

HERBST APPLIANCE REFERENCE CARD

Condyle-Fossa Modifications & Clinical Guidelines

▮ KEY RESEARCH FINDINGS

Voudouris et al. - Revolutionary Growth Relativity Theory

What Changed Everything:

- **✗ OLD THEORY:** Lateral pterygoid muscle hyperactivity drives growth
- **✓ NEW THEORY:** Viscoelastic tissue forces & mechanical transduction

Actual EMG Results:

- **DECREASED** muscle activity during successful treatment
- Growth occurred with **REDUCED** EMG activity in all muscles tested
- Contradicts 30+ years of previous assumptions

▮ TREATMENT CONTRIBUTIONS

(7mm change along occlusal plane)

Component	Contribution
Condylar Growth	22-46%
Glenoid Fossa Modification	6-32%
Dental Changes	~30%
TOTAL ORTHOPEDIC	~70%
TOTAL ORTHODONTIC	~30%

▮ AGE-RELATED RESPONSES

Age Group	Condylar Response	Fossa Response	Recommendation
Juvenile (Mixed)	High ✓	High ✓	OPTIMAL TIMING
Adolescent	Moderate ⚠	High ✓	Good timing
Adult	Limited ✗	Moderate ⚠	Consider alternatives

⚙️ **CRITICAL DESIGN FEATURES**

Must Include:

- **1.5mm occlusal coverage** (prevents condylar resorption)
- **Progressive activation** (1-2mm every 10-15 days)
- **Continuous wear** (not intermittent)
- **Vertical distraction** of condyle from eminence

Activation Protocol:

- 6 weeks: 4-5mm total advancement
- 12 weeks: 7mm total advancement
- 18 weeks: 8mm total advancement

📋 **EXPECTED OUTCOMES**

Skeletal Changes:

- **Super Class I** malocclusion development
- **Forward & downward** fossa remodeling
- **Increased mandibular length**
- **Superior & posterior** condylar growth

Timeline:

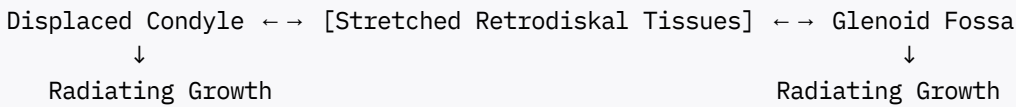
- **6 weeks:** Extensive cartilage proliferation
- **12 weeks:** Peak bone formation (1.2mm average)
- **18 weeks:** Maximum response (doubled spine thickness)

🚩 **CLINICAL RED FLAGS**

Warning Sign	Cause	Prevention
Condylar resorption	TMJ compression	Occlusal coverage essential
TMJ pain	Excessive force	Proper vertical dimension
Rapid relapse	Poor retention	6+ months retention minimum
Disk displacement	Improper design	Herbst-block design

▮ GROWTH RELATIVITY THEORY

Key Mechanism:



Force Distribution:

- **Viscoelastic tissue stretch** between condyle & fossa
- **Mechanical transduction** along fibrocartilage
- **Reciprocal bone formation** at both sites
- **NOT** muscle hyperactivity

▮ RETENTION PROTOCOL

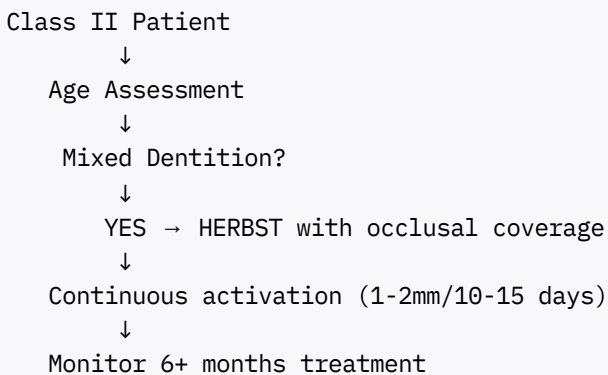
Critical Requirements:

- **Minimum 6 months** active retention
- **Progressive reduction** of appliance wear
- **Monitor muscle reattachment** process
- **Extended follow-up** essential

Why Retention Fails:

- Return of anterior digastric muscle function
- Perimandibular connective tissue pull
- Natural tendency for posterior condylar seating

▮ CLINICAL DECISION FLOWCHART



▮ MEMORY AIDS

"VOUDOURIS RULES"

- Viscoelastic forces drive change
- Occlusal coverage prevents resorption
- Undermining old muscle theories
- Decreased EMG during growth
- Orthopedic effects dominate (70%)
- Under-aged patients respond best
- Retention critical for stability
- Inferior-anterior fossa growth
- Super Class I results expected

▮ BOARD EXAM PEARLS

1. **Growth occurs with DECREASED muscle activity**
2. **70% orthopedic vs 30% orthodontic effects**
3. **Occlusal coverage prevents condylar resorption**
4. **Mixed dentition = optimal treatment timing**
5. **Continuous > intermittent activation**
6. **Retention failure = muscle reattachment**

▮ Clinical Applications

- Severe Class II mandibular retrognathism
- Mixed dentition preferred timing
- Requires comprehensive retention planning
- Monitor TMJ health throughout treatment
- Expect super Class I requiring finishing

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