

# The Use of Flexible Dentures in the Management of Ectodermal Dysplasia: A Case Report of Two Siblings

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## ABSTRACT

### Background

Ectodermal Dysplasia is a rare genetic disorder that is evident by abnormalities in the formation of two or more structures of ectodermal origin. It could affect structures such as the hair, nails, teeth, skin, sweat glands, and sebaceous glands.

The management of patients with Ectodermal dysplasia is complex and requires a multi-disciplinary approach involving both the medical team and specialties in the field of Dentistry. Early intervention is encouraged for aesthetics, function and psychosocial reasons.

**Case:** This report discusses the case of two siblings (9 and 13 years old) with typical features of ectodermal dysplasia who presented at the paediatric dental clinic, LASUTH, Nigeria

**Keywords:** Ectodermal dysplasia, Flexible denture, hereditary disorder, Prosthesis

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Received: 2-May, 2025

Revision: 15 June, 2025

Accepted: 21 June, 2025

*Citation: Omotuyole AS, Akingbehin AA, Ayebameru OE, Bowale MO. The use of flexible dentures in the management of ectodermal dysplasia: a case report of two siblings . J Paediatr Dent Res Pract 2025; 6(1):12-18*

<https://dx.doi.org/10.4314/jpdrp.v6i1.3>

## INTRODUCTION

Ectodermal dysplasia (ED) is a condition of genetic origin that affects the development and/or homeostasis of two or more ectodermal derivatives, including skin, hair, teeth, nails, and sweat glands.<sup>1,2</sup> It can also present with defects in other embryonic ectodermal organs such as the eyes, ears, adrenal and neural tissues.<sup>3</sup> Some people may even present with associated defects in tissues of mesodermal origin.<sup>4,5</sup>

Ectodermal dysplasia was first described by Thurnam in 1848;<sup>6</sup> however, it was Weech who officially named the condition "ectodermal dysplasia" in 1929.<sup>7</sup> Researchers have classified over 170 distinct variants of ectodermal dysplasia<sup>8</sup> commonly seen among Caucasians but not common among people of African descent.<sup>9</sup> In Nigeria, Familusi et al.<sup>10</sup> reported the first Ectodermal dysplasia case in 1975, subsequently followed by a number of reports.<sup>2,3,11,12,13</sup> Ogunrinde et al.<sup>12</sup> and Aliyu<sup>13</sup> reported positive history of consanguineous marriages.

Various classification schemes for ED utilize the phenotype and genotype of the patients<sup>14,15</sup> but a more recent approach proposed by Wright et al.<sup>1</sup> utilizes information from multiple domains including Online Mendelian Inheritance in Man number (OMIM #), phenotype, mode of inheritance, causal gene, and molecular pathway or structure. This new

classification approach incorporates phenotype, genetic inheritance, and molecular aetiology/pathogenesis to organize and cluster the ED variants, thereby guiding clinicians in making accurate diagnosis and improve communication with patients.<sup>1</sup>

Due to the multiorgan involvement of ectodermal dysplasia, patients often encounter a range of complex treatment challenges that necessitate a multidisciplinary approach to its management. This case report deals with the dental management of two siblings with ectodermal dysplasia in the paediatric age group, in line with the recent advances in dental rehabilitation using flexible dentures.

## CASE REPORT

A case report of two male siblings, aged 9 and 13, brought to the dental clinic by their parents on account of missing teeth, delayed eruption and abnormally shaped teeth (peg-shaped lateral incisors).

The parents revealed that both children had been seriously concerned because of their masticatory deficiency and overall facial appearance, particularly in the school environment. The parents dismissed the possibility of a consanguineous union or having any other family member with similar features as their children.



(1a)



(1b)

(1a & b) Picture of the 9-year-old patient showing the sparse hair, eyelashes and hypodontia



(2a)



(2b)

(2a & b) Picture of the 13-year-old patient showing the sparse hair, eyelashes and peg-shaped teeth

Detailed intra oral examination in the 13-year-old patient revealed mandibular and maxillary hypodontia with peg-shaped incisors and first permanent molar. Retained primary teeth present were the mandibular canines, maxillary and mandibular molars. In the 9-year-old patient, one primary molar was present in the left and right maxillary, and left mandibular regions. Also, the alveolar ridge was thin, the vertical bone height was reduced and the vestibular depth in the mandible was completely absent.

Extra-orally for both patients, the hairs on the scalp and eyelids were sparse and completely absent on the eyebrows. Their skin was dry and warm, and also wrinkled around the periorbital and perioral region. Treatment plan for both patients included the fabrication of valplast dentures (flexible) utilizing a multi-disciplinary approach among the dental team. Upper and lower alginate impressions were taken for the fabrication of working casts



(3a)



(3b)

(3a & b) Picture of the maxillary and mandibular working casts for the 13-year-old patient

Occlusal rims (in wax) were then made on the working casts, followed by a detailed record of the maxillo-mandibular relationship. The working casts

were then mounted on an articulator in centric relation, with the aid of the inter-maxillary relationship recorded on the occlusal rims



(4a)



(4b)

**(4a & b) Picture of the Bite registration for the 13-year-old patient**



(5a)



(5b)

(5a & b) Picture of the set up for maxillary and mandibular dentures for the 13-year-old patient. The tooth set-up was done and the wax form of the dentures was processed in the flask. The final prosthesis was retrieved and detailed finishing was done with vaccinate burs. The flexible partial dentures were polished until a high lustre shine was achieved by using a polishing cake. The dentures were satisfactorily inserted in the clinic. Post-

insertion instructions on how to insert the denture and adequate oral hygiene maintenance were given. Both patients were satisfied with their improved aesthetics and facial profile. Proper follow-up was done and there was no adverse impact of the denture on the soft tissue during follow-up. This could be because flexible dentures are thin, lightweight, more comfortable and adaptable to the mucosa.



(6a)



(6b)

**(6a & b) Picture of the post denture insertion for the 13-year-old patient**

### DISCUSSION

Ectodermal dysplasia is a rare genetic disorder that affects two or more tissues derived from the ectoderm. It is more prevalent in males.<sup>2, 16</sup> Female

carriers might present with abnormalities of sweat glands, teeth or hair ranging from no signs to signs of hypotrichosis, unilateral chest hypoplasia,<sup>17</sup> and

hypodontia such as missing upper lateral incisors.<sup>11, 12, 18, 19</sup>

Patients with ectodermal dysplasia could present with sparse light hair, deformed nails, dry wrinkled skin, reduced heat tolerance and teeth malformations.<sup>11, 14</sup> The teeth affectation could affect either the primary or permanent dentition,<sup>11</sup> in terms of number (oligodontia or hypodontia or anodontia)<sup>11, 20</sup> or in shape (conical or peg-shaped or tuberculoid<sup>11</sup> or in size (microdontia).<sup>21</sup> The alveolar bone also appears hypoplastic because of the missing teeth, resulting in a reduced vertical dimension of occlusion and sulcular depth. These features above were present in the reported cases.

The skin around the eyes may exhibit fine wrinkles along with hyperpigmentation, also observed is the mid-face hypoplasia which leads to prominent lips. A fairly characteristic craniofacial appearance has been observed to be common in affected individuals who also experience low self-esteem due to poor social acceptance.<sup>14, 22</sup> There could also be xerostomia causing mucosal dryness due to hypoplastic salivary glands but this is not common.<sup>11</sup> The missing or malformed teeth and the facial appearance were the major concerns for the reported patients and their parents, as observed in several studies.<sup>11, 15</sup>

Dental management of ectodermal dysplasia is multifaceted,<sup>16</sup> requiring collaboration across multiple disciplines. Due to the characteristic facial profile, it is imperative that management is tailored towards restoring a more natural facial and dental appearance, which will promote a positive psychosocial development. In this report, a collaboration involving the paediatric dentist, the prosthodontist, the oral maxillofacial surgeon and the laboratory technologist was employed in the choice of denture base material and fabrication of the prostheses.

The treatment plan for ED depends on the age of presentation, and the plan can progress from the initial use of removable dentures with clasps at a young age to orthodontic treatment, use of stainless steel crown on hypoplastic molars<sup>18</sup> in children and adolescents, and implants at an older age.<sup>15, 21</sup> As the patient advances in age, there is a corresponding growth of the maxilla and mandible, this could necessitate other treatments like denture relining, sulcus deepening, or ridge augmentation.

Some challenges experienced during management include reduced stability and retention of prosthesis due to poor jaw development and oral mucosa dryness.<sup>16</sup> It might be necessary to prescribe the use

of artificial saliva to improve oral health and increase patient's comfort while using the denture.

The rehabilitation of patients with ED using dentures could be full,<sup>11, 16, 20</sup> partial,<sup>11</sup> over dentures<sup>17</sup> or the use of implants.<sup>21</sup> The dentures can be made from cast metal or acrylic<sup>16, 20</sup> or flexible (valplast) base material.<sup>23</sup> The choice of tooth replacement is influenced by the number of missing teeth, clinician's skill, properties of the materials, cost and availability of materials, laboratory support and patient preferences.

There has been an increase in the use of thermoplastic materials like flexible dentures in comparison to the conventional cast or acrylic based denture material.<sup>23</sup> Flexible dentures, sometimes called soft dentures, are made from a special flexible resin that forms a soft base, ensuring comfort and protecting the gums from irritation while in use. The fabrication involves the use of a special flask design utilizing the injection moulding technique.<sup>24</sup> Several flexible dentures available commercially are Valplast, Impak, Duraflex, Proflex and Flexite.<sup>25</sup>

Valplast is composed of a fully polymerized base material and is free of monomer resulting in good biocompatibility and non – allergenic property.<sup>25</sup> Valplast is translucent, light in weight, strong and flexible thereby requiring no clasps. These features enhance its acceptability and comfort when in function hence its use in the fabrication of dentures for the reported cases.

Prostheses fabricated from flexible dentures base materials have shown various advantages over the traditional rigid denture base materials because they require no invasive preparation in the mouth.<sup>26</sup> They offer the potential for increased retention from the engagement of greater amounts of undercut, and are more comfortable for patients as a result of thin and lightweight base.<sup>27</sup> They are strong, flexible and resistant to fractures making them suitable for children and young adolescents.<sup>26</sup> They are also an alternative choice for patients allergic to acrylic.<sup>26</sup>

Flexible dentures are aesthetically pleasant due to its translucent and pink shade which matches with the mucosa and because no clasping is visible on tooth surfaces in comparison to a metal based partial denture made with visible metal clasps.<sup>26, 28</sup> Instead, thin finger like extensions which extend into undercuts and act as

clasps are utilized in flexible dentures.<sup>28</sup> Several studies<sup>27, 29</sup> that compared flexible and acrylic dentures showed that flexible dentures performed better in terms of aesthetics, speech, comfort during function and chewing efficiency.

A few drawbacks reported in the use of flexible dentures include cases with insufficient inter-arch space i.e., less than 4mm space, with prominent residual ridges where there is reduced space for labial placement of teeth and with flat flabby ridges with poor soft tissue support which require a more rigid prosthesis.<sup>28</sup> Also, flexible dentures are difficult to repair, relin or rebase.<sup>28</sup> Compared to acrylic dentures, it has a higher water sorption and surface roughness which increases the likelihood for discoloration and bacterial colonization.<sup>26,30</sup> The cost of production of flexible dentures are reportedly higher than the metal based or acrylic partial dentures.<sup>26</sup>

Olawale et al<sup>27</sup> reported that the elastic property of flexible denture increased its tendency to flex resulting in the loss of retentive peripheral seal during function in edentulous patients where there were no undercuts and in areas with lower ridge heights. However, several studies<sup>26, 29</sup> reported that subjects were more satisfied with the flexible dentures than the acrylic resin dentures with regards to aesthetic and functional improvement/relief.

To ensure patient cooperation and compliance with the use of the prosthesis, proper education and counselling of both patients and parents/guardians is required. Proper follow-up and maintenance of the prosthesis is also required. In these reported cases, follow-up appointments were scheduled after 1 day, 1 week, 1 month, 3 months and subsequently, regular 6 months. At the first follow-up appointment, a day after insertion, slight adjustments were made to the denture flanges in the 9-year-old patient, while the other patient had no complaint. At subsequent follow-up visits, both patients had no complaint and were comfortable with their dentures. Proper care for the dentures and the need for regular follow-up appointments were also re-emphasized.

#### CONCLUSION

Early intervention in the management of patients with ectodermal dysplasia is encouraged for aesthetics, functional and psychosocial reasons. The choice of prosthesis for missing teeth depends on clinician's skill, available materials and patient

preferences. Flexible dentures serve as a good treatment consideration in managing patients with ectodermal dysplasia.

#### Source of support

Nil

#### Conflict of interest

None declared

#### REFERENCES

1. Wright T, Fete M, Schneider H et al. Ectodermal Dysplasias: Classification and Organization by Phenotype, Genotype and Molecular Pathway. *Am J Med Genet A*. 2019; 179(3): 442–447. doi:10.1002/ajmg.a.61045.
2. Denloye OO, Dosunmu OO, Aderinokun GA, Onadeko MO. Ectodermal dysplasia with hypodontia in a set of Nigerian twins - a case report. *Afr J Med Med Sci*. 1996; 25(3):299-301. PMID: 10457810.
3. Owoeye JFA, Monsudi KF, Yusuf IA, Bamidele O. Ectodermal dysplasia with bilateral punctal agenesis in a Nigerian child: a case report. *Annals of Health Research* 2023; 9(1): 83-87. doi: 10.30442/ahr.0901-09-193
4. Achigbu K, Odinaka K, Amemilo I. Hypohidrotic Ectodermal Dysplasia: A Case Report in a Seven-Year-Old Nigerian Child. *Niger Med Pract* 2022; 81:4-6.
5. Johnson A-WBR, Abdulkarim AA, Adedoyin OT, Adegboye AO, Amole AOD. Anhidrotic ectodermal dysplasia: a case report in a Nigerian child and literature review. *Niger J Paed* 2012;39 (2):79 – 83. DOI: <http://dx.doi.org/10.4314/njpa.v39i2.9>
6. Thurnam J. Two cases in which the skin, hair and teeth were very imperfectly developed. *Proc RM Chir Soc* 1848; 31:71-82.
7. Weech AA. Hereditary ectodermal dysplasia (congenital ectodermal defect). *Am J Dis Child* 1929; 37:766-790.
8. Pinheiro M, Freire-Maia N. Ectodermal dysplasias: a clinical classification and causal review. *Am J Med Genet* 1994;53(2):153–162.
9. Ectodermal Dysplasia [https://en.wikipedia.org/wiki/Ectodermal\\_dysplasia](https://en.wikipedia.org/wiki/Ectodermal_dysplasia). Accessed 02 January 2025).
10. Familusi J, Jaiyesimi F, Ojo C AE. Hereditary anhidrotic ectodermal dysplasia: Studies in a Nigerian Family. *Arch Dis Child* 1975; 50:642-647.
11. Akeredolu PA, Olojede ACO. Prosthetic management of an 11-year-old patient with hereditary ectodermal dysplasia and partial

- anodontia – a case report. *African Journal of Oral Health* 2006; 2(1&2):37-42
12. Ogunrinde GO, Zubair RO, Ajike SO, Ige SO. Hypohidrotic (anhidrotic) ectodermal dysplasia in female twins. *Niger J Clin Pract.* 2012; 15(1):98-100. doi: 10.4103/1119-3077-94109. PMID: 22437101.
  13. Aliyu I. Living in the sub-sahara with anhidrotic ectodermal dysplasia: report of two cases. *Med J DY Patil Vidyapeeth* 2018; 11:352-4. doi: 10.4103/MJDRDYPU.MJDRDYPU\_213\_17
  14. Hekmatfar S, Jafari K, Meshki R, Badakhsh S. Dental management of Ectodermal Dysplasia: two clinical case reports. *J Dent Res Dent Clin Dent Prospect* 2012; 6(3):108-112. doi: 10.5681/joddd.2012.023
  15. Kratochvilova L, Dostalova T, Schwarz M, Macek Jr. M, Marek I, Malíková M, Misova E. Ectodermal dysplasia: important role of complex dental care in its interdisciplinary management. *Eur J Paed Dent* 2022; 23(2):140–146. DOI: 10. 23804 /ejpd. 2022.23.02.12
  16. Vázquez EU, Espinoza AS, Bori EN. Prosthodontic treatment of patients afflicted with hypohidrotic ectodermal dysplasia: report of two cases. *Revista Odontológica Mexicana* 2017; 21(1): 49-53
  17. Pae A, Kim K, Kim HS, Kwon KR. Overdenture restoration in a growing patient with hypohidrotic ectodermal dysplasia: a clinical report. *Quintessence Int.* 2011; 42: 235-238
  18. Bhakta P, Barthunia B, Nigam H, Pawar P. Ectodermal dysplasia - a rare case report. *J Family Med Prim Care.* 2019 ;8(9):3054-3056. doi: 10.4103/jfmpc.jfmpc\_625\_19. PMID: 31681695; PMCID: PMC6820434.
  19. Chappidi V, Voulligonda D, Bhogavaram B, Reddy PK. Ectodermal dysplasia: Report of two cases in a family and literature review. *J Family Med Prim Care.* 2019;8(3):1263-1265. doi: 10.4103/jfmpc.jfmpc\_48\_19. PMID: 31041288; PMCID: PMC6482801.
  20. Nejabi MB, Anwari A, Shadab H, Mtawakel N, Omarzad F, Ahmadi ME. Prosthodontic management of a patient with Ectodermal Dysplasia: case report. *Clin Cosmet Investig Dent.* 2023;15: 133-141. doi: 10.2147/CCIDE.S419939. PMID: 37576744; PMCID: PMC10416782.
  21. Kearns G, Sharma A, Perrott D, Schmidt B, Kaban L, Var-gervik K. Placement of endosseous implants in children and adolescents with hereditary ectodermal dysplasia. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1999;88:5-10.
  22. Lo Muzio L, Bucci P, Carile F, Riccitiello F, Scotti C, Coc-cia E, et al. Prosthetic rehabilitation of a child affected from anhydrotic ectodermal dysplasia: a case report. *J Contemp Dent Pract* 2005; 6:120-126.
  23. Jain N, Naitam D, Wadkar A, Nemane A, Katoch S, Dewangan A. Prosthodontic rehabilitation of hereditary ectodermal dysplasia in an 11-year-old patient with flexible denture: a case report. *Case Rep Dent.* 2012; 2012:489769. doi: 10.1155/2012/489769. Epub 2012 Dec 22. PMID: 23320200; PMCID: PMC3539337.
  24. Gaikwad S, Yeshwante B. A Case Report of flexible Denture. *IOSR Journal of Dental and Medical Sciences* 2018; 17(8):44-46. DOI: 10.9790/0853-1708134446
  25. Prafulla T, Padmaja S, Raghavendra RK. Flexible Dentures in Prosthodontics - an overview. *Indian J Dent Adv* 2013; 5(4): 1380-1385. doi: 10.5866/2013.541380.
  26. Kaira L, Dayakara H, Singh R. Flexible Denture for Partially Edentulous Arches - a case report. *Journal of Dentofacial sciences* 2012; 2: 39-42.
  27. Olawale OF, Ogunrinde TJ, Dosumu OO, Ajayi DM. The effect of ridge height on retention of acrylic and flexible dentures in patients with complete edentulous maxillary arch: A pilot study. *Ann Ibd. Pg. Med* 2022; 20(2): 151-159
  28. Singh K, Aeran H, Kumar N, Gupta N. Flexible Thermoplastic Denture Base Materials for Aesthetical Removable Partial Denture Framework. *Journal of Clinical and Diagnostic Research* 2013; 7(10): 2372-2373. DOI: 10.7860/JCDR/2013/5020.3527
  29. Akinyamoju CA, Ogunrinde TJ, Taiwo JO, Dosumu OO. Comparison of patient satisfaction with acrylic and flexible partial dentures. *Niger PG Med J.* 2017; 24:143–149
  30. Binaljadm TM. Flexible Denture: A Literature Review. *Cureus.* 2024; 16(3): e55425. doi: 10.7759/cureus.55425. PMID: 38567238; PMCID: PMC10985649.