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A to Z ORTHODONTICS

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ORTHODONTIC PRACTICAL NOTES

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Impression

Definition:

In dentistry, an impression is defined as the negative imprint of the natural standing teeth & surrounding supporting oral tissues.

Types of impression:

Three types of impressions are taken in dentistry. These are as follows –

a. Primary impression:

   When the impression is taken to see the gross outline of the teeth & oral cavity at 1st stage usually by impression compound is called primary impression.

b. Wash impression:

   When an impression is taken to correct an incomplete impression with a thin section of alginate or paste impression material over the incomplete impression is called wash impression.

c. Final impression:

   The impression of the edentulous jaw from which a final dental construction is carried out is called final impression.

Impression materials:

The materials which are used to take an impression are known as impression materials.

Types of impression materials:

A. Non elastic:
    a. Rigid
    b. Plastic:
        i. Thermo plastic
        ii. Paste

B. Elastic:
    a. Hydrocolloids:
        i. Reversible
        ii. Irreversible
    b. Elastomers:
        i. Polysulphide
        ii. Silicon
        iii. Polyether

Impression materials used in Orthodontics:

Irreversible hydrocolloids or alginate are used in orthodontics.

Why alginate is used:

a. As it's an aqueous impression material, it can be used for recording minimum details as required to prepare study model.
b. It's elastic in nature & has good plasticity.
c. It has good flow. So, it can readily flows into the caries & undercuts.
d. It has a viscid consistency. So, it isn't too thick or too thin in consistency.
e. It has a sufficient working time & set rapidly in mouth.
f. Easy to manipulate.
g. Comfortable for the patients.
h. Relatively inexpensive.
i. It has a low specific heat so doesn't burn the soft tissue.

Disadvantages:

a. Impressions aren't accurate.
b. Tears easily.
c. Model materials should be poured immediately.

What type of tray is used in Orthodontics?

Stock tray is used.

Why stock tray is used:

As it have the following qualities:

a. Antero – posteriorly it can extend to the limits of the denture bearing area.
b. Laterally, the lateral margins of the tray can extend about 1/8th of an inch beyond the buccal segment of the alveolar ridge.
c. Vertically, the flanges of the tray may or may not rise up into the labio buccal sulcus.
d. The general confirmation of tray should be is confirmation with the general confirmation of the denture bearing area.

Position of the patient for an upper impression:

a. The upper impression can be best worked from behind & right of the patient.
b. Sitting in the chair, the patient's mouth opening should be at the level of the operator's elbow.
c. Patient's head should be vertical.
d. The head rest is to adjust slightly forward resting behind the occiput of the patient.

Position of the operator:

The operator should stand completely behind & slightly right to the patient so that he bends down forward, can pass left hand around the patient's head & can also look into patient's mouth.

Manner of holding the tray:

The tray is held in the right hand. The handle is supported with the thumb on one side & middle & index fingers on the other side. The 3rd & 4th finger support the tray in the palatal area.

Insertion of loaded tray into the mouth:

a. The patient is asked to open up the mouth.
b. With the left index finger, coming from behind the left side of the patient, lift the left angle of the patient's mouth upwards & outwards.
c. Then the tray is inserted into the mouth.
d. The right posterior corner is lifted. Then pushing the right angle of the mouth away with the right flange of the tray, the corner is taken in the mouth as far as possible it could go.
e. Then, right cheek is pulled out with the right flange of the tray at the same time rotating & inserting the left corner in the mouth.

Taking impression:

Then the tray is centered in position. The tray should be centered horizontally & antero – posteriorly. Then the tray is pressed against the tissue. The tray is held in position for about ½ minute.

Removal of the impression:

Right angle of mouth is lifted up upwards & outwards. Peripheral seal is broken & the tray is withdrawn by making movements exactly opposite to the insertion. The tray is chilled in cold water in proper hindering of the composition.

Checking points for upper impression:

a. Alveolar ridge: completely record.
b. Palate: cover as far as vibrating line.
c. Hamular notch: Extension into hamular notch & is to be recorded.
d. Tuberosity sulcus should be recorded.
e. Labial & buccal frenum: should be recorded.
f. Vestibular reflection: Should be recorded.
g. Fovea palatni: Should be recorded.

Lower Impression:

Tray selection:

A tray is selected which is antero – posteriorly extends upto the retromolar pad. The width of the flanges should be close to the width

of the alveolar arch. The curvature of the tray should be similar to the curvature of the arch.

Position of the patient for a lower impression:

The chair is adjusted in such a way that when the patient is seated, his face is round about operator's mid chest level & the head of the patient is slightly reclined backwards so that when he opens up his mouth widely, the inferior border of the body of mandible is parallel to floor.

Position of the operator:

The operator should stand in front & to the right of the patient near the angle of chair formed by the seat & the junction of the foot rest.

Manner of holding the tray:

Same as upper impression's tray holding manner.

Checking points for lower impression:

The impression is to be checked for the imprints of some important landmarks as follows:

a. Retromolar pad: Should be covered by impression.
b. External oblique ridges: Should be covered by impression.
c. Mylohyoid ridges: Should be covered by impression.

d. Vestibular reflection: Extension of the impression into the vestibular pouch should be completed.
e. Lingual pouch: The impression should have a complete extension into the lingual pouch.

Orthodontic Study Model

Orthodontic study models are essential diagnostic records which help to study the occlusion & dentition in all three dimensions.

Objectives of orthodontic study models:

a. Models accurately reproduce the teeth & their surrounding soft tissues.
b. Models are to be trimmed so that they are symmetric & pleasing to the eye.
c. They're trimmed in such a way that the dental occlusion shows by setting the models on their backs.
d. They're clean, smooth, bubble – free surfaces with sharp angles are produced for trimming them.
e. Models are clean, smooth, bubble – free surfaces with sharp angles where the cuts meet.
f. The finished models will be treated with a soap solution to provide a glossy, mar – proof finish.

Why we make study models:

a. They're invaluable in planning treatment.
b. Occlusion can be visualized from the lingual aspect.

c. They provide a permanent record of the inter maxilla relationships & the occlusion at the start of therapy.
d. They're a visual aid for the dentist as he monitors changes taking place during tooth movement.
e. It helps to motivate the patient as the patient can visualize the treatment progresses.
f. They act as a reference for post treatment change.
g. They serve as a reminder for the patient & the parents of patient for the condition present at the start of treatment.
h. In case the patient has to be transformed to another clinician, study models are an important record.

Uses of study models:

a. Assist & record dental anatomy.
b. Assist & record intercuspation.
c. Assess & record arch form.
d. Assess & record the curves of occlusion.
e. Evaluate occlusion with the aid of articulators.
f. Measure progress during treatment.
g. Detect abnormality. E.g.; localized enlargements, distortion of arch forms.

h. Calculate total space analysis.
i. Provide record before, immediately, after & several years following treatment for the purpose of studying treatment for the purpose of studying treatment procedures & stability.

Parts of the study models:

The study models can be divided into two parts for the purpose of description:

a. The anatomic portion
b. The artistic portion

The anatomic portion:

It's that part which is the actual impression of the dental arch & its surrounding soft structure. This is the part which must be preserved while trimming the model.

The artistic portion:

It's the stone base supporting the anatomic portion. The portion is trimmed in a manner which depicts, in a general way, the dental arch form & is pleasing to eye.

Steps in art portion fabrication:

a. Determine the occlusal plane of the dentition. The base of the lower model is trimmed parallel to occlusal plane. (Occlusal plane is considered to be higher three points of the erupted teeth.)
b. Trim the back of lower model perpendicular to midline. It's generally easier to locate the midline in the maxillary cast. The back is trimmed. So, it's 90° to the base of the model.
c. To trim the back of the upper model, occlude the models utilizing the wax bite. The back of the upper & lower models should now be 90° to the base of the lower model. (Trim the posterior surfaces of both models until you're just posterior to hamular notch which should be several millimeters posterior to the last tooth.)
d. Trim the base of upper model so that it's parallel to the base of lower model.
e. Now we have two bases parallel to each other & to the occlusal plane. The backs of both upper & lower bases are at right angles to the bases, the occlusal plane & to the mid palatal aponeurosis.

The lower model:

a. Make the buccal cuts to the edge of the vestibule using a 60° angle. The edge of the vestibule is taken as a point approximately 5 – 6 mm

from the most prominent point of the lower canine or 1st bicuspid tooth.

b. The anterior segment of the lower arch is trimmed into a curve which should follow the arc of a . The finished model should have this curve trimmed to within 5 – 6 mm of the anterior teeth.
c. The heels of lower model are cut at approximately 115° to the back of the model. (The ideal set of models will have the art portion representing approximately 1/3rd of the total height & the anatomic portion approximately 2/3rd of this height.)

The upper model:

a. Make the buccal cuts to the edge of the vestibule at an angle of 60°.
b. Make the anterior cuts so that the ends are at the midline & approximately in the canine area. These cuts should be approximately 5 – 6 mm from the labial surface of anterior teeth.
c. The heels of the upper model are finished in such a manner that they are flush with the heels of the lower model at 115°.
d. The finished height of the occluded models should be 7 cm.

Finishing the models:

The surfaces must be smooth, remaining at the same time absolutely flat & at right angles to the base of the models.

Model analysis:

Model analysis can be classified in the following way:

A. Analysis to study the relationships of tooth size & available space in the permanent dentition:
    a. Carey's analysis
    b. Arch perimeter analysis
    c. Total space analysis
B. Analysis to study the relationships of tooth size to the size of supporting structures:
    a. Pont's analysis
    b. Linder Harth's analysis
    c. Korkhau's analysis
    d. Ashley Howe's analysis
    e. Diagnostic set up
C. Analyses to study the size relationships of groups of all:
    a. Bolton's tooth size ratio
    b. Sanin – Savara analysis
    c. Rock & Peck ratio

D. Analyses to study the relationships of tooth size & available space during mixed dentition:

   a. Moyer's mixed dentition analysis
   b. Tanaka – Johnston analysis
   c. Staley & Kerber analysis

Carey's analysis/Arch perimeter analysis:

The arch length – tooth material discrepancy is the main cause for most malocclusion. This discrepancy can be calculated with the help of Carey's analysis. This analysis is usually done in lower arch. The same analysis when carried out in upper arch is called as arch perimeter analysis.

Upper arch procedure:

a. Measure the mesiodistal width of all the teeth from the 1st permanent molar on one side to the second permanent molar on another side & sum it up. This gives us total tooth material.
b. The arch perimeter is measured anterior to 1st permanent molar using a soft brass wire. The wire is placed touching the distal aspect of first permanent molar then passed along the bucal cusp of premolars, incisal edgers of the anteriors & finally the same way up to the distal of the first molar of the opposite side. The brass wire should be

passed along the cingulum of anterior teeth if anteriors are proclined & along the labial surface of anteriors are recorded.

The mesiodistal width of teeth anterior to the 1st molars are measured & summed up as the total tooth material.

The difference between the arch perimeter & the actual measured tooth material gives the discrepancy.

Inference:

The amount of discrepancy between arch perimeter & arch perimeter & tooth material is calculated.

If arch discrepancy is –

- 0 – 2.5 mm: Proximal stripping can be carried out to reduce the minimal tooth material excess.
- 2.5 – 5 mm: Extraction of 2nd premolar is indicated.
- Greater than 5 mm: Extraction of 1st premolar is usually required.

Lower arch procedure:

Same as upper arch.

Pont's analysis:

Pont in 1909 suggested a method for determining the ideal dental arch width from the combined mesiodistal width of the maxillary central & lateral incisors.

Procedure:

a. Measure the mesiodistal width of maxillary central & lateral incisors on either side.
b. Sum up the mesiodistal width of Right & left central & lateral incisors. Let the value be “X”.
c. Measure the arch width in premolar region from the distal pit of 1st premolars to the opposite side.
d. Measure the arch width in molar region from the mesial pit of 1st molar to the opposite side.
e. Calculate the ideal arch width in premolar region using the formula –

   X/80 × 100

f. Calculate the ideal arch width in molar region using the formula:

   X/64 × 100

Inference:

- If the calculated value is greater than the measured value, the arch is narrow for the sum of incisors width & the arch needs expansion.
- If the measured value is greater than the calculated value, the arch is wider for the sum of incisors width & there’s no scope for expansion.

Drawback of Pont’s analysis:

a. Maxillary centrals are the teeth most commonly missing from oral cavity.
b. Maxillary centrals may undergo morphologic alteration like “peg” shaped central.
c. This analysis is derived solely from the casts of the French population.
d. It doesn’t take skeletal mal relationships into consideration.

Linder Harth index:

Linder Harth proposed as analysis which is very similar to Pont’s analysis. However, he made a variation in the formula to determine the calculated premolar & molar value.

The calculated premolar value is determined using the formula –

$$(SL \times 100) / 85$$

The calculated molar value is determined using the formula:

$$(SL \times 100) / 64 \div (SL \times 100) / 65$$

(SL: Sum of mesiodistal width of incisors.)

Inference:

Same as Pont’s analysis.

Korkhaus analysis:

This analysis makes use of the Linder Harth's formula to determine the ideal arch width in the premolar molar region.

An additional measurement is made from the midpoint of the interpremolar line to a point in between the two maxillary incisors.

According to Korkhaus, for a given width of upper incisors a specific value of distance between the mid points of interpremolar like to the point between the two maxillary incisors should exist.

Procedure:

a. The mesidistal width of maxillary incisors are measured & added. It's demoted as sum of incisors.
b. The width of the arch in the premolar region is measured from the deepest point in the transverse fissure of 1^{st} premolar to its opposite part on the other side. Position a ruler from 1^{st} premolar to 1^{st} premolar.
c. Measure the distance from the midpoint of the ruler to the labial surface of most anteriorly positioned maxillary central incisor. The forms the available anterior arch length.
d. The available anterior arch length (AAAL) is compared with ideal anterior arch length.

e. The ideal anterior arch length (IAAL) is obtained by Korkhau's formula –

$$IAAL = (SLu/160) \times 100$$

f. If the AAAL is measured in the mandible arch in the similar manner, however, the arch width at the premolar region is taken from the contact areas of first premolar & 2nd premolar for the mandibular arch.

g. The anterior arch length of the maxilla is 2 mm more than the anterior arch length in the mandible.

Inference:

a. If the anterior arch length is greater than the ideal anterior arch length, the maxillary central incisors are anteriorly mal positioned. (Maxillary incisors are proclined.)

b. If the anterior arch length is less than the ideal anterior arch length, the maxillary central incisors are posteriorly mal positioned. (Maxillary incisors are retroclined.)

Bolton's analysis / Bolton's ratio:

Bolton's analysis evaluates the maxillary & mandibular teeth for tooth size discrepancies. According to Bolton, there's a relation between the combined width pf mandibular & maxillary teeth.

Anterior ratio:

The sum of mesiodistal width of 6 mandibular teeth should be 77.2 percent the mesiodistal width of the maxillary teeth. According to Bolton, this ratio can be found out using the formula –

Anterior ratio = (Sum of mandibular 6 ÷ Sum of maxillary 6) × 100

If the anterior ratio is greater than 77.2 percent, the mandibular anterior teeth material is excessive. The amount of mandibular tooth material excess is calculated using the formula –

Mandibular anterior excess = Sum of mandibular 6 – (Sum of maxillary 6 ÷ 100) × 77.2

If the anterior ratio is less than 77.2 percent, the maxillary anterior teeth material is excessive. The amount of maxillary tooth material excess is calculated using the formula –

Maxillary anterior excess = Sum of maxillary 6 – (Sum of mandibular 6 ÷ 77.2) × 100

Overall ratio / Total ratio:

The width of all teeth from 1st molar on one side to 1st molar on the opposite side is measured & added for both arches.

The sum of mesiodistal width of 12 mandibular teeth should be 91.3 percent the mesiodistal width of the 12 maxillary teeth. According to Bolton, this ratio is calculated using the formula –

Total ratio = (Sum of mandibular 12 ÷ sum of maxillary 12) × 100

If the value is greater than 91.3%, the inference is overall mandibular teeth material excess. Value less than 91.3% show overall maxillary teeth material excess.

It's possible to quantify the total tooth material excess using the formula –

Maxillary tooth material excess = Sum of maxillary 12 – (Sum of mandibular 12 ÷ 91.3) × 100

Mandibular tooth material excess = Sum of mandibular 12 – (Sum of maxillary 12 ÷ 100) × 91.3

Howe's analysis / Ashley Howe's analysis:

Howe proposed that a relationship exists between the sum of mesidistal width of teeth anterior to 2nd molars & width of the dental arch in the 1st premolar region.

Crowding is the result of reduced dental arch width at the 1st premolar region according to Howe.

Procedure:

Total tooth material (TTM):

Sum of the mesiodistal width of all teeth in the arch from 1st molar on one side to 1st molar on the other side is measured & added up to obtain tooth material.

1st premolar buccal width (PMBAW):

The width of maxillary apical base measured from the canine fossa on one side to the other from a point close to the apices of 1st premolars.

The formula is –

$$(PMBAW \times 100) \div TTM$$

Inference:

a. The arches can be considered sufficient to accommodate all the teeth if the value obtained is greater than 44%. (Extraction isn't needed.)
b. The value less than 37% is suggestive of basal arch deficiency & extraction of 1st premolar is indicated.
c. The values between 37% – 44 % are border line & subjective decision should be taken regarding extraction of 1st premolars. (Extraction may be or may not be needed.)

ORTHODONTIC APPLIANCE

Orthodontic appliance:

This may be defined as the "appliance by which mild pressure may be applied to a tooth or a group of teeth and their supporting tissue in a predetermined direction to bring about the
necessary reaction processes within the bone and other tooth supporting tissues, to allow tooth movement".

Orthodontic appliances are divided into three main groups:

A. Removable appliance:

The term of removable appliance is defined as an appliance which can be removed for cleaning by the patient or for adjustment by the orthodontist. These appliances can be taken
out of the mouth by patient when required.

Removable appliances are three types:

1. Passive appliances: These appliances remain passive in the mouth and exert no active pressure.

Example as
1. Space maintainer
2. Retention appliances
3. Tongue guard

2. Functional appliances: These appliances work by transmitting or modifying muscle forces to the teeth and their supporting tissues.

Example as: 1. Andersen appliances

2. Frankels functional regulators

3. Mechanical appliances: These appliances carry some active components which are activated to exert active forces.

B. Removable-Fixed appliances: Some part of appliances can be removed by the patient and other parts remain fixed on the teeth.

Example as: 1. Highly lower appliance

2. Removable appliances whip spring.

3. Quadrihelix

C. Fixed appliances: These cannot be removed by the patient and consists of:

1. Bands- cemented on teeth (occasionally cast metal caps),

2. Attachments or brackets of different types attached on the bands or on teeth directly with

bonding materials

3. Labial or lingual arches- These may themselves be active or passive and may carry auxiliary springs for movement of teeth.

IDEAL REQUIREMENTSOF AN ORTHODONTIC APPLIANCE

1 An appliance must be simple in design and comfortable to use.

2 It should be strong enough so that, it does not break during the normal functional

activities such as swallowing, mastication, speech etc. It should not however be heavy or bulky.

3 It should be inert to the oral secretion, tasteless and odorless.

4 It must not cause any damage to the teeth or other tissue.

5 It should exert correct force in correct direction for the desired tooth movement.

6 It must have adequate retention.

7 It must not interfere the normal development of the dento-facial structure or function.

8 When removable, it should be easy to remove and insert.

9 It should be easy to keep clean.

10 It should be repairable.

11 It should be as inconspicuous as possible, particularly for the adult patient.

Component of orthodontic appliances

1. The component parts of removable orthodontic appliances are:

A. Retentive component- This part of removable orthodontic appliance holds the appliance in position and is called as clasp. It can also be referred to as the anchor unit of the removable orthodontic appliance. There are different types of clasps.

B. Active Component- This part of removable orthodontic appliance brings about the actual tooth movement. The active tooth movement cab be brought about by various components like-

(a)Labial bows.

(b) Springs

(c) Expansion screws

(d) Elastics.

C. Base Plate- This unit of removable orthodontic appliance carries all the other components of the appliance. Auto polymerizing (self curing) acrylic resin is the material generally used for fabricating the base plate, sometimes heat curing acrylic resins can also be used. The acrylic base can be modified to have bite planes which serve special functions such as reduction of overbite, reinforcing anchorage etc.

2. Components of Fixed Appliance:

A. Passive Components:

These are Bands, Brackets, Buccal tube, Lingual cleats, Lingual buttons, Lingual hooks, eyelets, Lock pins, Ligature wire etc.

B. Active Components:

l. Arch wires: Different types of readymade and other plain arch wires, Twist flex/Dentaflex

arch wire etc.

II. Springs: Different types of springs used with arch wires such as up righting, rotating, open or closed coil springs etc.

III. Elastics of different types and sizes

IV. Separators- These are used to separate the adjacent teeth to facilitate bonding.

3. Component of functional appliances:

The following appliances can be grouped under functional Appliances:

1. Bite Plane.

2. Oral Screen.

3. Activator.

Andresen appliance

The Harvold appliance (Harvold Activator)

Clark's Twin Block appliance

4. Frankel Appliance /Functional Regulator

5. Habit Breaking Appliance.

6. Tooth Positioner.

Removable appliance

The term of removable appliance is defined as an appliance which can be removed for cleaning by the patient or for adjustment by the orthodontist. These appliances can be taken

out of the mouth by patient when required.

ADVANTAGES OF REMOVABLE APPLIANCES:

1. The majority of cases which require simple tipping can be satisfactorily treated by

removable appliances.

2. Many tooth movements can be undertaken, readily with removable appliances For E**x**.:

Tipping, deep bite reduction.

3. Bite planes can be incorporated with removable appliances.

4. Simple tooth movement are undertaken, hence the control is less complex.

5. These can be handled by general practitioner for correcting simple malocclusions.

6. They can be removed for short periods, on socially sensitive occasions.

7. It allows growth guidance (functional appliances).

8. Takes less chair side time.

9. Less expensive for both the clinician and the patient.

10. They can be removed by patient for brushing teeth and appliance maintenance.

11. Oral hygiene maintenance is easier.

12. If there is any damage or problem, the appliance can be removed by the patient.

13. They are less conspicuous than the fixed appliances

LIMITATIONS OF REMOVABLE APPLIANCE

1. Only simple tipping can be corrected. If teeth are inclined unfavorably, must be treated with fixed appliance.

2. Multiple rotations cannot be treated.

3. In complex cases, treatment is prolonged, as only few movements can b e carried out at a

time.

4. Following extraction, if excess spaces are left behind, posterior segments cannot be brought forward.

5. Cases other than those requiring extraction of first premolars are difficult to manage.

6. Lower removable appliances are not well tolerated.

7. If they are not adjusted carefully, they bring about uncontrolled tipping of teeth.

8. Uncooperative patients are difficult to be managed because they can remove the appliance by them.

9. Appliances can be easily broken or damaged, if they are not worn and not cared for.

10. Cannot be given in high or low FMA angles cases. Cannot be given to severe Class II and Class III malocclusion cases.

Retentive component: Clasp

Definition:

Clasps can be defined as a component of removable orthodontic appliances that retains and stabilizes an orthodontic appliance in the oral cavity by contacting the surface of the teeth or by engaging the interproximal embrasures.

Types of claps Used in Orthodontics

Followings are the types of clasps used on Orthodontics.

1. Adam's clasp and its modifications such as:

a) Adam's clasp with soldered hook.

b) Adam's clasp with distal traction hook.

c) Adam's claps with helix.

d) Adam's clasp with single arrowhead.

e) Adam's clasp with soldered buccal tube.

f) Double clasps- Adam's clasp on incisors.

2. 'C' Clasp or Three-Quarter Clasps.

3. Full Clasp or Jackson's Clasp

4. Triangular Clasp.

5. Pre-fabricated Clasps like

    a. lnterdentally clasp

    b. Triangular head clasp

    c. Arrow anchor clasp

    d. Ball end clasp

6. Southend clasp

7. Duyzing Clasp

8. Schwarz Clasp

9. Eyelet Clasp

Adam's clasp:

It is the most commonly employed clasp. l t can be used on any tooth but usually used on molars and premolars. It was introduced by C.P. Adams. It is also called modified arrowhead

clasp o Liverpool clasp or as universal clasp.

Parts of the Adam’s clasp -

1. Bridge
2. Two Arrowheads
3. Two Retentive arm
4. Retentive tag (optional)

Uses of Adam’s clasp:- Used for retention.

Points will be checked in the finish of Adam’s clasp:

1. Arrowheads should be positioned at the buccoproximal undercuts.

2. Arrowhead should have a point contact rather than surface contact.

3. The bridges should be located t the middle third of the tooth.

4. The bridge should be 2 mm away from the tooth surface.

5. When side view, bridge should be at about 45 degrees angulations to the tooth surface.

6. The bridges should be parallel to the buccal surface.

7. The retentive arm should not interfere with the occlusion.

“C” Clasp:

Parts of 'C' Clasp-

1. Active arm
2. Body
3. Retentive arm

Drawbacks of 'C' clasp:

1. lt cannot be used on deciduous teeth as there is no Infabulge area.
2. lt cannot be used on partially erupted teeth.
3. lt can be used only on posterior teeth.
4. Clasp is difficult to adjust, it also gets distorted easily.
5. lt tends to create space between the teeth.
6. lf it breaks, it cannot be repaired. The whole clasp has to be replaced.

Uses of 'C' clasp:

- Used for retention.

Active component: Labial Bow

Definition:

Labial Bow is that component of removable appliance which helps in retracting and retaining the anterior teeth and also contributes for retention of the appliances.

Labial bow consists of three parts-

1. Horizontal bow portion

2. Vertical loops or 'U' Loops

3. Retentive arms.

Uses of Labial Bow:

l. Retraction of anterior teeth.

2. Retention of teeth, after active orthodontic treatment is completed.

3. Used for reinforcement.

4. For attachment of auxiliary springs.

5. It can also be used for carrying soldered attachments.

Function of each types of labial bow	
Types of Labial bow	**Function**
1. Short labial bow-	(1) For retraction of anterior teeth (2) used for retention of the teeth after active growth is compteted. (3) used for reinforcement.

	(4) used for attachment of auxiliary spring.
2. long labial bow	(1)Can be used to close the space between canine and premolars. (2)Used for retention.
3. Split labial bow	(1)Used for correction of spaces. (2)To flatten the arch.
4. Robert's retractor	(1)Can used for correction of severe protrusion of teeth.
5. Mitt's Retractor or Expanded labial bow	(1)Used for correction of severe protrusion of teeth.
6. High labial bow	(1)Used in retracting the teeth with severe proclination of teeth.
7. Reverse loop labial bow	(1)Used to retain ant teeth after treatment is completed.
8. Labial bow with self straignthing wire	(1)Can be used for correction of mild proclination or spacing of teeth.
9. Labial bow with elastic	

10.Fitted labial bow	1)For retention (2)Reverse loop help to control the canine.
11.labial bow used in howly's retainer	(1) For retention of teeth, after the active treatment is completed. (2) When used for retraction, it helps in consolidating the space.
12. Rickett's Retention labial bow	(1)Used for retention. As the horizontal arm is extended over the canine, helps in controlling the canine.

Active component: Springs.

Definition

Spring is an active component of removable orthodontic appliances which brings about the desired tooth movement.

Type of springs

The different types of springs which can be used to bring about the orthodontic, tooth movement are:

I. Finger spring.

2. Single Cantilever spring

3. Double Cantilever spring

4. “T” Spring

5. Self supporting buccal spring

6. Flapper spring

7. Apron spring

8. Coffin spring

9. Reverse loop canine retractor

10. Buccal canine retractor

11. Palatal canine retractor

12. "U" Loop canine retractor

Palatal Finger spring:

Parts of the spring-

1. Active arm

2. Helical or Helix or Coil

3. Retentive arm

4. Retentive tag (optional)

Uses of finger springs:

- Used for mesiodistal movement of the anterior teeth.

Double Cantilever or "Z" spring:

Parts of the “Z" springs-

1. Active arm

2. Two Helical, r Helix or Coil

3. Retentive arm

4. Retentive tag (optional)

Uses of "Z" springs:

- Used for proclination of the anterior teeth.

- Used for buccal movement of the posterior teeth.

Self supporting buccal spring or canine retractor:

Parts of the Self supporting buccal springs-

1. Active arm

2. ' U' loop

3. Retentive arm

4. Retentive tag (optional)

Uses of Self supporting buccal spring or canine retractor:

- Used for retraction of the canine teeth.

- Used for retraction of premolars.

3. Base plate:

The function of the base plate -

a. lt acts like a vehicle and carries all the components of the appliance.

b. lt transmits the force.

c. lt protects some of the component parts like boxed spings.

d. lt partly helps in retention.

e. In some cases it reinforces the anchorage.

f . Properly trimmed base plates guide the tooth movement.

g. Bite planes can be added. (When they are included in the design, they will also have many functions.)

Difference between Removable and Fixed appliance:

Removable Appliance	Fixed Appliance
1. Usually only tipping movement can be produced	All types of tooth movements can be produced
2. Usually only a few teeth are moved at a time.	Multiple tooth movements can be performed simultaneously.
3. Both the teeth and soft tissues may provide anchorage and therefore better anchorage control.	Only the banded teeth provide anchorage and therefore reinforcement of anchorage by E.O.T.
4. Design, preparation and adjustment of commonly used appliances are comparatively simple.	Plan, preparation and adjustment is complex. Therefore, special training is needed. Some appliances require a comparatively well equipped laboratory.
5. Chair-side time is short but laboratory time is long for the construction or repair of the appliance	Chair-side time is comparatively prolonged for construction or any repair.

6. Components are inexpensive and few.	Components are costly and are of many types.
7. Oral Hygiene maintenance is not a problem as the appliances can be removed for cleaning the teeth.	Oral hygiene maintenance is often difficult and tooth bearing a loose band may show decalcification or decay.
8. Do not require frequent visit for adjustment and check.	Require more frequent visit for adjustment and check.
9. Appliance can be removed and kept out of the mouth by the patent in case of distortion or any complain till seen by the doctor.	Appliance cannot be removed by the patient and therefore, in case of any distortion of the appliance or injury to the tissue, the patient has to return to the clinician immediately for adjustment.

The points should be consider during checking the orthodontic appliance when delivery to the patient -

1. Adequate retention of the clasp unit.

2. Absence of sharp margins or nodules on the fitting appliance.

3. The appliances should be polished properly cause during eating food does not adhere the appliance.

4. Active components should not press upon the gingival and cause blanching.

5. Springs should be kept away from the depth of the sulcus, frenum.

6. Height of the bite planes should be adjusted lower teeth should contact it regularly or two or three teeth should be in contact with the bite plane.

7. During the appliance delivery the active components should be activated.

8. To keep a watch on the anchorage, the distance between a stable tooth can be measured.

The points should be consider during insertion instruction to the patient on first visit -

1. Teach the patient to wear and remove the appliance with the help of a face mirror.

2. Appliances should be worn all the time day and night.

3. Only remove the appliance for cleaning.

4. Explain to the patient that initially the appliance feels strange and face some difficulties like -

a. Difficulty in swallowing

b. Difficulty in speech

c. Difficulty in eating

d. Discomfort to wearing the appliance

5. These problems will be disappearing within 48 hours of use. If possible do not stop wearing the appliance.

6. Speech different will be clear with more practice speaking like read out loud at home.

7. Remove the appliance while brushing; brush the appliance after brushing the teeth and wear it property.

8. Remove the appliance before meals and after the meals, wash the appliance and wear it.

9. Wash the appliance with soap or toothpaste.

10. Always use Adams clasp for removing the appliance.

11. It is better to avoid coarse or hard or sticky food for distortion or damage of the appliance.

12. Every time after insertion of the appliance, check the springs are in correct position in relation to the teeth.

13. lt is important to brush well three times per day and use a fluoride toothpaste.

14. lf any part of the wire or appliance is broken, report to the orthodontist as soon as possible. Do not wait for the next routine visit.

15. Do not rap with tissue paper in your pocket.

16. Do not playing contacts sports with the appliance like riding a bicycle or roller-skating.

17. Do not playing a musical instrument with the appliance like wind instrument e.g. flute or brass instrument.

18. Always maintain your regular appointments.

The points should be consider during checking the patients with Orthodontic appliance on Second visit -

1. Enquire to find out the regularity of wearing the appliance.

2. Check for any sore spots or pain in any region.

3. To observe the patient speech sounds are clear or not. When speech sounds are not clear ,the appliance is not worn regularly

4. Check the position of the appliance and its components in the mouth.

5. Look for any distortion of wire components.

6. Inspection of the mouth thoroughly for poor oral hygiene or any caries or any pathology.

7. Check for any interference in tooth movement.

8. Check the tooth movement.

9. Activate the active components.

10. If the appliance has an expansion screw, teach the patient how to activate it and instruct about the frequency of activating it.

11. Several sign which can indicate that the appliance is not worn regularly.

Principles of wire bending

General principles of wire bending:

a. All bends in orthodontic wires are placed by fingers, pliers are meant to hold the wire firmly & assist in wire banding.
b. Always hold the pliers using a palm grip.
c. Before starting to bend the wire, establish a firm grip over the wire.
d. In general, sharp bends should be avoided to prevent the incorporation of stress which can lead to the fracture of the wire later.
e. It's easier to make a bend by pushing the wire rather than by pulling the wire.
f. Take care to make all bends at right angle to the long axis of the wire maintaining the place of the wire to prevent tension of wire.
g. Use proper beak of the pliers to hold the wire before placing the bends.
h. Precise marking is necessary before making any bends.

To make a right angle bend:

Mark the position where the bend should be made. Hold the wire firmly with the pliers. Push the wire close to the pliers using thumb & forefinger.

To make acute bends:

Making right angled band first, withdraw the pliers slightly away from the mark & close the angle.

To make short curved bends:

Hold the wire firmly with the pliers & make the band with the fingers.

To make a circle:

They are made with the fingers only.

Palatal Finger Spring

Another name:

a. Single cantilever spring

Why so called:

As one end is fixed in acrylic & the other end is free, so it's called single cantilever spring.

Use:

a. It's used for mesiodistal movement of teeth.

Armamentarium:

a. 0.5 ss wire
b. Young loop bending wire
c. Adam's pliers
d. Marking pencil
e. Wire cutter
f. Modeling wax
g. Wax knife

Parts:

a. Active arm (12 – 15 mm)
b. Coil or helix (3 mm)
c. Retentive arm (4.5 mm)

Construction:

a. Using Young loop bending pliers, a coil is made of one & a quarter turns, having an internal diameter of 3 mm.
b. The coil should lie along the long axis of tooth.
c. The arm which brings about the tooth movement is called active arm & is placed towards the tissue.
d. The coil should be on the opposite side of the direction of tooth movement.
e. The retentive arm is adapted to the palate.
f. The active arm should contact only on the proximal side & is adapted on to the labial side away from tooth surface.

Modification:

Modification of finger spring is a double finger spring. In this spring, the retentive arms of the two finger springs are joined together.

Activation:

The active arm of the spring is adjusted close to the coil by opening it about 3 mm.

“Z” spring

It’s an active component of removable orthodontic appliance. It’s also called double

Cantilever spring.

Why it’s called “Z” spring:

Double cantilever spring has 2 coils & resembles the shape of alphabet “Z” when is activated. So, it’s called “Z” spring.

Ideal requisites of orthodontic spring:

a. It should be simple to fabricate.
b. It should be easily adjustable.
c. It should be fit in available space without discomfort to patient.
d. It should be easy to clean.
e. It should apply force of required magnitude & direction.
f. It shouldn’t slip or dislodge when placed over a sloping tooth surface.
g. It should remain active over a long period of time.

Parts:

a. 2 active arms
b. 2 coils or helix
c. 1 retentive arm

Instruments required:

a. 0.5 mm ss wire
b. Young loop bending pliers
c. Adam's pliers
d. Marking pencil

Fabrication:

a. Adaptation of 0.5 mm ss wire on to palatal surface of tooth.
b. A coil about 2 – 3 mm is placed at one of its end.
c. Then adaptation of wire parallel to active arm.
d. Then, another coil is placed at far end of 1st coil within limit of teeth.
e. From 2nd coil, wire is adapted parallel to active arm & at a point half way through the mesiodistal width of spring.
f. A right angle bend is placed & then a vertical bend towards the palatal side of tooth. (Vertical bend – proper direction of force)
g. So that the spring is positioned perpendicular to the retentive arm to form retentive tag.

Use:

a. Labial movement / proclination of incisors
b. Minor rotation of incisors (also done by coffin spring)

Activation of “Z” spring:

It is activated by opening both the helix about 2 – 3 mm at a time. In case of minor rotation, one helix is opened.

Instruments required for activation:

a. Loop former pliers
b. Adam’s pliers

Boxing Procedure:

The active arm, coils & path traverse by active arm are covered by thick modeling wax. Wax is extended & surface should be flatted, smooth. Retentive arm shouldn’t be covered with wax. After waxing of spring, acrylation of base is completed. The wax is then flushed out completely in dewaxing unit by flushing out with a stream of hot water.

“C” Clasp

Another name:

a. Circumferential clasp

b. Three quarter clasp

Used in:

a. Premolars

b. Molars mainly

Armamentarium:

a. 0.7 mm ss wire

b. Young loop bending wire

c. Marking pencil

d. Wire cutter

Use:

a. Retention of teeth

Construction:

a. This clasp extends from the interproximal embrasure either mesially or distally.

b. Then it passes below the maximum bulge area & above the gingival margin buccally crosses the buccoproximal line angle & turns

vertically to pass through the embrasure & above the marginal ridge on to lingual or palatal surface of the tooth.

c. As the wire reaches the gingival crest lingually or palatally, it raises slightly leaving some space between the lingual or palatal surface & the wire for the flow of acrylic during acrylisation.
d. At the end of retentive arm, a small bend is given for the clasp to be retained firmly in acrylic base.

Mesial or distal clasp:

The “C” clasp can be mesial or distal clasp depending upon the location of the open end either mesially or distally.

Adjustment:

The clasp is tightened by holding it at the contact point & bending it towards the tooth.

Advantages:

a. Advantage of this clasp is its simplicity of design & fabrication.

Disadvantages:

a. It can be used in partially erupted teeth where in the cervical undercut isn’t available for clasp fabrication.
b. It can’t be used on deciduous teeth as there’s no intrabulge area.
c. It can be used only in posterior teeth.

d. As clasp is made of thicker wire so it’s rigid.

e. Clasp is difficult to adjust. It also gets easily.

f. If it’s broken, can’t be repaired. The whole clasp to be replaced.

Self supporting buccal spring

Synonyms:

a. “U” loop canine retractor

b. Palatal canine retractor

Instruments required:

a. 0.7 mm ss wire

b. Adam’s pliers

c. Marking pencil

d. Loop former

e. Wire cutter

Parts:

a. “U” loop

b. Active arm

c. Retentive arm

Use:

a. it’s used to move canine in a distal as well as palatal direction

Indications:

a. Buccally placed canine

b. Canine placed high in vestibule

Advantages:

a. Easy to fabricate.
b. It can be used in presence of shallow sulcus.

Disadvantages:

a. Mechanically least effective.
b. Only used when minimal retraction of 1 – 2 mm is required.
c. It requires frequent adjustment.

Fabrication:

a. A “U” loop approximately equal to width of premolar is made using loop former pliers. The base of “U” loop should be 2 – 3 mm below cervical margin.
b. The mesial arm form active arm active arm of “U” loop is bended at right angle.
c. The mesial arm is adapted around the canine below its mesial contact point.
d. The distal arm is adapted mesial to 2nd pre molar to form retentive arm
e. The retentive tag is bended at the end of retentive arm.

Activation:

a. It’s activated by closing the loop by 1 – 2 mm or cutting free end of active arm & readapting it
b. By trimming base plate.

Adam's Clasp

Introduction:

Professor Philip Adams

Another name:

a. Liverpool clasp

b. Universal clasp

c. Modified arrowhead clasp

Use:

a. Molar, premolar (generally)

b. Can be used in any teeth

Parts:

a. Two arrowheads

b. Bridge

c. Two Retentive arms

Advantages:

a. It's rigid & offers excellent retention.

b. It can be made on deciduous as well as permanent teeth.

c. It can be used in molars, premolars & incisor teeth.

d. It can be used on partially or fully erupted teeth.

e. It provides retention by using bucco proximal undercut area.
f. No special pillar is needed to fabricate the clasp.
g. It's small & occupies minimum space
h. If it's fractured, it can be repaired by soldering.
i. It can be modified in a number of ways.

Requirements of an ideal clasp:

a. It should offer adequate retention.
b. It should offer adequate retention even in presence of shallow undercuts.
c. It should permit usage in both partially erupted & fully erupted teeth.
d. It should be easy to fabricate.
e. It shouldn't impinge on soft tissue.
f. They shouldn't apply any active force by themselves that would bring about undesirable tooth movements of the anchorage teeth.
g. It shouldn't interfere with normal occlusion.

Requirements:

a. 0.7 mm ss wire
b. Adam's wire bending pliers
c. Young loop bending plier
d. Wire cutter

e. Marking pencil

Optional pliers:

a. Adam's clasp bending pliers

b. Nance loop closing pliers

Cast preparation:

a. In case of short crown trimming of bucco proximal under cut area should be done.

Construction:

Step 1:

a. About 6″ long 0.7 mm ss wire is taken & is straightened.

Step 2:

a. An "L" shape bend is made.

Step 3:

a. Width of the bridge should be equal to the 2/3rd of the total mesiodistal width of tooth.

b. 2 vertical lines are made corresponding to the mesial & distal side of the tooth.

c. A horizontal line at the gingival margin is drawn to cut the vertical line.

d. A bisector is drawn at the mesial & distal side until it touches the tooth surface.

e. These 2 points corresponds to the position of the arrowheads. Width of the bridge should be taken from these 2 points.

Step 4:

a. Width of the bridge & bend are made.

Step 5:

a. The arrowhead is made using Adam's pliers. The length of the arrowhead should be approximately about 3 mm & width about 1 mm. (In case of partially erupted tooth or short crown, the arrowhead should be shorter. In case of longer teeth, arrowhead should be longer.)

Step 6:

a. The arrowhead is bended so that they are approximately 45° angle to the bridge.

Step 7:

a. Position the partially formed clasp near the tooth & then adapt the retentive arms.

Step 8:

a. The bend is placed on the retentive arm such that it lies below the level of the bridge.

Important points:

a. Arrowheads should be positioned at buccoproximal undercut areas.
b. Arrowheads should have a point contact rather than surface contact.
c. The bridge should be 2 mm away from the tooth surface.
d. The bridge should be located at the middle thrd of tooth.
e. When viewed from the side, bridge should be at about 45° angulations to the tooth surface.
f. The bridge should be parallel to buccal surface.
g. The retentive arm shouldn't interfere with the occlusion.

Mode of action of clasps:

Clasps act by engaging certain constricted areas of the teeth that are called undercuts. When clasps are fabricated, the wire is made to engage these undercuts. So, their displacement is prevented. There're 2 types of undercuts found in dentition:

a. buccal & cervical undercuts
b. Mesial & proximal undercuts

Modifications:

Adam's with helix:

A helix can be incorporated into the bridge of Adam's clasp. This helps in engaging elastics.

Adam's with soldered hook:

A hook can be soldered on to the bridge of the Adam's clasp. This hook also helps in engaging elastics.

Adam's with additional arrowhead:

Adam's clasp can be constructed with an additional arrowhead. The additional arrowhead engages the proximal undercut of the adjacent tooth & is soldered on to the bride of Adam's. This type offers additional retention.

Adam's with distal extension:

The Adam's clasp can be modified so that the distal arrowhead has a small extension in corporate distally. The distal extension helps in engaging elastics.

Adam's with soldered buccal tube:

A buccal tube can be soldered on the bridge of the Adam's clasp. This modification permits use of extra oral anchorage using face bow headgear – assembly.

Adam's on incisors & premolars:

Adam's clasp can be fabricated on the incisors & premolars when retention in those areas is required. They can be constructed to span a single tooth or two teeth.

Labial Bow

Definition:

Labial bow is that component of the removable orthodontic appliance which helps in retracting & retaining the anterior teeth & also for the retention of the appliance.

Parts:

a. Horizontal bow portion
b. Vertical loops
c. Retentive arms

Uses:

a. It's used for retraction of anterior teeth.
b. It's used for retention of teeth after active orthodontic treatment is completed.
c. It's used for reinforcement.
d. It's used for attachment of auxiliary spring.
e. It can be used for carrying soldered attachments.

Types:

a. Short labial bow
b. Long labial bow

c. Split labial bow

d. Robert's retractor

e. Mills retractor

f. High labial bow

g. Fitted labial bow

h. Reverse loop labial bow

i. Soldered labial bow

j. Begg retainer bow

Factors:

The types of labial bow selected for a case depending upon the following factors:

a. Number of teeth to be moved

b. Severity of protrusion of teeth

c. Purpose of labial bow

d. Location of spacing of teeth

e. Preference of the clinician

Armamentarium:

a. 0.7 mm ss wire

b. Young loop bending pliers

c. Adam's pliers

d. Marking pencil

e. Wire cutter

Construction of labial bow:

a. By measuring the wire from one molar across to the other molar area along the labial or buccal surface of the teeth & cut it with the help of wire cutter.

b. Use this piece of wire to fabricate the labial bow.

c. Using the fingers, form a bow adapting it on to the labial surface of the incisors at about the junction of middle & incisal 3rd of the teeth.

d. Place two marks on the bow corresponding to the contact points between the lateral incisor 7 canine on either side.

e. Place two right angle bends on the bow at the points marked.

f. The bends should be towards the gingival margin.

g. Make a mark on the vertical arm at about 2 mm beyond the free gingival margin on either side.

h. Form the loops at the marked points using the round beak of Young loop bending pliers.

i. The loops should be formed above the gingival margins & should be short of the sulcus to prevent irritation of the soft tissue.

j. Care should be taken to keep it away from the frenal or muscle attachments.
k. The distal arm of the vertical loop is adapted on to the palatal or lingual surfaces of the cast to form the tags.
l. Care is also taken to see that the labial bow remains at the junction of middle & incisal thirds while adapting the tag on the retentive arm.

Activation:

It's activated at the "U" loops by closing them with the help of Young loop bending pliers so that the horizontal bow portion is displaced palatally by 1 mm each time it's actvated.

Indications:

a. Minor anterior space closure
b. Minor overjet reduction
c. Closure of space distal to canine
d. Guidance of canine during canine retraction using palatal retraction
e. As a retaining device at the end of fixed orthodontic treatment

Advantages of short labial bow:

a. It can be fabricated easily.
b. It's useful for correcting minor discrepancy in the overjet.
c. It's used to reinforce anchorage.

d. It’s used for retention.

e. It’s used for attachments of whip spring.

f. It’s easy to adjust.

Uses of different labial bows:

A. Short labial bow:

a. They’re used only in case of minor overjet reduction.

b. Anterior space closure.

c. It can also be used for purpose of retention at the termination of fixed orthodontic therapy.

B. Long labial bow:

a. Minor anterior space closure

b. Minor overjet reduction

c. Closure of space distal to canine

d. Guidance of canine during canine retraction

e. Also is used for retention.

C. Split labial bow:

a. Anterior retraction

b. Correction of midline diastema

D. Robert’s retractor:

a. Correction of severe protrusion of teeth

b. Light force is applied as thinner wire is used for construction of labial bow.

E. High labial bow:

a. It's useful in retracting the teeth with severe proclination of the teeth.

b. It can be used to correct single tooth malposition.

F. Reverse loop labial bow:

a. It can be used to retain anterior teeth after active treatment is completed.

b. Controls the canine.

G. Fitted labial bow:

a. For retention

b. Reverse loop helps to control the canine.

H. Soldered labial bow:

a. It's used for retention of teeth after active treatment is completed.

b. It's used for retraction, helps in consolidating the spaces.

Retainers

Definition:

Retainers are the passive orthodontic appliances that help in maintaining & stabilizing position long enough to permit reorganization of supporting structures after active phase of orthodontic therapy.

The types of retainer to be used depend on following factors:

a. Type of malocclusion treated
b. Aesthetic needs
c. Patient's oral hygiene
d. Patient's co operation
e. Duration of retention

Ideal criteria of a retainer:

A good retainer should have following criteria:

a. Retainer should retain all teeth that have been moved desired position.
b. Retainer should permit normal functional forces to act freely on dentition.
c. Retainer should be self cleansing & should permit oral hygiene maintenance.

d. Retainer should be aesthetically acceptable.

Classification:

Retainers can be classified into –

a. Removable retainers

b. Fixed retainers

Removable retainers:

These are passive appliances that can't be removed by the patient.

Types:

a. Hawle's retainer

b. Begg's retainer

c. Fitted labial bow

d. Inactivated appliance

e. Soldered labial bow to appliance

f. Kesling's tooth positioner

g. Barrer spring retainer

h. Appliance using reverse loop labial bow

Activator:

a. Removable partial denture

b. Simple acrylic plate

Fixed retainers:

These are passive appliances that can't be removed by the patient.

Types:

a. Bonding lingual to maxillary incisors
b. Lingual retainers
c. Band & spur retainer
d. Flexible spiral wire

Hawley's appliance:

It is most frequently used retainer. It consists of clasps on molar & short labial bow extending from canine to canine having adjustment loops.

Advantages:

a. Easy to fabricate due to simple design.
b. Minimum patient discomfort due to reduced bulk.
c. Acceptable to most patients as it is relatively less inscapes.

Begg's retainer:

It consists of a labial wire that extends in last erupting molar & curves around it to get embedded in acrylic that span the palate.

Advantage:

a. There is no cross over wires between canine & premolar & thereby eliminating risk of space opening up.

Steps of preparation of fixed lingual retainer:

a. It can be prepared by stainless steel wire or blue eligibly wire. These retainers are bonded on lingual aspect from mid canine to mid canine.
b. The wire is adapted lingually to follow the anterior curvature. The ends are curved over canine where it is bonded.

Information & instructions to be given to patient using retainers:

A. Duration of use:

Removable retainers should be used for at least 6 months. This may means wiring at all the time at least before going on the just night time.

B. It's effect:

Your speech will be difficult. Practice speaking with brace in place. Read out loud at home on in own. Speech will be normal within couple of days.

C. Eating with retainer:

Try to eat with wiring retainer. But avoid sugary foods like cake, biscuit & increased amount of food juice.

D. Tooth brushing:

Brush well 3 times a day & use well tooth paste. If possible carry tooth brush for use after meal.

Wear the retainer as directed. Remove only for cleaning. When it is out of mouth, it should be kept in protecting box.

Frequency of appointment:

No need to be seen so often. Now the retainer is in place. You will be advised about this. Check up with regular dentist. Playing contact sports wearing gum shield. If it is broken, visit your dentist as soon as possible.

Bibilography:

1. Bhalajhi SI. Orthodontics – The art and science. 4th edition. 2009
2. Gurkeerat Singh. Textbook of orthodontics. 2nd edition. Jaypee, 2007
3. Houston S and Tulley, Textbook of Orthodontics. 2nd Edition. Wright, 1992.
4. Iida J. Lecture/class notes. Professor and chairman, Dept. of Orthodontics, School of dental science, Hokkaido University, Japan.
5. Lamiya C. Lecture/class notes. Ex Associate Professor and chairman, Dept. of Orthodontics, Sapporo Dental College.
6. Laura M. An introduction to Orthodontics. 2nd edition. Oxford University Press, 2001
7. McNamara JA, Brudon, WI. Orthodontics and Dentofacial Orthopedics. 1st edition, Needham Press, Ann Arbor, MI, USA, 2001
8. Mitchel. L. An Introduction to Orthodontics. 3 editions. Oxford University Press. 2007
9. Mohammad EH. Essentials of Orthodontics for dental students. 3rd edition, 2002
10. Proffit WR, Fields HW, Sarver DM. Contemporary Orthodontics. 4th edition, Mosby Inc., St.Louis, MO, USA, 2007
11. Sarver DM, Proffit WR. In TM Graber et al., eds., Orthodontics: Current Principles and Techniques, 4th ed., St. Louis: Elsevier Mosby, 2005
12. Samir E. Bishara. Textbook of Orthodontics. Saunders 978-0721682891, 2002
13. T. M. Graber, R.L. Vanarsdall, Orthodontics, Current Principles and Techniques, "Diagnosis and Treatment Planning in Orthodontics", D. M. Sarver, W.R. Proffit, J. L. Ackerman, Mosby, 2000
14. Thomas M. Graber, Katherine W. L. Vig, Robert L. Vanarsdall Jr. Orthodontics: Current Principles and Techniques. Mosby 9780323026215, 2005
15. William R. Proffit, Raymond P. White, David M. Sarver. Contemporary treatment of dentofacial deformity. Mosby 978-0323016971, 2002
16. William R. Proffit, Henry W. Fields, and David M. Sarver. Contemporary Orthodontics. Mosby 978-0323040464, 2006
17. Yoshiaki S. Lecture/class notes. Associate Professor and chairman, Dept. of Orthodontics, School of dental science, Hokkaido University, Japan.
18. Zakir H. Lecture/class notes. Professor and chairman, Dept. of Orthodontics, Dhaka Dental College and hospital.

Dedicated To

My Mom, Zubaida Shaheen

My Dad, Md. Islam

&

My Only Son

Mohammad Sharjil

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