Caries classification and management in the context of the CariesCare International (CCI™) consensus: a clinical case study

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Key points

- Provides an example for dentists to help them deliver optimal caries care and outcomes for their patients with the CariesCare International 4D-cycle as a practice-building format.
- Demonstrates how the system can prevent and control caries.
- Shows an example of how the system can engage patients as long term health partners with their practice.

Abstract

The objective of this clinical case study is to illustrate the caries management four-step structured process, leading to personalised interventions specific for each individual patient's risks and needs, according to CariesCare International, derived from the International Caries Classification and Management System (ICCMS) for clinical practice. An 18-year-old female was diagnosed with higher caries risk at the individual level, and with several caries lesions at different severity stages, some likely active and others likely inactive. A care plan was co-created with the patient and delivered to obtain optimal health outcomes. Several issues pertinent to patient-centred care are discussed, including caries management at the individual and the tooth surface level, the preservation of tooth structure, patient's caries risk management, and prevention and control of caries lesions. The patient's perspective is taken into account and the health outcome focus of the system is highlighted.

Introduction

CariesCare International (CCI™) is a charity promoting a patient-centred, risk-based approach to caries management designed for dental practice.[1] This comprises a health outcomes-focused system that aims to maintain oral health and preserve tooth structure in the long-term by sharing the same goals as the International Caries Classification and Management System (ICCMS).[2,3,4,5]

The CariesCare International guide takes the dental team through a four-step structured process (Fig. 1), leading to personalised interventions specific for each individual patient's risks and needs. The four interlinked steps in the cycle (4D's) are: 1st D: Determine caries-risk; 2nd D: Detect lesions, stage their severity and assess their activity status; 3rd D: Decide on the most appropriate care plan for the specific patient at that time; and then 4th D: Do the preventive and tooth-preserving care which is needed (including risk-appropriate preventive care; control of initial non-cavitated lesions; and conservative restorative treatment of deep dentinal and cavitated caries lesions). Full details of the consensus guide are available in the first *BDJ* article in this series.[1]

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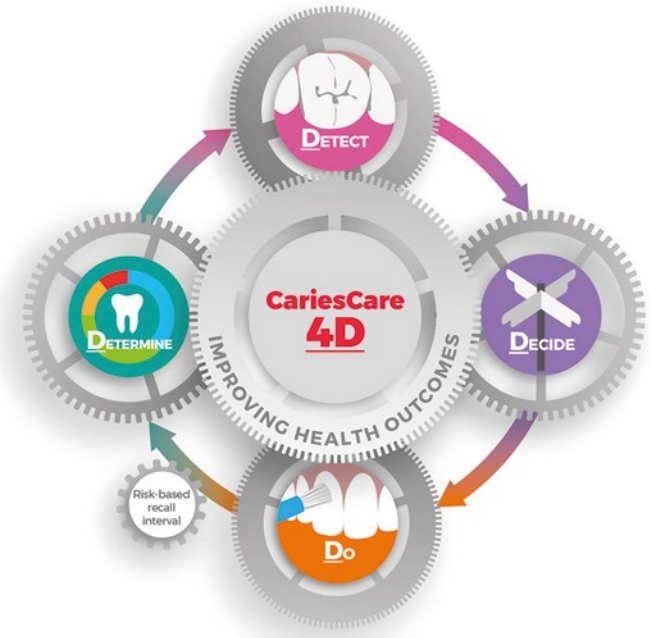


Note: Full details of the CariesCare International Consensus Guide are available in the first *BDJ* article in this series: *Br Dent J* 2019; https://doi.org/10.1038/s41415-019-0678-8.

Fig. 1 CariesCare 4D cycle clinical practice

Case report

An 18-year-old female patient presented complaining of sensitivity in a molar tooth at the level of the lower right quadrant when eating sugar. These signs and symptoms had been present intermittently for the previous three months.

1st D: DETERMINE: Caries risk

At the caries risk assessment, after gathering information from interview and clinical assessment with the patient, each of the caries protective factors which were failing and caries risk factors present that she presented with were clearly explained to her (Fig. 2).

2nd D: DETECT & ASSESS: Caries staging and activity

At the detection and staging of caries lesions and assessment of activity, the patient was shown the following findings from the visual and radiographic assessments:

ICDAS-merged radiographic caries stages

The patient showed on the bitewing x-rays initial enamel radiolucency (IER), initial dentine radiolucency (IDR), and moderate radiolucency (MR) in her posterior teeth (Fig. 3).

ICDAS-merged visual coronal caries stages and activity status

In the visual exam the patient presented initial, moderate and extensive lesions, some active and some inactive, caries lesions. The patient also showed a moderate dental fluorosis (according to TFI) and calculus in M of first upper molars.[2]

3rd D: DECIDE: Personalised care plan; patient and tooth levels

At the patient level, after analysing caries protective and risk factors from the '1st D', with the aid of the patient's caries risk level flowchart, her caries risk level was classified as 'At higher risk', due to the presence of a red-marked risk factor (presence of active caries lesions) and in addition a combination of other risk factors (high-amount/frequency free sugars intake, poor oral hygiene and access barriers) and protective factors failing (previous lack of dental care). At the tooth level, after analysing information from the '2nd D', and with the aid of the coronal caries diagnosis flowchart combining visual and radiographic caries severity stage with lesion activity (Fig. 4), the patient presented as: 'likely active: 2 extensive, 2 moderate (1 underlying dentinal shadow, 1 enamel breakdown/microcavity), 4 initial, and as likely inactive: 3 moderate and 15 initial caries lesions'. A shared personalised plan of care was discussed with her, focusing on identifying the elements and making them explicit (Fig. 5).

Fig. 2 Caries protective and risk factors

Caries protective factors	At risk	Patient's case
Fluoride toothpaste: twice daily brushing with fluoridated toothpaste (at least 1,000 ppm)	☐	*Patient refers that she brushes twice a day (with NAF 1,150 ppm fluoride toothpaste)*
Dental care: regular preventive-oriented dental care, including for example application of topical fluoride	☑	*She has rarely been to the dentist before*
Systemic fluoride: use of fluoridated drinking water or other community fluoride vehicles (where available)	☐	*The patient lives in Colombia, which has public health salt fluoridation since 1989*

Caries risk factors	At risk	Patient's case
Risk factors, social/medical/behavioural		
Hyposalivation, either drug-, disease-, head/neck-radiation or/and age-induced	☐	*No systemic diseases, no use of medicines and no self-reported dry mouth*
High intake (amount/frequency) of free sugars from drinks (including fruit juices/smoothies), snacks and meals	☑	*Patient refers having three meals and three snacks a day, including two fruit juices with refined sugar, one soft drink, and carbohydrates with the main meals*
Low socioeconomic level, low health literacy, health access barriers	☑	*Her family's socioeconomic status is low. She lived, until last year, in a rural village with difficult access to the closest municipality and with limited healthcare service. She has recently moved to the capital city*
Inability to comply, low motivation and engagement	☐	*Patient is compliant, motivated and engaged*
Special health care needs, physical disabilities	☐	*Patient has no special health care needs, nor physical disabilities*
Symptomatic-driven dental attendance	☐	*Patient is attending currently due to symptoms*
Risk factors, clinical		
Recent caries experience and presence of active caries lesion(s)	☑	*Several initial, moderate and extensive likely active coronal caries lesions present*
PRS (dental sepsis)	☐	*No*
Poor oral hygiene with thick plaque accumulation	☑	*Silness & Löe modified plaque index median: 2 (thick visible plaque in buccal and occlusal of molar teeth)*
Plaque stagnation areas (higher biofilm retention)	☐	*No*
Low salivary flow rate	☐	*No*

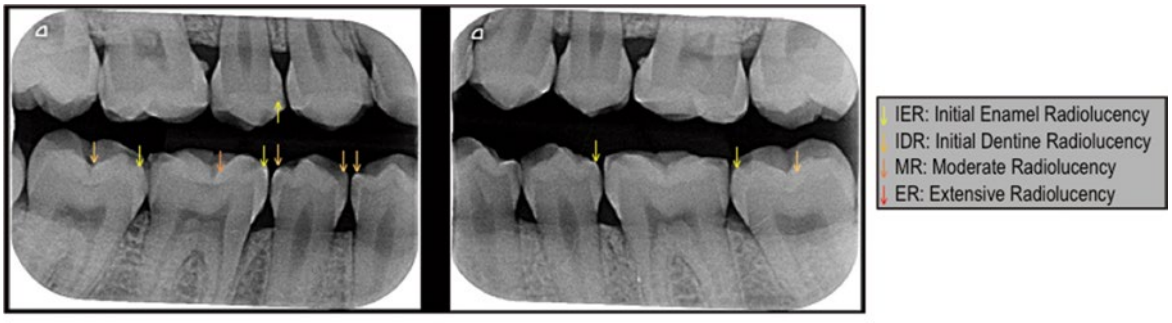


Fig. 3 Patient's ICDAS-merged radiographic stages

4th D: DO: Appropriate tooth-preserving and patient-level prevention and control

The personalised comprehensive caries care plan (Fig. 6) was built with the patient on the outcomes of the first three Ds and was further delivered by the dentist with the contribution of the dental hygienist. The management of the patient's higher caries risk was tailored at the individual level, with actions to improve the risk status taking into account the patient's needs, opportunities and preferences. Emphasis was given to the use of topical fluoride (toothpaste and varnish application), informative and one-to-one dietary advice focusing on free sugars, and toothbrushing. The management of the individual caries lesions was conducted according to their severity and activity. Extensive likely active caries lesions received tooth-preserving operative care (composite restorations), while moderate and initial likely active caries lesions located in the fossae/fissure system were sealed and those in free smooth surfaces received fluoride varnish application plus instructions on localised mechanical biofilm removal. It was decided to seal moderate likely inactive caries lesions and initial likely inactive lesions were assigned active monitoring and reassessment. The patient is now keen on maintaining dental visits every three months.

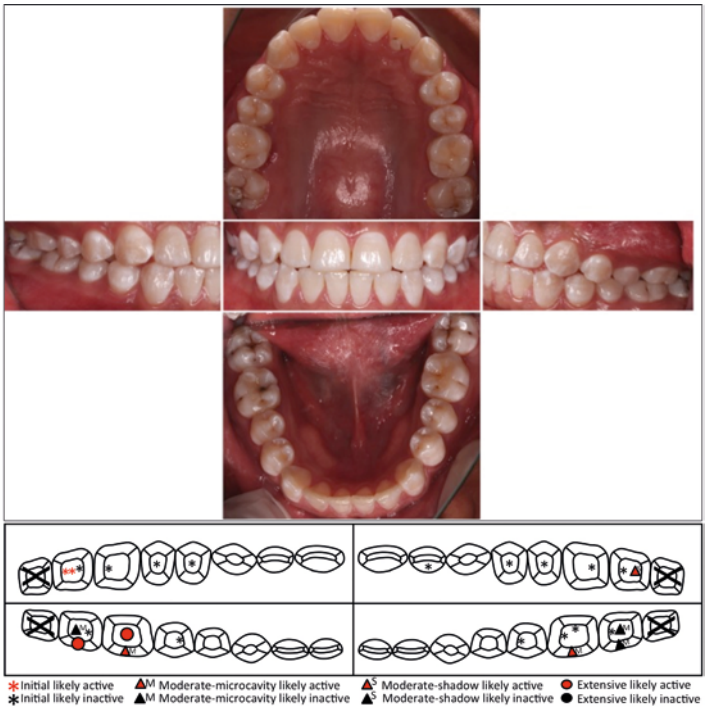


Fig. 4 Patient's ICDAS-merged visual stages and activity status

Discussion and summary

By using this patient-centred CariesCare systematic approach and being guided through a comprehensive 4D-cycle of caries management in practice, the dentist perceived that she was able to deliver optimal caries care and achieve positive health outcomes for the patient through preventing and controlling caries and engaging the patient as a health partner with her practice. The patient perceived that the process was not mechanistic and that her needs, opportunities and preferences were being taken into account during the process.

Fig. 5 Patient's care plan flowchart

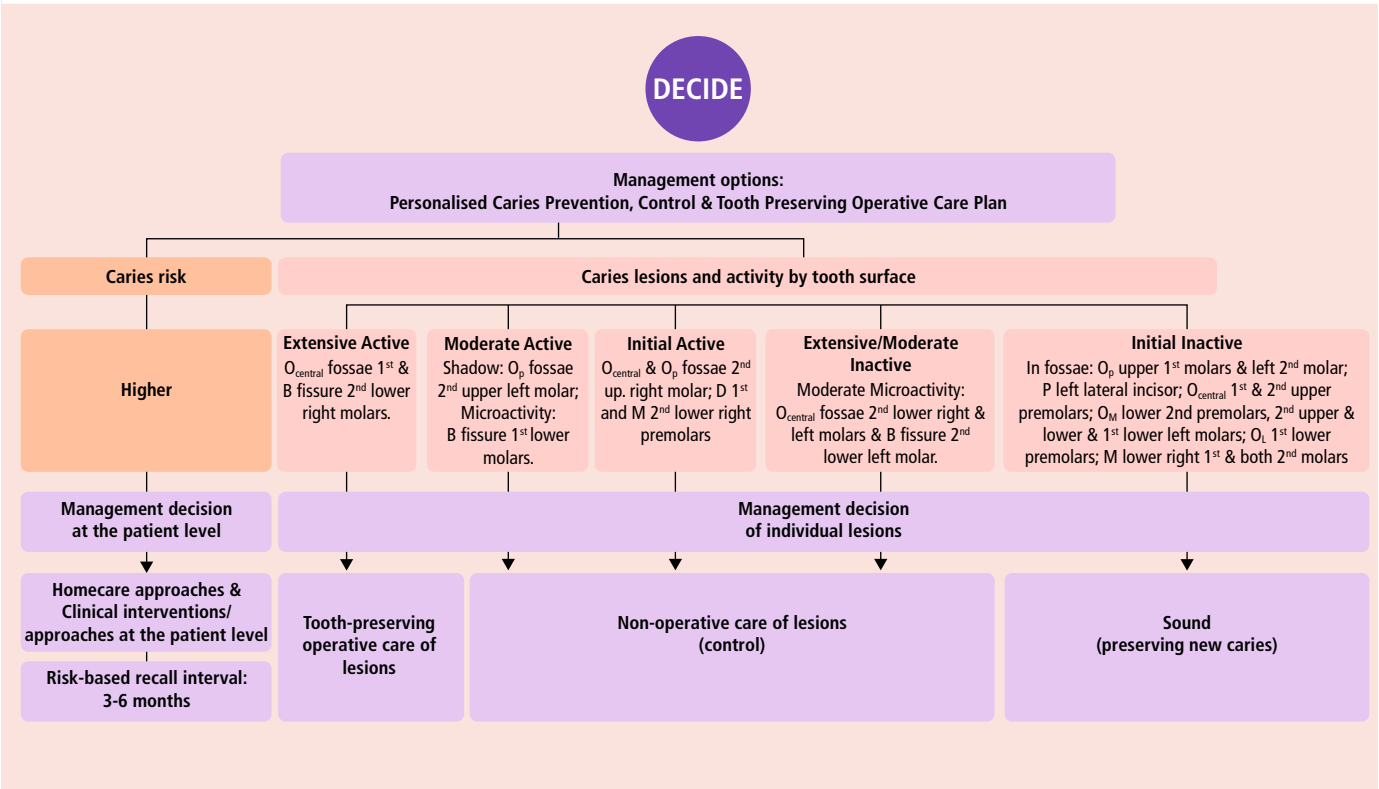
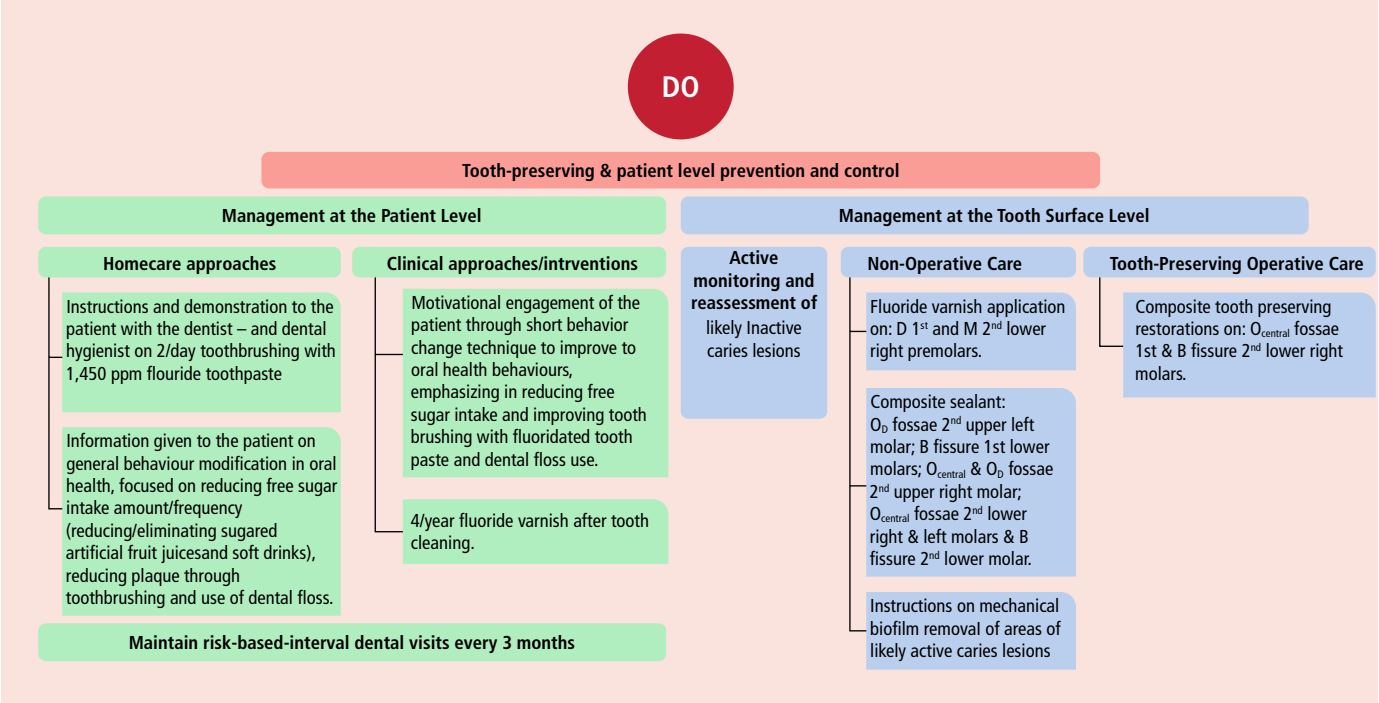


Fig. 6 Tooth-preserving and patient-level prevention and control flowchart



She now understood her personal higher level of caries risk and recognised, with the help of the practitioner, that she had a series of active and inactive caries lesions at various severity stages. Taken together, these realisations helped both the patient and the practitioner to identify ways of modifying behaviours to control the disease process and to create together a shared, personalised, plan of care. During the process, it became clear that the patient now wants to avoid fillings whenever possible.

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