

Do Bitewing Radiographs Paired with Visual-Tactile diagnosis Lead to Improved Treatment Outcomes in Primary Teeth?

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Clinical Problem

- Dental caries in children remains a major public health issue in Canada and worldwide (1, 2).
- The diagnostic strategy of choice for detecting carious lesions in children remains controversial (3).
- Bitewing radiographs (RAD) are recommended as an additional tool for visual-tactile detection (VIS) of caries.
- VIS+RAD may offer higher sensitivity (4).
- Although sensitivity may be increased, specificity tends to decrease, potentially leading to more false-positives that result in unnecessary treatment and radiation exposure (4).
- The use of VIS+RAD approach for caries diagnosis and treatment decisions needs to be justified by the evidence.**

Clinical Question

- In children, does the use of bitewing radiographs paired with visual-tactile caries detection compared to visual-tactile diagnosis alone impact caries treatment decisions and long-term clinical outcomes?**

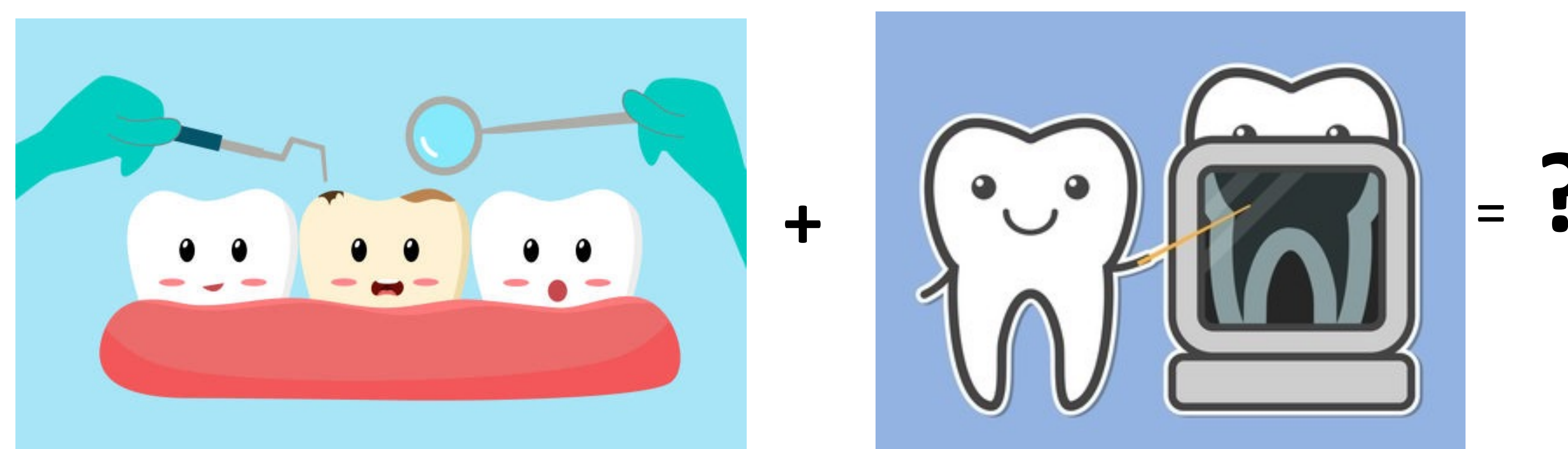
Evidence Search

- Search date: November 29th, 2023
- Study designs: Randomized Control Trials, Systematic reviews, Clinical Guidelines
- MeSH terms and key words: Child, Dental Caries, Radiography, Bitewing
- Ovid yield: 74 evidence sources
- Additional search: EBD journals, ADA and EBD website: 3 evidence sources
- Evidence selected:* Pontes et al. 2020 (3), 2021 (4) - RCT

Clinical Bottom Line

- VIS+RAD approach in children with primary dentition led to more restorative interventions compared to VIS alone.
- VIS+RAD did not change the majority of diagnostic and treatment decisions made by VIS alone.
- Within the 2-year follow up, no clinically meaningful differences in new operative interventions between the diagnostic approaches were found.
- VIS+RAD approach in children with primary dentition may lead to more potential harms related to false-positives, overdiagnosis, and lead-time bias.
- The current evidence does not support the additional use of radiographic detection in conjunction with visual-tactile diagnosis for caries management treatment decisions in primary dentition.**
- More studies with robust methodology and appropriate sample size are needed (primary and permanent dentition).

Results



- Pontes et al., 2020, 2021, RCT
- Intervention/Comparison:* VIS +RAD vs VIS alone; *N* = 250; *Age* = 3-6 years old; *Follow-up* = 2 years

Outcome	Statistically Significant	Clinically Meaningful	Clinically Decisive	Interpretation
Surfaces with new operative intervention MD= -0.20 (95% CI: -1.40 to 1.00)	No	No	No	No difference VIS vs. VIS+RAD
Surfaces with restorative procedures since the beginning of the study MD= 0.80 (95% CI: -1.00 to 2.60)	No	Yes	No	VIS+RAD produced a clinically meaningful higher number of restorative procedures compared to VIS alone.
Surfaces with no initial treatment MD= -2.50 (95% CI: -5.02 to 0.02)	No	Yes	No	VIS alone produced clinically meaningful higher number of surfaces with no initial treatment compared to VIS+RAD.
False positive results related to true caries lesion detection MD= 0.44 (95% CI: 0.23 to 0.65)	Yes	No	No	VIS+RAD produced a statistically significant higher number of false positive caries lesion detected compared to VIS alone.

MD = Mean Difference
 Clinically meaningful threshold for MD in treatment/diagnostic decisions = 0.5 tooth surface

Applicability

- The age group and follow up period are appropriate
- Caries experiences of children in Brazil (dmft of 0.7)(3) vs. QC (dmft of 3.96)(5)
- Caries risk factors: socio-economic status, water fluoridation, and diet may be different
- Different location (Brazil vs QC) and setting (dental school clinic vs private practice)
- VIS+RAD of posterior primary dentition is current standard of practice in QC.
- VIS is a non-invasive, low-cost, efficient approach for detecting caries in primary dentition.
- The ICDAS II visual-tactile criteria are relatively new and widespread continuing education training of dental clinicians is needed.

Strengths

- Random allocation sequence (web-site generated)
- Concealed allocation (opaque envelopes)
- Participants, evaluators and analysts were blinded
- Validated measurement instrument (ICDAS criteria)(6)
- Missing data statistically analyzed
- 2-year follow-up
- Intention-to-treat analysis

Limitations

- Unclear if biostatistician was blinded
- Examiner reliability was not reported (numerical values)
- SES, diet and oral hygiene habits of participants were not reported
- Incomplete follow-up (14% drop-out rate)

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