ARRANGEMENT OF ARTIFICIAL TEETH

DONE BY Maha Mishaal

Arrangement of artificial teeth

• It is the placement of teeth on a denture with definite objective in mind.



Guiding lines aid in arrangement of artificial teeth

For maxillary cast

- line bisecting the incisive papilla horizontally , this line aids in setting of upper anterior teeth.
- midline which is drawn over the median palatine suture and bisecting the incisive papilla.
- Canine eminence lines: record these two lines on the lateral walls of the cast on both sides aid in setting of the six maxillary anterior teeth.



Mandibular cast

1- line bisecting the residual ridge anteriorly, aid in setting of lower anterior teeth.

2- Canine eminence lines.

3- line that bisects the crest of the residual ridge posteriorly from canine area to retromolar pad on both sides of the cast used as a guid for the buccolingual position of the mandibular posterior teeth.



Arrangement of Anterior teeth

1- Lip support.

2-Permit satisfactory phonetics.

3-Esthetics.

Upper central incisor (C.I):

In frontal plane the incisal edge should be in contact with the occlusal plane, its long axis is perpendicular to the occlusal plane, its mesial contact area should touch the midline of the bite rim.





 sagittal plane, the tooth has a slight labial inclination to give support to the upper lip, and the facial surface of the tooth is nearly perpendicular to the occlusal plane.





 In horizontal or occlusal plane, the labial surface of the central incisor should be located at a distance of 8-10 mm from the center of the incisive papilla.



Lateral incisors

 frontal plane The maxillary lateral incisor should be positioned with a slight distal inclination and is usually ½ to 1 mm above the plane of occlusion.



• sagittal plane it shows slight labial inclination,





In horizontal plane, it must follow the arch curvature (the distal edge should rotate lingually).



Canine

Frontal plane the long axis is perpendicular to the plane, and the tip touches the occlusal plane.



• Sagittal view, the long axis is vertical



Horizontal plane, This tooth is rotated with arch and represents the transition from anterior teeth to posterior teeth and represents the corner or turning point of upper arch.



Mandibular anterior teeth

Lower central incisor:

In frontal plane, the midline of lower C.I should be coinside with the midline of upper C.I.

In sagittal plane should have labial inclination.





Over bite is the vertical extension of the upper anterior teeth on the lower anterior teeth when the posterior teeth are in centric occlusion. This overlap depends on several factors, but generally speaking over bite should be about 1-2 mm.





over jet which is the extension of the lower anterior teeth beyond the upper anterior teeth (2-4mm).



Lateral incisor

- **Frontal view**, the long axis is vertical to the occlusal plane
- **Sagittal plane**, should have slight labial inclination.
- **Horizontal view**, the distal edge rotated towards lingually to have the arch curvature





• The cuspids the long axis is very slightly inclined distally and the neck is more prominent than the tip, the tip of lower canine will be in the embrasure between upper lateral incisor and upper canine & its distal slope should be opposed to the mesial slope of upper canine, it's called normal canine position



Arrangement of posterior teeth



 curve of Spee is the curvature of the occlusal alignment of the teeth. It begins at the tip of the lower canine follows the buccal cusps of the premolars and molars and continues to the anterior border of the mandibular ramus.



Christensen's phenomenon

This is the the posterior opening of the dental arches or occlusion rims during forward movement of the mandible.



Compensating curve:

Is the anterio-posterior and the mediolateral curvature of the occlusal surface of a complete denture teeth. The compensating curves are called so because they compensate for that present in natural dention. Compensating curves may be increased or decreased in an artificial dentition to help achievement of balanced occlusion.



Curve of Wilson: is the curvature extend mesio laterally from one side of the arch to the other arch, to compensate for the opening that occur during lateral movement.



Mandibular first premolar: The tip of the buccal cusp should be 1mm below the occlusal plane, the central groove should be over the center of ridge.

Mandibular second premolar:

Mandibular first molar: The mesio-buccal cusp should be 1mm below the occlusal plane and the disto-buccal cusp is ½ mm below the occlusal plane.

Mandibular second molar: The mesio-buccal cusp is ½ mm below the plane, while disto-buccal cusp touch the occlusal plane. The mandibular first and second molar should be arranged with slight lingual inclination to give the lateral curve(curve of wilson).





- Maxillary first premolar : The lingual cusp should seat into the embrasure between mandibular first and second premolar.
- Maxillary second premolar: The lingual cusp should seat into the embrasure area between mand.second premolar and mandibular first molar.
- Maxillary first molar: The mesio-buccal cusp should rest in the buccal groove of mand. First molar, and the mesio-lingual cusp should seat into the central fossa of mandibular first molar.

 Maxillary second molar: The mesio-buccal cusp should rest in the buccal groove of mand.second molar and mesio-lingual should seat into the central fossa of mand.second molar.



Common errors in arrangement of teeth

1-setting mand. Anterior teeth too forward in order to meet max. teeth.

2-failure to make the canine the turning point.

3-setting mand. First premolar to the buccal side of the canine.

4- failure to establish the occlusal plane.

5-Establishing the occlusal plane by an arbitrary level on the face.

6-setting the mandibular teeth causing tongue interference.


Anatomy and Physiology Of Temporomandibular joint DONE BY;-**MAHAMISHAAL**

Temporomandibular joint (TMJ):

 It is the articulation of the condyle of the mandible, and the inter-articular disc; with the mandibular fossa (glenoid fossa) of the temporal bone.



TMJ consists of the following parts:

- The mandibular fossa (glenoid fossa) of temporal bone.
- The condyle or head of the mandible.
- Synovial cavity.
- The articular disc or (meniscus).



The difference beteeen TMJ and other joints in the body are:-

1- TMJ has an articular disc which completely divides the joint spaces into upper and lower joint compartments.

- 2- TMJ is Ginglymoarthrodial Joint.
- A-Hinge action(rotation).
- B-Slide action(translation).

3-Relation of teeth affects the relationship of the articulating components.

4-The mandible is the only bone in the body hinged on both ends that is not capable of independent movement at one ends. There are three groups of muscles:

- Closing muscles.
- Gliding muscles.
- Opening muscles.

Closing muscles

• The temporalis, masseter and medial pterygoid muscles supply the power for pulling the mandible against the maxilla (elevating and closing the mandible).





Gliding muscles

 The lateral pterygoid muscle connects the mandible to the lateral pterygoid plate in such a way as to act as the steering mechanism for the mandible and act to protrude the jaw or to move it laterally.



Opening muscles

The muscles that depress (open) mandible consist of three groups:-

suprahyoid muscles, infrahyoid muscles, and platysma.







Ligaments

- Temporomandibular and capsular ligaments.
- Sphenomandibular ligament.
- Stylomandibular ligament



Mandibular Axes and Mandibular Movements

- There are three axes around which the mandibular movements take place.
- The mandibular movements are related to three planes of skull (sagittal, transverse (horizontal), and coronal (frontal)).



1- Hinge axis or transverse axis:-

It is an imaginary line around which the mandible may rotate within the sagittal plane (during opening and closing movement).



2- Sagittal axis of the mandible:-

It is an imaginary anteroposterior line around which the mandible may rotate within the frontal plane.



Sagittal joint axis

3- Vertical axis of the mandible:-

It is an imaginary line around which the mandible may rotate through the horizontal plane.



Mandibular movements classification

Based on the dimension involved in the movement

1- Rotational

It occurs between the condyle and the inferior surface of the articular disk.

a-Rotation around the transverse or hinge axis.

b- Rotation around the anteroposterior or sagittal axis.

c- Rotation around the vertical axis.

Rotation



2- Translational or gliding It occurs between the superior surface of the articular disc and the glenoid fossa.



Functional movements

All mandibular movements except terminal hinge movement .They are including:-

-Opening and closing movements.

-Symmetrical forward and backward movements . -Asymmetrical side wise movement or lateral movement.



Wax-up and Gingival Contour of Complete Denture

Done by:-Maha Mishaal

POLISHED SURFACE:-

The outer surfaces which will be in contact with oral tissues and developed by waxing up a denture base.

The significant of waxing and contouring of complete denture are:

1- RETENTIVE QUALITY

2-STABILITY

3-ESTHETIC OF Complete Denture

4- TISSUE TOLERANCE OF THE DENTURE .

Requirements of waxing the polished surface

1-Should duplicate the covered soft tissue as accurately as possible.

2- The border both buccal and lingual should full the vestibule to achieve a good seal.

3-notches should provide to accommodate the frenum both size and direction.



4-The contour of the denture flange should be compatible with the drape of the cheeck and lips.

5- the contour of the lingual flanges should be compatible with the tongue.

6- palatal section of max . denture should be nearly production of the patient.





Procedure for wax contouring

1-The casts are removed from the articulator

2-Contour wax carefully to prevent movement of teeth

3-Avoid a bulky wax –up . the additional bulk of acrylic resin may contribute to porosity and dimensional processing error

4-A strip of base plate wax is added from the gingival 1/3rd of the teeth to the periphery border of the trial denture



5-the palatal surface of the maxillary denture is covered with a layer of base plate wax if the trial base is a temporary one and it is thinner than 2mm.



6-after the wax has cooled , carve the interdental papillae to resemble the natural papillae.

7-Develop the margin by carving at a 45 degree angle to the neck of the tooth.



8-Wax the lingual flange of the mandibular denture thickly enough to fill all depressions and to slope down from the necks of the teeth inward toward the tongue. The slope of the flange should be free from undercut and very slightly concave at or near the lower border.



9- Stippling the gingival contour. It is the procedure of the reproduction of the minute crease and pits that occur in the natural gums which give the orange peel appearance.


10- After the wax has been contoured smooth it by flaming and then polish it with wet cotton.



Posterior Palatal Seal area

It defined as a soft tissue along the junction of the hard and soft palates on which pressure within physiologic limits of the tissue can be applied by a denture to assist in the retention of the denture.

It is determined inside the patient mouth and transferred onto the cast using indelible pencil by drawing a line which extended from the right to the left hamular notches.



The vibrating line of the soft palate normally used as a guide to the ideal posterior borderof the denture, which determined according the following:

1-For anterior border of vibrating line , instructing the patient to say AH with vigorous burst.

2- The anterior vibrating is not a straight line, due to the projection of the posterior nasal spine.



3-For posterior border of vibrating line which separate the movable and immovable portions of the soft palate.











Technique for determination posterior palatal seal area

1-For conventional method, a line placed on vibrating line inside the patient mouth $_$ impression $_$ cast with pps.

2- For scarping of master cast, make points in the fovea palatina and the hamular notch and then connect these points to form solid line.

3- place points in the glandular area of hard palate 1.52 mm anterior to the first line and about 2 mm anterior
to the first line at the mid palatine suture and draw a
second line to form a buttrfly pattern.



4- Carve the seal along the draw lines into the cast.
A- It should be 0.5 mm deep in the middle of PPS.
B- It should be 1 mm deep in hamular notch area and
C- It should be 1.5-2 mm width in the glandular area between the hamular notch and the middle of the posterior palate .









The area between the anterior and posterior vibrating line is scraped in the master cast to depth of (1-1.5mm) on either side of Midpalatine raphe . In the region of the mid palatine raphe , it should be only (0.5mm to 1mm in depth).



Advantages of PPS

- 1- Determine the posterior border of maxillary denture.
- 2- Compensate for the shrinkage during processing.
- 3- Provide good seal and increase retention .
- 4- Prevent food to enter under the maxillary denture.
- 5- Reduce the tendency for gagre flex.

Under post damming

It is possible to be insufficient at some points, it is resulted from recording the tissue when mouth was wide open during the final impression because the pterygomandibular fold becomes tight.

Remarking post dam on the cast and add new acrylic resin to the denture will correct this fault.

Over post damming

It is present when the master cast was scraped too aggressively which lead to displace too much PPS tissue.

Selective reduction of the denture border with post dam will solve this problem.



SELECTION OF POSTERIOR TEETH

DONE BY: MAHA MISHAAL

Selection of Posterior Teeth

1- Shade.

2-Size.

3-Occlusal form.



SHADE OF POSTERIOR TEETH

Should be harmonized to the shade on anterior teeth, maxillary first premolars are used for esthetic more than function, so it is advisable to select premolar teeth with lighter color than the other posterior teeth, but not lighter than anterior teeth.



Generally the shades of posterior teeth are slightly darker than anterior teeth.

SIZE OF POSTERIOR TEETH

-Bucco-lingual width

should be slightly narrower than natural teeth, because the broader occlusal surfaces which

direct more stress during function to supporting tissue, leading to increase in the rate of ridge resorption.



• encroach into the tongue space leading to instability of the denture.



• Also, the teeth should not encroach into the buccal corridor space to avoid cheek biting.



-Mesio-distal Length

The lengths of all maxillary posterior teeth should be equal to the distance between canine line, and anterior border of maxillary tuberosity. For mandibular posterior teeth, the mesio-distal lengths should be equal to distance between the canine line and anterior border of retromolar pad.



Similarly the teeth should not be placed over displaceable tissues like the retromolar pad as it will cause tipping of the denture during function. In case with inadequate mesio-distal length, the premolar can be omitted.



VERTICAL HEIGHT (OCCLUSO-GINGIVAL LENGTH)

It is determined by the available inter-arch distance. The occlusal plane should be located at the midpoint of the interocclusal distance.

The length of the maxillary first premolar should be comparable to that of maxillary canine to have the proper esthetic effect. The height of posterior teeth usually divided into long, medium, and short.

Long posterior teeth are generally more esthetic in appearance than are shorter teeth.



OCCLUSAL FORM

1-Anatomical teeth (cusp form):-have cusp angles 33, 20, 5 degree.

2-Non- anatomical (cuspless form):- also called monoplane or zero degree teeth.



ANATOMIC TEETH

-Advantages

1-More efficient.



2-Can be arranged in balanced occlusion in eccentric position.

3-The cusp-fossa relation provide definite return to centric occlusion.

4-Esthetically more acceptable.

5-more compatible with surrounding structures.

NON-ANATOMICAL TEETH

-Advantage

1-Offer less resistance to non-masticatory movement like bruxism, therefore less damaging to supporting tissue.

2-More comfortable.

3-Less resistance to lateral forces so it used in excessively resorbed ridge.

4-Allow greater range for movement therefore used in patient with mal-related jaw.

5-Used in patients with uncoordinated neuromuscular control in which jaw relation records are not repeatable.

MATERIALS OF TEETH

-Porcelain teeth:-

These preferred for young person because they look like vital, very smooth and difficult to abrade.

-Acrylic teeth :-

They are used when there is insufficient inter-occlusal distance, opposing natural teeth, partial denture and gold bridge.

| NO. | Acrylic teeth | Porcelain teeth |
|-----|--------------------------------|--------------------------------------|
| 1 | Not brittle, easily abraded | Brittle, more resistance to abrasion |
| 2 | Esthetically good | Esthetically excellent |
| 3 | Chemically bonded | Mechanically bonded |
| 4 | Easily ground and polish | Difficult to grind and polish |
| 5 | Transmit less forces to mucosa | More forces to mucosa |
| 6 | No clicking on contact | Clicking on contact |
| 7 | Thermal expansion | Much lower than acrylic |



Selection of anterior teeth DONE BY MAHA MIISHAAL

Anterior teeth are primarily selected to satisfy esthetic requirements.




Records of shade, size, and form of teeth

could be obtained from pre-extraction records which include:-

- 1- Preserved extracted teeth.
- 2- Previous diagnostic casts with natural teeth.
- 3- Pre-extraction radiograph.
- 4- Pre-extraction photograph.
- 5- Observation of teeth of close relatives.

Factors to be considered when pre-extraction records are not available

- 1- Shade.
- 2- Size.
- 3- Form.

SHADE

It is the degree of darkness of the color. There are two basic shades, the yellow and grey, and the other shades vary in between.

The factors of shade selection:-

1- AGE

The younger the patient, the lighter the shade is preferred.

2- GENDER

The gender may affect the shade; it seems that females are given lighter and brighter teeth than males.

3- COMPLEXION

The color of the face should harmonize the shade of the teeth. Lighter teeth are suitable for lighter skin, while darker teeth are suitable for darker skin.

4- PATIENT PREFERENCE

(method of pair comparison) More than two or three shades should be selected and comparison between them would help in final right selection. To select the size of anterior teeth, we have to consider the following:

- 1- LENGTH
- a- Length of upper lip:
- In short lip more than 2 mm seen from the maxillary central incisors.
- In medium lip length 1.5-2 mm seen from the maxillary central incisors.
- In long lip nothing can be seen from the maxillary central incisors

| Lip Length | Incisal Display |
|------------|-----------------|
| 10-20mm | 3-4mm |
| 20-25mm | 2mm |
| 26-30mm | 1mm |
| 30 & over | 0 |



b- Length of the lower lip:

Length of mandibular anterior teeth should be with the level of lower lip.

c- Inter-ridge distance:

When the space is available, it is more esthetically acceptable to use a tooth long enough to eliminate the display of the denture base (teeth are more attractive in appearance than denture base materials). 2- WIDTH

a- The width from the tip of left canine to the tip of right canine is almost equal to the width of the nose (interalar width) when measured by the caliper. (Width of six anterior teeth = interalar width + 7 mm)







b- The width of maxillary central incisor equals approximately to 1/16 of bizygomatic width, and the width of maxillary anterior teeth equals to 1/3.36 of bizygomatic width.



c- Width of the anterior teeth can be measured on maxillary occlusal rim depending on the intraoral anatomical landmarks like: (buccal frenum, corner of the mouth, and canine eminence).

3- PATIENT PREFERENCE

Set two different sizes of teeth on a piece of wax rope, place them under the upper lip, and find out which one the patient prefers. Two or three presentations may have to be made to reach a suitable decision.





FORM

The form or outline of anterior teeth depends on the following factors

1- FACIAL FORM

... According to frontal outline: The face could be classified into: square, ovoid, and tapering. The maxillary central incisor form should be in harmony with patient face.





...According to profile: The face could be classified into: straight, convex, and concave. The labial surface of maxillary central incisor viewed from mesial aspect should be in harmony with profile of face.





2- GENDER

• Masculine form is associated with square, cuboidal, and angular form.

• Feminine form is associated with more rounded, ovoid, and tapering features.







Figure 1b

3- AGE

In old patients the teeth tend to have square form due to attrition, more round features disappear and line angle quite seen in those patients.

4- PERSONALITY

It seems reasonable that a large vigorous type of persons have teeth of more square, large teeth with prominent markings, different from those of delicate appearing persons.

5- PATIENT PREFERENCE

Set two different forms of teeth on the right and left sides of a piece of wax rope, and ask the patients which they prefer.



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REPAIR OF COMPLETE DENTURE

DONE BY MAHA MISHAAL

types of repair

Maxillary or mandibular denture base fracture.



• Replacement of the broken or missing tooth.



• Missing labial or lingual border.



Repairing of fractured denture base



 Broken parts are assembled & fixed together with sticky wax on the polished surface. Assembled parts may be strengthened with burs or plastic sticks.



 Any undercut on the fitting surface is blocked out with wax or clay.

• The fitting surface is painted with petroleum jelly.



 Stone plaster is poured into the fitting surface. After stone has set, the denture is removed from the cast and cleaned from any traces of sticky wax.

 Fractured edges are widened along the fracture line and beveled towards the polished surface to increase bonding surface area.



 The cast is painted with separating medium and the denture is secured to the cast with rubber bands.

Self cure acrylic resin is applied to the modified fracture area until the area is overfilled.
Cure the denture in the pressure pot.









Finish and polish the dentures





Replacement of broken tooth or missing tooth







-create a socket and fit the tooth within








-trim and polish



Replacement of Missing labial or lingual border









Index









Replacing of missing parts

. An impression is made with the denture placed in patient mouth.

. After pouring the cast, either self cure acrylic resin is applied to replace the missing part, or wax is added and carved to resemble the broken denture part, followed by flasking, packing, curing, finishing & polishing.



Advantages of using visible light cured resin

- Superior strength.
- Complete polymerization without residual monomer.
- Ease of manipulated.
- Well tolerated.
- Need minimum time and effort.



Relining and Rebasing

Done by :-Maha Mishaal

Relining

The procedures used to resurface the tissue side of denture with new material, thus producing an accurate adaptation to the denture foundation

area.



Rebasing

The laboratory process of replacing the entire denture base material on an existing prosthesis .



INDICATION FOR RELINING AND REBASING

- 1- Loss of retention and stability.
- 2- Loss of occlusal vertical dimension.
- 3- Loss of support for facial tissues.
- 4- Horizontal shift of dentures: in correct occlusal relationship.
- 5- Reorientation of occlusal plane.

CONTRAINDICATION OF RELINING AND REBASING

1- When there is increased vertical dimension (insufficient interarch space).

2- Poor esthetic and incorrect position of teeth.

- 3- Unsatisfactory jaw relationship in the denture.
- 4- Excessive resorption of residual ridge.
- 5- Severe osseous undercuts.
- 6- Dentures causing major speech problems.
- 7- Temporomandibular joint problems.

Relining can be achieved in one of two ways:

- 1- DIRECT (CHAIR-SIDE).
- 2- INDIRECT (LABORATORY).

PROCEDURE OF DIRECT RELINING

Cold cured acrylic or tissue conditioner material is used, but are not very durable. Direct relining is less time consuming.

- 1- The fitting surface of the denture is cleaned, roughened, and slightly reduced.
- 2- The flanges are trimmed (to reduce danger of overextension) and the undercuts removed.



3- Put lubricant over polished surface to prevent the new resin material to adhere on it.

4- The new self-curing relining material is then mixed and applied to the fitting surface.



5- The denture is inserted and the patient asked to bite gently on the denture to ensure that the occlusion is not altered by the procedure.

- 6- Border molding can then be carried out.
- 7- The denture is kept in situ for about 5 minutes after which it is removed and carefully examined.



THE DISADVANTAGES OF COLD CURED ACRYLIC

1- The material has often produced a chemical burn on the mucosa(exothermic reaction).

2- Color stability is very low and bad odor due to porosity of the material, since no flasking procedure is used.

3- Liability for errors and wrong positioning of the denture is great.

4- Improvement in the denture requirement is very little and low.

5- It is a short term solution.

PROCEDURE OF INDIRECT RELINING

1- The fitting surface is cleaned, the undercuts are removed and the flanges are shortened.

2- Minor defects and extensions can be corrected.

3- A wash impression by zinc oxide eugenol is making with the old denture, with the patient in light occlusal contact







Laboratory procedure

1- Beading and boxing of the impression, then pouring the boxed impression with stone material.

2- The denture and the cast are not separated, but any excess impression on the teeth or facial surfaces of the base is removed, then the denture flasked in the usual manner.

Zinc oxide eugenol) elimination in hot water for 5 minutes; then separated and all the impression material is cleaned from the cast and the denture base.







- 4- Painting the cast with a separating medium.
- 5- Paint the surface of the denture with cotton pellet moistened with monomer.
- 6- Mix the acrylic resin and place it in the flask (the new relining material should be compatible with the old denture base material chemically and esthetically).
- 7- Curing the heat cured resin.

8- The denture deflasked and the cast removed from the denture then polish the denture; the relined denture is ready to be inserted in the patient mouth.









PROCEDURE OF REBASING

Rebasing procedure is the same as those for relining with some differences:

1- Impression is made and a cast is poured in the denture as in relining procedure.

2- The denture with the cast is mounted on an instrument as Hooper duplicator or Hanau articulator with mounting jig that maintains the relationship of teeth to the cast.

3- The old denture base is cut and removed.

4- The original teeth are re-waxed in their previous positions on the cast.

5- The denture is then processed in the laboratory as for relining.

6- The denture deflasked and the cast removed from the denture then finished and polish the denture; the denture is ready to be inserted in the patient mouth





Fig. 16.4. Denture base has been ground close to the lingual surface of the teeth leaving only a narrow horseshoe of acrylic resin holding the arch of teeth.





Record Base and Occlusion Rims DONE BY MAHA MISHAAL

Record Base

Is a temporary form representing the base of a denture. It is used in recording maxilla mandibular relations and in the arrangement of the teeth.






Requirements :

- 1-Should be rigid.
- 2-Should be accurate.
- 3-Should be stable.
- 4-The borders should be round & smooth as the borders of finished dentures.
- 5-Should be thin at the crest ,labial & buccal slopes to provide space for tooth arrangement.

The accuracy of maxillomandibular record is affected by

- Rigidity.
- Stability.
- Movability .
- The smoothness of surfaces contribute to the comfort of the patient.
- The more comfortable and compatible of record base, the more normal are the jaw movement.

Types of Record Bases

- 1-Temporary Record Base.
- 2- Permanent Record Base.

1- Temporary Record Base

They are discarded and replaced by denture base material, once their role in establishing jaw relation, teeth arrangement and try in is complete.





Types of Temporary Record Bases

1-Shellac base plate.

- 2-Reinforced shellac base plate.
- 3-Cold cure acrylic resin.
- 4-Visible light cure acrylic resin.
- 5-Vacuum formed vinyl and polystyrene.

6-Base plate wax.

2- Permanent Record Bases

They are not discarded and become part of the actual base of the finished complete denture.



Types of Permanent Record Bases

- 1-Heat cure acrylic resin.
- 2-Gold.
- 3-Chromium-cobalt alloy.
- 4-Chromium-nickel alloy

OCCLUSION RIMS

Are occluding surfaces constructed on record bases or temporary denture bases to be used in recording jaw relations and for arranging teeth.





Requirements

1-The position should be in the anticipated position of the artificial teeth.

- 2-it must be securely attached to the base.
- 3-The occlusal surface must be smooth and flat.
- 4-It should be contoured to support the lip and cheeks accurately.
- 5-All the surfaces should be smooth.

Uses of occlusion rims

1-To establish the level of the occlusal plane.
2-To establish the arch form.
3-To record the maxillary mandibular relations.
4-For arrangement of the teeth

MATERIAL & METHODS

1-Ready-made occlusion rim.

2-Handmade occlusion rim.







Measurements of maxillary occlusion rim

1-It should have slight labial inclination, labial surface should be 7 mm ant. To line bisecting the incisive papillae.

2-the width should be 4 mm ant. And 7 mm post.

3-they should be directly over the crest of the ridge.

4- the height should be22 mm from labial flange lateral to the labial frenum and 18 mm from the buccal flange to the tuberosity area.







Measurement of mandibular -occlusion rims

1- should be over the crest of the residual ridge.

2-the height should be 18 mm from the labial flange lateral to the labial frenum and with the level of the acrylic base.

3- the labio-lingual thickness should be 4 mm anteriorly 7mm posteriorly.





All above points in laboratory work

The best anatomics guides in the patient mouth

- To aid in determining the proper contouring of anterior section of upper and lower occlusion rims.
- -The naso-labial sulcus.
- -The mento labial sulcus.
- -The philitrum.
- -The commisure of the lips.









Uses of occlusion rim

- 1- In determination of jaw relation
- Vertical dimension.
- Centric and eccentric jaw relation.
- 2- In selection of teeth
- -the position of midline.
- -canine line at the corner of mouth .
- -width of 6 ant. teeth = distance bet. the canine lines.

-width of post. teeth = distance bet. the canine line and end of wax rim posteriorly.



- The high lip line (smiling line)
- The low lip line (speaking line)
- 3-setting up of teeth
- 4-orientation of occlusal plane
- 5-determination of shape of arch
- 6-support of the facial musculature

Occlusal plane

An imaginary surfaces that is related anatomically to the cranium and theoretically touches the incisal edges of the incisors and tips of the occluding surfaces of the posterior teeth.



Fox bite (Fox plane guide)

An appliance used to check the parallism of the wax occlusal rim anteriorly and posteriorly.





Anteriorly extend 2mm below relaxed lip& oriented to be parallel to inter pupillary line.





(Camper's line, ala-tragus line)

line passing from the lowest point of the ala of the nose to the center of the tragus of the ear.



COMPLETE DENTURE OCCLUSION

LEC.15

Done by:-Maha Mishaal

CENTRIC OCCLUSION

 The occlusion of opposing teeth when the mandible is in centric relation. May or may not coincide with maximum intercuspation. (tooth to tooth relation).



 CENTRIC RELATION
 It is the most retruded relation of mandible to maxilla when condyle in most posterior unstrained position in the glenoid fossa. (Bone to bone relation).



MAXIMUM INTERCUSPATION

• The complete intercuspation of the opposing teeth, independent of condylar position.



In complete denture construction it is essential that centric occlusion is in harmony with centric relation even though this condition doesn't always occurs in natural dentition.
In centric occlusion, the buccal cusp of the mandibular teeth contact the central fossa of maxillary teeth, while the lingual cusps of the maxillary teeth fill into the central fossa of mandibular teeth, this overlap prevent cheek biting.





IMPORTANCE OF CENTRIC RELATION

- Reproducible.
- Recordable.
- Stable.
- Regarded as a reference point for setting of teeth in maximal intercuspal position.

ECCENTRIC OCCLUSION

Any occlusion other than centric occlusion (protrusive, right and left lateral movement).

CONCEPTS OF COMPLETE DENTURE OCCLUSION

- Balanced occlusion.
- Monoplane occlusion.
- Lingualized occlusion.

BALANCED OCCLUSION

Means contacting of the upper and lower teeth on the right and left and in the anterior and posterior occlusal areas (working, balancing and protrusive).



Working side:

The side to which the mandible move in a lateral excursion.



Balancing side:

That side of the mandible that moves toward the median line in a lateral excursion.

WORKING OCCLUSION

Occurred when the facial or buccal cusps of maxillary teeth meet the facial cusps of mandibular teeth and the lingual cusps of maxillary teeth meet the lingual cusps of mandibular teeth (it isn't cusp tip to cusp tip relation, but cusp tip into cusp valley).

Enable to hold and crush food



BALANCING OCCLUSION

- Occurred on the opposite side from working occlusion.
- The lingual cusps of maxillary teeth contact the buccal cusps of the mandibular teeth.

Maintain the denture in position





PROTRUSIVE OCCLUSION

- The mandible moves in in protrusive direction from centric position.
- The distal inclines of the maxillary buccal cusps contact the mesial inclines of the mandibular buccal cusps.

Bring anterior teeth into position for incision



IMPORTANCE OF BALANCED OCCLUSION

- 1- It avoid displacement of denture.2-It help in repositioning of denture.
- 3- It minimize period of adaptation of the patient.
- 4-Prevent trauma to the supporting tissue

FACTORS CONTROLLING THE BALANCED OCCLUSION

- 1- Inclination of condylar guidance.
- 2-Inclination of Incisal guidance.
- 3- Cusp height.
- 4- Orientation of the occlusal plane.
- 5- Prominence of the compensating

curve.



MONOPLANE OCCLUSION

 Characterized by occlusal contact of maxillary and mandibular teeth initially in maximum intercuspation.





The disocclusion of posterior teeth occurs because of their arrangement in a single plane, and the contact of the anterior teeth during movement of the mandible (there is no vertical overlap).



INDICATIONS OF MONOPLANE OCCLUSION

- Flat ridge.
- Class II jaw relations.
- Class III jaw relation.
- Handicapped patients.
- Cross bite.
- Doubtful or without any perfect centric relation records.

LINGUALIZED OCCLUSION

The maxillary lingual cusps are the main functional occlusal elements. These may oppose mandibular zero or shallow cusp teeth in balanced or non balanced patterns.



- The presence of cusped teeth looks more natural when compared to zero teeth.
- Presence of lingual cusp centralize the occlusal forces and reduce frictional resistance of flat teeth.
- Stability during para-functional movements.



Occlusal correction

Done by: Maha Mishaal Turki

- Artificial teeth may move about to a minor degree during waxing and processing of the trial denture to a resin one (wax elimination, packing of acrylic resin, and curing).
- Occlusal discrepancies caused by these dimensional changes are removed before the dentures are polished.

CAUSES OF ERRORS IN OCCLUSION

1- Inaccurate maxillo-mandibular relation record by the dentist.

2- Errors made in the transfer of maxillomandibular relation to the articulator.

3- Failure to use the face-bow and subsequently changing in the vertical relation on the articulator.

4- Failure to seat the occlusion rims correctly on the cast (ill-fitting record bases).

- 5- Incorrect arrangement of posterior teeth.
- 6- Failure to close the flask completely during processing.
- 7- Warpage of the dentures by overheating them in polishing stage.
- 8- Dimensional changes of the denture base material (acrylic resin).

Selective grinding

It is the modification of the occlusal forms of the teeth by grinding according to a plan. The modification of the occlusal forms of the teeth by grinding at selected places marked by spots made by articulating paper, or marked by parts of the teeth cutting through a thin layer of occluding wax placed over the teeth.











CORRECTION OF OCCLUSAL ERRORS

Two methods are generally used in correcting errors due to processing changes, in both the occlusal surfaces of teeth are altered by selective grinding:

1- Intraoral (inside patient mouth, clinically).

2- Extraoral (on the articulator, in the laboratory)





DISADVANTAGES OF INTRAORAL CORRECTION

 1- It is difficult to see the errors because the soft tissues will be distorted and obscure the errors.
2- The denture bases will be shift in relation to the underlying bone when there are errors in occlusion due to the resiliency of the soft tissue. 3- The articulating paper marks are likely to be incorrect due to the presence of the saliva.

4- The central of jaw position depends entirely on the ability of the patient to place and move jaw correctly.

ADVANTAGES OF EXTRAORAL CORRECTION

- 1- Easily visible.
- 2- Easily located.
- 3- Easily corrected by selective grinding.
- 4- The articulating paper marks can be quite easily made on dry teeth.

5- Make the correction away from the patient thus there is a psychological advantage.

 Articulating paper and occluding wax can be used to detect the premature contacts, although it is preferable to use occluding wax because premature contact will cause the cusps to penetrate through the wax indicating heavy contact is present.





An alternate method to correct the occlusion before removal the dentures from the casts

1- Replace the upper and lower mounting casts and the dentures on the articulator. If processing changes in occlusion have occurred, they must be corrected.

2- Reestablished the vertical dimension of occlusion at this time, an opening in the vertical dimension can be noted by corresponding opening in the relationship of the incisal pin to the incisal table. The pin should contact the table. • If excessive opening between incisal pin and incisal table, the flask do not correctly closed.

- 3- Refine and equalize the centric occlusion.
- 4- Perfect the working and balancing occlusions.
- 5- Correct the protrusive occlusion.

RULES FOR SELECTIVE GRINDING IN BALANCED OCCLUSION

1- Never grind a centric cusp tip unless it contacts prematurely in all excursions of the mandible. Always grind the opposing fossa. (i.e. if the cusp is premature contact in centric relation and is also premature in balancing or working, then the cusp should be reduced)



if the cusp is in premature contact in centric relation, but is not in working or balancing prematurity, then the opposing fossa or marginal ridge should be reduced).


2- Utilize the (BULL rule) when perfecting working occlusion prematurity, grind the lingual incline plane of the Buccal cusps of the Upper teeth, or the buccal incline plane of the Lingual cusps of the Lower teeth. BULL rule applies working side only.



3- If there is a premature contact on the balancing side, then adjust the buccal incline plane of the lingual cusp of the upper teeth, or the lingual incline plane of the buccal cusp of the lower teeth. When grinding to perfect balancing occlusion prematurity, never grind the interfering cusp tips but grind the cusp inclines.





4- In correcting protrusive interference in the anterior teeth grind the labial portion of the incisal edges of the mandibular teeth and the lingual portion of the maxillary teeth. For protrusive interference in the posterior teeth, reduce the distal slopes of the upper buccal cusps, or the mesial slopes of the lower lingual cusps.





Selective grinding of balanced lingualized occlusion is similar to a fully balanced occlusion with exception that only the lingual cusps of the maxillary teeth or their antagonist surfaces are adjusted.



MOUNTING DONE BY MAHA MISHAAL

MOUNTING

It is the procedure of attaching the maxillary and mandibular casts to the articulator



The maxillary cast is first articulated, and then the mandibular cast is articulated after recording the vertical and centric jaw relations

We have 2 types of mounting:

1-Arbitrary mounting.2-Mounting using face- bow.





Preparation of the articulator before mounting procedure

In **mean value** articulator (Class II articulator).

1-The articulator should be clean

2-The incisal pin should be level with the top of upper member of articulator to give zero reading.

3-The mounting table properly fixed to the articulator.

In dentatus class III:-

The maxillary cast with record base and occlussion rim mounted first on upper member of articulator by using face bow, which supported upper rim in correct position during mounting, then lower cast mounted after taking the records.

Preparation of the cast to mount on the articulator

1-Determine the midline of the cast with the midline of incisive papilla and continue this line posteriorly all around the cast.



2-With wax knife, 3 - 4 V shape cuts on the base of upper and lower casts, so as to facilitate the laboratory remounting. The cut should be approximately 1/4 inch dep and 1/2 inch width.

3-Lightly coated the base of the casts with Vaseline or any separating medium. 4-The base plate with occlusion rim should be sealed to the cast by wax.

Mounting The Maxillary Cast

The maxillary cast is first attached to the upper member <mark>of</mark> the articulator after

orientation jaw relation by using the face-bow with **adjustable type of articulators**, to support the maxillary occlusion rim in its position during mounting.





- while for the use of **the mean value articulator** mounting table support the maxillary cast with

occlusion rim. Alignment of the midline of the maxillary bcclusion rim to the center of the cross midline which found on the mounting table anteriorly and posteriorly, so that the cast will be centralized to the mounting table and the occlusal rim fixed to the mounting table by wax.



-Enough space should be present between the base of

the cast and the upper member of the articulator to accommodate for the plaster material over the cast. If there is not enough space trimming should be done to the base of the cast.



-Plaster is mixed according to the manufacturer instruction then the plaster is poured over the base of the cast and the upper member is closed until the incisal pin touches the incisal table.





Nounting The Mandibular Cast 1-The mandibular occlusion rim should be well secured to the mandibular cast with it record base by using wax, also sealing should be done between the maxillary and mandibular rims after making tentative centric jaw relation.



2-Care should be taken that there is no posterior interference between the maxillary and mandibular casts (Heel area).



3-The articulator with the mounted maxillary cast is inverted to aid in the mounting the mandibular cast.

4-The maxillary occlusal rim with mandibular occlusal rim (centric record) placed on the maxillary cast.

5- The mandibular cast is placed on the mandibular occlusal rim (It should be soaked in slurry water before mounting).



6-The plaster is mixed and poured over the base of the mandibular cast and the articulator is closed until the incisal table touch the incisal pin, then the plaster should be smoothed and polished.



CHECKING THE MOUNTING

1-The midline of maxillary cast should be coincided with the midline of mandibular cast and midline of articulator.



2-Centralization of maxillary cast with upper member of articulator then the centralization of lower cast which depend on accuracy of the maxillary cast.



3-Incisal pin checked if it does not touch the incisal table. and must be flashed with upper member of articulator.



ERRORS MIGHT OCCUR DURING MOUNTING

1-The record base is not properly secured to the cast.
2-Interference of the casts posteriorly.
3-The incisal pin does not touch the incisal table.
4-The incisal pin is not properly screwed.
5-Wrong transference of the midline of the articulator with that of the casts (shifting of the midline).
6-Movement of the casts during mounting.
7- Maxillary and mandibular rims are not properly fixed after making centric record.
8-Dimensional changes in the plaster material.



Maxillo-Mandibular Relation DONE BY MAHA MISHAAL

Vertical relation

It is the amount of separation between the maxilla and mandible in a frontal plane.

Vertical dimension

It is the distance between two selected points, one on a fixed and one on a movable member.





Vertical Dimension of Occlusion (VDO)

The distance between two selected points one on the fixed part (maxillae) and one on the movable part (mandible) when occluding members (bite rim or teeth) are in contact.


Vertical Dimension of Rest (VDR)

The distance between two selected points one on the fixed part (maxillae) and one on the movable part (mandible) when the maxillofacial musculature is in a state of tonic equilibrium.



Inter Occlusal Distance(freeway space) (FWS)

The distance between occluding surfaces of upper and lower teeth when the mandible is in its physiologic rest position.

VDR-VDO=FWS







Importance vertical dimension

1-Functional roles include:-A-Mastication.B-Deglutition.C-Phonetic.D- Respiration.

2-Physiological role (comfortable role):-maintain health of tissue(mucosa, bone , muscles, and tempro- mandibular joint).

3-Esthetic role.

4-Psychological role.

Consequences of increased VD

- Acceleration of residual ridge resorption
- Increased lower facial height
- Difficulty in swallowing and speech
- Pain and clicking in TMJ
- Stretching of facial muscles and skin
- Increase space of oral cavity

- Loss of biting power
- Increase naso-labial angle
- Bulky denture
- Premature contact
- Instability of denture
- Clicking during speech and mastication
- Excessive display of artificial teeth ad gum





Consequences of decreased vertical dimension

- Lesser trauma to denture bearing area
- Lower facial height
- Difficult in swallowing and speech
- Pain and clicking in TMJ
- Presence of wrinkles and folds
- Decreased space of oral cavity

- Loss of biting power
- Naso-labial angle is less than 90
- Angular cheilitis
- Cheek biting
- Thinning of vermilion border of the lip
- Prominence of lower jaw and chin









Both patients are wearing CDs which are in occlusion



facial appearance shows excessive VDO

a gross loss of VDO freeway space is approximately 10mm



Excessive freeway space

corrected VDO

Correct VD as the lips contact each other lightly before wax rims contact when the mouth is closed

VD affects lips appearance: amount of vermilion border that is visible ,folds of corners

Equal proportions of the forehead & middle of the face & lower face





Methods of recording rest vertical dimension

- Facial measurements
- Tactile sense
- Phonetics
- Facial expression
- Anatomical landmarks(willis method)
- Electro-Myographic method

Facial measurement



65

-Patient relaxed, with trunk upright and the head unsupported.

-After insertion of the occlusal rims the patient should be asked to swallow and let the jaw relax.

-The lips are parted to reveal how much space is present between the occlusal rims.

-The interocclusal distance should be 2-4mm at the premolar region.



Tactile sense



Willis method



Methods of recording occlusal vertical dimension

Pre-extraction records
-profile photographs
-profile silhouettes
-articulated casts
-Facial measurements
-measurements from former

Profile photograph



Profile silhouettes



Profile radiograph

1. PROFILE RADIOGRAPHS

- Much used in research of vertical dimension of occlusion
- Lateral skull radiographs before and after extraction are compared.

Disadvantages:

- Radiation risks So cannot be considered for routine clinical use.
- Considerable time
- Unreliable-
- -Inaccuracies that exist in the technique
- Inaccuracies in the method of comparing measurements



65

articulated casts



Measurement from former denture



Without Pre-extraction records
Direct methods to find the occlusal vertical dimension
1-Boos method(power point)
2-Tactile sense or neuromuscular perception
3-Swallowing threshold
4-Phonetics

Boos method (power method)



2-Tactile sense or neuromuscular perception



Swallowing threshold



Phonetics


'f' and 'v' sounds - The incisal edges of the <u>maxillary anterior teeth</u> create a seal on the moist area of the vermilion border of the lower lip.

• 's' - The position of the <u>mandibular anterior</u> teeth is determined when the patient says words beginning with 's'. When the 's' sounds are articulated, the mandible moves forward. The incisal edges of the anterior teeth do not make contact.





Maxillary arch anatomical landmarks

Done by Maha Mishaal

Anatomical landmarks

- * Supporting structures.
- * Limiting structures.
- * Relief areas.

Supporting structures

Stress-bearing areas

are the load bearing areas. The denture should be designed such that most of the load is concentrated on these areas.

Support is the resistance to the displacement towards the basal tissue or underlying structures.



Residual alveolar ridge

* It is the primary stress bearing area.



Types of residual ridge



Maxillary tuberosity

 It is the area of the alveolar ridge that extend from the second molar to the hamular notch. It may be over sized, resorbed or undercut.





Incisive papilla

It is a pad of connective tissue lie between the two central incisor on the palatal side overlying the incisive foramen where the nasopalatine nerves and vessels arise.



Rugae area

* These are raised dense ct in the ant.1/3 of the palate .It is secondary stress bearing area.



Median palatal raphae

* It overlies the medial palatal suture, extend from the incisive papilla to the distal end of the hard palate.



Canine eminence

* It is a round elevation in the corner of the mouth. It used as a guide for the arrangement of maxillary anterior teeth.



Zygomatic process

* It is located opposite to the 1 st molar region.



Hamular notch

* It is a marrow cleft of LCT lie between the maxillary tuberosity and the pterygoid hamulus. It is used as boundary of the posterior border of maxillary denture.





Torus palatinus

 It is hard bony enlargement occure in the midline of the hard palate, if it is very large surgical correction needed.



Limiting structures

Anatomical Landmarks that limit the Periphery of the denture.

These are the sites that will guide us in having an optimum extension of the denture so as to engage maximum surface area coverage without encroaching upon the muscle actions. Encroaching these structures will lead to dislodgement of the denture and/or soreness of the area while failure to cover the areas up to the limiting structure will decreased retention, stability and support.

Labial frenum

 It is a fold of mucous membrane extends from the mucosal lining of upper lip to the labial surface of the residual ridge. It contains no muscle fibers. It create a maxillary notch in impression or denture.





Buccal frenum

It is fold or folds of mucous membrane and its direction anteroposteriorly. The movement of the frenum affected by facial muscles (orbicularis muscle –forward, buccinator muscle – backward).





Labial vestibule

* It lies on both side of the labial frenum, bounded by the upper lip and residual alveolar ridge.



Buccal vestibule

It is the space distal to the buccal frenum ,bounded laterally by the cheek and medially by the residual alveolar ridge.





Fovea palatinae

 These are two indentation on each side of the midline formed by a coalescence of several mucous gland ducts, act as a guide of the vibrating line.



Vibrating line

* An imaginary line drawn across the palate extended from one hamular notch to the other.



Relief area

- Relief areas are areas where they are either resorb under constant load, having fragile structures within or covered by thin mucosa which can be easily traumatized.
- * It should be designed in such away that the masticatory load is not concentrated over these area.

Relief areas

- * Incisive papilla
- * Mid-palatine raphe
- * Crest of the residual ridge
- * Cuspid eminence
- * Zygomatic process



Mandibular Anatomical Landmarks

done by Maha Mishaal

Mandibular Anatomical Landmarks



support

Resistance to vertical movement or displacement of the dentures towards the basal seat area



Supporting landmarks

• Residual alveolar ridge:

The bone of crest is spongy bone therefore not be favorable as primary stress bearing area.





• Buccal shelf area:

It considered as primary stress bearing area because it is covered by compact bone. It provide support to denture because it is perpendicular to the vertical masticatory forces.



Limiting structures

Anatomical Landmarks that limit the Periphery of the denture.

These are the sites that will guide us in having an optimum extension of the denture so as to engage maximum surface area coverage without encroaching upon the muscle actions. Encroaching these structures will lead to dislodgement of the denture and/or soreness of the area while failure to cover the areas up to the limiting structure will decreased retention, stability and support.

o Labial frenum:

fold of mucous membrane not pronounced as maxilla . It active during mastication because it may contain fibrous band attached to orbicularis oris muscle. Proper fit around it provide sealing.





• Labial vestibule:

extend from labial frenum to buccal frenum. The denture flange limited by the attachment of muscles close to the crest. Overextension causes instability and soreness.



• Buccal frenum:

It is either U-shaped or narrow V-shaped must have enough space in order to get proper denture seal.



Buccal vestibule:

Extended from buccal frenum to the distal end of the residual ridge.


• Retromolar pad:

Is pear shaped area at the distal end of residual ridge. Must be covered by the denture to perfect the seal of the denture. Retromolar papilla anterior to the retromolar pad.





• Lingual frenum:

Fold of mucous membrane can be observed when the tongue elevated . Must be molded well during impression to prevent displacement and ulceration .



- Alveololingual sulcus: extended from lingual frenum to the retromylohyoid curtain. Divided into:-
 - -Anterior region: from lingual frenum to premylohyoid fossa.
 - -Middle region: from premylohyoid fossa to the distal end of the mylohyoid ridge .



-Posterior region:

Is this retromylohyoid space or fossa. Lingual flange must fill retromylohyoid fossa. Proper recording impression gives Sshaped of the lingual flange.







• External oblique ridge:

Extended from just above the mental foramen to be continuous with the anterior border of the ramus. it become a guide for the termination of the buccal flange.



Relief area

- Relief areas are areas where they are either **resorb** under constant load, having fragile structures within or covered by thin mucosa which can be easily **traumatized**.
- It should be designed in such away that the masticatory load is not concentrated over these area.

• Mental foramen:

Located between 1st and 2nd premolar region. The denture should be relieved over foramen to prevent pressure being applied on mental nerve and vessels.



• Genial tubercles:

pair of bony structures found anteriorly on the lingual side of mandible.



• Torus mandibularis:

These are bony exostosis found on the lingual surface of the mandible at premolar area.







• Mylohyoid ridge:

It is an irregular bony crest on the lingual surface of the mandible .the border of the lingual flange may extend below the mylohyoid line if it slopes toward the tongue.









Horizontal jaw relation

DONE BY MAHA MISHAAL

Horizontal Jaw Relation

 It is the relationship of the mandible to the maxilla in a horizontal plane. It can also described as the relationship of the mandible to the maxilla in anteroposterior and side-toside direction. The Horizontal Relations include:

- 1. Centric jaw relation
- 2. Eccentric jaw relations
- A. Protrusive or forward relation
- B. Left or right lateral relation

Centric jaw relation

- It is the Maxillo-mandibular relationship in which, both condyles head articulate with the thinnest avascular portion of their respective disks with its complex in the anterior-superior position against the shapes of the articular eminencies.
- This position is independent on teeth contact (bone-to-bone relationship).



Centric occlusion

It is the contact between the occlusal surface of the maxillary teeth with the opposing mandibular teeth when the mandible in centric relation.



Maximal Intercuspal Position

The most complete interdigitation of the teeth independent of condylar position. Hence, maximal intercuspation is a maxillo-mandibular relationship determined by tooth-to-tooth relationship.



Importance of Centric Jaw Relation

- 1. It is a reference position from which the mandible can move to any direction
- 2. It is a learnable, repeatable and recordable position.
- 3. It is the start point for developing occlusion.
- 4. Functional movement like chewing and swallowing are performed in this position.
- 5. It is a reliable jaw relation because it is bone-tobone relation.

Methods of Recording Centric Jaw Relation

- 1. Functional (chew-in) methods.
- 2. Graphic method.
- 3. Tactile or interocclusal check record method.

• A- Needles-House Technique



• B- Patterson Technique



• C- Swallowing Technique



Graphic methods







Tactile or interocclusal check record method





An indication of interocclusal check record method

- 1. Abnormally related jaws.
- 2. Displaceable, flabby tissue.
- 3. Large tongue.
- 4. Uncontrollable mandibular movements.

5. It used for patients already wearing a complete denture.

Methods used for assisting patient to retruded the mandible:

1. Instruct the patient to let his jaw relax, pull it back, and close slowly on his back teeth"

2. Instruct the patient to contact with his tongue a piece of wax placed on the posterior palatal seal area and slowly close.

- 3. The patient asked to bring his upper jaw forward while occluding on the posterior teeth.
- 4. The head tilted backward, which makes protrusion more difficult
- 5. The patient asked to swallow and close slowly.
- 6. Instruct the patient to do routine jaw exercises.

Factors that complicate centric relation record

- 1- Resiliency of the tissues supporting the denture base.
- 2- Stability and retention of the record bases.
- 3- The TMJ and its neuromuscular mechanism.
- 4- Amount of pressure applied in making the record.
- 5- Technique employed in making the record.
- 6- The ability of the dentist.

Eccentric jaw relations

Any relationship between the jaws other than centric relation.

-Lateral jaw relation: The relation of the mandible to the maxillae when the lower jaw is in a position to either side of centric relation.

-Protrusive jaw relation: The relation of the mandible to the maxillae when the mandible thrust forward.
Methods of Recording Eccentric Jaw Relations

The main reason in making an eccentric jaw relation is to adjust the articulator to simulate the eccentric movement of the mandible to the maxilla and establish balanced occlusion.



Interocclusal eccentric records

(Protrusive, left and right lateral movement), Using Hanau articulator.

L=H/8+12

- L= lateral condylar inclination.
- H= horizontal condylar inclination as established by the protrusive record.

Factors considered during making eccentric jaw relation

1. The condylar path of the patient cannot be altered.

2. The condyles do not travel in straight lines during eccentric mandibular jaw movements.

3. Semi-adjustable articulators in which the condyles travel on a flat path cannot be used to reproduced eccentric movements exactly.

4. Fully-adjustable articulators, where the condylar and incisal guidance is fabricated individually with

IMPRESSION TRAYS

DONE BY MAHA MISHAAL

IN COMPLETE DENTURE PROSTHESIS WE MAKE TWO IMPRESSION :

PRIMARY IMPRESSION

FINAL IMPRESSION .

TO MAKE IMPRESSION WE SHOULD HAVE IMPRESSION TRAY.

IMPRESSION TRAY

- It is used to carry, confine and control the impression materials from the patient mouth while making impression. The tray facilitate insertion and removal of impression materials from the patient mouth.
- Impression tray consist of two main parts:-
 - 1-Body:
 - -Floor.
 - -Flanges.
 - 2-Handle:

Extension from the union of the floor and labial flange. It is L in shape so that not interfere with lip.



• There are upper tray for maxillary arch.

• Lower arch for mandibular arch.

The difference between them is that:

- -The upper tray has palatal portion.
- -The lower tray has lingual flange.



TYPES OF TRAYS

- Stock tray.
- Special tray.

Stock tray

used for several patients and used for making primary impression . They are made from different materials and variety of sizes and shapes to fit different mouths.



TYPES OF STOCK TRAY

- Stock tray for edentulous patient.
- Stock tray for dentulous patient.

The difference between them in that flanges for edentulous patients have short flange, oval and narrow floor.

while for dentulous patients have long, wide and flat floor.



• Stock tray classified into:-

-Perforated: used with alginate impression material.

-Non perforated: used with impression compound.



Stock tray classified into:

Perforated

-Perforated with rim lock.-Perforated without rim lock.

Non perforated

- -With rim lock.
- -Without rim lock.









SELECTION OF STOCK TRAY

- The type of impression materials.
- Size of the arch.
- Form of the arch.
- Must cover all the anatomical landmarks.
- Give a sufficient space to impression materials.

SPECIAL TRAY

Individualized impression tray constructed on the primary cast. the ridge show variations of shape and size, so special tray is constructed because the stock tray can fit the ridge in an arbitrary manner.



ADVANTAGES OF SPECIAL TRAY

- Economy in impression materials.
- More accurate.
- Minimize tissue displacement and dimensional changes
 Correct extension.
- The work with special tray is easier and quicker.
- More adapted to oral vestibule retention.
- Less bulky

more comfortable for the patient

better

MATERIALS USED FOR SPECIAL TRAY CONSTRUCTION

• Cold cure acrylic.

• Visible light cure acrylic.

• Shellac base plate.

Impression compound(some time).

• Heat cure acrylic (rarely).









TYPES OF SPECIAL TRAY

Spaced special tray.

Closed fitted acrylic resin.

Spaced

--Without stops.

The wax sheet is adapted on the cast, then a uniform layer of acrylic is adapted on it.



--With stop

4 stopper 2- at anterior area and 2- at posterior area made on the wax sheet after adapted on the cast. Then a uniform layer of acrylic resin adapted on it.





• Closed fitted special tray

We used only separating medium on study cast then a uniform layer of acrylic resin adapted on it.



Techniques for construction of special tray

- Finger adapted dough method.
- Sprinkle-on acrylic method.

FINGER ADAPTED DOUGH METHOD

















SPRINKLE-ON ACRYLIC METHOD

Build up labial flange by alternating polymer and monomer addition



CRITERIA FOR SPECIAL TRAY CONSTRUCTION

- The tray must not impinge upon movable structures.
- The border must be under extended the (2mm).
- The posterior limits must slightly over extended to insure inclusion of the posterior details.
- Should be rigid with sufficient thickness
- Must have handle for manipulation.
- Must be smooth and should have no sharp edges which would injury the patient.



PROCESSING OF THE COMPLETE DENTURE

DONE BY MAHA MISHAAL

PROCESSING THE DENTURE

After the trial dentures (Acrylic base, wax and teeth) have been waxed, they are prepared for denture processing to substitute the acrylic record base and the wax with a hot cure denture base attached to the teeth.

This is done in the following steps:

- 1- Flasking.
- 2- Wax elimination.
- 3- Mixing.
- 4- Packing.
- 5- Curing.
- 6- De-flasking.
Flasking

The process of investing the cast and a waxed denture in a flask to make a sectional mold used to form the acrylic resin denture base.

Flask:

Is a metal tube used in investing procedures, in which a mold is made of artificial stone or plaster of Paris for the purpose of processing denture or other resinous restorations.





FLASKING



Flask consist of:-

1-Lower half: that holds the cast with waxed denture.2-Upper half: that invest teeth of waxed denture.3-The cover or lid.





Flasking techniques

1-Compression technique.
2-Injection technique.
3-Microwave technique.

Injection technique



Microwave technique



Compression technique





... Seal the periphery of the denture flange to the inner edge of the land of the cast.





Both dentures are sealed onto their respective casts





After soaking the master casts and mountings in water for a few minutes, gently remove the casts from the mountings.







Invest the trial dentures in the lower half of the flask with dental plaster







Smoothen the dental stone



Apply separating media to the dental stone



Pour dental stone till the incisal and occlusal surfaces









- Separating medium is painted on the dental stone.
- Dental stone is used to fill the remainder of the flask. The lid of the flask is pressed into place while the investing stone is still soft.





-> Clamp

Extent

Statutes

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Flask Press

COE-BILT

Wax elimination: the removal of wax from a mold, usually by heat











• Open the flask. The softened wax is removed from the mold. Remaining wax is flushed from the mold with a stream of boiling water. The mold is then cleaned with a soft brush.





Remove wax completely



Teeth locked in stone



Apply separating media while the casts are still warm



Mixing acrylic



Packing Acrylic Resin The placement and adaptation of denture base resin within the mold cavity are

termed packing.





Trial flask closure: any preliminary closure made for the purpose of eliminating excess material and making sure that the mold is completely filled.

The flask assembly is placed into a flask press, and pressure is applied.

The flask is transferred to a flask carrier, which maintains pressure on the flasks during processing.

Curing cycle

 It is the process of polymerization of the heat acrylic resin by heating in water bath and pressure.

1-Rapid curing cycle:-140c for 10minutes with pressure 40 psi.

2-Slow curing cycle:-

70c for 7hours and rise to 100c for 3hours,or heated to 75c for 6 hours then100c for 1 hours.

Deflasking









Complete denture prosthesis {Definition and Objectives}

DONE BY MAHA MISHAAL

Outline

- Prosthetic.
- Prosthodontics.
- Dental prosthesis.
- Complete denture.
- Partial denture.
- Changes after loss of teeth.
- Objectives of prosthodontics treatment.
- **Steps of Complete Denture** Construction.

Prosthetic: The art and science of supplying artificial replacements for missing parts of the human body.



Prosthodontics: Is the branch of dental arts and science pertaining to the restoration and maintenance of oral function by the replacement of missing teeth and structures by artificial devices.

The term *Prosthodontics* is a combination of the words prosthesis and dentistry.

Dental prosthesis: An artificial replacement of one or more teeth and associated dental and/or alveolar structures



<u>The complete denture</u>: A dental prosthesis that replaces the lost natural dentition and associated structures of the maxilla and mandible.



The partial denture: A prosthesis that replace one or more, but less than all, of the natural teeth and associated structures and that is supported by the teeth and/or mucosa.



Anatomical and esthetic changes after loss of teeth

0

Unattractive appearance when the person has lost one or more of anterior teeth.

Change in the shape of the lips or cheeks due to loss of support by teeth.

Change in a person's appearance due to conscious or subconscious efforts to avoid smiling.

Change in facial contour resulting from loss of support from muscles of facial expression.

Illusion prominent chin resulting from the mandible being closer to maxilla i.e. lost of vertical dimension.



Objectives of prosthodontics treatment(complete and partial)are:

1. Mastication

2.esthetic

3.preservation of remaining tissues healthy

4.comfort of the patient (psychological)

5.speech

The primary difference between a complete denture and a removable partial denture is the method by which the prosthesis gains support.

A complete denture is supported by bone covered by soft tissue mucosa

A **removable partial** denture gains support from the bone covered by mucosa, and from the remaining teeth.





Surfaces and parts of complete denture



Steps of Complete Denture Construction



Primary Impression

0











Study cast







Special Tray



















Upper and lower <u>occlusion blocks</u> constructed on master casts for recording the maxillary-mandibular relationship (Registration Bite)



Vertical Dimension







The occlusion blocks are placed in the patient's mouth for bite registration



The recorded bite (the assembled occlusion blocks) is then removed from the patient's mouth

then mounted on an articulator





Setting up of the artificial teeth



dentures ready to used





References :

Textbook of Complete Denture PROSTHODONTICS.

Essential of COMPLETE DENTURE PROSTHODONTICS.

Prosthetic Treatment For Edentulous Patient.



COMPLETE DENTURE IMPRESSIONS DONE BY MAHA MISHAAL

Dental Impression

Negative likeness of the teeth and/or edentulous areas where the teeth have been removed ,made in a plastic material which becomes relatively hard or set while in contact with these tissues.





COMPLETE DENTURE IMPRESSION

Is a negative registration of the entire denture bearing, stabilizing and border seal areas of either the maxilla or the mandible present in the edentulous mouth.



Objectives of impression making

 Retention:- is the ability of the denture to withstand displacement against its path of insertion.



Stability:- is the ability of the denture to withstand horizontal forces.



 Support:- In order to provide good support, the denture base should cover as much denture-bearing area as possible.



 Aesthetics:- Impression should perfectly reproduce the width and height of the entire sulcus for the proper fabrication of the flange

 Preservation of remaining structures:-Impression should record the details of the basal seat and the peripheral structures in an appropriate form to prevent injury to the oral tissues.
Primary Impression

- Is defined as an impression made for the purpose of diagnosis or for the construction of a special tray.
- It is the first impression made for the patient and from which the study cast was produced. These impressions are obtained by a stock tray.



MATERIALS USED FOR MAKIUNG PRIMARY IMPRESSION

1-Impression Compound2-Alginate (Elastic Material)3-Silicone Rubber Base (Putty Type).





Production of study cast

1-The primary cast is produced by pouring the primary impression with plaster which is the positive reproduction of the oral tissues.

2-The plaster mixed with water by the saturation method in the rubber bowl and pour in the impression. When the plaster becomes hard, the cast is separated from the impression.

3-The special tray, which is used to make the final impression, will be constructed on the primary cast.





Final or Secondary impression

 It is a negative likeness or registration of the entire denture bearing, stabilizing area and border seal area of the mandible & maxilla for the purpose of fabricating a prosthesis.





Master cast (definitive or final cast)

 A replica of the tooth surfaces, residual ridge areas and \or other parts of the dental arch and \or facial structures used to fabricate a dental restoration or prosthesis.



Materials used for final impression

 1- zinc oxide eugenol impression material.
2-Alginate impression material.
3-Elastomers impression material(polysulfide, polyether and silicon).
4-Light body.













Techniques used for making final impression

- 1-Mucostatic impression technique (non pressure technique).
- 2-Function impression technique (pressure technique).
- 3-selective pressure impression technique.





Boxing

Is the enclosure of an impression to produce the desired size & form of the base of the cast & to preserve desired details. Boxing impression can be used for primary & final impression for complete denture.

This procedure cannot usually be used on impression made from hydrocolloid materials (e.g. alginate) because the boxing wax will not adhere to the impression material & the impression material (alginate) will be distorted.

Advantages of boxing

- 1-To facilitate pouring the impression with plaster or stone.
- 2-Produce the desired size & form of the base of the cast (adequate thickness of the cast).
- 3- Preserve desired details & borders of the impression.
- 4- In the lower impression, reproduction of the lingual borders & tongue space easier

MATERIALS USED FOR BOXING

1- Beading wax: a strip of wax is attached all the way around the outside of the impression approximately (1-2 mm) below the border &sealed to it with wax knife





- 2-Boxing wax : a sheet of wax is used to made the vertical walls of the box & it is attached around the outside of the beading wax strip
- 3- Base plate wax: a sheet of wax can be used to fill the tongue space





 Artificial stone is mixed according to manufacturer s direction and sufficient stone is poured into the final impression so that the base of the cast will be from 10-15mm in thickness .The cast is called master cast.





COMMON FAULTS IN IMPRESSION MAKING

1-Poor selection of the tray and materials. 2-Insufficient material loaded in the tray. 3-Excessive material loaded in the tray. 4-Failure to press the tray completely to position(insufficient seating pressure or excessive seating pressure). 5-Incorrect position of the tray before finally seating it.



DENTAL ARTICULATOR DONE BY MAHA MISHAAL

DENTAL ARTICULATOR

It is a mechanical device represents the TMJ, maxillary and mandibular arches to which maxillary and mandibular casts attached to simulate some or all mandibular movements.





FUNCTIONS

1- It allows most of the prosthetics work to be done in the absence of the patient.

2-Maintain jaw relation record during setting – up of teeth.

3-Denture re mounting after processing for correction of occlusal disharmony.

TYPES OF ARTICULATOR

- × Simple hinge articulator (Class I).
- × Mean value (Class II).
- × Adjustable articulator.
- -semi adjustable(Class III).
- -fully adjustable(Class IV).
- × Digital computerized articulator.



Possible movement 1-Single hinge movement only (opening & closing). 2-No lateral movement.



Record required -Vertical dimension of occlusion. -Centric relation

Disadvantages Not represented TMJ

CLASS II

Possible movement 1-Opening and closing 2-Protrusive movement Record required -Vertical and centric -Face bow record



BONWILL TRIANGLE





DISADVANTAGES

- Most of these articulator not accepted face bow record
- × No lateral movement
- It is successful in patient whose condyle approximate that of articulator

CLASS III



CLASS III

- The horizontal condylar path adjusted by protrusive movement obtained from the patient
- Iateral condylar path is adjusted according to hanau's formula:L = H / 8 +12
 - L = lateral H = horizontal condylar path

The inclination of the condylar path

Types :

A- Sagittal (HORIZONTAL) condylar path angle



B- Lateral condylar path angle





MEAN IT HAS CONDYLES ON THE LOWER MEMBER AND THE CONDYLAR GUIDES ON THE UPPER MEMBER











Arcon articulator



NON ARCON



Non Arcon articulator



SEMI ADJUSTABLE ARTICULATOR

- ARCON: condylar elements are on the lower member of the articulator, mechanical fossae are placed on the upper member of the articulator
- NON ARCON: condylar path simulating the glenoid fossae are attached to the lower member, condylar elements are placed on the uper portion of the articulator


Possible movement

- -Opening and closing
- -Protrusive and lateral movement
- -Some types have bennett movement
- **Record required**
- -Face bow record to mount the upper cast



-Vertical and centric relation record -Protrusive record to adjust the horizontal condylar path inclination of the articulator

Disadvantages

-The lateral condylar path angle is determined from the formula.

-Most of them have no bennett movement

CLASS IV

It differ from the semi adjustable articulators in that the lateral condylar pat inclination are adjusted according to records taken from the patient.

Possible movements

-The same movements of the semi adjustable articulators in addition they have Bennett movement.

Bennett Movement

It is defined as "the bodily lateral movement/ lateral shift of mandible resulting from movements of condyles along lateral inclines of mandibular fossa during lateral jaw movement" Dr Norman Bennett



Records required:

-Face bow, vertical, centric and protrusive record. In addition:

-Right lateral record to adjust the left lateral condylar path inclination.

-Left lateral record to adjust the right lateral condylar path inclination.



D-AAD-01

Transfer Jig (optional)

Provided with adjustable parts for a total, partial prosthesis, and a crown Articulator without options



and bridge work. Versatile Standard



Disadvantages:

-Multi records are required with possibility of errors.

Therefore the <u>Semi adjusable</u> enough for complete denture construction

DIGITAL COMPUTERIZED ARTICULATOR

These are able to design prosthesis. They are capable of:

- -Simulating human mandibular movements
- -Moving digitalized occlusal surfaces against each other according to these movements

-Correcting digitalized occlusal surface to enable free movements

There are two types :

- Completely adjustable articulators

It records exact movement paths of mandible using electronic jaw registration system called (JMA).

 Mathematically simulated articulator
It is a fully adjustable 3D virtual articulator
capable of reproducing the movements of a mechanical articulator







FACE BOW

Caliper like device that is used to record the relationship of maxilla to the TMJ or the opening axis of the jaw and to orient the cast in the same relationship to the opening axis of articulator.

- It consist of :
- -U-shaped frame.
- -The condyle rods.
- -The fork.



TYPES OF FACE - BOW

The kinetic face-bow

It is used to locate the kinematic transverse hinge which is an imaginary line in which the mandible rotates during opening and closing.

Two basic type:

Kinematic face bow









The maxillary face-bow

It is used to record the position of the upper jaw in relation to the arbitrary hinge axis which is positioned on a line extending from the outer canthus of the eye to the middle of the tragus of the ear and approximately 13 mm in front of the external auditory meatus





IMPORTANCE OF THE FACE BOW

- An arbitrary mounting of the maxillary cast without a face bow transfer can introduce errors in the occlusion of the finished denture.
- It allows minor changes in the occlusal vertical dimension.
- It is helpful in supporting maxillary cast while it is being mounted on the articulator

