

Space Regainer in Pediatric Dentistry

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INTRODUCTION

The transition from mixed dentition to a permanent one is seldom accurate, the hurdles being space loss, tooth size arch length discrepancy, early exfoliation of primary teeth, or premature eruption of permanent teeth. When the usual sequence of eruption of permanent teeth does not occur, it must warn the clinician of monitoring the arches and intervening with extractions, space maintainers or space regainers. This article highlights the various types of space regainers used in pediatric dentistry.

Types of space regainers

Fixed space regainers

- a) Pendulum appliance
- b) Herbst space regainer
- c) Lip bumper
- d) Hotz lingual arch
- e) Sectional arch technique
- f) Anterior space regainer
- g) Gerber space regainer

Removable space regainers

- a) Jack screw space regainer
- b) Split saddle /split block space regainer
- c) Sling shot space regainer
- d) Free end loop space regainer

1. Fixed space regainer

a) Pendulum appliance

Pendulum appliance is used mainly to regain space in case of mesial drift of upper first molar due to early loss of primary molars.



Construction - steps

1. Pendulum appliance uses palate as anchorage unit to distalise first molars.
2. It consists of acrylic plate retained by clasps to first premolars.
3. Distal arm or springs are constructed using 0.6mm stainless steel.
4. It consists of closed helix and U loop.
5. Closed helix is for activation of distalisation arms.
6. It is activated extra orally. Generates a force of 250 g per side.

Indication of pendulum appliance

- First phase of orthodontic treatment for unilateral or bilateral distalisation of 1st molar for correction of class II molar relationship.
- Space regaining in case of mesial drift of upper 1st molar due to early loss of primary molars .
- Non – extraction treatment of mild to moderate crowding.

b) Herbst space regainer

It is a reciprocal active space regainer that

is used in the mandibular arch after the eruption of first premolar into the oral cavity. It is also known as Open coil space regainer



3. It is used to relieve the lip pressure
4. This pressure can be used to distalise molars by:
5. Incorporating loops in the arch wire just before it enters buccal tube.
6. Utilising coil spring.

b) Hotz lingual arch type regainer

A distal movement of permanent first molar is achieved by means of wire spring attached to lingual arch. Also an addition of a loop in the arch that is gradually opened to gain space. Anchorage is necessary for exerting force to move the first molar distally



Construction - steps

1. A molar band is fitted to the first permanent molar.
2. Molar tubes are soldered or spot welded in horizontal position both buccally and lingually to the band.
3. An alginate impression is made
4. stainless steel wire slightly smaller than the tube size is selected and bent into a 'U' shape. Base of the U should contain a reverse bend to contact the distal surface of first premolar.
5. The wire comes out of the tube towards the premolar at a point below the greatest convexity of the first premolar.
6. A spaced coil spring is selected and is cut about 2 to 3mm longer than the anterior stop to the molar tube. The band is cemented with the coil springs compressed.

c) Sectional arch technique

Sectional arch technique can be used to regain lost arch length. By this technique, a space of upto 4 mm can be regained effectively. It can be used in cases where second molar is erupted.

d) Anterior space regainer

It is a technique using anterior space regainer by direct bonding. A labial tube is attached to the lateral incisor. 0.014 inch wire was inserted in open coil spring and activated

a) Lip bumper

1. It is used where bilateral movements are desired.
2. It consists of heavy labial arch wire over which an acrylic flange is prepared in anterior region such that it does not contact lower anterior.



g) Gerber space regainer

- This type of appliance may be fabricated directly in the mouth.
- It requires no laboratory work.
- In this a U shaped assembly is used into which the U shaped wire can be fitted.

- It is soldered onto the mesial aspect of the band .
- The coiled spring is fitted onto U shaped wire which is fitted into u assembly. It is cemented to the teeth.



2. Removable space regainers

A. Screw type of space regainers

An expansion screw is embedded in resin base of removal appliance by expanding the screw , the distal movement of the first permanent molar is achieved. The expansion of screw is done by the patient once a week. The permanent first molar can be distalised by maximum opening width of screw

B. Spring type space regainer

In this appliance, springs are incorporated to produce the movement. This is used to produce distal movement of first permanent molar. The movement is achieved by the force produced by the spring using 0.7 mm wire

Jackscrew space regainer

- Jackscrew regainer is used to recover the loss of space caused by tooth drift into an edentulous area.
- This appliance produces rapid results.
- It is activated regularly to exert a consistent force against banded teeth.
- Bilateral version of this appliance consists of coiled loaded lingual arch that passes through tubes soldered lingually molar bands.
- The cast is poured after transferring the on



the impressions made.

- A 0.036 inch buccal tube is soldered or welded to the molar band.
- The tube should be centered in the middle one-third of the band and aligned with the other banded abutment teeth.
- A jackscrew unit consists of one adjustment nut and one lock nut on a threaded shaft.
- The mesial end of the shaft is trimmed and contoured to band surface.
- It is then soldered to the band.
- End of the shaft should be trimmed so that it extends 2mm from the distal end of the tube. It is then cemented into the patient mouth.

b) Split saddle type space regainer

- It is also known as split block space regainer.
- This appliance is commonly used in lower arch.
- A distal movement of first permanent molar can be achieved by this appliance.
- It is activated by flattening the bent portion of wire connecting the split saddles of acrylic base plate.
- The distal movement is limited to 1 to 2 mm.

C) Sling shot type space regainer

- From distal end of this appliance , hooks are attached on the buccal and lingual sides of first permanent molar which needs to be move distally.
- An elastic band is stretched between the hooks and force from elastic band produces distal movement of first permanent molar.
- The distal movement is limited to 1 to 2 mm.

Sling shot space regainer

- It is called sling shot appliance since distalising force is produced by elastic stretched on middle of lingual surface of the



- molar to be moved.
- It consists of wire elastic holder with hooks instead of wire spring .
- It transmits force against the molar to be distalised.
- The other is arranged in same position on buccal surface of molar.
- The elastic can be changed once each day.

Other methods of gaining space

- Proximal stripping
- Expansion
- Extraction
- Distalization
- Derotation of posteriors
- Uprighting of molars
- Proclination of anteriors

Proximal stripping

- Proximal stripping is also known as slenderisation , disking , proximal slicing.

Indications

- indicated only when space required is minimum.
- In cases where extraction can be avoided.
- It can be done in lower anterior as an aid in retention.

Contraindications

- It cannot be done in very young patients due to risk of pulpal exposure.
- Patients with high caries index,

Patient with sensitivity

Procedure

- It is done in the following ways :
- Use of metallic abrasive strips.
- Safe sided carborandum discs.
- Long thin tapered fissure burs.

After proximal stripping fluoride application is done to prevent caries Not more than 50 % of teeth should be sliced. Morphology of the tooth should not be altered.

Uprighting of molars

- Premature loss of deciduous 2nd molar or extraction of 2nd premolar can cause mesial tipping of 1st permanent molar.

- Mesilly tipped molar occupies more space than upright molar.
- Uprighting can be done using uprighting springs or some space regainers. By uprighting molars some amount of space can be regained

Derotation of posterior teeth

- Rotated posteriors occupies more space than normally placed molars.
- Derotation of teeth can result in some amount of space.
- Derotation of teeth is best achieved by fixed appliance with springs or elastics.

Proclination of anteriors

- Proclination of retruded teeth results in regaining space.
- It is indicated where teeth are retroclined.
- In cases where proclination will not affect the soft tissue profile.

Distalisation

- Distalisation is aimed at moving the molars indistal direction to gain space.
- Ideal time for distalisation is before eruption of permanent 2nd molar.

Methods of distalization

- Extra oral method
- Intra oral method

oral method

- Headgears deriving anchorage from cervical or cranial region can be used to distalise the tooth.
- It consists of face bow with inner and outer bow.
- Outer bow is attached to headcap or neck strap.
- Inner bow is connected to buccal tubes placed on molars

Intra oral method

•Using intra oral magnets

- Intra oral repelling magnets are used to distalise the tooth.
- The magnets are placed one on the molar tooth an other on anterior tooth.
- Anterior anchorage can reinforced using

Nance holding arch.

Extraction

- One of the common method of gaining space is extraction.
- Extraction of 1 premolar from a quadrant provides sufficient space.
- It is uncommon to extract molars or incisors

Expansion

- It is a non invasive method of gaining space.
- It can be skeletal or dento – alveolar.
- Skeletal expansion involves splitting of mid palatal suture.
- Dental expansion produces no skeletal change.
- It is brought about by various appliance like jackscrew, or use of springs.

Rapid maxillary expansion

- It is a skeletal type of expansion .
- It involves split of mid palatal suture.
- It can be given upto 16 years in girls and upto 18 years in boys.
- Types of appliances :
- Removable appliances.
- Fixed appliances

•Removable appliance

- It consists of split acrylic plate with midline screw.
- It is retained by clasps on posterior teeth.

Fixed appliances

These are fixed to teeth and are more reliable to produce expansion.

The appliances used are :

Hass type

Issacson type

Hyrax type

Derichsweiler type.

Slow expansion

- Appliances used for slow expansion are :
- Jackscrews
- Coffin spring
- Quad helix.

CONCLUSION

Thus regaining of space is important in case of premature loss of deciduous teeth .After regaining the space, it is even more important to maintain the regained space .The regained space can be maintained by the use of space maintainers.

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