ISSN No:-2456-2165

Prosthodontic Management of Ectodermal Dysplasia Case using Unconventional Impression Techniques and Fabricating Hollow Denture: A Case Report

Dr. Prakash Nidawani[1], Dr. Saumya Singh[2], Dr. Shiva Sai[3], Dr. Girish Galagali[4]
Professor[1], Post graduate student[2,3], HOD[4]
Department of Prosthodontics Navodaya dental college
Raichur, Karnataka,
India

Abstract:- Ectodermal dysplasia is a rare hereditary disorder associated with dysplasia of the tissues of ectodermal origin. The dental characteristics include are oligodontia, anodontia etc. which not only affects their phonetics but nutritional status as well. Among the choices for a final treatment strategy are fixed, removable, or implant-supported prosthesis, either separately or in combination. This case report describes the management of an 18-year-old girl with sporadic ectodermal dysplasia, with an interim conventional maxillary complete denture and hollow mandibular complete denture in order to provide for the patient an acceptable masticatory function, speech, and aesthetics. The case has been treated using unconventional impression techniques and same has been described in detail.

I. INTRODUCTION

Ectodermal dysplasia (ED) is a large, heterogeneous group of inherited disorders that are characterized by primary defects in the development of two or more tissues derived from the embryonic ectoderm. The Hidrotic (Clouston's syndrome) and Hypohidrotic (Christ-Siemens-Touraine syndrome) forms of ED are the two main categories. Hidrotic ectodermal dysplasia has an autosomal dominant inheritance where sweat glands are normal which are absent in Hypohidrotic ectodermal dysplasia. [1] Hair may be absent or very thin in patients with HED. After puberty, some patients see improved hair growth. The eyebrows, eyelashes, and other body hair may also be absent or sparse. Frontal bossing, a depressed nasal bridge, protruding lips, and hypotrichosis are examples of extraoral manifestations.

The dental characteristics include anodontia or hypodontia of the primary and/or permanent teeth, hypoplastic conical teeth, and underdevelopment of the alveolar ridges. [2,3] When teeth are missing, the alveolar bone in which they are typically lodged does not mature properly, causing a diminished vertical dimension and a typical aged appearance 2 Case Reports in Dentistry in the face .[4,5] The deviation from normal facial growth of HED subjects tends to lessen with age when rehabilitated with functional and prosthetic appliances .[6] Patients with ED have psychosocial issues due to the orofacial manifestations presenting at such young age therefore restoring appearance and function is more challenging keeping long term prognosis in mind. There are multiple treatment options for this condition, but the most frequent prosthetic treatment of ED in young patients is removable prosthodontics. This clinical report describes prosthetic rehabilitation using unconventional impression technique to provide better stability and retention of the prosthesis and impart hollowness in the mandibular denture.

II. CASE REPORT

An 18-year-old female patient reported with complaint of unpleasant appearance and difficulty to grind food, due to missing teeth and she desired the replacement of the missing teeth.

A. Extraoral Findings Are

- Depressed nasal bridge
- Scanty scalp hairs and eyebrows
- Not fully formed ear pinnae

B. Intraoral Findings Are: -

- Grade III mobile 18 (maxillary right third molar) present
- Thin, atrophic edentulous mandibular ridge.

ISSN No:-2456-2165

Fig. 1: Frontal View

Fig. 2: Lateral view showing depressed nasal bridge

Fig. 3: Scanty Eyebrows

Fig. 4: Malformed pinnae

Fig. 5: Grade III ,mobility with respect to 18 in maxillary arch

Fig. 6: Thin , atrophic edentulous mandibular arch

ISSN No:-2456-2165

Fig. 7: OPG

Fig. 9: Delta tray with measuring tool

Fig. 11: Tray consistency alginate loaded on delta tray for impression

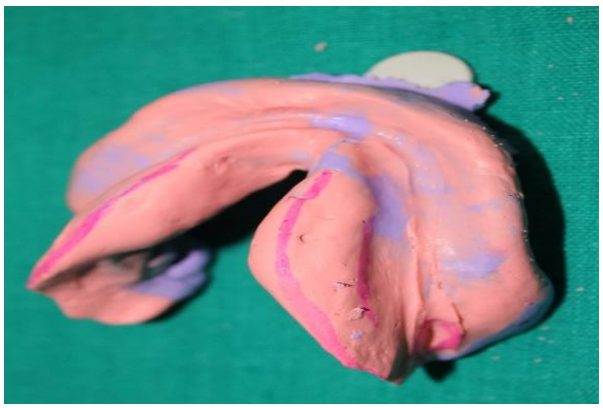

Fig. 13: Lateral throat form and retromolar pad recorded in primary impression

Fig. 8: Cavex alginate in tray and syringe consistency

Fig. 10: Syringe consistency alginate been applied to maxillary arch

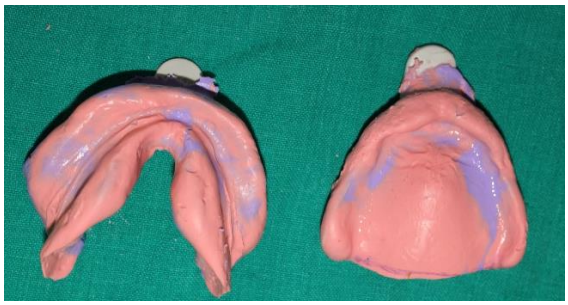

Fig. 12: Primary impression of maxillary and mandibular arch

Fig. 14: Border moulding done, recorded Sublingual crescent

Fig. 15: Seconadary impression made showing sublingual crescent

ISSN No:-2456-2165


Fig. 16: Facebow recording


Fig. 17: Facebow Transfer Hanau Wide Vu Semi Adjustable Articulator

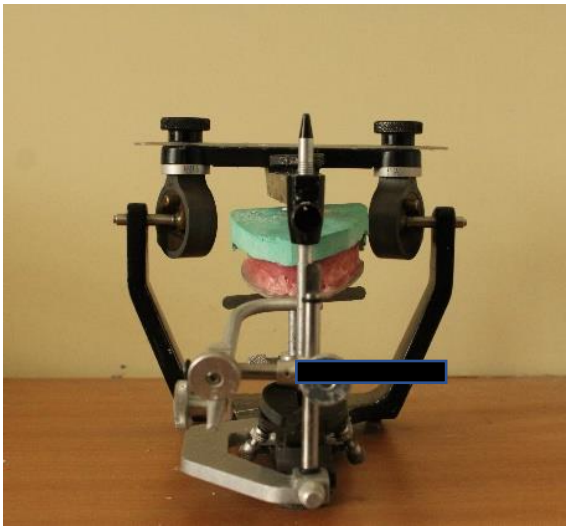
Fig. 18: Maxillary cast placed on the Hanau articulator


Fig. 19: Tryin


Fig. 20: Mandibular hollow denture – lost salt technique


Fig. 21: Post denture insertion

ISSN No:-2456-2165

Family history revealed that the symptoms were not present in her sibling or anyone in her blood related family, suggesting the occurrence sporadic in nature.

- **Investigations**: There were Hematological and Radiographic investigations prescribed, which are listed as below:

HAEMATOLOGICAL TESTS	RADIOGRAPHIC INVESTIGATION
COMPLETE BLOOD COUNT	ORTHOPANTAMOGRAPH
SERUM CALCIUM LEVELS	LATERAL CEPHALOGRAM
ALKALINE PHOSPHATASE LEVELS	PA SKULL VIEW
LIVER FUNCTION TESTS	

Table 1: List of investigations

- **Radiographic findings: -** {OPG} examination revealed periodontally compromised (Grade III }18 in maxillary arch and thin atrophic ridge in mandibular arch Lateral Ceph analysis revealed deep mentolabial sulcus indicating high mentalis activity.
- **Haematological results: -** It revealed normal haematocrit values, ranging within the physiological limits. Serum calcium levels were too in physiological limits but alkaline phosphatase levels were high {obtained 245 IU} , indicative of liver or parathyroid disorders. The final treatment plan proposed is Implant retained dentures, owing to financial constraints, interim conventional maxillary complete denture and hollow mandibular denture is planned.

III. STEPS IN TREATMENT

- The treatment started with extraction of Grade III mobile 18, post which patient was recalled after 4 weeks post extraction.
- The primary impressions are made using Alginate {mucostatic material) using delta trays.
- The primary impressions are poured using Type 2 Dental plaster and custom trays are fabricated using autopolymerising resin for border moulding and secondary impression.
- Conventional border moulding is done in maxillary arch using greenstick compound and border moulding in mandibular arch aimed to cover **sublingual crescent {butterfly impression technique}** [10] as to enhance retention and stability of the prosthesis.
- Secondary impression using zinc-oxide eugenol are made in maxillary and mandibular arch. Secondary casts are poured using Type 3 Dental stone.
- Temporary record bases {autopolymerising resins} with occlusal rims on maxillary and mandibular arch were fabricated for jaw relation.
- During jaw relation procedure, facebow transfer is done and same is transferred to Hanau wide vu semi adjustable articulator.
- Bilateral balanced occlusion is incorporated in the teeth arrangement and same is verified during try-in procedure.
- The denture is acrylized and conventional complete maxillary denture and hollow denture using lost salt technique is fabricated in mandibular arch.
- The processed denture after acrylization is trimmed and polished.
- The denture is inserted and post insertion instructions were given. Recall check-up is done after 2 days.

IV. DISCUSSION

Complete dentures and / or dental implants are typically used as the main treatments for ED patients who have total anodontia. Clinicians have initiated prosthetic treatment for ED patients at the age of 5 years stating that it ensures functional, phonational, psychologic and aesthetic rehabilitation of the child .[7] Initiating prosthodontic treatment at an early age enhances masticatory muscles tonicity, delays alveolar bone resorption associated with the absence of teeth, compensates for the decrease in vertical dimension.

- DELTA TRAYS: -The preliminary impression was made using delta trays. Delta trays are designed to follow the ridge anatomy to capture the important landmarks. To make a good impression, these trays are autoclavable at 121°C. {Edentulous Impression Tray By Xtend Trays, Vijay dental store, Chennai, India}. Choice of impression material was alginate (tray and syringe consistency) {Alginate Impression Materials by Cavex, Netherland}. It has ability to record the impression up to 5 microns with detail reproduction, high tear strength elasticity. It has pleasant odour/colour which helps to overcome biting resistance. Normal Set (210 sec.) The delta trays are specifically designed with the incorporation of masseteric notch, retromolar pad and sub mentalis knob and sublingual arc so as to record all the major anatomical landmarks in primary impression. They are available for severely resorbed ridges and normal ridges. Making impressions using delta trays aids in producing suction effective mandibular impressions.

V. UNCONVENTIONAL IMPRESSION TECHNIQUE

Establishing retention and stability in a lower complete denture with a severely resorbed ridge is still a difficult task. Incorporation of sublingual crescent technique enables to enhance the retention and stability in denture.[8] Lewis was first to report about the anterior sublingual area anatomy and utilization of sublingual crescent space for the retention of the mandibular denture. He states that the most important area for retention of the lower denture is the anterior lingual region, from cuspid to cuspid.[9] A sublingual flange extension improves the retention and stability of complete lower dentures. It provides broader tissue surface of the denture, enhancing simple adhesion and subsequently retention. According to Azzam et al., the denture is more stable during typical tongue movements once the sublingual

ISSN No:-2456-2165

crescent border has been completed, showing signs of improved resistance to dislodgment.[11]

VI. NEED FOR FABRICATING HOLLOW MANDIBULAR COMPLETE DENTURE

It is obvious that in large maxillofacial defects and in severe resorption of the edentulous ridges, there is a decreased denture bearing area for support, retention and stability. Increased inter-ridge space compounds this problem. To decrease the leverage, reduction in the weight of the prosthesis was recommended and was also found to be beneficial. [12, 13] Extreme resorption of the ridge whether maxilla or mandible will lead to a reduced denture bearing area which in turn will affect retention, stability and support for the complete denture. As the resorption process advances, the residual ridge may become narrower and more constricted, reducing the amount of supporting tissue and increasing the amount of restorative space.[14] There are studies in which it is proved that, by reducing the weight of the denture, either by making a hollow denture or by altering the plane of occlusion to some extent, preservation of the existing residual alveolar ridge is possible. An added advantage with a hollow denture is a comparable increase in retention and stability that can be achieved.[15] In this case, due to increased interridge distance hollow denture is planned in order to reduce constant overload on the mandibular ridge, to prevent further ridge resorption. Bilateral balanced occlusion is also incorporated to preserve the bone.

VII. CONCLUSION

"*PRESERVE THE RESERVE*", an old adage, implies herein too, where all efforts are made to conserve the remaining bone and enhance the mastication, aesthetics and phonetics in this case. It aims to restore the lost vertical dimension and overall boost the self-confidence of the patient. Incorporation of butterfly impression technique in rehabilitation

REFERENCES

[1.] 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 reports in dentistry. 2012 Jan 1;2012.

[2.] A. Itthagarun and N. M. King, "Ectodermal dysplasia: a review and case report," Quintessence International, vol. 28, no. 9, pp. 595–602, 1997.

[3.] M. A. Pigno, R. B. Blackman, R. J. Cronin Jr., and E. Cavazos, "Prosthodontic management of ectodermal dysplasia: a review of the literature," Journal of Prosthetic Dentistry, vol. 76, no. 5, pp. 541–545, 1996.

[4.] T. J. Vergo, "Prosthodontics for pediatric patients with congenital/developmental orofacial anomalies: a long-term follow-up," Journal of Prosthetic Dentistry, vol. 86, no. 4, pp. 342–347, 2001.

[5.] A. J. Hickey and M. Salter, "Prosthodontic and psychological factors in treating patients with congenital and craniofacial defects," Journal of Prosthetic Dentistry, vol. 95, no. 5, pp. 392– 396, 2006.

[6.] C. Dellavia, F. Catti, C. Sforza, D. G. Tommasi, and V. F. Ferrario, "Craniofacial growth in ectodermal dysplasia: an 8-year longitudinal evaluation of Italian subjects," Angle Orthodontist, vol. 80, no. 4, pp. 733–739, 2010

[7.] Guckes, A.D., M.S. Scurria, T.S. King, G.R. McCarthy and J.S. Brahim, 2002. Prospective clinical trial of dental implants in persons with ectodermal dysplasia. J. Prosthet Dent., 88: 21-25.

[8.] Gafoor MA, Kumar VV, Sheejith M, Swapna C. Recording 'sublingual crescents' in lower complete dentures: A technique so effective but still esoteric and arcane. J Contemp Dent Pract 2012; 13:222-6

[9.] Lewis ET. Repositioning of the sublingual fold for complete dentures J Prosthet Dent 1958; 8:22.

[10.] Pradeep N, Devassy JP, Sreekumar AV. Sublingual crescent extension: A solution for loose lower denture. The Saint's International Dental Journal. 2015 Jan 1;1(1):66.

[11.] Azzam MK, Yurkstas AA, Kronman J. The sublingual crescent extension and its relation to the stability and retention of mandibular complete dentures. J Prosthet Dent 1992; 67:205-10.

[12.] El Mahdy AS. Processing a hollow obturator. J Prosthet Dent 1969; 22:682-6.

[13.] Brown KE. Fabrication of a hollow bulb obturator. J Prosthet Dent 1969; 21:97-103

[14.] O'Sullivan M, Hansen N, Cronin RJ, Cagna DR. The hollow maxillary complete denture:A modified technique. J Prosthet Dent 2004;91:591-4.

[15.] Aggarwal H, Jurel SK, Singh RD, Chand P, Kumar P. Lost salt technique for severely resorbed alveolar ridges: An innovative approach. Contemporary clinical dentistry. 2012 Jul;3(3):352.