



## CLINICAL PROBLEM

- The prevalence of crowding of permanent incisors is 33.3%-50% worldwide (1).
- Crowding is associated with aesthetic concerns, possible difficulties with plaque control and other malocclusions (1).
- One intervention to correct incisor crowding, surgical extraction of primary canines (Cs), is believed to induce spontaneous alignment of incisors.
- These extractions of Cs are controversial due to concerns about their long-term effects on arch space.

## CLINICAL QUESTION



Among children with permanent incisor crowding, to what extent does primary canine extraction alter the permanent incisor crowding compared to no extraction within 5 years?



## EVIDENCE SEARCH

Search date: January 31st, 2023

Keywords and MeSH terms: dentition, mixed, child, cuspid, canine extraction, tooth extraction, dental arch, incisor, incisor crowding, treatment outcome, malocclusion/therapy. PubMed yield: 683 evidence sources

Additional search: Cochrane, Scopus, Web of Science, Clinical Trials, OpenGrey, and Google Scholar

Article selected: Espinosa D. et al., 2020, Systematic Review, 3 primary studies (2 RCTs and 1 non-RCT)

**REFERENCES:** (1) Espinosa, Daybelis González et al. "The effect of extraction of lower primary canines on the morphology of dental arch: A systematic review and meta-analysis." *International journal of paediatric dentistry* vol. 31,5 (2021): 583-597. doi:10.1111/ipd.12726

(2) Kau CH, Durning P, Richmond S, Miotti FA, Harzer W. Extractions as a form of interception in the developing dentition: a randomized controlled trial. *J Orthod.* 2004;31(2):107-114.



## CLINICAL BOTTOM LINE

Overall, there is **limited** evidence to support the extraction of lower primary canines to reduce permanent incisor irregularity. **More RCTs involving lower primary canine extraction and long-term follow-up are needed, notably to evaluate the effect on the eruption of other teeth.**

## RESULTS

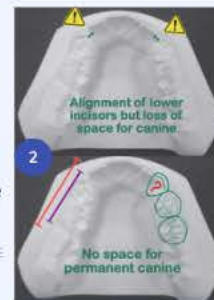
- MD (incisor irregularity) = -2.83mm (95% CI: -3.56, -2.09) I2=98%
- MD (Arch length): -1.26mm (-1.58,-0.94) I2= 90%
- MD (Intermolar Width): -0.41mm (-0.61,-0.22) I2=0%
- MD (Overbite): 0.43mm (0.10,0.76) I2=0%

## INTERPRETATION

- The results for incisor irregularity are **CLINICALLY MEANINGFUL** and **CLINICALLY DECISIVE** (threshold: 2 mm).
- **Extraction of primary canines** reduces the available space for permanent canines.
- Within 5 years, there is **NO EVIDENCE** on the extraction of the canines on lower incisor crowding.



2 year follow up  
Incisor crowding resolved,  
little space for permanent canine



■ REQUIRED SPACE  
■ AVAILABLE SPACE



2 year follow up  
Incisor crowding NOT resolved,  
insufficient space  
for permanent canines



Images taken from (2)

## STRENGTHS:

- Systematic review with clearly defined PICO; Six different databases; No language limits.
- Two independent reviewers and arbitrator.
- PRISMA diagram; summary table; GRADE approach.
- Validated Cochrane risk of bias tool.

## LIMITATIONS:

- Indications for extraction of primary canines not mentioned.
- High statistical heterogeneity related to incisor irregularity.
- Space analysis limited to the anterior crowding and arch length comparisons, with no estimates of future canines/premolar dimensions.
- 3 studies only, including a non-RCT; one RCT only examined effects on the lower arch.
- Follow-up less than 5 years.
- No assessment of publication bias.
- Lingual arch effectiveness not properly investigated.
- Authors incorrectly concluded that treatment length was decreased for exo of Cs only from a study that investigated serial extractions (C's, D's and 4s).



## APPLICABILITY

- High-income countries, similar to Canada's population and modern dental practices.
- Children in mixed dentition: population of interest.
- No information about the cost, socioeconomic status of the study population and setting.
- Quebec covers tooth extraction for children under 10.
- In Canada, eligible guardians can apply for insurance coverage of dental care costs for children under 12.
- Sufficient time to follow up to see short-term effects.
- Insufficient time-to-follow-up to assess long-term effects: permanent canines may not have space to erupt.
- Invasive procedures (may create lifelong reluctance regarding dental treatment in young children).

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