Functional appliances are used to treat orthopedic discrepancies as well as muscular dysfunction. They disrupt abnormal influences and facilitate a return to normal functional patterns. Functional appliances are most often used in growing patients.

**Xbow™**
**Higgins Crossbow Class II Corrector**

Xbow™ (Crossbow) appliance is an alternative to the Herbst® appliance for treatment of Class II malocclusions in children and adolescents. The Phase I appliance allows simultaneous anteroposterior and transverse correction.

The Xbow™ pits the entire mandibular arch against the maxillary bicuspids and molars, which opens space for the erupting canines. Used in conjunction with the Forsus™ Fatigue Resistant Device from 3M Unitek, the Xbow appliance allows overcorrection of the molars into a Class III relationship.

**The Xbow™ appliance consists of:**
- Maxillary expansion appliance
- Triple “L” Arch™ (lower labial lingual arch)
- Forsus™ Fatigue Resistant Device (25mm Direct Push Rod) and Gurin locks (allow for easy activation).

**Fabrication Requirements:**
1. Upper and lower models
2. Bands on upper 6’s (with occlusal headgear tubes) and upper 4’s (If serial extraction of all first bicuspids, band the upper e’s or 5’s and 6’s.)
3. Bands on lower 6’s

*Patent #5678991 Issued October 21, 1997
*Patent held by; Gerald R. Eganhouse, DDS, MS, Cedar Rapids, IA.

**The Eganhouse Class III Appliance**

**C106**

This appliance delivers forces to the facial complex to counter Class III growth problems. The Eganhouse appliance allows the maxillary and mandibular arches to work against each other in a frictionless fashion using modified splint appliances.

The design of the appliance includes upper and lower flat plane splints which articulate together. An anterior guide block and guide block groove balance the force vectors working against the Class III growth pattern. Facial hooks are incorporated into the splints to hold 3/16” - 6 oz. or 8 oz. elastics, or 1/4” - 6 oz. or 8 oz. elastics (depending on what the patient can tolerate) between the upper molar and lower cuspid hooks on each side. 1/8” - 6 oz. elastics are placed between the upper anterior and lower cuspid hooks to keep the splints together. The third set of hooks may be attached to Reverse-Pull headgear. A lower labial bow is incorporated into the lower splint design to increase anterior anchorage.

**Fabrication Requirements:** Maxillary and mandibular casts with a construction bite 4-5mm incisal opening.
**The Clark Twin Block**

**C105**

The Twin Block technique was developed by Dr. William Clark of Scotland during the early 1980’s. This technique develops a new principle in functional orthopedics by using the forces of occlusion as the functional mechanism to correct the malocclusion. Twin Blocks are worn 24 hours per day. This means that the patient eats with the appliances in the mouth and the forces of mastication are harnessed to maximize the functional response to treatment. Cooperation is excellent with Twin Blocks because the appliance is not removed for two to three days after it is fitted. There are no aesthetic cheek pads, lip pads, uncomfortable lingual extensions, as well as no anterior wires. Twin Blocks can be modified to treat a wide range of malocclusions to achieve sagittal and vertical correction of Class II division I, Class II division II, and Class III, malocclusions. Twin Blocks are also indicated in treatment of temporomandibular joint dysfunction.

The basic appliances are separate upper and lower plates. The upper plate includes an expansion screw for stability during transverse development. The lower lingual acrylic is extended distally to the last tooth with a lingual support wire, and a labial bow with acrylic is added. This serves to make the appliance more stable and retentive.

Deviations from standard design are Twin Block sagittal design, Twin Blocks to expand (i.e. Schwarz and Jackson), Twin Block Quad Helix for arch development, Twin Block Crozat for adult treatment, Fixed Twin Blocks, Magnetic Twin Blocks, and Sagittal Twin Blocks for TM Joint therapy.

**Fabrication Requirements:** Upper and lower models and a wax construction bite advanced 5-7mm, leaving 5mm vertical opening in the deciduous molar/bicuspid area.

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**Lab Tip:** Be sure to check your models for distortion, and broken or chipped teeth before sending them to the lab.
Bionators

The Bionator appliance has become widely accepted as a result of the reliable orthopedic corrections it produces. Other major advantages of these appliances are their extreme durability, ease of patient acceptance, and delivery.

Standard Bionator I
(to open bite)

**C107**
The Bionator I is designed to aid in correction of Class II malocclusions by maintaining the mandible in an advanced position and guiding eruption of the posterior teeth. In order to prevent the supereruption of the anterior teeth, the mandibular anteriors are covered with an acrylic cap which comes in contact with the maxillary anteriors. An expansion screw can be added to maintain a tight fit of the appliance.

*Shown with expansion screw*

Standard Bionator II
(to close bite)

**C108**
The Bionator II is designed to aid in correction of Class II malocclusions and the reduction of an anterior open bite. The latter is achieved by keeping the acrylic coverage over the occlusal surfaces of the posterior teeth. An expansion screw can be added to maintain a tight fit of the appliance.

*Shown with expansion screw*

**Fabrication Requirements:**
1. Upper and lower models must be provided.
2. Bite registration for Bionators to open should be in an edge-to-edge incisal relationship with a 2-3mm anterior vertical opening. For Bionators to close, a 2-3mm posterior vertical opening is required.

**Dr. Sondhi Modifications**
Whip springs are used instead of the lingual bar to control maxillary incisor inclination and a tongue crib is incorporated for open bite cases.

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“On many occasions the laboratory staff has responded creatively to special problems, displaying great depth of knowledge and concern for their customers and their patients.”

Irene D. Strychalski, DDS, MS
Dunkirk, NY

“Great Lakes is a company we have really learned we can rely on for absolutely straight answers and total commitment to service”

Peter E. Dawson, DDS
Center for Advanced Dental Study
St. Petersburg, FL
Fränkel Appliances

The Fränkel appliance (Functional Regulator) is a removable orthodontic appliance used in the growing individual to affect the development of muscle, bone, and the dentition simultaneously.

It provides a framework that promotes the interruption of abnormal function and facilitates the establishment of harmonious functional patterns. It also provides an environment in which inhibiting factors are removed and in which structural harmony can be achieved.

The goal of Fränkel treatment is facial balance.

Orthopedic Corrector I
(to open bite)
C109

The purpose of the Orthopedic Corrector I is to correct Class II malocclusions, as well as to reduce the overbite. It is also capable of increasing the arch width and the length of the maxilla and/or mandible by means of expansion screws. The mandible can be subsequently advanced by the clinician with minor adjustments made to the acrylic.

Fabrication Requirements:
1. Upper and lower models with detailed tissue definition must be provided.
2. Bite registration should reflect a mandibular advancement of 2-6mm, and vertical opening of approximately 2mm between the upper and lower bicuspids.

Fränkel I
D101

The Fränkel I is utilized to promote transverse arch development both dentally and skeletally. This is accomplished by the vestibular shields removing external muscle pressure from both the maxillary and mandibular arches. The appliance is also effective for interruption of abnormal mentalis function. Since there is an absence of dental contact, the appliance will also promote facial development.

Fabrication Requirements:
1. Upper and lower models must be provided.
2. Bite registration should be taken with a 3-4mm minimal mandibular advancement and vertical opening of 2-3mm between the upper and lower premolars.

Orthopedic Corrector II
(to close bite)
C110

The Orthopedic Corrector II is constructed to allow for a Class II correction, along with the ability to assist in closing an anterior open bite. This is achieved by holding the mandible in an advanced position and restricting the eruption of the posterior teeth with an acrylic cap. This appliance can also affect the arch length and width in a manner similar to that of an Orthopedic Corrector I.

Fabrication Requirements:
1. Upper and lower models must be provided.
2. Bite registration for Orthopedic Correctors to open should be in an edge-to-edge incisal relationship with a 2-3mm anterior vertical opening. For Orthopedic Correctors to close, a 2-3mm posterior vertical opening is required.

Fränkel II
D102

The primary thrust of the Fränkel II will also accomplish transverse and vertical development of both the maxillary and mandibular arches. The construction of this appliance allows for subsequent additional advancement of the mandibular portion of the appliance, thus largely eliminating the necessity for replacement appliances as mandibular growth occurs. Consultation with our laboratory is recommended to determine the optimum method of additional advancement techniques.

Fabrication Requirements:
1. Upper and lower models with detailed tissue definition must be provided.
2. Bite registration should reflect a mandibular advancement of 2-6mm, and vertical opening of approximately 2mm between the upper and lower bicuspids.
**Fränkel III**

D103

This appliance is used to aid in the correction of Class III malocclusions. This can be achieved by retarding further development of the mandible while simultaneously allowing for the development of the maxilla to its fullest growth potential. It is also effective in conjunction with other treatment modalities such as the Adaptable Class III Mask.

**Fabrication Requirements:**
1. Upper and lower models with detailed tissue definition must be provided.
2. Bite registration should be taken in habitual or mildly retruded position. The vertical opening should be 1mm between upper and lower molars or a sufficient opening to clear anterior cross bite.

**Fränkel IV**

The Fränkel IV is used exclusively in Class I malocclusions where skeletal open bite, arch width deficiency, or abnormal muscle function are present. Wire or acrylic stops are placed on posterior teeth allowing anterior tooth eruption. The vestibular shields will aid arch expansion and muscle stimulation. Please note that the Fränkel IV will not sustain any advancement or retrusion of the mandible.

**Fränkel V**

The Fränkel V is a modification of the Fränkel II and is intended for Class II malocclusions, particularly in cases where an increase in vertical dimension is undesirable. The Fränkel V is often used in conjunction with extraoral traction devices.

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**Lab Tip:** Make sure your bite registration reflects the correct midline relationship for appliance fabrication.