

**PRACTICE GUIDELINES FOR USE IN THE
COMMUNITY DENTAL SERVICES DIVISION
OF THE NORTH YORK PUBLIC HEALTH DEPARTMENT**

Guidelines for:

**The Use of Professionally Applied Topical Fluorides
The Use of Pit and Fissure Sealants
The Use of Dental Radiographs
The Use of Space Maintainers
When to Place and Initial Restoration
Posterior Restorative Materials and Restoration Replacement
Infection Control**

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Table of Contents

	<u>Page</u>
Table of Contents	1
Introduction	2
The Use of Professionally Applied Topical Fluorides G.L. Woodward and D.W. Lewis	6
The Use of Pit and Fissure Sealants G.L. Woodward and D.W. Lewis	8
The Use of Dental Radiographs G.L. Woodward and P.A. Main	10
The Use of Space Maintainers G.L. Woodward and J.L. Leake	12
When to Place an Initial Restoration G.L. Woodward and J.L. Leake	16
Materials For Use in Posterior Restorations and Restoration Replacement G.L. Woodward and W.H. Ryding	18
Infection Control P.A. Main	20

Introduction

North York is a municipality of Metropolitan Toronto with a population of approximately 560,000 people. The water supply has been fluoridated since 1963 and dental caries among children has fallen dramatically over the last 20 years. The average DMFT score in 1990 for a 13 year-old in North York was 1.97 but most of the burden of disease is born by a minority of children.

The North York Public Health Department operates a school-based dental program that provides preventive and treatment services to children aged 3-14 years who are identified through a screening procedure. In an effort to allocate appropriately their limited resources and to obtain the best possible outcomes in this program, North York has an ongoing quality assurance process. One aspect of this quality assurance process involves the development, revision, and application of procedural or practice guidelines.

The dental practice guidelines provided by North York serve a number of purposes. Guidelines can be used to educate and assist in the decision making of both the practitioner and the patient, provide a standard by which to assess and help assure the quality of care, and help guide the allocation of scarce dental care resources. They may also reduce both the agency's and the practitioner's risk of legal liability for negligent care.

Practice guidelines need to be reviewed and revised, when necessary, on a regular basis, according to the changing scientific evidence and the resources available to the program. At the direction of the program manager, North York's

guidelines for professionally applied topical fluoride, pit and fissure sealant, radiographs, space maintainers, restorative services, and infection control were reviewed and updated by the Community Dental Health Services Research Unit (CDHSRU). This review process involved several steps, starting with an assessment of the burden of illness among North York children, followed by a critical review of the scientific literature, and an assessment of whether the literature indicated that revisions to the existing guidelines were needed. Any necessary revisions were drafted keeping in mind the number of children treated and the likely change in benefits that would occur by revising the procedure compared to the likely change in benefits that would occur in any other procedures affected by this change. In a system with explicitly fixed resources and a defined population under care, a change in the intensity of one procedure either allows or comes at the expense of the systems ability to provide other services. These critical appraisals of the literature and the guidelines which followed from each were then reviewed by two panels.

Guideline Development

To critically review the literature, computer aided searches were carried out using CD\ROM and Medline to locate relevant scientifically-based articles and studies. Existing guidelines from the University of Toronto, the University of Western Ontario, and the American Academy of Pediatric Dentistry were also considered in some cases. Reviews of the literature were written from which evidence-based recommendations and guidelines were drafted. If scientific evidence

were lacking, expert opinion and existing guidelines from professional organizations or Ontario dental faculties were used.

After drafting the revised guidelines, the literature reviews and their respective guidelines were examined by two panels. An internal (staff) panel, consisting of three dentists and one hygienist, all of whom work in North York's school-based dental program, initially examined each literature review and the recommended guidelines. Concerns and recommendations of the internal panel regarding practical implementation of the guidelines were discussed with members of the CDHSRU and appropriate changes were made based on the panel's advice. The revised documents were then reviewed by an external panel of experts consisting of a representative of the Royal College of Dental Surgeons of Ontario (the 1991-93 President), a representative of the Ontario Dental Association (the 1992-93 President), an epidemiologist, an ethicist, a paedodontist, a general practitioner, and a member of the internal panel. Concerns and recommendations of the external panel were discussed with members of the CDHSRU and any recommended changes were made. The literature reviews and their respective guidelines were then finalized after approval by both the internal and external panels.

The approved guidelines were then incorporated into the North York Policy and Procedure Manual by the program managers and then staff participated in education sessions designed to have them follow the guidelines in their practice. Compliance with the guidelines and their impact on the health of the children will be monitored through a computerized management information system.

Document Summaries

The following are summarized versions of the literature reviews and the guidelines approved by the internal and external panels. Each summary contains the major points or conclusions of the original literature review, but does not cite any sources of information. For more specific information and references, the reader is directed to the individual reports¹. Each summary is then followed by the approved recommended guidelines. In most instances, the guidelines are specific to the North York target population, their actual disease levels, and the expected marginal costs and effects of various procedures. Therefore, the guidelines may not apply directly to any other dental program or practice.

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- a) The use of professionally applied topical fluorides in the North York Public Dental Program. G.L. Woodward and D.W. Lewis. CDHSRU Quality Assurance Report No. 8.
 - b) The use of pit and fissure sealants in the North York Public Dental Program. G.L. Woodward and D.W. Lewis. CDHSRU Quality Assurance Report No. 1.
 - c) The use of dental radiographs in the North York Public Dental Program. G.L. Woodward and P.A. Main. CDHSRU Quality Assurance Report No. 3.
 - d) The use of space maintainers in the North York Public Dental Program. G.L. Woodward and J.L. Leake. CDHSRU Quality Assurance Report No. 4.
 - e) When to place an initial restoration. G.L. Woodward and J.L. Leake. CDHSRU Quality Assurance Report No. 9.
 - f) The use of amalgam, composite resin, and glass ionomer for posterior restorations, and the criteria for replacing restorations in the North York Public Dental Program. G.L. Woodward and W.H. Ryding. CDHSRU Quality Assurance Report No. 2.
 - g) Review of current infection control procedures. P.A. Main. CDHSRU Quality Assurance Report No. 5.

Professionally Applied Topical Fluorides

- Professionally applied topical fluorides are an effective means of reducing the incidence of coronal caries in children.
- Topical fluorides are more effective on smooth tooth surfaces than pit and fissure surfaces in terms of percent reduction of caries.
- In fluoridated communities, the majority of children have a low probability of new tooth decay in any one year.
- North York schoolchildren who have a combined def/DMF of greater than one have a higher probability of tooth decay than children with a def/DMF of zero
- Clinical studies do not show biannual applications of topical fluoride to be more effective at reducing caries than annual applications.
- Prophylaxis and topical fluoride are independent procedures.
- A prophylaxis may be required to remove extrinsic stains or calculus build-up.
- A prophylaxis is not required prior to the application of topical fluoride to realize the fluoride benefit.
- A prophylaxis will not increase a child's susceptibility to caries and does not need to be followed by a topical fluoride application.
- No consistent difference in the cariostatic effectiveness of sodium fluoride (NaF), stannous fluoride (SnF₂), or acidulated phosphate fluoride (APF) has been shown.
- APF gel and APF solution are equally effective, but APF gel is easier to use and requires less treatment time.
- Topical Application of APF results in an average caries reduction of 20-30%
- Fluoride uptake by tooth enamel from APF gel is significantly greater after a four minute application time than after a one minute application, but how this relates to its cariostatic effectiveness is unknown.
- To reduce ingestion of APF gel, no more than 2-2.5 grams or 40% of the application tray should be applied. Suction should be used during the application of APF gel and children should expectorate for 30 seconds to one minute following the application.

Guidelines for the Use of Professionally Applied Topical Fluorides

- (1) Children with one or more decayed smooth surfaces should receive annual topical fluoride treatments on the year of diagnosis and the following year.
- (2) No prophylaxis is necessary before the application of topical fluoride. A prophylaxis may be required because of extrinsic stains or calculus build up. However, it is not necessary to follow a prophylaxis with a topical fluoride application unless a topical is indicated based on the child's oral health status (see 1). If no topical fluoride treatment will follow a prophylaxis a fluoridated prophylaxis paste is recommended.
- (3) APF gel should be used and applied using a styrofoam tray. Enough gel should be used to completely cover the teeth, but this should be no more than 2-2.5 grams per tray or 40% of the tray's volume. Gel should be retained on the teeth for 4 minutes and suction should be used during and after the application procedure. Patients should expectorate for at least 30 seconds after the fluoride trays are removed, and gel should be wiped from teeth of young patients. All patients should be instructed not to eat or drink anything for at least 30 minutes.

Pit and Fissure Sealants

- The majority of tooth decay in schoolchildren occurs on the occlusal (pit and fissure) tooth surfaces.
- Pit and fissure sealants are a proven means of caries prevention, reducing occlusal caries by about 80% over one year and 40-50% over seven years.
- The incidence of caries in permanent molars, especially first molars, is much greater than in premolars, and therefore sealing molars should take priority.
- The use of sealants on primary molars is questionable and should only be considered if there is a high probability of decay.
- The time since a tooth's eruption is inversely related to its probability of decay; most teeth that have been caries-free for a number of years will remain this way.
- If the occlusal surface of an erupting permanent tooth is not completely free of the gingiva before sealant application, the retention, and thus effectiveness, of the sealant will be significantly reduced.
- Although some investigators suggest that all permanent molars should receive sealant, this would not be a cost-effective procedure for the North York Public Health Department; only children with a high probability of pit and fissure decay should receive sealants.
- Children who have experienced tooth decay in the past, and who have teeth with deep and narrow pits and fissures, have a greater probability of pit and fissure decay and should be considered for sealant application.
- Children with the following def/DMF scores are above average for North York and may have a greater probability of experiencing dental decay:
 - children aged 7 years or less with a combined def/DMF ≥ 2 ;
 - children aged 8-9 years with a DMF ≥ 1 ;
 - children aged 10-13 years with a DMF ≥ 2 .
- Children with rampant proximal caries/restorations in the permanent dentition or who have a proximal lesion in a tooth indicated for sealant should not receive sealant.

Guidelines for the Use of Pit and Fissure Sealants

- (1) For a child who has never received sealant, selection should be based on tooth morphology and patient risk to caries. Sealant should be given to children who have teeth with deep and narrow pits and fissures and who are:
 - aged 7 years or less with a def/DMF \geq 2;
 - aged 8 or 9 years or less with a DMF \geq 1;
 - aged 10-13 years with a DMF \geq 2.
- (2) Children with sealant already present on some teeth, and with a DMF less than those listed in (1), should be considered for sealant use based primarily on tooth morphology.
- (3) Children with rampant proximal caries/restorations in the permanent dentition should not receive sealant.
- (4) If a proximal carious lesion exists on a tooth indicated for sealant, this tooth should not receive sealant.
- (5) Sealant should only be applied to permanent molars, and should be applied as soon as possible after the occlusal surface is completely free of gingival tissue.
- (6) Sealant may be placed up to one year after tooth eruption. In very special circumstances, that must be recorded on the patient's chart, sealants may be placed on permanent molars more than one year after eruption.

NOTE: The purpose of this recommendation is to prevent routine sealing of the first permanent molars that have been present for many years. For example, if a 12-13 year-old, first-time patient meets the criteria for sealing his/her second molars, but the first permanent molars are also not sealed, the first molars should remain unsealed. Any first molars that have not decayed by this time are unlikely to.

Dental Radiographs

- Dental radiographs have been shown to be a valuable tool when diagnosing and treating developmental anomalies, oral disease, and dental caries, especially interproximal caries.
- When prescribing a dental radiograph, the probability of obtaining information benefitting the patient must outweigh the radiation risk.
- Dental radiographs should only be prescribed after a clinical exam and should only be prescribed if they are expected to aid in diagnosis or treatment.
- The practice of routinely taking dental radiographs before a clinical examination or taking dental radiographs of patients without signs or symptoms of disease is not supported by the literature.
- When using radiographs to diagnose caries, the probability of wrongly cutting into a sound tooth increases with the number radiographs taken and as the prevalence of dental caries decreases.
- Panoramic radiographs are not recommended for a public dental program.
- When choosing a film type and size, the practitioner should use the largest film allowed by the patients anatomy in order to maximize the amount of information obtained for a single dose of radiation.

Guidelines for the Use of Dental Radiographs

A radiograph should only be taken:

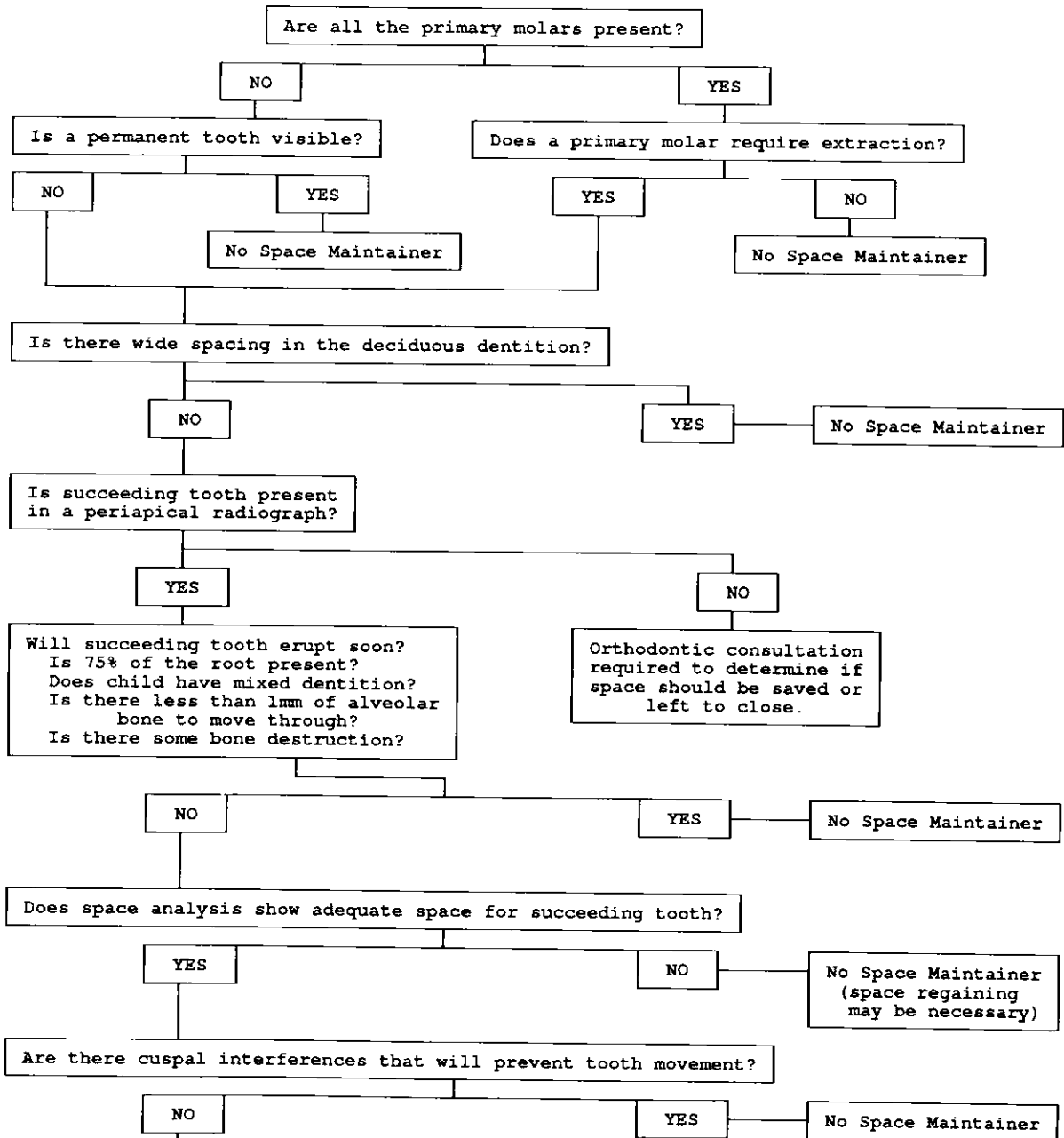
- if the findings of a clinical examination and/or patient history require further investigation; **and**
- when the treatment choice is not clear; **and**
- when additional information from the x-ray is expected to identify the need for and/or type of treatment; **and**
- the information cannot be readily obtained by other means.

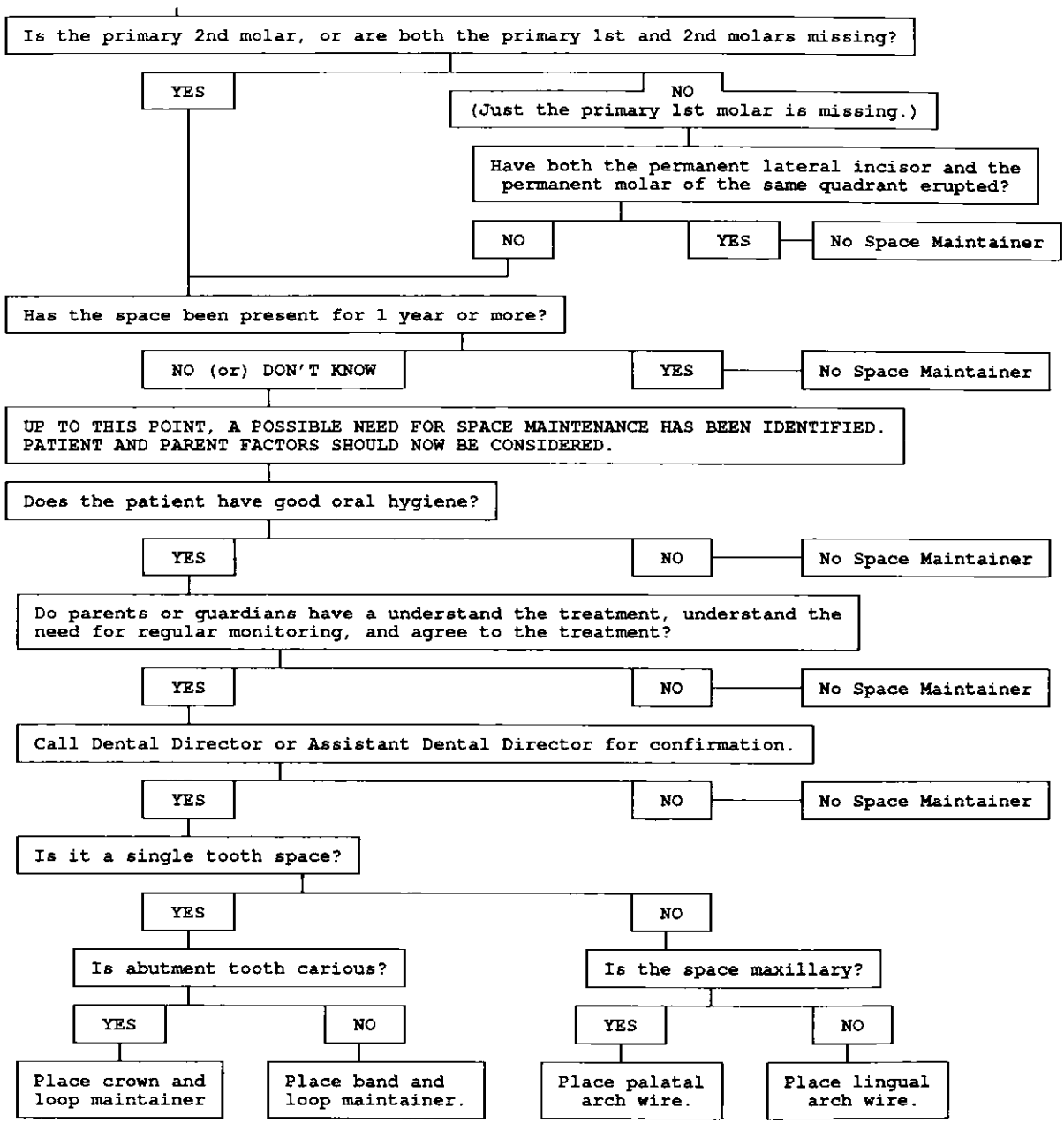
Space Maintainers

- Undesirable tooth movements following the premature loss of a primary tooth may result in a reduction or loss of the space required by the succeeding tooth.
- Placement of a space maintainer may prevent this space loss, although conclusive evidence on the efficacy of these appliances is lacking.
- Assuming that space maintainers are an effective means of preserving the necessary arch space, disagreement exists among practitioners concerning when space maintenance is required.
- It is generally believed that a space maintainer should be placed if:
 - 1) the primary first molar is lost prematurely and both the permanent first molar and the permanent lateral incisor have not erupted; **or**
 - 2) the primary second molar is lost prematurely; **or**
 - 3) the both the primary first and second molars are lost prematurely.
- A space maintainer should not be placed if:
 - 1) cuspal interferences are present that may prevent tooth movement into the space; **or**
 - 2) the primary dentition is widely spaced; **or**
 - 3) the succeeding tooth is expected to erupt within 6 months; **or**
 - 4) the present space is not adequate for the succeeding tooth; **or**
 - 5) the patient may require future orthodontic work.
- Eruption of the succeeding tooth within 6 months most likely if:
 - 1) 75% of the root is present on the succeeding tooth; **or**
 - 2) less than 1 mm of alveolar bone is covering the succeeding tooth; **or**
 - 3) some destruction of the alveolar bone occurred when the primary tooth was lost; **or**
 - 4) the child's mixed-dentition is in its later stages.
- Parental consent to proceed should be sought only after the parent has been informed that:
 - 1) a space maintainer requires regular monitoring;
 - 2) the patient must maintain adequate oral hygiene;
 - 3) the appliance may break, requiring repair or replacement;
 - 4) broken appliances pose a hazard to the child and will be ineffective;
 - 5) even properly maintained appliances may fail to preserve the space.
- Placement of a space maintainer should occur as soon as possible after tooth loss.

- Band and loop space maintainers are recommended to preserve single spaces.
- Crown and loop space maintainers are recommended to preserve single spaces if the abutment tooth is highly carious.
- Lingual or palatal arch space maintainers are recommended to preserve multiple spaces.
- Intra-alveolar or distal shoe appliances are recommended if a child loses the primary second molar before the eruption of the primary first molar; however, this represents one of the most difficult space management problems - great care during placement and regular monitoring are essential and these appliances should not be placed in individuals with medical conditions such as blood dyscrasia, congenital heart defects, history of rheumatic fever, or diabetes.

Decision Tree for the Use of Space Maintainers





When to Place an Initial Restoration

- A great deal of variability exists among dentists in their diagnoses of caries and their criteria for when to treat a carious lesion.
- Evidence suggests that areas of enamel demineralization often arrest and may remineralize.
- The average approximal carious lesion in a permanent tooth requires approximately 3-4 years to progress through the enamel and into the dentin.
- A smooth surface carious lesion in a permanent tooth should not be restored until it has reached the dentin or cavitation of the enamel has occurred.
- When using radiographs to determine the extent of a carious lesion, the radiographic image of the lesion should reach dentin-enamel junction (DEJ) before the tooth is restored.
- Visually diagnosing pits and fissures of clean dry teeth without the use of an explorer will not reduce the practitioners diagnostic accuracy.
- Forceful probing as a means to diagnose pit and fissure caries may enhance the breakdown of demineralized areas.
- When a pit or fissure appears carious but no cavitation exists or there is no evidence of dentin caries, a non-invasive technique using sealants or treatment using a preventive resin restoration can be practised.
- Pits and fissures should be restored when there is evidence of dentin caries, or when the practitioner is highly suspicious of dentin caries.
- When preparing the cavity to restore a pit and fissure lesion, the practitioner should conserve as much tooth tissue as possible.
- According to recent estimates of caries progression in primary teeth, the average enamel lesion requires 1.5 years or more to progress to the dentin.
- Where there is a high probability that a primary tooth will exfoliate within the next twelve months, restoring the tooth is not usually necessary.
- Estimating the probability of exfoliation of a primary tooth should be done using the degree of root resorption, the patient's dental age, and the patient's chronological age.

Guidelines for When to Place an Initial Restoration due to Caries

Permanent Teeth

Smooth tooth surfaces should be restored if:

- (1) there is a clinically detectable carious cavitated lesion i.e. a discontinuity in the tooth's enamel, or;
- (2) the tooth surface in question cannot be diagnosed clinically, but the radiolucency extends to the dentin-enamel junction.

Pit and fissure surfaces should be restored if:

- (1) a clinically detectable carious lesion is present in the enamel, or;
- (2) a radiograph indicates that the dentin at the base of the pit or fissure is carious i.e. radiolucency in the dentin.

In both cases (1) and (2), cavity preparation should be as conservative as possible, removing only enough tissue to properly restore the tooth. This allows the practitioner to treat a lesion with a preventive resin restoration or sealant if the lesion is very small or if a false positive diagnosis has been made. This approach may also be considered for highly suspicious surfaces.

Primary Teeth

Primary teeth should be restored if:

- (1) there is a high probability that caries has progressed through the enamel; and
- (2) there is a low probability that the tooth will be exfoliated within the next 12 months. The probability of a primary tooth being shed can be determined using dental age, chronological age, and root resorption, although dental age may be more accurate than chronological age.
 - (a) **DENTAL AGE** - A primary tooth will probably exfoliate within a year if one or more permanent teeth in the same series are present. Mandibular teeth are generally lost 6-12 months before maxillary teeth, except for the second molars which are all lost at the same time.
 - (b) **CHRONOLOGICAL AGE** - Average ages that primary teeth are shed are as follows:
 - central incisors, 6-7;
 - lateral incisors, 7-8;
 - canines, 9-11;
 - first molars, 10-11;
 - second molars, 11-12.
 - (c) **ROOT RESORPTION** - Primary teeth are expected to exfoliate within 12 months if at least 3/4 of the root(s) is resorbed. However, primary incisors and canines, especially in the mandible, may exfoliate more rapidly and may exfoliate within 12 months if at least 2/3 of the root is resorbed.

Note: In some instances, pain, function, and space maintenance may also need to be considered.

Materials for Use in Posterior Restorations
and Restoration Replacement

- Resistance to wear is greater for amalgam restorations than posterior composite resin or glass ionomer.
- Amalgam and posterior composite resin produce better tooth to restoration margins than glass ionomer, except in class V restorations.
- Restoration survival in permanent teeth is greatest for amalgam followed by posterior composite resin and glass ionomer, except in class I restorations where composite resin longevity approaches that of amalgam.
- The average amalgam restoration in a permanent posterior tooth of an adult can be expected to survive 10 years or more and the average composite resin restoration can be expected to survive 5 to 10 years.
- Survival of amalgam restorations is only about 2 years in children who are 5-6 years of age at the time of placement, but this increases with the child's age; survival in the middle and later teens is similar to adult estimates.
- Little difference exists between the survival of amalgam restorations in permanent and primary teeth of same aged children.
- Few long-term studies compare amalgam to composite resin or glass ionomer restorations in primary teeth; however, shorter studies indicate that amalgam is superior except, perhaps, in smaller, low stress restorations.
- Composite resin and glass ionomer restorations require much less tooth material to be removed when being placed than an amalgam restoration.
- Pit and fissure sealants alone or in conjunction with posterior composite resin (preventive resin restoration) may be used to successfully restore small pit and fissure lesions, even when placed directly over a carious lesion.
- Recent studies have shown that no relationship exists between an inadequate restoration margin and probability of secondary caries.
- Morphologically or aesthetically imperfect restorations do not need to be replaced unless they are having a negative effect of the patient's oral health.

Guidelines for Posterior Restoration Materials

- (1) **Amalgam** should be used in all posterior restorations of permanent teeth, except for small class I or V restorations where posterior composite resin or occlusal sealant should be used. Glass ionomer may also be used for class V restorations.
- (2) **Amalgam** should be used in all posterior restorations of primary teeth.
- (3) **IRM/ZOE** should be used for all temporary or caries control restorations.

Guidelines for Restoration Replacement

Restorations should be replaced if:

- (1) the restoration is cracked or absent;
- (2) there is active caries associated with the restoration's margin;
- (3) there are problems with the restoration directly resulting in,
 - (i) clinically significant loss of function,
 - (ii) tissue inflammation,
 - (iii) pulpal pathology;
- (4) there is an allergic response to the recently placed material (mild allergic responses should be monitored for at least 2 weeks before replacement).

Restorations should only be replaced if the procedure is expected to improve or overcome a problem. The presence of morphological imperfections alone, such as a marginal gap or surface deficiencies, are not cause to replace a restoration.

Infection Control

- universal precautions are measures intended to prevent transmission of blood-borne pathogens
- in a public health setting, universal precautions
 - (1) apply to all exposures involving blood or body fluids contaminated with blood
 - (2) do not apply to faeces, nasal secretions, sputum, breast milk, sweat, tears, urine, and vomitus unless they contain visible blood
 - (3) do not apply to saliva except in a dental setting where blood contamination is common
 - (4) require that disposable gloves be worn by staff potentially exposed to blood
 - (5) supplement but do not replace established infection control measures such as hand washing
- transmission of HIV, HBV, and other blood-borne pathogens can be minimized if staff,
 - (1) take care to prevent injury when handling needles and other sharp instruments
 - (2) do not resheath needles
 - (3) do not remove used needles from syringes by hand
 - (4) do not bend, break, or otherwise manipulate used needles by hand
 - (5) dispose of used needles by placing them in an approved puncture resistant container which should be located at the site of needle use
 - (6) immediately and thoroughly wash hands and other skin surfaces that are contaminated with blood
- it is recommended that all professional staff be immunized against hepatitis B, polio, tetanus, diphtheria, measles, mumps, and rubella

Procedural Guidelines for Infection Control

(1) Protective equipment, devices and clothing

- **Handpieces** must be sterilized after each patient, and cleaned and lubricated as per the manufacturer's guidelines, prior and post sterilization.
- **Instruments** must be sterilized in appropriate quantities or groups in autoclave bags. All instruments shall be stored in these bags sterile until required to be used.
- **Autoclaves** shall be used to sterilize all heat resistant instruments and supplies. The process indicator tape shall be used routinely. Regular biological testing will be undertaken for all autoclaves.
- **Masks and glasses** shall be worn by all providers. Patients will be appropriately draped, and be provided with protective glasses.
- **Uniforms** will be provided to all clinical dental staff, as follows, three(3) the first year of employment, thereafter two(2) each subsequent year, permitting adequate numbers of uniforms to ensure a clean uniform daily. Uniforms should be laundered in a moderately high temperature wash cycle. The design of the uniform shall comply with recommendations from CDC Atlanta (short sleeves, washable).

(2) Personal Hygiene

- The Department will include hand washing instruction in orientation for all staff, especially those in clinical patient contact.
- Hand washing should be a routine of 15 second wash between patients, and use of 2 consecutive 15 second washes followed by a high alcohol preparation at the beginning of the day.
- Hands and other skin surfaces should be washed immediately after removing gloves, and after each patient. A microbial soap is provided for this purpose.
- Finger nails should be kept short and should be washed thoroughly around and under; nail polish should not be worn since it acts as a reservoir for bacteria.
- Jewellery should not be worn when treating patients.

(3) Staff patient interaction

- **Screening and Surveying by the Hygienist**

Screening examinations in school or institutional settings do not require gloving, unless the hygienist has a lesion or wound on her hands. However thorough hand washing and a "no touch" technique should be used, ie routine screening: no gloves; Ministry Survey: gloves to be worn, since essential contact is necessary.

- **Dental Procedures**

Universal precautions apply. All personnel must wear uniform gowns, gloves, glasses and masks.

Potentially infective patients should be seen at the end of the day.

All instruments must be autoclaved. All hard surfaces shall be disinfected with a disinfectant (Asepti-phene).

(4) Disposal of Waste

- All wastes must be correctly categorised and disposed of appropriately. Sharps must be disposed of into a puncture resistant container.