

A vacuum-formed splint for luxated tooth with a repositioning on the model

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The results of fixation of a luxated tooth using a vacuum-formed splint, formed on a plaster model after repositioning of the luxated tooth on the model are presented. This may be useful where the adjacent tooth gap is wide or only minimal anchorage and support are available from the adjacent teeth.

J Clin Pediatr Dent 29(2): 123-126, 2005

INTRODUCTION

Traumatic injuries to teeth, including subluxation, intrusion, extrusion, lateral luxation and exarticulation, are common in infants and young children.^{1,2} Various splinting techniques, including wire splints, arch bar splints, acrylic cap splints and acid-etched splints, have been used to fix luxated teeth.³ However, in cases of tooth luxation, the adjacent tooth gaps are often wide and or only minimal anchorage and support are available from the adjacent teeth, so that it is difficult to adequately fix the luxated tooth into the original position.⁴ In such cases, we have had success using a vacuum-formed splint made on a plaster model where the luxated tooth had been repositioned. In this article we discuss the procedure for construction of the splint.

MATERIALS AND METHODS

The case of a seven-year-old girl, who had extruded her upper left central incisor in a bicycle accident is shown in Figures 1-6. Note also the impacted supernumerary

tooth interfering with the eruption of the neighboring right central incisor (Figures 1, 2). In this case, the deciduous teeth were mobile and could not be used as anchors for the luxated tooth. After initial treatment of the injury, the luxated tooth is repositioned in a similar,



Figure 1. Oral view after the initial treatment of the case. The maxillary left lateral incisor is displaced and the mesial gingival has already closed with 3-0 silk.

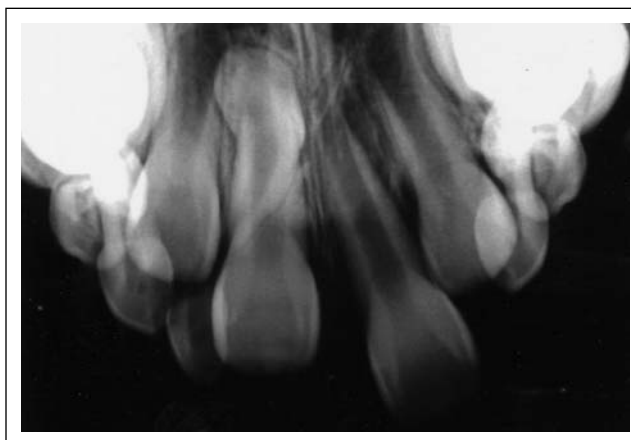


Figure 2. Radiographic view shows that the maxillary left lateral incisor is extruded and the impacted supernumerary tooth is interfering with the eruption of the neighboring right central incisor.

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Figure 3. The plaster model before the reposition of the luxated tooth.

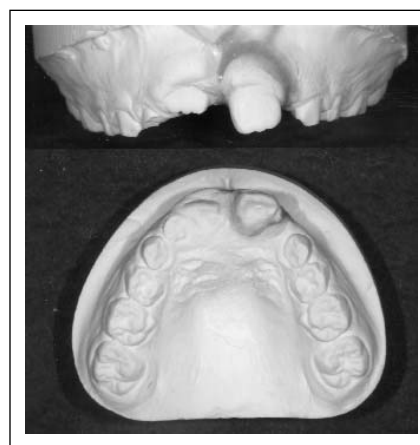


Figure 4. The plaster model after repositioning of the luxated tooth. The luxated tooth has been repositioned and fixed with self-curing acrylic.



Figure 5. The completed vacuum-form splint.



Figure 6. Oral view after the fitting the splint.

but not identical, position to the original using clinical and radiographic reference points. Impressions of both jaws are then taken. To reduce the likelihood of the luxated tooth being removed with the impression material, a suture in the adjacent soft tissue and a crossing suture from the proximal gingiva to the incisal edge of the luxated tooth may be useful to hold the luxated tooth in the socket. After impression taking, the occlusal index of the luxated tooth is recorded with the tooth in the pre-injury position using a wax or a silicon impression material.

In the laboratory, the plaster models are made (Figure 3). The luxated tooth is then cut off the model using an engine bur. The palatal side is cut along the outside of the cervical margin of the crown, while the buccal side is cut in an ovoid shape, from the plaster model. The cut surface of the plaster of the luxated tooth is then shaved until the incisal edge of the luxated tooth is in the correct position according to the occlusal index. Once the correct position is decided upon, the plaster luxated tooth is fixed to the model using self-curing acrylic (Figure 4). An acrylic

sheet, Erkodur, 0.8mm thick (Erkodent Erich Kopp GmbH, Germany) is warmed and compressed against the plaster model under vacuum pressure in an Erko-press (Erkodent Erich Kopp GmbH, Germany).⁵ After the marginal portion of the acrylic plate is trimmed and polished (Figure 5), the completed vacuum-formed splint is fitted in the patient (Figure 6).

DISCUSSION

The wire-composite splint has been the most popular and reliable method for fixation of a luxated tooth.^{3,6} However, there are cases, especially in primary or mixed dentition, where adaptation of the wire-composite splint is difficult due to retention problems. In such cases, cap splints may be useful.^{4,7,8} Since direct formed splints may be difficult to remove,³ splints formed indirectly on plaster model are often more appropriate. Moreover, they permit the luxated tooth to be positioned in the correct position.^{3,4}

Our method is also an indirect one, but in this case it is not necessary to position the tooth in a final position before impression taking. Removal of the luxated tooth

with the impression material is prevented by appropriate preliminary treatment.

The advantage of using this splint is that the luxated tooth is positioned appropriately. The construction of plaster model is relatively easy and ensures replication of the pre-injury position of the luxated tooth. Clinical and experimental evidence from recent studies has revealed that long-term rigid immobilization results in an unfavorable prognosis of luxated teeth.⁹ The vacuum-form splint gives a luxated tooth a physiological stimulation that is beneficial for the development of a functional periodontal attachment.^{4,5} Moreover, the 0.8 mm thickness of the acrylic plate does not interfere with articulation. The disadvantage with this method is that it is time consuming, although this is for the most part restricted to the laboratory.

It is not appropriate to spend undue time fixing luxated teeth in the clinical setting in many cases, particularly in infants and young children.⁷ Thus, when receiving patients from clinics that do not have devices such as Erkopress, it may save time if the impression has already been taken and the model poured prior to referral.

In conclusion, we recommend the use of this modified vacuum-form splint in cases where luxated teeth do not have support from neighboring teeth.

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