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Original Research

Anchorage in Orthodontics

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ABSTRACT:
During orthodontic treatment, the teeth are exposed to variousforces and moments. However, these forces further induce complimentaryforces. To avoid unwanted tooth movements, these opposing forces must be effectively diverted. Clinicians throughout the times have made an effort to find alternative biomechanical resultsto control anchorage. This article focuses on anchorage and gives in-depth knowledge about its various aspects including definition, sources, classification, and other basics of anchorage.
Keywords: orthodontic treatment, forces, complimentary forces, biomechanical solutions, anchorage.

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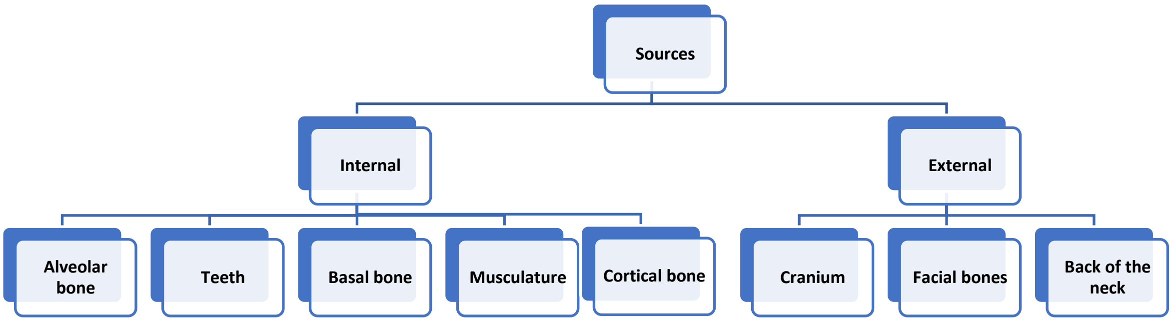
INTRODUCTION
In orthodontics, Anchorage is a delicate conception and delicate to maintain. To simplify the anchorage concept this can be considered analogous to bending one larger tooth against another smaller tooth, or against two smaller teeth.
Every orthodontic appliance consists of two rudimentsan active component and a resistance component. The active corridor of the orthodontic appliance is concerned with tooth movements. The resistance units give resistance (anchorage) that makes tooth movements possible.Initially, in 1923, **Louis Ottofy** defined anchorage as “the base against which orthodontic force or reaction of orthodontic force is applied.”Accordin*g to* ***W.R. Proffit.:”***It is a resistance to unwanted tooth movement.” Resistance to reaction forces that arehanded (generally) by other teeth, or(occasionally) by the Palate, head, or neck (via extraoral force), or implants in bone.[1]***T.M. Graber***defined anchorage as the nature and degree of resistance to displacement offered by an anatomic for the purpose of effecting tooth movement.[2]Nanda has defined anchorage as “the amount of movement of posterior teeth (molars, premolars) to close extraction space in order to achieve selected treatment goals.”Its role in orthodontic treatment was appreciated since the 18th century, as prominent orthodontists such as Gunnell, Desirabode, and Angle realized the limitations of moving teeth against other teeth used for anchorage, introducing ideas such as the use of occipital, stationary, and occlusal anchorage.[3]
According to the 3rd law of Newton, for every action, there is a reaction equal in amount and opposite in direction. This can be applied in orthodontics simply when renouncing canine against posterior teeth. The tooth movement that occurs ofa reactive member is termed anchorage loss and it is undesirable in most instances. To exemplify, mesial anchorage loss: unwanted mesial movement of molars during retraction/pull of anterior teeth using buccal segment.
Harvold[4] has shown that a Class II molar correction can be obtained almost completely through vertical manipulation. If the upper molar is not allowed to erupt while the lower molar is encouraged to erupt, the molar relation correction can be aided immensely when our goal is to obtain maximum skeletal change.
For instance, Tweed[5] method took lower incisor length into account but averaged close to 1 mm additional arch length for each degree of lingual tipping.

The anchorage requirement depends on: [6,7]

1. The number of teeth to be moved: If they are less thenlesser the anchorage demand.
2. Type of tooth movement:Bodily tooth movement requires more force as compared to tilting the same teeth.
3. Periodontal condition of the dentition:Teeth with dropped bone support or periodontally compromised teeth are easier to move as compared to healthy teeth attached to a strong periodontium.
4. Duration of tooth movement:Prolonged treatment time places more strain on the anchor teeth.
5. Space requirements: Maximum anchorage support is needed when all or most of the space created, most commonly through tooth extraction, is required in order to achieve the desired tooth movements.
6. Growth rotation and skeletal pattern.
7. The angulations and position of the teeth: usually, in cases where there is bi-protrusiveness or excessive proclination of the anterior teeth, total control of anchorage will be necessary.

SOURCES OF ANCHORAGE:[7]



CLASSIFICATION

Angle,in the 7th ed. of his book,[8] discussed that there were numerous means for obtaining anchorage or resistance, including the teeth themselves and also sources external to the teeth. The author classified anchorage as ***simple, stationary, reciprocal, intermaxillary, and occipital***. -borne appliances, such as removable plates and the Nance palatal button can be added to expand this classification. Apart from this, muscle-borne anchorage, as developed by lip bumpers and some forms of functional appliances, is also included.In modern orthodontics, the term anchorage control has been used widely. In extraction cases, ***minimum anchorage***has been used to describe situations in which up to two-thirds of the extraction space can be allowed to close through the forward movement of the posterior segments. ***Moderate anchorage*** requires limiting the forward movement of the posterior segments to half the extraction space. ***Maximum anchorage*** has been described as that which will allow only one-third or less of the extraction space to be closed by the forward movement of the posterior teeth.

Moyers Classification: According to the manner of force application:[10]

a) **Simple anchorage:** Resistance to tipping.
   Dental anchorage in which the manner and application of force tend to displace or change the *axial inclination* of the tooth or teeth that form the anchorage unit in the plane of space in which the force is being applied.

b) **Stationary anchorage:** Resistance to bodily movement.
   Dental anchorage in which the manner and application of force tend to displace the anchorage unit *bodily* in the plane of space in which the force is being applied is termed stationary anchorage.

c) **Reciprocal anchorage:** Two or more teeth moving in *opposite directions* and pitted against each other by the appliance. It involves the pitting of two teeth or two groups of teeth of equal anchorage value against each other to produce reciprocal tooth movement example: in closing mid-line diastema, two central incisors are pitting against each other.

NANDA CLASSIFIED ANCHORAGE AS: [9]

1. **A anchorage: (critical/severe)** 75% or more of the extraction space is demandedfor anterior retraction.A situation in which the treatment objectsbear that veritably little anchorage e can be lost.
2. **B anchorage: (moderate)** fairly symmetric space closure (50%). A situation in which anchorage is not critical and space closure should be performed by reciprocal movement of both the active and the anchorage segment.
3. **C anchorage: (mild/non-critical)** 75% or more of space closure by the mesial movement of posterior teeth.A situation in which, for an optimal result, a considerable movement of the anchorage

segment (anchorage loss) is desirable, during the closure of space.

MARCOTTE'S CLASSIFICATION (1990):[11]

Group A Anchorage: This also refers to maximum posterioranchorage. 75% or more space is required for anteriorretraction. The biomechanical paradigm is to increaseposterior M/F ratio (beta M/F ratio) relative to the anteriorM/F ratio (Alfa M/F ratio).

Group B Anchorage: The simplest form of space closure. The requirement includes equal translation of the anterior and posterior segments into the extraction space. Equal and opposite moments and forces are indicated.

Group C Anchorage: This also refers to maximum anterior anchorage. 75% of space closure is achieved through the mesial movement of posterior teeth. The biomechanical

paradigm is to increase the anterior M/F ratio (i.e., Alfa M/F ratio) relative to the posterior M/F ratio (i.e., beta M/F ratio).

CLASSIFICATION ACCORDING TO JAWS INVOLVED

- **Intra-maxillary anchorage:**multiple teeth are used in an anchorage unit *in the same arch*, for example using a molar and a second premolar as an anchorage unit for retraction of a canine
- **Inter-maxillary anchorage:** Anchorage distributed to *both jaws.Baker's Anchorage (1904)*

Classification based on the site of Anchorage:

- **Extraoral:**cervical, parietal, occipital
- **Intraoral:** teeth, alveolar bone, palate
- **Muscular:**vestibular shield, lip bumper

One of the excellent anchorages is offered by teeth but they are housed in a dynamic environment suspended in alveolar bone through PDL (periodontal ligament) that is reactive to force. Anchorage value is also determined by the surface area of the root.

DIFFERENTIAL ANCHORAGE[12]

The main considerations for assessing anchorage capacityare the density of the alveolar bone & the cross-sectional area of the roots in the plane perpendicular to the direction of tooth movement. Anchorage value is theamount of osseous tissue that must be resorbed for a tooth to move a given distance. If all bones offered the same resistance to tooth movement, the anchorage potential of maxillary and mandibular molars would be about the same. Despite the above statement, clinical experience shows that maxillary molars usually have less anchorage value than mandibular molars in the same patient. A usual example is space closure in a Class I four premolar extraction case; it often is needful to use headgear on the maxillary first molars to maintain the Class I relationship. The relative resistance of mandibular molars to mesial movement is a well-known principle of differential mechanics.

REINFORCED ANCHORAGE

Continuing with the extraction site example, if it is desired to differentially retract the anterior teeth, the anchorage of the posterior teeth could be reinforced by adding the second molar to the posterior unit as seen in **table-1**. This would change the ratio of the root surface areas so that there would be relatively more pressure in the PDL of the anterior teeth and therefore relatively more retraction of the anterior segment than forward movement of the posterior segment.[1]

Upper	**450**	**533**	**254**	**282**	**194**	**130**
Teeth	2nd Molar	1st Molar	2nd Premolar	Canine	Lateral Incisor	Central Incisor
lower	**450**	**475**	**240**	**270**	**200**	**170**

Table 1: The "anchorage value" of any tooth is roughly equivalent to its root surface area. As this diagram shows, the first molar and second premolar in each arch are approximately equal in surface area to the canine and two incisors. (Reference: W.R. Proffit 6th ed.)

As depicted in **Table below-2**, Root ratings have been calculated based on the root surface area (cm^2) of each tooth. Multirooted teeth have large root surface areas, hence offering more resistance and needing more force to move compared to teeth with smaller root surface areas. Robert Lee of Australia introduced the concept and was further used by Roberts M. Ricketts in the bioprogressive technique. The combined root surface areas of the 2ndpremolar and 1stmolar is close to three anterior teeth. Therefore, in maximum anchorage cases, additional/alternate anchorage conservation methods are utilized which include the use of a 2nd molar, anchorage savers such as TPA, headgear, or mini screw for en-masse retraction of anterior. In some circumstances, anterior retraction is performed in 2 stages,retraction of canines followed by retraction of incisors. Brian Lee suggested that for optimal tooth movement, a force of 200 g/cm^2 of the root surface is required. Ricketts, however, felt that their calculations on force values are higher and a reduction of 25% is required. Consequently, Rickettsrecommended 150 g/cm^2 as the optimum force value.

Table 2: Root ratings have been calculated based on the root surface area (cm^2) of each tooth.

Upper:							
	1st Molar	**2nd Premolar**	**1st Premolar**	**Canine**	**Lateral Incisor**	**Central Incisor**	**Total**
Root surface area (Cm$^{2)}$	1.20	.55	.75	.75	.40	.50	4.15
Force at 200g cm^2	+240	+110	+150	+150	+80	100	830
Force at 150g cm^2	+180	+85	+110	+115	+60	+75	635

Force at 150g cm^2	+175	+90	+90	+115	+40	40	550
Lower:							
Force at 200 g cm^2	+220	+120	+120	+150	+50	50	710
Root surface area (Cm^2)	1.10	.60	.60	.75	.25	.25	3.55
	1st Molar	2nd Premolar	1st Premolar	Canine	Lateral Incisor	Central Incisor	

According to *T.M. Graber and Swain*, if incisor irregularities or arch length requirements can be completed with minimal strain on the posterior anchorage, much of the problem of anchorage control is eliminated. If the canines can be moved back into the extraction spaces & the anterior teeth aligned with some or no loss of anchorage of the posterior, the remaining requirements for anchorage control consist of 2 divisions: (1) incisor retraction by control of anchorage for the desired degree and (2) correction of intermaxillary occlusal discrepancies. As the mechanics involved are different, anchorage control for the lower arch and the upper arch will be considered separately.

SPECIAL CONSIDERATIONS FOR THE LOWER ARCH

A technique for incisor retraction utilizing horizontalelastics on 0.016-inch round archwires has been presented that works well for minimum and moderate anchoragerequirements. In the case of maximum anchorage control, however, there is a different sequence.Instantly after the initial alignment archwire has completed its work, the 2nd molars if available arebanded. In either case a 0.016-inch round or a 0.016 x0.022-inchrectangular lower archwire with anti-tip &uprightingbends is inserted. The purpose of this archwireis to obtain as much occlusal plane leveling as possible. If spaces open up between the lower 1st&2ndmolars, a continuous C chain is placed from molarto molar. The archwire is not cinched back or bentup at the ends. It is re-tied and reactivated as neededuntil the occlusal plane is almost flat. This leveling isimportant to reduce the possibility that the anterior and posterior segments might tip into the extraction space during final space closure. It is also important because teeth in the buccal segments that have been uprighted offer better anchorage than if they are in mesioangular positions. In maximum anchorage situations, a 0.017 x0.025-inch vertical tension loop archwire. Slight anti-tip bends are placed in the posterior sections to prevent mesial tipping of these teeth. In the most extreme situations Class **III** elastic hooks are soldered to the archwire midway between the canine and lateral brackets and very light (3 to 4 oz) Class **III** elastics are worn continuously. In growth patterns in which eruption of the upper first molar should be prevented, a Root high pull facebow is employed to prevent this eruption and provide anchorage control to the upper molars. In the most severe conditions, no other retractive forces should be used simultaneously in the upper arch.

SPECIAL CONSIDERATIONS FOR THE UPPER ARCH

As stated previously, the control of anchorage in the upper arch is more difficult than in the lower arch. In maximum anchorage situations, a headgear attached to tubes on the upper first molar is almost always employed. The type of headgear will depend on the patient's facial pattern and whether extrusion of the upper molars should be allowed. The various types of headgear are discussed in the next section. The archwires and treatment sequence have already been described. In Class **II** malocclusions maximum control of upper posterior anchorage is essential. If good cooperation with the headgear is in doubt, a transpalatal archwire should also be employed to aid in the bodily control of the upper molars. Additionally, it minimizes the extrusion of the upper first molars by the pressure exerted by the tongue against the arch. Although I have not used them, tissue-borne lip shields in the upper arch may be helpful in some cases. Retraction of all six upper anterior teeth with continuously acting forces such as horizontal elastics or sectional retraction loop assemblies is taxing on the upper posterior anchorage and should be avoided in situations requiring maximum anchorage control.

According to T.M. Graber and Swain, some of the most valuable means are extraoral forces—including several types of headgear, chin cups, reverse headgear, and facial masks. Inaddition to producing skeletal changes, most of these appliances can also be used to effect tooth movements and control posterior anchorage.

- **Root high pull facebow**, isdesigned to produce an intrusiveforce on theupperbuccal segments. It is a valuable tool in the treatmentofpatients with high mandibular plane angles whosemandibular growth is more vertical than horizontal.There is alsoan intrusive effect on the upper buccal segments.
- **High pull headgear,** consists of a high-pull occipital strap, Jhooks, and ameans of supplyingforces from the head unit to the J hooks. Thepurpose of thehigh-pull headgear when used in this manner is to produceanintrusive andretractive force to the upper anteriorteeth. This force is also usefulincounteractingthe downward vector of force produced by Class II elastics. Wirebows attached to hookssoldered gingivally on the upper archwire midway betweenthe central and lateral brackets. The pull is derived from self-limitingspring units. In patients with low mandibular plane angles thatneed as much vertical development as possible, thecombination of the high-pull headgear and Class II elasticsprovides

an excellent treatment choice. Both verticaldevelopment and horizontal correction are providedsimultaneously. The lower lip in these individuals usuallyprovides a powerful restraint to the forward pull ofthe Class II elastics. The eruptive forces on the lowerfirst molars combined with the intrusive action on thelower anteriorsprovide part of the vertical overbite.

- **Horizontal pull headgear,** also utilizesa J hook assembly and anoccipital strap to produce apull that is horizontal or parallel to the occlusal plane.Again, thisassembly can be utilized by soldering hooks to the archwire or by resting the Jhooks against thebrackets themselves. It can be used for its skeletal effect, for anchorage control, or to produce en-massemovement of the upper buccalsegments. The 2nd order bends are placed in the archwire and the archwire is advanced 1 or 2 mm infront of the unbanded incisors. In approximately 6weeks the force of the headgear should move the upperarch distally until it is in contact with the incisors. Theteeth to be moved distally can be determined by placing**a** stop on the upper archwire. Usually, the stops areplaced in contact with the buccal tubes on the secondmolars until these teeth have moved back. The archwire is then advanced and the stops are placed in contactwith the brackets of the first molars. A Gurin archwire lock is a convenient method for quickly andefficiently changing the location of the stop.

CORTICAL AND SKELETAL ANCHORAGE

As described by W.R. ProffitCortical bone is more resistant to resorption, and tooth movement is slowed when a root contacts it. A layer of dense cortical bone that has formed within the alveolar process can certainly affect tooth movement. As a general rule, torquing movements are limited by the facial and lingual cortical plates. If a root is persistently forced against either of these cortical plates, tooth movement is greatly slowed and root resorption is likely. It is to be noted cortical bone layer can be formed on the extraction site, exemplified as, that an adult in whom a molar or premolar was lost many years previously.

Absolute (Skeletal) anchorage is required to avoid unwanted tooth movement caused by reactive forces. In absolute or infinite anchorage due to force applied to move teeth, there is no movement of the anchorage unit.[11]Such an anchorage can only be obtained by means of skeletal anchorage which includes all the devices that are fixed to the bone. Skeletal anchorage expands the range of biochemical possibilities with screws, pins, or some readily removable implants anchored to the jaws, so that forces might be applied to produce tooth movement in any direction without detrimental reciprocal forces.

*Skeletal anchorage system (SAS), mini-implants*devised by Sugawara is an orthodontic anchorage system that mayutilizemini-plates and mono-cortical screws made up of titanium that are temporarily fixed in the maxilla and/or mandible to provide absolute orthodontic anchorage.[13]The plates and screws are made of commercially pure titanium that is biocompatible; which is strong enough to withstand and resist the optimal orthodontic forces but it can also be bent with ease for fitting into the bone contour of the implantation site. The miniplate is shaped according to bone morphology and is fixed in the cortical bone area above roots using fixating screws; two or three screws according to the plate used.[14]The mini-plates are the most effective and anticipated treatment modality option.[15]Using miniplate the dentoalveolar complex can be remodeled beyond the limits of contemporary mechanics.

METHODS OF OBTAINING CORTICAL SKELETAL ANCHORAGE:

- Conventional Dental Implants
- Endosseous Implants (Example:Palatal Endosseous Implants)
- Implants
- Retromolar Implant Anchorage
- Mini implant
- The Spider Screw
- Micro implant
- C-orthodontic Micro implant
- Impacted Titanium Post
- Transitional Implants
- Mini Plate
- Zygoma Anchorage System (Usually in the zyogomatic buttress area of the maxilla)

ENDOSSEOUS IMPLANTS

Direct bone apposition at the endosseous interface results in rigid fixation(osseointegration).[16]From an anchorage perspective, a rigid endosseous implant is the functional equivalent of an ankylosed tooth. Complete bony encapsulation is not necessary for an implant to serve as a rigid anchorage unit.[12]

RETROMOLAR IMPLANT ANCHORAGE

The isolated loss ofa lower first molar with a retained third molar is acommon problem. Rather than extract the third molarand replace the first molar with a three-unit bridge,mesial translation of the second and third molars to closethe edentulous spaces often is preferable. The first case with long-term follow-up has been published.[17] Because of the increasing incidence of progressivebone loss and fatigue fracture associated with singletooth implants in lower first and second molar areas, theorthodontic option for mesially translating the molars toclose the space is increasing in popularity.

THE SPIDER SCREW ANCHORAGE SYSTEM

It is a self-tapping, commercially pure titanium miniscrew. The screw can be loaded immediately with forces in the range of 50 to 300 *g*. Complete osseointegration is neither expected nor desired with this anchorage system. The Spider Screw® (HDC Company, Sarcedo, Italy, hdc@goldnet.it), anchorage system can be used to support a variety of orthodontic tooth movements in clinical situations involving mutilated dentitions, poor cooperation, or extraction cases requiring maximum anchorage.[18]The head of the Spider Screw is designed with internaland external rectangular slots 0.021 x 0.025 inches in size.It also has a round internal vertical slot 0.025 inches indiameter.

MINI-IMPLANTS&PLATES

In the maxillary sites -limited to the zygomatic buttress and the piriform rim. The Y-plate is used to intrude or distalize upper molars which are usually placed in the maxilla at the zygomatic buttress. I-plate is routinely placed at the anterior ridge of the piriform opening for the intrusion of upper anterior teeth or protraction of upper molars. The L-plate and/or the T-plate are usually placed at the anterior border of the ascending ramus for extrusion of impacted molars or in the mandibular body for intrusion, protraction, or distalization of lower molars. The miniplate does not interfere with the roots of moving teeth and as the head of the miniplate is closer to the centre of rotation of the arch, the force applied will induce controlled and continuous movement. Thus, mini-plates are more reliable and no patient cooperation is required.[19]The anchorage derived from implants is categorized into two parts i.e., direct anchorage in which an endosseous implant is used as an anchorage site, and indirect anchorage in which implants are used for preserving anchorage.They are mostly indicated in cases for space closure from mesial, space closure from distal, intrusion and extrusion (anterior and posterior teeth), distalization, mesialization, midline corrections, and Molar uprighting.[20]

The most common complication is acute infection, with pain, swelling, and pus production at the mini-plate implantation site.[21] Other potential complications include mucosal overgrowth over the mini-plate head and very rarely numbness.[22]

ANCHORAGE PLANNING

It depends upon various factors:

- The number of teeth to be moved
- The type of teeth being moved
- Type of tooth movement
- Craniofacial pattern
- Periodontal condition
- Duration of tooth movement
- Anchorage value

ANCHORAGE SAVERS

Anchorage savers include:

Transpalatal Arch (TPA), Translingual arch, Nance palatal arch, Vertical Holding Appliance (VHA), Utility Arch.

- **Reinforcement of anchorage:**

Including as many teeth as possible in the anchorage unit. The ratio of the PDL area of the anchor unit to the PDL area of the tooth movement unit is 2:1 without friction and 4:1 with friction.

- **Subdivision of desired tooth movement:**

A common way to improve anchorage control is to pit the resistance of a group of teeth against the movement of a single tooth rather than dividing the arch into less equal segments. For example: to reduce strain on posterior anchorage, retraction of canine individually can be done.

- **Tipping/Uprighting:[23]**

It is best to tip the teeth and then upright them rather than moving them bodily.

- **Nance Holding Arch:**

It consists of a wire embedded in an acrylic button on the anterior palate and soldered to bands on the maxillary first permanent molars. It has been used to maintain the distance between the anchor molars and the labial segment after premature exfoliation of deciduous teeth.

- **Tip Edge Concept:**

It allows initial tipping followed by root uprighting. Simple tipping free tipping requires far less anchorage than moving the same teeth bodily. However, it is a feature of differential tooth movement that the total anchorage requirement and duration of treatment seem significantly less than straight wire or edgewise systems, particularly in difficult cases.

ANCHORAGE CONSERVATION IN MANDIBLE

The mandibular molar has a – 6 ° distal tip incorporated in it which promotes leveling and helps in gaining arch length(Tweed's philosophy)

Anchorage Conservation in Maxilla includes the use of tying back of orthodontic wires**,** omega loops which is the most preferred method, and archwire bend backs.

Anchorage control during Levelling and alignment with the preadjusted appliance system is summarized below:[24]

Planes of anchorage control		
Horizontal	**Vertical**	**Lateral**
Limiting mesial movement Of posterior teeth. Example: Class II div 1 case	Limiting vertical skeletal & dental development Example: High angle case, intrusion of the anterior segment.	Maintenance of expansion procedure and avoidance of extrusion and tipping. Example: Narrow arch case

Table-3 Anchorage control during Levelling and alignment with preadjusted appliance system.[24]

Table-4 Assessment for control of anchorage:[24]

Sagittal Control	
Anterior Segment	Lace back: Robinson in 1989 described that - lower molars moved forward 1.76 mm on average with lace backs and 1.53mm\ without lace backs - lower incisors moved distally1.0 mm with lace backs and 1.4 mm forward without lace backs Cinch back/ Bend back for AP incisor control: -Bending the archwire back immediately 1mm distal to the molar tube and minimizing forward tipping of incisors.
Posterior Segment	Headgear: Combination Occipital Cervical
Vertical Control:	
Incisors	Due to the tip in the canine bracket, the archwire, if engaged without proper lace back result (i.e., canine upright and moved distally), may lead to incisor extrusion. It is to be noted that not to engage high labially placed canine with initial archwire but can be engaged with elastic thread.
Molar	• Step bend behind 1st premolar if 2nd molar has to be engaged to prevent extrusion. • Positionthe Palatal bar 2 mm away from the palate for intrusive force on the molar. • High-pull headgear. (Forhigh-angle cases)
Lateral plane	• Normally, by maintaining arch form. • Assessment for crossbite correction and expansion.

ANCHORAGE LOSS

Anchorage loss is the movement of the reaction unit or the anchor unit instead of the teeth to be moved.Anchorage loss is a potential side effect of orthodontic mechanotherapy and one of the major causes of unsuccessful results. **Causes** of anchorage loss includes**-**not wearing the appliance adequately, too much activation of springs or active components, poor retention of an appliance, using heavy force in moving teeth, and poor anchorage planning.

Signs of anchorage loss: Some of the signs of anchorage loss are as follows:[25]

- Mesial movement of molars.
- Closure of extraction space by the movement of posterior teeth.
- Proclination of anterior teeth.
- Spacing of teeth.
- Change in molar relations.
- Buccal crossbite of upper posteriors.

Means to detect anchorage loss:

Many methods such as:

- Relating the position of other teeth to the teeth in the same and opposite arch.
- Increase in overjet.
- Measurements of the distance of anchor teeth from the midline.
- Measurements from palatal rugae and frenum.
- Inclination of the anchor teeth.

CONCLUSION

Anchorage should be of prime consideration before the treatment plan is formulated. The skeletal and dentalanchorage should be judiciously planned for a better finish and complete success in orthodontic therapy.Anchorage plays a prominent role in the utilization of extraction spaces, use of head gears, retraction mechanics, etc.Skeletal Anchorage System has mainly changed the possibilities and paradigms in orthodontic treatment.[26] The use of the miniplate for absolute anchorage has proved to have many attractive features and advantages.

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