief the pressure.by grinding.

b. The use of pressure indicating paste, easing paste or a soft mix of alginate to detect areas of over extension and pressure. The pressure indicating paste consist of equal parts of lanolin and starch. Technique Apply the paste evenly on the fitting surface, insert the denture in position, ask the patient to close and perform chewing movements. Remove the denture and examine the fitting surface, removal of the paste indicates an over extended area or pressure area, correct by grinding.

2. Poor fit: It is detected by: Poor retention, rocking, and inability to seat the denture in any position. The movement of the denture rubbing the mucous membrane causes pain with a result of redness.

Treatment

New denture to be constructed, meanwhile the old denture can be worn with a lining with zinc oxide paste.

3. Insufficient Relief: The denture rocks on the hard area causing pain, the painful area appears red and may be ulcerated.

Treatment

Relieve the area which requires relief.

4. Rough fitting surface of the denture: If a denture is processed on a poorly poured model, small projections will be found on the fitting surface of the denture. Patient will complain of pain under pressure, and localized areas of irritation are seen usually in the palate.

Treatment

Remove the roughness from the fitting surface of the denture.

5. Allergy: Rarely, some patients are allergic to the methyl methacrylate, especially if it is not completely polymerized. Patients Complain of burning sensation in the mouth whilst wearing the dentures and some times for some hours afterwards, the mucous membrane in contact with the denture appears inflamed. In most cases, the irritation is confined to the tissue in contact with unpolished surface of the denture, but sometimes to a lesser degree, to the check, tongue and lips. It affects the upper denture area and less markedly under the lower denture due to the presence of thicker layer of intervening saliva.

Treatment

New dentures of another material, as vulcanite or metallic dentures.

B. Due To Occlusal Units

1. Incorrect centric occlusion:

This is due to one of the following or a combination of them:

a. Wrong antero-posterior relation :

In centric occlusion, the mandible will not be fully retracted; difficult to diagnose, but can only be detected by watching the patient occlusal plane closely whilst the patient slowly approximates the teeth, the lower denture will move.

Treatment:

- If slight, it can be cured by grinding the denture.
- If gross, a new denture is required.

b. Uneven pressure:

Pain is due to trauma caused by the heavy one-sided pressure.

Treatment:

Either with spot grinding, if it is slight, or by newly constructed lower denture.

c. Open bite:

When the vertical height is increased beyond normal, pain is associated with white patches, relief of the denture over these patches gives an immediate relief, but within few days patient returns with the same condition but differently located. Besides, the patient complains of clattering of the teeth either when eating or talking.

Treatment:

New lower denture with reduced vertical dimension provided that the upper denture is corrected, otherwise both upper and lower dentures has to be done.

d. Over closure:

This is rarely associated with the new dentures, but it is always the result of loss of the vertical height due to resorption of the alveolar ridge. The resulting pain is resembling the neuralgia.

I. Costen's syndrome:

It is the result of prolonged over closure of the mandible, the condyle is forced back in the articular fossa, this leads to:

1. Otological symptoms: tinnitus, which is experienced while chewing, mild catarrhal deafness (loss of hearing).

2. Pain in the head and neck: pain in and around the ears, headaches in the vertex and occipital regions.

3. Miscellaneous symptoms; Vertigo, tenderness of the T.M.J. burning sensation in the tongue and throat, dryness of the mouth and metallic taste.

Treatment

New denture with the vertical dimension increased by few millimeters.

2. Cuspal Interference

A dragging action will be exerted on both upper and lower dentures during all lateral and protrusive movements with the teeth in contact. This dragging will cause widely distributed pain with well fitting dentures, and instability with those having poorer retention. The sore areas are located on the labial and buccal surfaces of the lower alveolar ridge and rarely can be seen on the lingual surfaces. This condition can easily be diagnosed by:

1. Asking the patient to grind the teeth, with plenty of movement, when shifting of the dentures can be seen.

2. Holding the upper denture gently in place by the fingers and thumb which are placed above the canine teeth, asking the patient to grind the teeth, dragging can easily be felt.

Treatment:

1. If cuspal interference is slight and confined only to 1-2 teeth, can be corrected by selective grinding (use articulating paper and grind the high spots) or by the use of grinding paste to let the patient wear off the offending high spots.

2. If the cuspal interference is gross, correctly articulated new dentures are required.

3. Teeth Off The Ridge

Here, pain is confined to the upper buccal sulci and maxillary tuberosity. Usually due to setting the upper teeth, too far buccal, during mastication the upper denture tilts digging the periphery of the tuberosity or other undercut areas on the opposite side.

Diagnosis

Ask the patient to bite on a wooden tongue depressor on the posterior teeth on one side and then the other.

Treatment

New upper denture with cross bite and sometimes complete upper and lower dentures (depending upon the case).

C. Due To Denture Foundation And Alveolar Ridge

1. Undetected pathology

For example: Retained roots or unerupted tooth.
Here, pain is due to:

a. Direct pressure on an area which is already tender and can be felt soon after inserting a new denture.

b. A well-fitting denture preventing drainage from undetected sinus and causing increased pressure within the bone.

Diagnosis

1. The detection of the sinus.
2. X-ray.

Treatment:

1. Extraction of the root or tooth.
2. Relining of the denture.
3. Relief over the post of the imbedded roots or unerupted tooth if extraction is contra-indicated.

2. V-shaped ridges

Mainly associated with the lower denture, sometimes with the upper, caused by pressure during mastication pressing the mucous membrane against a sharp ridge of the bone. Pain is severe to the side habitually used for eating, pain is most severe during and immediately after a meal.

Treatment

In the lower: alveolectomy then relining the lower denture.
In the upper: relief over the crest of the ridge as the palate resists the masticatory stresses.

3. Irregular ridge resorption

During alveolar resorption, an area is formed with rough and with sharp spicules of bone, if the mucous membrane covering it is thin so pain will be caused by pressure on it.

Diagnosis

The uneven alveolar ridge can be detected by digital pressure, and confirmed by x-ray.

Treatment

Alveolectomy of the affected area or Relining the denture.

4. Infection with monilia albicans

The palatal area which is traumatically irritated by rough fitting surface of the denture will be infected (by one of the fungiMonilia albicans). This is more frequent in:

- Patient with low Protein and vitamin diet.
- Patient with long antibiotic therapy.
- Patient wearing their dentures day by night.
- When we used alginate impression materials, which copy on the model all minute details of the palatal tissue (in these cases, the model is covered with tin foil before processing the denture to reduce the roughness).

Clinically

The patient's palate is inflamed and the mucous membrane is swollen and hyperplastic.

Treatment:

- Instruct the patient not to wear the denture continuously and to put the denture in dilute solution of hypo-chlorite.
- Let the patient rinse his mouth with hypo-chlorite mouth-wash as hot as possible twice or three times per day.
- The protein and vitamins content of the diet should be increased.
- Smooth the fitting surface of the denture and apply to it a fungicide (as Nystatin ointment).

5. Undercuts

This is sometimes helpful in the retention of the denture, but it causes pain to the patient during the insertion of the dentures. So, these undercuts must be relieved from the fitting surface of the denture, the periphery must not be reduced in height. If this treatment is not sufficient, due to severe undercuts, so alveolectomy is necessary.

6. Mental foramen

Normally it is situated in the buccal surface of the mandible below the lower ridge and thus it is outside the denture bearing area. In case of gross resorption of the alveolar ridge and basal bone, the foramen will line under the denture. When a new denture is constructed to these altered conditions adequate relief should be given for the mental nerve, otherwise neuralgic pain will be created due to pressure of the denture on it.

Diagnosis

Locate the mental foramen and apply firm pressure on this area, this will cause the same type of pain.

Treatment

Relief the lower denture on that area.

7. Swallowing and sore throat

Causes:

In the upper teeth

a. Extension into the soft palate with good retention (firm pressure).

b. Excessive pressure in the Hamular notch.

In the lower:

Over extension distally in the lingual pouch. The pain stops if the denture is left outside the mouth and starts again after re-insertion.

Treatment:

Reduce the over extension.

Appearance

Nose and chin approximation which is due to closed bite and excessive freeway space.

Cheeks and lips fallen in which are due to:

a. Lack of the facial muscle tone.

b. Lack of their support by teeth and alveolar ridge.

Treatment:

a. Plumping the upper denture in the region of the modulous to compensate for the loss of the muscular tone.

b. In case of good retention, the teeth can be set-up slightly outside the ridges.

Colour, shape and position of anterior teeth

Colour

Patient complaining that the teeth are too dark or too light, so explain to him that:

a. Natural teeth darken with age.

b. Very light shaded teeth look more artificial.

Shape

Patient complains that the artificial teeth are not identical with the natural ones, this may be due to the fact that mesial and distal surfaces are not so rounded so the artificial teeth look larger than natural ones.

Position

Patient complains that the anterior teeth are too far back in the mouth, more often or too far forward.

Amount of tooth showing

It must be remembered that the upper natural teeth show less in old age than in young due to:

a. Attrition.

b. Laxity of the upper lip.

Inefficiency

Inability to eat any thing

This complaint is mainly confined to patients who are wearing their dentures for the first time.

Inability to eat meat

This is due to:

a. The use of cuspless posterior teeth.

b. Over closure with decreased muscle efficiency.

c. Unbalanced occlusion.

d. Cuspal interference.

e. Inexperience in using the denture.

Disloding of the denture by eating:

may be due to one or both dentures

a. Cuspal interference.

b. Unbalanced articulation.

c. Upper teeth are outside the ridge.

d. Insufficient tongue space.

e. Periphery overextended.

f. Inexperience.

Poor Retention

When opening the mouth

Patient complains that during yawning, the lower denture lifts, so, we must explain to the patient that this is normal.

Causes

a. Over extension

b. Cramped tongue.

c. Under-extension.

d. Tight lips: when in conjunction with flat lower ridge, the Inward pressure of these tight lips seats the upper denture more firmly in position, but will dislodge the lower denture.

Treatment

a. Resetting the lower anterior teeth more lingually.

b. A definite labial concavity on the denture.

c. Maximum extension in the region of the retro- molar area and the lingual pouch.

When coughing or sneezing

Patient complains that the upper denture falls and the lower denture lifts, whenever he coughs or sneezes violently. This is due to the fact that during coughing or sneezing, the pressure inside the mouth increases than the

atmospheric pressure, so peripheral seal is broken, with the result that the upper denture tends to fall

Clattering Teeth

Patient can hear a noise during eating or talking.

Causes

a. Too great vertical height, so reduce the height.

b. Gross cuspal interference.

Nausea and gagging

Causes:

a. Upper denture slightly over-extended at the posterior limit, so remove the excess.

b. Thick posterior border of the upper denture, so the dorsum of the tongue being irritated by this thickness of the edge. Thin down the posterior border of the denture.

c. May be due to the effect that the lingual surface of the lower anterior teeth is too smooth,so the tip of the tongue feels something different than normal feeling, this initiates nausea.

d. The upper denture moves due to an inadequate air seal(as the upper denture here ends on the hard palate).

e. The palatal edge can be detected easily by the dorsum of the tongue as the posterior edge of the denture is insufficiently embedded in the mucous membrane. Correct by extending the denture to the vibrating line and post-dam accurately.

f. Psychoneurotic patient.

Discomfort

Cramped tongue:

This is due to arrangement of teeth with increased lingual inclination, i.e. teeth are not set in the neutral zone between the muscular forces of the check and tongue. Correct by either trimming of slight lingual inclination or re-make.

Altered vertical dimension: It may be 1-2mm which in some cases is sufficient for sensitive patients to notice the difference.

Altered occlusal plane; As this will require some adjustments of muscular movements.

Treatment:

Let the patient wear the new dentures for several weeks, by this time mostly the discomfort will disappear. otherwise, remaking the denture accurately copying the old ones.

altered speech

when completed dentures are first worn, there is always a temporary period of altered speech, this is rapidly overcome by reading out loud.

causes of altered speech

a. Denture outline and thickness.

b. Vertical dimension.

c. Antro-posterior position of the incisors.

d. The post-dam area.

e. The width of the dental arch.

f. The relation of the upper anterior teeth.

Biting the cheeks and tongue

Causes

a. Insufficient over-jet: Normally, there is overlap of the upper teeth over the lower teeth, as this will prevent cheeks getting caught between the teeth and the bitten. Premolar and molars occluding edge to edge with the teeth of the opening arch will often catch the cheeks.

b. Patient with lax cheeks

Treatment

- Increase buccal over-jet
- Plump the denture, i.e. make it thicker.
- In some cases remove the last molar
- Grind the buccal surface of the lower posterior teeth, so the lingual cusps only make contact with the upper teeth.

c. Reduced vertical height

If greatly reduced results in bunching the cheeks.

Treatment

- Restore the vertical dimension
- If it is impossible, so grind the buccal cusps of the lower teeth. Biting the tongue is due mainly to decreased tongue space.

Food Under The Denture

Many patients have this complaint only during the initial period of adaptation to the prosthesis.

Later-on, food continues to get under the denture (especially the lower ones) but patients accustomed to the sensation.

Also the patient develops greater skill in using his dentures after prolonged use. poor retention, instability, over extension and lack of post-damming are the common causes of this complaint.

Uncommon Complaints

1. Whistling: This is common when the upper denture is first worn, then gradually decreases as patient becomes familiar with the use of the denture. If whistling dose not disappear, the upper denture should be examined to check vault height, form and position of upper incisors.

2. Ear-Ache: Due to T.M.J. pain, resulting from premature contact in the occlusion.

3. Loss of taste sensation:

Elderly patients complain of this more than younger patients because their taste buds begin to atrophy at about the same time that dentures were first made. Patients are told that most of the taste buds are on the tongue and are not covered by dentures. This complain usually disappears later on when the patient is accustomed to the dentures.

4. Peculiar taste: May be due to:

a. Poor oral hygiene.

b. Certain diseases produce specific disturbances in taste, e.g. Fuso-spriochetosis (but rarely found in edentulous patients) produce metallic taste. Salty tastes result from draining cysts or from haemorrhage.

5. Lisping: Is a speech defect caused by:
Tongue defect, thickness of denture at rugae, narrow upper denture and when the anterior teeth are set backwards.

6. Burning of the mouth: Felt in the region of the rugae, lips, side, of tongue. So, stabilize the denture to minimise this burning sensation. Also, anxiety and riboflavinosis may be the cause.

Treatment

Large doses of vitamin B complex, instruct patient to leave the denture out at night. Also ice pieces in the mouth give temporary relief.

7. Defensive tongue: In certain cases, when dentures are inserted, The tongue will tend to eject them and patient finds it difficult to train a tongue of his type to control the denture.

Treatment

Is by training the tongue or the use of other aids to retention.

Part VII:

RETENTION OF COMPLETE DENTURES

Complete Denture Retention

Definition

Retention of complete dentures is that state wherein functional forces acting away from the mucous membrane are unable to destroy the attachment existing between the dentures and the underlying mucous membrane, i.e. it is that state at which dislodging forces fail to displace the denture away from its basal seat.

Factors Affecting Complete Denture Retention

A. Anatomic Factors

1. Arch size and form :

The larger the arch, the more surface area can be covered and the greater the retention.

2. Type of arch :

Square type of arch is more favourable for retention that avoid and tapering types.

3. Vault form :

High arched vault is unfavourable for retention (weak resistance to vertical displacement), round or U-shaped vault is the best.

4. Ridge form :

U-shaped ridge is the most favourable form. Its height resists lateral displacement; its parallel sides maintain good peripheral seal.

5. Arch relationship :

- ClassI Normal
- Class II Maxillary protrusion
- Class III Mandibular protrusion

Maxillary protrusion (ClassII), is the least favourable condition because the areal coverage of the mandible, always less than the maxilla, is even less than normal.

6. Tongue :

The broad thick tongue provides an excellent seal for the lower denture.

7. Mucosa :

If the mucosa is excessively thick or flabby, it will not provide a stable seat for the denture. The most favourable is a firm, Compressible mucosa of an even thickness.

8. Saliva :

It is the medium which allows surface tension, adhesion and cohesion to act.

Scanty thin, saliva interferes with the seal of the completed dentures leading to poor retention.

B. Physical Factors:

1. Adhesion and cohesion

Adhesion and cohesion play an important role in denture retention. Adhesion of saliva to mucosa and saliva to denture acrylic.

Cohesion of saliva molecules to one another.

These two factors can be enhanced by:

- Intimate contact between the denture and the surface mucosa.
- Increasing areal coverage.

2. Surface tension :

The cohesive force between the molecules of a liquid is responsible for the surface tension. It can be defined as the force exerted by the free surface of saliva along its line of contact with the denture base.

3. Atmospheric pressure :

When the upper denture is inserted, air is expelled out from the area between the fitting surface and the mucous membrane. If there is a good peripheral seal, the resulting pressure acting on the fitting surface of the denture will be less than that acting on the non-fitting surface (atmospheric pressure) The difference between these two pressures gives a positive force which will hold the denture in place.

4. Viscosity of saliva :

The higher the viscosity the lower the rate of flow and the greater the fixation power.

5. Gravity :

It may only affect the lower denture through increasing its weight, but it is not an actual retentive force.

C. Mechanical Factors :

1. Tissue or fitting surface :

By increasing the area of fitting surface, this leads to an increase in the forces of adhesion and cohesion, hence increasing retention.

2. Polished surface :

The shape of the polished surface must be contoured during waxing up so that it allows the

cheeks and tongue to stabilize the denture, not to unseat it from its position.

3. Occlusal surface : Requirements :

- Balanced occlusion.
- Correct occlusal plane.
- Reduced cusp angels.
- Absence of cuspal interlocking.

4. Outline of the denture :

Accurate muscle trimming during impression stage is important to allow for free movements of the muscles of cheeks, tongue and all muscle attachments.

D. Psychological Factors :

The degree of patient intelligence, his general attitude towards dentistry and prosthodontics, his expectations, capacity for muscle control, the interrelation between the dentist and the patient and how far the patient is convinced with his dentist.

All these factors may play a role in achieving a good prognosis.

E. Aids to retention :

1. Denture adhesives :

Usually composed of gum tragacanth, gum arabic and flavouring agent.

Application

- Supplied in powder form, powder is sprinkled over the moist fitting surface of the denture, this will stick in place for several hours.
- Can be used for retaining upper record block during jaw relation record.

- Used to hold poorly retained or old dentures as a temporary procedure.
- Prolonged use causes constipation.

2. Springs :

These are made of coiled stainless steel or gold plated metals or recently nylon.

Application

It is attached at their ends to the upper and lower dentures at pre-molar and molar regions. The dentures are thus attached to each other and held in occlusion to be inserted in the mouth. As soon as they are released, the dentures are forced apart towards their ridges by the action of springs. It is unhygienic, and causes:

- Permanent pressure.
- Soreness in the cheeks.

3. Magnets :

Small steel magnets may be embedded under the premolar and molar region of both dentures, with their similar poles oposing each other, this will lead to a force of repulsion, this may help to keep the denture in place. Practically, the repulsion force is markedly decreased or even disappears when the jaws are opened widely.

4. Suction chamber :

Resemble relief areas in shape but differs in having a clearly defined outline.

Upon inserting the upper denture in place, a partial vaccum is created in the chamber, by sucking and swallowing. This area of reduced pressure helps to keep the denture in place.

It may improve retention in difficult cases.
Prolonged use leads to palatal hyperplasia, with loss of suction.

5. Rubber suction disc :

They consist of a rubber disc which is attached to the fitting surface of the upper denture.
It is unhygienic; Their use is condemned because they may lead to serious pathological conditions like perforation of the palate or malignancy.

F. Surgical Interference :

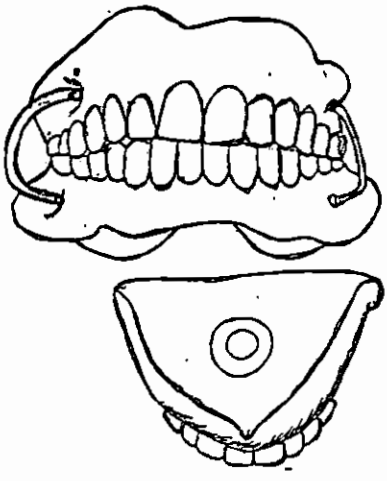
When all prosthetic means fail, surgery is indicated for favourable cases.
Surgical interference will be either by:

1. Ridge reconstruction :

- By bone graft.
- Cartilage.
- Inert material

2. Deepending of the sulcus with epithelial graft.

3. Denture implants.



← Fig. 82 Springs: Attached to upper and lower dentures as an aid to retention.

← Fig 83 Rubber suction disc: Attached by means of a mental stud to the fitting surface of the upper denture.

Appendix: Form and Function

Structure	Morphology	Histology
1. Face	Symmetrical with a protruding forehead. Then a depression (glabella) between the eye followed by the nose elevation then a slightly labially inclined upper lip and a depressed chin area ending with a chin point.	Mostly stratified squamous epithelium that is variable in degree of deratinization.
2. Upper lip	Slightly labially inclined providing the face with its natural profile	Composed of: i. Labial or outer part keratinized stratified squamous epithelium. ii. Vermillion border: Blends with thouter part where it is a horizontal part characterized by beeing pink due to underlying B.V. iii. Lingual (inner part): A lining mucous membrane of stratified squamous epithelial origin with an underlying lamina propria containing B.V., mucous glands, muscles-fats.

Adaptation of form to function	Diagnostic value
Function of eyes, nose lips.. etc.	a. Non edentulous: i. Patient arriving before loss of all teeth, where all data may be reco-ded (pre extraction records) may be used afterwards to determine the height or contour of the face and the shape, size and shade of teeth. ii. Recording any abnormalities in either profile or height of face to improving it. b. Edentulous: i. With dentures: check their effectiveness in emproving the patient's vert'cal dimension profile, where if not.. improve upon it.
Essential for sound production process involved speech.	The form anc length of the patient's lips vary considerably. Some patients have thin lips, others thick ones. Thick lips give the appearance of adequate support in case of lost teeth. The tength of lips is significant in deciding on the height of the teeth.
The mucous secretion is needed to keep the lip moistened	Excessively short lips give the appearance of too much tooth structure. Long lips make it difficult to show sufficient tooth structures.
Fats act as a cushion or pad to applied pressure.	The philtrum is lost due to loss of teeth. The vermillion border has an aesthetic value.

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