

Treatment Considerations for a 12-year-old Male with Amelogenesis Imperfecta

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Background

- Amelogenesis imperfecta (AI) is an anomaly of tooth development leading to defects in enamel.¹ There are four known types.
- AI has an estimated incidence of 1:14,000. Etiology has been linked to genetic mutations with various inheritance patterns.
- There are no clear dental treatment guidelines for AI, with limited empirical research directly comparing materials. The American Academy of Pediatric Dentistry offers general considerations for treatment options, noting that timely care is essential.²
- A primary learning objective of this study was to evaluate the various dental treatment modalities available for patients with AI.
- A second learning outcome was to demonstrate the importance of considering multiple factors (i.e., evidence-based research, growth, and development) together when determining a treatment plan.

Case Report

Initial Presentation 5/11/2023

- A 12-year-old Hispanic male with AI presented to JHMC for treatment discussion of tooth #30. The patient's mother ultimately chose to have the tooth extracted with nitrous oxide.

Follow-Up Appointment 7/17/2023

- The patient was seen for a follow-up exam, in which tooth #13 was found to have a cavitation. Generalized enamel hypoplasia was detected across the entire dentition.
- Overall, these findings are consistent with AI type I.

Treatment Plan Discussion 8/28/2023

- Treatment options were discussed with the patient's mother: composite resins, stainless steel crowns, and ceramic crowns. An amalgam restoration was selected due to its conservative design.

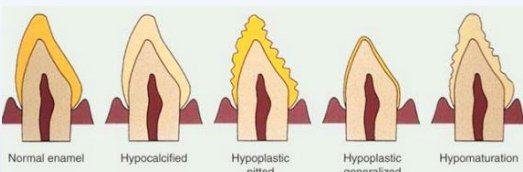
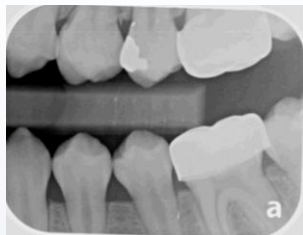
Treatment Appointment 12/6/2023

- #13-MO amalgam with sealant was completed. The patient was sent home with a mouthguard and prescribed Prevident toothpaste.

Before Treatment



After Treatment



Four Types of Amelogenesis Imperfecta

Type I	Hypoplastic – general or localized pitting of enamel, which is distinct from dentin radiographically
Type II	Hypomaturational – less dense enamel, which may have a similar radiopacity to dentin radiographically
Type III	Hypocalcified – poorly mineralized with enamel less radiopaque than dentin radiographically
Type IV	Hypoplastic/hypomaturational with taurodontism – Type I or II with enlarged pulp chambers in molars

Discussion

- Composite resins** – Studies have shown high failure rates of adhesive restorations in AI type III, likely attributed to compromised bonding from enamel with relatively higher protein content.³
- Amalgam** – There is a limitation of long-term studies showing prognosis of amalgam restorations in AI patients. In general, it is thought that amalgams can be a good starting choice for small lesions; however, defects in enamel margins and risk of fractures can make amalgam an inferior choice.⁴
- Stainless steel crowns (SSC)** – These are one of the most definitive and cost-effective treatment options for primary and permanent molars.⁵ The long-term success of SSC on molars affected by AI remains questionable when compared to ceramic crowns.
- Ceramic crowns** – Ceramic crowns offer a definitive and esthetic solution for teeth affected by AI. A randomized control trial followed 193 teeth affected by AI, which were treated with ceramic crowns. A 5-year survival rate of 99.6% was reported.⁶

- While there are a series of case reports describing restorations on patients with AI, no long-term empirical studies exist directly comparing these materials. Recent guidelines lack quality, making it difficult to determine the best treatment for patients with AI. Because of the low prevalence of AI and recent advances in technology, further research is necessary to determine long-term success of these restorative options.

- While coronal therapies have been shown to be a more cost-effective and definitive treatment choice for teeth affected by AI, an **amalgam** restoration was chosen as it is minimally invasive to the tooth structure of a developing adolescent.⁷ A sealant was placed on top of the amalgam to mitigate fracture risks in the interim; a definitive crown may be placed in the future. The mouthguard, Prevident prescription, and 3-months recall serve as preventative measures to control caries. Ultimately, growth and developmental factors – as well as timely care – should be accounted for in the treatment plan process.

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