

Non-restorative cavity treatment: from guideline to the practice

Summary. The new KIMO guideline 'Oral Health Care for Children' approach caries as a behavioural related disease and unequivocally assign priority to causal caries treatment, emphasising lifestyle and behavioural changes. The 5-step concept of non-restorative caries treatment (NRCT) is recommended as treatment of choice for cavitated dentine lesions in primary dentition. Communicative aspects of NRCT are supported by limited technical interventions, for the purpose of effective oral care. A balance between aetiological and symptomatic treatment is sought for each child individually, in close cooperation with the parents. Technical aspects per tooth range from limited interventions like making cavities accessible for brushing, applying fluoride varnish or SDF, covering the cavity with a layer of glass ionomer cement to treatment like ART restoration or the Hall technique, in cases of necessity. Lifestyle changes lead to sustainable treatment results and enhance the quality of life of the child or young person.

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INTRODUCTION

Dental caries is a behaviour related disease (Van Palenstein Helderman et al, 2015). The new KIMO guideline 'Oral care for children' shows a paradigm shift in the treatment of children's teeth, in which priority is unambiguously given to the causal treatment of caries. The International Convention on the Rights of the Child, article 3 gave form and direction for the development of the guideline. In customized individual care, the main focus is directed to communication and it is recommended to exercise restraint with restorative treatment. About Non-Restorative Cavity Treatment (NRCT) the guideline states: *"NRCT links seamlessly with the Non-Operative Caries Treatment Program (NOCTP), also known as the Nexø project. Because the caries lesion is not covered, a visible evaluation of the development of the process and the result of the intervention remains possible"* (KIMO, 2020).

A first attempt towards causal therapy, including the introduction of the 5-step NRCT concept, was made during a consensus conference of the NVvK/VBTGG (Burgersdijk and Van Gemert-Schriks, 2008). The response was positive, but in practice there is still much to be gained in this area with the cooperation and efforts of the Ivory Cross.

The 5-step NRCT concept was first published in the NTVT in 2010 (Gruythuysen, 2010). The founder of cariology, GV Black, has already started slicing cavities in the temporary dentition in order to put less strain on children. This, combined with the development of NOCTP, gave rise to the development of the NRCT concept. The international presentation of the concept at the ORCA Congress in Montpellier in 2010 led Edwina Kidd to question the restoration of temporary teeth (Kidd, 2012). This has led to research into the

GLOSSARY

- KIMO** Knowledge Institute Oral Care
- ART** Atraumatic Restorative Treatment
- NRCT** Non-Restorative cavity treatment
- NOCTP** Non-Operative Caries Treatment Programme, also known as Nexø project or 'Gewoon Gaaf'
- UCT** Ultra Conservative Treatment
- SDF** Silver Diamine Fluoride
- ORCA** European Organisation for Caries Research
- MI** Motivational Interviewing

results of NRCT compared to traditional treatment and the Hall technique (Santamaria et al, 2017). Based on the results of this and the results of research into the UCT concept, which is related to NRCT, Edwina Kidd prompted to write a follow-up to her 2012 article in 2019 (Mijan et al, 2014; Gruythuysen, 2019).

It has now become clear that routine restoration of children's teeth leads to unnecessary mental and dental stress in children. It also became clear that slicing alone in combination with only a conventional brushing instruction as one-way communication does not effectively contribute to better oral health. Motivational interviewing and counselling are of decisive importance in this regard (Van Palenstein Helderma et al, 2015; Frencken, 2017; Gruythuysen and Van Strijp 2018; Gruythuysen et al, 2021).

This article will address the following questions:

- Treatment goals in children with cavities in primary teeth.
- The what and how of the 5-step NRCT concept.
- Indications, reasons of failure and conditions for success of NRCT.
- Meaning of the published research for the practice.

In addition, 2 cases will illustrate how a child is treated in the spirit of the current guideline.

The abbreviations often used in this article are listed in the 'Glossary' box.

TREATMENT GOALS FOR CHILDREN WITH CAVITIES IN PRIMARY TEETH

Caries development is seen as a dynamic process that takes place in the biofilm on the surface of the hard dental tissues (Kidd, 2012). This process is mainly influenced by a person's self-care, whether or not supported by a caregiver. More than 30 years ago, it was demonstrated that precise brushing with fluoride toothpaste can arrest the caries process in cavitated dentin lesions (Nyvad and Fejerskov, 1986). If removal of the biofilm from the cavity is sufficient, what is the purpose of restoration? It is argued that restoration facilitates plaque removal. This is highly questionable. Plaque removal on the adjacent tooth is made less possible by restoration. The caries process does not stop with restoration, which is why secondary caries is the main cause of restoration failure (Chisini et al, 2018). Moreover, experience shows that the motivation of the patient is here the deciding factor. It should be borne in mind that an approximal caries lesion,

CASE 1. CAS

A shy, anxious 5-year-old child of foreign origin has been visiting the dentist since 2018. The child brushed without parents help and was still receiving a bottle of milk in bed. During the first visit, Cas was directly referred to a paediatric dentist for an option of treatment under general anaesthesia because of generalized fear of doctors and fear of injections after a bad experience in the past.

There were approximal active caries lesions in all primary molars present. Only tooth 74 showed clear cavitation in the dentine; the other lesions still showed no apparent cavitation (Fig. 1).

How can this child be treated according to the new KIMO guideline?



Fig. 1. Bitewing X-Rays (a and b) of Cas, taken at the age of 5 (September 2018).

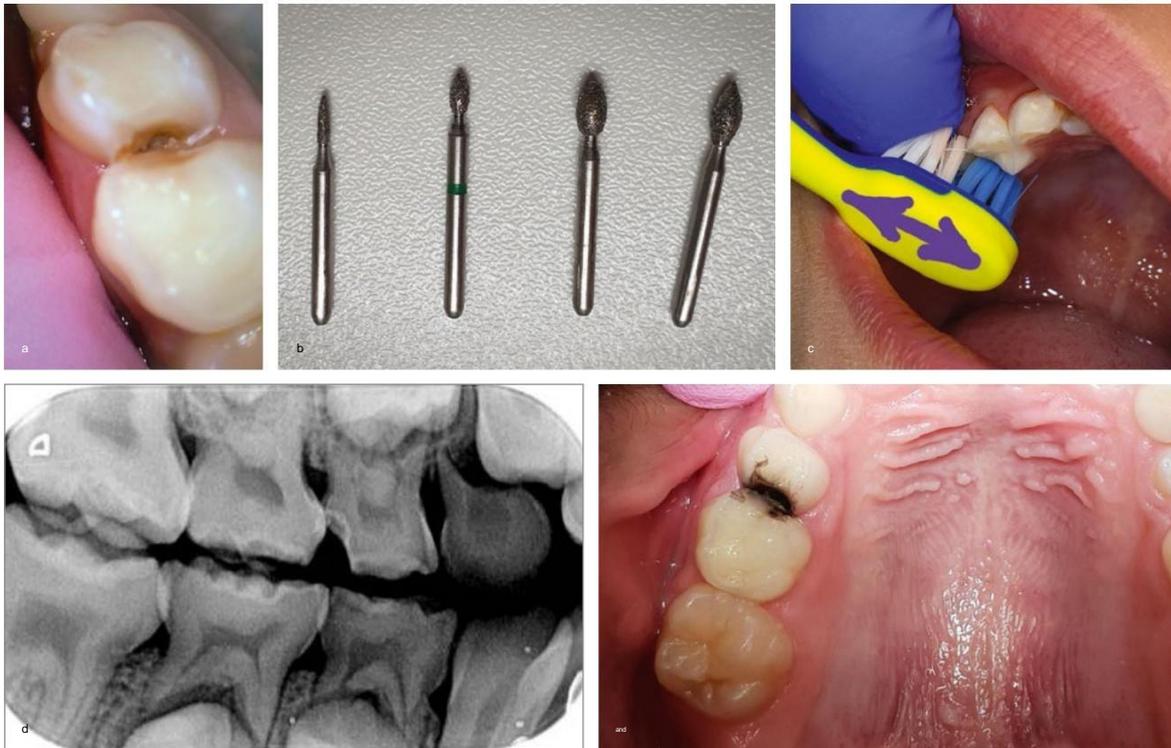


Fig. 2. A deep caries lesion of tooth 54 and a minor lesion of tooth 55 in an 8.5-year-old child with a fear of needles. The lesions were made accessible to the toothbrush by slicing tooth 54 more obliquely than tooth 55; afterwards SDF was applied (a). The diamond burs for slicing (b). The parents and the child were instructed to brush the lesion perpendicularly to the dental arch and evaluation took place every 3 months (c). Hypermineralized layer after the second application of SDF a year later is visible on the oblique slice of the tooth 54 (d, e).

whether restored or not, poses a high risk to the adjacent proximal surface (Mejäre et al, 2001). Already in 1994 in Sweden was demonstrated that slicing of the distal surface of a carious second primary molar can stop the caries development on the mesial surface of the first permanent molar (Ek and Forsberg, 1994).

Research shows no advantage of restoration over non-restoration (Mijan et al, 2014; Maguire et al, 2020). However, the learning effect during cavity cleaning can prevent the development of new lesions (Hilgert et al, 2017).

The goal of oral care in children with cavities is to put the parents or carers in control of the caries activity and thereby achieve a cure or stabilization of the disease (Van Palenstein Helderma et al, 2015). To prevent pain and inflammation, children with cavitated primary teeth, together with their parents, are guided to the moment of exfoliation.

THE WHAT AND HOW OF THE 5-STEP NRCT

CONCEPT The NRCT concept is a coherent package of low-impact, non-restorative actions with the aim of slowing down or stopping the caries activity detected in the cavity of 1 or more teeth (Gruythuysen, 2010). The steps are shown in table 1 and organized according to communicative and technical aspects of NRCT.

NRCT is a multi-level intervention, where first of all the necessary changes at the family and behavioural level to achieve effective oral care are being addressed. Afterwards it is determined whether and, if so, which technical aspects are necessary to support the behavioural change and the stabilization of the caries process. The care provider is challenged to achieve a balance between these two aspects of treatment. Parents are actively involved in this and are given a crucial role in reducing caries activity (Fig. 2).

Building up a partnership with the

parents The basic principle is that the care provider does not solve the problems for the parents and the child, but that this is done together with the parents and the child. By giving control over the caries activity out of the hands, trusting and appreciating the other, the other person discovers their own strengths and possibilities.

In practice it appears that very few parents are familiar with NRCT and the possibility to stop the development of caries in a cavity. The oral care provider should therefore take sufficient time to clarify the caries process and the possibilities of the NRCT concept, as indicated in the Supplementary Advice on Caries Prevention (Ivoren Kruis, 2011). The caregiver guides the parents and the child towards better oral health and,

Communicative aspects	Technical aspects
<p>Step 1 of NRCT concept. <u>Partnership with the parents/carers</u> is formed to manage the disease in the child. The care provider discusses the options for treating caries as a manageable process, including the roles of all those involved. An agreement is reached via <i>informed consent</i> and complies with the principle of 'joint decision making' of the WGBO</p>	<p>Step 3 of NRCT concept. <u>Limited supportive measures at tooth level</u> (*not always necessary)</p> <ul style="list-style-type: none"> • Making inaccessible caries lesions accessible for brushing (Fig.2). This can be done in one go or stepwise; • Applying medicaments to enhance remineralization, such as fluoride varnish or SDF; • Applying a protective layer of a glass ionomer cement (if necessary in combination with SDF)
<p>Step 2 of NRCT concept. <u>Effective communication.</u> Motivational interviewing helps with building contact with the parents and with guidance in changing self-care behavior.</p> <p>This process involves the following steps:</p> <ul style="list-style-type: none"> • Engaging, building a care relationship. • Focusing – exploring values and goals, exploring obstacles, choosing on which goals will be worked on and in which steps. • Exploring motivation, parental reasons for better health and increasing of motivation through MI techniques. • Guiding parents in making of a change plan and supporting in the implementation of it. <p>For examples of conversations and brushing training, see appendices to the online article, at www.ntvt.nl. To go directly to online article, scan the QR code: The 'Uitblinkers' technique, based on MI mindset, can also be used for this.</p> 	<div style="border: 1px solid red; padding: 5px;"> <p>In cases of necessity: When limited measures are not sufficient and the risk of pain and inflammation is too great, a decision can be made to restore a tooth in a minimally invasive manner using ART or Hall technique</p> </div>
<p>Step 4 of NRCT concept. <u>Evaluation and documentation</u> of the achieved goals and self-care agreements, adjusting the goals and determining the evaluation interval according to the NOCTP/Nexø/Gewoon Gaaf concept</p>	<p>Step 5 of NRCT concept Documentation/recording of caries activity by means of colour photos, description and, if necessary, X-rays</p>

Table 1. Organization of the 5-step NRCT concept according to communicative and technical aspects.

together with them, chooses the necessary aids that suit their situation.

NRCT is based on motivational interviewing “If every patient made a healthy habit of their oral hygiene, oral care providers would always have the ideal patient in the chair.” (Zwart & Gresnigt-Bekker, 2017). Unfortunately, many children’s oral health leaves a lot to be desired. If the oral care provider tries to convince the parents, this usually does not lead to the desired result or even has the opposite effect (Miller and Rollnick, 2017).

Like NOCTP, NRCT is based on motivational interviewing and starts with the *mindset* of the care provider (Gruythuysen, 2019; Gruythuysen et al, 2021). The oral care provider facilitates the change process by eliciting and reinforcing reasons for change in the patient and/or his parents. The aim is to bring out personal strengths, abilities, own resources and the wisdom of the patient and the parents by creating a positive climate conducive to change. The child’s parents decide for themselves what is possible in their situation. Oral care providers must also be able to understand and manage relapses into old behaviour.

Research shows that change process starts with the caregiver, through embracing the empathic form of motivational

interviewing (Miller and Rollnick, 2017). Behavioural change is often time-consuming, especially in the beginning; later it saves time.

Technical support for the behavioural change at the tooth level

The extent to which the behavioural change develops and its consequences for caries development, the location and extent of the lesion determines which clinical intervention is appropriate.

Of course, teeth with the (risk of) pain complaints are treated first. After that, the guidance is intensified.

Limited technical measures (see tab. 1) are used in NRCT when caries activity cannot be sufficiently stopped due to obstacles and there is a risk of pain/inflammation. These means are chosen depending on:

- Accessibility of the lesion to effectively remove the biofilm.
The inaccessible cavity can be sliced in with a diamond bur, opened with a margin trimmer or a combination of these instruments (Gruythuysen, 2010; Frencken, 2017).
- Lesion activity. Inaccessible cavitated lesions are considered active. Accessible dentine lesions that feel soft or leathery with gentle probing with a blunt probe or pocket probe may be treated with fluoride varnish, 38% silver diamine fluoride

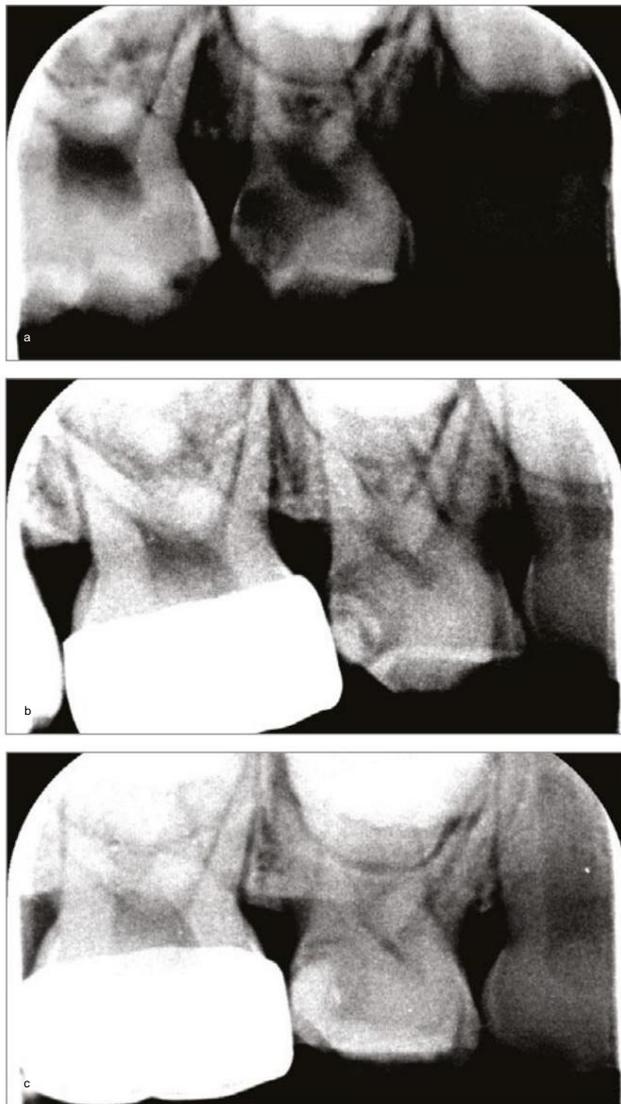


Fig. 3. In a child with deep active lesions in 55/54 SDF was applied in January and June of 2018; on tooth 55 a Hall crown was placed; crown cement formed a protective layer for the cavity in tooth 54 (a). SDF and a layer of high-viscosity glass ionomer cement was applied on 54 in July 2018 (b). November 2020: the pulp of 54 has remained vital after this minimally invasive treatment and a layer of tertiary dentin is visible on the x-ray (c, d)

(With thanks to T. Boulanger).

(SDF), a layer of glass ionomer cement or SDF in combination with glass ionomer cement.

The choice depends on the increasing severity, the risk of pain and inflammation and the capacity of the child. The exposure time and frequency of applying SDF influences the effectiveness (Fung, 2016). Usually SDF is applied 2 times a year. With highly active lesions and very poor child cooperation, a number of shorter-term applications may be required. Due to its antibacterial, desensitizing and remineralizing effect, SDF offers extra time to change the behaviour, but it does not work sufficiently without adequate self-care. The backgrounds, possibilities and safe application of SDF have been described in Dutch (Jasulaityte, 2020

- Sensitivity of the lesion and gums. Brushing can sometimes be sensitive. Brushing with little pressure makes the gums less sensitive. Extra fluoride in the toothpaste, fluoride varnish and SDF can reduce the sensitivity of the dentine. If this is not sufficient, a layer of glass ionomer cement can be placed in the cavity. In which steps limited resources are applied in NRCT is depending on the child's capacity and cooperation, and the activity and accessibility of the lesions.
- Often, targeted brushing in the cavities can be started immediately, without any additional interventions. Sometimes cavities are not accessible. With one child it is necessary to apply fluoride or SDF immediately after slicing, while with another child it is better to first apply SDF with superfloss or soft-pick to reduce sensitivity and then in 1 or more other sessions to slice the tooth. Sometimes, in addition to making the cavity accessible and the application of SDF, a layer of glass ionomer cement is necessary. This can be done in the same session or during the future evaluation sessions.
- With cavitated anterior teeth, caries process usually stops by brushing with fluoride toothpaste. SDF is usually not necessary for anterior teeth with small or medium sized dentine lesions. Parents prefer to avoid the black discoloration and that motivates them to focus more on brushing. In rare cases with very young, uncooperative children, SDF in the front may be necessary. In that case,

at the explicit request of the child, discoloration can be later masked with a layer of glass ionomer cement or with strip crowns of high- viscosity glass ionomer cement, whereby the administration of anaesthesia is not necessary. Good self-care and sufficient cooperation are the prerequisites. Children rarely have this request themselves. Aesthetic treatment is only indicated in cases of bullying or uncertainty about one's own appearance (Gruythuysen et al, 2011).

- For molars, it is recommended to slice at an angle (60 degrees) in order to avoid or limit the loss of contact with the neighbouring tooth as much as possible to prevent food impact (fig. 2). The distal surface of the first primary molar is sliced more obliquely than the mesial of the secondary primary molar to facilitate brushing. The parents are trained to brush perpendicular to the dental arch.

Evaluation of the achieved goals and self-care agreements. Risk and self-care behaviour are continuously monitored and evaluated. Give affirmation or appreciation for what has been achieved and what is going well. Remember that mistakes, ambivalence and relapse are normal parts of the change process. Examine the obstacles and what support the parents need, set the new goals together. Additional return visits are planned based on the risk assessment, for example using NOCTP/Nexø model/Gewoon Gaaf.

The caries-active areas in the mouth are being monitored, preferably in combination with oral photography and discussed with the parents. It is also important to report in the file the obstacles and achievable goals formulated in their own words by the parents. At the next visit, this forms the starting point for the evaluation interview. The judgment of the healthcare provider is subordinate to this (Gruythuysen, 2018).

Evaluation of caries process takes place at each appointment . Activity of caries lesions is clearly documented through description and/or colour photographs. If necessary, X-rays are made (Gruythuysen, 2010). Lesion activity is evaluated during each evaluation or periodic follow-up. The principle is that the lesions are considered active until stabilization has occurred and the lesions meet the criteria for *arrested* lesions, as described in the diagnostic guideline (KIMO, 2019). At each visit, it is assessed whether intensification of self-care and clinical interventions are necessary. If there are active lesions, the visit frequency is increased, with stabilization of the caries process, the visit frequency decreases, according to the NOCTP protocol.

Support with minimally invasive restorations

Prevention of pain and inflammation through adequate monitoring and, if necessary, invasive action are essential parts of the NRCT treatment concept. Activity, depth and accessibility of the lesion, and the condition of the pulp determine the risk of pulp reactions (Gruythuysen, 2010).

If the intended treatment goal cannot be achieved with NRCT, additional treatment options are required. The preference is for minimally invasive restoration by means of the ART or the Hall technique or the indirect pulp capping, depending on:

- The vulnerability of the child. In children with a reduced resistance and medical problems it is more likely to have a need to resort to the interventions in the form of restorations
 - The situation surrounding the child, various (temporary) problems in the family. Are the parents able to perform precision cavity brushing after training and to change the diet? How is the situation of the parents themselves, are there major stressors in the family, and is there sufficient support available? In very difficult situations, seek support from youth (health) care services (Gruythuysen et al, 2015a).
- The cooperation of the child. Cooperation is needed for good oral hygiene, and precision brushing of cavitated lesions can be extra challenging. Take the circumstances into account. Sensitivity of the cavities despite the use of SDF and inflamed gums, but also severe gag reflex, spasticity, hard biting, behavioural problems, handicaps or psychological problems of the child can seriously impede brushing. Therefore sometimes additional restorative interventions are necessary as extra support and to prevent the risk of unfavourable clinical consequences.

Effect of glass ionomer cement on the caries lesion

Frænken (2020) describes the advantages of glass ionomer cement and in particular high-viscosity glass ionomer cement. Glass ionomer cement is the only material with direct chemical bonding to dental tissues. The adhesion improves if the cleaned cavity is first treated with a polyacrylic acid conditioner. Glass ionomer cement promotes remineralization and creates a hypermineralized layer of dentin. Even if all or part of the glass ionomer cement layer is lost, this layer inhibits the caries activity. Glass ionomer cement has a therapeutic effect on dental tissues due to an exchange of ions.

The glass ionomer cement layer can be used in combination with SDF. SDF does not impede the adhesion of glass ionomer cement to the dental tissues (Fröhlich et al, 2020). With low cooperation, the cavity can be protected with a layer of glass ionomer cement after plaque removal without excavating (Fig. 3). When the cooperation allows, the enamel-dentin margin is manually excavated and an ART restoration can follow. High-viscosity glass ionomer cement is easy to apply with the finger-pressure technique and that makes it less stressful for the child. A meta-analysis showed that single-surface and multi-surface restorations of high-viscosity glass ionomer

CASE CONTINUED 1. TREATMENT OF CAS

September 2018. At home Cas was spoiled with sweet drinks and foods up to 8 times a day and parents were not willing to change that.

Therefore the focus was to improving the brushing quality and the option of SDF was discussed with the father. After approval, SDF was applied on the lesion of tooth 74 (Fig. 4a). Cas found it stressful.

February 2019, after slicing tooth 74 (Fig. 4b). In 2019 Cas came for evaluation 6 times. Attempts to motivate the parents to cut down on sweets did not lead to the intended result. The parents did help with electric brushing every day.

Gradually, various lesions developed further into for cleaning inaccessible cavities; that can be seen on the X-rays (Fig. 4c-d). The parents had trouble with Cas's sugar addiction. Cas still found the treatment difficult. During evaluation appointments, the active caries lesions were treated gradually in minimally invasive approach, with a combination of NRCT, ART and Hall crowns. No separate treatment appointments were required. Evaluation, motivational interviewing, if necessary, combined with a technical intervention could be performed in 20 minutes.

Despite the *corona lockdown* in 2020, the situation remained stable. The parents focussed on brushing, also in the fissures of the erupting first molars (fig.4e-f). The sugar consumption was slightly reduced. Parents and the child received affirmations for their performance.

November 2020. Situation was still stable, parents worked on reducing sweet moments (Fig. 4g-h). That was a big challenge, Cas has a strong character.

Conclusion. Treatment under general anaesthesia was unnecessary. Motivational Interviewing with parents and evaluation of the situation formed the basis of the treatment, with the goal of stabilizing the caries process. That progressed slowly. Oral hygiene improved, but the diet change proved more difficult. Where possible, no restorative treatment was performed. Stabilization of the caries process in the child lasted longer than 1 year with a lasting result. Feedback via colour photos helped in communication with the parents.



Fig 4. See description of the images in the text above.

cement in primary molars perform as well as traditional restorations (Frencken et al, 2021).

Resin-modified glass ionomer cement may be an alternative in children with low co-operation.

Indications, reasons of failure and conditions for success of NRCT

NRCT is recommended in the guideline as the first choice of treatment in children with cavitated dentine lesions in primary teeth without irreversible inflammation.

This is especially true when caries activity is high. The treatment is also easily accepted by young, anxious children.

The reasons for failures of NRCT are usually iatrogenic: incorrect slicing, too vertical, insufficient opening to facilitate proper cleaning, inadequate guidance and supervision, incorrect indication (lesion too deep/too far

cervically), failure to act proactively in the event of insufficient support for the child by parent or caregiver with regard to brushing and nutrition (Gruythuysen et al, 2015b; Hansen and Nyvad, 2017).

The principles of self-care are relatively simple. But the practice is often far from simple (Toarmina et al, 2020). Family functioning, stress and mutual relationships play an important role in children's oral health (Duijster and van Loveren, 2017; De Jong-Lenters et al, 2019; Couchene et al, 2021). External events, such as the *corona lockdown*, can also disrupt the balance in the family. This can affect daily oral care (Verlinden et al, 2020).

A condition for success is also that oral care providers are well trained to adequately perform motivational interviewing and NOCTP/Gewoon Gaaf (Van Palenstein Helderma et al, 2015). One should not

CASE 2. CHILD WITH HALL CROWNS

In an anxious young child, the 54 and 64 with dentin lesions were previously restored with Hall crowns. That did not prevent caries development.

In **January 2019** the child was 5 years old. On the bitewing radiographs, caries lesions in 55 mesially, 74 distally and 84 distally were still not cavitated (**fig. 5a-b**). During conversation with the mother, it was decided to monitor and support the process, due to difficulties in brushing for the unwilling child. Appointments for guidance and evaluation took place every 3-4 months.

In **June 2020** on bitewing radiographs the progression of the lesions is visible (**Fig. 5c-d**). The *corona lockdown* had a negative impact on consumption of sweets and brushing.

Motivational interviewing helped to pick up the thread of self-care again. After explanation of treatment options, NRCT was decided: the lesions of 55 mesially, 74 and 84 distally were sliced and SDF was applied.

The first permanent molars had erupted. The mother practiced brushing the difficult locations.

March 2021. The lesions appeared clean and hard (**Fig 5e h**). The mother brushed all molars and lesions perpendicularly to the dental arch. The fissures of the first permanent molars were clean and hard with dark discolorations present. Mother and child are satisfied with the result.



Fig 5. See description of the images in the text above.

forget that causal treatment is by definition a tailor-made care that places high demands on the competence and dedication of an oral care provider to identify individual problems, provide the necessary support and, if necessary, seek help from youth (health) care.

MEANING OF THE PUBLISHED RESEARCH FOR PRACTICE

Parts of the NRCT concept have been researched and proven to be effective. It was recently confirmed that the results of making the cavities accessible and cleaning them are comparable with the results of restoration (Mijan et al, 2014; Maguire et al, 2020). Motivational interviewing is successfully used for the treatment of lifestyle-related diseases (Miller and Rollnick, 2017). Motivational interviewing was also found to be more effective than traditional counselling in oral care, especially in populations with a lower socio-economic background (Faustino-Silva et al, 2019). Pine et al (2020) showed in a multicentre randomized clinical trial a significant difference in the caries

lesion development and the relative risk of developing new lesions in favour of the motivational interviewing group. The proven positive effects of silver products on the inhibition of caries activity in dentin lesions are now generally accepted (Horst et al, 2016). A newly published randomized controlled trial by Abdellatif et al (2021) showed no difference in *arrested* caries between SDF and ART treatment, but SDF treatment was significantly shorter and therefore more child-friendly.

One problem of the prospective NRCT study published so far is that the 5-step concept is not part of it. Both Santamaria and the researchers of the FICTION trial, which compared non-restorative cavity treatment with traditional restoration and Hall crown restoration, failed, among other things, to extensively train the performers in motivational interviewing, while this forms the basis for the success of NOCTP and NRCT. In addition, in the studies of Maguire and Santamaria, the application of SDF was not included

(KIMO, 2021). It has recently been argued that the ORCA definition for NRCT, referring solely to making the caries lesion accessible, seriously underestimates the importance of the 5-step concept for the effectiveness of the NRCT (Gruythuysen et al, 2021). This has been confirmed in various case reports (Gruythuysen et al, 2015b).

Despite the limitations mentioned, the studies into the variants of the NRCT concept formed a sufficient basis for choosing to prioritize causal treatment in the guideline.

Existing prejudices about NRCT could become refuted (Gruythuysen and Van Strijp, 2018; Gruythuysen, 2019). A well-known example of this is the risk of loss of space and the consequences for dental development. The inaccuracy of this prejudice was demonstrated with correct slicing almost 40 years ago and recently also confirmed for the use of ultraconservative (UCT) treatment (Ingers, 1982; Gomide et al, 2020).

The causal methods are more effective than symptom control for controlling the caries process, changing parental and patient behaviour and improving oral health. It was noted that one of the success factors is the caregiver's ability to change patient behaviour and understand family circumstances (Santamaria et al, 2020).

DISCUSSION

Experience shows that the application of NRCT in children requires a substantial change in practice. Most contact moments with the patient are for preventive guidance and evaluation, if necessary supported by a short technical intervention. Practical analysis showed that the NRCT concept, as in the FICTION trial, did not lead to more pain complaints (Maquire et al, 2020).

NRCT often can be very well applied for the treatment of children with complex problems and treatment under general anaesthesia is rarely necessary in this group (Boulanger, 2021). It is important to allow sufficient time for communication in the initial phase, this investment saves time later. Only occasionally is a short treatment under sedation or general anaesthesia necessary, which usually involves a few extractions, possibly combined with some limited technical intervention. For the other teeth with less risk, in accordance with the guideline, preference is given to causal treatment in order to make the child and parents aware of their own influence on oral health.

The new NRCT guideline and its positioning is a challenge for the entire team (Gruythuysen, 2019; KIMO, 2020). Not only does every team member have a role to play in this. But it is at least as important to periodically check whether the mutual coordination leads to a treatment that is in accordance with the guideline.

In complex situations involving children and parents with multiple problems, prevention appointments cannot simply be left to a prevention assistant. It is best to have the same dentist or dental hygienist carry out the guidance themselves and monitor the situation until it stabilises.

CARIES TREATMENT

Go for the folder 'Caries, information about various trading options. Which treatment is best for you child?' to the online article at www.ntvt.nl or go directly to the online article and scan the QR code. The folder has been added to the online article as a PDF attachment.



The treatment process takes longer, but it is less intensive for the child and the result is more durable, as experience has shown. In light of the COVID-19 outbreak, NRCT is ideally suited to limit aerosols in the practice, possibly using a diamond bur with a coarse grain, low speed and without cooling (Eden et al, 2020). The guideline reads: *"Supporting parents/carers on their way to a preventive healthy lifestyle is the core task of youth health care."* In 2013, doctors and dentists argued in favour of embedding oral care for youth in youth (health) care (Burgersdijk et al, 2013). Hopefully, the professional groups will implement this.

Remuneration per unit of time for the implementation of the NRCT concept would do justice to the goal of NRCT because effective communication takes the most time. The use of medicaments to support caries arrest is possible under the code M30.

There is discussion about the barriers to performing NRCT among oral care providers, such as uncertainty about the most effective communication, leaving the comfort zone, lack of experience and knowledge of the indication and implementation of the 5-step NRCT concept (Gruythuysen, 2019). Investigating the full 5-step NRCT concept is a complex challenge. But randomized clinical trials only give a global impression of the effectiveness of a treatment and do not show what this means for the individual child. As a result, there is a particular need for case reports about NRCT in order to enter a discussion about the practice of effective care (Hordijk, 2011). Hopefully, educational institutions will set an example in this.

CONCLUSION

NRCT is a child-friendly method of causal caries management, based on the consideration of caries as a behavioural disease. The main contribution to the treatment is made by the parents at home and that is pleasant for the child. Development of anxiety in the child is prevented or limited by limited or delayed treatment. At the same time, caries on other surfaces and teeth is prevented or inhibited. By changing the lifestyle, the result remains sustainable. The goal of NRCT is, together with the other forms of causal therapy to restore the balance in the biofilm and thus contribute to the quality of life in the child by guiding the child to the moment of exfoliation of primary teeth without pain and inflammation. The job of oral health care providers is to elicit strengths in patients and their parents or caregivers and to guide them with empathy towards good oral health.

LITERATURE

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