

# Orthodontic Intrusion of an Immature Avulsed Permanent Maxillary Incisor

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## Introduction

The AAPD has well documented trauma guidelines for avulsed dentition with open apices.

Recommendations include immediate reimplantation followed by a 2-week flexible splint. Short immature teeth may require a longer splinting time.

Research supports that in immature teeth with open apices, there is a potential for spontaneous healing to occur in the form of new connective tissue with a vascular supply. This allows continued root development and maturation. AAPD guidelines recommend that endodontic treatment not be initiated unless there are definite signs of pulp necrosis and infection of the root canal system at follow-up appointments.


## Case Report

In June of 2024, an 8 y.o. male presented to an Urgent Care for an avulsed #8 due to a traumatic injury while playing basketball. The Urgent Care provider put the avulsed tooth back in its original socket and the patient was then transferred to Children’s Wisconsin ED to be seen by dental.


The patient was dentally delayed with #7,9,10 unerupted at age 8. Radiographs showed that tooth #8 had approximately 50% root formation.

A passive splint was placed for tooth #8 using an 0.14 stainless steel wire with tubing for open spaces. Unerupted adjacent incisors decreased the overall stability of the initial splint. At the 2 week follow up the tooth remained mobile and depressible. It was decided to continue with splinting and reevaluate at 4 weeks. At the 4 week re-evaluation, the tooth remained mobile, depressible and was extruding from the socket. Soft tissue was healing well with only slightly erythematous gingival margins. A nickel titanium wire was used to put an intrusive force on the tooth.


Patient was brought in for evaluation at ~6, 8, 12 and 16 weeks for active surveillance. A bracket was added to #9 to assist with leveling after tooth #9 erupted. Tooth remained asymptomatic throughout treatment.



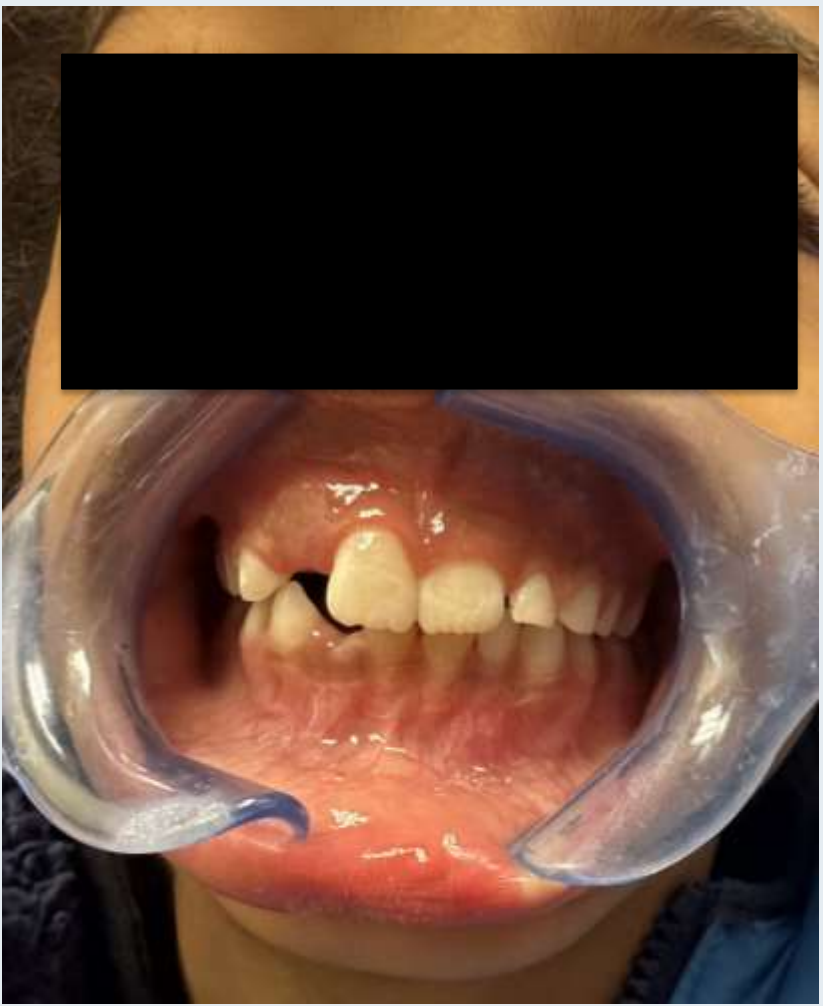
6/5/24 - Initial reimplantation of tooth #8




10/10/24 – Splint during treatment



12/19/24 - Splint prior to debond



12/19/24 – Splint removal



6/5/24 – Initial reimplantation






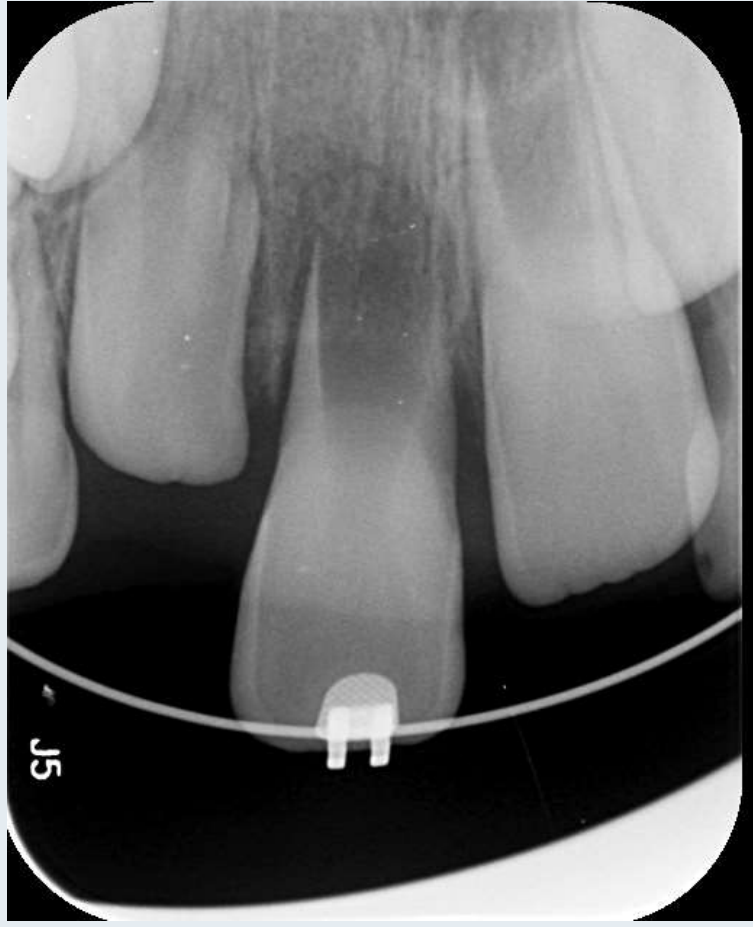
Figure 1: 6/5/24 – Initial splint




7/12/24: Extrusion from socket. 0.18 NiTi placed (Class I mobile and depressible)



7/26/24 - Retied with 17x25 NiTi to increase intrusive force on tooth (Class I mobile and slightly depressible)



8/9/24 - Continued 17x25 NiTi



12/19/24 - Final radiograph prior to debond

Tooth #8 was in good position at debond with incisal edge alignment. Final radiograph demonstrated progression of root formation since initial reimplantation, however, calcification of root apex can be visualized radiographically. This could be indicative of incomplete root formation. Continued close follow up is needed and ankylosis or necrosis are possible sequela following trauma treatment.

If ankylosis occurs replacement resorption may occur over time and could result in infraocclusion of #8. Treatment methods for ankylosed teeth include no treatment, extraction and replacement with a prosthetic tooth or orthodontic space closure, surgical luxation, corticotomy, block osteotomy, distraction osteogenesis, and decoronation.

## Conclusion

A possible complication of reimplanting short immature teeth is natural extrusion following reimplantation. If stability is not achieved with the initial splint an intrusive force may be needed to increase the stability of the avulsed tooth.

This approach is not well documented in the literature and more research is needed to determine long term sequelae of intrusion of immature teeth which may include ankylosis or stunted root formation.

## References

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