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REMOVABLE ORTHODONTIC APPLIANCES

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Abstract

Removable orthodontic appliances are devices used in the field of orthodontics to correct a variety of dental and skeletal malocclusions. Removable appliances are commonly used for patients with mild to moderate alignment issues, providing a less intrusive treatment option compared to traditional fixed braces. These appliances include retainers, clear aligners (e.g., Invisalign), active plates, functional appliances, and space maintainers, each serving a specific role in treating misalignment, maintaining post-treatment tooth positioning, or guiding jaw development.The effectiveness of removable appliances is contingent on patient compliance, as they must be worn for prescribed durations to achieve the desired outcomes.This articles gives a brief overview of the design , usage and different types of removable orthodontic appliances . The article discusses about the basis of classification of removable orthodontic appliances and gives an overview about the removable orthodontic appliances to the reader.

INTRODUCTION

An orthodontic appliance is 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" .The term removable appliance is used to indicate 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.1Orthodontic appliances are devices used to correct malocclusion, misaligned teeth, and other dental irregularities. Removable orthodontic appliances are particularly significant due to their flexibility and ease of use.Orthodontic treatment through the use of removable appliances constitutes a very large part of the needs of orthodontic management of any community today and removable orthodontic appliances, their design, construction and use must be based on the clearest, most unequivocal and comprehensible principles rather than on inspired ingenuity and inborn mechanical instinct2 This article explores the types, indications, advantages, and limitations of removable orthodontic appliances, along with their care and maintenance. 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 4 modifying muscle forces to the teeth and their supporting tissues. Example as: Andersen appliances Frankel functional regulators 3. Mechanical appliances: These appliances carry some active components which are activated to exert active forces[1]

DESIGN OF REMOVABLE ORTHODONTIC APPLIANCES

The components of removable appliances consist of the energy or pressure source, the clasping system and the baseplate or framework of the appliance. The pressure source may be a metal spring or an elastic band or, alternatively, the elasticity of the periodontal structures may be used to store the energy produced by the movement of the teeth by a rigid screw. The clasping or appliance-retaining system secures the appliance to the dental arch. The baseplate is the framework of the appliance which supports the pressure system and distributes the reaction of the pressure to the anchorage. Clasped removable appliances may also have additional attachments to make use of anchorage from the head and neck through the use of headcaps or collars.

Orthodontic Springs

Orthodontic springs on removable appliances today are almost universally made of 18/8 stainless steel or nickel/chrome wire. Before the introduction of stainless steel wires for

Fig No. 1: Finger spring and Z spring

orthodontic purposes, platinized gold wires were used but this material had rather a small elastic limit so that the range of action of the springs made from it was fairly short. Stainless steel is more elastic and this makes possible the construction of springs with an adequately long range of action. The amount of pressure exerted on a tooth has to be considered as the pressure being applied per unit of root area.

Springs

- Single cantilever spring (finger spring)
- Double cantilever spring (Zspring)
- Tspring
- Coffin spring
- Soldered auxiliary spring3

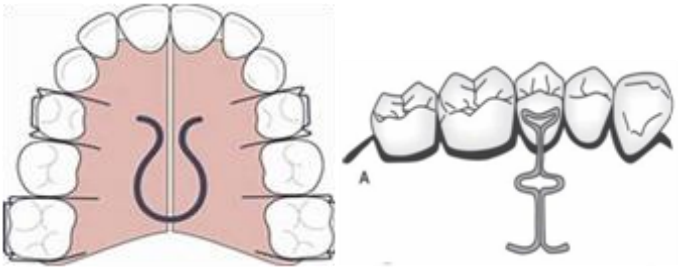

Fig No. 2 : Coffin spring and T spring

Bows

Bows may be active or passive and will usually span a number of teeth. Both ends of the bow are incorporated in the acrylic. Active bows are used for incisor retraction. The bow selected will depend partly on the preference of the operator and partly on the amount of retraction required

Some of bows used are:

Roberts' retractor

High labial bow with apron spring

Labial bow with U loops

Extended labial bows4

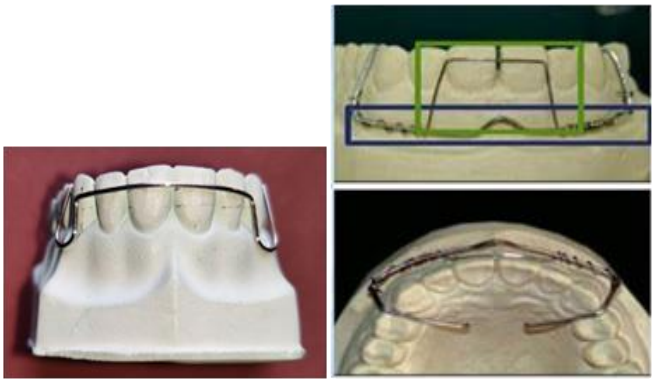

Fig No.3: Short labial bow and High labial bow

Elastics

Elastic bands have for many years been used to store energy in orthodontic appliances. Elastics have a considerable range of action and produce a very suitable degree of force application to a tooth or to teeth due to the ease with which they are applied, and the fact that the patient can renew the elastics at regular intervals and thereby maintain an even degree of pressure on the tooth or teeth that are being moved.3

Clasps

Clasps are wire components that aid in retention of a removable appliance. These are the retentive components that aid in keeping the appliance in place and resist displacement of the appliance. An ideal clasp should :-

- Offer adequate retention
- Permit usage in both fully and partially erupted teeth
- Be passive
- Be easy to fabricate
- Not impinge on the soft tissue
- Not interfere with normal occlusion

Different clasps are :

1. C' clasp- It is also known as three-quarter clasp (3/4 clasp) or Circumferential clasp. They are very simple clasp and engage bucco-cervical undercut.
2. Jackson's clasp- It is also known as Full clasp or 'U' clasp. It was introduced by V H Jackson in 1906.This clasp makes use of bucco-cervical undercut and also the mesial and distal proximal undercuts.
3. Arrowhead clasp -This clasp was introduced by A M Schwarz in 1956. This clasp makes use of mesial and distal undercuts. This clasp is made using half round or round stainless steel wire of 0.7 mm diameter. This clasp is made by use of a special plier called 'Tischler's plier'.
4. Adam's clasp- It is also known as Universal clasp or Modified arrowhead clasp or Liverpool clasp. This clasp was devised by C P Adam in 1948. This clasp makes use of mesial and distal undercuts. This is the most effective and most widely used orthodontic clasp today. This clasp is constructed using 0.7 mm hard round stainless steel wire. Modifications of Adam's clasp are: Adam's clasp with single arrowhead, Adam's clasp with J hook, Adam's clasp with incorporated helix , Adam's clasp with additional arrowhead, Adam's clasp with soldered buccal tube , Adam's clasp with distal extension and Adam's clasp on incisors and premolars.
5. Delta clasp -This clasp was designed by William J. Clark. This clasp is similar to Adam's clasp in principle. It engages interdental undercuts. Adjustment: -hold retentive loop and twist inwards. -bending towards interdental undercut as it emerges from acrylic.
6. Southend clasp- . It provides retention in the anterior region. The wire is adapted along the cervical margin of both the central incisors. The distal end of the wire crosses over the occlusal embrasures and end as retentive arms on the palatal side.
7. Triangular clasp -It has a small triangular shape that engages the proximal undercut of two adjacent teeth. It provides excellent retention. It doesn't cause irritation of gingiva. It is used when additional retention is required.
8. Ball-end clasp- This clasp is also known as Scheau anchor clasp. This clasp has a ball at the end which engages the proximal undercut between two adjacent teeth (interdental area). Preformed wires having a ball at the end are used for making this clasp. The ball can also be made using silver solder. This clasp is used whenever additional retention is required.
9. Double ball-end clasp- This clasp includes a stem embedded into and extending from the acrylic portion of the appliance. Two ball clasps extend from the stem and are laterally spaced apart from one another. Each ball clasp has an elongated flexible member and an enlarged exposed end. A bridge segment extends laterally between the flexible members of the first and second ball clasps. This clasp does not exert any wedging force in the interdental embrasure like the single ball clasp. This clasp provides better retention.
10. Schwarz clasp- It is said to be predecessor of Adam's clasp. This clasp has a number of arrowheads that engage the inter-proximal undercuts of posterior teeth.
11. Crozat clasp - This clasp was suggested by Crozat in 1920. It is modification of Jackson's clasp. An additional piece of wire is soldered to the Jackson's clasp which engages into the mesial and distal proximal undercuts. Thus, it provides better retention than the Full clasp.
12. Duyzing clasp - This clasp has two wires emerging from the plate that cross the occlusion over the anteriorand posterior contact point of the tooth clasped. This clasp is used to engage the buccal undercuts of molars.If the situation demands, only half of the clasp can also be made.
13. Eyelet clasp -This clasp can be constructed as a single eyelet or continuous eyelet clasp. An eyelet is made using a Young loop forming plier. Eyelets are placed in the embrasure. Three to four eyelets can be made depending upon the retention requirement
14. Plint clasp - Plint clasp is also known as 'Fly Over Clasp'. Plint clasp are useful when using a removable appliance in combination with a fixed appliance. These clasps are constructed using 0.7 mm stainless steel wire. This clasp is used to engage under the tube assembly on a molar band.

15. Visick clasp- This clasp was given by H C Visick. This clasp is used on palatal side for active retention accompanying the base plate and molar clasp on buccal side. It is made using 0.7 mm stainless steel wire. Retention is increased with this clasp because both the buccal and palatal surfaces are engaged5

BASEPLATE

The acrylic baseplate constitutes the body of the removable appliance. It has three functions: it provides a foundation, which supports other components such as springs and clasps; it contributes to anchorage through its contact with the palatal vault and teeth that are not being moved; and it may be built up into bite planes to disengage the occlusion or produce overbite reduction.4

CLASSIFICATIONS

Removable orthodontic appliances are categorized based on their function, mode of action. Here's a detailed classification:

1. Based on Function

A. Passive Appliances

These are used primarily for retention or maintaining the position of teeth after orthodontic treatment.

- **Examples**:
  - Hawley retainer

B. Active Appliances

These apply forces to move teeth or modify jaw growth

Mechanical appliances

- Expansion screws
- Activators

Functional appliances

These modify the position or growth of the jaws using muscle forces.

- Examples:
  - Twin Block
  - Bionator
  - Frankel appliance

2. Based on Mode of Action

A. Tooth-borne Appliances

These rely on dental support for their action.

- **Examples**:
  - Hawley appliance
  - Expansion plates

B. Tissue-borne Appliances

These utilize oral soft tissues for their function.

- **Examples**:
  - Frankel appliance

C. Hybrid Appliances

These combine both dental and tissue support.

HAWLEYS RETAINER

'U'loop labial bow retainer (Hawley) The appliance generally has Adams' clasps on the upper first molars and a 'U' loop labial bow lying against the incisors . The acrylic contacts the palatal surface of the teeth all the way around the arch. When fitting this type of retainer it is important that the labial bow contacts the incisors - especially any aspect of an incisor that may have been displaced at the start of the treatment. The acrylic should be in contact with the incisors unless an attempt is being made to achieve slight over-correction of a pre-existing rotation. In such a case, the acrylic may need to be trimmed adjacent to the most displaced part of a tooth.

Hawleys can be delivered with anterior and posterior bite plane. Anterior bite planes should be horizontal transversely and anteroposteriorly, so that when the appliance is in place the premolars are separated by 2 or 3 mm. Ideally the bite plane should be flat but if the lower incisors are irregular it may be necessary to adjust it to contact at least three of them. As overbite reduction occurs the bite plane can be built up and levelled with the addition of cold-cured acrylic.

Posterior bite planes can be used to eliminate a lateral or anterior displacement of the mandible. Posterior bite planes will assist in the correction of a buccal crossbite or an anterior crossbite by preventing interference by the opposing teeth and allowing the mandible to adopt a centric position

CONVERTED APPLIANCE

The final removable appliance used during treatment can sometimes be converted into a retainer by deactivating any springs and adding cold-cured acrylic to make them passive and to lock any screws into position. The appliance can then be worn full time for 2-3 months before if necessary, being worn only at night for a further 6 months. This type of retention might follow, for example, the correction of a lingual crossbite in the mixed dentition, which is frequently carried out with an upper removable appliance using springs or screws. If molar capping has been used it should be removed before the appliance is converted to a retainer. If the corrected incisor has an overbite of 2 mm or more the prognosis for stability is good.

BEGG RETAINER

This retainer, which was devised for the Begg technique, avoids the need for a molar clasp by using a continuous bow with adjustment loops which emerges distal to the upper molars (Figure 11.3). This appliance has the advantage that the absence of the molar clasps permits better settling of the occlusion but, for the same reason, good appliance retention may be difficult to achieve.

THE ACTIVATOR

Andresen stated that orofacial musculature has a major role in teeth positioning, using this forces, one can move the teeth by creating a new reflex in the orofacial musculature. The activator, designed by Andresen and Haupl, was fabricated to advance the mandible by several millimetres for correction of class II malocclusion. The appliance was loosely fitted so that the patient could hold the appliance in position actively (by muscle activity or by functioning).

It looked similar, to the monobloc constructed by Pierre Robin. The original activator by Andresen was tooth borne passive appliance, consisting of large acrylic splint covering palate and teeth in both the arches. The acrylic guides the eruption of mandibular teeth mesially whereas maxillary teeth are directed distally.2 Frankel and many other authors modified the functional appliance systems after Andresen described his system. But it can be true to say that the Andresen appliance i.e. the activator remains one of the most widely used of the functional appliances in various countries

Bimler appliance (Bite former, Bimler stimulator) (1949) This appliance was designed by H.P. Bimler. There are three kinds of

Bimler appliance:3 1. Type A – For treating Class II Division-1 Malocclusion 2. Type B -Class II Division-2 Malocclusion 3. Type C - Class III Malocclusion.

Bionator (1950) Bionator also known as 'skeletonized activator' is an activator-derived appliance developed by Professor Wilhelm Balter.

The kinetor (1951) It was designed by Dr. Hugo Stockfish in 1951. It is a type of elastic activator. It was combination of functional principles with active operation of various screws and springs added to the appliance

Herren Shaye activator (1953) According to Herren mandible with activator during sleep will not maintain its position. The incisors will detach from the maxillary part when the mandible is lowered, this will lessen the effectiveness of the appliance. To maintain correct mandibular posture during sleep the following modification were done: 1. The mandible is advanced forward 3-4 mm beyond the neutral relationship by compensating the sagittal positioning in construction bite. 2. Jackson clasp, Duyzing clasp or Triangular arrowhead clasp are used for retention of the appliance on maxillary dentition. 3. To hold the appliance in position during sleep long lingual flanges were constructed

Activator of Shaye (1953) It is a modification of Herren activator by R Shaye. LSU activators causes sagittal repositioning of the mandible to a significant degree

Bow activator of AM Schwarz (1956) The bow activator consist of maxillary and mandibular portion connected by an elastic bow.

Elastic open activator (1960) This appliance was designed by G. Klammt. Acrylic bulk is reduced and is replaced by wire.

Karwetzky modification (1964): This appliance is similar to bow activator. It consists of upper and lower active plates joined in the first molar region by 'U' bow. U bow has one short leg and one long leg, depending on which arch to be moved both the legs are embedded accordingly

Nocturnal airway patency appliance (1987)

Lehman activator:(1988) It is a combination activator-headgear appliance. The design comprises of a maxillary acrylic plate to which rigid outer bows are attached and a mandibular lingual shield. It also comprises of two expansion screws (one anterior and one posterior) by which selective expansion is possible.

Modified Teucher Activator (2006) It is modification of Teuscher activator designed mainly to control upper incisor inclination. Headgear tube is present in the premolar region for the use of high pull headgear.6

STANDARD TWIN BLOCK APPLIANCE

On 7 September 1977, DR Williams J Clark developed the Twin block [5,6] appliance . The twin blocks were a natural progression in the evolution of functional appliance therapy, representing a significant transition from one piece appliance that restricts the normal function to a twin appliance that promotes normal function. The goal of twin block therapy was to produce a technique that could maximize the growth response to functional mandibular protrusion by using an appliance system that is simple, comfortable and aesthetically acceptable to the patients.4 The basic philosophy behind the twin block therapy was one, that the occlusal inclined planes were the fundamental functional mechanism for the natural dentition. If the mandible inclined planes are in a distal relation to that of maxilla then the force acting on the mandibular teeth will have a distal force vector leading to a class II growth tendency. The aim of the inclined planes of the bite blocks in the twin block is to modify these inclined planes and cause more favourable growth pattern. Hence the unfavourable cuspal contacts of the distal occlusion are replaced by favourable proprioceptive contacts on the inclined planes to correct the malocclusion. Secondly, it could be worn 24 hours, hence the masticatory forces can be transmitted via the appliance to the dentition from where they are transmitted to the bony trabaculae according to wolfs law, influencing the rate of growth and the trabaculae structure of the supporting bone. Keeping these principles in mind Clarks came up with what was called as 2,3 the standard twin block appliance and had the following components- I. Occlusal bite blocks meeting at 70° II. Delta Clasps on upper molars and premolars. III. Ball end on lower incisors. IV. Labial bow to retract the upper incisors. V. Upper and lower base plate

Fig. No.4: Twin Block appliance

VARIOUS MODIFICATIONS OF THE TWIN BLOCK APPLIANCE

A) Twin block for transverse developmentIt is nothing but a combination of Schwarz appliance and twin block. Screws are incorporated in the upper and lower twin blocks to develop the arch form during the mixed dentition.

B) Twin block for sagittal development Twin block sagittal appliance: such a type of twin block in which the anteroposterior arch development is achieved by two screws which are aligned anteroposteriorly in the palate. This is usually needed when upper and lower incisors are retroclined with a deep overbite

C) Twin block for transverse and sagittal appliance- patients who require both sagittal and transverse development of the arches, a three way screw can be used in the anterior part of the palate.

D) Twin block Crozat appliances suitable in adult treatment with minimum palatal and lingual coverage. Disadvantage of this type of appliance is that it requires careful adjustment to maintain symmetry

E) E) Magnetic Twin block appliance In twin block therapy magnets can be added to increase the occlusal contacts on the bite blocks so as to maximize the functional forces in order to correct the malocclusion

F) Twin Block with a Spinner : In patients needing twin block therapy who have a tongue thrust habit a spinner can be added to control tongue thrust

G) Fixed Twin Block It is essentially used in cases where patient is not motivated enough to wear the twin block twenty four hours i.e. a non cooperative patient.

H) Reverse twin block This is another modification given in case of class III malocclusion, for the correction of maxillary retrusion

I) Twin block hybrid applianceThis modification is done

to increase the forward movement of the incisors by adding upper lip pads (which are originally used in the frankels appliance) attached to the upper anterior segment of the twin block.7

BIONATOR

Balters developed the original appliance in the early 1950s. It is the prototype of a less bulky appliance. Its lower portion is narrow; upper part has only lateral extensions, with a crosspalatal stabilizing bar. The palate is free for proprioceptive contact with tongue and the buccinator wire loops hold away the potentially deforming muscular action

According to Balters, the equilibrium between tongue and circumoral muscles is responsible for the shape of dental arches and intercuspation. The functional space for tongue is essential for normal development of orofacial system. Adiscoordination of its functions can lead to abnormal growth and actual deformation. Bionator establishes good coordination and eliminates these deforming and growth restricting aberrations. The principle of treatment with bionator is not to activate the muscles but to modulate muscle activity, thereby enhancing normal development of inherent growth pattern and eliminating abnormal and potentially deforming environmental factors. The bite cannot be opened and must be positioned in an edge to edge relationship. Balters reasoned that a high construction bite could impair tongue function and the patient can actually acquire a tongue thrust habit as the mandible dropped open and the tongue instinctively moved forward to maintain an open airway

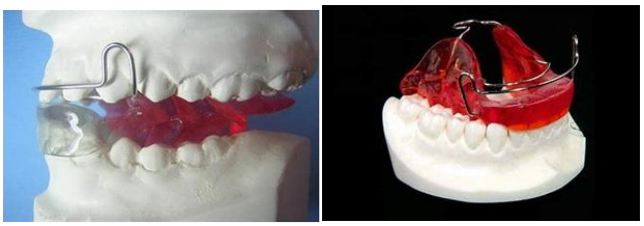

Fig. No. 5: Bionator applinace

Skeletal Effects of Bionator

Bionator appliance therapy improved maxillomandibular relationship in class II patients as it increases mandibular length and has slight restrictive effect on anteroposterior dimension of the maxilla

Freeman et al. reported that use of bionator and high pull facebow combination followed by fixed appliance therapy in patients with hyperdivergent facial patterns resulted in increase in mandibular plane angle and larger inclination of Frankfort horizontal plane to occlusal plane in treated group than controls. Bionator, when used during pubertal growth spurt, results in elongation of mandible, increase in mandibular ramus height, and significantly more backward direction of condylar growth.

Dental Effects of Bionator

Bionator appliance corrects molar relationship and overjet of class II patients mostly by dentoalveolar changes. Bionator treatment resulted in reduced overjet, labial tipping of lowerincisors, and lingual inclination of upper incisors. Class II molar relation is corrected by mesial movement of mandibular molars and distal movement of maxillary molars.

Almeida, Henriques, and Ursi concluded that bionator results in labial tipping and linear protrusion of the lower incisors and a lingual inclination and retrusion of the upper incisors, significant increase in mandibular posterior dentoalveolar height. Bionator produced proclination of lower incisors and insignificant increase in inclination of upper incisors.

FRANKEL APPLIANCE

The functional regulator (FR) is designed to be an exercise device. Frankel believes that a poor postural behaviour of the orofacial musculature is the primary etiologic factor in Class II malocclusions. He believes that the correction of a Class II malocclusion is achieved by permanently advancing the position of the mandible through muscular exercise.

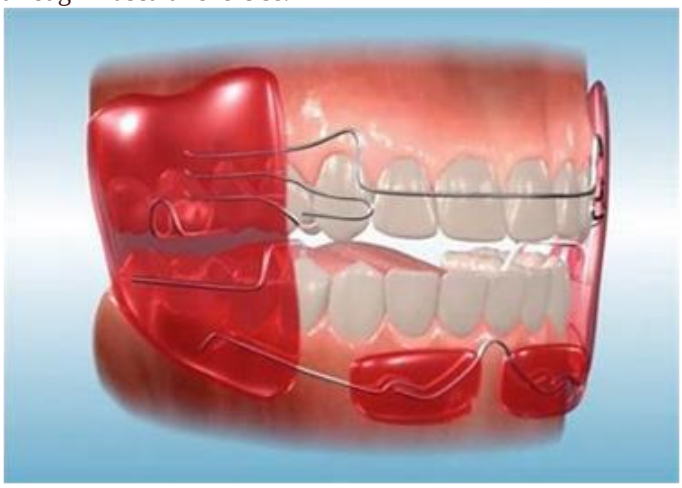

Fig. No.6: The functional regulator

Frankel Philosophy

1.Vestibular area of operation 2. Sagittal correction via tooth borne maxillary anchorage 3. Differential eruption guidance 4. Minimal maxillary basal effect 5. Periosteal pull by buccal shields and lip pad

Effects Of Functional Regulator

- Increase in transverse and sagittal direction.
- Increase in vertical direction.
- Muscle adaptation.
- Mandibular forward positioning.

Types of Frankel Appliance

- FR I -Class I and Class II div 1 malocclusion
- FR Ia- Class I with deep bite, Class I with minor to moderate crowding.
- FR Ib- Class II div 1- Overjet 7mm
- FR II - Class II div 1 and div 2
- FR III- Class III
- FR IV- Open bite
- FR V - Vertical maxillary excess+ high mandibular plane angle in long face patients (along with headgear)
- In the growing phase, FR II appliance of Frankel is an effective method in achieving the following:
- Initial correction of anteroposterior maxilla-mandibular relationship,
- Increase in LAFH without altering the facial growth pattern
- Pronounced vertical development of mandibular molars,
- Reduction in the overjet and overbite and
- An improvement in the molar relationship
- Retroclination of maxillary incisors, and proclination of mandibular incisors.[9]

ORAL SCREEN

The oral screen is a simple and versatile myofunctional appliance

used in early interceptive treatment of dental arch deformities. It was first introduced by Newell in 1912. Oral screen was routinely used in England before Second World War. Kraus inventeddouble oral screen and first differentiates the difference between oral screen and vestibular screen. Later oral screen has been advocated by Hotz , Nord and Fingeroth. Designed to produce its effect by redirecting the pressures of the muscular curtain of the cheeks and the lips.[1]

Indications Correction of thumb sucking, lip biting and tongue thrusting [2]. For correction of mouth breathing when the airways are open. 3. Mild disto-occlusions with premaxillary protrusion and open bite in the deciduous and mixed dentitions. 4. Flaccid, hypotonic orofacial musculature.

The lips exert pressure through the plastic shield against the anterior part of the dentition and the bony support. Since the buccal portion of the oral screen is away from the posterior teeth by 2 –3 mm, the tongue's active function moulds the posterior segments and helps to expand the narrow dental arch. Thus the anterior segment is influenced directly and the posterior segment indirectly by keeping away cheek pressure.

Fig. No. 7; Oral Screen

MODIFICATIONS –

A thick wire ring can be incorporated while acrylizing the oral screen on the labial side to aid in carrying out the muscle exercises (Hotz)

In patients with mouth breathing habit, breathing holes are incorporated to psychologically satisfy the patient

In cases of tongue thrusting habit, Kraus recommends a smaller lingual acrylic screen attached to the oral screen, called the 'Double oral screen'.

It includes an acrylic projection or a wire extending onto the lingual aspect to keep the tongue away.[11]

CATALAN'S APPLIANCE

Was introduced by Catalan in 1808. Used in cases of developing anterior crossbite.It is angulated at 45 degrees. It can be used to retract labially malposed lower incisors and in cases where the bite is not too deep. It has the characteristic of opening the bite by allowing the supra-eruption of the posterior teeth. It can be made of acrylic or cast metal when it is to be cemented.

It should never be kept for more than 6 weeks. It is contra indicated if there is an end to end overbite relationship or an open bite tendency. The state of development of the root apices must also be determined before placing the appliance, because early placement of the appliance may cause for shortening of the roots.[11]

Fig. No. 8: Catalan appliance

UPPER ARCH EXPANSIONAPPLIANCE (SCREW)

Lateral arch expansion is indicated only in well defined circumstances. It is not a suitable procedure for the relief of crowding and if the upper incisors are crowded; space must be made by retraction of the canines. The principal indication for upper arch expansion is the existence of a unilateral crossbite associated with a lateral displacement of the mandible when the patient closes from rest to occlusion. Such crossbites should be treated early (in the mixed dentition) to eliminate the displacement and to allow the occlusion to develop with the mandible in a centric relationship. Occlusions of this type are basically symmetrical and the apparent asymmetry is produced by the mandibular displacement, which is due to occlusal interference. Symmetrical expansion of the upper arch is required. The presence of a unilateral crossbite with no mandibular displacement suggests a true asymmetry, either of the maxillary or the mandibular arch (or both). Examination of the arch form and the face may indicate whether this is alveolar or skeletal in origin. In either case the lack of displacement indicates that there is no underlying functional disharmony. Such an occlusion may sometimes be accepted but if treatment is to be undertaken it will be complex and is likely to involve fixed appliances. A bilateral cross bite usually reflects an underlying dental base discrepancy, but there is rarely an associated mandibular displacement and so treatment to correct the crossbite is not mandatory. Indeed, correction of a bilateral cross bite is rarely stable and relapse is common. For these reasons, correction of a bilateral crossbite with removable appliances should not be attempted. In a few cases, the orthodontic specialist may correct a bilateral crossbite by rapid expansion to separate the mid-palatal suture. Even this treatment is prone to relapse. • An appliance for lateral expansion Active component A screw (or a coffin spring) is used. Good retention is essential and for that first molars and premolars should be clasped. If the latter teeth have not erupted, deciduous teeth may be clasped, but retention will be less good. Baseplate The baseplate is split in the mid-line to allow for the expansion. Posterior bite planes are required for the following reasons:

- To eliminate the occlusal interference and thus the displacement
- To avoid secondary expansion of the lower arch by occlusal forces

An appliance for lateral expansion Active component A screw (or a coffin spring) is used. Retention Good retention is essential. 6/6 and 4/4 should be clasped. If the latter teeth have not erupted, D ID or CIC may be clasped, but retention will be less

good. Baseplate The baseplate is split in the mid-line to allow for the expansion. Posterior biteplanes are required for the following reasons: • to eliminate the occlusal interference and thus the displacement • to avoid secondary expansion of the lower arch by occlusal forcesto help seat the appliance particularly after activation.[12]

ADVANTAGES AND DISADVANTAGES OF REMOVABLE APPLIANCES

Advantages of removable appliances

• They are removable and therefore easier to clean

• They can provide increased vertical and horizontal anchorage due to palatal coverage

• They can produce efficient over-bite reduction in a growing child

• They can transmit forces to blocks of teeth

Disadvantages of removable appliances

- The appliances can be left out
- Only tilting movements are possible
- They affect speech
- A technician's input is required to make the appliances
- Intermaxillary traction is more difficult
- They are inefficient for multiple tooth movements
- Lower removable appliances are more difficult to tolerate[13]

CONCLUSION

Removable orthodontic appliances are appliance of choice for many youngster and definitely adult patients. Less compliant patients are more prone to wear such hidden appliances.The appliance is prone to technique of fabrication and has to be made carefully. Moreover, the finger springs of these appliances are more effective than devices of complicated design and provided with screws. Cost wise, the appliance is the best choice for patients. Another advantage is represented by less oral hygiene complications. Finally, the device is simple to adjust for the orthodontist, and the easy management of the appliance by the patient ranks it as a very dependable treatment option in orthodontics.

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