

## Balancing Function and Growth a Heat-Cured Temporization Approach for Ectodermal Dysplasia: A case Report

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**Abstract:** Ectodermal dysplasia is a rare hereditary disorder affecting structures derived from the ectoderm, most notably the teeth, hair, and sweat glands. Dental manifestations often include hypodontia or anodontia, leading to functional and esthetic concerns, especially in growing patients. In growing patients, ongoing jaw development necessitates the use of non-splinted prostheses to accommodate skeletal changes and prevent restriction of normal craniofacial growth. Heat-cure temporization serves as an effective fixed interim prosthetic option due to its superior strength, durability, and esthetics, providing improved function and patient comfort during the transitional phase of treatment in growing individuals. A 16-year-old boy who was reported to department of prosthodontics with complaint of missing teeth was treated by heat cured provisional fixed prosthesis. The interim prosthesis was designed to restore masticatory function, improve facial esthetics, and support psychological well-being during the patient’s developmental years.

**Keywords:** Ectodermal dysplasia, Heat-cured temporization, Prosthetic rehabilitation, Hypodontia, Anodontia

**Introduction:** Ectodermal dysplasia (ED) encompasses a diverse and complex group of inherited disorders marked by developmental defects in structures originating from the ectodermal germ layer. These conditions present with a wide range of clinical manifestations, varying from mild cosmetic issues to severe functional impairments.<sup>1</sup>

The oral manifestations of ectodermal dysplasia commonly include conical or peg-shaped teeth, hypodontia (partial absence), or complete anodontia (total absence) of both primary and permanent dentitions. Present teeth may exhibit malformation, and patients often display generalized spacing, underdeveloped alveolar ridges, and delayed eruption of permanent teeth. Interestingly, even in cases of complete anodontia, jaw growth remains unaffected, suggesting that jaw development excluding the alveolar process is independent of tooth presence.<sup>2</sup> Additionally, hypoplasia of the

salivary and intraoral accessory glands may occur, contributing to xerostomia and dryness or cracking of the lips.<sup>3</sup>

Prosthetic rehabilitation is essential in managing the dental complications associated with ectodermal dysplasia, with the primary goals of restoring oral function, improving esthetics, and enhancing the patient’s self-esteem.<sup>1</sup> These can be employed individually or in combination, depending on the patient’s age, growth status, severity of dental anomalies, and overall treatment goals. Each modality has their advantages and disadvantages, and the choice of prosthesis must be carefully made to balance function, esthetics, and adaptability to future growth and development.

Traditionally, treatment has focused on the use of removable prosthetic options such as partial or complete dentures. Although these conventional solutions offer temporary functional and esthetic

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benefits, they can pose significant challenges particularly in growing patients due to issues with retention, stability, and the need for frequent adjustments to accommodate ongoing craniofacial development.<sup>4</sup>

Nowak<sup>5</sup> stated that “treating the pediatric patient with ED requires the clinician to be knowledgeable in growth and development, behavioral management, techniques in the fabrication of prosthesis, the ability to motivate the patient and parents in the use of the prosthesis, and the long-term follow-up for the modification and/or replacement of the prosthesis.”

However, because the child’s jawbones and oral structures are still developing, fixed or permanent solutions are often delayed. Instead, removable prostheses or interim prosthesis are commonly used, as they can be adjusted or remade periodically to accommodate changes in the oral cavity. Dental implants and permanent fixed partial denture must not be given until the age of 16-18 until the jaw growth is completed.<sup>3,6</sup> Rigid fixed partial dentures may interfere normal jaw growth, particularly when they extend across the midline.<sup>4</sup> Hogeboom<sup>7</sup> reported a notable case where jaw growth in a patient with ectodermal dysplasia led to the separation of two segments of a detachable fixed prosthesis at the midline, clearly illustrating the impact of transverse jaw development.

**Case Report:** A 16-year-old male patient reported to department of Prosthodontics with chief complaint of missing teeth, poor esthetics and difficulty in mastication. On extraoral examination, the patient displayed characteristic features of ectodermal dysplasia, such as a depressed nasal bridge, prominent forehead, and everted lips (Fig. 1) He also presented with a short upper lip and unclear speech. His facial form was square with a concave profile (fig. 2), and a diminished vertical dimension contributed to a prematurely aged appearance.

Examination of the temporomandibular joints revealed no abnormalities. Intraoral examination revealed restricted mouth opening due to palpable taut fibrous bands in the buccal mucosa. The teeth showed characteristic Ectodermal dysplasia symptoms such as partial anodontia, Peg shaped teeth, underdeveloped alveolar ridge and jaws. The patient presented the following teeth present in the maxillary arch: 17,16, 12, 11, 21, 26, and 27 (Fig.3) and in the mandibular arch: 47, 43, 32, 33, 34, 35 and 36 (Fig.4). The periodontal status of the remaining teeth was fair. Tongue was normal in size, but showed restricted movements.

On orthopantograph radiographic examination, (Fig.5) it was seen that the alveolar ridges appeared inadequate in height. The root length of all the teeth was found to be short and with receded pulp chambers. Bone appeared to be sparse and erupting 15 and 37 and impacted 14.



Fig 1: frontal view



Fig 2: Lateral view

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Fig 3: Maxillary arch



Fig 4: Mandibular arch



Fig 5: OPG

As the patient had restricted mouth opening 0 no. stock tray was used to make the diagnostic impression. A facebow transfer and interocclusal bite registration using Alu wax were performed. The facebow record was used to mount the maxillary cast on a semi adjustable articulator, and the mandibular cast was subsequently mounted in relation to the maxillary cast using the interocclusal record.

Diagnostic wax up was on the diagnostic cast using the putty index a cold cure provisional restoration

was made and cemented in patient's mouth any changes required were corrected.(Fig.6)



Fig.6 : Post cementation intraoral photograph of temporary prosthesis

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According to the mock trial and final approval of patient, the following treatment plan was made for the patient: A heat cured fixed full mouth provisional restoration was planned taking into consideration the patient's age, jaw growth, psychological condition, financial conditions etc. Taking the case from Hogeboom<sup>5</sup> into consideration sectioning of the prosthesis was decided.

Minimal tooth preparation was done to compensate the undercuts and give chamfer margins for preservation of tooth structure. Final impression was made.

Wax pattern was fabricated on the mounted casts for acrylization (Fig. 7). The casts were sectioned with the help of die cutting machine. The sectioned waxed-up restorations are invested in a separable flask in a manner as per the instructions in dental laboratory procedures volume II.<sup>8</sup> Acrylic polymer powder is sprinkled into the areas to be cast and moistened with acrylic monomer. The procedure is repeated until the contours have been over built. The flask was closed in an appropriate press with a sheet of cellophane or trial pack separating film. The flask was separated and excess flash is removed. Flask is closed, placed in clamp, and resin polymerized. Under pressure ensures dense resin in the cured provisional restoration. The resin was polymerized by immersing in water at 212°F (100°C) for 30 to 60 minutes.<sup>8</sup>



Fig 9: wax pattern for final restoration of both arches



Fig 9: wax pattern for final restoration of both arches

The prostheses are taken out of the casts and then finished and polished as required. The prosthesis was cemented in the patient with the help of glass ionomer luting cement (Fig.8). The patient was educated about the post operative instructions and instructed about maintaining hygiene. Recall was done after 24 hours to make necessary adjustments. Monthly recall is done for checking the jaw growth and follow up checkup.

Post-treatment, the patient reported substantial improvement in masticatory function, clearer speech, and enhanced esthetics. These changes were instrumental in restoring self-esteem and improving quality of life, particularly in social and peer interactions.



Fig.10: post cementation facial view

Discussion: In pediatric and adolescent patients, the use of heat-cured temporary prostheses offers several advantages over cold-cure or chairside

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alternatives. Heat-cured acrylic resins are more durable, biocompatible, and color stable, providing improved patient comfort and long-term performance. In the present case, a heat-cured removable prosthesis was chosen to ensure strength, retention, and adaptability, while allowing future modifications in line with the patient's growth and craniofacial development.

The primary goals in managing ED patients are to restore masticatory efficiency, enhance speech, support facial soft tissues, and boost self-esteem. Early prosthodontic intervention helps in guiding normal growth patterns and jaw development,

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