

Best clinical practice guidance for management of early caries lesions in children and young adults: an EAPD policy document

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Abstract

Background The European Academy of Paediatric Dentistry (EAPD) encourages prevention and arrest of active dental caries. Therefore, the present guidance provides evidence- and clinically-based recommendations for detecting and diagnosing early/non-cavitated caries lesions, risk assessment and disease management.

Methods A search of different databases was conducted using all terms related to the subject. Relevant papers were identified after a review of their titles, abstracts or full texts. Three workshops were held during the corresponding EAPD interim seminar in Brussels in 2015. Several statements were agreed upon and, furthermore, gaps in our knowledge were identified.

Results Following the systematic reviews and outcomes of the seminars, it was concluded that visual and radiographic caries detection should be utilised as a basic diagnostic approach to locate, assess and monitor non-cavitated caries lesions in primary and permanent teeth. As another important evaluation step, a caries risk assessment should be performed at a child's first dental visit, and reassessments should be performed on a regular basis. It is widely accepted that non-cavitated caries lesions can be managed non-invasively in the majority of cases. The spectrum of measures includes a low cariogenicity tooth-friendly diet, daily and appropriate management of the biofilm, home and within the dental office/surgery usage of fluorides as well as sealing techniques.

Conclusion The detection and management of non-cavitated caries is an essential aspect of preventive dentistry. Therefore, the EAPD encourages oral health care providers and caregivers to implement preventive practices that can arrest early caries and improve individual and public dental health.

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Introduction

This best clinical practice guidance was agreed upon as a result of the Interim Seminar and Workshop organised by the European Academy of Paediatric Dentistry in Brussels in May 2015. This summary is based upon a comprehensive search of the literature that was undertaken and presented by the invited speakers (Pretty and Ekstrand 2015; Twetman 2015; van Loveren and van Palenstein

Helderman 2016). While scientific evidence was identified for several questions of clinical relevance, for other aspects, limited information and/or scientific data were documented. This guidance reports the level of recommendation according to the GRADE proposal (Guyatt et al. 2011, Table 1).

Selection of the guidance topic

Dental caries is mostly an active process which begins in young children and becomes clinically visible as an early caries lesion. Today, the early stage of dental caries is more frequently called a ‘non-cavitated caries lesion’ (Pitts 2009). This term summarises different clinical appearances of the early caries lesions that have not reached the cavity level according to commonly used caries diagnostic criteria (Pitts 2009; Kühnisch et al. 2011). Reaching the cavity level may cause loss of dental function and quality of life if there is no appropriate intervention. Further clinical consequences include an increased tooth sensitivity, pain, chronic or acute pulpitis, abscesses, retained roots, food impaction and space loss in the molar region (Finucane 2012). Therefore, sustainable attempts should be made to prevent new caries and to arrest existing non-cavitated caries lesions. These goals are highly relevant and with the aim that every child born in 2026 should stay cavity-free during their lifetime (www.allianceforacavityfreefuture.eu).

Early dental caries can be diagnosed during or just after eruption of primary teeth during the first years of life and if not preventively managed, may result in early childhood caries, ECC (AAPD 2015). The typical characteristics of ECC are numerous (non-)cavitated lesions in the primary dentition caused by high frequency or ad libitum bottle feeding with sugar-containing drinks/foods and/or breast-feeding (Fontana 2015). Further, between-meal snacks and all drinks or beverages containing carbohydrates increase an individual’s risk of caries. Often, oral hygiene procedures and the use of fluoride toothpaste are frequently not enough in periods of active caries. Recently published epidemiological data indicate that a proportion of up to half of <6-year-olds are affected by (early childhood) caries, but prevalence data vary substantially as a result of different definitions, study designs or diagnostic criteria (Dye et al. 2015). Additionally, early caries is also frequently found at proximal and occlusal surfaces in primary molar teeth. Therefore, it must be emphasised that caries in childhood remains a prevalent and challenging problem for paediatric dentists (Stecksén-Blicks et al. 2004). In the permanent dentition, the disease is typically located in posterior teeth on occlusal and proximal surfaces (Mejàre et al. 1998, 2004). Both sites are anatomical and ecological niches with an increased risk by comparison with free surfaces. Therefore, the caries burden is predominately concentrated on these caries specific sites (Mejàre et al. 1998; Poorterman et al. 1999, 2000; Hannigan et al. 2000).

Table 1 Quality rating of evidence and recommendation level according to the GRADE proposals (Guyatt et al. 2008, 2011)

Code	Quality of evidence	Definition
A	High	Further research is very unlikely to change our confidence in the estimate of the effect Several high-quality studies with consistent results In special cases, one large, high-quality multicentre trial
B	Moderate	Further research is likely to have an important impact on our confidence in the estimate of the effect and may change the estimate One high-quality study Several studies with some limitations
C	Low	Further research is very likely to have an important impact on our confidence in the estimate of the effect and is likely to change the estimate One or more studies with severe limitations
D	Very low	Any estimate of the effect is very uncertain Expert opinion No direct research evidence One or more studies with very severe limitations
Level of recommendation		The GRADE system offers two grades of recommendations: ‘strong’ and ‘conditional’. When the desirable effects of an intervention clearly outweighs the undesirable effects or clearly does not, guideline panels offer strong recommendations. However, when the balance of desirable versus undesirable is less certain either because of low-quality evidence or because evidence suggests that desirable and undesirable effects are evenly balanced, conditional recommendations become mandatory (Guyatt et al. 2008)

To reduce the caries burden in children and adolescents, appropriate strategies for (early) caries detection and proven caries management strategies for routine daily oral care are of great importance.

Considering epidemiological caries data from Europe, different trends have been recently observed. When analysing data from adult populations, it must be stated that caries is still a prevalent disease. However, caries beginning in the permanent dentition usually starts at an early age, with a more or less constant increase over time occurs but with the knowledge that the disease is not equally distributed in child populations and will predominately be diagnosed in those children at high risk (Broadbent et al. 2013; Stecksén-Blicks et al. 2014). The highest prevalence and severity rates were found to be more likely in vulnerable subgroups in high- and middle-income countries and are often associated with lower socio-economic status within those countries (Schwendicke et al. 2015). Contrary to this, a substantial decline in cavities, caries-related restorations and extractions in permanent teeth have been observed since the 1980s in the majority of industrialised nations (Marthaler et al. 1996; Marthaler 2004; Steiner et al. 2010; Stecksén-Blicks et al. 2014; Dobloug and Grytten 2015).

Specifically, mean caries experience is reduced <2 DMFT in most 12-year-old European populations when the cavity level was used as the discriminating threshold (Marthaler 2004). National figures from Denmark showed an example of the substantial increase in caries-free children over the past 25 years. For example, 9 % of 18-year-olds had a DMFS = 0 in 1989; this increased to 42 % in 2014 (Forebyggelse and Borgernære Sundhedstilbud 2015). The reasons for this positive trend include the availability of fluoride delivery systems, the implementation (and acceptance) of public or individual preventive programmes, the improved awareness of oral hygiene throughout life, as well as aetiology-related dental disease management. In addition to this encouraging trend, it should be considered that caries is indeed more frequently present when taking early disease markers into account. The proportion of ‘caries-free’ 10-year-olds decreased, for example, from 79.9 % (D3-4MFT) to 40.4 % (D1-4DMFT) when considering non-cavitated caries lesions in a clinical examination and statistical analysis (Heitmüller et al. 2013). While on the one hand, these data (Agustsdottir et al. 2010; Heitmüller et al. 2013) emphasise the importance of early lesions from an epidemiological and public health perspective. On the other hand it is obvious to consider non-cavitated lesions as a relevant disease marker and as a clinical risk and activity predictor.

In summary it is obvious that early caries plays a significant role in individual dental health and requires effective management especially in children and

adolescents. Therefore, this guidance aims to give the best evidence-based recommendation (Table 1) and to provide recommendations with respect to good clinical practice where evidence is weak.

Caries detection and diagnosis

Detection at an early stage and monitoring of caries lesions is fundamental for managing the disease at the tooth surface level. Furthermore, caries risk assessment is important in order to implement risk-related management to avoid start of new lesions. Several methods have been developed to detect lesions at an early enough stage to permit the effective implementation of preventive therapies.

In this paper, *detection* means a process involving recognition (and/or recording), traditionally by optical or physical means, of changes in enamel and/or dentine and/or cementum, which are consistent with having been caused by the caries process (Pitts and Stamm 2004). *Monitoring* is defined as assessment, over time, of one or more of the characteristics of a caries lesion in order to assess whether any changes have occurred in the lesion. Such changes can be extensive at the level of caries activity (Longbottom et al. 2009).

The following clinical recommendations were developed by consensus and are based on the best available evidence. These statements apply for children with no medical problems affecting their abilities to receive dental care and for children with no dental anomalies.

- The detection at an early age and monitoring of caries lesions is important for managing the disease at the surface level. The strength of recommendation: Strong.
- The selection of an appropriate recall interval for each patient is a decision based on many factors. In order to help the clinician in this decision-making process, the EAPD Guidelines have introduced a Diagnostic Plan based on the dental age of each child (Table 2) which includes a recommended minimum number of visits in order to achieve optimal conditions for diagnosis as early possible. According to the caries risk assessment of each child, any clinician will be able to decide whether patients require additional visits and management between the firm scheduled visits. Level of evidence: Moderate/ Strength of recommendation: Conditional.
- A careful, methodical visual tactile caries examination is required in order to detect and reach the correct diagnosis. A clinical examination of cleaned (no staining) and carefully dried, sealed and unsealed teeth with appropriate lighting must be carried out. Level of

Table 2 Diagnostic plan: recommended minimum number of recall visits for dental caries based on the dental age of the patient

Visits	Time of visit	Comments
First consultation		Ideally before birth: Prevention begins during prenatal and perinatal period Mothers should be informed that tooth formation begins during pregnancy and should be advised that any disturbances in their health might affect the primary but also the permanent tooth formation (systemic illnesses, medications, malnutrition, etc.) Parents should be informed that their own oral health habits will affect their child's oral health The aetiology of ECC is mainly bacterial, and <i>Streptococcus mutans</i> are transmitted to the child mainly from the parents through salivary contact (feeding, kissing on the lips, etc.)
	With the eruption of the first tooth (NO later than the first year of age)	<i>After birth</i> Structured preventive programme, nutrition advice, feeding habits and oral habits, brushing habits, fluoride use, etc.
Second consultation	With the eruption of the first primary molars	11–18 months old
Third consultation	With the eruption of the second primary molars	20–30 months old
First clinical examination	As soon as there is a firm proximal contact of the first and second primary molars	36 months old
Second clinical examination	18 months after the fourth visit	4.5 years old The recommended 18-month interval is based on the knowledge that it takes about 18 months in the primary dentition for a carious lesion to develop and progress through enamel and the risk surfaces (Shwartz et al. 1984)
Third clinical examination	With the eruption of the first permanent molars	A little before 6 years old
Fourth clinical examination	18 months after the firm proximal contact of the second primary molars and the first permanent molars	The recommended 18-month interval is based on the knowledge that it takes about 18 months in the primary dentition for a carious lesion to develop and progress through enamel and the risk surfaces (Shwartz et al. 1984; Mejäre et al. 2004)
Fifth clinical examination	With the eruption of the second permanent molars	10–12 years old
Sixth clinical examination	18 months after the firm proximal contact of the first and the second permanent molars	The recommended 18-month interval is based on the knowledge that it takes on average about 4 years in permanent teeth for a carious lesion to develop and progress through enamel and the risk surfaces

The clinician will be able to adjust changes as needed and decide whether the patient requires additional visits and the management at each visit

evidence: Moderate/ Strength of recommendation: Conditional.

- Radiographs for caries detection and monitoring. Appropriate radiographic examinations should be provided according to the EAPD Guidelines for the use of radiographs on children (Espelid et al. 2003). Level of evidence: Moderate/ Strength of recommendation: Strong.

These Guidelines recommend the use of Radiographic Scoring Systems which divide the dentine radiolucency depth into thirds (no radiolucency, radiolucency in enamel, radiolucency in the outer third of the dentine thickness, radiolucency extending to two-thirds of the dentine thickness, radiolucency extending to full dentine thickness).

In cases where the child is not cooperative or the parents refuse to agree or consent a radiographic examination, the recommendations are for the use of Fiber-optic Transillumination (FOTI) device or the use of separators or a combination. There is no current

evidence to recommend the use of any other diagnostic tool.

- It is important to identify the activity of the lesion. Table 3 summarises clinical characteristics/indicators of active and inactive lesions. Level of evidence: Moderate/ Strength of recommendation: Conditional.
- The EAPD Guidelines recommend the use of a Condensed Scoring Caries Diagnosis System (condensed ICDAS). Table 4 summarises the recommended condensed system which combines the clinical and radiographic information and the lesion activity. Level of evidence: Low/Strength of recommendation: Conditional.
- The longitudinal monitoring of lesions may be complicated by a clinician's ability to recall the appearance of the lesion on previous examinations, and this may be mitigated by the use of simple intra-oral imaging (cameras, photographs). The widespread availability and low cost of such intra-oral cameras suggests that the recording of lesion appearance in the digital patient

Table 3 Simple indicators to identify a carious lesion's activity

Active lesion (one or more)	Inactive lesion (one or more)
1. Plaque stagnation area	1. Self-cleansing areas
2. Lesion appears <i>dull and whitish</i>	2. Lesion appears <i>dark and shiny</i>
3. Enamel <i>Roughness</i> on gentle tactile examination	3. Enamel <i>Smoothness</i> on gentle tactile examination
4. Gingival <i>Bleeding</i> adjacent to the lesion (proximal, gingival lesions)	4. <i>No gingival bleeding</i> adjacent to the lesion
5. Associated with <i>partially erupted</i> teeth	5. <i>Fully erupted/Teeth in occlusion</i>

Table 4 Recommended condensed scoring system for caries diagnosis

Sound (ICDAS 0)		
Caries categories	Initial (not cavitated) (ICDAS 1–2)	<i>Initial active</i> Non-cavitated stages of caries located in a plaque stagnation area, often more whitish than brownish, may be rough to probing. Radiographically there may be, have no radiolucency (occlusally) or radiolucency in enamel or if into the dentine has penetrated at most to outer third of the dentine. There may be no visible signs of caries (approximally), but the radiolucency in enamel or if into the dentine has penetrated at maximum the outer third of the dentine. This is on the activity predictors having a greater likelihood for progress than not progressing
	Moderate (dentine shadows/localised enamel breakdown) (ICDAS 3–4)	<i>Moderate active</i> Cavitated stages of caries, but the cavitation is limited to the enamel or the lesion or/and revealed itself as an obvious shadow or/and the radiolucency is in the enamel. If in dentine at least by middle third of the dentine. Or there are no visible sign (unlikely), but the radiograph shows radiolucency into the middle third of the dentine and based on any predictors of activity has a greater likelihood for progressing than not progressing
	Extensive (ICDAS 5–6)	<i>Extensive active</i> Cavitated stages of caries with exposed dentine clinically and if visible on the radiographs have radiolucencies deeper than the middle third of the dentine. This is based on the activity predictors indicating a greater likelihood for progressing than not progressing
	1. Active	
	2. Inactive	
	1. Active	
	2. Inactive	

ICDAS International Caries Classification and Management System

record could be of significant benefit in monitoring early carious lesions following their detection. By using imaging technology, a clinician may be able to motivate the parents and the patient in a positive way. Level of evidence: Low/Strength of recommendation: Conditional.

Gaps in our Knowledge

There is a need for more research into the use of the various diagnostic devices as despite the different devices and systems available, there is not enough evidence to support their use in dental practice even if some of them seem to have potential.

- There is a need for more research in the primary dentition because most of the available studies consider only the permanent dentition.
- Radiograph subtraction studies need to be conducted.
- Ongoing evaluation of new methods and devices.
- In addition, there is a need for well-designed prevention studies on early childhood caries which will provide sufficient and strong evidence of the cost-effectiveness

of early prevention and intervention. The public bodies which fund and apply the preventative programmes need this strong evidence. It costs much less to prevent dental problems from occurring than to pay for extensive and expensive restorative or surgical treatment.

- Finally and most importantly, there is a significant need to bring the knowledge and learning to regular dental practice to all the paediatric health care providers, the children and their parents as the oral health of an individual is strongly related to his overall health and well-being.

Caries risk assessment

Caries risk assessment (CRA) is the clinical process of establishing the probability for an individual patient to develop caries lesions over a certain period of time, or the likelihood that there will be a change in size or activity of lesions already present (Twetman et al. 2013). It is accepted that CRA is an essential component of clinical

Table 5 Summary of guidelines for caries risk assessment (CRA)

Key elements	Evidence	Guideline	Recommendation
Objective of CRA	Not available (very low quality)	A valuable guide for the dental care of children	Conditional
Methods for CRA	Multivariate models perform better than single predictors (low quality)	Use a structured comprehensive format	Conditional
	No clear support for one model over another (low quality)	Use any multivariate model	Conditional
Timing of CRA	Expert opinion (very low quality)	At child's first dental visit and periodically afterwards	Conditional
		Life events and onset of chronic diseases	Conditional

decision-making for adequate prevention and management of childhood caries as well as for individual timing of recall intervals. The recommendations were based on a quality assessment of recent systematic reviews, guidelines and relevant primary papers published 2012–2014 (Twetman 2015). No paper displayed a low risk of bias, but one of the systematic reviews and three of the primary publications were of moderate risk of bias.

The EAPD clinical guidelines and best practice points for CRA are summarised in Table 5. The following statements were reached in consensus:

- A caries risk assessment should be carried out at every child's first dental visit, and reassessments should be completed during childhood and adolescence. Strength of recommendation: Conditional.
- The assessed risk category should be linked to appropriate preventive and restorative care with recall examinations based on an individual need. Strength of recommendation: Conditional.
- Multivariate models display a better accuracy than the use of single predictors, and this is especially true for preschool children. The accuracy in the early ages can be over 80 %. Strength of recommendation: Conditional.
- There is no superior method to clearly predict future caries and no evidence to support the use of one model, programme or technology before any other. Strength of recommendation: Conditional.

Gaps in our Knowledge

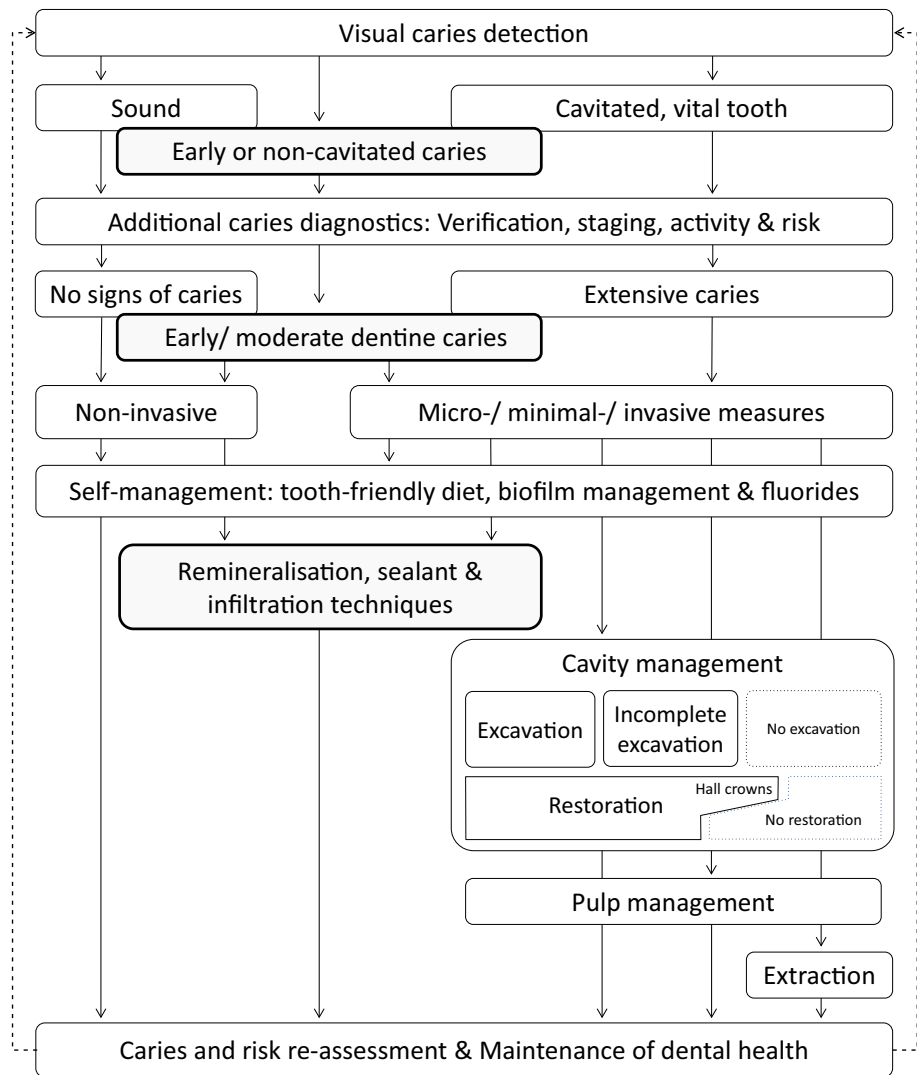
The validity of models and single risk factors, as well as the role of confounding factors (e.g. age, lifestyle, socio-economy and socio-demography), for predicting caries remains uncertain (Mej re et al. 2015; Twetman 2015), and these gaps can only be filled through prospective clinical

trials. Further quantitative and qualitative studies among health professional and parents would be helpful to identify perceptions and barriers to carry out a CRA and to deliver a risk-based preventive care that could bridge the social inequalities in dental health. More research is also needed to follow-up the implementation of risk-based caries prevention and to establish the cost-effectiveness of such strategies.

Management of early caries lesions

Appropriate disease management depends on a correct caries diagnosis and assessment, and it is further influenced by each child's CRA of a patient. Following up-to-date caries management strategies, the overwhelming majority of early caries lesions need non-invasive treatment. Contrary to this main management strategy, several visually detectable early lesions in the mouth might be associated clinically with caries that has progressed into the dentine, which may require operative intervention to protect the dentine and pulp. Therefore, management of early caries should include a careful evaluation of all diagnostic findings and the determination of an appropriate treatment option. When considering the diversity of early caries in clinical practice, a spectrum of non-invasive and invasive treatment options has to be considered (Fig. 1).

Considering the clinical importance of the topic and the partially insufficient evidence from the literature, different philosophies and divergent management strategies exist across Europe. Nevertheless, there is an overwhelming agreement regarding the need of a spectrum of non-, micro- and minimal-invasive dental caries management methods and procedures in paediatric dentistry for the treatment of early caries lesions. The following statements comprise a summary from the EAPD Guidelines workshop.

Fig. 1 Flow diagram of caries management options

Non-invasive measures for preventing or arresting caries

- There is a basic understanding that every paediatric dentist has to be emphatic to a patient and their family in aiming to raise the awareness of (early) caries in children and adolescents. Simple measures that are more likely to increase appropriate self-management of caries should include the explanation of causes and effects, the usage of age-adapted motivation for a preventive lifestyle and an increase in parental responsiveness. Responsible self-management of caries has to be understood as a key factor for successful caries prevention and arrestment. Level of evidence: Low/ Strength of recommendation: Strong.
- Following disease management based upon the aetiology a non-cariogenic diet prevents new lesions, reduces the overall risk and supports the inactivation of existing caries (Rugg-Gunn et al. 1984; Burt et al. 1988). Level of evidence: Moderate/ Strength of recommendation: Strong.
- There is evidence to support the involvement of parents by motivational interviewing in improving paediatric health behaviours and outcomes, e.g. oral health, diet and physical activity. (Borelli et al. 2015). Level of evidence: Moderate/ Strength of recommendation: Strong.
- The twice-daily removal of the dental biofilm by brushing with a fluoride toothpaste prevents new caries lesions. Level of evidence: Strong/Strength of recommendation: Strong.
- Fluorides have been proven to effectively arrest caries and should, therefore, be used to inactivate early caries (Mejàre et al. 2015). Level of evidence: Moderate/ Strength of recommendation: Strong.
- Pit and fissure sealing prevents new occlusal caries in permanent molars (Ahovuo-Saloranta et al. 2013) and

is able to arrest existing non-cavitated lesions (Griffin et al. 2008). Level of evidence: High/Strength of recommendation: Strong.

- In general, there is inadequate evidence concerning possible preventive effects of non-invasive methods and procedures on cavitated caries lesions (Chu et al. 2002; Ng et al. 2012; Mijan et al. 2014; Santamaria et al. 2014). If this treatment option is chosen, careful monitoring and guidance is necessary.

Micro- or minimally invasive treatment strategies on (early) caries lesions

- While arrested non-cavitated caries lesions require non-invasive intervention only, persistent active lesions might be considered for a ‘sealing’ strategy to establish a permanent protective barrier and fissure sealants can be used to arrest non-cavitated occlusal caries. Non-cavitated caries lesions on proximal and smooth surfaces can be arrested by the caries infiltration technique; however, most of the available studies were performed in permanent teeth, and there is a need for long-term studies (Doméjean et al. 2015). Level of evidence: Moderate/ Strength of recommendation: Strong.
- There is a broad spectrum of opinions regarding the treatment for non-cavitated caries lesions with obvious dentine involvement. Decisive indicators were proposed, e.g. the presence of any signs of (micro) cavitation, lesion severity and progression into dentine in relation to the pulp, the caries activity, the age of the lesion and an individual’s caries risk. Considering the challenge and need of performing reliable and quick decision-making in young children, future studies should address this issue.
- The biofilm should be removed from cavitations, and a long-lasting seal of the cavity should be placed (Kidd 2004). There is evidence indicating that to excavate soft and wet dentine only with the aim of maintaining pulp vitality and reducing the need of endodontic treatment (Schwendicke et al. 2013). Level of evidence: High/ Strength of recommendation: Strong.
- Non-excavative and/or non-restorative techniques were controversially discussed during the workshop. Examples of these treatments are the Hall technique and the non-restorative caries treatment. However, in most cases, there are little data available regarding the indications, benefits and long-term risks.

Gaps in Knowledge for future research

- In general, there is insufficient evidence on the topic of management of early caries because of the limited

number of studies that explicitly address non-cavitated caries lesions in the primary and permanent dentitions. With respect to the clinical importance of early caries, more effort has to be undertaken to close this knowledge gap.

- While the benefits of fluorides are well proven, usage at home might be confounded by different factors-related to individual’s circumstances, form of administration, frequency and duration of application, systematic and time of day of tooth brushing, supervision by parents, overall rinsing habits, age–dose–response relationship and amount of fluoride concentration in any devices used.
- In general, the effectiveness of any (non-)invasive measure might differ under normal conditions by comparison with (randomised) controlled clinical trials in children and adolescents. Therefore, qualitative and quantitative health research and practice-based studies are needed.
- Clinical studies on caries management should consider the socio-economic status and compliance of children and their families (external validity of the study).
- Future reports should precisely specify indications for the clinical use of any non-invasive or invasive method in relation to sound surfaces, non-cavitated lesions and cavitation on smooth, proximal or occlusal surfaces in primary or permanent dentitions.
- Another unanswered question concerns the weight and strength of each caries management method in relation to other methods and sites in primary and permanent teeth. To answer this question, long-term studies are needed based on clinical practice.

Conclusion

The detection and management of early caries is an essential part of preventive dentistry. Paediatric dentists should therefore welcome the use of new diagnostic devices and the use of less invasive or minimally invasive methods and procedures. The aim should be to identify and/or arrest existing lesions under the condition of ensuring good cooperation of every child to reduce the need of extensive operative measures with sedation or general anaesthesia, especially in young children. All these methods should ideally feature high safety levels for children with the best longevity and without causing harm or risks. Therefore, the EAPD encourages providers of oral health care and caregivers to implement preventive practices that can decrease caries and improve individual and public dental health.

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Workshop 1/Caries diagnostics Griet van Steenkiste, Stephanie Theys (Belgium), Domagoj Glavina (Croatia), Charalambos Sakkas (Cyprus), Vuokko Anttonen (Finland), Patrizia De Fabianis (Italy), Marlies Elfrink (the Netherlands), Anne Skaare (Norway), Ewa Nadolska-Gazda (Poland), Carmen Savin (Romania), Vesna Zivojinovic-Toumba (Serbia), Alenka Pavlič (Slovenia), Miguel Hernandez (Spain), Thayalan Kandiah (United Kingdom), Maria Spyridonos (Cyprus, Moderator).

Workshop 2/Caries risk assessment Luc Martens, Stephanie Theys (Belgium), Vlasta Merglova (Czech), Androniki Grigoriou-Kokkinos (Cyprus), Ulrich Schiffner (Germany), Nikos Kotsanos (Greece), David Finucane (Ireland) Livia Ottolenghi (Italy), Marit Slättilid Skeie (Norway), Eleonora Schiller (Romania), Rok Kosem (Slovenia), Mónica Miegimolle (Spain), Juliane Leonhardt Amar (Switzerland), Hani Nazzal (United Kingdom), Sotiria Gizani (Greece, Moderator).

Workshop 3/Caries management Thierry Boulanger, Rita Cauwels (Belgium), Koberova Ivancakova (Czech), Costakis Onisiforou (Cyprus), Dorte Haubek (Denmark), Nick Lygidakis, Elias Berdouses, Kostantinos Oulis (Greece), Aifric Ni Chaollai (Ireland), Silvia Pizzi (Italy), Clarissa Bonifacio (the Netherlands), Ivar Espelid (Norway), Michał Sobczak (Poland), Rodica Luca (Romania), Mirjana Ivanovic (Serbia), Tanja Tomažević (Slovenia), Eva Martínez (Spain), Anika Anzedei (Switzerland), Figen Seymen (Turkey), Jo Montario (United Kingdom), Jan Kühnisch (Germany, Moderator).

Please note that a slightly different wording in relation to the evidence and recommendation level was used in the sequence of papers from this workshop.

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