



Nature's Nurture; Resorbable Polylactic Acid Posts for Primary Incisors: Brief Review

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KEYWORDS	ABSTRACT:
Early Childhood Caries, Trauma, Primary Incisors, Esthetics, Polylactic Acid Posts	<p>The esthetic restoration of severely mutilated primary anterior teeth has been a challenge for the pediatric dentist for a long time, not only because of the available materials and techniques but also because the children are usually among the youngest and least manageable group of patients.</p> <p>Premature loss of carious primary incisors have known to affect not only speech, masticatory efficiency, causes abnormal tongue habits and potentially subsequent malocclusion but also affects psychologically if esthetic demands are compromised.</p> <p>In recent years, esthetic rehabilitation of carious damaged primary anterior teeth have gained interest in pediatric dentistry. This review highlights on biodegradable intracanal post that can be used effectively in primary teeth followed by pulp therapy.</p>

One of the most prevalent chronic diseases affecting children globally is dental caries, particularly early childhood caries (ECC), which affects children under 72 months of age. ECC is a chronic, irreversible, multifactorial disease often linked to night time feeding (whether breast or bottle-fed), poor oral hygiene, and a diet high in cariogenic substances. The most commonly affected teeth are the maxillary central and lateral incisors, followed by the maxillary and mandibular first primary molars.^{1,2}

A common challenge faced by pediatric dentists is the esthetic restoration/rehabilitation of primary maxillary incisors that have been severely damaged either due to caries or trauma. Premature loss of these carious primary incisors can lead to several functional and developmental issues such as affecting the speech, particularly the pronunciation of consonants and labial sounds, and may cause decreased chewing efficiency additionally leading to abnormal tongue habits and development of potential malocclusion, along with psychological distress due to compromised esthetics.^{4,5,6} Hence, to address these issues the American Academy of Pediatric Dentistry (AAPD) recommends immediate therapeutic intervention to prevent further damage and associated health issues.

However, restoring severely damaged maxillary incisors poses a significant challenge for Pediatric dentists. This is due to the limited tooth structure available for bonding,

as well as the behavioral challenges posed by young children.^{3,7} The recommended treatment for such cases is pulpectomy, followed by restoration using a post and core to rebuild form and function where in a post is a dental restorative material placed within the root of a structurally compromised tooth to provide adequate retention for the core and coronal restoration.^{8,9} Posts are classified into two types: custom-made and prefabricated. Prefabricated posts can be further divided into:

- **Metal posts:** made of materials like stainless steel, Ni-Cr alloy, titanium, and gold-plated brass.
- **Non-metal posts:** made of materials such as composite, glass fiber, biologic materials, carbon fiber, polyethylene, and polylactic acid (PLA).

Non-metal posts, especially those that are resorbable, are often preferred in primary teeth due to their physiologic properties, such as compatibility with the natural resorption and shedding of primary teeth. One such recent innovation is the **Polylactic Acid (PLA) post**.

Polylactic Acid (PLA) Post

PLA is a highly crystalline polymer with a high molecular weight and is derived from Corn starch, Sugarcane, Potato starch, Tapioca starch. It is known to primarily degrade through hydrolysis, a process that takes between 12 and 30 months and upto 3 years in vitro



and In vivo respectively, providing a reliable restorative solution until physiological root resorption of the tooth. With a bonding strength of 250–290 MPa and a shear strength of 170–220 MPa, PLA posts can offer the necessary mechanical support to restore the coronal structure of primary teeth. Inside the human body, PLA degrades into lactic acid, which is metabolized into pyruvate and eventually excreted as carbon dioxide and water via the tricarboxylic acid cycle. PLA's advantages over other plastics include biocompatibility, high transparency, resistance to acids and alkalis, and approval by the US Food and Drug Administration (FDA), making it a suitable dental material for primary tooth restoration.^{9,10}

The various benefits of PLA posts includes its Biocompatibility, Biodegradability, Flexibility, Esthetic appeal, Minimal gingival injury, No reported cervical fractures and is also Cost-effective. However few limitations of PLA Posts are its limited durability, unsuitable for long-term applications, Sensitivity to high temperatures, and is not suitable for load-bearing areas^{8,10}

Application of PLA material in other fields of dentistry includes;

- As Biodegradable implants
- Clear aligners
- Resin materials for denture artificial teeth
- As Suture material
- Anatomical models for diagnostic and educational purposes
- Customized occlusal devices such as splints and night guards

Conclusion

Rehabilitation of severely mutilated primary anterior teeth is challenging and must consider the patient's compliance, operator skills, materials and costs. Resorbable PLA intracanal posts represent a significant advancement, marking a new era in Pediatric dentistry. Their properties such as biocompatibility, biodegradability, and ability to support restoration during the resorption phase make PLA posts an ideal option for restoring the morphology and function of primary teeth, bringing smiles back to young patients. Hence PLA posts

shows promising alternative to existing posts in Pediatric dentistry.

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