Missing Second Premolars: Can early treatment make a difference?

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At what age can you know second premolars are absent?

- chronological age 8 to 9
- compare to first premolar
- compare to opposing arch
- family history
- late eruption
Missing Second Premolars and Associated Anomalies

- absent left second premolars
- ectopic Mx canines
- resorption of lateral
- infraocclusion of second primary molar
- late development right second premolars
Missing Second Premolars and Associated Anomalies

Infraocclusion – 25% vs 9%
Distoangular premolar – 8% vs 0.2%

Missing Second Premolars
Treatment Options

- leave primary molars ± build up ± disk
- extract – hold space – restore
- extract – close space
- extract early or disk – drift – close
- Transplant
- TADS to protract molars
4 Principles
Kennedy DB Eur Arch Ped Dent 2009 10 : 201-10

- Establish correct space
- Preserve occlusal table
- Preserve alveolar ridge
- Correct incisor position
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3 Questions

• What would you do if the absent tooth were present?
• Can this malocclusion be satisfactorily treated with extractions?
• What is the likelihood of survival of deciduous molar?
What is the survival rate of deciduous second molar with absent premolar?
What is the survival rate of deciduous second molar with absent premolar?

- reduced numbers of retained maxillary deciduous molars
- mandibular molars maybe more durable
- mandibular molars show increased infraocclusion
- resorption occurs in about 50%

Sletten et al  AJODO  2004 : 124 : 625-630
What is the survival rate of deciduous second molar with absent premolar?

- age 36 to 48 years
- negligible root resorption
- no infraocclusion

Sletten et al AJODO 2004 : 124 : 625-630
What is the survival rate of deciduous second molar with absent premolar?

• If deciduous molar lasts to adulthood without resorption or infraocclusion: excellent prognosis for longevity.
Retained Second Deciduous Molar
Problems: size of molar

- deciduous molar wider than absent premolar
- results in end on \( \frac{1}{2} \) cusp Class II molar
Retained Second Deciduous Molar Problems: root resorption

- resorption progressive
- reduced crown root ratio for restoration
- non restorable
- space too wide
- end on molar
- surgical removal
- compromised bone for implant
Retained Second Deciduous Molar Problems:

- infraocclusion

- impact magnified with growth
- early ankylosis worse than late
- infraocclusion worse when absent premolar than if premolar present

Kurol 1984 Eur J Ortho 6: 277-93
Kurol 1984 Angle Orthod 54: 283-94
Retained Second Deciduous Molar Problems:

- infraocclusion magnified with growth
- space loss > leeway space
- adjacent teeth tipping
- reduced vertical growth of adjacent teeth
- midline deflection in unilateral cases

Becker A et al AJO 1992 102 256-264
Becker A et al AJO 1992 102 302-309
Becker A et al AJO 1992 102 427-433
Impact of Extraction of Infraoccluded Deciduous Molars - *vertical*

- *vertical* considerations
- don’t let infraocclusion extend beyond proximal contact
Can we enhance extraction socket for future implant?

- rct of coral granules placed in primary molar extraction sites
- Posterior Mx and Mn 93.5 % successful in preserving alveolar width
- No pre-implant grafting needed

Sandor et al. : Dent Traumat : 19 : 221-7 : 2003
Missing Teeth Treatment

- **Costs**
  - orthodontic treatment
  - prosthetic replacement
  - adjunctive procedures (CBT / grafting)
  - maintenance of prosthesis
  - $4000 per tooth
Treatment Options

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- TADS to protract molars
Leave upper space to obtain
Class I canine and molar
Treatment Options

• leave primary molars ± build up ± disk
• extract – hold space – restore
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• extract early or disk – drift – close
• Transplant
• TADS to protract molars
• Maryland bridge until growth complete
• less invasive
• less cost
• future implant still an option
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- **extract – close space**
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Missing Second Premolar

Early Extraction

- saved 4 prostheses?
- reduced costs
- shorter orthodontic treatment
- easier orthodontic treatment
- less / no incisor retraction
- no dentistry is best dentistry
Spontaneous Space Closure after Extraction

- 11 patients mean age 11.8 years
- Class I non crowded with missing second premolars
- models before, 1, 2 and 4 years
- ceph before, 2 and 4 years

Spontaneous Space Closure after Extraction

- 55% Mx space closed in 1\textsuperscript{st} year
- 46% Mn space closed in 1\textsuperscript{st} year
- at year 4 - 89% of Mx space closed : 0.9 mm left
- at year 4 - 80% of Mn space closed : 2.0 mm left

Spontaneous Space Closure after Extraction

- Mx premolar tipped 7° by year 4
- Mx molar tipped 4.5° by year 4
- Mn premolar tipped 9° by year 4
- Mn molar tipped 5.7° by year 4
- most tipping occurred in 1st year

Spontaneous Space Closure after Extraction

- minimal incisor movement
- Mx incisor retroclined 3.5°
- Mn incisor retroclined 3.0°
- Mn incisors 0.9 mm posterior to A-Pg line
- unilateral case showed midline shift

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Autogenous transplantation of premolar to premolar sites

- 40 consecutive patients
- mean observation of 10 years 4 months post Tx
- 92.5% success
- 2/3 of transplants with open apices survived with pulpal vitality
- roots continued to grow on transplanted teeth

Premolar to Premolar Transplant
Class II Camouflage Tx / Missing Premolar
Missing Second Premolars: can early treatment make a difference?

- longevity of primary molar
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Yes