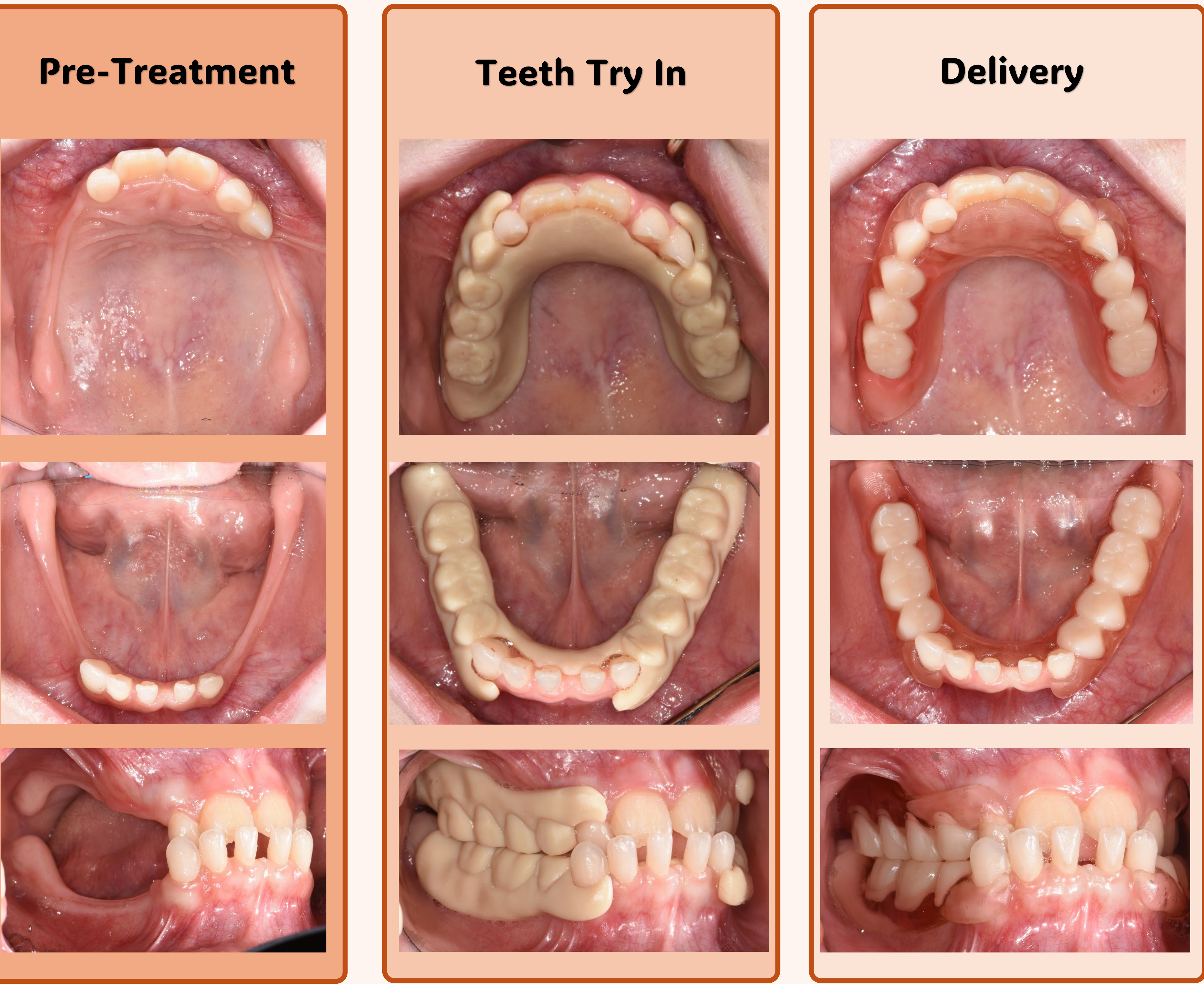


Prosthetic Rehabilitation of a Pediatric Patient with Ectodermal Dysplasia Using a Digitally Designed, 3D-Printed Flexible Partial Denture: A Clinical Report

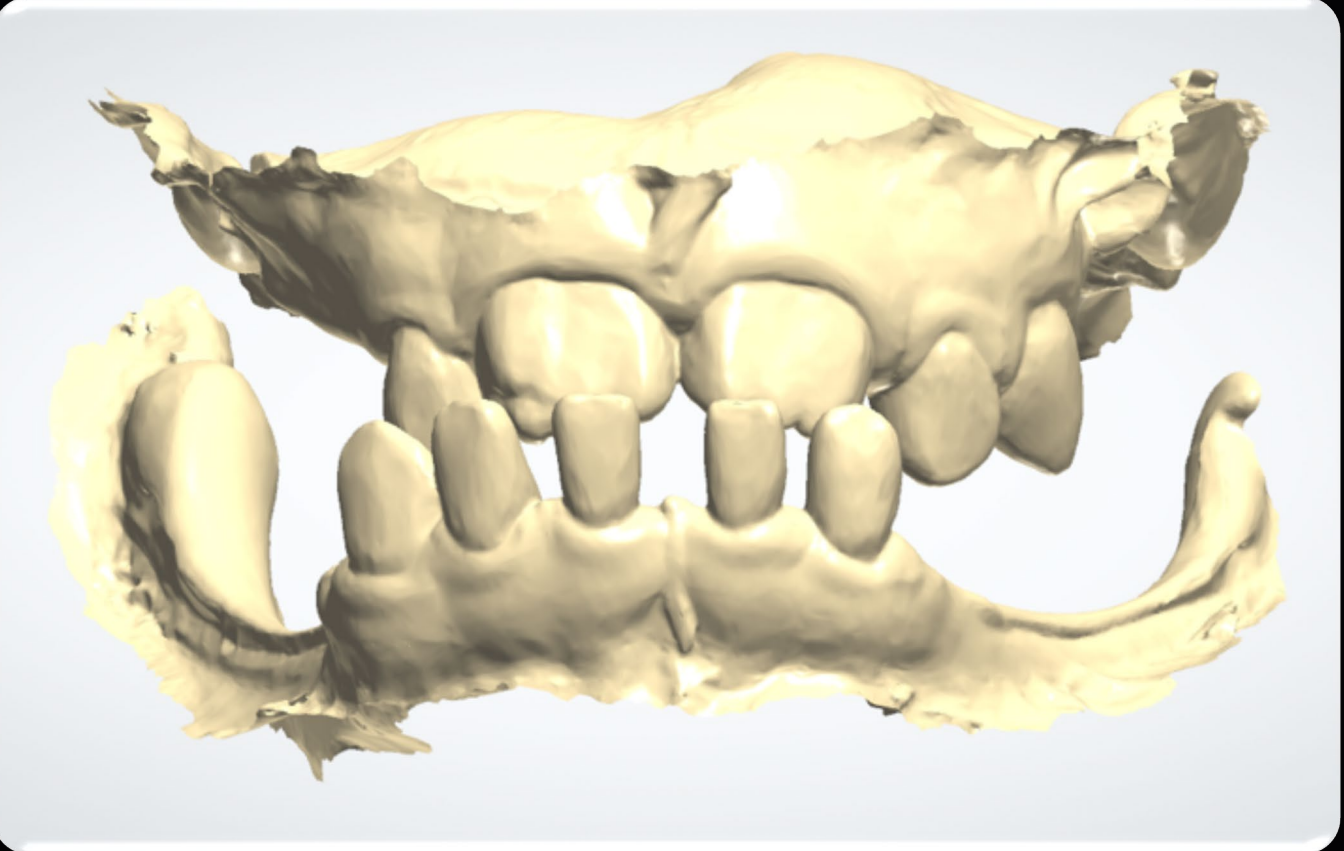
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- Aim:** The aim of this clinical report is to describe the prosthetic rehabilitation of a pediatric patient with ectodermal dysplasia using a fully digital workflow that integrates 3Shape design and 3D printing with FP3D flexible denture resin. This study seeks to demonstrate how digitally designed and 3D-printed flexible partial dentures can restore function, esthetics, and vertical dimension in a growth-accommodating manner, while addressing the limitations of conventional acrylic partial dentures in pediatric prosthodontics.
  - Prosthetic management must adapt to **craniofacial growth, esthetics, and functional preservation**. Conventional **PMMA/wrought wire RPDs** remain widely used but present significant **limitations in pediatric care**.<sup>1-7</sup>
  - Reported overall **satisfaction rates of ~50%–81%** for traditional RPDs.<sup>8</sup>
  - Main causes of dissatisfaction in children:
    - Pain during mastication.<sup>8</sup>
    - Speech interference & Visible clasps compromising esthetics.<sup>8,9</sup>
    - Plaque accumulation.<sup>9</sup>
  - Rigid acrylic bases:** prone to **loss of retention** as alveolar contours change with growth.<sup>10</sup>
  - Kennedy Class IV** and **mandibular distal extension bases**—common in severe hypodontia/anodontia—associated with **lower stability and satisfaction**.<sup>11</sup>
  - Flexible partial dentures** consistently show **higher patient-reported outcomes** in:
    - Comfort.<sup>12</sup>
    - Esthetics.<sup>12</sup>
    - Stability.<sup>12</sup>
- Advances in Flexible Denture Materials**
- Carbon® FP3D flexible denture resin** offers improvements over PMMA/wrought wire designs.<sup>13</sup>
  - Advantages:**
    - Engages **both dental and soft tissue undercuts**.
    - Flexibility accommodates minor growth changes while maintaining retention and stability.
    - Durability** documented for **>3 years** under normal use.
    - Provides **improved comfort, esthetics, and function**, while upholding prosthodontic principles of support, stability, and retention.



- Discussion:**
- FP3D flexible denture resin specifically addresses shortcomings of conventional designs:
    - Engages both dental and soft tissue undercuts** → eliminates need for visible metal clasps.<sup>13</sup>
    - Enhanced esthetics** and patient confidence.
    - Flexibility allows micro-adaptation** to growth changes while maintaining snug fit.
    - Upholds principles of **support, stability, and retention**.
  - Durability and Digital Workflow Advantages**
    - FP3D durability:** documented longevity of **>3 years under normal use**.
    - Important in pediatric patients where repeated remakes:
      - Disrupt development and function.
      - Affect psychosocial well-being.
    - Digital workflow benefits:**
      - Precise customization and predictable occlusion.
      - Rapid reprint or modification in case of **loss, breakage, or growth-related adjustments**.
      - Supports adaptability required for **pediatric compliance and eruption changes**.

- Clinical Application in Present Case**
- Integration of **3Shape digital design** with **FP3D fabrication** produced a prosthesis that:
    - Met **functional and esthetic goals**.
    - Addressed **mastication and speech issues**.
    - Preserved **occlusal vertical dimension (OVD)**.
    - Provided an **adaptable solution with reduced maintenance burden**.
  - Result: improved **short- and long-term outcomes** by ensuring comfort, function, and esthetics.



Step 1  
Patient Data  
Acquisition &  
Digital  
Preliminary  
Records

Step 2  
Teeth Try-In  
Stage

Step 3  
Delivery and  
Maintenance

