OHCAN
Oral Health Clinical Advisory Network

CLINICAL GUIDELINES FOR CHILD AND ADOLESCENT ORAL HEALTH

July 2019

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Oral Health Clinical Advisory Network

OHCAN – WHO ARE WE?

The Oral Health Clinical Advisory Network (OHCAN) is a network of professionals from the oral health sector who work, or have an interest in, publicly-funded dental services in New Zealand. OHCAN provides clinical leadership to the oral health sector and advice to the Ministry of Health on oral health issues, with a particular emphasis on publicly-funded oral health services.

If you are involved in clinically or professionally leading a team or group of clinicians, you can apply to become a member of OHCAN. Individually, members are regarded as leaders by their peers, are able to think strategically and to work across and between disciplines. As a member you will receive updates on OHCAN's work streams and projects, as well as any oral health sector developments that OHCAN are engaged with. You will also be invited to OHCAN group meetings as and when they are planned.

You can contact OHCAN by sending an email to
OHclinicaladvisorynetwork@gmail.com

There is further information about OHCAN on our website

www.nzohcan.org.nz

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Clinical Guidelines for Child and Adolescent Oral Health

INTRODUCTION, BACKGROUND AND PURPOSE

July 2019

INTRODUCTION

These clinical guidelines for Child and Adolescent Oral Health have been developed by the Oral Health Clinical Advisory Network (OHCAN) to present some best practice guidance to oral health professionals who provide oral health care to children and adolescents throughout New Zealand.

The guidelines embrace and promote the prevention of disease and the maintenance of good oral health through:

- **Guiding best practice and evidence-based treatment planning and decision-making.**
- **Oral health services becoming more patient/family and whānau centered, accessible, culturally appropriate and empowering.**
- **Ensuring that oral health care is consistently delivered and provided, in a manner that is appropriate to the New Zealand context.**

Four guidelines have been developed to date that we believe form the main principles on which best practice and evidence-based prevention and oral disease management are founded. These include:

» **Prevention**

» **Caries Management**

» **Bitewing Dental Radiography**

» **Informed Consent**

We would like to thank all those who have contributed and assisted over the last few years with the development of these guidelines. Advice and input have been sought from senior clinicians and colleagues from Hospital and Community Oral Health Services, private specialist dental practices and oral health educational institutions within New Zealand.

We hope these guidelines will help and encourage clinicians to reflect on their current clinical practice. We also would like to see an improvement in the equity of access and consistent provision of evidenced base care to all of New Zealand's children and adolescents: irrespective of where they live, study or work.

We would also like to take this opportunity to acknowledge the dedication and passion of the many oral health clinicians, past and present, working in hospital and community oral health services as well as private dental practices. Thank you for all the excellent oral health care you provide to the children and adolescents of New Zealand.

BACKGROUND

Since 2007, the Government has invested a significant level of funding ($116 million in capital and $32 million in annual operating funding) to establish a modern Community Oral Health Service ('COHS') for children and adolescents. A key aim of the new facilities and models of care that emerged was to improve access, reduce disparities in oral health status and increase service use among children and adolescents. The new models of care have a strong emphasis on effective prevention, accessible services, and family/whānau participation.

In 2013, OHCAN, in collaboration with the Ministry of Health, conducted an evaluation of the impact of two international documents on the clinical practice of dental therapists and community dentists in New Zealand. The two documents, 'Prevention and Management of Caries in Children: Guidance in Brief' (Scottish Dental Clinical Effectiveness Programme); and 'Child Friendly Dentistry' promoted a preventive and caries management approach consistent with the new COHS model of care. The evaluation concluded that these two documents were based on evidence-based and best practice principles. It was well received by clinicians.

Subsequently, it was recommended that the messages and guidance contained within the documents be adapted and presented in a way to reflect the New Zealand context. This would take into account the service delivery, workforce and facility models that currently exist within publicly-funded community oral health services and independent dental practices.

The provision of oral health care and treatment is changing over time in line with emerging evidence and best practice, with a stronger emphasis now on a preventive and minimally invasive approach, with increased engagement and involvement of patients' whānau and social support networks.

These clinical guidelines have been developed to specifically provide practical guidance to relevant oral health professionals on the delivery of oral health services to children and adolescents, in a way that:

- **reduces inequalities in oral health outcomes**
- **achieves and maintains a 'low risk' oral health status for each individual**
- **provides evidence-based, consistent and accessible care throughout NZ**
- **provides positive and empowering dental care experiences**
- **engages and informs families/whānau**
- **are aligned with the Dental Council's Standards Framework for Oral Health Practitioners. These standards provide ethical principles; professional standards; and practice standards for all oral health professionals.**

We intend to review these guidelines every 4 years to ensure they remain up-to-date and evidence-based.

We hope you will find these clinical guidelines helpful and informative.

Moira Smith
(Chairperson, Oral Health Clinical Advisory Network)
on behalf of the OHCAN executive group.

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Clinical Guidelines for Child and Adolescent Oral Health

PREVENTION

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THE FOUR CORNERSTONES OF PREVENTION

1. Brushing twice a day with fluoride toothpaste

2. Fissure sealants

3. Dietary advice for food and drink intake

4. Other fluoride vehicles as recommended by the The Ministry of Health Guidelines on the Use of Fluorides https://www.health.govt.nz/publication/guidelines-use-fluorides

PREVENTING DECAY BY TOOTHBRUSHING WITH FLUORIDE TOOTHPASTE

Brush twice a day with a fluoride toothpaste

Brushing should be for about two minutes, early in the morning and last thing at night before bed, with nothing to eat or drink after brushing at night.

Use the correct amount of toothpaste and fluoride concentration

Under 5 years: Use a small smear of paste containing not less than 1000 ppm F.

6 years and above: Use a pea-sized amount of paste of between 1000 ppm and 1450ppmF.

‘Spit, don’t rinse’

Children who spit out and don’t rinse after brushing show an extra 10% reduction in caries experience compared with those who rinse their mouth out with water.

Supervised tooth brushing up to the age of 7 years

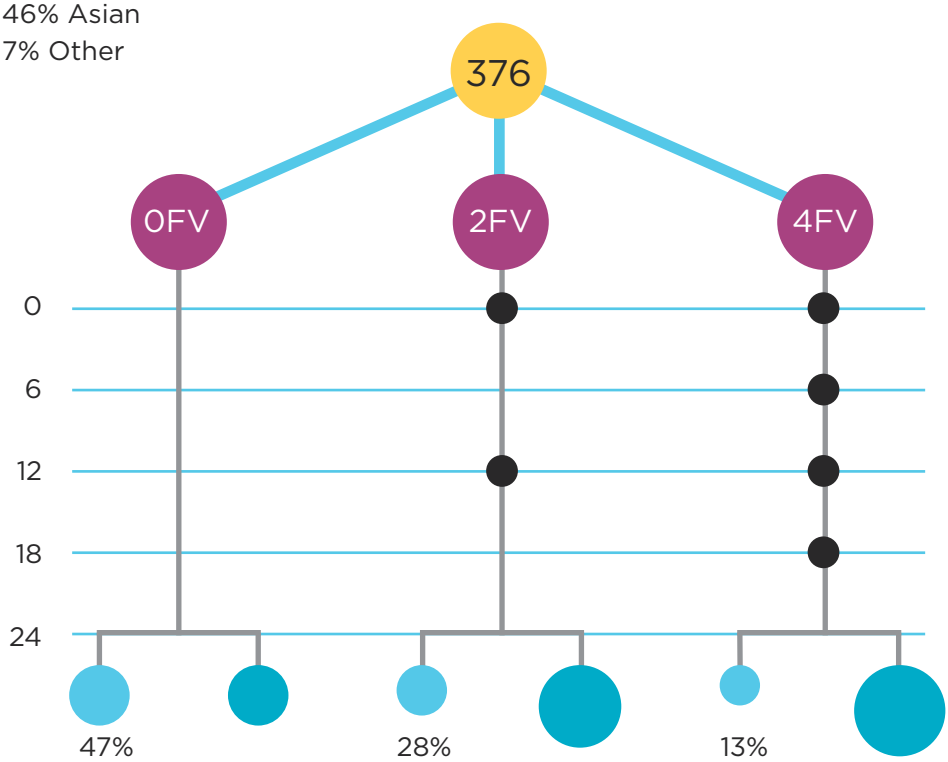
Young children need help with brushing. Parents and caregivers should supervise toothbrushing sessions to ensure that brushing is done well enough, for long enough and with the right amount of toothpaste.

PREVENTING DECAY WITH FLUORIDE VARNISH

- Applying fluoride varnish once a year reduces dental decay.
- Applying fluoride varnish every 3 or 6 months provides additional benefit.

Reduction in caries experience for those children receiving fluoride varnish (FV) applications

San Francisco population (fluoridated)
Aged 20 m (6-44)
All received age-specific counselling
47% Hispanic
46% Asian
7% Other



Weintraub et al, J Dent Res 2006

PREVENTING DECAY WITH FLUORIDE VARNISH

Fluoride Varnish: Key Points

Professionally-applied, high-concentration fluoride varnishes may be used for people aged over 12 months who are at high risk of dental caries.

- Fluoride varnish applications should be applied at 3-monthly or 6-monthly intervals as part of a preventive oral health plan.
- Fluoride varnish should be applied to all erupted teeth, especially close to areas of higher caries risk such as interproximal smooth surfaces.
- Fluoride varnish is less effective than fissure sealants at preventing dental decay in occlusal surfaces.
- Professionally-applied, high-concentration fluoride varnishes are not recommended for people at low risk of dental caries, except when there are specific surfaces deemed to be highly susceptible.
- Health practitioners applying fluoride varnish should have appropriate training.

PREVENTING DECAY WITH OTHER FLUORIDE VEHICLES

Fluoride mouthrinses

- Fluoride mouthrinses are not recommended for children aged under 6 years or people aged 6 years and over who are at low risk of dental caries.
- Fluoride mouthrinses may be used by people aged 6 years and over who are at high risk of developing dental caries.
- After rinsing, the mouthrinse should be spat out, not swallowed.
- Fluoride mouthrinse should be used as part of a preventive oral health plan.

Fluoride gels and foams

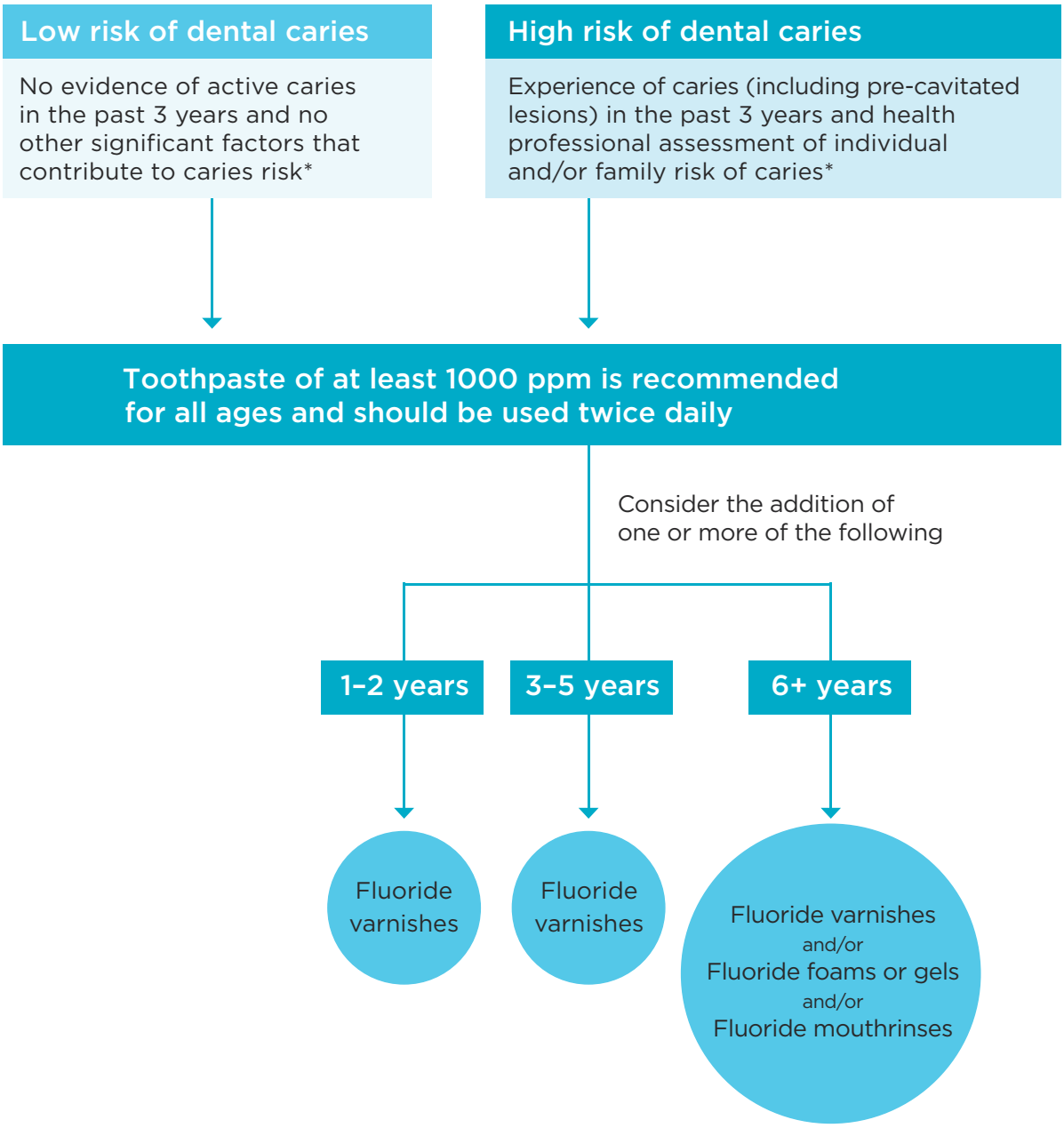
- Professionally-applied, high-concentration fluoride gels and foams are not recommended for children aged under 6 years or people aged 6 years or over who are at low risk of dental caries.
- Professionally-applied, high-concentration fluoride gels and foams may be used for people aged 6 years and over who are at high risk of dental caries. Fluoride gel applications should be applied at 3- to 6-monthly intervals as part of a preventive oral health plan.

Fluoride tablets

- Fluoride tablets are not recommended in NZ as a population health measure.
- Fluoride tablets may be recommended for people aged 3 years and over at high risk of dental caries.
- Tablets should be chewed or sucked, or dissolved in drinking liquid.

FLUORIDE GUIDELINE ALGORITHM:

Algorithm
Guidelines for the use of fluorides



***Dental caries risk factors:** Socioeconomic deprivation, suboptimal fluoride exposure, ethnicity, poor oral hygiene, prolonged bottle feeding, poor family dental health, enamel defects, eating disorders, irregular dental care, high sugar diet, high carbohydrate diet (in people with complex medical conditions), active orthodontic treatment, low salivary flow

COMMUNITY WATER FLUORIDATION

Community water fluoridation is an effective, safe and affordable way to prevent and reduce tooth decay for everyone.

It's effective

Over 60 years of international and New Zealand studies show that children and adults living in areas with community water fluoridation have significantly less tooth decay than those living in non-fluoridated areas. The **NZ Oral Health Survey 2009** https://www.health.govt.nz/publication/our-oral-health-key-findings-2009-new-zealand-oral-health-survey shows that on average New Zealand children have 40% less decay experience (i.e. decayed, missing or filled teeth) in areas with community water fluoridation than in areas without it.

It's safe

Overwhelming evidence from decades of research shows that community water fluoridation is safe.

It's affordable

There is strong evidence that community water fluoridation is cost-effective, saving much more in dental costs for individuals than it costs to run fluoridation programmes. For every dollar that is spent on community water fluoridation, $9 are saved in dental care costs. Some of these savings are realised in the health system, but it is mostly individual New Zealanders who benefit – paying for fewer fillings and tooth extractions.

(Sapere Research Group, 2015)

It is absolutely clear that at doses used in New Zealand to adjust the natural level to one that is consistent with beneficial effects (0.7–1.0ppm), there is no risk from fluoride in the water.

Professor Sir Peter Gluckman, Chief Science Advisor, Office of the Prime Minister's Science Advisory Committee.

$2.60

Cost of fluoridation approx. $2.60 per person per year

(Sapere Research Group, 2015)

$250

Average cost of a single filling for an adult

(Sapere Research Group, 2015)

PREVENTING DECAY WITH FISSURE SEALANTS

Fissure Sealing: key points

- Children who are at medium and higher risk of caries should have all pits and fissures in permanent premolar and molar teeth sealed.
- Children's partially erupted permanent teeth should be sealed with glass ionomer to protect them until they are sufficiently erupted to seal with a resin material.
- If moisture control is difficult then seal with glass ionomer cement (GIC) instead of resin.
- Sealants must be checked at **EVERY** review visit.
  REPLACE AND REPAIR EACH AND EVERY TIME
- The most common reason for sealant failure is moisture contamination.
- Fissure sealants may be placed over early non-cavitated, carious lesions (incipient caries, usually in enamel). Evidence suggests that caries will not progress as long as the fissure sealant remains intact. It is generally not recommend to fissure seal over active dentinal caries. Radiographs will aid when making a decision as to whether to fissure seal over carious lesions.

PREVENTING DECAY WITH FISSURE SEALANTS

Resin Versus Glass Ionomer Cement Fissure Sealants

- Reviews of the use of fissure sealants find that resin sealants are retained for longer than GIC fissure sealants; however, in terms of caries prevention, there is insufficient evidence to conclude that either material is superior. GIC is generally regarded as inferior to resin for protecting teeth, due to its lower retention rates. However, high-viscosity GIC sealants appear as effective as resin sealants in preventing occlusal caries.
- Overall, the various reviews and fissure sealant policy guidelines available recommend resin as the material of choice for fissure sealing teeth. But GIC may be used as an interim measure in circumstances where it is not possible to fissure seal with resin.

If 100 Children **Do Not** Receive Sealants

50 children will have caries

50 children will not have caries

76% REDUCTION IN CARIES

If 100 Children **Do** Receive Sealants

12 children will have caries

38 children will be caries free due to sealant application

50 children will not have caries

PREVENTING DECAY THROUGH HEALTHY EATING AND DRINKING

5 + a DAY
fresh fruit & vegetables

DIETARY ADVICE

Key points to focus on during dietary counselling:

- what's good for oral health is good for general health
- sugar not to be consumed more than 3 times a day
- water only whenever possible
- between meals, drink milk or water; snack on fresh fruit, or occasionally, a small piece of cheese
- nothing to eat or drink after brushing last thing at night.

Why concentrate on between meals eating?

Because of the amount of **hidden sugars** in many pre-prepared meals and foodstuffs.

And why is eating last thing at night so damaging?

Because the salivary flow rate drops to about one tenth of the daytime flow rate. This results in a longer clearance time for sugars in the mouth, and so encourages the development of dental caries.

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https://nutritionfoundation.org.nz/healthy-eating

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https://www.health.govt.nz/your-health/healthy-living/food-activity-and-sleep/healthy-eating

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CARIES MANAGEMENT

July 2019

BACKGROUND INFORMATION

For over a century the profession focused on using interventional operative procedures to address the signs and symptoms of dental caries for over a century. Fortunately in more recent times, a more preventive and disease management approach is being adopted by the profession. This has meant significant changes to established practices of service delivery, health promotion, clinical care, and health education as well as new approaches and direction to caries management and public health policy.

With prevention now becoming the main focus, we have seen the development and implementation of various caries prevention, diagnosis and management systems. These have all been designed to give practitioners evidence-based guidance when examining patients, assessing risk and planning further treatment. This New Zealand-based guideline encompasses and supports the principles of the International Caries Detection and Assessment System (ICDAS) and the Scottish Dental Clinical Effectiveness Programme (SDCEP). Practitioners are encouraged to familiarise themselves with both programmes. However where recommendations on fluoride differ from the The Ministry of Health Guidelines on the Use of Fluorides, the New Zealand guidelines should take precedence. https://www.health.govt.nz/publication/guidelines-use-fluorides

It is important to acknowledge that prevention and caries management in children is not possible without the active involvement of parents and caregivers. Family members and caregivers provide the environment within which the disease of dental caries both begins and can be prevented. Therefore any caries management programme must involve engagement with, and empowerment of, family members and caregivers. At the same time, the professional must build a positive and trusting relationship with the child.

PURPOSE AND PRIORITIES

- **Achieve and maintain dental health**
  - Keep the primary and permanent dentitions free from disease.
  - Reduce the risk of pain of sepsis, and therefore reduce possibility of treatment-induced dental anxiety.
  - Encourage children to be positive and knowledgeable about their oral health, and encourage the skills and motivation to maintain it into adulthood.
  - Encourage parents and caregivers to take responsibility for their child's oral health, homecare practices and to support and attend their child's dental appointments.
- **Minimise the use of surgical intervention**
  - Focus on the prevention of caries.
  - Apply preventive measures in order to prevent new carious lesions and to halt the progression of existing enamel and early dentinal carious lesions.
  - When carious lesions do occur, diagnose enamel and dentine lesions early and manage them appropriately.
  - Manage caries in the deciduous dentition so that the tooth can exfoliate naturally without causing pain, sepsis or dental anxiety.
- **Monitor behaviours and changes**
  - Aim for mutually agreed dietary changes. Monitor these without judgement in subsequent visits.
  - Collaborate with other child services agencies to support families.
  - Review dental health at appropriate intervals to monitor new lesions and lesion progression or regression.

GUIDING PRINCIPLES OF PATIENT CARE

- Empower (educate and coach to upskill) patients, parents and caregivers through activities focused on understanding the disease process, and adopting effective prevention and treatment at home.
- Adopt the principles of minimally invasive surgical approaches.
  Note: Minimal intervention dentistry (MID) interventions such as Hall technique stainless steel crowns, atraumatic restorative technique (ART) or silver modified atraumatic restorative technique (when a NZ registered product becomes available).

A CONCEPTUAL FRAMEWORK FOR CARIES MANAGEMENT

The Caries Management System (CMS)

CMS Framework		
	Empowering the Person exposed to the risk factors of this preventable, chronic NCD in his or her cultural, socio-economic, family & physical environments	**Managing the Lesion** (sign of the disease) in the dental hard tissues as a result of the patho-physiology in the mouth and the dental plaque
Assess	Person's characteristics and behaviours	Severity and extent of all lesions & surfaces at risk
Treat	Modifying key risk factors using motivational behaviour change & skill development	Lesions non-invasively and operatively in the home & clinics
Monitor	Behaviour changes	Lesion changes

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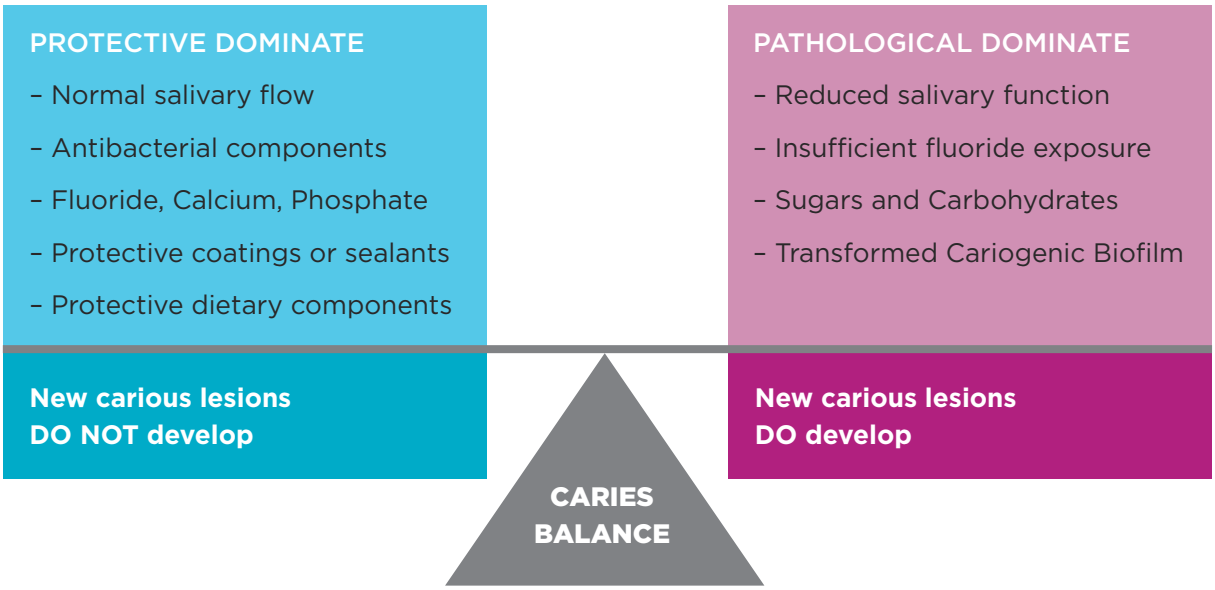
THE FOUR KEY CARIES RISK FACTORS ARE: SUGAR, SALIVA, PLAQUE, FLUORIDE

The impact of these four key caries risk factors should be reviewed at each examination.

Four Key Caries Risk Factors	
SUGAR	Exposure and frequency to sugars is what transforms a biofilm into one that is dominated by acid-tolerant or acid-producing organisms.
SALIVA	Saliva inhibits plaque growth, dilutes the acids of plaque organisms, and remineralises the tooth tissues demineralised by exposure to acids under the plaque.
PLAQUE	Thick plaque isolates the tooth surfaces from the protection of the salivary minerals.
FLUORIDE	Exposure to fluoride in foods and drinking water is protective. This results in ongoing fluoride ion availability in the saliva and in the plaque on teeth. Fluoride helps reduce the bacterial production of acids from sugars, reduces the period of demineralisation, and promotes quicker remineralisation of tooth tissues.

The Caries Risk Factor Balance



After Prof John Featherstone

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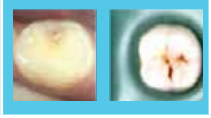
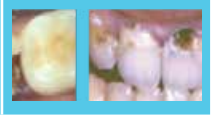
ASSESS THE CHILD AND INSPECT THE DENTITION

Begin with a full clinical examination of all soft and hard tissues and record all findings in your tooth base charting and written clinical records.

ICDAS Coronal Caries visual codes could be used in addition to your base charting.

ICDAS Coronal Caries Codes

Sound	White or brown spot	Shadow from dentine	Small cavity into dentine <1/3 of surface	Extensive cavity into dentine >1/3
0 or 1	2 or 3	4	5	6
				

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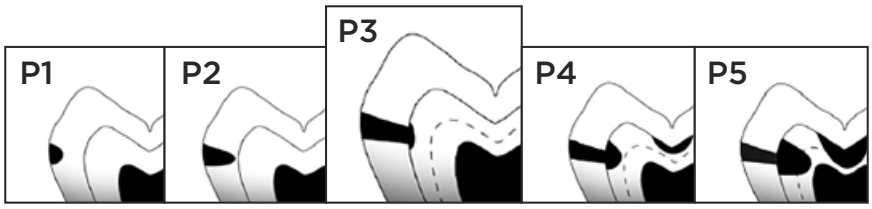
RADIOGRAPHIC DETECTION OF CARIOUS LESIONS

Record radiography results using ICDAS, P, or similar system and plan appropriate treatment.

Radiography Classification using Progression "P" System



For more information refer to the Bitewing Dental Radiography guideline.

MANAGING CARIOUS LESIONS AND SITES AT RISK

Lesions may be managed by either preventive measures or by surgical intervention. When considering which approach to take, the best practice is to always do more good than harm.

- It is potentially harmful to restore carious lesions that have a strong potential to arrest.
- It is potentially harmful to cut a cavity in a tooth if the benefits do not outweigh the lifelong risks of restoration failure, replacement, fracture of tooth tissue, and pulpal complications.
- Interventions that require no drilling, local analgesia, or rubber dam are less likely to cause dental anxiety and fears.
- It should be noted that all restorative procedures are iatrogenic.

Preventative Measures:

- All children should receive **standard prevention** according to their age (SDCEP).
- Children at increased risk of developing dental caries, should receive **enhanced prevention** (SDCEP).
- Fluoride varnish should be applied according to Ministry of Health Guidelines on the Use of Fluorides.
- Fissure protections (using a glass ionomer cement material) and fissure sealants (using composite or resin materials) when replaced and topped up as required, are effective in preventing new carious lesions in the fissures of permanent molars.

Notes:

** Even though glass ionmer cements (GIC) are less well-retained, a lost GIC should provide a fissure with ongoing protection against new carious lesions (Yengopal V et al., 2009).*

** A lost composite or resin sealant leaves a pit or fissure with no protection against new carious lesions, but the fissure is no worse off than one which has never been sealed (Griffin SO et al., 2009).*

BRUSHING WITH A FLUORIDE CONTAINING TOOTHPASTE

- Effective daily tooth brushing with fluoride toothpaste modifies three caries risk factors (fluoride, plaque, saliva). It is also the best non-invasive way to treat all sites at risk and carious lesions that do not need restorative treatment. On average:
  - Daily brushing with a 1000ppm fluoride toothpaste reduces new carious lesions by 24%.
  - Each 1000 ppm increase in the concentration of fluoride in the paste reduces new carious lesions by an additional 8%.
  - Each extra brushing occasion reduces new carious lesions by an additional 14%.
  - Swishing the toothpaste/saliva slurry vigorously for 60 seconds after brushing doubles the possible protection from each brushing. Rinsing with water after spitting is counter-productive as it dilutes the fluoride concentration within the mouth.

For more information refer to the Prevention guideline.

Restorative Options (Deciduous teeth)

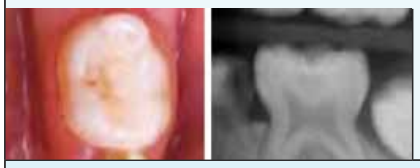
Caries in deciduous teeth should be managed using a caries management strategy to avoid upsetting the child and causing treatment-induced anxiety. Five strategies are available:

1. Complete caries removal, and restoration
2. Partial caries removal, and restoration
3. No caries removal, seal with restoration
4. No caries removal, leave cavity, or make lesion self-cleansing, provide prevention
5. Extraction, or review with extraction if pain or sepsis develops

Restorative Options (in Permanent teeth)

- In permanent molars, non-cavitated occlusal dentine lesions with a shadow (ICDAS 4) and radiographically in the outer 1/3 of the dentine can be sealed and monitored.
- Permanent teeth with proximal lesions that are in the outer 1/3 of the dentine could be separated using orthodontic separators to visually inspect if there is enamel breakdown, or cavitation into dentine. Follow-up radiographs should be taken to review lesions within 12 months.
- Consider the life-span of a deciduous tooth with defective restorations, when deliberating whether to place a stainless steel crown, a replacement restoration or to leave and review.

MANAGEMENT OPTIONS FOR CARIOUS LESIONS IN PRIMARY TEETH

	Complete caries removal and restoration	Partial caries removal and restoration	No caries removal:		No caries removal:		Extraction or review with extraction if pain or sepsis develops
			seal caries with fissure sealant	seal caries with Hall crown	provide prevention alone	make lesion self-cleansing and provide prevention	
	Section 8.1	Section 8.2	Section 8.3	Section 8.3	Section 8.4	Section 8.4	Section 8.5
Occlusal, non-cavitated lesions 	✓	✓	✓		✓*		
Occlusal, cavitated lesions	✓	✓		✓	✓*	✓*	
Aproximal, early dentinal lesions	✓	✓		✓	✓*		
Aproximal, advanced lesions	✓	✓		✓	✓*	✓*	
Anterior cavitated lesions	✓	✓			✓		
Grossly carious unrestorable tooth, without signs or symptoms of pain or sepsis					✓		✓

*Due to lack of supporting evidence, these approaches are only appropriate for these types of lesions if no alternative is feasible. Document the use of these approaches in the patient's record.

(Scottish Dental Clinical Effectiveness Programme, 2010 p.44)

MODIFYING THE RISK FACTORS AND UPSKILLING THE PATIENT

For patients with new or progressing carious lesions, the disease will not be brought under control until the balance of risk factors is less pathological. This needs to be communicated without judgment to the patients/parents/caregivers. The aim is to seek their collaboration and involvement to change things for the better.

Using motivational interviewing techniques will help practitioners engage with parents in a non-threatening and non-judgmental manner.

INFORMED CONSENT

Discuss treatment options, risks and alternatives.
For more information refer to the Informed Consent guideline.

MANAGING CARIOUS LESIONS USING INTERVENTIONS

(Fissure protections and sealants, restorations, stainless steel crowns)

Aim:
to bring the cariogenic biofilm back to the surface where the patient can manage it (Edwina Kidd 2010).

MONITOR

At each visit:

- monitor patient behaviour change and skill (ie. plaque levels and any other negotiated behaviour changes).
- carry out interventions (fissure protections and sealants, restorations, stainless steel crowns).

Review at appropriate intervals to monitor new lesions and lesion progress.
Take follow-up radiographs and reassess the caries risk for the patient.

ASSESSING FUTURE CARIES RISK STATUS AT RECALL VISITS

Oral health in childhood predicts oral health in adulthood. Children with high rates of dental caries at age 5 years are more likely to have dental disease at age 26 years (Thomson et al., 2004).

The risk of carious lesions remains greater than zero throughout life unless all foods and drinks bypass the mouth (e.g. PEG fed patients).

Notes:

** Past and present caries experience is a predictive indicator regarding the possibility of new lesions forming. The pattern of teeth and surfaces with lesions, and the severity of each lesion are clues about contributing factors, and may assist when considering where to focus discussions about identifying and modifying risk factors.*

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Clinical Guidelines for Child and Adolescent Oral Health

BITEWING DENTAL RADIOGRAPHY

July 2019

SUMMARY

- Posterior bitewing radiographs are an essential adjunct to clinical examination.
- Bitewing radiograph frequency should be determined by caries risk assessment.
- Carious lesions in enamel and dentine should be identified as early as possible.
- Baseline radiographs for high risk children should be taken as soon as possible from 3 years old onwards (dependent on adequate cooperation, caries risk status and informed consent).
- Radiation dose must be kept as low as reasonably achievable.
- Caries risk assessment should take place at each and every visit.
- Children at high risk of caries should have bitewing radiographs every 6 to 12 months.
- Children at medium risk of caries should have bitewing radiographs every 12 months.
- Children at low risk of caries should have bitewing radiographs every 18 to 24 months.

INTRODUCTION

Posterior bitewing (BW) radiographs are an essential adjunct to clinical examination. They are necessary for early interproximal carious lesion detection in enamel and dentine, occlusal caries detection in dentine, to monitor the extent and speed of progression of lesions and to assist with caries risk assessment.

BW radiographs assist with early detection of lesions in both enamel and dentine, thereby facilitating timely preventive and operative caries management interventions. A series of BWs will assist with monitoring the progression and regression of lesions and are an essential part of a caries risk assessment process.

The efficacy of BW examination strongly depends on the refinement of the clinical caries diagnostic criteria. The full potential of the visual-tactile examination should be exploited. A thorough clinical examination should be carried out on clean dried teeth.

Any exposure to x-rays involves some risk of health detriment. Risk is age-dependent, being highest for the young and least for the elderly. The dose from BW exposures is low compared with medical exposures and natural background radiation. However, total dose generated by the wide spread use of dental radiographs should be considered. Every effort must be made to minimise the patient's exposure because the effects of radiation exposure accumulate over time. This concern must be balanced against failing to use a diagnostic tool that has been shown to be effective in detecting caries that would otherwise remain undetected.

Good quality bitewing radiographs increase our ability to detect early interproximal caries in dentine by almost 40% over and above what can be detected with the naked eye.

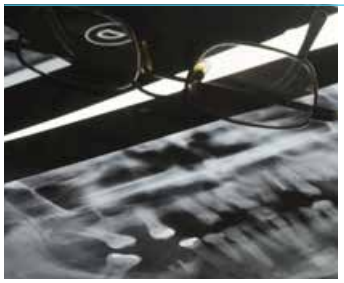
In addition to using physical methods of minimising dose (i.e. equipment and film factors) well-defined criteria based on published evidence for prescribing BW radiographs and quality assurance are required for dose reduction.

The following factors need to be considered when making a decision on radiographs:

- The potential health hazard caused by exposure to low dose ionizing radiation particularly for children.
- The reduction in caries levels and the skewed caries distribution.
- The relatively slow rate of caries progression in a population exposed to fluoride.

Prescription of BW radiographs for caries diagnosis should be based upon caries risk assessment. Individual caries risk assessment is now a recognised step in the decision-making process as it prompts the clinician to plan the most appropriate preventive strategy and recall intervals.

The importance of caries risk factors will vary from child to child, and risk status needs to be re-evaluated to check on the changes. Children can move in and out of caries risk categories with time. Individual caries risk assessment should include high, medium or low categories.



What glasses are you wearing to look at your radiographs?

A 'caries treatment' lens?

Or a 'caries management' lens?

GUIDELINES FOR BASELINE BWs AND FREQUENCY OF BW RADIOGRAPHS

Considerations

- Dose as low as reasonably achievable (ALARA)
- Reduction in caries levels and skewed caries distribution. Slow rate of progression in population exposed to fluoride

Rationale

- Adjunct to clinical examination
- Necessary for early detection of enamel and dentinal lesions in proximal surfaces, and dentinal occlusal lesions
- To estimate the extent of lesions
- To monitor the progression and regression of lesions

Baseline BW radiographs as early as you can get them.

(From 3 years old upwards, dependent on adequate cooperation, caries risk status and informed consent)

High caries risk children from 3 years upwards

BW radiographs for all new patients above 5 years of age where no previous radiographs have been taken

Intervals between subsequent BW radiographic examinations should be based on patient's caries risk status, which is reassessed at every visit

High risk

BW radiographs are taken every 6 to 12 months (until patient enters another risk category)

Medium risk

BW radiographs are taken every 12 months

Low risk

BW radiographs are to be taken every 12 to 24 months

Primary dentition: every 12 to 18 months

Permanent dentition: every 18 to 24 months

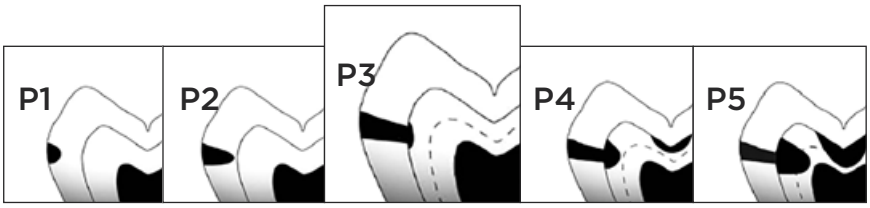
TAKING BITEWING RADIOGRAPHS IN CHILDREN AND ADOLESCENTS

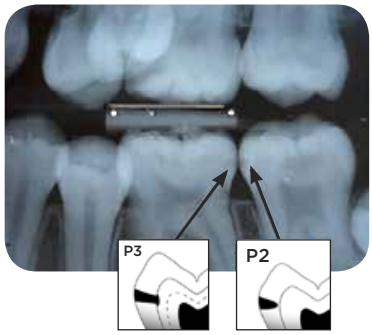
All dental radiographic examinations must be justified on an individual patient basis by demonstrating that the benefits to the patient outweigh the potential detriment. The anticipated benefits are that the radiographic examination would add new information to aid the patient's management.

Thus a child should only be exposed to radiation after history taking and thorough clinical examination.

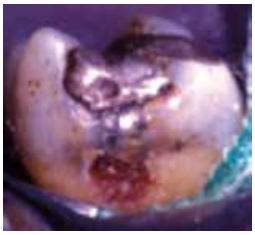
Use a dental radiography classification system as an adjunct to monitor lesion progression.

Dental radiography classifications encourage us to look at our BW dental radiographs with a 'caries management' lens first and foremost.





When the contiguity of the enamel surface is still intact a more 'preventive' or 'caries management' approach can be considered.



When the the enamel surface is breached or cavitated a caries management approach alone may not halt progression of a lesion and a more interventional approach may be required.

Percentage of cavitated lesions in primary teeth with the following radiographic lesion classification

- 2.0% of P1
- 2.9% of P2
- 28.3% of P3/P4
- 95.5% of P5

Percentage of cavitated lesions in permanent teeth with the following radiographic lesion classification

- 0% of P1
- 10.5% of P2
- 40.9 % of P3/P4
- 100% of P5

FIRST (BASELINE) BW RADIOGRAPHS

Baseline BW radiographs should be considered for all dentate children from 3 years of age in higher caries-risk children and from 5 years of age in lower caries-risk children.

Generally the optimal trade-off between the risk of undetected caries and adequate co-operation begins at about five years of age. But it is subject to individual variation.

Even in low risk children BW radiographs at the age of 5 years give a considerable diagnostic yield. They can identify otherwise undetected proximal lesions in primary molars, or confirm that there are no enamel of dentinal lesions.

ASSESSMENT OF CARIES RISK STATUS

An assessment of caries risk of the individual child should be made at each recall visit. The importance of caries risk factors will vary from child to child. Children can move in and out of caries risk categories over time. Individual caries risk assessment should probably include high, medium or low risk categories.

"We know it makes sense to focus more on preventive strategies to reduce the risk of future disease than to treat the disease itself."

INTERVALS BETWEEN SUBSEQUENT RADIOGRAPHIC EXAMINATIONS

The intervals between subsequent radiographic examinations should be based on the patient's caries risk status.

Because risk status may change with time, it is important to assess the risk status at each recall visit. Future intervals for BW radiographs should be scheduled individually.

Risk assessment should include the number and extent of proximal carious lesions found at baseline and the progression or otherwise of existing lesions, as well as other relevant risk factors.

A blanket regimen of routine radiographic examination at fixed intervals in the absence of specific indications is not supported by the available evidence.

Available data suggest the rate of progression of enamel lesions in primary teeth is about twice that of young permanent teeth. The different progression times should be considered when deciding on the interval between radiographic examinations.

"Having a timeline series of two or more sets of BW radiographs provides the opportunity to assess more fully, whether a patient's caries-risk status is actually getting worse, staying the same, or improving."

"Watching and recording the progression, or otherwise, of an enamel lesion or early dentinal lesion is important to help assess current, past and possible future caries risk status."

INTERVALS BETWEEN SUBSEQUENT RADIOGRAPHIC EXAMINATIONS

HIGH RISK

- All children at high risk should have 6-12 monthly BW radiographs until no new or active lesions are apparent and the individual has entered another risk category.
- A 6-monthly interval between BW examinations needs careful decision-making. A 6-monthly interval is particularly advocated if proximal dentinal lesions are left unrestored, to ensure close monitoring of these lesions.

MEDIUM RISK

- All children at medium risk should have BW radiographs annually until no new or active lesions are apparent and the individual has entered another risk category.

LOW RISK

- All children at low risk should have BW radiographs taken at 12-18 monthly intervals in the primary dentition and at 18 months to 2-year intervals in the permanent dentition.

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Clinical Guidelines for Child and Adolescent Oral Health

INFORMED CONSENT

July 2019

INFORMED CONSENT: KEY STATEMENTS

- Informed consent is a continuing process of engagement with patients, parents, legal guardians, lead caregivers and family members.
- Informed consent is not a one-off conversation at the beginning of an episode of care or the obtaining of a signature.
- Informed consent is rarely 'black and white' and every informed consent process is different.
- Verbal and written consent are equally valid forms of informed consent* as long as they have been accompanied and preceded by the sharing of relevant information, and/or a discussion with a patient, parent or legal guardian about any tests, treatments or interventions being proposed.
  **except for sedation, general anaesthesia, experimental treatment and research and/or where it is deemed there are significant risks.*
- Every interaction (including any attempts to engage) with a patient, parent, legal guardian, or family member: whether by phone, email, text, letter, conversation or by any other form of communication, is part of the informed consent process and should be recorded in the clinical record.
- You should seek advice when you have any concerns about the consent process.

Introduction

In New Zealand, treatment may only be provided if the patient makes an informed choice and gives informed consent. Informed consent is necessary before and during any proposed examination, treatment procedure or episode of care. This guideline describes what is involved in informed consent and who can give informed consent. It will help the clinician remain patient-centric and maintain a balance between ensuring valid consent is sought whilst avoiding unnecessary delaying or inappropriate withholding of treatment.

What is informed consent?

Informed consent is the process whereby a patient (or another person legally entitled to consent on the patient's behalf), who has the capacity/competence to consent to a given treatment, having been given sufficient information, voluntarily arrives at a reasoned decision as to whether to agree to the proposed treatment or procedure. Informed consent is not a one-way information stream, a one-off conversation at the start of treatment, or the obtaining of a signature.

PROCESS OF INFORMED CONSENT

Best practice informed consent requires and involves:

- **Adequate information**
- **Effective communication**
- **Comprehension of the information**
- **Competence to decide about their own treatment**
- **Absence of coercion**
- **The right to refuse proposed treatment/procedures**

ADEQUATE INFORMATION

This includes information on:

- Diagnosis
- Reasons for treatment
- Options for treatment including those available with other providers
- Nature of treatment – time required
- Inherent risks that are either deemed to be very common, or 'rare and serious' – based on patient's values
- Expectancy of success
- Possible consequences if treatment is not provided
- Costs of treatment (if applicable)
- Honest answers to any questions about the treatment or the provider

If any of this information changes, further discussion is needed. The patient (or their guardian) can request a written summary of the information provided.

EFFECTIVE COMMUNICATION

All patients, whatever their age, should be provided with information that is relevant to their age and communicated in a manner that they will comprehend. A two-way sharing of information cannot be done by sending standard forms. It is best done in person, but can be achieved via good quality telephone and email conversations.

Every conversation will be different. Relevant cultural perceptions should be considered and you may require an interpreter, diagrams or pictures, or more than one visit to finalise a treatment plan and obtain informed consent.

ABSENCE OF COERCION

The person giving consent must give this willingly without coercion. The patient or legal guardian has a right to refuse and withdraw consent at any time, and has the right to change their mind and ask further questions or request further information. If an individual requires time to think about options, then treatment should be delayed.

A clinician should not overtly coerce a patient into accepting a particular treatment option. However, it is acceptable to provide an element of guidance in cases where a patient, parent or guardian may request or invite you to do so. Any significant 'difference of opinion' or 'conflict of interest' that may arise between yourself and a patient/parent can sometimes be resolved by advocating and facilitating a referral to another suitably experienced and qualified clinician for a second opinion.

RIGHT OF REFUSAL OF TREATMENT

Everyone has the right to refuse treatment, or the use of a material, or a procedure, without fear of prejudice. Likewise, this right also applies to clinicians who may be coerced by patients/parents to provide dental care in ways that he or she may be professionally uncomfortable with (e.g. cutting a cavity without local anaesthetic or being coerced by a patient to remove all their teeth when there is no clear clinical justification).

It does mean however that referral to another clinician may be necessary to help resolve the issue. A second opinion should be offered to patients when resolution cannot be achieved. We should remember though, that as part of our professional duty to the patient, we should be prepared to facilitate that second opinion if requested by the patient.

Case study A

Phoebe, aged 11, attended for check up with her mother. She was complaining of occasional pain from a carious, mobile 55. After examination, 65 was also found to be carious and mobile. The oral health therapist, Phoebe and Phoebe's mother discussed the treatment options and agreed that Phoebe would return for extraction of teeth 55 and 65. At the next appointment Phoebe was dropped off by her mother, who needed to get to work. She was going to be picked up by her neighbour at the end of the appointment. Phoebe had remembered that she was having teeth removed and was a little anxious. The oral health therapist was happy that the mother was aware of the plan and was happy for the treatment to go ahead (as she had dropped Phoebe off). Extraction of both teeth was completed.

DURATION OF CONSENT

The nature of informed consent is that of an ongoing process throughout the patient-clinician partnership. However, it would be reasonable to assume consent, once legitimately obtained, remains valid until you have a reason to think it is no longer valid. Reasons could include: if the risk changes, your recommendation changes or if the patient's views change, or a long period of time has passed.

WHO CAN GIVE CONSENT?

The ability to give consent in New Zealand is determined by age and competence. Generally, those legally able to give informed consent must be 16 years or older and can understand and discern the treatment being offered to them. For those aged under 16, various people are legally able to give consent on their behalf. As for adults, any person giving consent on behalf of a child must be competent themselves to give consent.

CHILDREN AND ADOLESCENTS GIVING CONSENT

Children and adolescents under 16 years old can give informed consent, but only if they can fully understand and discern between the different treatment options and treatment outcomes available to them, including any common risks or adverse events. It is recognised that many older children and younger adolescents can sometimes have both the capacity to understand, and the ability to decide, on many of the dental treatments offered to them. The capacity to give consent may vary depending on the complexity of the treatment, the patient's age and their ability to understand and discern.

Case study B

Damon, aged 15, attended his examination after school on his own. His oral health therapist noted a small cavitated dentinal lesion on 26 which he wanted to restore with composite. The oral health therapist discussed this with Damon, who asked how pain would be prevented during the procedure and what would happen if the cavity was not restored. After the discussion, the oral health therapist felt Damon understood the procedure and the consequences adequately to give his own informed consent. The oral health therapist also quickly called Damon's mother to explain what would be happening next, before completing the restoration.

LEGAL GUARDIAN

This is usually the parent, but may also include:

- a guardian approved by the family court
- a guardian appointed by the court
- a district court judge

Increasingly complex family situations, including family disputes, may mean it is difficult to determine who is a legal guardian of a child. If you are not sure, consult with a colleague, Child Youth and Family or your legal team.

PERSON ACTING IN PLACE OF PARENT

Where there is no guardian in New Zealand, or the guardian is unable to be found (after reasonable effort), or the patient is incapable of giving consent, then consent can be given by the person who has been acting or could act in place of the parent. It is also recommended that in these situations more than one clinician agrees that any treatment proposed is in the best interest of the child.

Whilst parents and guardians are the natural advocates for their children and have powers to consent on their behalf, children's wishes about treatment options and procedures should be sought and considered. This concept would also apply to adults and children with intellectual disabilities and mental health conditions, who might be considered to have limited competence to consent.

	COMPETENT	IN-COMPETENT	
<16 years old	Child	• Parent, • Other legal guardian or • Person acting in place of parent	
≥16 years old		Adolescent or adult	• Enduring Power of Attorney for Health and Welfare, or, • Court appointed Welfare Guardian

WHO CAN LEGALLY GIVE CONSENT FOR A CHILD?

Case study C

Manu attended for his check up with his grandmother as his parents both work. After examination it was determined that restorative treatment, along with some prevention advice was needed. This was discussed with his grandmother, who has an interest in Manu's health but is not his legal guardian. After clinic had finished for the day the oral health therapist rang Manu's mother and talked to her about her child's teeth. The mother had some questions about the treatment, which were all answered. The oral health therapist documented the phone call and made a subsequent appointment for Manu to return for treatment.

PROVIDING IMMEDIATE EMERGENCY CARE
(without formal legal consent)

If informed consent cannot be gained from a legal guardian in a timely manner, or the patient is an adult who is deemed incompetent and has no legal 'Power of Attorney', it is possible to proceed with treatment if:

- it is in the best interests of the patient not to delay care
- every reasonable effort has been made to try and seek informed consent from the person legally able to give consent
- views have been ascertained from other suitable persons interested in the welfare of the patient.

Removal of a tooth with an acute abscess (late on a Friday afternoon!) or re-implantation of an avulsed permanent incisor are two examples where you might provide emergency dental treatment without consent.

RECORDING INFORMED CONSENT

Informed consent is a process, so your clinical notes should document the process of agreeing consent. Each conversation about proposed treatment will be different, so standard text should not be used. Treatment options, relevant discussions points, amendments, restrictions or even a change of mind should all be recorded in the notes as a medico-legal record of how informed consent was arrived at.

A verbal consent is just as legal as a signed one, if it has been legitimately obtained and is recorded in the notes on the patient's record. Likewise, a written consent can be proven invalid if the patient did not understand what they were consenting to.

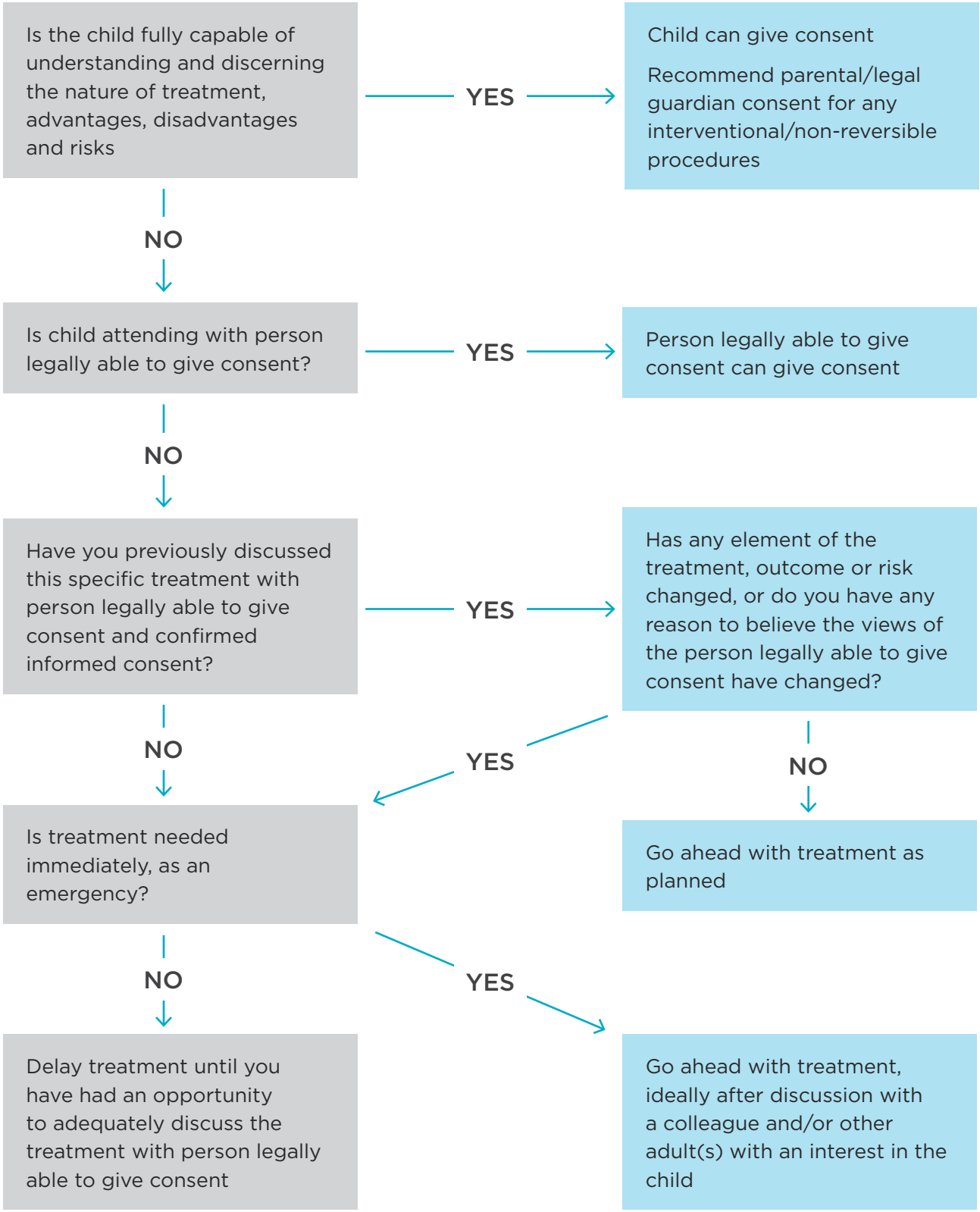
Written consent must be obtained when:

- the treatment is under general anaesthesia.
- the patient is participating in any research.
- the procedure is experimental.
- there is a significant risk of adverse effects to the patient.

Case study D

The Health and Disability Commissioner was asked to investigate a case. The parent claimed she was unaware that her child's tooth was to be extracted, leading to space loss and subsequent need for private orthodontic treatment. The dentist claimed that extraction had been discussed and agreed on. On review of the clinical notes the Commissioner read the entry for that appointment: 'lengthy discussion with mother re pros and cons of exo 55; advised space loss and option of orthodontic opinion re space maintainer; agrees to exo'. The Commissioner found that information had been shared and the consent process followed.

CONSENT FOR TREATMENT FOR CHILD AGED <16 YEARS



WHEN TO SEEK FURTHER ADVICE

- When you are unable to reach an agreement about treatment with the person legally able to give consent.
- When you are unable to identify who is the person legally able to give consent.
- When you have any concerns about competence to give consent.
- When emergency treatment without consent is considered necessary.

For minors (children under 16 years of age), or for incompetent adults the clinician is expected to advocate on behalf of the patient, especially in cases of neglect or the 'patient's best interests'. This includes all the responsibilities expected of him/her under the Vulnerable Children's Act 2014, including the possibility of writing a report of concern to Oranga Tamariki where consent has been unreasonably withheld.

REFERENCES

The HDC Code of Health and Disability Services Consumers' Rights Regulation 1996
http://www.hdc.org.nz

The New Zealand Dental Association Code of Practice on Informed Consent: March 2014
http://www.nzda.org.nz

Dental Council of New Zealand Code of Practice on Informed Consent: December 2016
http://www.dcnz.org.nz

Care of Children Act 2004
http://www.legislation.govt.nz/act/public/2004/0090/latest/whole.html#DLM317443

CLINICAL GUIDELINES FOR CHILD AND ADOLESCENT ORAL HEALTH