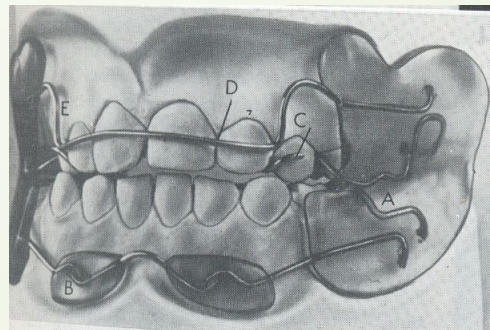


MYO-FUNCTIONAL APPLIANCES



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CONTENTS

- *Definitions*
- *Classifications*
- *Components*
- *Mode of action*
- *Indications*
- *Contra-Indications*
- *Advantages*
- *Optimum timings*

- 
- 
- *Diagnosis and treatment planning*

Major Appliances

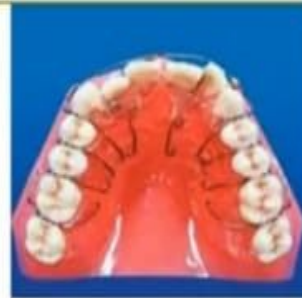
- *Activator*
- *Bionator*
- *Frankel*
- *Twinblock*

Minor appliances

TYPES OF APPLIANCES



REMOVABLE



MYOFUNCTIONAL



FIXED

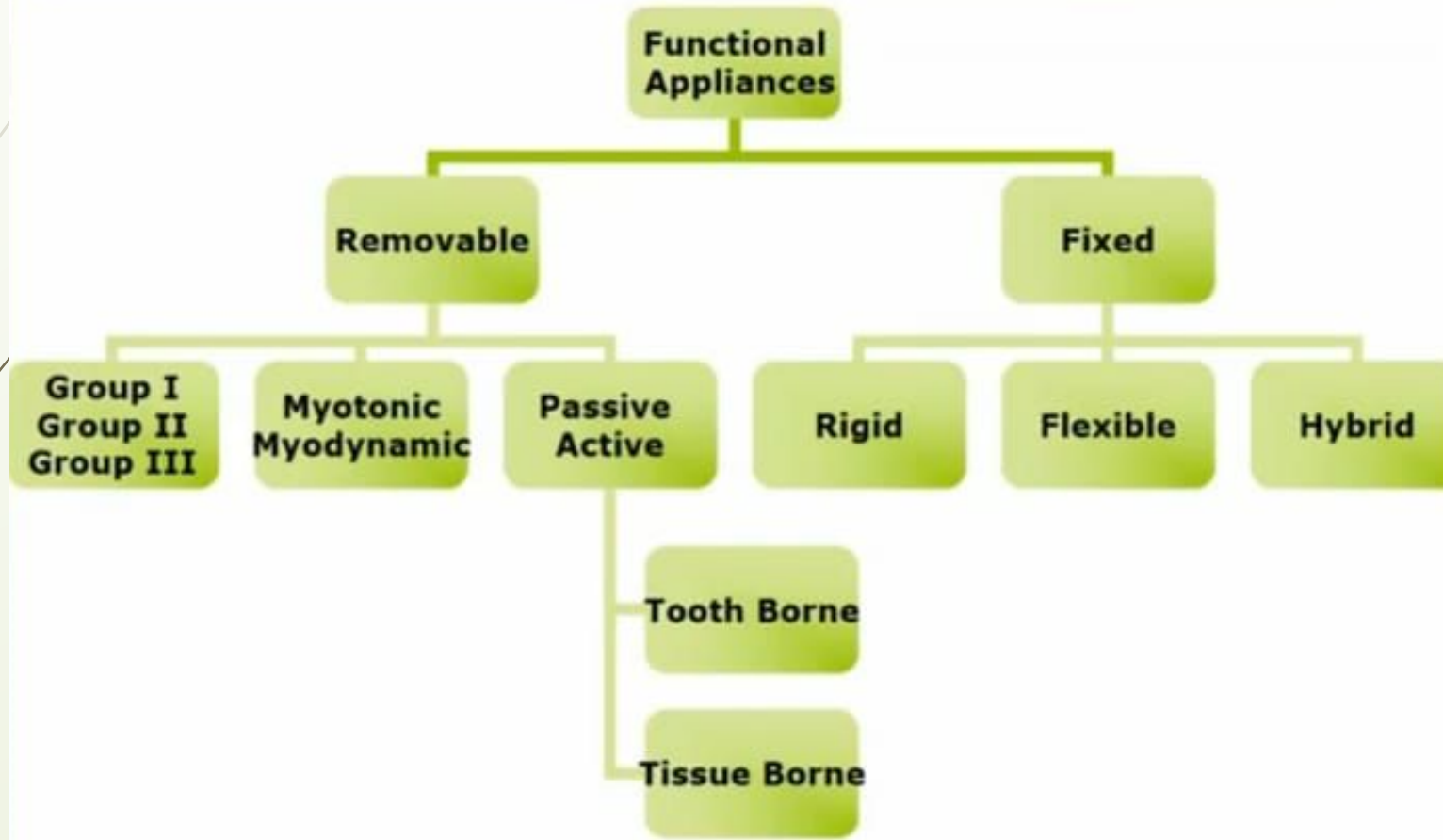


ORTHOPEDIC



Parietal pull

CLASSIFICATION




Uses Of Myofunctional Appliances



- A change in the spatial relationship of jaws
- Change in the direction of growth of the jaws
- Acceleration of desirable growth





Advantages


- Treatment can be initiated at an early age
- Less chair side time is needed
- Less frequent appointments for the patient
- Easier to maintain oral hygiene


Disadvantages

- Cannot be used in adult patients in whom growth has stopped
- Cannot be used to bring about single tooth movement
- Patient cooperation is essential for the success of treatment
- Fixed appliance therapy may be required at the termination of treatment for the final detailing of occlusion





Objectives of Functional Appliance Treatment

- Harmonious development of the dentofacial structures*
 - Eliminate unfavorable myofunctional and occlusal factors*
 - Establish new functional behavior pattern*
 - Unlock the malocclusion*
 - Stimulate growth by applying favorable forces*
- 



ADVANTAGES-Early treatment

- 1. Superior facial esthetics*
 - 2. Greater ability to modify the growth process*
 - 3. Fewer extractions*
 - 4. Reduction in the duration and difficulty of subsequent therapy*
 - 5. Consistent and predictable elimination of phase II treatment*
- 



6. *Improvement in patients self concept*

7. *Reduction in the fracture potential of protruding maxillary incisors*

8. *Greater patient compliance*

9. *Eliminate, if not reduce the need for future jaw surgery*

10. *Greater stability*



DISADVANTAGES-Early treatment

- 1. Longer overall treatment time*
- 2. Loss of compliance*
- 3. Greater risk due to prolonged treatment such as root resorption, whitespot lesion, bone loss caries*
- 4. Increased cost*
- 5. Dilacerations of roots*
- 6. Impaction of maxillary canines by premature uprighting of the roots of lateral incisors*
- 7. Impaction of maxillary second molars*

Indications

- Patients *only in active growth phase* can receive this form of treatment .
- 1. *Mild to moderate sagittal discrepancy corrections.*
- 2. *Reduced /normal / moderately increased anterior facial height .*
- 3. *Anticipated downward & forward growth of the mandible .*
- 4. *No missing teeth .*



5. *No severely rotated /tipped teeth*

6. *Lower incisors well aligned to profile*

7. *Minimal excess of space / crowding*

8. *Nasal breather*

9. *Adequately Motivated.*





Contra-Indications

Neuromuscular problems are a contraindication


- 1. Adults / Post – Pubertal growth patients*
- 2. Unfavourable facial morphology { Vertical growth pattern /increased anterior lower facial height }*
- 3. Severely malposed teeth .*



4. *Severe crowding / spacing*

5. *Patient is a mouth breather /adenoids or has known allergies / speech problems .*

6. *Lack of cooperation*



Components of functional appliances

Three Components are,

- 1. Bite planes- eruption*
- 2. Shields or screens-muscle balance*
- 3. Construction or working bite-mandibular repositioning*



Facial Growth Spurt

- Beginning of puberty or menstruation
- Evaluated by age, tooth eruption, height, ossification of hand/wrist bones on x-ray



Optimum timing

- Increase of STH (Somatomedin)
- Increase of sex hormone
- High growth rate
- 8-10 years for removable type
- 11-13 years fixed type

Note- Most efficient in permanent dentition-
(Profit, Pancherz AJO 2002)



What are the changes ??

- 1. Orthopaedic changes*
- 2. Dentoalveolar changes*
- 3. Muscular changes*

Effects on Mandible:

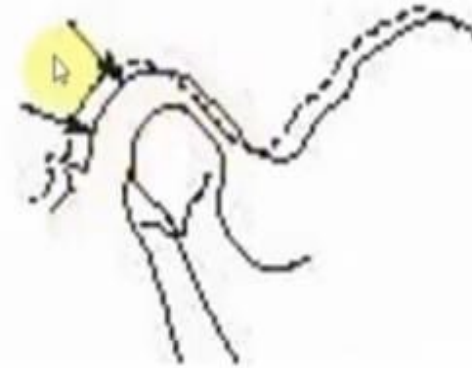
Condylar Growth



Condylar Reshaping



Fossa Remodeling

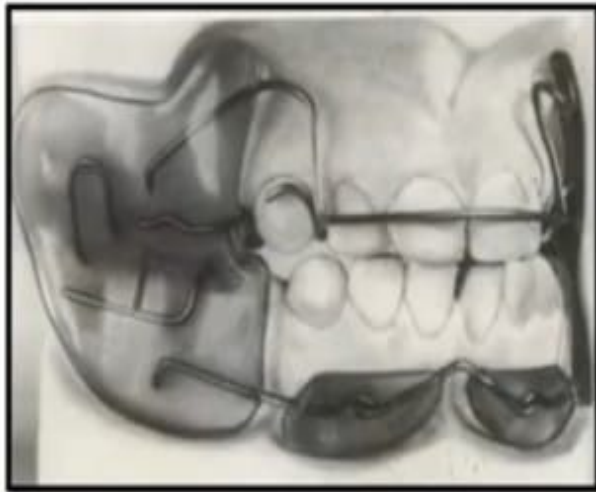


2. Effects on Maxilla:

- ❑ Inhibit horizontal maxillary growth
-

3. Effects on Dentition:

- ❑ Maxillary incisor lingual tipping
- ❑ Mandibular incisor labial tipping



Treatment Principles

Force Application



← Force is applied

Force Elimination



Forces already present are eliminated

NEED FOR FUNCTIONAL TREATMENT



ALTERED MUSCLE BALANCE AND HABITS

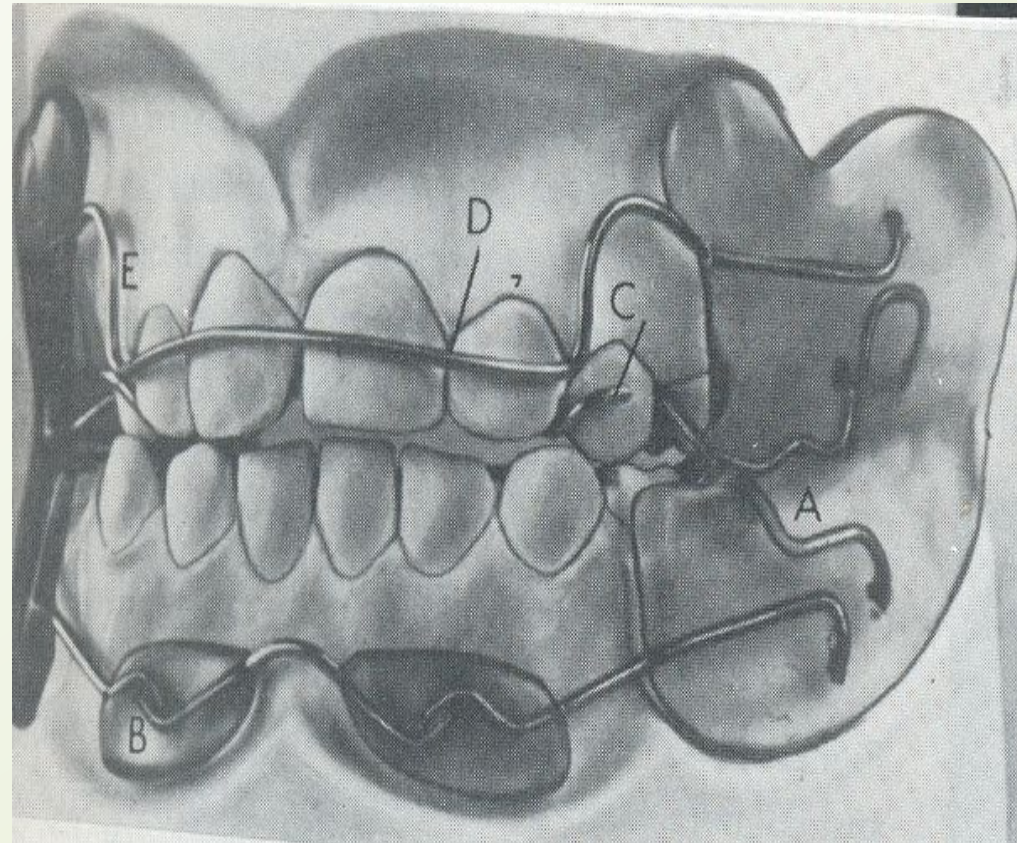


REDIRECTION OF JAW GROWTH



IMBALANCE IN SKELETAL JAW BASES

Frankel Functional Regulator




FRANKEL APPLIANCE

❖ Developed by *Rolf Frankel* of East Germany 1966.

Sometimes also referred to as

- ❖ *Deficiency appliance.*
- ❖ *Muscle training appliance.*
- ❖ *Function corrector or regulator*
- ❖ *Oral gymnastic appliance*

The Frankel Device is an Exercise device, stimulating normal function while eliminating the Lip Trap, hyperactive Mentalis and Aberrant Buccinator and Orbicularis Oris action.

- 
- ❖ *The action of Frankel Regulator is intended to **change or regulate the muscular environment** of the face and teeth to stretch facial musculature to normal dimension, impede abnormal activity of the lips, tongue and cheeks and thus allow development of the jaws and teeth in all three planes.*
 - ❖ *This Functional appliance which is passive in itself plays a mediating role between the **orofacial muscles and skeletal-dentoalveolar structures** of the maxillae and mandible.*



Indications

1. *Horizontal Growth Patterns.*
2. *Functional Retrusion.*
3. *Deep Overbite.*
4. *Excessive inter- occlusal clearance*
5. *Normally positioned maxilla*

Appliance design

The 4 basic variations of the appliance by Rolf and Christine Frankel (1989):

FR I a- Class I deep bite cases

b- Class II div 1 cases- overjet <7mm

c- Class II div 1 cases- overjet >7mm

FR II- Class II division 1, Class II division 2

FR III- Class III cases

FR IV- Open bite cases

FR V- with headgear

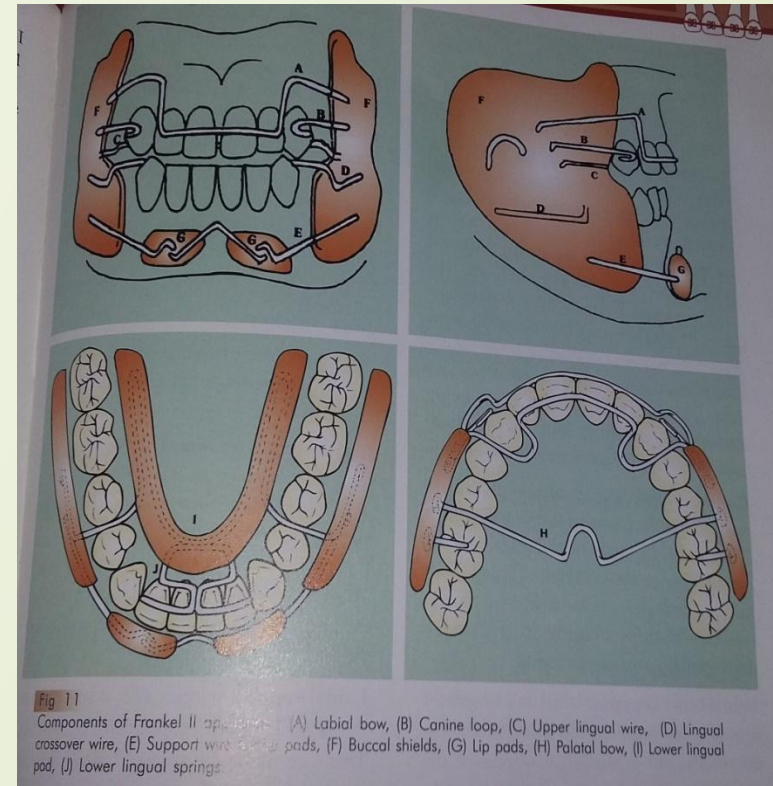
BASIC PARTS OF A FRANKEL APPLIANCE

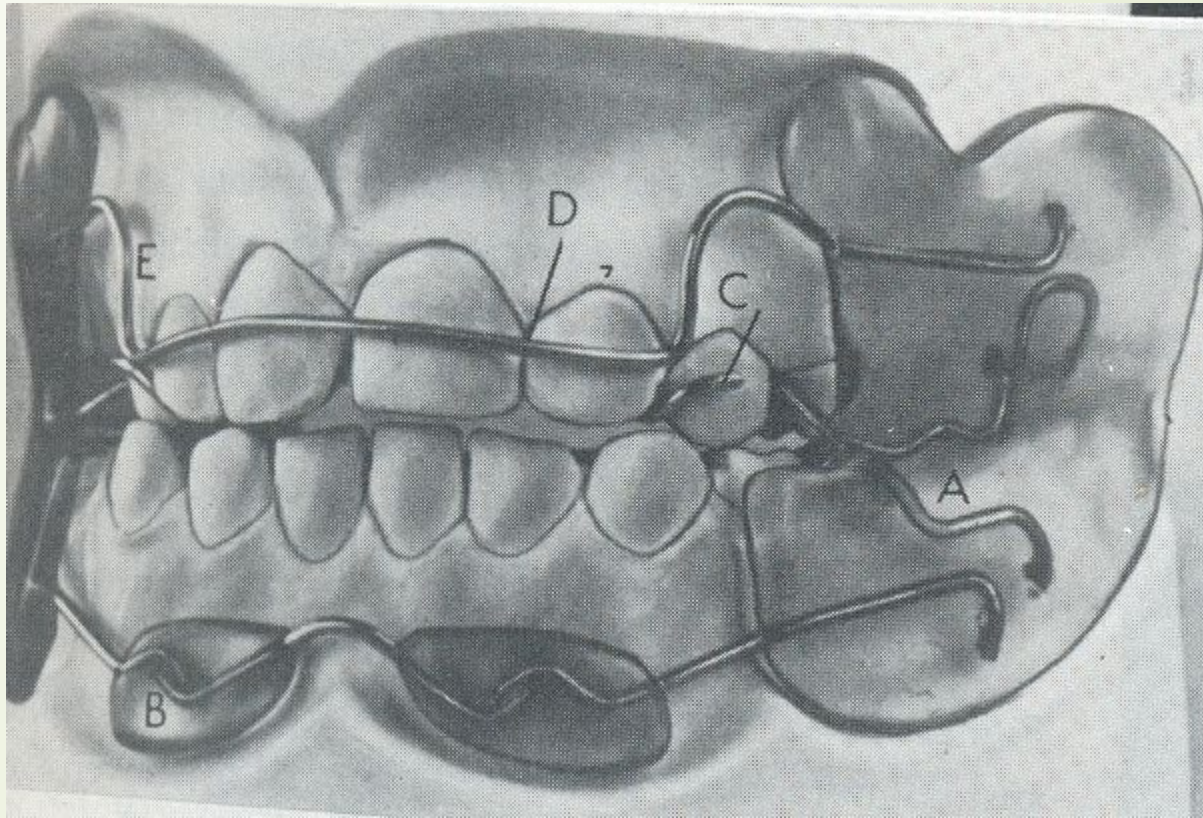
Acrylic components

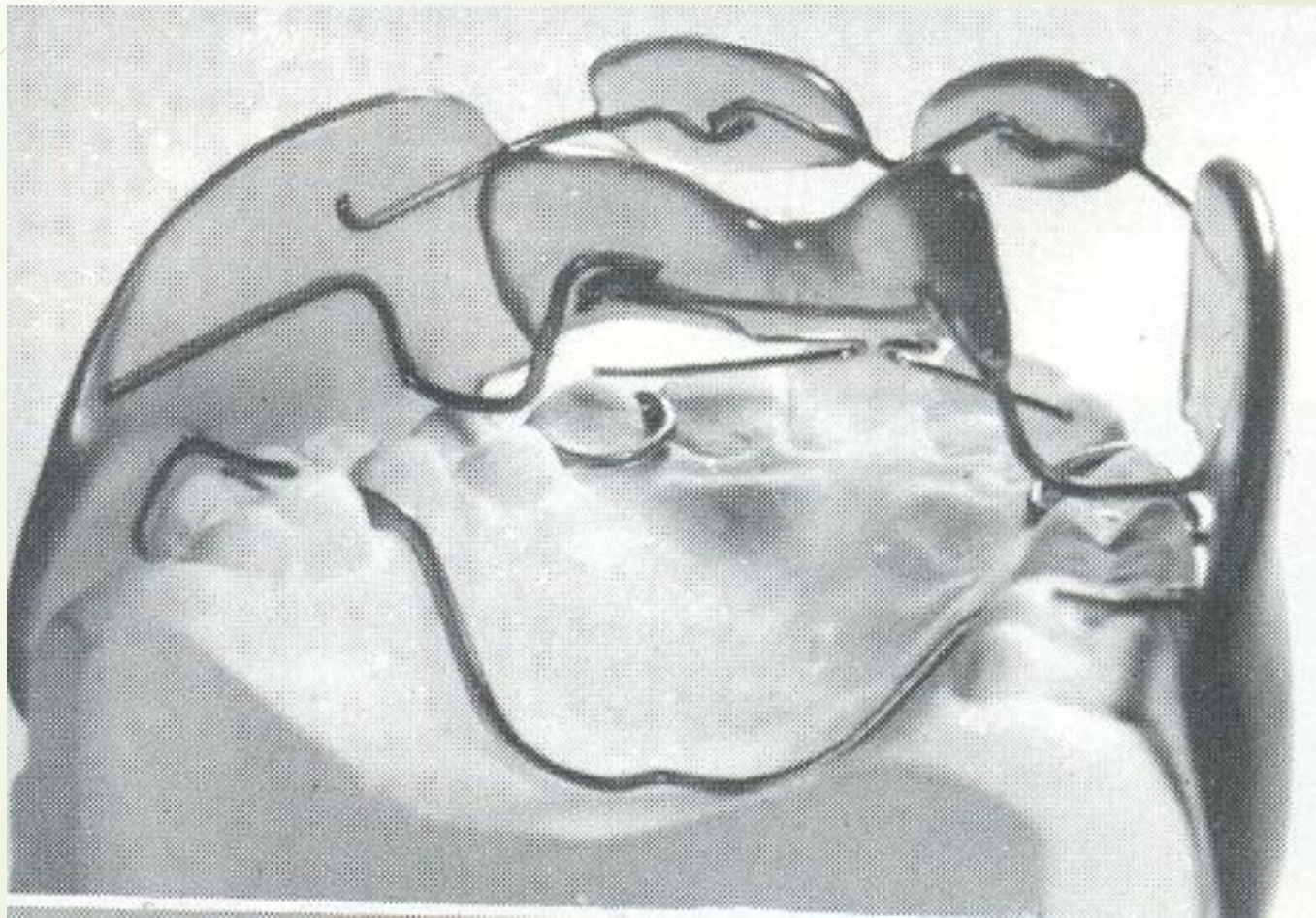
1. Buccal Shields.
2. Lip pads.
3. Lower Lingual pads.

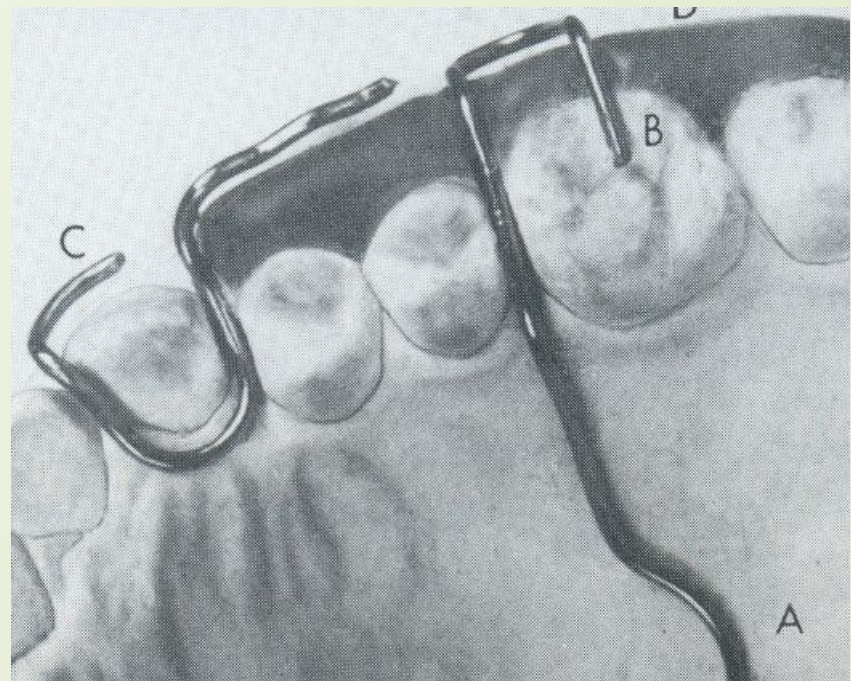
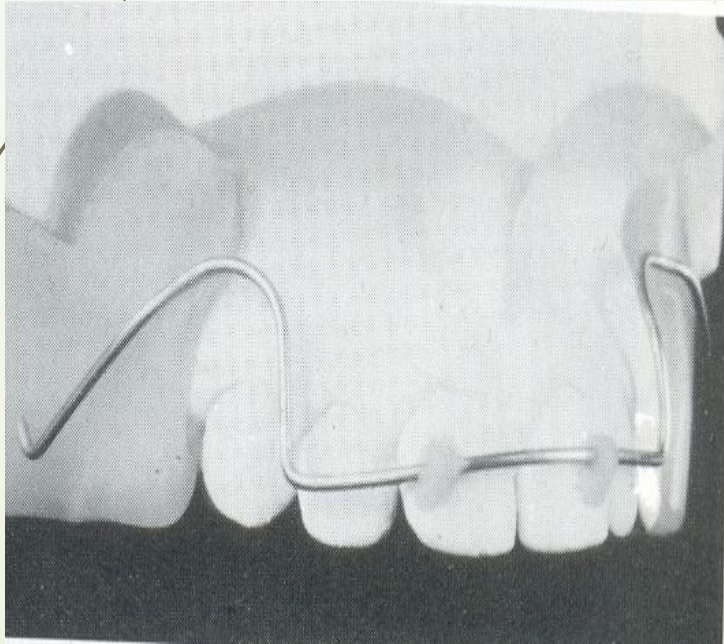
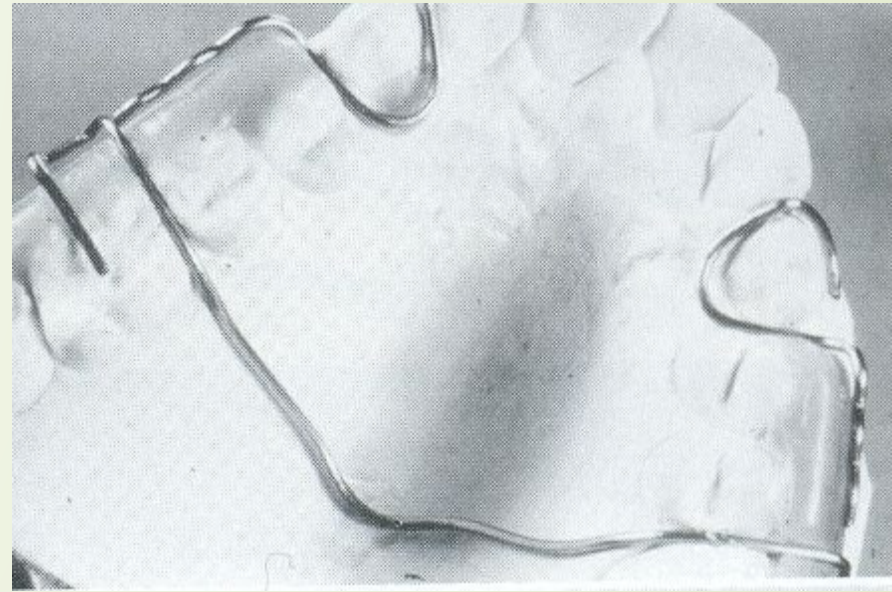
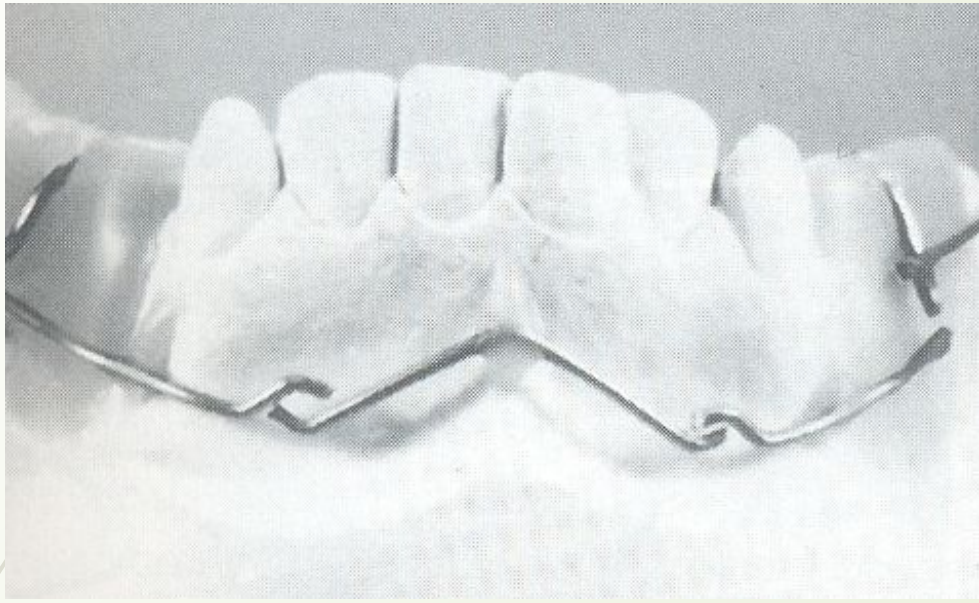
Wire components

4. Palatal bow.
5. Labial bow
6. Maxillary Canine Clasp.
7. Maxillary Molar Occlusal Rest.
8. Maxillary lingual wire
9. lower Lingual springs
10. lower Lingual crossover wire
11. Labial support wires



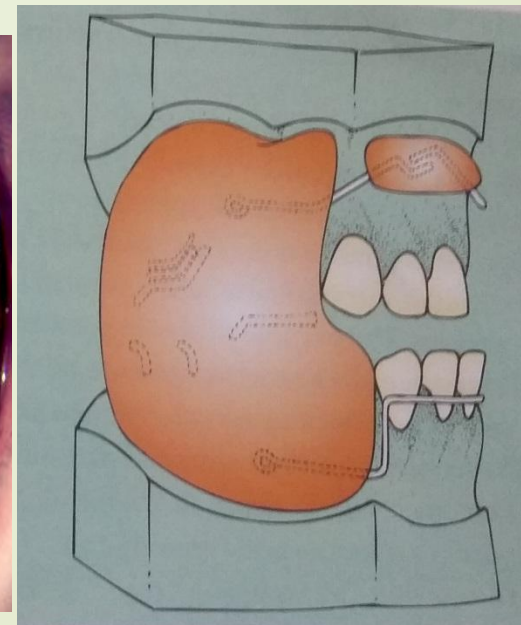
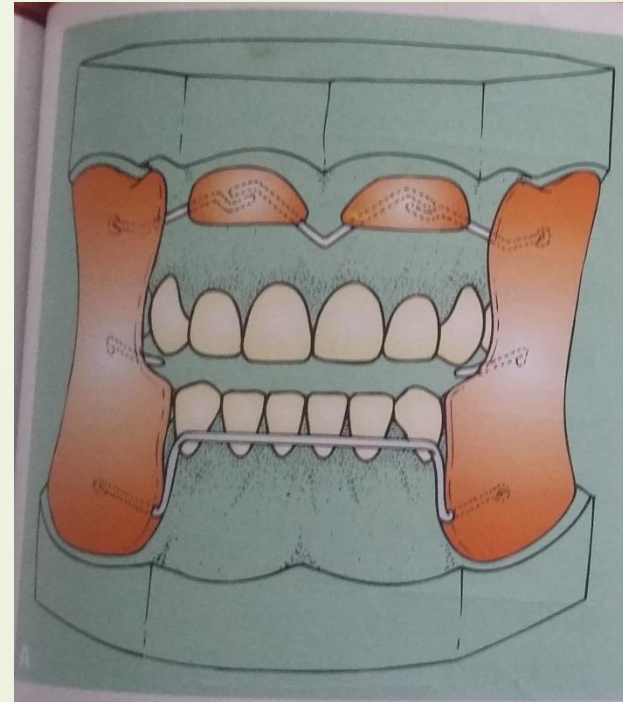






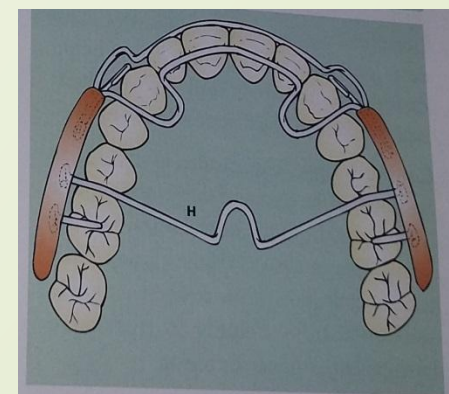
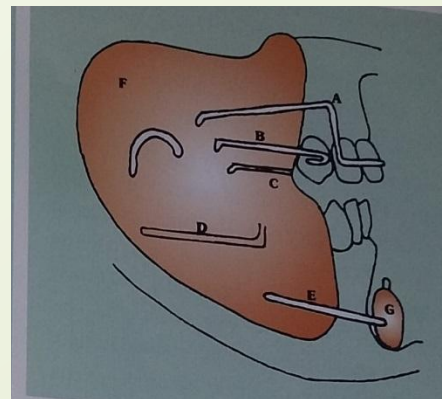
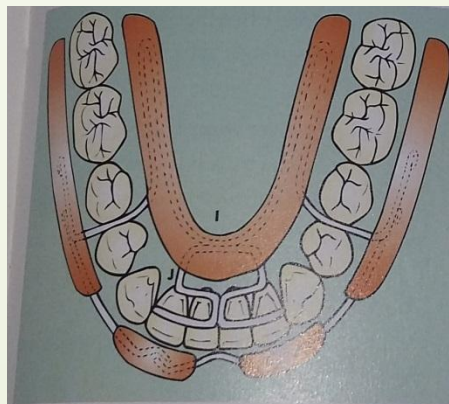
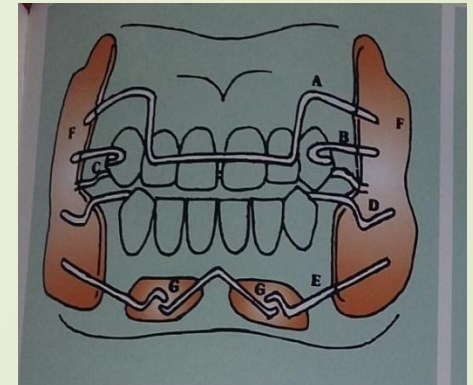
FR III:

- ❖ *The lip pads are situated in the labial vestibular sulcus of the upper incisor segment, instead of the lower.*
- ❖ *The pads stand away from the mucosa and underlying alveolar bone in the same manner as with the FR II.*
- ❖ *For maxillary retrognathism.*



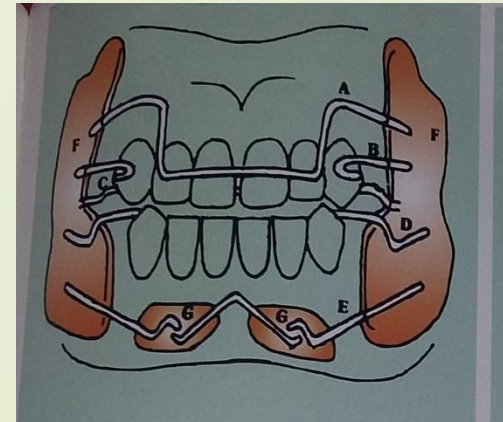
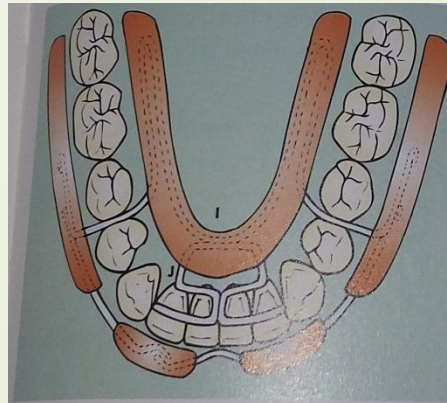
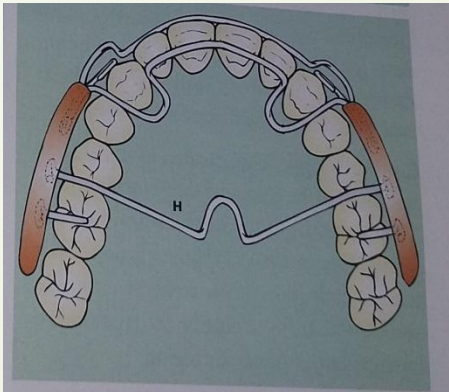
The Frankel Philosophy

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



Mode of action

1. *Increased in transverse and sagittal intraoral space*
2. *Increase in vertical space*
3. *Mandibular protraction*
4. *Muscle function adaptation*





Wear time

- First 3 weeks- 2-4 hours/day*
- After 3 weeks- 4-6 hours/day*
- After 3rd visit – full time*

Exercises like talking, reading, closing the lips tightly etc.

CONCLUSION

- These appliances utilize the muscle action of the patient to produce orthodontic or orthopaedic forces to restore facial balance.
- The question that must be addressed in diagnosis is :
“does the patient require orthodontic treatment or functional orthopedic treatment or a combination of both and to what degree?
whether the patient requires functional appliance alone or need a orthognathic surgery or to what extend FA can reduce need for surgery?”



REFERENCES

- *Dentofacial orthopaedics with functional appliances by Thomas M. Graber, Thomas Rakoshi, Alexander G . Petrovic*
- *Contemporary orthodontics by William R Proffit*
- *Removable orthodontic appliances by Graber, Neuman*
- *Textbook of orthodontics, Gurkeerat Singh*

