Conference Paper

Evidence of Effectiveness of Current Therapies to Prevent and Treat Early Childhood Caries

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Abstract: ***Purpose:*** *The purpose of this paper was to systematically review the quality of evidence related to self-applied and professionally applied fluorides, antimicrobial agents, fissure sealants, temporary restorations, and restorative care for the prevention and management of early childhood caries (ECC).* ***Methods:*** *Relevant papers were selected after an electronic search for literature published in English between 2000 and April 2014. From 877 reports, 33 were included for full review. The quality of evidence was expressed according to the GRADE (Grading of Recommendations Assessment, Development and Evaluation) system.* ***Results:*** *There was moderate and limited quality of evidence in support of fluoride toothpaste and fluoride varnish for ECC prevention, while the evidence for fluoride tablets/drops was insufficient. The support for the use of silver diamine fluoride, xylitol, chlorhexidine varnish/gel, povidone iodine, probiotic bacteria, and remineralizing agents (casein phosphopeptide-amorphous calcium phosphate) was insufficient. There was also insufficient quality of evidence for the use of sealants, temporary restorations, and traditional restorative care to reduce incidence of ECC.* ***Conclusion:*** *The results reinforce the need for high quality clinical research and point out the knowledge gaps to be addressed in future studies.* *(Pediatr Dent 2015;37(3):246-53) Received January 26, 2015 / Last Revision March 20, 2015 / Accepted March 31, 2015*

KEYWORDS: DENTAL CARIES, FLUORIDE, INFANTS, RESTORATIVE CARE

Early childhood caries (**ECC**) is a complex condition associated with impaired oral health-related quality of life (**OHRQOL**) and high costs for families and society in general. It is commonly postulated that ECC is a preventable disease, but studies to support this are actually rare. In a previous update, Tinanoff and Reisine[1] concluded that preventive programs to combat ECC have been proven only partly successful, and the relapse after restorative treatment is commonly reported to be approximately 40 percent.[2,3] In addition, many ECC prevention guidelines have been released over the years, but their effectiveness has seldom been proved.[4] Systematic reviews on ECC prevention and management highlight early introduction and regular use of fluoride toothpaste as the best self-care method to prevent the disease.[5,6] Among the professional methods, the use of fluoride varnish has been a recommended procedure for children younger than six years old, albeit the evidence is not strong.[7] Consequently, there are still knowledge gaps and room for further clinical trials in infants.

The purpose of this conference paper was to systematically review the evidence with a focus on the following five clinical questions: (1) Do self-applied and professionally applied fluorides reduce the incidence of early childhood caries? (2) Do anticaries agents (e.g., antimicrobials, remineralizing agents) reduce the incidence of ECC? (3) Do sealants reduce the incidence of ECC? (4) Do temporary restorations provide disease management for ECC? (5) Does traditional restorative dentistry provide disease management for ECC?

Methods

A broad search for articles published in English was conducted in the PubMed database and Cochrane library. The main search terms, in various combinations, were: early childhood caries; nursing caries; infant caries; prevention; fluoride; fluoride varnish; antibacterial agents; caries control; caries management; and restorative treatment. Relevant papers published between 2007 and April 2014 (prevention of ECC) and 2000 through April 2014 (treatment/management of ECC) were identified after an independent review of the abstracts by the authors (Figure 1). Diverging opinions were resolved in consensus. For the prevention sections (questions one and two), only prospective, randomized, and non-randomized controlled trials describing a defined intervention implemented to children before three years of age were considered. Furthermore, an endpoint reporting caries prevalence and/or incidence over a study period of at least one year was required. Reference lists of accepted papers and systematic reviews were hand-searched for additional literature. Studies reporting surrogate endpoints or interventions directed

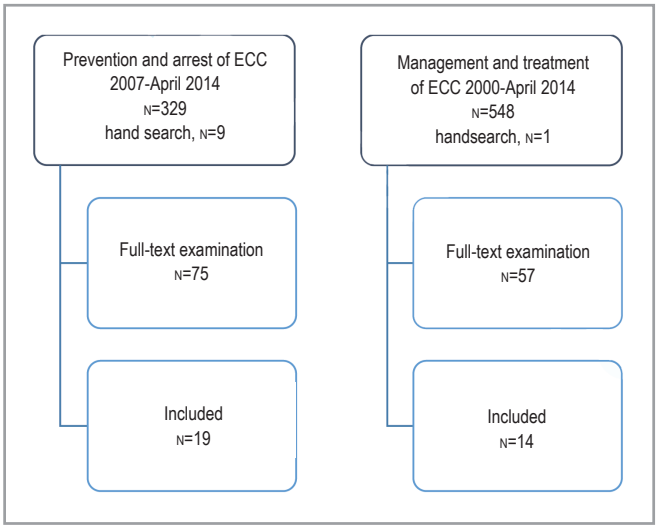

Figure 1. Flowchart of papers.

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Table 1. QUALITY OF EVIDENCE ACCORDING TO GRADE[9]

Grade	Legend	Quality of evidence
High	⊕⊕⊕⊕	Based on high or moderate quality studies containing no factors that weaken the overall judgment
Moderate	⊕⊕⊕O	Based on high or moderate quality studies containing isolated factors that weaken the overall judgment
Low	⊕⊕OO	Based on high or moderate quality studies containing factors that weaken the overall judgment
Very low	⊕OOO	The evidence base is insufficient when scientific evidence is lacking, quality of available studies is poor, or studies of similar quality are contradictory.

to mothers (primary-primary prevention) were excluded. For non-operative ECC management (questions three and four related to sodium diamine fluoride, atraumatic restorative treatment, temporary fillings, and sealants) and restorative treatment in children up to six years old (question five), controlled non-randomized clinical trials and observational studies were accepted, with endpoints related to the fate of treated teeth, new cavities (recurrent disease), caries arrestment, quality of life, and pain reduction. Case reports, case series, abstracts, textbooks, narrative reviews, and expert opinions were excluded. In the event of multiple publications from the same project, only the most recent contribution was included. Papers describing community fluorides (e.g., in water, milk, and salt) were not assessed.

Key data were extracted and compiled in tables. Both authors, according to predetermined criteria for methodology and performance, assessed the quality of the selected publications independently. The criteria of the Cochrane handbook for interventions[8] were used, and the risk of bias for each paper was graded as low, moderate, or high. Due to the diversity of the included studies, a narrative synthesis was carried out. The quality of evidence for each of the clinical questions was rated, using the GRADE profiler software version 3.6.1. The GRADE (Grading of Recommendations Assessment, Development and Evaluation) system,[9] allows rating the quality of evidence in four categories, as shown in Table 1.

Results

Question 1: Do self-applied and professionally applied fluorides reduce the incidence of ECC? Self-applied fluorides. Only two original papers from 2007 were included (Table 2), both supplying high-risk families with fluoride toothpaste and toothbrushes from early age as a part of oral health promotion activities for parents.[10,11] Both had a high risk of bias and displayed a mixed outcome. This illustrates the challenge to get compliance among those with the greatest needs. However, several previous systematic reviews, of which two were published in recent years,[12,13] have concluded that fluoride toothpaste reduces caries in the primary dentition. Thus, daily toothbrushing with fluoride toothpaste from the eruption of the first tooth must be regarded as best clinical practice today, based on moderate quality of evidence (⊕⊕⊕O). No recent papers on other self-applied fluoride supplements (tablets, drops) met the inclusion criteria, so the quality of evidence was based on systematic reviews of previously published literature.[5,6,14] Therefore, it may be concluded that evidence for ECC prevention with fluoride tablets and drops is insufficient (⊕OOO).

Professional fluorides: Fluoride varnish. Seven papers describing six studies with fluoride varnish (five percent sodium fluoride) applications, typically two to four times per year, in combination with oral health promotion were included (Table 2).[15-21] Only one study reported a double-blind placebo-controlled design,[21] and none were assessed with a low risk of bias. Common confounding factors were water fluoride, supervised toothbrushing with fluoride toothpaste, attrition bias, and inadequate controls. The mean prevented fraction, calculated

Table 2. SELF-APPLIED AND PROFESSIONAL FLUORIDES FOR EARLY CHILDHOOD CARIES (ECC) PREVENTION (2007-2014)*

Author, year	Design size/age	Intervention	Control	Follow-up age (yrs)	ECC outcome/ PF (%)	Risk of bias
Self-applied						
Davies, 2007[10]	Cohort 664/8 mos	FTP+OHP	NI	5	20 vs. 32%/38%	High
Livny, 2007[11]	Cohort 596/6 mos	FTP+OHP	NI	2.5	15 vs. 15%, NS	High
Professionally applied						
Lawrence, 2008[15]	CRCT 1146/6mos	FV, 2yrs+OHP	OHP	2.5-7	11.0 vs. 13.4 dmfs/18%	Moderate
Milgrom, 2009[16]	CCT 473/64 mos	V, 3yrs+FTP	FV, 3yrs	4	8.2 vs.10.3 deft 20%	Moderate
Minah, 2010[17]	CCT 219/6 mos	FV + OHP	Historical	2-3	0.1 vs. 1.3ds/93%	High
Slade, 2011[18]	CRCT 543/18 mos	FV, 2yrs+OHP	NI	3.5-6	6.9 vs. 9.9 dmfs/24%	Moderate
Ramos-Gomez, 2012[19]	CCT 361/4 mos	FV, 2yrs+OHP	OHP+(FV)	3	34 vs. 34%, NS	High
Divaris, 2013[20†]	CRCT 543/18 mos	FV, 2yrs+OHP	NI	3.5-6	RR: 0.75/25%, NS	Moderate
Oliviera, 2014[21]	RCT 200/12 mos	FV, 2yrs	Placebo, 2/yrs	3	36 vs. 47% d2d3/11%, NS	Moderate

* PF=prevented fraction; FTP=fluoride toothpaste; OHP=oral health promotion; NI=no intervention; CCT=controlled clinical trial; RCT=randomized controlled trial; CRCT=cluster randomized controlled trial; FV=fluoride varnish; NS=not significant; RR=relapse rates.

† Secondary analysis of Slade et al., 2011.[18]

from the three studies with moderate risk of bias, was 18 percent, and it seems reasonable that fluoride varnish to some extent can decrease caries incidence in early childhood. Yet, the quality of evidence was rated as low (⊕⊕OO).

Silver diamine fluoride (SDF). The literature search did not reveal any new articles other than those included in the reviews of Rosenblatt et al.[22] and Fung et al.[23] Both claimed single and multiple applications of 38 percent SDF to be effective in arresting dentin caries in primary teeth. The four trials that were published after 2000, however, were not considered in this review, since they were conducted on children over three years old. Thus, the quality of evidence for the prevention of ECC was rated as very low (⊕OOO).

Question 2: Do anticaries agents (e.g., antimicrobials, remineralizing agents) reduce the incidence of ECC? The 10 papers that met the inclusion criteria are listed in Table 3. The antibacterial agents studied were xylitol (four papers),[24,25,28,30] chlorhexidine varnish/gel (two papers),[31,33] povidone iodine (two papers),[26,27] and probiotic bacteria (one paper).[29] In addition, one paper evaluating the use of a remineralizing agent (casein phosphopeptide-amorphous calcium phosphate, or CPP-ACP) was identified.[31] The scientific quality was mixed; none displayed a low risk of bias, and six papers were assessed with a high risk of bias. Three papers with topical xylitol applications (lozenges, syrup, and wipes)[25,28,30] displayed significant reductions in caries prevalence at the one-year follow-up, with only one having a moderate risk of bias.[25] None of the other technologies displayed any beneficial effects on ECC incidence, in spite in some studies having significant reductions in salivary mutans streptococci levels. The quality of evidence for anticaries agents to prevent or control caries incidence in early childhood was graded as very low (⊕OOO).

Question 3: Do sealants reduce the incidence of ECC? No papers were identified on sealants specific to ECC, and there was scarce information on the use of sealants in primary teeth in very young children. Only one RCT on fissure sealants conducted in early childhood was identified (Table 3),[34] and this study found no evidence that glass ionomer sealants had an effect on caries incidence. Due to indirectness and risk of bias, the evidence on use of sealants to reduce incidence of ECC was graded as very low (⊕OOO).

Question 4: Do temporary restorations provide disease management for ECC? There were no papers identified that evaluated the use of temporary restorations like the atraumatic restorative technique (**ART**) or interim therapeutic restorations (**ITR**) without additional interventions in ECC.

Question 5: Does traditional restorative dentistry contribute to disease management for ECC? Three questions were formulated to address this query and facilitate a relevant literature search.

1. *In ECC children, does restorative care reduce relapse rates or reduce new caries?* A total of eight papers evaluating postoperative relapse rates or evidence of new caries in the follow-up visits were included (Table 4).[3,35-41] All of these were observational studies with restorative intervention done under general anesthesia.

Table 3. ANTICARIES AGENTS FOR EARLY CHILDHOOD CARIES (ECC) PREVENTION PUBLISHED BETWEEN 2007-2014 AND SEALANTS FOR REDUCTION OF INCIDENCE OF ECC PUBLISHED BETWEEN 2000-2014*

Author, year	Design	Size/age	Intervention	Control	Follow-up age	ECC outcomes/PF	Risk of bias
Anticaries agents							
Meurman, 2009[24]	Cohort	794/18 mos	Xyl+OHP	OHP	5 yrs	20 vs. 20%, NS	High
Milgrom, 2009[25]	RCT	94/9-15 mos	Xyl syrup	Placebo	2-3 yrs	24 vs. 52%/54%	Moderate
Simratvir, 2010[26]	RCT	30/3-4 yrs	PI	Water	4-5 yrs	Decreased relapse	High
Milgrom, 2011[27]	q-exp	172/12-30 mos	PI+FV	FV	2-4 yrs	41 vs. 54%/24%	High
Alamoudi, 2012[28]	RCT	60/10-36 mos	Xyl. tabl+OHPFV	2/yrs+OHP	1.5 yrs	0.8 vs. 4.4dmft/82%	High
Taipale, 2012[29]	RCT	106/1-2 mos	Probiotic tabl	Xyl tabl	4 yrs	NS	High
Zhan, 2012[30]	RCT	44/6-35 mos	Xyl wipes	Placebo	1.5-4 yrs	5 vs. 32%/85%	High
Plonka, 2013[31]	RCT	622/birth	CPP-ACP+FTP	FTP	2 yrs	1 vs. 2%, NS	Moderate
			CHX gel+FTP	FTP	2 yrs	1 vs. 2%, NS	Moderate
Pukallus, 2013[32]	RCT	191/birth	CPP-ACP	NI	2 yrs	2 vs. 7%, NS	Moderate
Pukallus, 2013[33]	RCT	189/birth	CHX-gel+FTP	FTP	2 yrs	5 vs. 7%, NS	Moderate
Sealants							
Chadwick, 2005[34]	RCT	508/18-30 mos	GI	Placebo	30-60 mos	76.5 vs. 75.9%, NS	High

* PF=prevented fraction; PI=povidone iodine; CHX=chlorhexidine; FTP=fluoride toothpaste; OHP=oral health promotion; Xyl=xylitol; FV=fluoride varnish; CPP-ACP=casein phosphopeptides-amorphous calcium phosphate; RCT=randomized controlled trial; CCT=controlled clinical trial; NS=not significant; GI=glass ionomer.

Table 4. POST-RESTORATIVE CARE RELAPSE RATES IN CHILDREN WITH EARLY CHILDHOOD CARIES (ECC) BETWEEN 2000-2014*

Author, year	Design	Size/age	Intervention¥	Control	Follow-up period	Relapse rate (RR)/PF (%)	Risk of bias
Almeida, 2000[35]	Observational	73/1.9-4.9 yrs	Restorative work	Caries-free group	2 yrs	79 vs. 29/63(s)	High
Primosch, 2001[36]	Observational	38/< 6 yrs	Restorative work	No control	6 mos	38	High
Chase, 2004[37]	Observational	79/2.3-7.3 yrs	Restorative work	No control	6 mos	37	High
Foster, 2006[39]	Observational	193/19-60 mos	Restorative work	No control	2 yrs	53	High
Zhan, 2006[38]	Observational	22/2-6 yrs	Restorative work+10% PI, 1.23% APF	Restorative work+saline, 1.23% APF	1 yr	67 vs. 60/10 (NS)	Moderate
Amin, 2010[40]	Observational	36/<6 yrs	Restorative work	No control	2 yrs	53	High
Berkowitz, 2011[3]	Observational	49/3.72 yrs	Restorative work+10% PI, 1.23% APF	No control	6 mos	39	High
Hughes, 2012[41]	Observational	117/2-6 yrs	Restorative work	Caries-free group	1 yr	22	High

* PF=prevented fraction; NS=not significant; S=significant; PI=povidine iodine; APF=acidulated phosphate fluoride.

Interestingly, evidence of new caries in the follow-up visits (at three months, two years) consistently indicated a relapse rate observed in the range of 22 to 79 percent (Figure 2). Since all the studies were observational in nature with moderate/high risk of bias, the quality of evidence was graded as very low (⊕OOO).

2. *In ECC children, does restoration of primary teeth influence the progression of disease and sequels like pain/abscess?* No papers were found that evaluated the effect of restorative care on progression/sequel of caries in ECC children.
3. *In ECC children, does restorative care improve OHRQOL, body weight, and performance in school settings?* Five papers that evaluated the impact of restorative care on quality of life were included (Table 5).[42-46] All of the included studies carried out a parental survey to assess the quality of life. Significant improvement was reported by parents in the child's overall health post-operatively at the six-month and one-year follow-ups[42,43,46] and in the child's oral health three to four weeks postoperatively.[44,45] Filstrup et al.[44] also surveyed children and found significant post-treatment improvement in the response to questions such as: "Do your teeth hurt you now?"; Do your teeth hurt when you eat something hot or cold?"; "Do your teeth hurt when you eat something sweet?"; and "Is it hard for you to chew and bite?" Thomas et al.[43] also observed changes in children's weight between pretreatment and post-treatment follow-ups but found no significant changes over one year. Cunnion et al.[46] reported significant improvement in parental ratings of their children's overall oral health and significant reductions

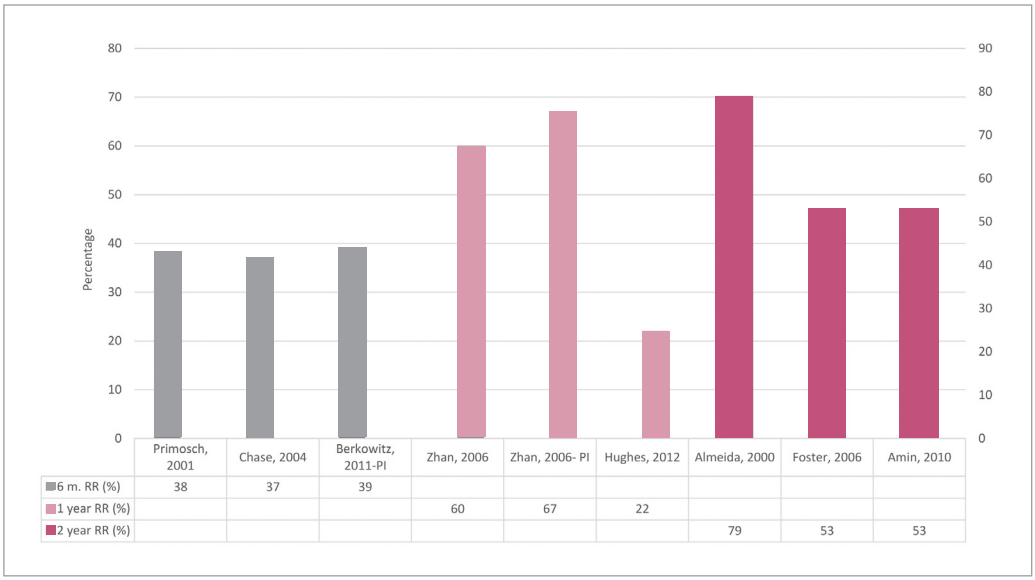

Figure 2. Postoperative relapse rates.

* RR=relapse rates; PI=intervention included application of 10% povidine iodine in addition to restorative care.

in problems associated with physical (pain related), mental, and social functioning for children who received dental treatment for ECC. These children maintained improvement at the one-year follow-up; however, the parent-reported health continued to be better for the caries-free control group. Since most of the studies were survey based and at high risk of bias, the quality of evidence was graded as very low (⊕OOO).

Discussion

This update was conducted mainly in accordance with methodology suggested by Siwek et al.[47] For prevention, the literature search was made to overlap the update by Twetman[5] while the interval was extended to the year 2000 for management and restorative treatment of ECC due to a lack of previous reviews. For studies to be included, an implementation before the age of three years was required. This was based on the European Academy of Pediatric Dentistry's definition of ECC, which regards the disease as a unique entity to be separated from the normal occlusal and proximal caries lesions appearing in later preschool ages. The main limitations with the present review were the restriction to the English language and the fact that the systematic reviews were not quality assessed. A positive finding was that the benefits clearly outweighed the adverse events; no significant complications were reported in any study. It should be noted, however, that the included studies were not designed specifically to unveil such outcomes.

It was disappointing to find few new trials with home care fluorides for the treatment of ECC. Considering the conflicting opinions and traditions over the globe, high-quality trials on toothpaste concentration, frequency of brushing, and age of toothpaste introduction would be extremely helpful.

Since the study by Weintraub et al.,[48] sodium fluoride varnish has emerged as the professional treatment of choice to prevent and control ECC in children at risk. Our present findings partly reinforced this concept, but it should be emphasized that the prevented fraction was low and the quality of evidence was weaker than that of studies of fluoride varnish in young permanent dentition.[49] A certain publication bias might also have occurred, as the findings from the three most recent trials in high-risk children[19-21] were generally less in favor of fluoride varnish and, in fact, statistically nonsignificant. In addition, it was concluded that biannual fluoride varnish applications were not effective as a supplement to daily supervised toothbrushing in preschoolers living in Athens.[50]

However, interesting site-specific observations were reported by Divaris et al.[20] in a secondary analysis of a previous trial.[18] They found that the fluoride varnish intervention had the greatest efficacy on surfaces that were sound at baseline; also, the facial surfaces of the upper incisors received the most caries-preventive benefit. Thus, these findings suggest starting early with fluoride varnish applications in order to maximize the outcome, especially in high caries populations. Nevertheless, further placebo-controlled studies of fluoride varnish in combination with supervised toothbrushing in infants are needed to elucidate its clinical use.

SDF is often used as a last option in uncooperative children and special needs children with an urgent treatment need. It is, however, not approved for clinical use in several countries due to the high content of fluoride (44,800 ppm) and the lack of understanding regarding the mechanisms of action. No trials conducted in early childhood were identified in this search; however, according to a narrative review of Fung et al.,[23] SDF can arrest dentin caries in primary teeth and prevent caries recurrence after treatment. Since the included studies in the aforementioned review[23] were not quality assessed, further studies on this concept in early childhood are warranted.

In accordance with previous reviews,[5,6] we found little evidence of efficacy for the use of xylitol, chlorhexidine varnish/gel, povidone iodine, probiotic bacteria, and remineralizing agents in ECC prevention. However, lack of evidence is not the same

Table 5. POST RESTORATIVE CARE OF EARLY CHILDHOOD CARIES: CHANGES IN QUALITY OF LIFE (2000-2014)*

Author, year	Design	Size/age	Intervention	Control	Follow-up period Follow-up age	Outcome	Risk of bias
Acs, 2001[42]	Survey	228/41±6 mos	Restorative care (GA)	None	— 43±10 mos	OHI†: 65%	High
Thomas, 2002[43]	Observational/ survey	50/2-7 yrs	Restorative care (GA)	None	13±1 mos —	Change in weight: NS OHI: 90%	High
Filstrup, 2003[44]	Survey	37/22-70 mos	Restorative care (GA or in-office treatment)	Caries-free group	4 wks —	OH: S; OH(C)‡	High
Klaassen, 2009[45]	RCT	104/2-7 yrs	Restorative work (GA)	Pre-treatment survey	Before treatment/ 3-4 wks —	OH: S; OHI: NS	Low
Cunnion, 2010[46]	Survey	501/2-8 yrs	Restorative work (GA)	Caries-free group	6 mos/1 yr —	OH: S; Improvement in mental, physical, social functioning: S	High

* OH=oral health-related quality of life (parental reporting); OHI=overall health improvement (parental reporting); OH(C)=oral health-related quality of life (child/self-reporting); PF=prevented fraction; RCT=randomized controlled trial; NS=not significant; S=significant; GA=done under general anesthesia.

† For patients with noncontributory medical histories.

‡ Significant improvement for questions like: Do your teeth hurt you now or when eating something sweet/hot/cold? Is it hard for you to chew and bite?

as lack of effect. In this context, the study of Milgrom et al.[25] was of particular interest, indicating a possible role of xylitol in ECC prevention that should be further studied in larger settings and other populations.

There is no literature pertaining to the use of pit and fissure sealants in children to prevent ECC. Based on clinical recommendations from the American Dental Association, there is weak evidence to support use of sealants in primary teeth and sealants should be placed when it is determined that the tooth, or the patient, is at risk of experiencing caries.[51] Interestingly, Borges et al. found sealants as effective as conventional composite restorations for management of noncavitated dentin occlusal lesions in primary teeth.[52] The studies utilized for the ADA review, however, were not graded for quality or risk of bias. Additionally, since most of the data of the ADA review were from older populations the evidence supporting use of sealants in ECC children is generally an extrapolation. Since the literature is not conclusive, the onus of the clinical decision to seal primary teeth in ECC children can be based on individual clinical expertise and patient preferences.

It was discouraging to see the lack of literature on effectiveness of techniques like ART/ITR in managing ECC, although some data is available for older children. Yassen[53] evaluated ART restorations in primary molars in six- to seven-year-olds and noted survival rates of 89 percent at six months and 74 percent at 12 months. Ng et al.[54] reported a reduction in new cavitation, pain, and referrals to the operating room among children undergoing a comprehensive disease management protocol versus historical controls. Some of these children received ITR as a part of the disease management; however, they received other interventions as well, so the effect of ITR as an intervention was not separately observed. There is certainly a need for further trials to evaluate effectiveness of temporary restorations in ECC.

Most of the studies evaluated in this paper to assess effectiveness of traditional restorative dentistry as a part of disease management were either surveys or observational in nature. Thus, the quality of evidence available to support restorative care was found to be insufficient. Even though graded as insufficient, the included studies provide some evidence highlighting high post-treatment relapse rates. Thus, there is lack of substantial evidence to suggest that restorative treatment leads to acceptable long-term clinical outcomes.

The evidence on influence of traditional restorative dentistry on overall or oral health-related quality of life is very limited and was assessed to be of weak quality. Most included papers noted evidence of improvement in OHRQOL, as reported by the parents. But conflicting results were also presented. For example, in a previous paper, Acs et al.[55] showed that the percentile weight categories for ECC children were significantly less than the caries-free patients. The authors also noted a significant improvement in weight following therapeutic dental treatment. However, these findings were inconsistent with those of Thomas et al.,[43] who were unable to confirm such a catch-up growth. Even though the current evidence supporting effectiveness of traditional restorative dentistry in ECC children is insufficient, it remains an integral part of the strategy to manage the disease. There is certainly a need to go beyond the drill-and-fill dentistry and integrate other concepts of disease management to ensure long-term success. One may also interpret the paucity of high-quality research as meaning the glass is half-full rather than half-empty. The mapping of knowledge gaps disclosed here and in other fields of pediatric dentistry[56] is a call for intensified clinical research and points out the most pertinent topics to be addressed in ECC prevention and management.

An appropriate question is: "What should be used to assist clinical decision-making when the quality of evidence is low or very low?" According to Sackett et al.,[57] evidence-based practice is a triad that requires the judicious integration of systematic assessments of clinically relevant scientific evidence, relating to the patient's oral and medical condition and history, with the dentist's clinical expertise and the patient's treatment needs and preferences. In pediatric dentistry, this means that the informed clinician must combine best available scientific evidence with his/her own expertise and parents' values and expectations. It further underpins the need and responsibility of the profession to understand and remain updated on the best available evidence for pediatric dental care.

Conclusions

Based on this updated review, the following conclusions can be made:

1. There is moderate and limited quality of evidence in support of fluoride toothpaste and fluoride varnish for early childhood caries prevention, while the evidence for fluoride tablets/drops is insufficient.
2. There is insufficient evidence to support the use of silver diamine fluoride, xylitol, chlorhexidine varnish/gel, povidone iodine, probiotic bacteria, and remineralizing agents (e.g., casein phosphopeptide-amorphous calcium phosphate) for ECC prevention.
3. There is insufficient evidence for the use of sealants to reduce incidence of ECC.
4. There is insufficient evidence to support the use of temporary restorations as a part of disease management of ECC.
5. There is insufficient evidence to evaluate the value of traditional restorative dentistry as a part of disease management of ECC.

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