

ANCHORAGE

DEFINITION

* Anchorage in orthodontics as the nature and degree of resistance to displacement offered by an anatomic unit for the purpose of tooth movement.

according to Newton's Third Law of Motion "To every action there is an equal & opposite reaction"
ANCHORAGE = resistance to unwanted tooth movement. ANCHORAGE UNITS : The areas or units which provide this undesirable movement.

Each orthodontic appliance consists

of two elements

Anchor Unit

Moving Unit

Classification of Anchorage

Manner of Force Application

Simple Anchorage

When the manner & application of force is such that it tends to change the axial inclination of the tooth or teeth that form the anchorage unit in the plane of the space in which the force is applied.
((Resistance to tipping))

Simple anchorage is obtained by engaging a greater number of teeth than are to be moved

Stationary Anchorage

When the application of force tends to displace the anchorage unit bodily in the plane of space in which the force is being applied.

((Resistance to bodily movement))

The anchorage potential of teeth being moved bodily is considerably greater as compare to teeth being moved using a tipping force.

Reciprocal Anchorage

When two teeth or two sets of teeth move to an equal extent in an opposite direction .
Here the root surface area of the anchorage unit is equal to that of the teeth to be moved.
The effect of the forces exerted is equal.

Classification of Anchorage

According to Jaw Involved

Intra-maxillary

Inter-maxillary

Intra-maxillary

teeth are to be moved and the anchorage units are in the same arch (either maxilla or mandible)

Eg. Elastic chains are used to retract the anterior segment using the posterior teeth as anchorage unit. Eg. TPA

SUB DIVISION :

Simple

Stationary

Reciprocal

Lingual Arch

Inter-maxillary

Also called “Baker’s anchorage” Teeth are to be moved in one arch and resistance units are in opposite arch
Eg: -class ii ,class iii elastics
SUB DIVISION : Simple Stationary Reciprocal

Classification of Anchorage

According to Site Involved

Intra-oral

The anchorage units lie within the oral cavity. They include: • The alveolar bone • The teeth • The basal bone • The cortical bone • The musculature

Extra-oral

(anchorage obtained from outside mouth)

Cervical

Occipital

Facial
Muscular

1) cranium(occipital anchorage):-anchorage obtained from occipital bone

eg:-head gear to restrict maxillary growth

2)cervical:-anchorage from cervical or neck region

eg:-cervical head gear

3)facial bones:-face mask used to protract maxilla take anchorage from forehead and chin

4-musculature:hypertonic labial musculature used for anchorage in lip bumper

Classification of Anchorage

According to Number of Units

Single or Primary Anchorage

Compound Anchorage

Reinforced Anchorage

Single or Primary Anchorage

The resistance provided by single tooth with greater alveolar support is used to move another tooth with lesser alveolar support.

Eg. Molar being used
to retract a premolar

Compound Anchorage

The resistance is provided by more than one tooth with greater support is used to move teeth with less support.

Eg. Retracting incisors
using loop mechanics

Reinforced Anchorage

The anchorage units are reinforced by the use of more than one type of resistance units.

Anterior inclined plane

Exerts a backward pull

On the maxillary appliance
through the mandible.

Classification of Anchorage According to Space Available

Minimum Anchorage

2/3rd space utilized by the movement of anchor unit

Moderate Anchorage

1/2 space utilized by the movement of anchor unit & remaining 1/2 by the movement of moving unit

Maximum Anchorage

Anchorage demand is very high more than 1/4 th of the extraction space should be lost by forward movement of anchored tooth

Absolute Anchorage

Absolutely no movement of anchor unit e.g. Implants

Factors affecting anchorage

1-Teeth: When one tooth moves the others can act as anchorage units, it depends on

- Root form
- Root size
- No. of roots
- Root length
- Root inclination

2-Alveolar bone: Alveolar bone resist tooth movement up to its limit, beyond that it allow tooth movement by remodeling.

Healthy alveolar bone-more anchorage

3-basal bone: Certain areas act as resistance areas-provide good anchorage like hard palate, lingual surface of mandible

Anchorage planning

Depends on : -

The number of teeth to be moved
The type of teeth to be moved
Type of tooth movement
Periodontal condition
Duration of tooth movement

Anchorage value can be improved

Incorporate as many teeth as possible in anchorage unit

Reduce number of teeth in moving unit

Use of anchorage bends

Reduce the force applied to the optimal for producing the required tooth movement

Reinforce intra-oral anchorage with extra-oral anchorage

Use of palatal or lingual arch

Use of intra/inter maxillary elastics

Use of lip bumper-----anchorage from musculature

Cortical anchorage

Anchorage to be Considered

In Antero-posterior plane

(Anchorage loss appears in the form of movement of anchor unit in antero-posterior plane e.g. bodily mov. or tipping)

In Vertical plane

(Anchorage loss appears in the form of extrusion of molars or Tip back of molars so care must be taken when planning to treat High angle cases)

In transverse plane

(anchorage loss in the form of buccal flaring)

Mini implants :Miniscrews are designed to mechanically retains into bone and not to undergo osseointegration for their easy removal. They should be preferably self drilling to make placement

procedure simple. The design provide provision for attachment of orthodontic spring or auxiliary or bracket head to receive an archwire

Implants have become one of the best sources of reliable anchorage.