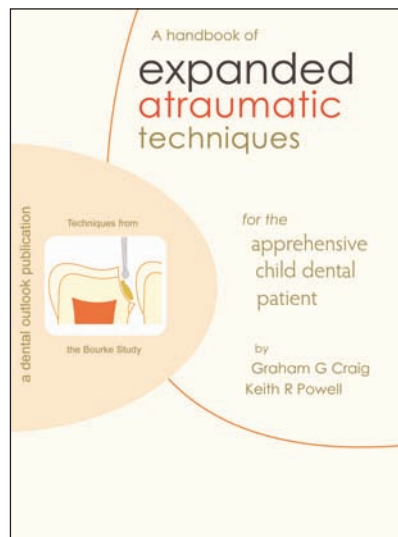


TECHNIQUE NOTES

for

Atraumatic procedures for
child patients in outreach
dental programmes.

by Graham G Craig and
Keith R Powell



Based on 'A Handbook of Expanded Atraumatic Techniques for the Apprehensive Child Dental Patient' by GG Craig and KR Powell. Dental Outlook Publications, 2013.

These notes are divided into 3 sections to correspond to the various situations encountered, including patient co-operation, and the dental equipment available for the treatment of open carious lesions in primary molar teeth:

1. Chemical treatments.
2. Interim restorative treatments.
3. Restorative treatments requiring rotary instruments.

All relevant references and photographs of cases followed for up to 4 years can be found in 'A Handbook of Expanded Atraumatic Techniques for the Apprehensive Child Dental Patient' by GG Craig and KR Powell. Dental Outlook 2013.

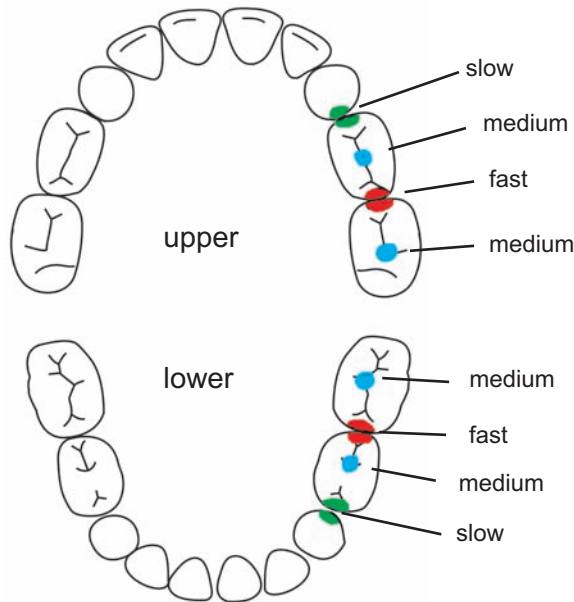
Available from Dental Outlook Publications
www.dentaloutlook.com.au

Email for GG Craig - dentaloutlook@bigpond.com

Begin by looking at the existing lesions

• Where are they located?

Although it may vary from one population group to another, there are some general guidelines as to which lesions in primary molars that tend to progress rapidly and those that do not. This is illustrated below:



Summary

Fast progression

- Distal of first primary molars.
- Mesial of second primary molars.
- Distal of second primary molars (when first permanent molars have erupted).

Medium progression

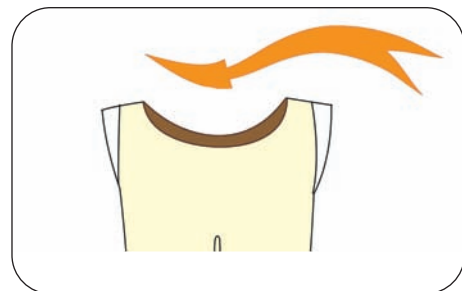
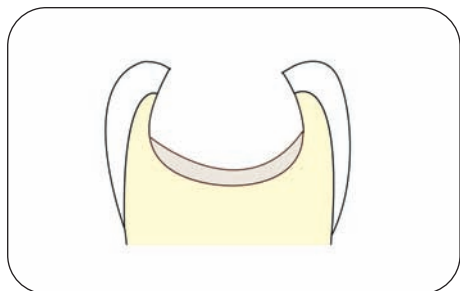
- Occlusal of first and second primary molars.

Slow progression

- Distal of canines.
- Mesial of first primary molars.
- Smooth facial surfaces of primary molars.

• How open are the lesions?

As a general observation the more open a lesion is to saliva, the slower its progression.

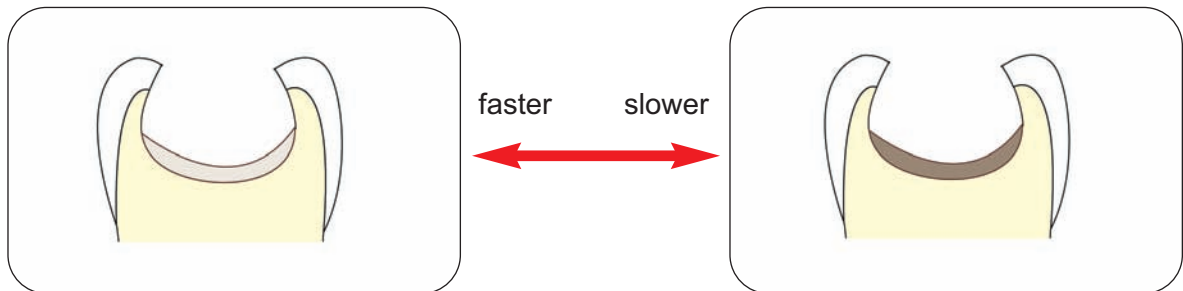


Above: The simple act of opening up a carious lesion (left) to the action of saliva can result in the arrestment or slowing down of the lesion (right).

Saliva has a good buffering and remineralising capacity and its effect can be utilised in the treatment of open carious lesions in primary molars.

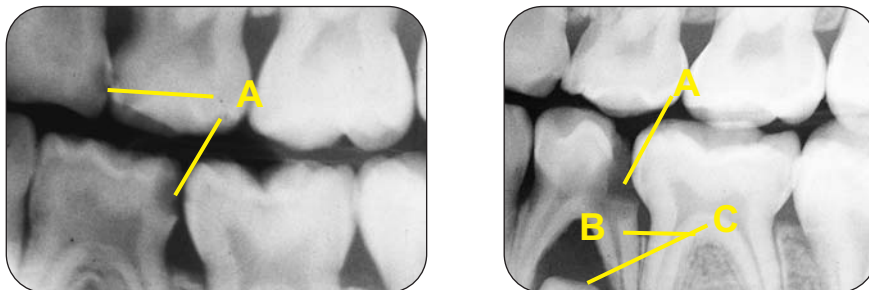
- What colour are the lesions?

Invariably darker lesions are progressing more slowly than lighter-coloured ones and, whilst probing of a lesion is best avoided, the darker-coloured ones are usually firmer.



- If bite-wing radiographs can be taken....

A considerable amount of very useful information can be obtained from bite-wing radiographs of primary molar teeth particularly regarding lesion depth of approximal surface and occlusal lesions. Unlike the situation with permanent teeth, in primary molar teeth the radiographic depth of a lesion usually corresponds very closely with the clinical depth.



Information that can be obtained from bitewing radiographs includes:

- A. Depth of approximal surface and occlusal lesions.
- B. Presence of furcation pathology.
- C. Degree of root resorption and position of permanent successor.

Summary:

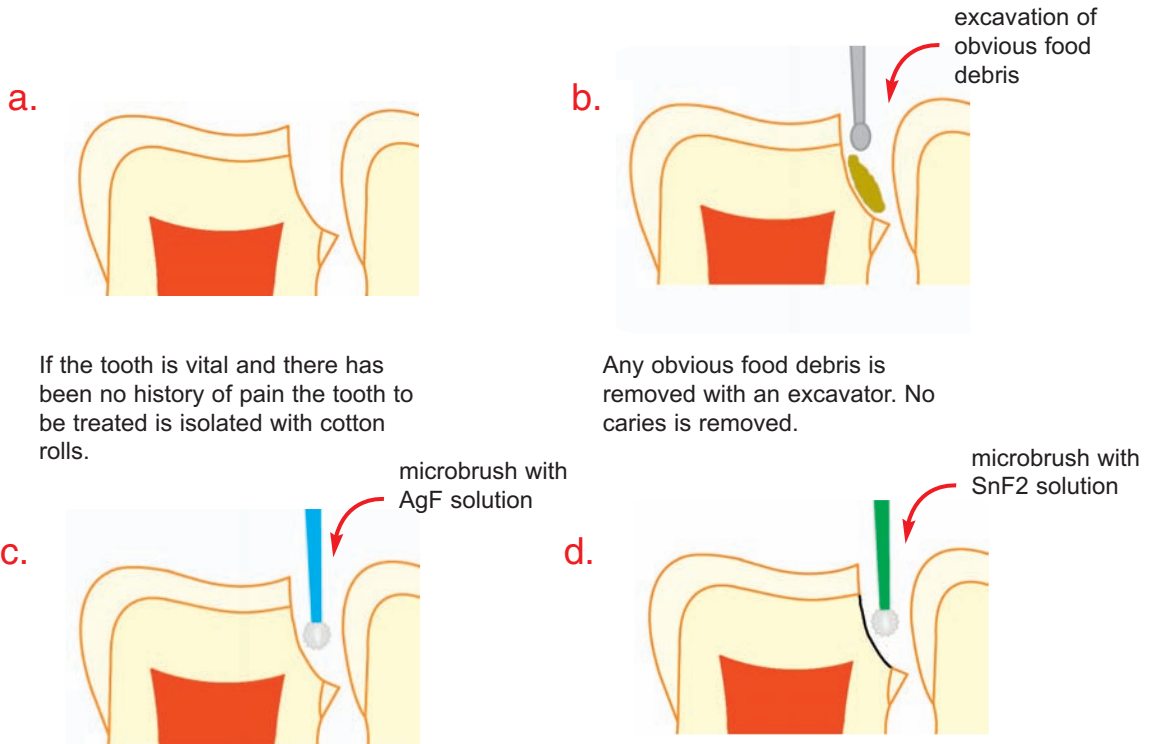
The fact that a lesion may look large does not necessarily mean that it is progressing rapidly. The above information can help differentiate the lesions that are likely to progress quickly as against those with a lower priority.

Chemical treatments

• Technique

A simple atraumatic start, especially for apprehensive child patients, is the use of 40% silver fluoride on open carious lesions in vital, asymptomatic primary molars. A number of clinical studies have shown the usefulness of silver fluoride preparations in the treatment of open carious lesions in primary teeth.

If bite-wing radiographs are available there should be approximately 0.5 mm or more of radiographically sound dentine from the base of the lesion to the pulp for open occlusal or approximal surface lesions.

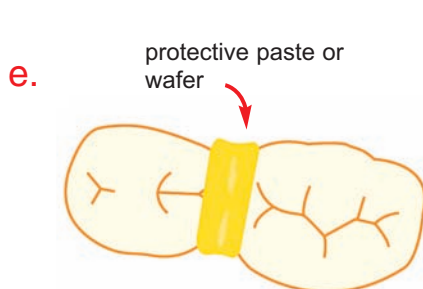


If the tooth is vital and there has been no history of pain the tooth to be treated is isolated with cotton rolls.

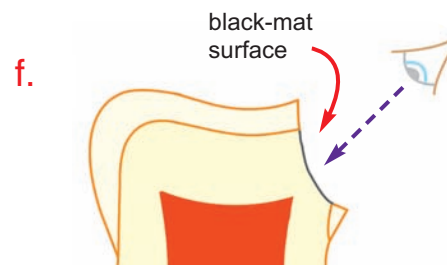
Any obvious food debris is removed with an excavator. No caries is removed.

The silver fluoride AgF preparation is applied on a microbrush and the site is kept wet with the solution for at least one minute.

After the silver fluoride application period 10% stannous fluoride (SnF2) is applied as a reducing agent to turn the surface of the lesion black.



The treated site is temporarily covered with **Orabase Protective Paste** (Convatec). Experienced operators may prefer to use a piece of **Stomahesive Wafer** (Convatec).



A few days later the surface of the lesion is examined to see if the entire surface has a black mat appearance. If it does not, the non-pigmented area is inspected to ensure it is not a pulp exposure. If this is not the case, repeat the above steps.

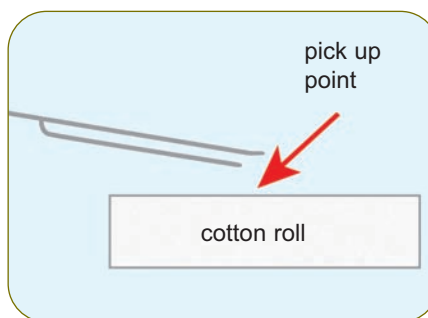
- Useful items

Silver fluoride and stannous fluoride



Open lesions are treated with 40% silver fluoride (left) for at least one minute followed by the use of 10% stannous fluoride paste (right) as a reducing agent. Both products were produced by Creighton Dental, Sydney.

Garmers cotton roll holders



Junior **Garmers Cotton Roll Holders** (Garmers) are ideal for lower arch isolation. They have the additional advantage of removing the need for high volume aspiration and the accompanying noise that may have upset some apprehensive young patients.

Tip: When using **Garmers Cotton Roll Holders** the cotton roll is picked up with the prong *half-way* along the roll, not at the end. This makes seating far easier.

Temporary covering



Left: Even though it does not stay as long as the wafer (below), **Orabase Protective Paste (Convatec)** is easy to apply with the gloved finger.

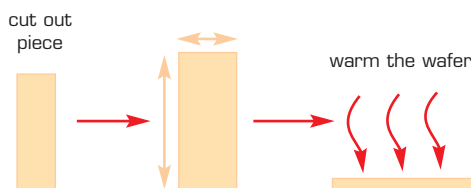
Below: Experienced operators may prefer to use a piece of **Stomahesive Wafer** (Convatec):



Piece of **Stomahesive Wafer** with backing removed.



Treated site covered by a piece of **Stomahesive Wafer**.



Technique: For a small piece of **Stomahesive Wafer** to adhere properly to tooth structure, it has first to be thinned and then warmed. Thinning can be achieved by pressing it between two glass slabs and it can be warmed by the patient holding the piece in his or her hand. It is adapted with firm pressure on sound tooth structure making sure the edges are completely sealed. After adaptation the wafer is left to dissolve in the oral fluids.

- How do you know it has worked?

One of the advantages of using stannous fluoride one minute or more after the application of 40% silver fluoride is that it turns the surface of the carious lesion black. This is a valuable indicator because if the surface becomes lighter it is an indication that the lesion may be progressing and needs closer inspection.

In addition the distinctive black colour provides an indicator to other operators not to intervene. Some procedures, such as with nano-silver, do not stain the surface of a lesion. In these circumstances it can be very difficult for an operator to determine whether a lesion is stationary or progressing. Probing a surface, especially when the lesion is deep, can produce iatrogenic damage.



Above: After the silver fluoride/stannous fluoride treatment, the continuing presence of a black mat on the surface of the lesion is a strong indicator that the lesion is static.



Above: Loss of the black matt surface at some stage after the silver fluoride/stannous fluoride treatment as shown is indicative of lesion progression.

Treatments can be repeated if lesion lightening does occur.

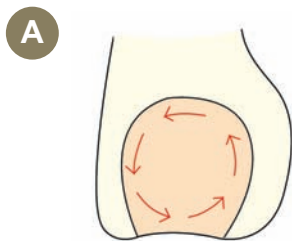
Interim restorative treatments

• Background

A standard part of the Atraumatic Restorative Technique (ART) is the use of hand instruments to remove caries and prepare a cavity. However, there are a number of subtle points that have to be kept in mind when using the ART technique on open lesions in primary molars.

• Excavating caries

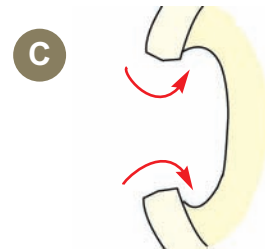
The excavation technique shown below involves starting at the periphery of the lesion and working inwards. The natural undercuts produced by the lateral spread of caries just inside the dentino-enamel junction are used to assist in retention of the restoration.



Caries is gently excavated starting at the periphery of the lesion.



The outer areas are freed of decay before working inwards.



To assist retention of the restoration, utilisation is made of the natural undercuts just inside the dentino-enamel junction produced by the slight lateral spread of the lesion.

• Grades of difficulty

The length of service of an interim restoration, where cavity preparation is carried out with an excavator alone, can vary with the site of the lesion. It is usually easy to obtain reasonable longevity for occlusal lesions and hardest for lesions on the distal surface of first primary molars.

easiest

hardest



Occlusal lesions.



'Box-type' approximal surface lesions in second primary molars.



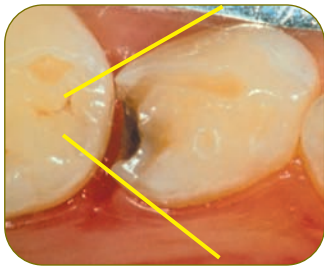
'Box-type' distal surface lesions in first primary molars.



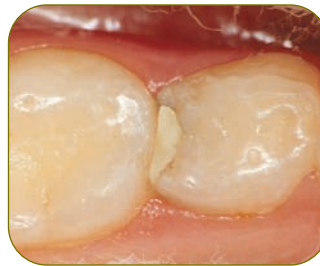
Wide, but shallow, distal surface lesions in first primary molars.

- **Problem area: Distal surface of first primary molars**

It can be extremely difficult to retain an interim restoration in the distal section of a lower first primary molar. The taper of the facial and lingual surfaces towards the distal plus the relatively thin enamel makes retention a problem with 'box only' preparations.

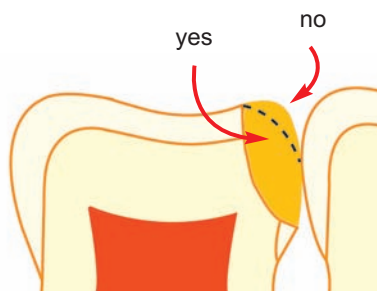


The taper of the facial and lingual surfaces towards the distal plus the thin enamel in first primary molars can make the retention of 'box only' restorations a problem in this area.

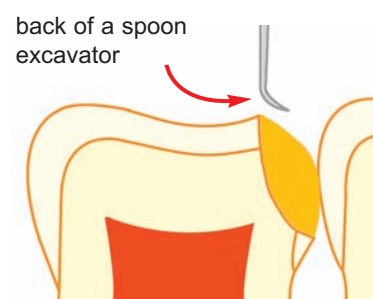


As a first step, a 'box only' preparation may have to be used. The life-span of this type of restoration is likely to be limited and, as a longer-term solution, it may be necessary to place a restoration with an occlusal lock.

- **Contour of an approximo-occlusal interim restoration**



To increase the longevity of interim approximo-occlusal restorations the marginal ridge height is lowered as shown.



After placement of the glass-ionomer cement, the back of a spoon excavator is used to achieve the appropriate contour.

Note: Unlike the situation with permanent teeth, the contact area with approximo-occlusal restorations in primary molars only needs to be at some point above the gingival margin to prevent food impaction.

- **Materials**

As in ART, high-viscosity, glass-ionomer cement is the preferred restorative materials for interim restorations. However, some operators have had good results with *very thickly* mixed **IRM** (Dentsply).

Use of rotary instruments

• Increasing salivary access to a lesion

Rotary instruments can be useful in increasing salivary access to a lesion. Two methods are shown below:

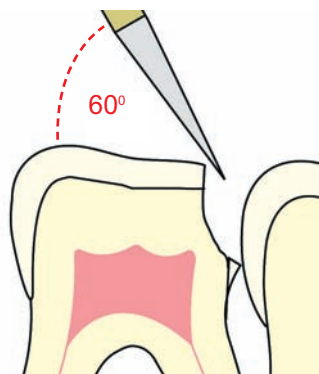
Ingers' Technique:

With a co-operative patient, the Ingers' Technique is extremely useful for handling the problem of disto-occlusal cavities in first primary molars.

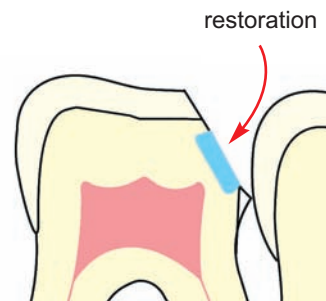
It can be used when there is no gap between the first and second primary molars at the level of the gingival margin.



For the Ingers' Technique to be used there must be no gap at the gingival margin between the first and second primary molars.



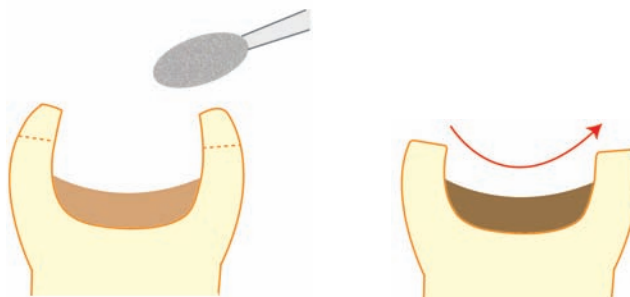
With the Ingers' Technique a slice is made with a tapering diamond bur at an angle of approximately 60 degrees or less.



The remaining caries is removed and a simple 'box-type' restoration placed.

Cusp reduction:

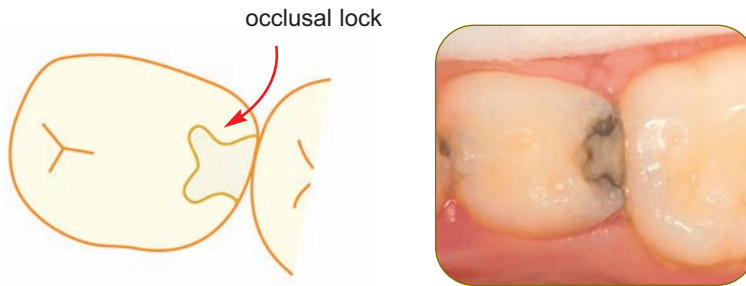
Cusp reduction can be used to open up a carious lesion to the action of saliva.



An oval-spined diamond bur can be used for cusp reduction and so open up a lesion to the action of saliva.

- Preparation of an occlusal lock

To increase the longevity of disto-occlusal restorations in first primary molars it may be necessary to place an occlusal lock.

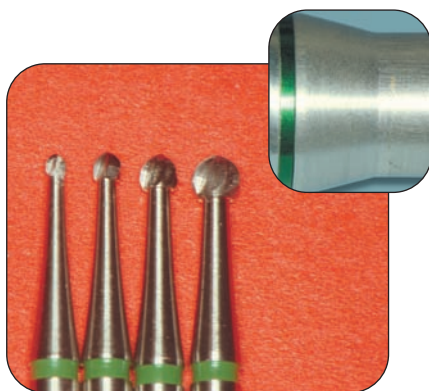


The preparation of an occlusal lock follows the shape shown and is carried out with round burs rotating slowly in an ultra-low speed handpiece. Care should be taken to ensure that there is at least a small periphery of sound dentine, just inside the dentino-enamel junction, on the gingival floor and the buccal and lingual walls.

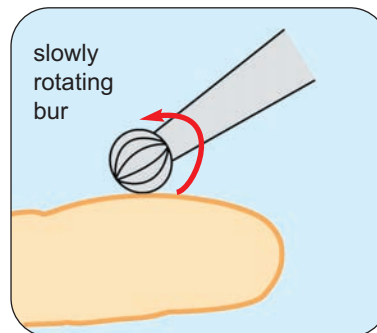
- Use of ultra-low speed cutting

Ultra-low speed cutting can be very useful for cavity preparation in primary teeth. It has been found that *pressure* from a slow moving round bur tends to cause little or no discomfort whereas *vibration* does.

Tooth structure of primary teeth can be removed cleanly and efficiently by using sharp round tungsten carbide burs in a handpiece rotating at around 100 to 200 rpm.



Example of sharp round tungsten carbide burs that can be used to prepare retentive features for restorations in primary molar teeth. They are used at 100-200 rpm in a reduction handpiece (inset). These handpieces are commonly identified by a green band on the shank.

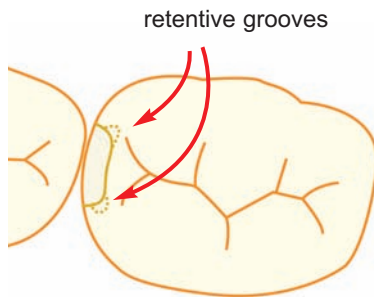


To reduce apprehension when working without local anaesthesia it is a good idea to first run the round bur on the child's finger at a slow speed.

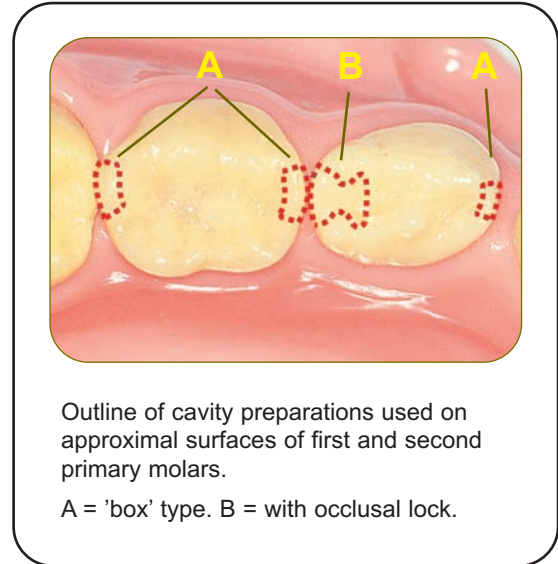
- Cavity preparation for second primary molars

As with disto-occlusal cavities in first primary molars, all the cavity preparation is carried out with round burs. However, because of the greater thickness of enamel it is invariably not necessary to prepare an occlusal lock.

There is usually sufficient room to prepare adequate retentive grooves in the buccal and lingual walls of the approximal box. A periphery of sound dentine, is prepared just inside the dentino-enamel junction, on the gingival floor and the buccal and lingual walls.



Placing retentive grooves just inside the dentino-enamel junction in an approximal box as illustrated can be used to increase the longevity of mesio-occlusal and disto-occlusal restorations in second primary molars.



Outline of cavity preparations used on approximal surfaces of first and second primary molars.

A = 'box' type. B = with occlusal lock.

• Main causes of pain in primary molars

Food impaction



Food impaction as shown is a common cause of pain in the primary dentition. It can be misinterpreted as a sign of an abscess.

The main causes of pain in the primary dentition appear to be:

- Pain from food impaction.
- Pain from tooth mobility caused either by imminent exfoliation or a chronic alveolar abscess.
- Possibly pulpitis.
- Very early stages of a chronic alveolar abscess before the abscess has pointed.
- Acute alveolar abscess (fortunately fairly rare in the primary dentition).

Treatments:

Pain from food impaction:

Recognition:

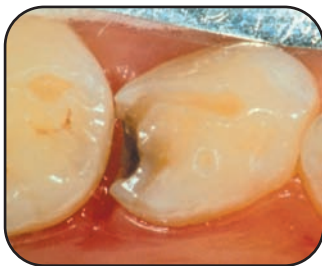
- Patient complains of pain when chewing fibrous foods such as meat or chicken.
- There is an approximal surface lesion with the overlying marginal ridge broken away.
- Close inspection shows fibrous food remnants jammed between the teeth.
- Examination of the bite-wing radiograph shows a *definite layer of sound dentine* between the base of the lesion and the pulp.

Be aware of a common mistake:

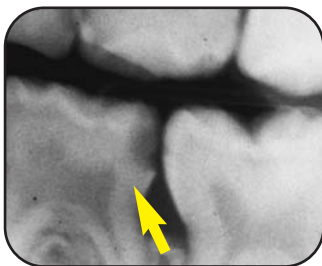
A common mistake is interpreting 'pain on chewing' as a sign of an abscess. All indicators should be taken into account before a final diagnosis is made.

Treatment:

- The jammed food remnants are teased out carefully in an *occlusal* direction with the end of an explorer. Care should be taken not to push impacted items towards the gingival margin as this could invoke a pain response.
- Place a temporary restoration.
- Recall the patient the next day to ensure that the symptoms have subsided.
- Restore the tooth.



Photograph showing impacted food removed. Note how the impaction produced a distinct crater in the gingival tissue.



A the bite-wing radiograph showed the presence of a distinct layer of sound dentine between the base of the lesion and the pulp. This is a useful indicator that the cause is not of pulpal origin.

Treatments (cont)

Food impaction (cont)



Once impacted food is removed a temporary restoration is placed. The patient is recalled the next day to ensure that the symptoms have subsided. The tooth is subsequently restored.

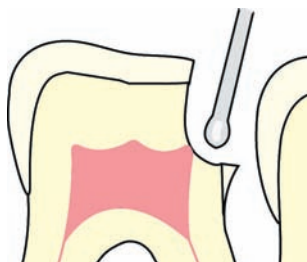
Other pulp treatments

The other pulpal problems encountered with carious primary molars are a chronic alveolar abscess and an acute alveolar abscess. Traditional treatment carried out by the authors used **Kri 1 Paste** (Pharmachemie) and **Ledermix Paste** (Lederle). However, **Kri 1 Paste** is no longer marketed and so an alternative is required (see box next page).

Chronic/acute abscess



Bite-wing radiograph shows caries has reached, or is extremely close to, the pulp.



It was important to excavate right up to the point where vital tissue is encountered.

Treatment:

Pain from pulpal involvement:

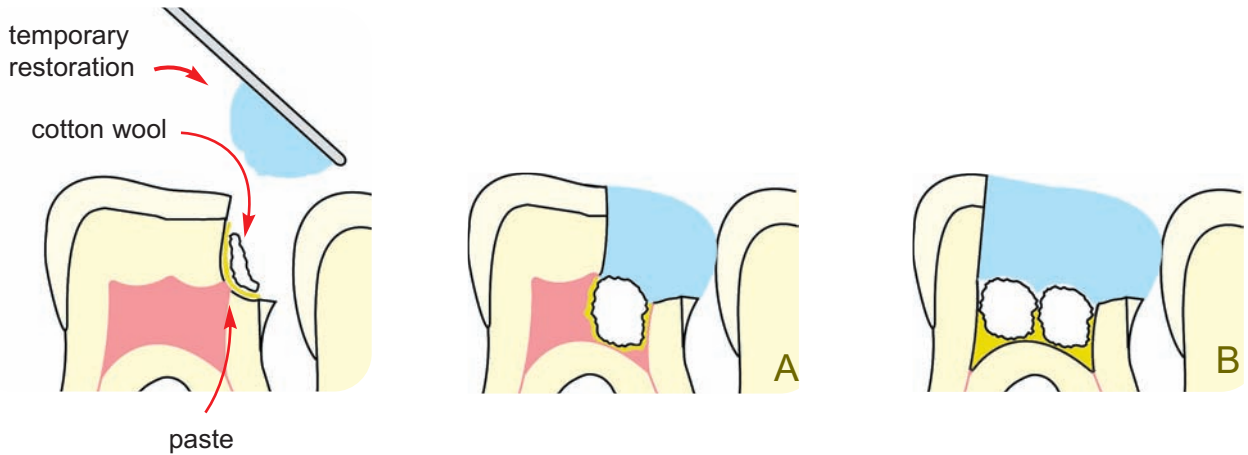
Recognition:

- Indications from patient history.
- The possible presence of swelling etc.
- Evidence from a bite-wing radiograph that caries had reached the pulp.

Technique:

(The process can be carried out *without* anaesthesia but requires proceeding with caution).

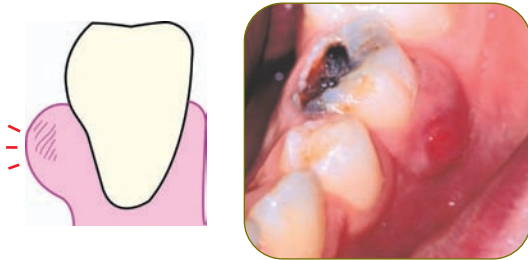
- Caries is excavated *right up to* the point where vital tissue is encountered. (Quite frequently primary molar teeth exhibiting signs of a chronic alveolar abscess can have pulps which, clinically at least, are completely vital).
- If the pulp chamber is reached without encountering any vital tissue, the pulp chamber is entered and progress stopped when any vital tissue was reached. (If the pulp chamber is free of vital tissue, and the patient is co-operative, the roof is removed with a tapering bur in a high speed handpiece to gain better access).



The exposure site is covered with the iodoform/*Ledermix* mixture. A piece of flattened cotton wool is placed on top and tamped into position. Finally the temporary restoration is inserted.

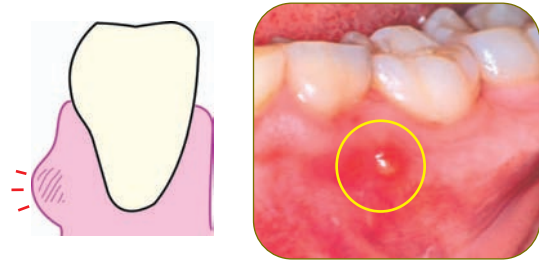
Depending on the presence or absence of vital tissue the final dressing can be either like (a) or (b) above. Interestingly, the iodoform/*Ledermix* combination tends to have a devitalising effect on remaining pulp tissue which makes the subsequent root filling a lot easier.

Two types of chronic alveolar abscess:



One type of chronic alveolar abscess points at or near the gingival margin, often occurs just before a badly broken down tooth exfoliates.

Tooth mobility is often the main cause of the discomfort in these cases.



Another type of chronic alveolar abscess points in a region adjacent to a root apex (shown above) tends to be associated with a more long-standing pulpal involvement.

Quite often the patient is unaware that the abscess is present.

Chronic alveolar abscess:

Treatment:

The treatment with iodoform/*Ledermix* paste as outlined above is followed. With chronic alveolar abscesses experience has shown that vital tissue may still be present (often in the pulp chamber or root canal furthest away from the pulp exposure site). Furthermore, in some primary molar teeth >

Alternative to Kri 1 Paste

80.0% iodoform
20.0% silicone oil
(mix and homogenise)

Treatments (cont)Chronic alveolar abscess:Treatment: (cont)

showing signs of a chronic alveolar abscess, the pulp clinically appears to be vital. In such cases it is possible that the abscess represents an escape of inflammatory exudate from the pulp rather than pus.

When treating teeth with a chronic alveolar abscess no attempt is made to ream and file the root canals, instead try and introduce >

some iodoform/ *Ledermix* paste into a root canal with the point of a probe.

Acute alveolar abscess:Treatment:

Conservative treatment may be difficult, however, the course of treatment outlined for a chronic alveolar abscess in combination with antibiotic treatment has been found to be successful.

Other conditionsChronic hyperplastic pulpitis:

A condition that can be associated with grossly carious primary teeth is chronic hyperplastic pulpitis. In this situation tissue grows out from the exposure site into the cavity. When it occurs it appears to cause little or no discomfort to the patient.

Root stumps:

A root stump may be able to be retained and act as a space maintainer. However, even if not causing pain, a root stump should be removed if it is causing deflection of the permanent successor.