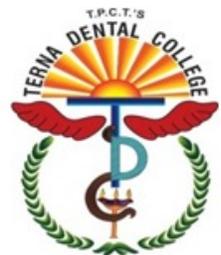


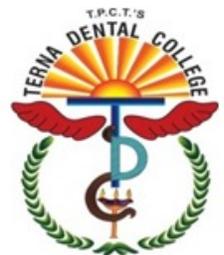
MYOFUNCTIONAL APPLIANCES

DEPARTMENT OF ORTHODONTICS AND
DENTOFACIAL ORTHOPAEDICS



LEARNING OBJECTIVE

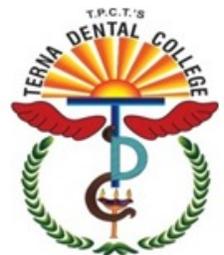
1. To understand the importance of growth modulation.
2. To know the indications, contra-indications, limitations of myofunctional appliances.



CONTENTS

PART 1

1. DEFINITION
2. THEORETICAL BASIS FOR THE APPLIANCE
3. HISTORY
4. TREATMENT PRINCIPLES
5. CLASSIFICATION
6. COMPONENTS OF FUNCTIONAL APPLIANCE
7. ACTION OF FUNCTIONAL APPLIANCES
8. CASE SELECTION
 - VISUAL TREATMENT OBJECTIVE
9. ADVANTAGES AND LIMITATIONS OF FUNCTIONAL APPLIANCES



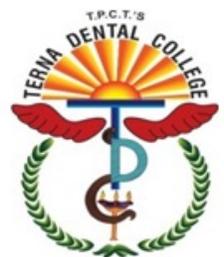
PART 2

11. ACTIVATOR

- i. HISTORY
- ii. DESIGN
- iii. INDICATIONS
- iv. MODE OF ACTION
- v. CONSTRUCTION BITE
- vi. FABRICATION AND MANAGEMENT
- vii. TRIMMING
- viii. MODIFICATIONS

12. BIONATOR

- }. VESTIBULAR SCREEN
- l. LIP BUMPER



PART 3

15. FRANKEL APPLIANCE

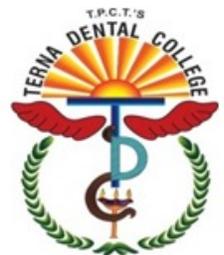
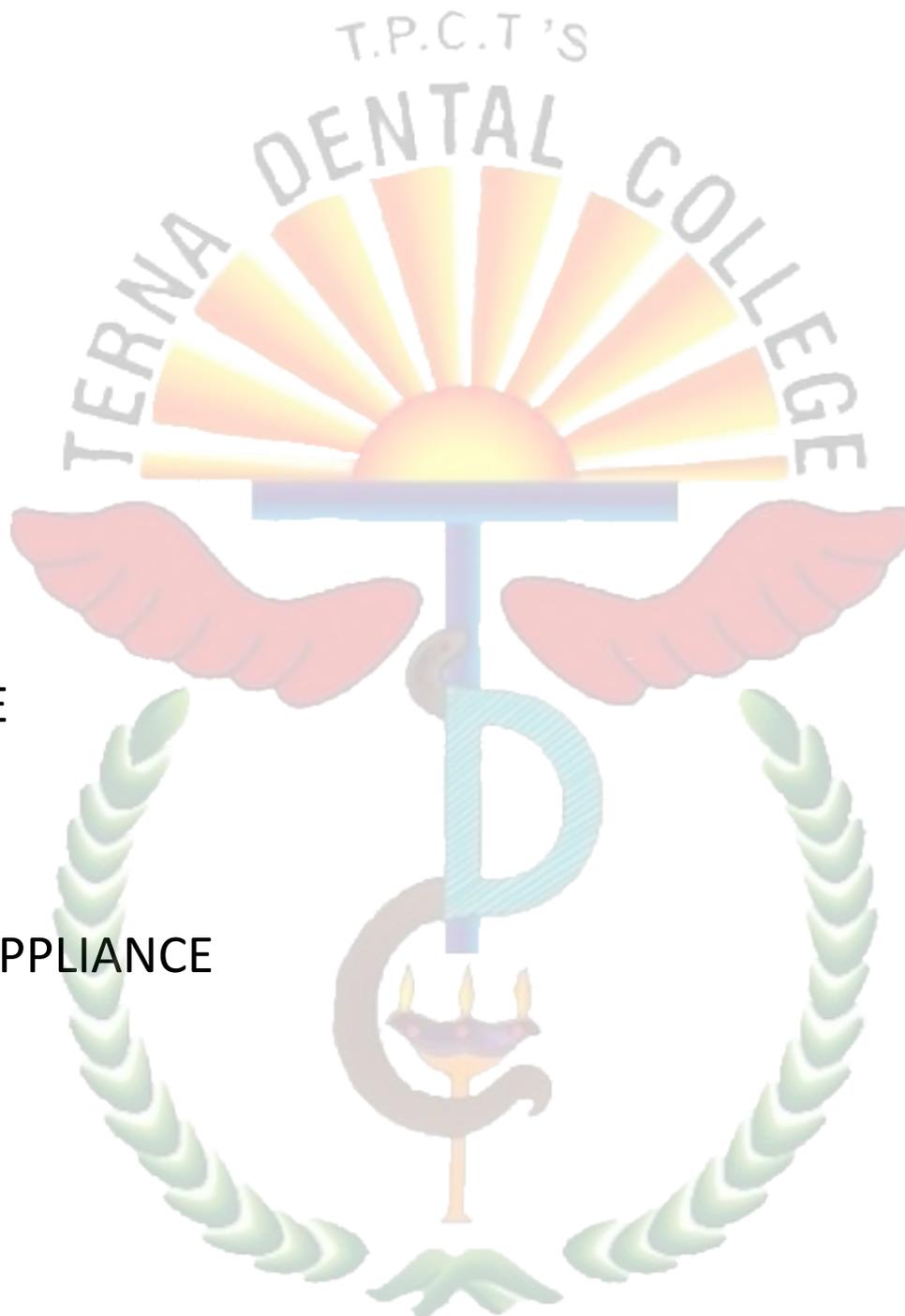
- i. PHILOSOPHY
- ii. MODE OF ACTION
- iii. COMPONENTS
- iv. CONSTRUCTION BITE
- v. WEAR TIME

16. TWIN BLOCK

17. FIXED FUNCTIONAL APPLIANCE

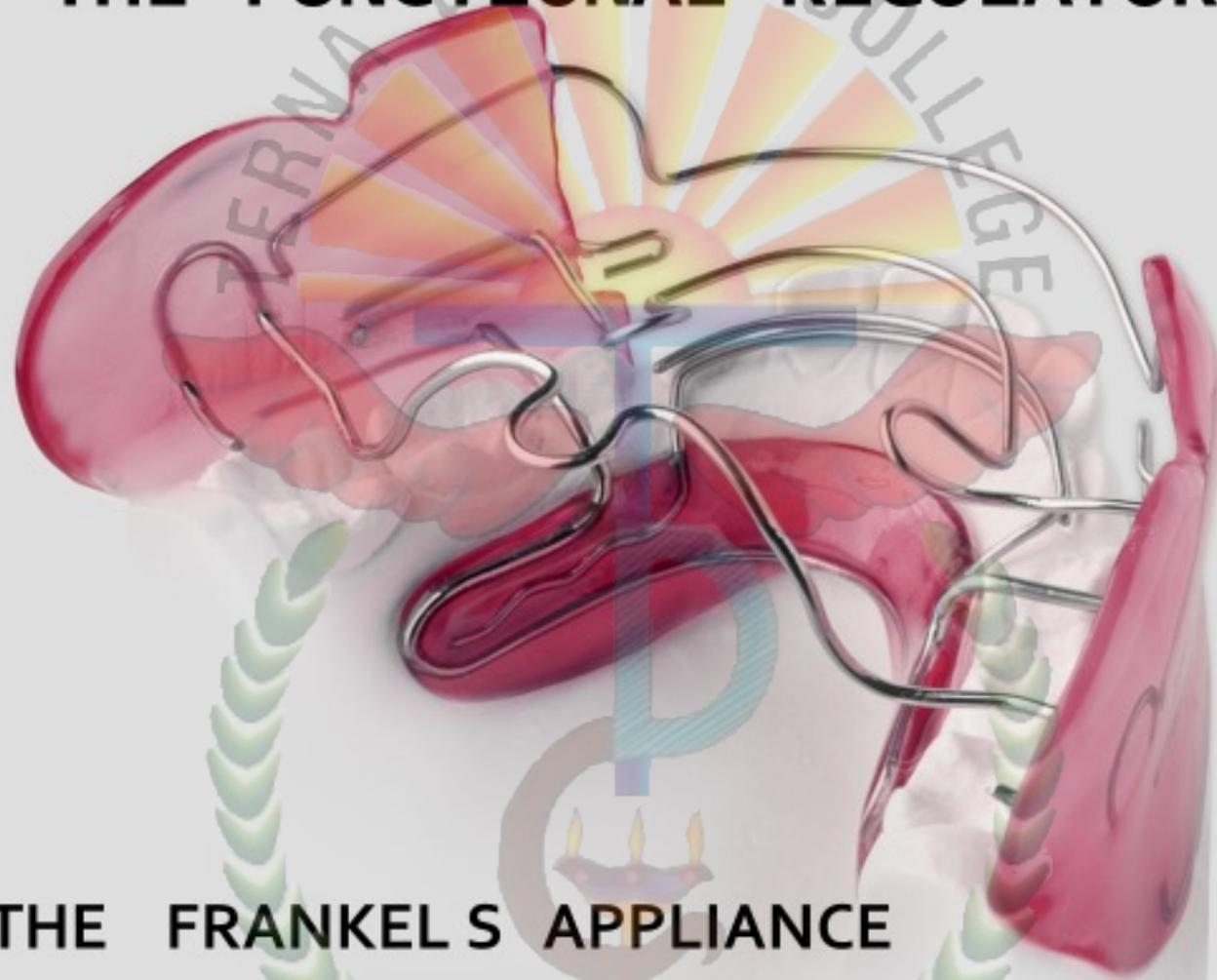
18. HERBST APPLIANCE

19. JASPER JUMPER

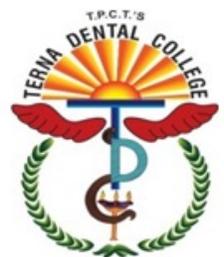


T.P.C.T.'S

THE FUNCTIONAL REGULATOR

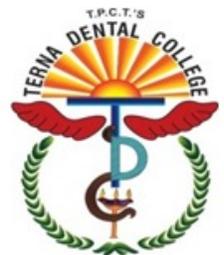


THE FRANKEL S APPLIANCE

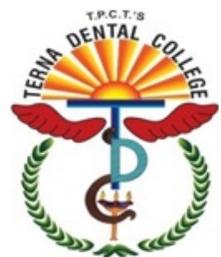


Prof. Rolf Frankel

1957- Functional Regulator.



RAISING THE PILLARS TALL



FRANKEL PHILOSOPHY

- THE FIVE PILLARS

1. Vestibular arena of operation
2. Saggital correction via tooth borne maxillary anchorage
3. Differential eruption guidance
4. Minimal maxillary basal effect
 - Periosteal pull by buccal shields and lip pads



FRANKELE PHILOSOPHY

- **VESTIBULAR ARENA OF OPERATION**

Holding away the buccal and labial musculature

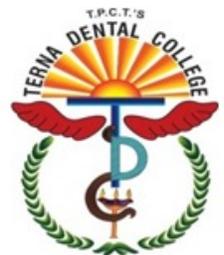
Eliminating the
restraining force

Allowing muscles to
exercise and adapt

↓
Allowing the normal
outward development
of dentition

↓
Eliminating lip trap
Hyperactive Mentalis,
Buccinator, Orbicularis
Oris

Exercise device for oral gymnastics



FRANKEL PHILOSOPHY

- **SAGGITAL CORRECTION via MAXILLARY ANCHORAGE**

They pass between the tooth below the occlusal surfaces.

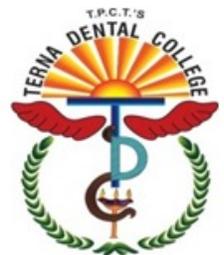
Between deciduous
Canine and molar

Deciduous 2 nmolar
and permanent first
molar

Canine loop crossover

Palatal loop crossover

Proper maxillary anchorage



FRANKEL PHILOSOPHY

- *SAGGITAL CORRECTION via MAXILLARY ANCHORAGE*

Forward positioning of the mandible

Thin wire loops

Thin acrylic pads

proprioceptive signal
than physical barrier.

More efficient in holding the
mandible forward.



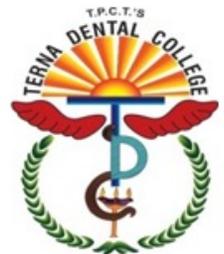
- **FUNCTION :** To overcome the poor postural performance of the muscles suspending the mandible.

When mandible tends to slide back to original position

A pressure sensation on the lingual aspect is provoked

Activate proprioceptors

Stimulate protrusion to eliminate the disturbance



FRANKEL PHILOSOPHY

■ *DIFFERENTIAL ERUPTION GUIDANCE*

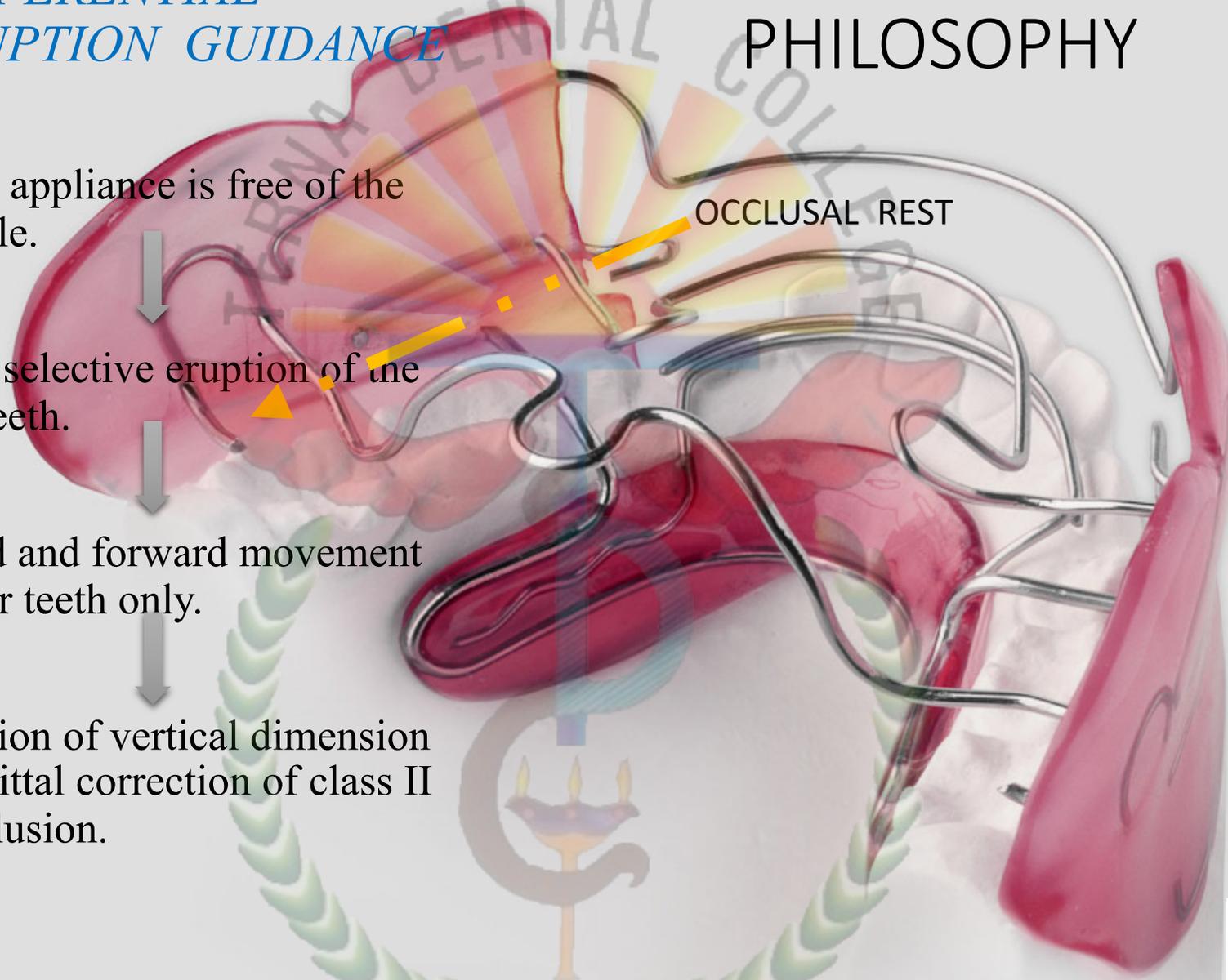
Frankel appliance is free of the mandible.

Allows selective eruption of the lower teeth.

Upward and forward movement of lower teeth only.

Correction of vertical dimension and sagittal correction of class II malocclusion.

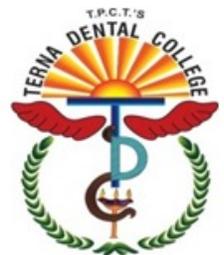
OCCLUSAL REST



FRANKEL PHILOSOPHY

- **MAXILLARY BASE EFFECT**

- The appliance has little retrusive effect on maxilla as compared to the marked protrusive effect on mandible





BUCCAL SHEILD

LIP PADS

PERIOSTEAL PULL

PULL ON THE PERIOSTEAL TISSUES

- Buccal shields & lip pads

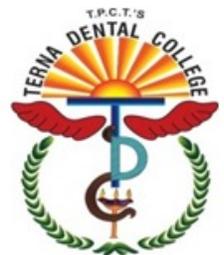
DEPTH OF VESTIBULE

- Tensional force

- BONE WIDENED

APICAL BASE WIDENING

THE FRANKEL'S APPLIANCE



1. Increase in transverse sagittal direction

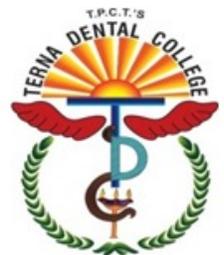
- by use of buccal shields and lip pads

2. Increase in vertical direction

- by allowing the lower molar to erupt freely because appliance is fixed to the upper arch

3. Muscle adaptation

- The form and extension of the buccal shields and lip pads along with the prescribed exercises corrects the abnormal peri-oral muscle activity.



TYPES OF FUNCTIONAL REGULATORS

- FR I a - Class I malocclusions
- FR I b - Class II div I malocclusion with overjet less than 7 mm.
- FR I c - Class II div I malocclusion with overjet greater than 7 mm.



Class II Division I Malocclusion



- FR 2 – Class II Division 1 and 2 malocclusion



Class II Division II Malocclusion

- FR 3 - Class III Malocclusion



- FR 4 – Bimaxillary protrusion and open bite cases



- FR 5 – functional regulator incorporates headgear.
 - indicated in long face patients with high mandibular plane angle and vertical maxillary excess

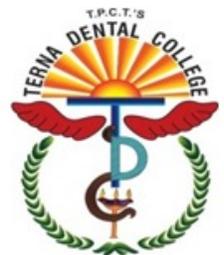
COMPONENTS OF FRANKEL

ACRYLIC COMPONENTS

- Buccal shields
- Lip pads
- Lingual pads

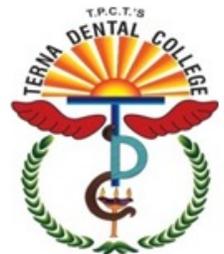
WIRE COMPONENTS

- Labial wire
- Canine loop
- Protraction bow
- Palatal bow
- Lingual springs
- Crossover wires
- Support wire for lip pads

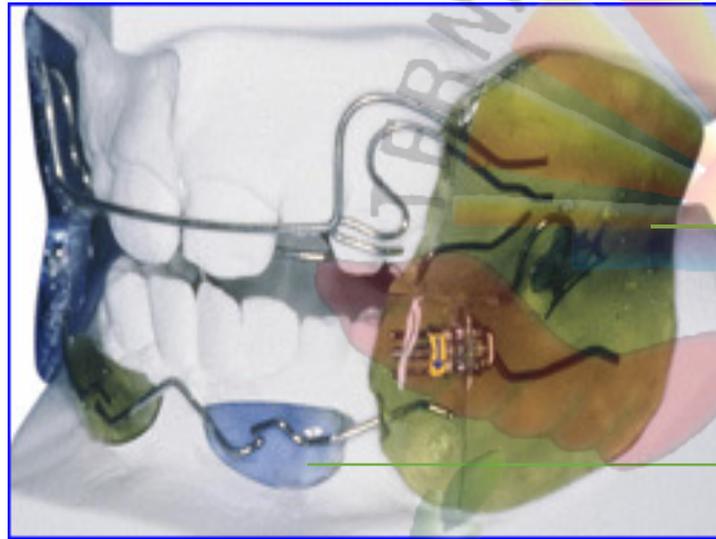


STEP BY STEP.....

STEP GUIDES

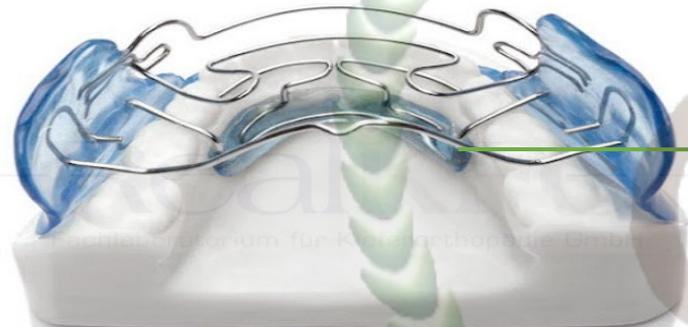


ACRYLIC COMPONENTS



BUCCAL SHEILD

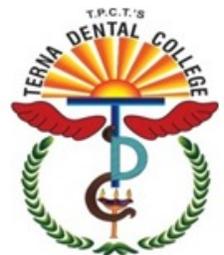
LIP PADS



LINGUAL PADS

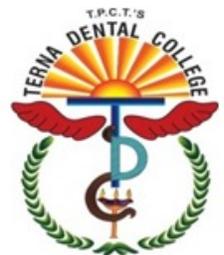
Fränkel Typ II Apparatur © RealKFO

RealKFO
Fachlaboratorium für Kieferorthopädie GmbH



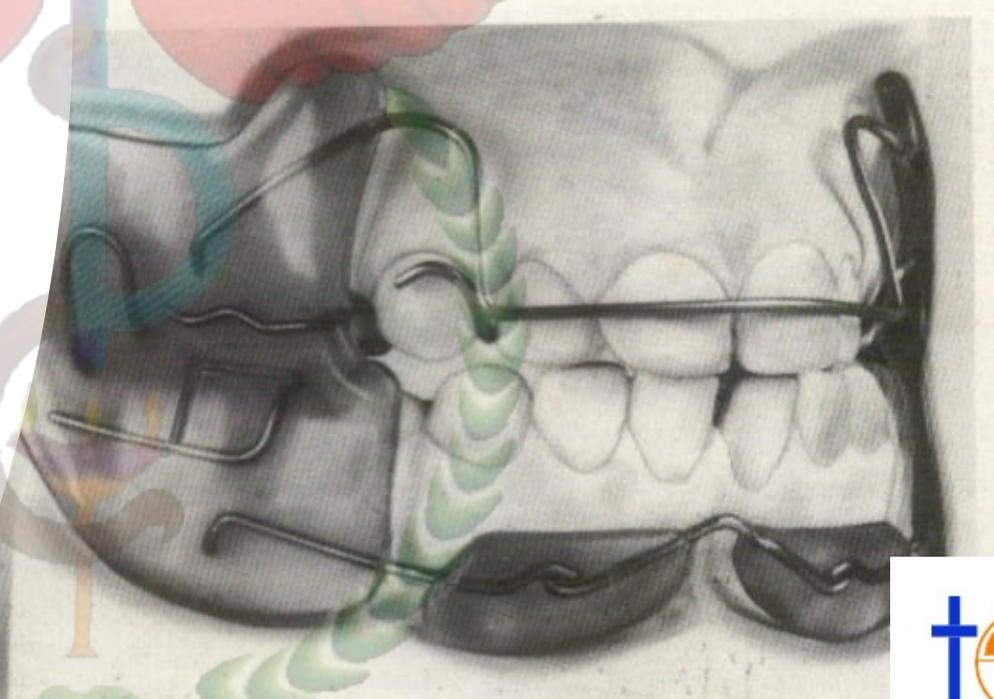
Buccal shields

- **POSITION** : They extend deep into sulci.
- **EXTENSION** : Maxillary premolar area & maxillary tuberosity area.
- **THICKNESS** : Not more than 2.5 mm.
- **FUNCTION** : Every region in which expansion of the dental arch and alveolar process is required, it is placed at an appropriate distance from the lateral aspect of teeth.
 - Expansion of the capsule
 - Dentoalveolar development



Lip pads

- Rhomboid shape – fits the labial surface of lower frontal alveolar process
- Also called pellets
- Supporting effect on the lower lip
- Improves the lip posture
- Establishing the competent lip seal
- Prevent hyperactive mentalis muscle
- Periosteal pull --- bone growth

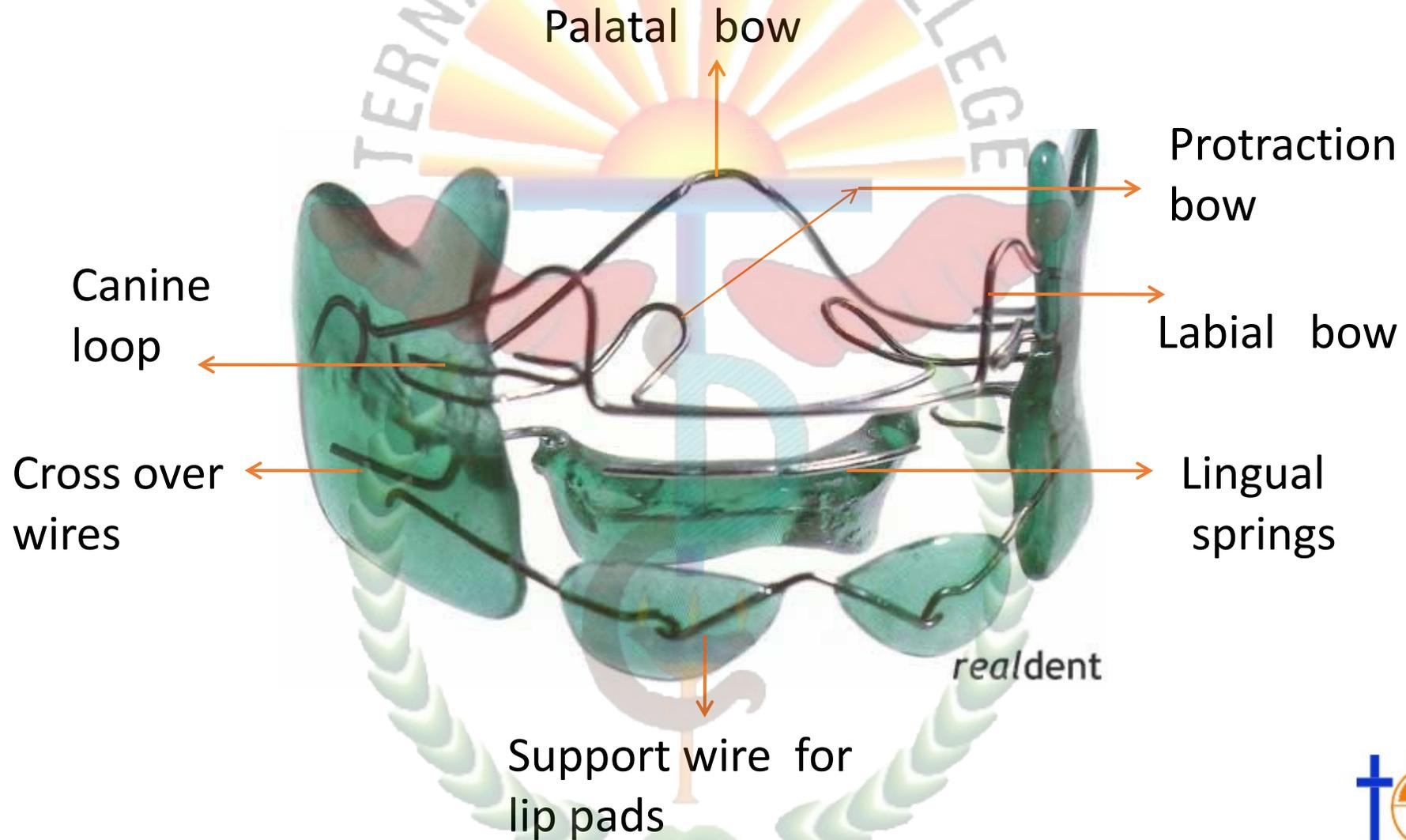


Lingual pad

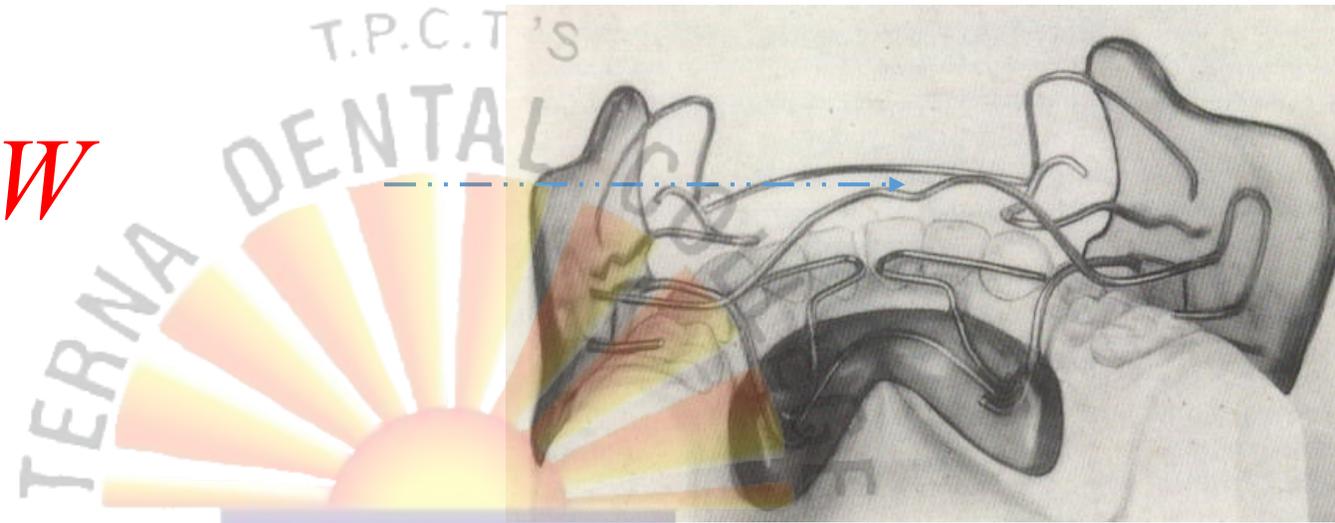
- Over comes the poor posture of mandibular muscles



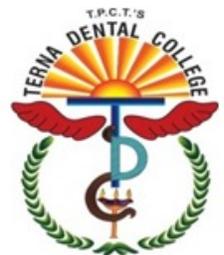
WIRE COMPONENTS



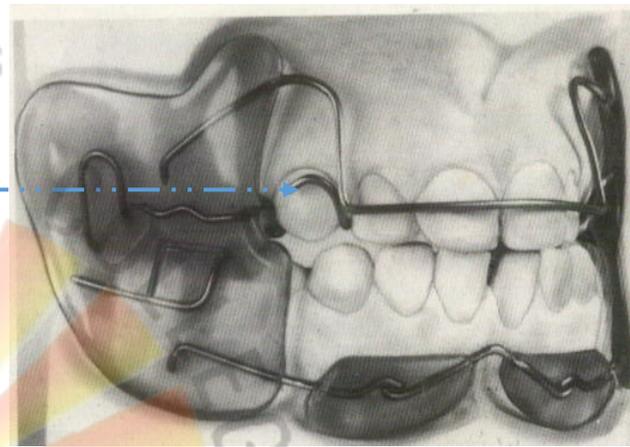
PALATAL BOW



- **POSITION** : Crosses the palate with a slight distal curve & runs interdentally between the maxillary first molar and second premolar
- Makes a loop in the buccal shield
- Emerges to form the occlusal rest between the buccal cusps of molar.
- **FUNCTION** : Connecting and stabilizing action in vertical direction.

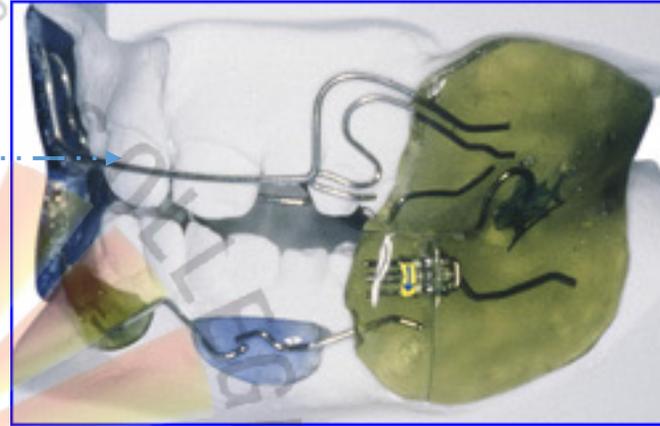


CANINE LOOP



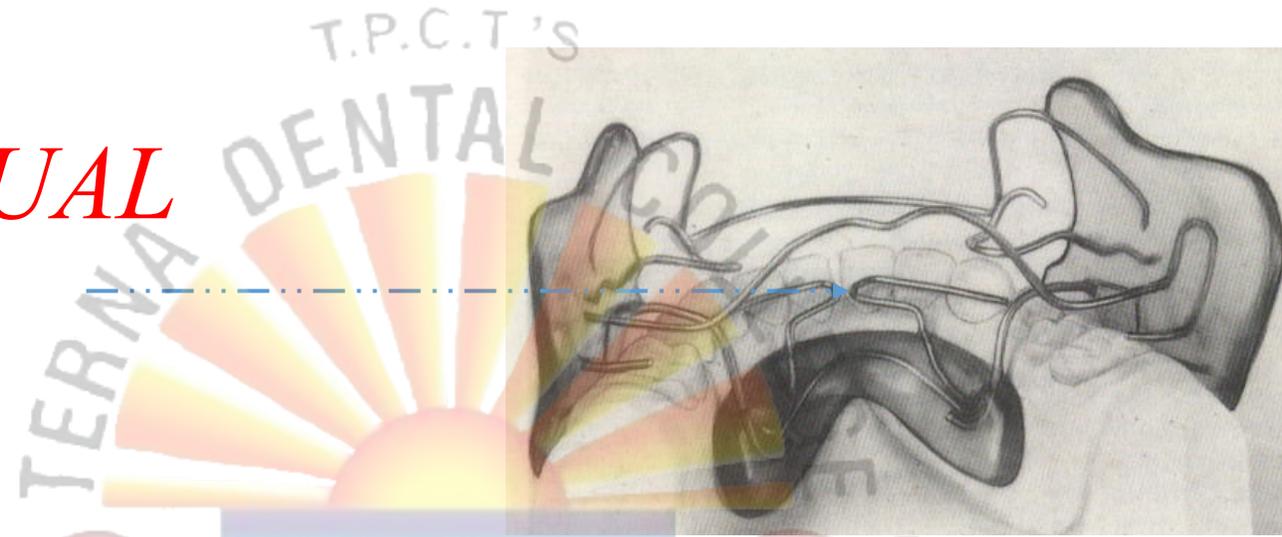
- Also called canine guards.
- POSITION : Embedded in the buccal shield at the level of occlusal plane
- FUNCTION : Keeps the perioral tissue away from canine and provides space for spontaneous lateral movement of canine.
- In eruption of canine – guiding element

LABIAL BOW



- POSITION : Middle of the labial surface of maxillary incisors.
- Passive in nature.
- FR III- labial bow adapted on the labial surface of lower incisors.

LOWER LINGUAL SPRINGS



- POSITION : Lingual surface of the incisors at the level of cingulum.
- FUNCTION : In deep bite – prevent further eruption
- To screen the tongue pressure from lower incisors
- To procline the lower incisors actively

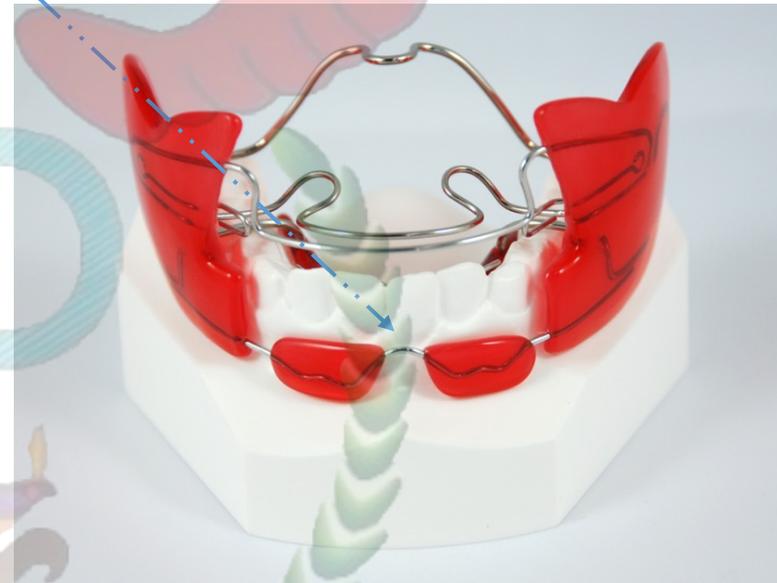
CROSSOVER WIRES



- POSITION : Connect the buccal and lingual shields btw mandibular first and second premolars without touching the occlusal surfaces.

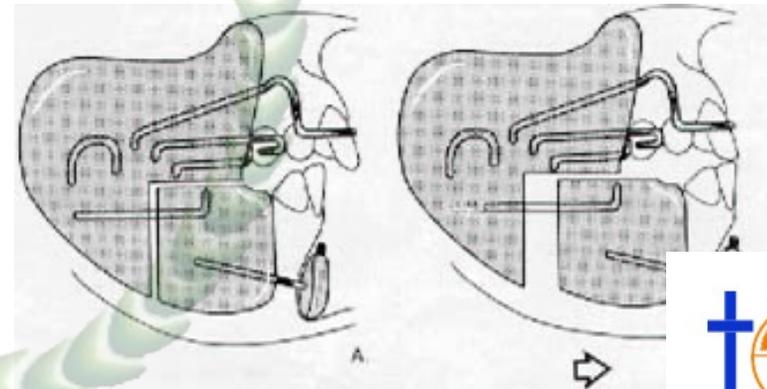
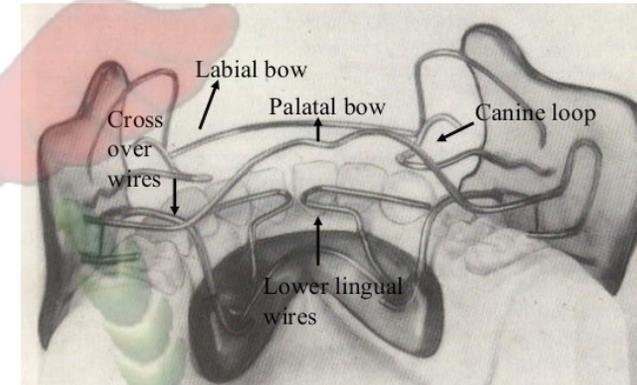
LABIAL SUPPORT WIRE

- Offer support to the lip pads
- 7mm below the gingival margin
- Central wire- inverted 'V'
- Another wire emerges from the lip pad and gets embedded in the buccal shields.



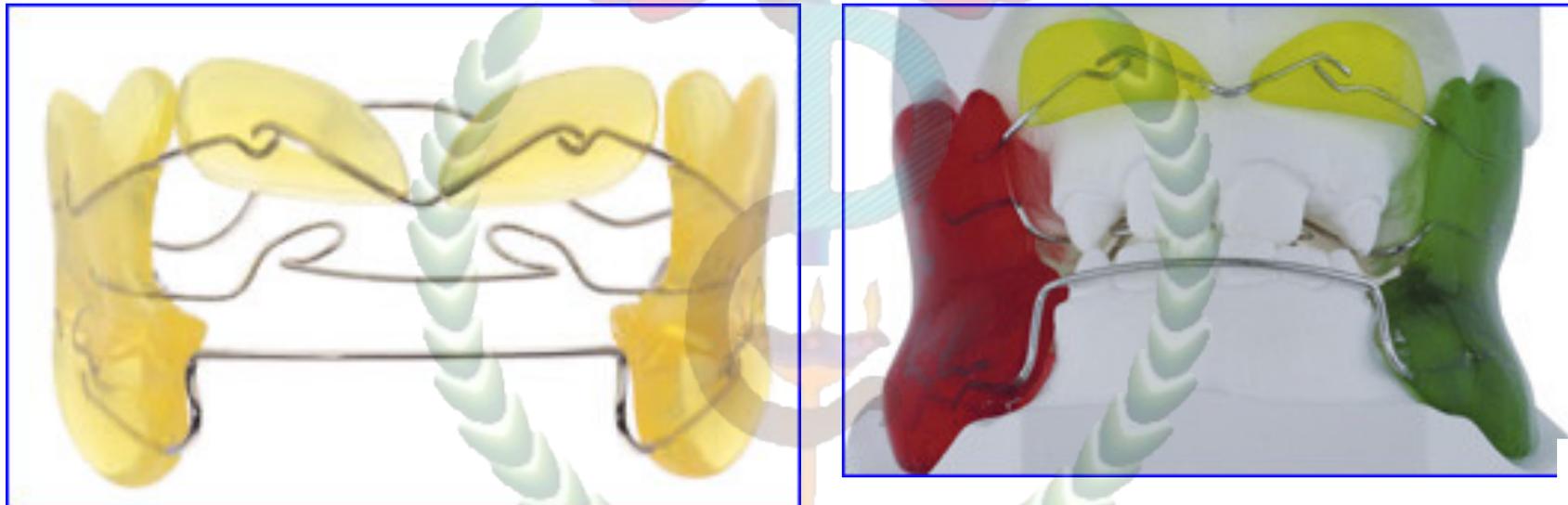
DIFFERENCE BETWEEN FR 1 a, b, c

- All aspects of FR I are similar to FR II except that it lacks lingual shield, lingual crossover wires and upper lingual bow.
- FR 1 a – lingual bow , lingual acrylic pad absent
- FR 1 b – thin acrylic pad
- FR 1 c – bcoz of increased overjet, segmental advancement is done.
- Horizontal and vertical split in the buccal shield.



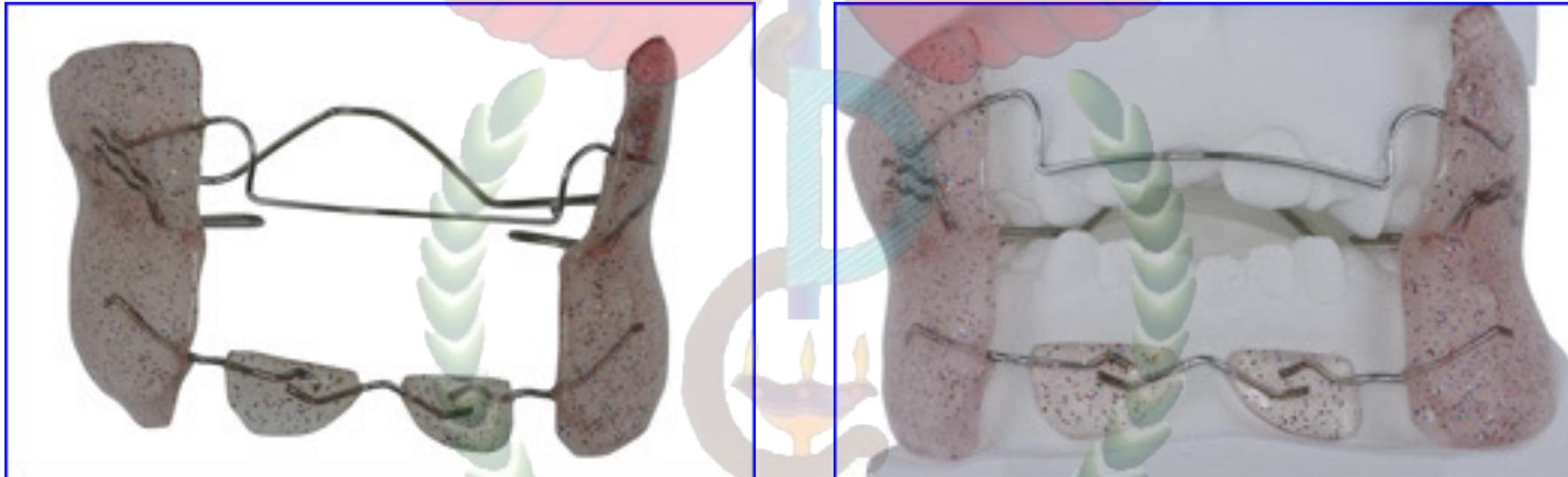
FRANKEL III

Frankel' regulator	Acrylic components	Wire components
FR III	2 upper lip pads Buccal shields	Labial support wire Labial bow Protrusion bow Palatal bow



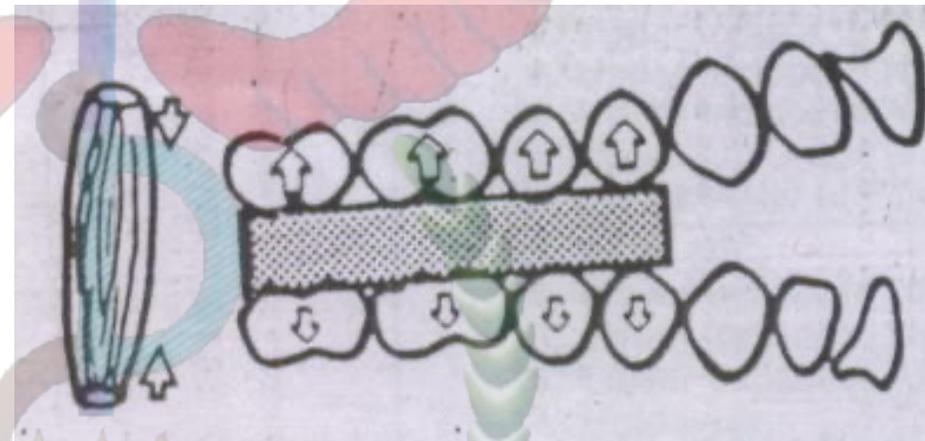
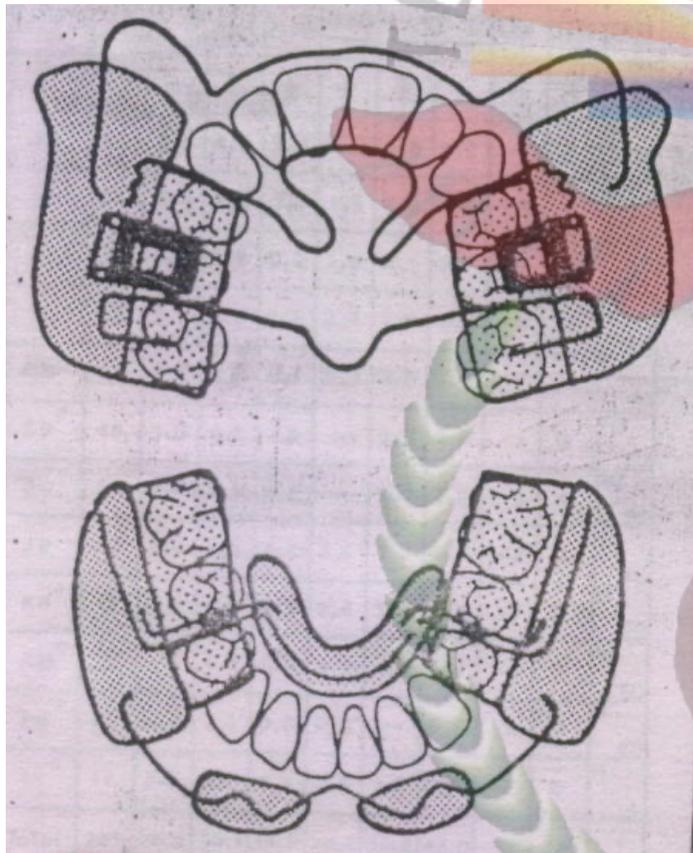
FRANKEL IV

Frankel' regulator	Acrylic components	Wire components
FR IV	2 lower labial pads 2 vestibular shields	Protrusion bow Occlusal rests Palatal wire



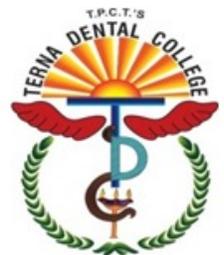
FRANKEL V

Frankel' regulator	Acrylic components	Wire components
FR V	Posterior acrylic bite blocks	

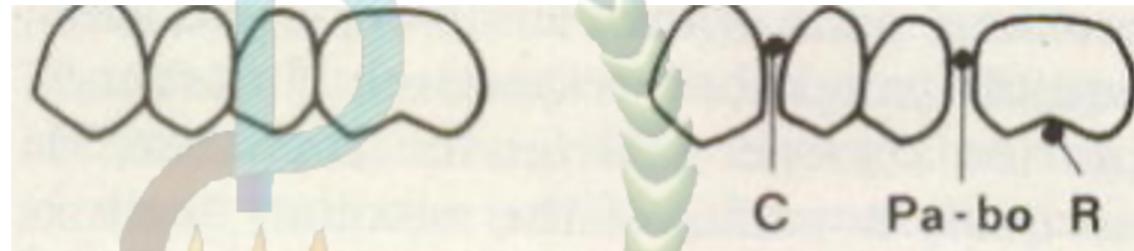
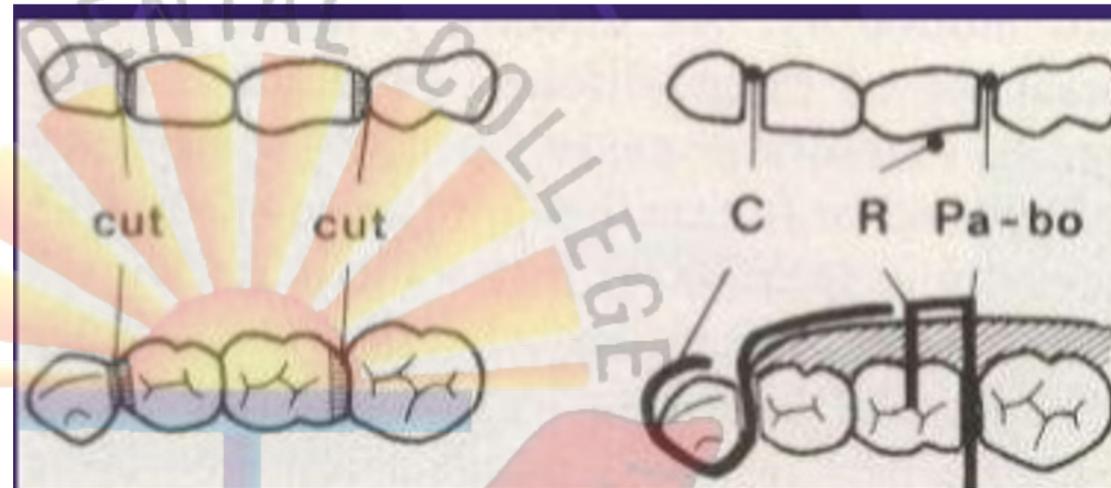


CONSTRUCTION BITE

- Forward and vertical positioning
- Midline visualization
- Forward movement : no more than 2.5-3 mm
- Vertical movement : only to allow wire crossovers
- Step wise advancement is preferred.



Separation
and
seating
grooves



WEAR TIME



1ST FEW WEEKS : 2-4 HRS/
DAY



AFTER 3 WEEKS : 4-6 HRS
/DAY



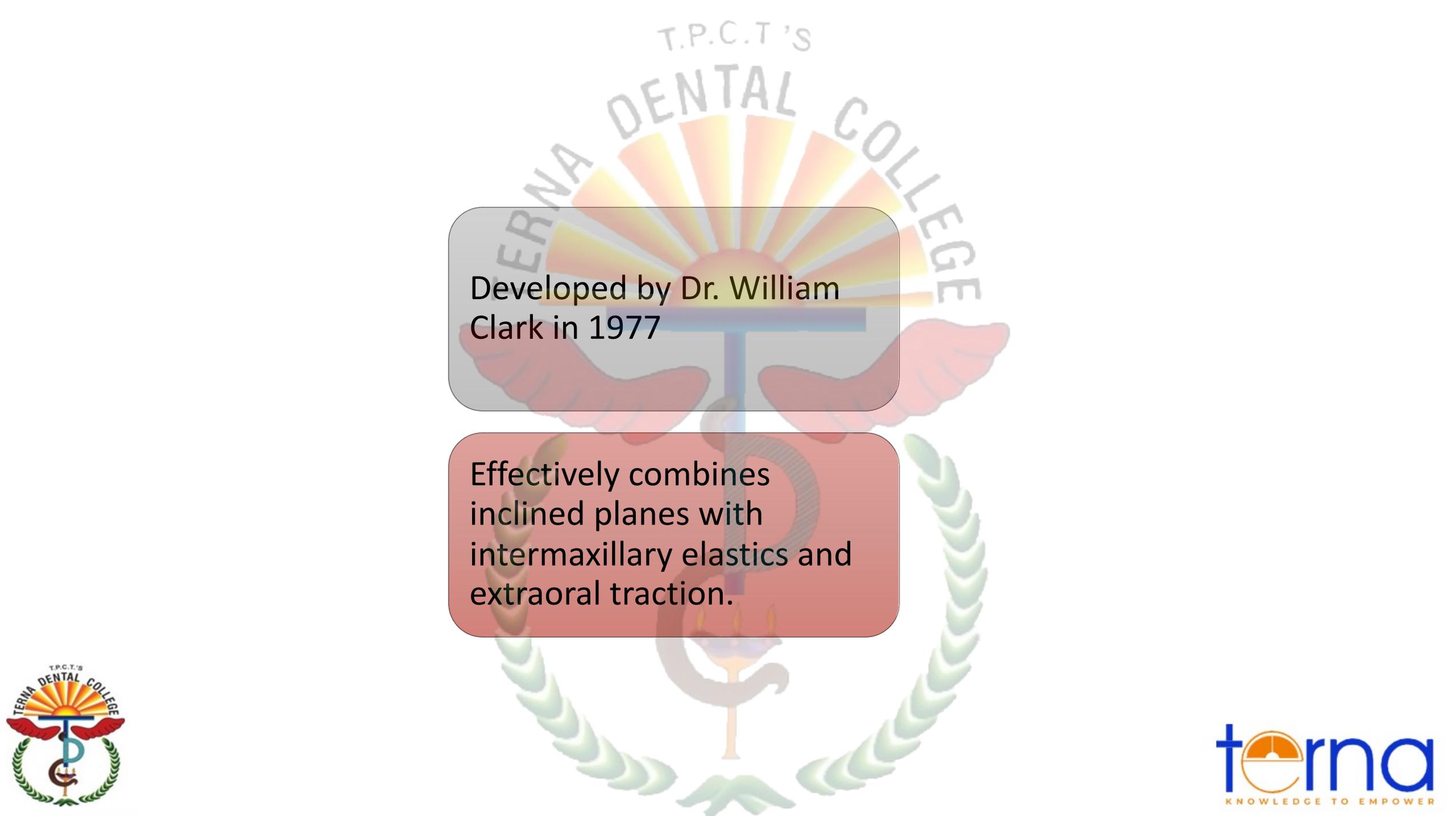
AFTER 2 MONTHS : FULL
TIME WEAR



Patient is asked to perform oral gymnastics i.e. talking, reading, tightly grasping the appliance in the vestibule.

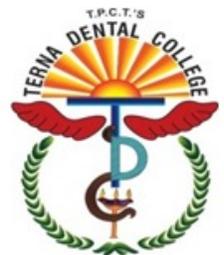
TWIN BLOCK





Developed by Dr. William
Clark in 1977

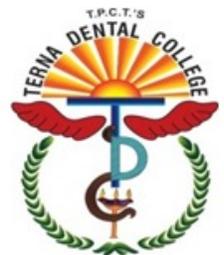
Effectively combines
inclined planes with
intermaxillary elastics and
extraoral traction.

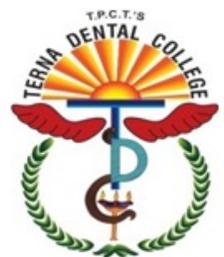
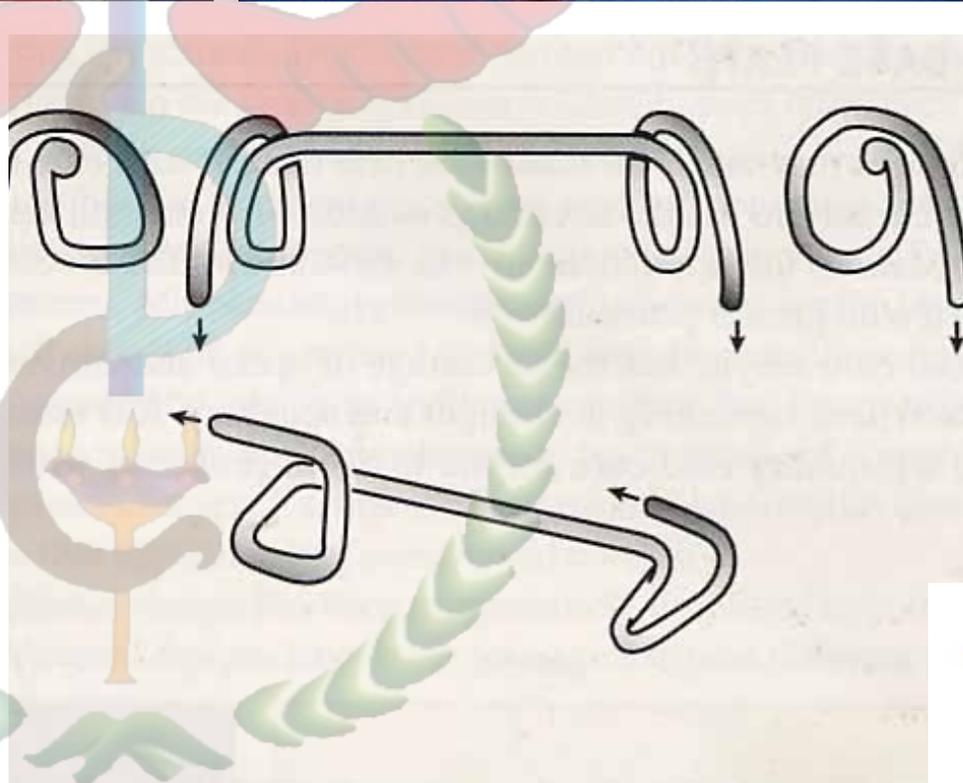
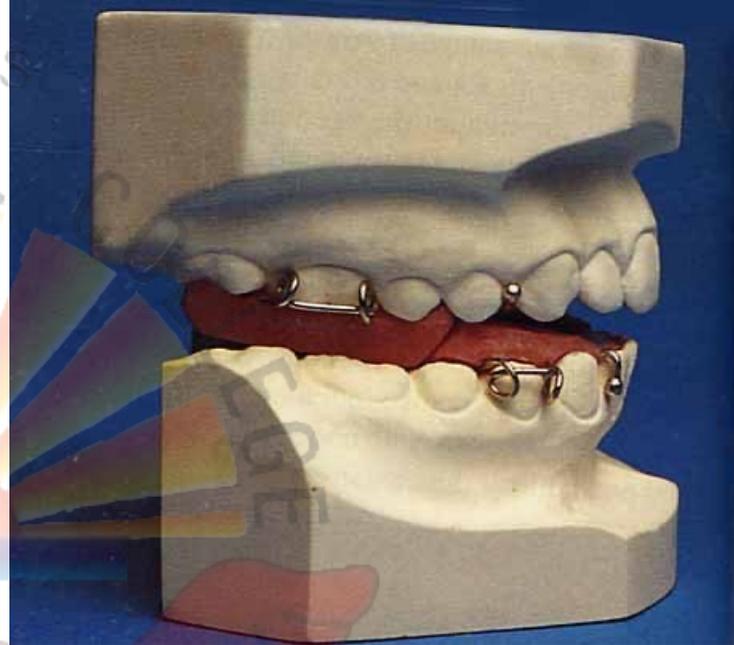
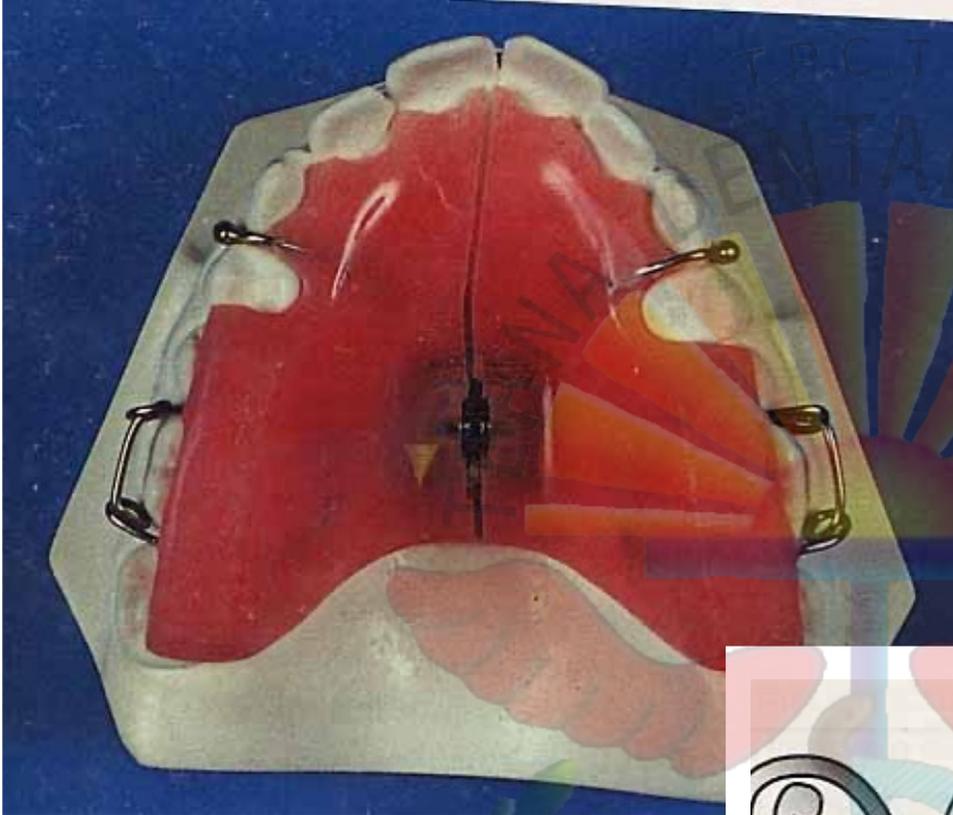




STANDARD TWIN BLOCK APPLIANCE

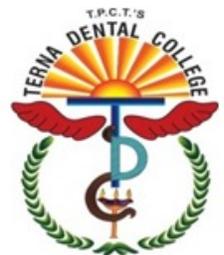
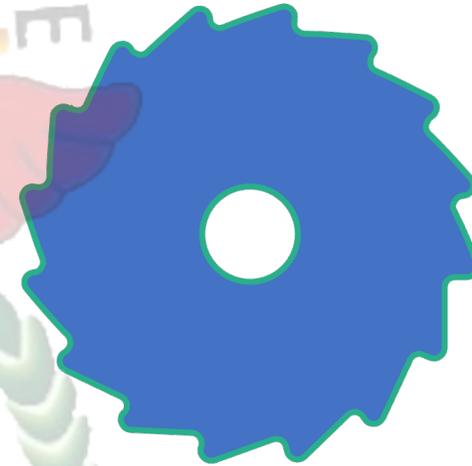
1. Labial Bow
2. Expansion screw
3. Delta Clasps
4. Ball end Clasps
5. Base Plate
6. Occlusal Inclined Planes





CONSTRUCTION BITE

- Similar to activator
- Mandible is sagittally advanced by 5-7mm
- Vertically bite opened by 3-5mm

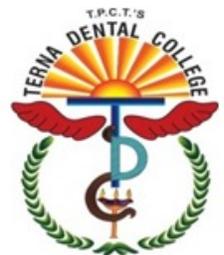


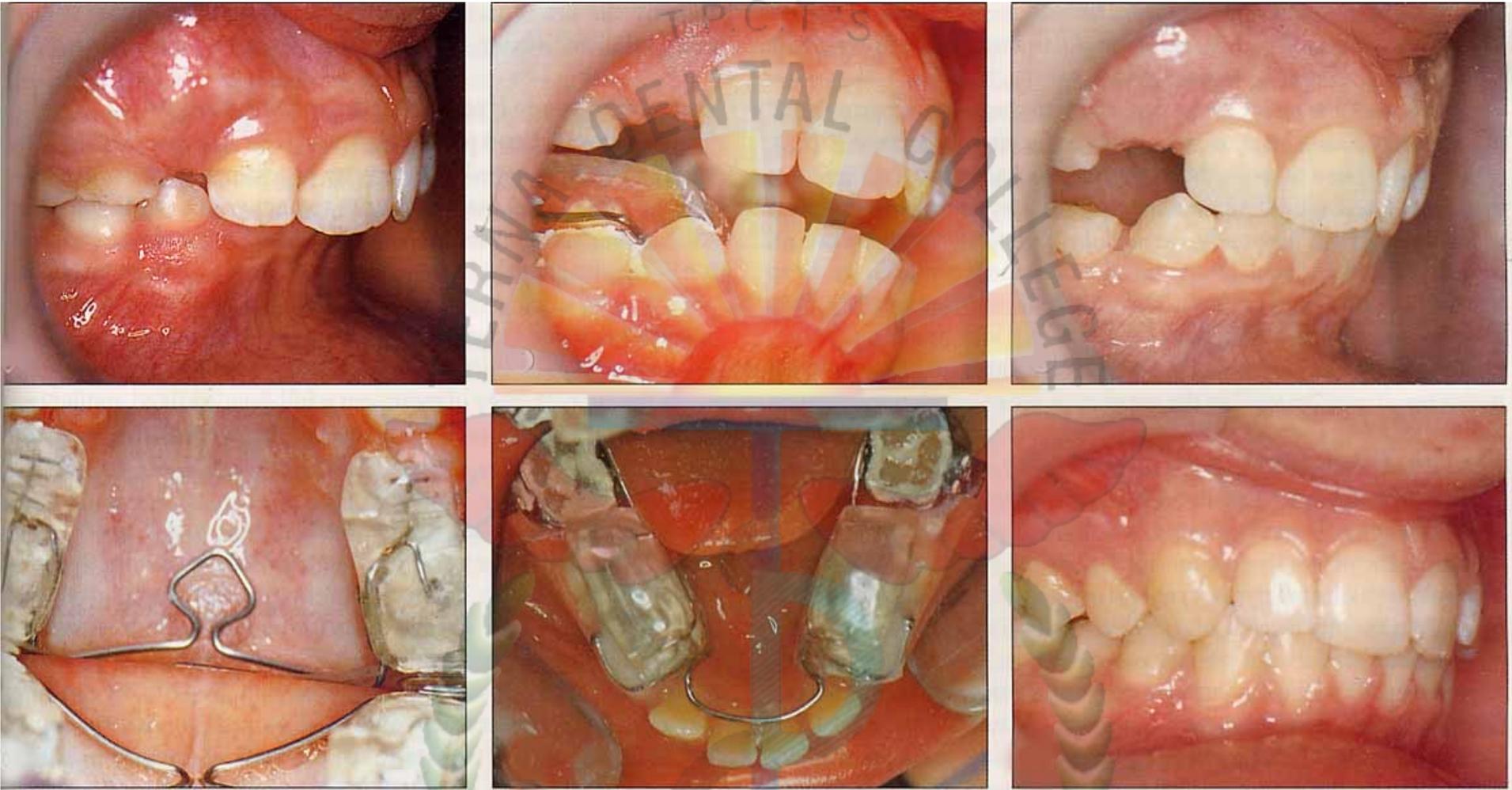
MODIFICATIONS OF TWIN BLOCK

FIXED TWIN BLOCK

**TWIN BLOCK
TRACTION TECHNIQUE**

REVERSE TWIN BLOCK





FIXED TWIN BLOCK

TWIN BLOCK TRACTION TECHNIQUE

- In case the response to functional correction is poor the addition of orthopedic fore, may be considered.
- Extraoral traction = 200gms each side for 8-10 hrs
- Intermaxillary force of 150gms from lower appliance to the labial hook on concord facebow.

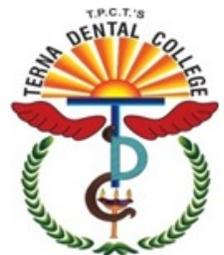




REVERSE TWIN BLOCKS FOR TREATMENT OF CLASS III MALOCCLUSION

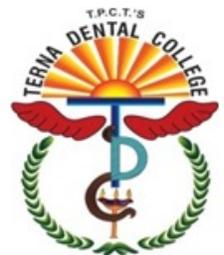
PATIENT ACCEPTANCE

- Freedom of movement
- Speech less interference
- Change in appearance fast





FIXED FUNCTIONAL APPLIANCES

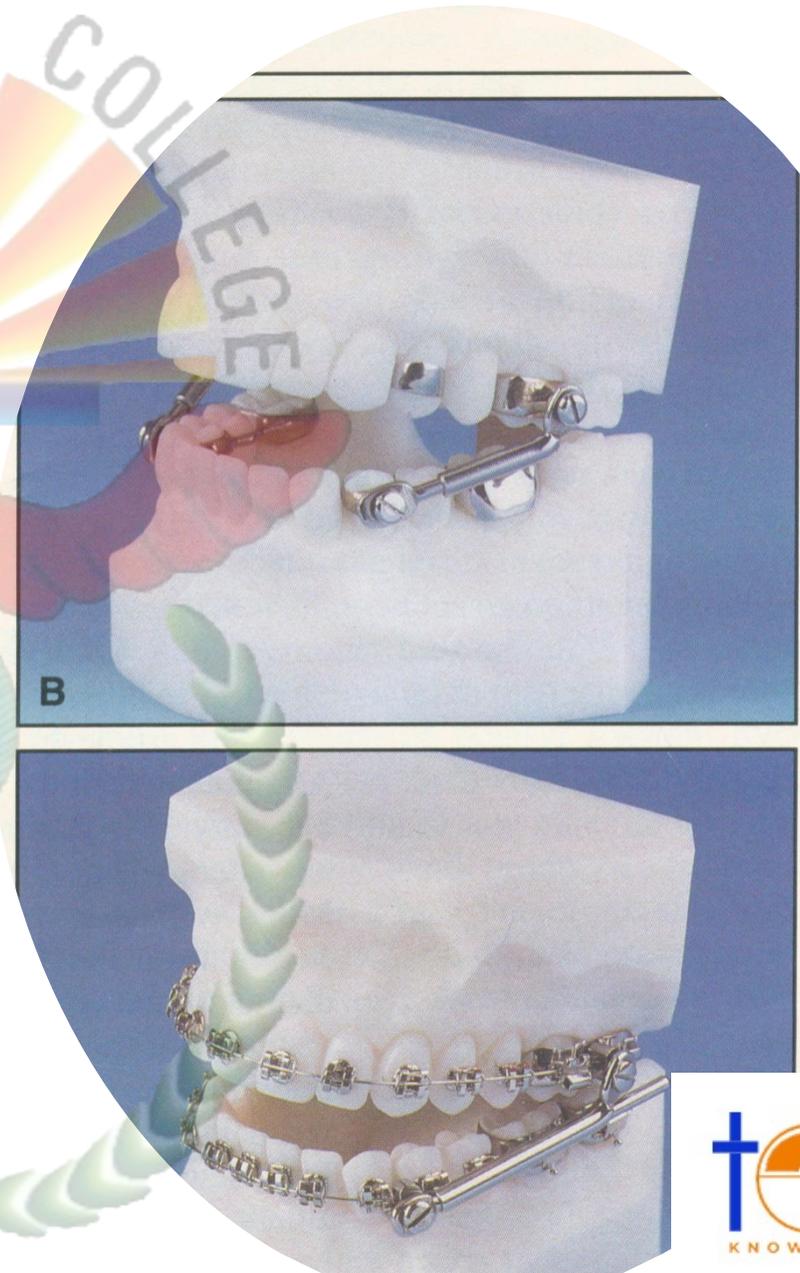


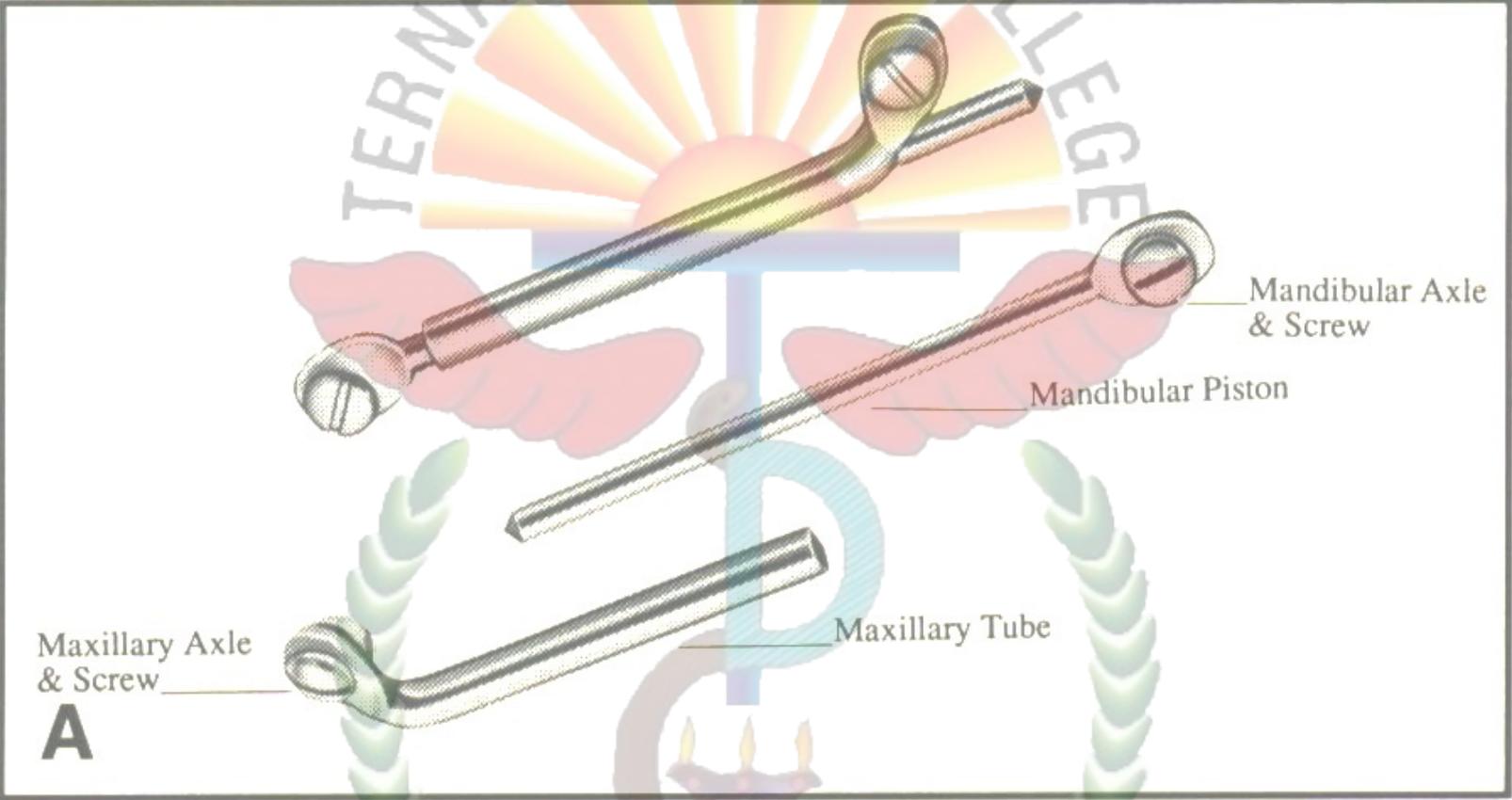
The Herbst appliance

Early 1900 : Emil Herbst

1979 : Pancherz

- Tube and plunger assembly
- Axle and screw assembly anchored onto the upper molars and the lower bicuspid





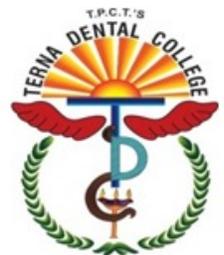
Indications of Conventional Herbst

Mandibular retrusion

Mouth breathers

Post adolescent patients

Un-cooperative patients



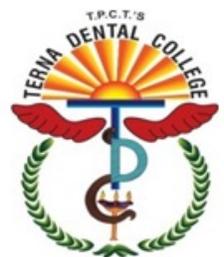
T.P.C.T.'S
TERNA DENTAL COLLEGE



BANDED HERBST
APPLIANCE



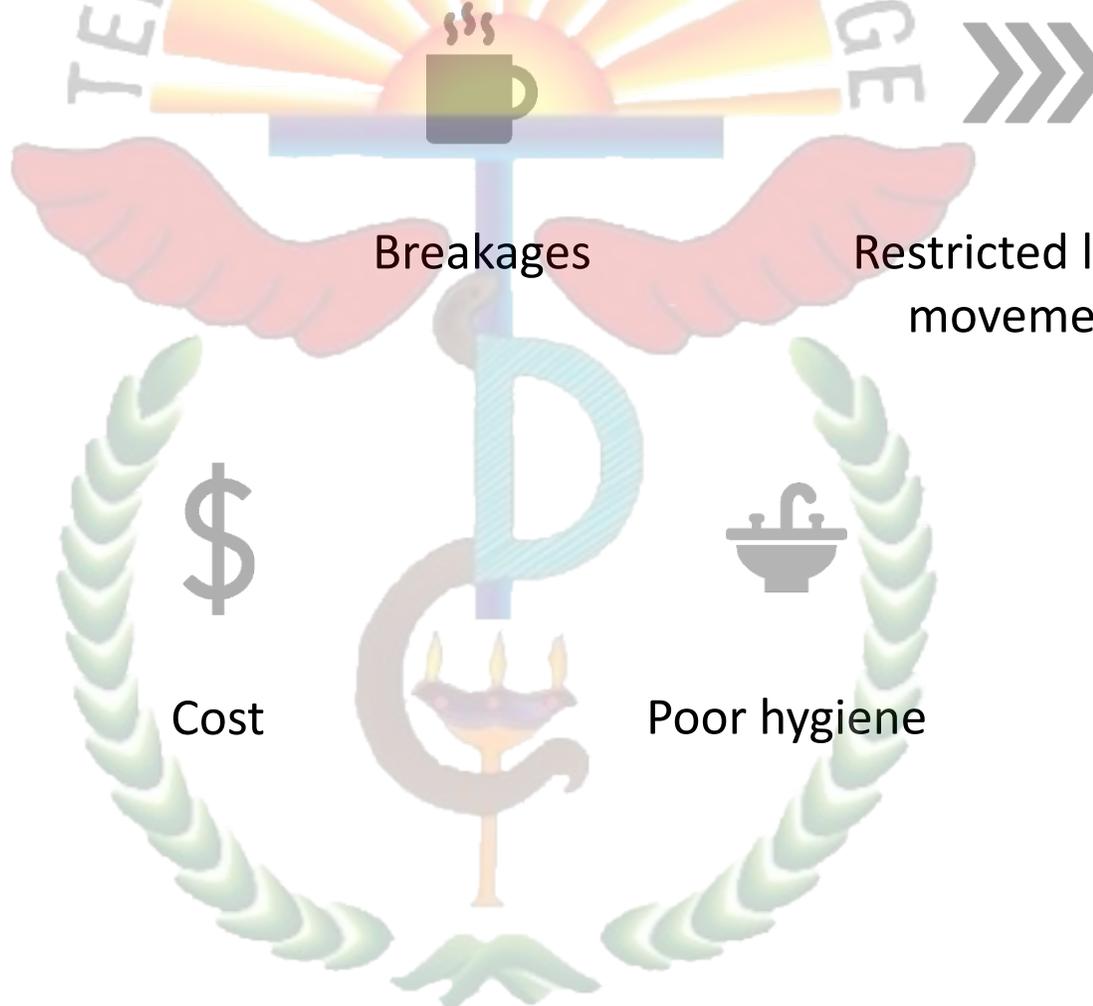
BONDED HERBST
APPLIANCE



Problems with Conventional Herbst



Difficulty in fabrication



Breakages

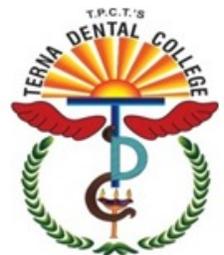
Restricted lateral movements



Cost



Poor hygiene



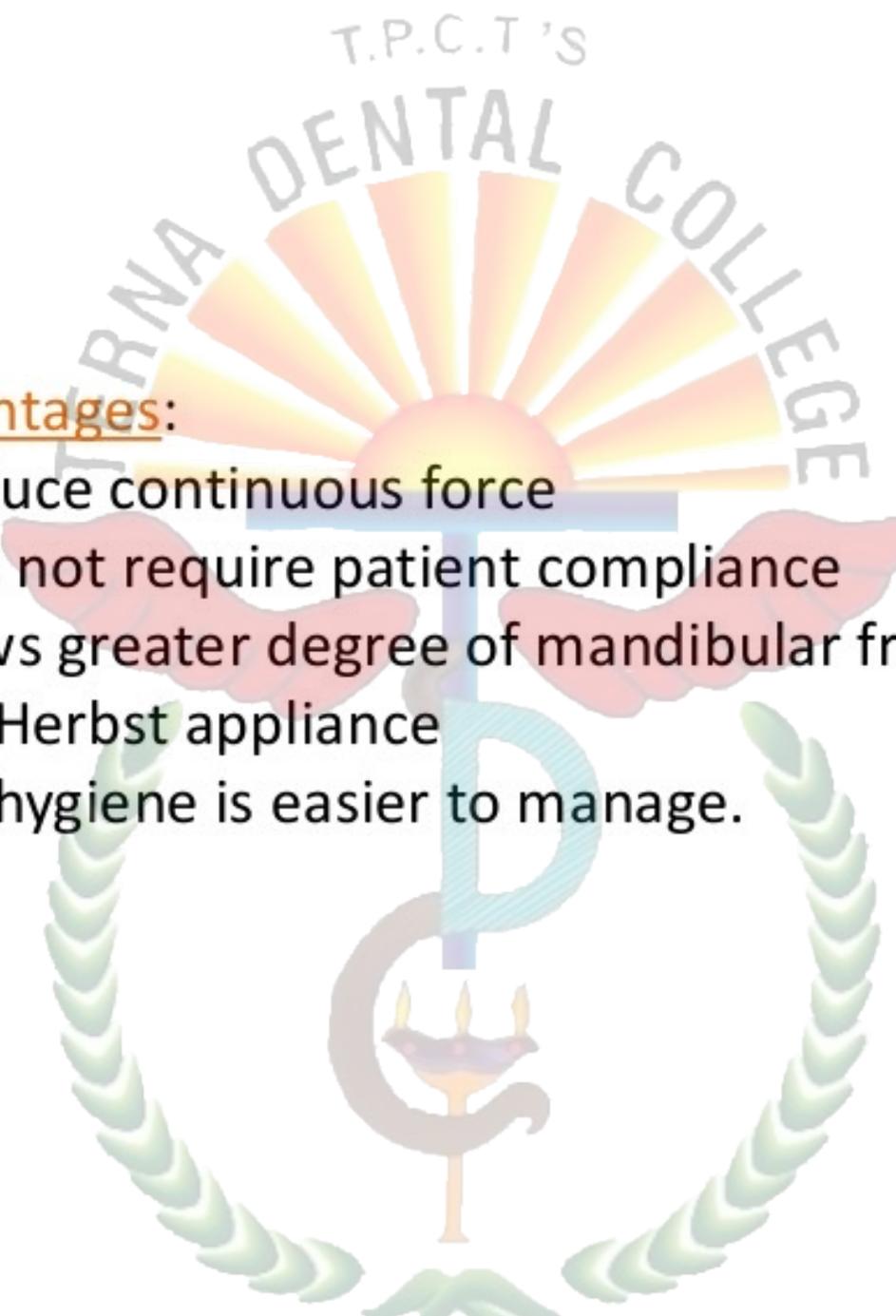
JASPER JUMPER

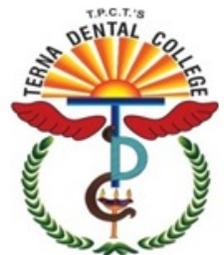
- Introduced by J.J Jasper
- Flexible fixed tooth borne functional appliance
- Actions are like herbst, but lacks rigidity
- Basically indicated in skeletal class II malocclusion with maxillary excess and mandibular deficiency





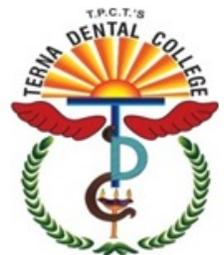
- Stainless steel coil attached at both the ends to stainless steel end caps.
- Covered in opaque polyurethane for the purpose of hygiene.
- Size= 26-38 mm

- 
- Advantages:
 - produce continuous force
 - does not require patient compliance
 - allows greater degree of mandibular freedom than Herbst appliance
 - oral hygiene is easier to manage.



CONCLUSION

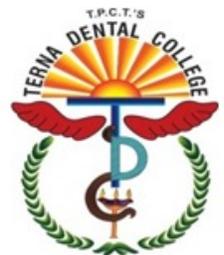
- Myofunctional appliances are used for growth modulation in young children to correct skeletal malocclusions thereby avoiding its severe consequences.



TAKE HOME MESSAGE:

Diagnosis and treatment of skeletal malocclusion can be initiated at an early age by the use of myofunctional appliance.

Hence identification of malocclusion at an early age can prevent the possible consequences at a later age.



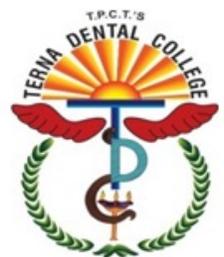
PROBABLE LAQS AND SAQS

LAQ:

1. TWIN BLOCK
2. FRANKEL'S PHILOSOPHY AND ITS COMPONENTS

SAQ:

1. CLASSIFICATION OF FRANKEL'S APPLIANCE
 2. MODE OF ACTION OF TWIN BLOCK
 3. FIXED FUNCTIONAL APPLIANCE
- JASPER JUMPER





Thank you

