

Temporary Anchorage Devices

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1

Objectives

- Understand the principles of anchorage relating to TADs
- Explain the various types of TAD systems available and their indications
- Understand the benefits and indications for using mini-implants

2

Anchorage

- Anchorage in orthodontics can be defined as the resistance to unwanted tooth movement during treatment.
- Newtons third law
- 'For every action, there is an equal and opposite reaction'



3

Anchorage dimension

- AP:
 - Incisor retraction and torque
 - Molar distalisation
 - Molar protraction
- Vertical:
 - Single/multiple teeth intrusion
 - Tooth extrusion



4

Anchorage dimension

- Transverse:
 - Centreline correction
 - Altering occlusal plane
- RME

5

- Successful skeletal anchorage is the main biological concept behind these devices and this offers two possibilities:
- Indirect anchorage: use of such devices means provision of immovable connections to the teeth, which serve as the actual anchorage units
- Direct anchorage: which means utilization of direct forces originating from the actual device itself, in this case the screws inserted into the bone

6

Types

- Osseointegrated
- Miniplate systems
- Mini-screws

7

Osseointegrated implants

- Modified from dental implants
- Provide maximum anchorage
- Usually placed in mid-palatal region



8

Disadvantages

- To facilitate osseointegration they require to be left in place for 3 months
- Used in edentulous regions due to their size
- To remove requires bone removal leading to discomfort



9

Miniplate system

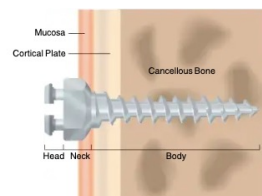
- Based on maxillofacial bone plate
- Transmucosal portion projects into mouth to allow connection to the fixed appliance
- Surgical procedure require to remove



10

Mini-screws

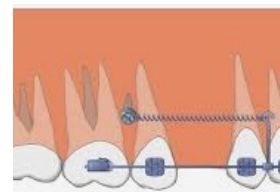
- Developed from screws of maxillofacial plating
- 6-12mm in length and 1.2-2mm in diameter
- No osseointegration required
- Possible movement and therefore do not provide absolute anchorage as risk of movement during treatment
- Most popular
- Placed under LA
- Provides anchorage in AP, vertical and transverse dimensions



11

Indications for TADs

- Reinforcement of anchorage
- Movement of buccal teeth in a mesial or distal direction
- Movement of anterior teeth in a palatal or labial direction
- Correction of crossbite or scissor bite
- Movement of buccal or anterior teeth in a vertical intrusive direction



12

Advantages

- Reduce need for compliance
- Flexible timing for anchorage control
- Predictable insertion and grater predictability of tooth movement
- 3D anchorage control
- Multiple sites for insertion
- Ease of removal
- Minimal discomfort
- Temporary

13

Disadvantages

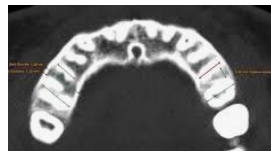


- Root/periodontal damage
- Perforation of maxillary antrum
- Damage to neurovascular bundle
- Soft tissue inflammation
- Risk of fracture
- Risk of infection
- Risk of failure
- Technique sensitive
- Patient selection-gain

14

Factors for success

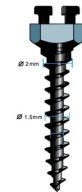
- Cortical bone thickness and density
- Interproximal space
- Soft tissue and oral hygiene
- Low V High angle faces
- High angle have a relatively thin maxillary buccal cortical plate
- Age
- Smoking
- BMI



15

Mini-implant design

- Dimensions
- Shape
- Thread design



16



- Increase in mini-implant dimensions (i.e. a larger body) leads to greater contact with the surrounding bone surface area
- Tapered (conical) body shape have better primary stability than cylindrical as they have a high insertion torque
- Low profile mini-implant results in lower risk of unfavourable force at the mini-implant and bone interface

17

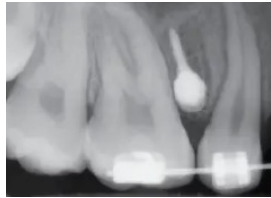
Guidance systems

- A stent is capable of reliably transferring the 3D pre-scription from the planning to the insertion stage
- 1. Plan insertion using a dental model and radiograph
- 2. Drill a pilot hole on model
- 3. Insert mini-implant into the model
- 4. Fit abutment onto the analogue
- 5. Form stent with vacuum forming machine

18

Clinical technique factors

- Insertion technique: >success rates with increased clinical experience
- Root proximity: avoid contact with root and periodontium
- Force application: 50g for 1st 4-6 weeks and increased to 150-200g



19

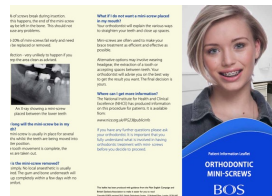
Location

- Buccal/labial
- Palatal
- Direct
- Indirect

20

Consent

- Rational
- Patient discomfort
- Instability
- Root contact
- Mini-implant fracture/displacement
- Written information: BOS



21



22

Questions?

23