

# Post-operative complications associated with intrusive luxation

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## Abstract

*A two-year-old white female sustained an intrusive luxation injury to her right primary maxillary central incisor. The displacement was unfavorable, and the incisal edge was fractured, exposing the pulp. Pulp necrosis occurred and the tooth was surgically removed after a two week-period when the patient became symptomatic. A histological evaluation of the pulp is presented. Emphasis is placed on evaluation, diagnosis and treatment considerations when dealing with this type of traumatic injury.*

## Introduction

Intrusive luxation presents a challenging and yet confusing form of traumatic injury in the pediatric patient.

While opinions vary as to the exact type of therapy, it is generally agreed that primary attention should be given to the injured soft tissue. Any attempt at imme-

diate repositioning should be deferred<sup>1</sup> and an observation period established before a final decision on therapy is made.

## History

The literature is somewhat sparse in dealing with long term studies on intrusive trauma. Schreiber<sup>2</sup> reported on 42 cases of intruded primary teeth; 26 were retained after reeruption. Ravin<sup>3</sup> reviewed the results of 248 primary teeth involved in trauma; 88 were intrusive luxation. Within six months, 80 of these teeth were fully erupted. The remaining eight were extracted for infection and failure to reerupt.

## Treatment

It appears that unaided reeruption should be considered the treatment of choice in those cases that are displaced favorably and where root fractures have been ruled out.

Wald<sup>4</sup> has stated only teeth with vestibularly displaced apices should be allowed to reerupt. Andreason<sup>5</sup> feels that when the radiographic examination indicates the apex is displaced toward the permanent successor, the primary tooth should be extracted immediately.

Finn<sup>6</sup> suggests that the primary tooth can be manipulated with digital pressure into proper position, and then stabilized into position.

This author feels that many intruded teeth are displaced vestibularly through the buccal cortical plate in such a way that they are in an unfavorable buccal position. It then becomes obvious that reeruption will not occur. It is suggested that in those cases attempts

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After six months, nine surfaces were retreated (a total time of 51 min.:23 sec.); after 12 months, five surfaces were retreated (a total time of 30 min.:16 sec.); and after 18 months, four surfaces required reapplication (a total time of 27 min.:40 sec.). The maintenance treatment increased the total mean time invested per surface for a sealant program to 8 min.:45 sec. after 18 months.

In analyzing the sealed surfaces that required retreatment (Table 4), there appeared to be no consistent pattern to the way in which failure occurred. There were 12 surfaces that were retreated only once during the 18 months, three surfaces that were retreated twice, and only one surface that was retreated three times. Of the 55 surfaces treated initially, 51 surfaces were available at the 18-month recall and 35 of those surfaces (68.6 percent) endured the 18 months without retreatment.

**Table 4. Analysis of sealant treatment failure**

	Surfaces Evaluated at 18 Months	Number of Retreatments Performed				
		0	1	2	3	4
Surfaces	51	35	12 <sup>a</sup>	3 <sup>b</sup>	1 <sup>c</sup>	0
Percent	—	68.6	23.5	5.9	2.0	0

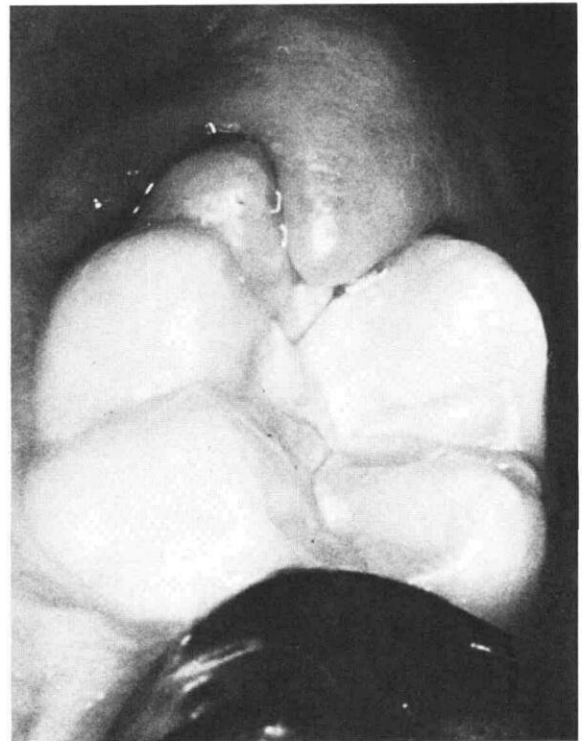
Note: <sup>a</sup>represents: 7 retreated at 6 months  
2 retreated at 12 months  
3 retreated at 18 months

<sup>b</sup>represents: 1 retreated at baseline and 6 months  
1 retreated at 6 months and 12 months  
1 retreated at 12 months and 18 months

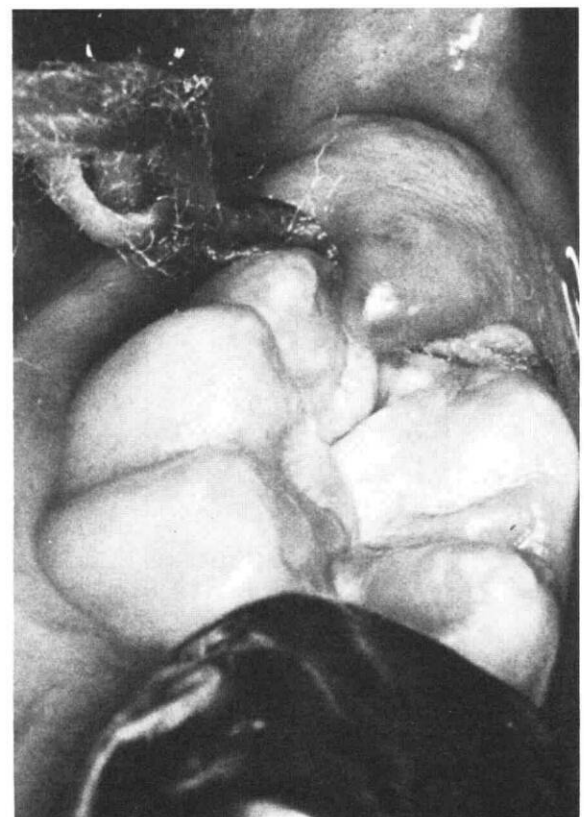
<sup>c</sup>represents: 1 retreated at baseline, 6 months, and 12 months.

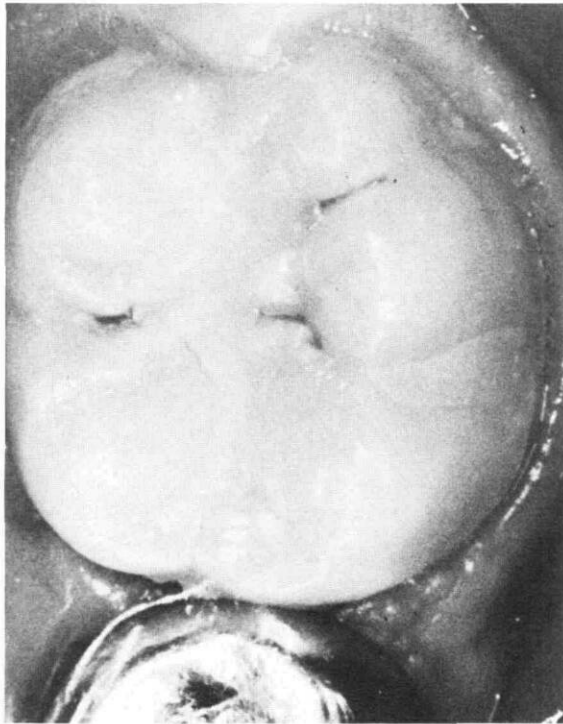
## Discussion

The relatively high incidence of early sealant failure and the need for retreatment during the first six months (Table 1) is an indication that the initial bond between sealant and enamel was insufficient to withstand the stresses of the oral environment. Of the nine surfaces retreated with sealant at six months (Table 4), seven were sustained for the remaining 12 months without further problem and three required additional retreatment at either 12 or 18 months. The leading

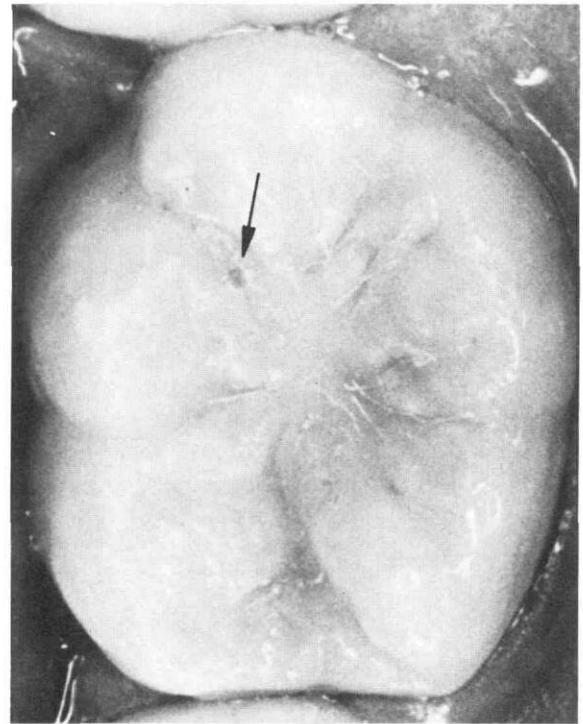


**Figure 1. Partially erupted first mandibular molar. (A) Preoperative view with tissue tab extending onto distal-occlusal surface; (B) Placement of gingival retraction cord.**





**Figure 2. Severe sealant deterioration requiring retreatment, 18 months.**



**Figure 3. Minor sealant deterioration requiring retreatment, 18 months.**

cause of adhesive failure at the enamel interface is contamination of the freshly etched enamel substrate with oral fluids; therefore, emphasis must be placed upon effective isolation procedures during application of the sealant. A typical isolation problem encountered during the study is illustrated in Figure 1. Tissue retraction cord can be gently inserted under the residual tag of tissue without anesthesia to provide access and a measure of isolation to the distal pit of a mandibular molar. A rubber dam may be the most effective technique to insure isolation but it may necessitate waiting on tooth eruption until the clamp can be secured, risking the additional exposure time to a cariogenic environment.

There is little information available to define the factors associated with clinical wear of a sealant coating that indicate the need for a retreatment procedure. An idealistic approach was taken in this study, and every defect in the coating that could potentially expose an underlying fissure or develop increased plaque retention was recoated with sealant. An example of relatively severe deterioration after 18 months is shown in Figure 2. On the occlusal surface, the sealant has either been abraded or thin edges have fractured during function, exposing the buccal, lingual and distobuccal fissures with evidence of stain pene-

trating under the remaining material. The exposed fissures were determined to be non-carious after mechanical removal of the loose sealant edges. Application of a new sealant coating restored continuous coverage to the exposed fissures and created a smooth margin junction.

A comparable sealant coating at the same 18-month recall period (Figure 3) illustrates a similar type defect along the distal buccal fissure. The clinical evaluation showed no margin discoloration and only an explorer catch of the margin along the exposed area. Although the severity of the defect is greater and the potential for caries development much more likely in the previous patient (Figure 2), both teeth require retreatment and the expenditure of similar time and material.

A much less severe problem, but one that is more likely to occur in the use of a filled resin system with its increased viscosity, is the exposure of an air void during clinical function (Figure 4). This observation appeared more likely during the early stage of clinical service, and was evident at insertion as subsurface porosity. Some of the larger surface voids were found to retain plaque and debris and it was impossible to determine by explorer examination whether the base of the void was in resin or exposed underlying, caries-sus-

the permanent successor. There is no question that this is a real possibility with intrusive luxation trauma.

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