

Headgear Appliances

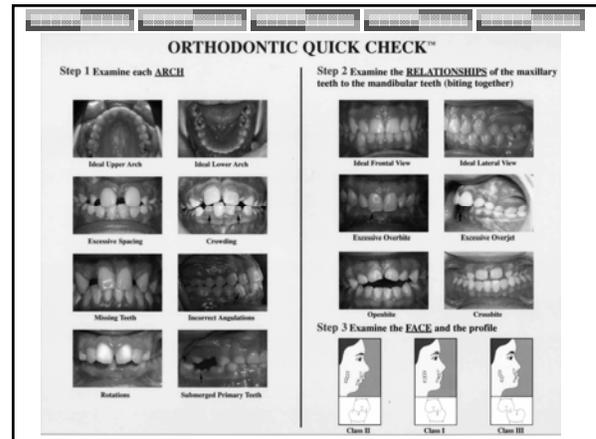
Natalie A. Capan, D.M.D.
580 Sylvan Avenue, Suite 1M
Englewood Cliffs, New Jersey 07632
(201)569-9055
www.CapanOrthodontics.com
CapanOrtho@nj.rr.com

Ideal Orthodontic Treatment Sequence

- All patients should be referred no later than age 7 for an orthodontic consult
- At that visit, orthodontist assesses if there are any issues that must be addressed prior to eruption of all of the adult dentition
- If so, patient is receives comprehensive orthodontic treatment
 - Phase I – Typically between ages 7-11
 - Phase II – Begins after eruption of most of adult dentition

A Common Misconception

Dentofacial Orthopedics *and* Orthodontics



What is Headgear?

- Orthopedic appliance that allows orthodontists to control growth of facial structures
- Various designs
- Used with growing patients



Importance of Proper Planning of Phased Treatment

- Phase I and Phase II are planned together to work in accordance with each other
- Patient's case must be treatment planned and diagnosed completely before the start of Phase I to ensure proper design of any Phase I appliance
- Just like headgear, all of the phase I appliances require proper design in order to be beneficial to the patient
- Proper diagnosis requires
 - Panoramic Radiograph
 - Cephalometric Radiograph
 - Models
 - Photos
 - Full orthodontic examination

Typical Phase I Treatments

- ☛ Sagittal Corrections (Anteroposterior)
 - Headgear
 - Functional appliances
 - Active retainers
- ☛ Transverse Corrections
 - Expanders
- ☛ Vertical Corrections
 - Bite plane retainers
- ☛ Spacing Corrections
 - Space maintainers
 - Nance appliances

Types of Headgear

- ☛ **Class II Correction** (excess growth of maxilla/deficient growth of mandible)
 - Cervical Headgear
 - High Pull Headgear
 - Combination
- ☛ **Class III Correction** (deficient growth of maxilla/excess growth of maxilla)
 - Reverse Pull Headgear
 - Chin Cup



Phase II Treatment

- ☛ Fixed bracketed appliances on maxillary and mandibular teeth
- ☛ If phase I is conducted properly, phase II treatment can often minimize need for premolar extractions and excessively long treatment times

Differential Diagnosis of Class II Skeletal Pattern

- ☛ Anteroposterior
 - Prognathic maxilla/retrognathic mandible/combination of both
 - Superimposed on the skeletal problems are the maxillary and mandibular dentition which may be protrusive or retrusive and proclined or retroclined
- ☛ Vertical
 - facial excess or deficiency must be considered
- ☛ Transverse
 - Maxillary or mandibular constriction



Angle's Classification of Malocclusions - Review

- ☛ Class I – Normal molar relationship (neutroclusion)
 - The mesiobuccal cusp of maxillary molar in line with the buccal groove of the mandibular molar
- ☛ Class II – Lower molar distal to upper molar (distocclusion)
- ☛ Class III – Lower molar mesial to upper molar (mesiocclusion)

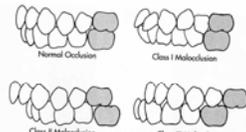


FIGURE 1-4 Normal occlusion and malocclusion classes as specified by Angle. This classification was quickly and widely adopted early in the twentieth century. It is incorporated within all contemporary descriptive and classification schemes.

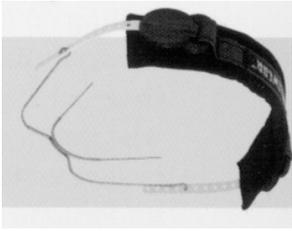
Treatment Options for Class II Correction

- ☛ Restrict maxillary growth
 - Headgear
 - Must be in growing patient
- ☛ Retract maxillary dentition
 - Limited potential
- ☛ Camouflage by extraction of upper premolars
- ☛ Advance the Mandible
 - Alter growth with a functional appliance
 - Surgery
- ☛ Advance Mandibular Dentition



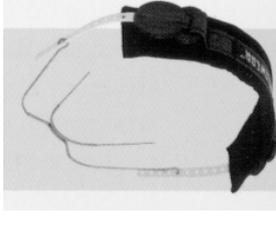
Headgear Components

- Force applied to first molars that are banded via a facebow with a headcap or a neckstrap for anchorage



Cervical Headgear

- Extraoral anchorage is at the back of the neck
- Advantages
 - Easy to wear
 - Not as visually apparent
- Disadvantages
 - Causes extrusion of the upper first molars which can cause an open bite



Facebow

- Outer bow – different lengths
- Inner bow – sized, connects to the maxillary molars



High Pull Headgear

- Anchorage at the back of the head
- Advantages
 - Will not extrude upper molars
- Disadvantages
 - More hardware for patients
 - More difficult to achieve posterior forces on the maxilla



Headstraps

Cervical Type

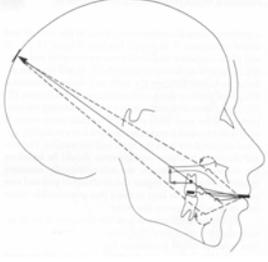


High Pull Headgear



High Pull Headgear

- To produce no tipping of the molar, the force of the headgear should go through the root trifurcation



Optimal Usage of Headgear

- Worn regularly for 10-12 hours per day
- Normally, orthodontists suggest 14 hours/day
- Growth hormone released in the early evening
- Ideal to place headgear after dinner not before bedtime



Effects of Less Force

- May produce dental changes and not skeletal changes

Magnitude of Force

- Ideal amount of force is 350-450 gm per side (12 to 16 ounces)
- Most movement through intermittent forces
- Hyalinized bone around molars
- Mobility of Molars normal



Side Effects of Headgear

- Unwanted extrusion forces on maxillary molars (typically found with cervical headgear) will cause the mandible to move inferiorly and posteriorly
- Negates Class II correction
- Can also be caused with distal tipping of molars



Effects of Excessive Force

- Greater than 1000 gm total
- Traumatic to the teeth and supporting structures

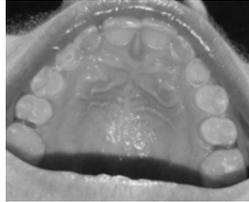
Center of Resistance

- Studies show that the center of resistance of the maxilla is above the roots of the premolar teeth
- Forces must be directed perfectly through this point to effectively restrain maxilla without tipping it



Clinical Procedures in Headgear Placement

- Separators make room for band placement
- Molar bands placed on maxillary first molars fit with buccal tubes
- Bands are fitted and cemented

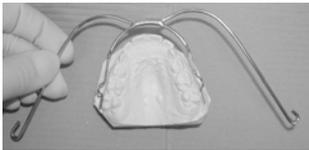


The Outer Bow adjustment

- The outer bow should rest several millimeters from the cheeks
- The bow should be cut to proper length and inclination

Facebow Fitting

- Preformed facebows selected and modified to fit the arch form of the patient
- Inner bow should fit closely to the arch form
- Omega loops/stops should allow the anterior portion to be about 4-5 mm away from maxillary incisors
- Anterior portion should fit comfortably between the lips which in place



Class II Presentation – Frontal View

- Protrusion of the upper incisors
- Possible incompetent lips



Facebow Expansion

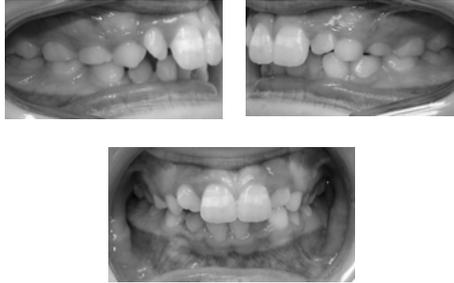
- As the Class II relationship corrects, crossbite will occur if the facebow is not adequately expanded
- 2 mm expansion is sufficient
- Patient will need to squeeze inner bow to place it in the tubes

Class II Soft Tissue Findings – Profile View

- Prognathic maxilla
- Retrognathic mandible
- Incompetent lips
- Strained facial musculature



Dental Findings



Frequent Soft Tissue Findings – Frontal View Class III Patient

- Narrow alar base
- Deficient zygomatic, paranasal, infraorbital areas
- Margin of sclera showing below pupils
- Midface deficiency
- Thin vermilion border
- Decreased maxillary incisor exposure at rest
- Reduced upper lip length



Class II Case - Initial



Frequent Soft Tissue Findings – Profile View

- Mandibular prognathism
- Well defined mandibular border
- Normal neck-chin angle of 120 degrees
- Midface deficiency

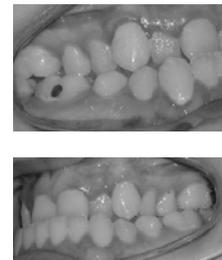


Class II Case - Final



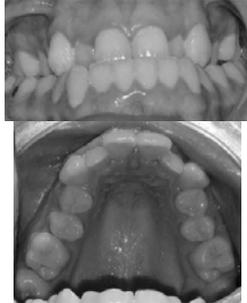
Frequent Dental/Intraoral Findings

- Mesioocclusion of molars and canines
- Crossbite tendency
- Buccal crown tipping of maxillary molars



Frequent Dental/Intraoral Findings

- ☛ Decreased attached gingiva for mandibular anterior dentition
- ☛ Maxillary retrognathism
 - Often absent or undersized maxillary lateral incisors
 - Maxillary dental crowding in canine/premolar area
- ☛ Mandibular Prognathism
 - Large tongue with crenations, interdental spacing, generalized open bite



Reverse Pull Headgear

- ☛ Forward traction on the maxilla
- ☛ Facemask attached to banded maxillary molars by elastics
- ☛ Side effects include downward and backward rotation of the mandible
- ☛ Lingual tipping of the mandibular incisors



Class III Skeletal Patient



Timing of Any Headgear Treatment

- ☛ Females
 - 8.5-10.5 years old
 - In general, if menses have occurred, most of the rapid growth has already occurred and headgear will not be very helpful
- ☛ Males
 - 9.5-11.5 years old

Progress (Between Phase I and Phase II)



More Technical Timing of Treatment

- ☛ Hand-Wrist Radiographs can be taken with the cephalometric units in orthodontic offices
- ☛ The ossification of various bones at the cartilaginous plates can be compared to an atlas
- ☛ A more scientific guide of actual degree of growth remaining



Why Didn't the Headgear
Work?

The Most Important Element

COMPLIANCE!

Another Possible Factor

- No one can predict how much differential growth the patient will have during the treatment time
- Good late growth of the mandible is very beneficial in the Class II correction with headgear
- Can be checked by taking serial radiographs and determining growth of structures during treatment time