“Early Treatment for Missing & Impacted Teeth”

“Diagnosis & Interceptive Management of Ectopic First Permanent Molars”

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Presentation available as E-handout @ AAO website

Ectopic Eruption: Definition

Developmental disturbance in the eruption patterns of any permanent teeth that results in atypical resorption of an adjacent tooth (either primary or permanent).

Ectopic Eruption of Maxillary First Molars

Reported prevalence of 1 to 4%
3 to 4% most likely

Young: J Dent Child 24:153, 1957

Ectopic Eruption of Mandibular First Permanent Molars

Incidence: 0.2%
- occurs 20 times more frequently in maxillary first molars than for mandibular first molars.

Treatment approach will generally be the same as maxillary!

Reversible
Irreversible

“Jump” type
“Hold” type

Young: J Dent Child 24:153, 1957
Reversible Type >> (“Jump Type”)

- After resorbing the distal root surface of the second primary molar, the permanent molar becomes free and erupts into a normal position (“self-corrects”).

Irreversible type >> “Hold Type”

- Molar becomes blocked by 2nd primary molar and remains in a “locked” position until treatment or premature exfoliation of the primary molar occurs.

Potential sequelae of irreversible ectopic maxillary first molars:

- Blocked eruption of 6’s.
- Resorption and early loss of 2nd primary molar
- Space Loss / Blockage of 2nd bicuspid

Ectopic 6 yr. molars > “Reversible”

“Self-correction”

- ~ 2/3rds of cases
- Occurs by age 7 years
- Resorption usually stops once cleared

Ectopic 6 yr. molars > “Irreversible”

- First molar remains locked under E
- Resorption usually progresses

Potential sequelae of irreversible ectopic maxillary first molars:

- Supra-eruption of lower 6
- Disruption of arch integrity & malalignment
ECTOPIC MOLARS: Etiological Factors
- Larger than normal teeth
- Small maxillary base
- Arch length inadequacy
- Retrusive maxilla
- Abnormal mesial eruption path of first molar
- Delayed calcification of first molar
- Cleft palate (up to ≈ 30% concurrence)
- Familial tendency (up to ≈ 20% in affected siblings)

Bjerklin & Kurol (AJO 84:147, 1983)

Sequeleae of ectopic maxillary 1st molars:
- About 1 in 5 with lower incisor ectopic eruption patterns will show ectopic eruption of the upper first permanent molar. Note resorption of lower canines, ectopic laterals.


Ectopic Maxillary 1st Molars & “Crowding”:
- Premature loss of primary molars almost always results in malocclusion with compromised arch circumference.
- Early loss of maxillary second primary molar produces greatest amount of space loss at the fastest rate when compared with other primary molars (Up to 8 mm. vs. 4.5 mm. in mandible with early loss of 2nd primary molar.)
- Major indicator of inherent inadequate arch perimeter (i.e. - expect further crowding and malocclusion).

> About 1 in 5 with ectopic upper 1st molars show lower incisor ectopic eruption (O’Meara: J Dent Res 41:607, 1962)
> One-fourth of canine impaction patients had ectopic upper 1st molars (Bockner et al: Eur J Orthod 27:186, 2005)

TREATMENT OF ECTOPIC MOLARS

Step 1. EARLY RECOGNITION
- PANORAMIC, PA’S or Adequate BWX 5 - 7 Y.O.

Pan BEST Option – Rx’d upon eruption of first permanent tooth

TREATMENT OF ECTOPIC MOLARS

Step 1. EARLY RECOGNITION > 5 - 7 Y.O.
- PAN, PA’S or Adequate BWX (#2 size)

# 1 BWX Too small
# 2 BWX More vertical exposure
TREATMENT OF ECTOPIC MOLARS

Step 2: Consider Observation

- Six months later >>> worse than before

Remember – 2/3rds “self-correct”; but not after age 7 years

ECTOPIC MOLARS: Treatment Objectives

- Distalize ectopic molar into normal A-P position
- Maintain arch integrity of buccal segment
- Maintain favorable exfoliation sequence
- Ensure vertically stable occlusion
- Maintain overall arch dimensions

ECTOPIC MOLARS: Treatment Variables

- Extent of blockage
- Degree of “E” resorption
- Access to 6 year molar
- Timing factors
- Arch-length status
- Cooperation

TREATMENT OF ECTOPIC MOLARS
INTERCEPTIVE “Options”

- Elastic separators
- Separating springs
- Brass wire
- SSC or band extension on 2nd molar
- Distalizing springs (Humphrey)
- Distal pull elastomerics (Halterman)

ELASTIC SEPARATORS

First option IF separator can be engaged around contact overhang - pull floss through “under” contact & vertically. Can tie the floss across the occlusal with sep. under area.

Step 3: Interceptive Tx. ➔ TIMING

- Patient age 7 years of age or more
- Lower 6 eruption At occlusal plane
- Upper E resorption Before extensive loss
- Upper 6 position Mesially inclined

Noted indicators negate "watchful waiting" - Time to intercept!

Bjorklin & Kurol: AJO 84:147, 1983

**One year recall**

**Age 7y. 9m.**

**Diagnosis & Elastic Separator Tx. @ Age 6y. 10m.**

- Replaced @ 3 week intervals (4 times)

**Separating Elastics**

**Advantages:**
- Ease of placement
- Cost of materials
- No anesthesia required (?)
- Do not interfere with eruption
- Do not interfere with occlusion.

**Disadvantages:**
- Limited Application
- Frequent Follow up

**SEPARATING SPRINGS**

**Combo**

- Separating Springs >>
- Elastic >>
- Separators

**Separating Springs**

- **Advantages:**
  - “Ease” of placement.
  - Prefabricated.
  - Inexpensive.

- **Disadvantages:**
  - Occlusal interference / occlusal clearance.
  - Anesthesia often required to place.
  - Limited Access = limited application.
  - “Somewhat” dangerous ➔ dislodgement ???

**BRASS WIRE SEPARATION**

Use of a brass ligature wire looped and tightened around the contact area of the ectopic eruption.

Replaced / tightened every week - progressively larger.
BRASS WIRE SEPARATION

Pre-Tx  Placement  6 weeks

Brass Wire Ligature

- Difficult to place
- Usually requires local anesthesia
- Often requires multiple replacements
- Breaks easily when attempting to tighten or it will pull through the contact.
- Relapses easily
- Can hinder eruption

“In essence is vastly over-rated!!!”

TREATMENT OF ECTOPIC MOLARS

Active Distalization Appliances

Springs > Push  Elastomerics > Pull

HUMPHREY APPLIANCE

Pre-Tx.  Placement


HUMPHREY APPLIANCE

Correction > 8 weeks

Corrected  Retained w/ band extension

Correction Time = six weeks

HUMPHREY APPLIANCE

Distalizing Springs
HUMPHREY APPLIANCE: Design

- Band E - E, connect with TPB, .036 S.S.
- Distal oriented helical loop of .025 S.S.
- Passive extends distal to ectopic molar
- Activated to engage composite ledge.

Humphrey Appliance

The "original"

Modifications
- Braden: Dent Clin N Am 8:441, 1964
- Garcia-Goday: JADA 105:244, 1982

Humphrey Appliance helical springs engaged against bonded composite ledges provide distal forces to ectopic molars.

- Produce forward forces, need TPB anchor.
- Interfere with vertical eruption, need second stage of correction >>> band “extensions”.

Advantages:
- Stability
- Quickness of correction
- Can correct severe locks of the first permanent molar

Disadvantages:
- Placement & activation of spring difficult
- Fabrication and cementation appointments are long and require significant cooperation.
- Spring can distalize molar; but prevents vertical eruption, may produce rotations & displacements of both permanent and primary molars.

DISTALIZING ELASTOMERICS

HALTERMAN APPLIANCE

Stretching elastomeric chain from wire to occlusal bonded button produces distalization force.

Halterman CW: JADA 105:1031, 1982
HALTERMAN APPLIANCE
Correction in 6 weeks with distal & vertical movement of molar.
Elastics disengaged, components left in place until molar erupts & occludes with bonded button.

HALTERMAN APPLIANCE
2 weeks change with distal & vertical movement.
Rel engaged chain to next loop >> need to clear by 2mm.

HALTERMAN APPLIANCE
Correction in 4 weeks
Occlusion in 8 weeks - removed
Same Patient @ 6 months Post. Tx.

Halterman Appliance @ 3 weeks Tx. Time
Case from Dr. David Kennedy

Halterman Appliance Six weeks treatment
Case from Dr. David Kennedy
Response @ three weeks Follow-up @ six months

Halterman Appliance: Design
Band E - E, connect w/TPB, 036 S.S.
Distally extend .036 wire from palatal side
Bond button on 6 as mesial as possible
Elastic chain (closed) from button to wire
HALTERMAN PROTOCOL
- Place appliance & molar “button” with elastic chain in place
- Monitor at two week intervals
- Reengage elastic chain until distalized 2 to 3 mm. beyond “E”
- Once cleared, discontinue elastic > leave appliance in > monitor
- Once molar button in occlusion, o.k. to remove
- If relapses, reactivate until cleared, retain with band extension

Halterman: Pre > Tx 3 weeks > Post > 4 yr.

Halterman Appliance
- Advantages:
  * Ease of basic appliance placement.
  * Ease of fabrication design.
  * Ease of activation.
  * Minimal displacement of 2nd primary molar.
  * Rarely requires any anesthesia.

- Disadvantages:
  * Bonding of occlusal button of first molar.
  * Critical adaptation of distal extension wire.
  * Difficulty in replacing power chain.

Ectopic Lower Molar > Halterman
- Same basic tx. objectives, timing of intervention, and appliance options as maxillary ectopic molars.

Case from Dr. David Kennedy
**ECTOPIC MOLARS: Summary Overview**

Incidence 3 to 4% in maxillary arch, rare in lower arch (0.2%).

Self-correction - 2/3rds of cases, resorption stops once “jumped”.

“Irreversible” - molars remain locked in resorption area of 2nd primary molar. Treat once lower first molar reaches occlusal plane height, age 7 years.

Intercept to guide 1st molar into normal position, retain primary molar & favorable eruption sequence, maintain arch length & a level occlusal plane.

**Preferred Tx. Options**
1. Elastic separators
2. Halterman Appliance

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**Lower Halterman**

- Only modification to Mx. Halterman appliance is to place distal extension arms from buccal of second primary molars - avoids tongue irritation.
- Can also incorporate lingual holding arch; but must be careful of erupting lower incisors.

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