Original Article

Dental Implants And Orthodontics In Patients With Ectodermal Dysplasia: A Systemic Review

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Abstract

Ectodermal dysplasia is a hereditary disease that is associated with the involvement of organs with embryonic ectodermal structure such as teeth, nails, hair and sweat glands, lacrimal and salivary glands. The prevalence rate of this disease is 1 in every 100,000 people. The most common and severe form of ectodermal dysplasia is the X-linked hypo hidrotic type. The second common type of hidrotic ectodermal dysplasia is autosomal dominant, unlike the first type, sweat glands are not involved. Small and fragile nails, hyperkeratosis of the palms and feet, dry mouth, decreased tear production are some of the clinical symptoms of ectodermal dysplasia, which are the result of intolerance to heat. The facial features of the patient include a prominent forehead, sunken nose bridge, protruding ears, prominent lips, hypoplasia of the middle part of the face, and skin pigment around the eyes and mouth. Dental involvement is one of the most prominent features of ectodermal dysplasia, which can be seen in both primary and permanent tooth systems. Reduction in the number of teeth, delay in tooth growth, abnormal shape of anterior teeth in peg-shaped or conical form, smaller size of posterior teeth and enamel defects are observed. Alveolar ridge hypoplasia is also common due to the lack of teeth, followed by a decrease in the vertical height of the occlusion. A child with ectodermal dysplasia faces many problems in feeding, chewing, and speaking. Early treatment with dental prostheses can significantly reduce these problems.

Keywords: Dental Implants, Orthodontics, Patients, Ectodermal dysplasia.

Introduction

Oral reconstruction in ectodermal dysplasia patients is necessary to solve problems related to beauty, speaking, chewing, as well as establishing correct vertical and sagittal communication of the facial skeleton during the period of craniofacial development [1-3]. Dental involvement is one of the most prominent problems of patients with ectodermal dysplasia. These conditions, especially during childhood, can have adverse effects on the patient's mental and mental maturity, which are the most common treatment plan for movable prostheses. Implant-based dentures are also recommended in these patients, but the issues that must be considered are the need for bone grafting in alveolar

ridge atrophy, the cost and complexity of the treatment. Also, due to psychological effects, implant surgery is more dangerous than prosthetic treatments [4-6].

On the other hand, in a growing child, implants act like an ankylosed tooth and are not placed in occlusion. As a result, the side tooth deviates into the created space and the beauty are compromised. Therefore, in young patients, implants should be used with caution. Treatment with early dental prostheses is suggested from the age of 5, and based on the child's cooperation, it is even possible to use it from the age of 3-4. Ectodermal dysplasia are genetic and hereditary diseases in which defects of hair, nails, sweat glands and teeth are seen. When a person has at least two of these abnormal ectodermal features, they are known to have ectodermal dysplasia. Ectodermal dysplasia are a group of highly diverse diseases in which other parts of the body may also be affected [7-9]. During the embryonic period, the ectoderm participates in the formation of eye lenses, a part of the inner ear, fingers and toes, nerves and other parts. Therefore, in ectodermal dysplasia, these parts may also be involved. There are more than 150 types of ectodermal dysplasia. Symptoms range from mild to very severe in patients. Only in some of the rare forms, people's lives are shorter than the normal life span, and in a few of them, learning problems such as mental retardation are seen [10-13].

How are ectodermal dysplasia diagnosed?

In some cases, ectodermal dysplasia can be detected at birth. In other cases, parents and doctors may diagnose ectodermal dysplasia when the person's teeth grow abnormally. It will be possible to diagnose ectodermal dysplasia by identifying the parts of the body involved and how those parts function, grow and develop (Figure 1). Genetic tests are only available for the diagnosis of a limited number of ectodermal dysplasia [14-16].

What is the cause of ectodermal dysplasia?

All ectodermal dysplasia are genetic and hereditary diseases. This means that it is possible to transfer genes to the next generation. Although it is possible that the affected child is the first person in the family to be affected by ectodermal dysplasia. In this case, the genetic change has occurred in him anew [17].

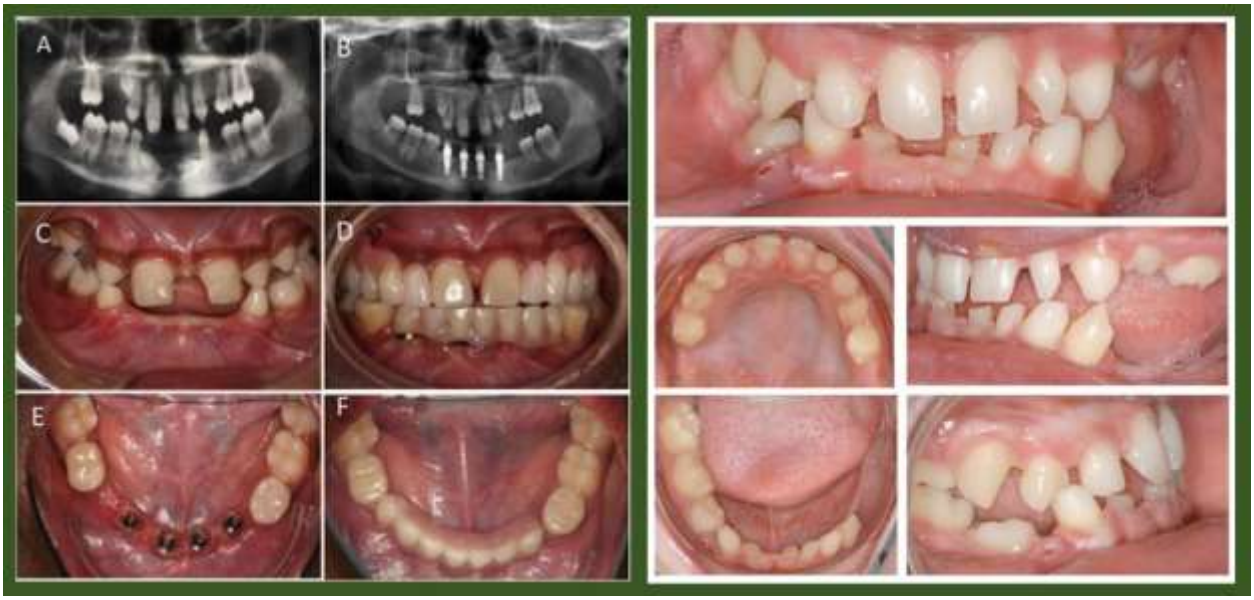

Figure 1. Rehabilitation of ectodermal dysplasia patients presenting with hypodontia: outcomes of implant rehabilitation part 1 - ScienceDirect

Search strategy and selection of articles

Search in Scopus, Google scholar, PubMed databases and by searching with keywords such as "Patients with Diabetes", "Chronic Heart Pain", "Lower Limb Bone Fractures" and “Radiology Stereotypes” to obtain articles related to the selected keywords [28-30]. Case report articles, editorials, and articles that were not published or only an introduction of them were available, as well as summaries of congresses and meetings that were in languages other than English, were ignored. Only the original research articles that evaluated the effectiveness of different drugs in the treatment of COVID-19 using standard methods were studied (figure 2) [31].

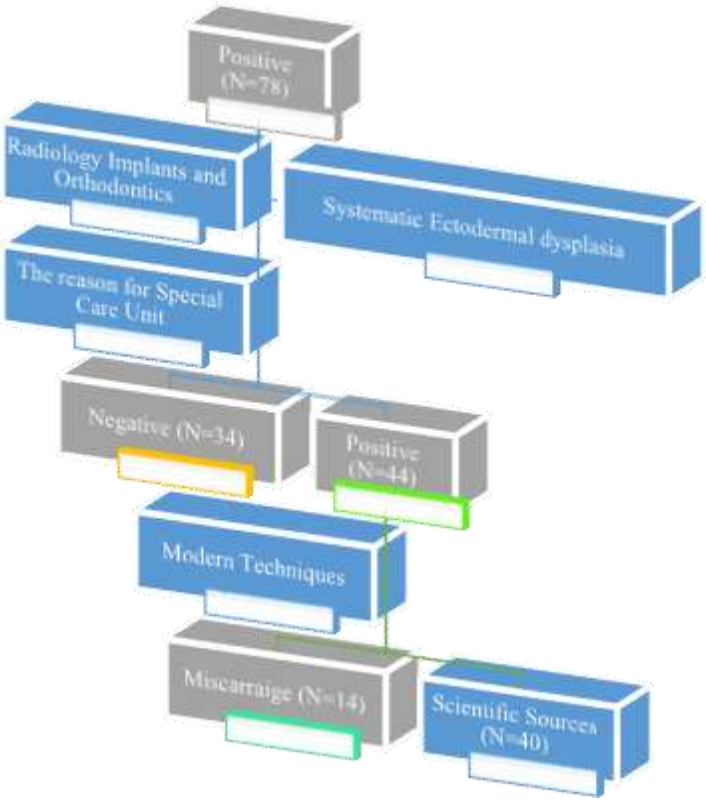

Figure 1. Flow chart of included subjects

Dental in Patients with: A Systemic Review

What is the rate of ectodermal dysplasia?

There are no accurate statistics on this matter. The most recent review, conducted in 1990, suggests an incidence rate of 7 in 10,000 births. Ectodermal osteodysplasias affect both males and females and are seen in all ethnic groups [18].

Can ectodermal dysplasia be treated?

Currently, there is no cure for ectodermal dysplasia, but there are many treatments available to alleviate the symptoms of the disease. Research to discover different genes that cause ectodermal dysplasia, the discovery of these genes enables us to prevent the birth of new cases of the disease and to find new treatment methods for current patients [19].

What are the parts derived from the embryonic ectoderm layer that are affected in ectodermal dysplasia?

Teeth: Teeth may not be formed, or may be pointed, spaced, or prone to decay due to enamel defects. Dental care of the teeth is always necessary and affected children need artificial teeth from the age of two. As the child grows, multiple dentures may be needed. For adults, dental implants are also an option. Orthodontics may also be needed.

Hair: Body and head hair may be absent, weak and scanty, or light colored. Hair may be curly or curly. Wigs can hide hair growth defects.

Nails: Fingernails and toenails may be thick, thin, abnormally shaped, abnormally colored, ingrown, weakly growing, and brittle. The nail cuticle may be susceptible to infection.
Sweat glands: Many people with ectodermal dysplasia are unable to sweat. Sweat glands may not have formed at all or may not function properly. Without natural sweating, the body is unable to regulate temperature. Therefore, overheating of the body is a major problem during the summer, for which it is necessary for the patient to have access to cool air.
Skin: Skin may be thin, pale, dry, easily prone to damage, infection, sunburn [20]. Also, the palms of the hands and feet may be thick. Skin erosion is also possible in open areas of the skin or on the back of the head, hands and feet. Therefore, bleeding, infection and damage to the skin should be avoided as much as possible. In some cases, other problems of ectodermal origin develop in other parts of the body, such as dry skin, sun sensitivity, cataracts, reduced vision, hearing problems, respiratory infections, cleft lip and palate, and missing fingers or toes [21].

Diagnosis of ectodermal dysplasia

To diagnose ectodermal dysplasia, doctors and dentists examine the structure of the ectoderm involved in the patient. They may also notice structures that are not derived from the ectoderm by observing the pattern of children's physical characteristics, they are able to establish the correct diagnosis and help families cope with this condition. Correct diagnosis is essential to determine the prognosis. Prognosis means predicting the types of problems that the child will face in the future. Many patients may have a correct clinical diagnosis. There are also cases that are not similar to the previously reported cases. That is, people receive the diagnosis of ectodermal dysplasia with an unspecified type. This situation may be frustrating for the family. Failure to reach a final diagnosis may be due to one of several reasons [22-24].
First: that some ectodermal dysplasia are unique conditions that may not have been reported before. It means that a new gene has caused the disease.
Second: In some cases, the reason for not being diagnosed is the presence of additional symptoms in the patient that are not part of ectodermal dysplasia.
Third: that everyone who has a specific type of ectodermal dysplasia may not show all the symptoms to the same degree as others [25].
Fourth: that the medical literature may be biased and only report people with severe disease, and as a result, people diagnosed with mild ectodermal dysplasia may not be easily and quickly diagnosed.

Hereditary dentin disorders

To treat this disorder, doctors recommend that the patient's family history be examined to identify other family members (Figure 3). Because dental dysplasia is inherited in an autosomal recessive dominant form, there is a 50% chance that children born to an affected parent will develop a genetic defect.

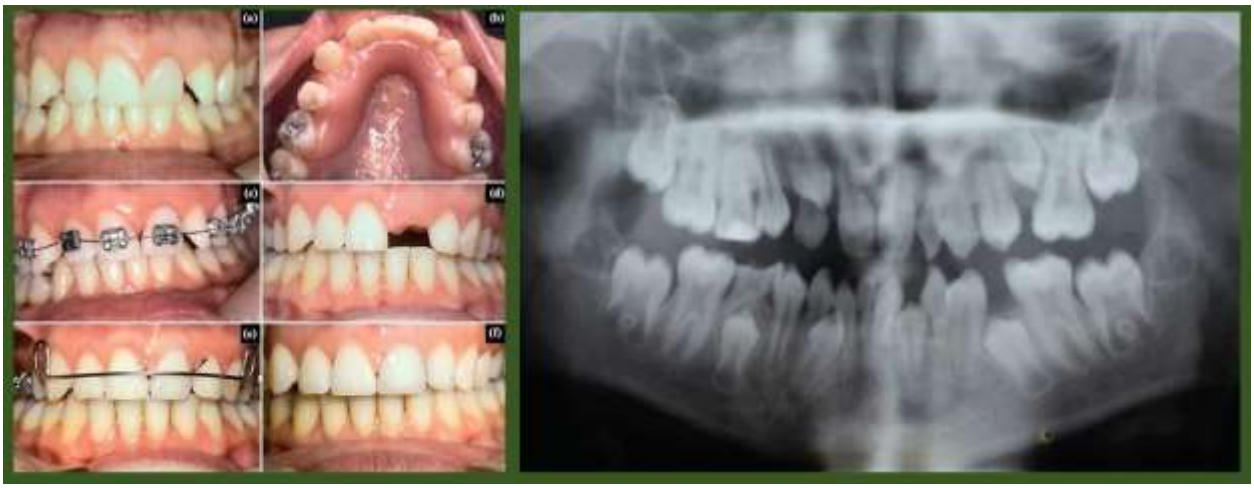

Figure 3. Orthodontics. Part 12: Combined orthodontic treatment

Developmental dysplasia

This disorder may be mistaken for developmental maladjustment, especially when the lower palate is affected. If dysplastic fibrosis affects the upper jaw, it may cause more problems. If dysplasia spreads to the ears and eyes, it can affect hearing and vision. These patients should first be monitored with radiography and bone scan and then undergo surgery. In some cases, orthognathic surgery may also be performed in these patients with the discretion of the orthodontic specialist.

Two studies in this regard:

Study 1: A 6-year-old girl with her parents referred to the faculty of dentistry of Islamic Azad University of Tehran, department of pediatric dentistry, complaining of the lack of eruption of several teeth and difficulty in chewing food. In reviewing the medical history, the child's mother mentioned intolerance to heat and crying with little tears. Family history showed that the child's grandmother had a similar problem. In the extraoral examination, dry skin, thin scalp hair, thin eyebrows and eyelashes, sunken nose bridge, hypoplasia of the middle part of the face, protrusion of the upper lip, relatively large ears and a decrease in the height of the lower third of the face were observed. Observations in the intraoral examination include the following:

- ✓ The crown of the anterior teeth is short and small and cone-shaped.
- ✓ Lack of a number of milk teeth.
- ✓ Wide distance between existing teeth [26-28].
- ✓ Overbyte increase.
- ✓ Atrophy of the maxillary alveolar ridge in edentulous areas and reduction of vestibule depth in both jaws.

Based on extraoral and intraoral findings as well as the patient's history, a diagnosis of hypo hidrotic ectodermal dysplasia was made. Radiographic findings confirmed the clinical diagnosis of the disease. Absence of the buds of ten milk teeth and seventeen permanent teeth except the third molars was seen in the panoramic view of the patient. In order to solve the problem of chewing and speaking and improving the patient's appearance, the treatment plan included upper and lower jaw overdentures. Initial molding was done with zinc oxide on a prepared tray [29-31].

Due to the small size of the crowns of the anterior teeth, there was no change to shorten them. After making a special tray with acrylic, first the molding was done with polyvinyl siloxane and then the final molding was done with elastomeric materials. Jaw relations were recorded by temporary base and rim wax, and after the teeth were arranged in another session, the patient's oral examination and occlusion adjustments were performed. After the laboratory procedures, the overdenture was handed over to the patient and explanations about oral hygiene education were provided [32-34].

3 days later and 14 days later, the patient was examined again and the problems related to overdentures were resolved. The next follow-up sessions were considered every 6 months for the possibility of needing to readjust or replace the overdenture. In the mentioned patient, after mouth reconstruction with bimaxillary overdenture, the relationship between the jaw, beauty, speaking, self-confidence of the child and also the chewing function improved to a great extent. The child was able to eat different foods such as meat, fish and vegetables. Dental prosthesis treatment steps are associated with problems. In patients with ectodermal dysplasia, due to dry mouth and lack of development of maxillary tuberosity, it is difficult to achieve proper grip and stability. On the other hand, in a growing child, due to changes in the vertical and transverse dimensions of the jaw, as well as the growth of other teeth, there is a need for frequent follow-ups to readjust or replace dentures early. In general, in the studies, the acceptance of movable prostheses by parents and patients has been done well, and it has created a better quality of life and good psychological and emotional effects [35]

Oral reconstruction in young patients with ectodermal dysplasia with full or partial removable prostheses is a non-invasive, reversible, effective and accepted method by the patient and parents and can greatly improve the child's beauty, speaking, chewing and self-confidence [36].

The second study: an 8-year-old male patient with ectodermal dysplasia without any other systemic disease and without a history of hospitalization and without taking any special medication referred to the pediatric department of Kashan Dental School [37].

None of the child's close relatives had this disease, which can be considered as a de-novo mutation. The main complaint of the patient was the lack of eruption of the front teeth of the lower jaw and the abscess of the upper posterior milk tooth and the discharge of pus. In the clinical examination, there was sparse hair, dry skin, hypotonic lip muscles, and dry mouth. Also, the wound on the corner of the lip, dry and furrowed lips could be recognized, and the patient's eyebrows were severely thin. On the other hand, in the pink and skeletal manifestations, the ears protruded and the bridge of the nose seemed sunken [38-40].

In the intraoral examination, the absence of a large number of milk and permanent teeth was evident. The relationship of canine teeth on both sides and the relationship of molars on the right side was class I. The posterior milk teeth on both sides had a crossbite. Then, a panoramic radiograph was prepared to evaluate the location and position of unerupted teeth, as well as a bitewing radiograph to detect caries and interdental bone surface [41].

According to the above evidence and the presence of the diagnostic triad, the child's disease was diagnosed as hypohidrotic ectodermal dysplasia. In addition to the absence of teeth, periapical abscess of upper right primary molar and lower left primary molar, as well as non-eruption of upper left permanent primary molar, were visible. According to the parents, the child had problems with the appearance of his mouth and refused to laugh and speak at school. Difficulty in chewing and swallowing was also reported due to lack of saliva. Due to the lack of sweat glands, the child had a problem with sweating and frequently reported heat intolerance and increased body temperature [42-44].

First, a list of the child's dental problems was prepared. In this child's treatment plan, emergency treatment of teeth with abscess and infection was done first. Due to the child's high stress and the possibility of high body temperature due to severe anxiety, the treatment was performed under oral sedation with 10 mg/5 ml hydroxyzine suspension at a dose of 1 mg/kg. The teeth D of the right upper jaw and D of the left lower jaw were extracted due to the presence of radiolucency in the furca area and generalized destruction. The upper left tooth D was treated with pulpectomy due to the presence of inflammation inside the canals and was reconstructed with a stainless-steel veneer due to the destruction of the pulp [45-47].

To reduce the child's body temperature, mobile cooling systems were used around the dental unit to prevent hyperthermia. Right lower jaw tooth D was treated with pulpectomy due to inflammation of the pulp inside the canals and was reconstructed with amalgam restorative material, and then the teeth that needed to be restored were treated. Also, fissure sealant or groove cover treatment was performed to prevent decay of three erupted permanent first molar teeth. Oral hygiene, proper brushing and flossing were taught to the child and his parents. Fluoride therapy was performed with fluoride varnish and fluoride toothpaste, demineralizing paste and xylitol gum were prescribed to reduce caries formation. In addition to its properties against Streptococcus mutants to stop decay, xylitol gum can also stimulate the flow of saliva [48].

On the other hand, to compensate for the severe lack of saliva flow and to improve the chewing and swallowing function in the child, artificial saliva was prescribed. In another part of the treatment plan for this child with ectodermal dysplasia, the child's cosmetic needs were evaluated. Due to the lack of stability of the bone dimensions until the age of 18, it was not possible to place a dental implant for him. The child's low level of oral hygiene and the presence of multiple caries and restorations placed the child in the category of high caries risk. Therefore, a removable plaque was used to cover the areas of missing teeth in the anterior part of the lower jaw so that the child could remove the plaque and clean it well.

In this plate, 4 Adams clasps were installed in the areas of E and 6 lower jaw teeth to provide maximum grip, and the edentulous area was replaced with 4 anterior acrylic teeth. In order to provide maximum beauty, colorless acrylic was placed in the buccal sulcus area so that the natural color of the child's gums and mucous membranes are visible [49].

The child was taught to remove the plaque from the mouth and clean it well with diluted chlorhexidine mouthwash before going to sleep. To provide beauty in the anterior region of the upper jaw, the teeth were reconstructed by composite veneers to restore the natural appearance of the anterior teeth. With restorative treatments for this child, his chewing improved and the child's nutrition improved according to his parents [50].

The child's weight in the follow-up session had also increased compared to before the dental treatment. The beauty treatments performed for the child increased the child's self-confidence and in the three-month, 6-month and one-year follow-ups, the child's parents reported the improvement of the child's academic performance and the improvement of his social relations in school and family. Also, the child's aggression decreased and he showed better relationships with his peers. In the follow-up visits, the mandibular removable plaque holder was adjusted regularly and fluoride therapy was given every three months due to the high risk of caries in the child [51].

Discussion

In the classification of ectodermal dysplasia, two types of this disease have been reported based on the level of sweat gland function: hidrotic and hypo hidrotic. The most common form of this disease is the x-linked hypo hidrotic type. Its prevalence is one to seven per 100,000 births. The classic diagnostic triad in this disease is lack of hair, absence or deficiency of sebaceous glands and sweat glands. Due to lack of sweat glands, heat intolerance and hyperthermia occur. Also, lack of tears and lack or absence of teeth are seen in most cases [52].

Hypodontia and multiple abnormalities in the shape of the teeth and delayed tooth eruption are found in both primary and permanent dentition systems. The teeth in the mouth of these patients are conical or wedge-shaped, and the teeth are far apart. Also, the decrease in the depth of the oral vestibule, dry mouth and cracks in the corners of the lips are common symptoms in these patients. Due to the existence of these problems, psychological complications also occur in these patients. The prevalence of oral manifestations of this disease is higher in the lower jaw than in the maxilla. Due to the lack of teeth in these patients, the alveolar bone is severely depleted and the bone ridges are often not thick enough to place dental implants, they are hypoplastic, and the vertical height of the occlusion is reduced. In this case report, the dental treatment of an 8-year-old child, who has multiple treatment needs due to ectodermal dysplasia and also the presence of numerous dental caries, is discussed. This child had sparse hair, dry skin and hypotonic lip muscles [53].

To complete the treatment in this child, cosmetic dental treatments and removable plaque for reconstruction of the dental arch and alveolar ridge were also considered in the treatment plan. Ectodermal dysplasia is a recessive x-linked hereditary disease that is associated with involvement of ectoderm-derived tissues such as hair, nails, and teeth. This disease mostly affects men. Reconstruction of dental arches in these patients is challenging. Because this disease is multifactorial and most dentists do not have enough experience in treating these patients [54-56].

In addition, treatment for children with this disease is often not possible due to lack of cooperation, as well as heat intolerance and long treatment procedures. On the other hand, any mobility rehabilitation treatment in children before puberty requires multiple sessions to follow up on the correct use of functional devices and regular control of hygiene by children and adolescents. In most of the case reports in various articles, the therapists' attitude was only to restore the dental arch, but in this study, in addition to the restoration of thought, a comprehensive treatment plan for the prevention of dental diseases and restorative treatments was carried out. Also, the point that makes this case report different is the use of oral sedation technique, with this method, the child's anxiety was overcome and dental treatments were performed with the highest quality [57].

Bergendahl treated a child who was referred for ectodermal dysplasia with agenesis of 15 teeth. During the 20-year period of treating this patient, he used several methods such as fixed and movable prostheses, dental implants and lamination. Multiple phases of treatment in the above case report were mentioned as successful and the patient was satisfied with his beauty and chewing performance during the treatment period. In the initial stages of the treatment of this case in childhood, movable prostheses were used, which is consistent with the treatment plan of the present study, but the final stages of the treatment of this case report are different from the treatment performed in the current case report. Because we were not able to perform implant treatment and bone stability was not formed in the child under our treatment [58].

Mohajerani et al used dental implant and ceramic fixed prosthesis in a case report in a 24-year-old patient with ectodermal dysplasia. Successful treatment in this case was possible due to the dimensional stability of the bone in an adult, and good cosmetic results were obtained. Also, the patient reported a significant improvement in chewing function. If there is no stabilization in bone growth, it is not possible to carry out successful implant treatment in the

long term. For this reason, in this case report, we used non-implant related methods to achieve beauty and function. The methods used in the present study rely on soft tissue and teeth, and despite being mobile, they have enough grip and stability. The use of Adams clasp for more grip has been helpful in this reconstruction [59].

de Alencar et al investigated the effects of dental arch reconstruction treatment on oral health-related quality of life in ectodermal dysplasia patients and concluded that placing upper and lower jaw dentures can provide immediate improvement in oral health-related create quality of life. This result is consistent with our case report (Figure 4). Following restorative treatments in our study, the child and his parents reported that the child's quality of life related to oral health increased and the child regained self-confidence. The need of children with ectodermal dysplasia to reconstruct the beauty and function is agreed by both studies [60].

Figure 4. Routine dental cleaning during orthodontic treatment | oral hygiene d…

In a case report, Quintanilla et al. treated a 4-year-old child with ectodermal dysplasia with a removable denture. He suffers from missing teeth, dry skin, heat intolerance and alveolar ridge atrophy. The high number of referral sessions and the low stability of removable dentures are among the problems of this report.

In this article, these problems have been solved by performing one treatment session with one molding and also by placing multiple Adams clasps. The use of clasp-based prosthesis increases retention and improves the quality of the prosthesis in relation to routine functions [61]. Alsayed et al treated a patient with ectodermal dysplasia who reported symptoms of dry skin and mouth. They used telescopic crowns to reconstruct the dental arches in this 55-year-old patient and achieved successful results in terms of attachment, stability and support in the removable prosthesis. This is despite the fact that in the current case report, due to the lack of stabilization in bone growth, it was not possible to perform prosthetic treatments to implants. Also, it was not possible to use the telescopic Kirwan in the present case report. Because fixed prosthesis treatments based on teeth in people under 18 years of age do not have favorable results and the cervical margins of veneers will be unstable [62-64].

Levy-Bercowski treated a child with ectodermal dysplasia who suffered from oligodontia, dry skin, and lack of sweating. They were looking for an easy, affordable, and effective solution, and that's why they used an instant vacuum overdenture. The main problem of this method is its temporary nature and lack of sufficient strength. This is despite the fact that in the present case report, the treatment is not temporary and can be used for years with a little adjustment and have a good function and beauty. Also, the treatments performed in the present study have good strength and high failure resistance [65-67].

In a study on a case of ectodermal dysplasia of hypo hidrotic type, Ierardo et al. used an expansion plate to treat maxillary arch stenosis in the palatal region and successfully expanded the maxillary arch. This expansion of the arch

makes it easier to carry out prosthetic treatments for dental reconstruction. This issue was not indicated in the current case report. because the maxillary arch was not narrow in the child and there was no need for expansion.

In a study, Liu et al treated a teenage girl with ectodermal dysplasia. At first, they completed orthodontic treatments, and then, when all the milk teeth fell out, they placed 6 implants in the maxilla and 6 implants in the mandible. Then they delivered the prostheses related to the above implants and with this solution they improved the function and beauty of the patient [68-70].

In another case report by Al-Nuaimi et al., prosthetic treatments were performed for a patient with ectodermal dysplasia aged 5 years. This child, who suffers from oligodontia, was treated with a spacer device with a tooth in the upper jaw and a band around the second milk molar teeth and a fixed lower jaw denture, and beauty and function returned to the child. The treatments performed in this case report are consistent with the treatments performed in our case report and can restore function and beauty [71-73].

Bhakta et al presented a case report of a 16-year-old girl with alopecia, dry skin, and absence of sebaceous glands. They also reported nail dystrophy in this patient. According to the radiographs in this patient, 16 teeth had agenesis. They stated that the key to treatment in these patients is an interactive approach between several specialists, including pediatric dentists and prosthetists, and in the final conclusion, they assessed the classification of patients with ectodermal dysplasia based on signs and symptoms as difficult because of the overlap between different cases.

The interdisciplinary treatment approach has been observed in our case report, and prosthetists and surgeons were consulted to perform the treatments, but due to the age difference between our study case and Bhakta's study case, the final treatments selected are different [74]. In a study, Torres et al investigated the treatment of a 6-year-old girl with ectodermal dysplasia. They observed conical teeth and tarodontism in this child and emphasized that methods should be used for treatment that do not interfere with the child's natural growth and development. They stated that prosthetic reconstruction treatments can restore self-confidence to the child and enhance his beauty. The treatment methods and arguments obtained in their study are in line with the present study, and both emphasize the effectiveness and usefulness of mobile therapy in pre-puberty.

In a study, Wang et al investigated bone anatomy in patients with ectodermal dysplasia and mentioned several treatment methods such as mobile and fixed prostheses as well as implants to treat these patients. They reported that the thickness and height of the zygoma in these patients is insufficient due to the presence of oligodontia, and hypoplasia of the zygoma is found in them.

In our study, hypoplasia of the zygoma and alveolar ridge analyzes were observed, which is in confirmation of Wang's study, but due to the high age of the participants in Wang's study, the treatments adopted in the two studies are different [75].

In pre-pubescent people, due to lack of stability of bone dimensions, treatment options change from fixed prostheses and implants to mobile prostheses. Clasp-based removable plate is the most cost-effective method for dental arch reconstruction. It is also appropriate in terms of providing adequate hygiene.

1	Hosseini et al.	2008					0.56	[0.11 – 0.66]	1.55
2	Ibrahim et al.	2020					0.26	[0.15 – 0.48]	4.33
3	Kalantari et al.	2020					0.48	[0.19 – 0.55]	6.77
4	Rothan et al.	2020					0.24	[0.17 – 0.29]	3.03
Heterogeneity t^2=0.05, I^2= 0.07, H^2=0.78							0.22	[0.03 – 0.32]	
Test of Θ= Θ, Q (4) =3.01, P= 0.11									
1	Michler et al.	2021					0.77	[0.39 – 1.06]	3.11
2	Chiusano et al.	2020					0.65	[0.54 – 1.02]	6.05
3	Delin et al.	2020					0.73	[0.63 – 1.01]	4.06
4	Gadlage et al.	2010					0.41	[0.25 – 1.08]	7.03
Heterogeneity t^2=0.12, I^2= 0.01, H^2=0.99							0.48	[0.22 – 1.07]	6.03
Test of Θ= Θ, Q (4) =1.45, P= 0.14									

Figure 4. Forest plot showed Dental Implants in Patients with Ectodermal dysplasia: A Systemic Review

Raw	Study	Year	Severe COVID-19		non- Severe COVID-19			Proportion Wight 98%		Weight %
			Yes	No	Yes	No				
1	Wang et al.	2021						0.85	[0.39 – 1.02]	6.02
2	Kragholm et al.	2021						0.83	[0.42 – 1.01]	5.92
3	Papadopoulos et al	2021						0.74	[0.55 – 1.02]	5.65
4	Team	2020						0.91	[0.48 – 1.08]	6.03
Heterogeneity t^2=0.00, I^2= 0.00, H^2=1.00								0.98	[0.20 – 1.08]	
Test of Θ= Θ, Q (4) =3.99, P= 0.66										
1	Hafeez et al.	2020						0.68	[0.52 – 1.06]	6.02
2	Wang et al.	2020						0.74	[0.31 – 1.08]	5.92
3	Guan et al	2020						0.89	[0.19 – 1.01]	5.65
4	Zhang et al	2020						0.90	[0.29 – 1.02]	6.03
Heterogeneity t^2=0.00, I^2= 0.00, H^2=1.00								0.98	[0.20 – 1.06]	
Test of Θ= Θ, Q (4) =4.44, P= 0.71										

Figure 5. Forest plot showed Orthodontics in Patients with Ectodermal dysplasia: A Systemic Review

Conclusion

Orthodontic treatment can be performed in affected patients with full precision. Because patients with short roots need special planning. These plans include the use of orthodontic forces that try not to shorten the short roots. In this way, orthodontic treatment will improve aesthetics and function for the patient, but before starting the treatment, these risks must be clearly explained to the patient and his family. Today, the clinical results show a successful treatment for dental dysplasia, and the proposed goals have been carried out with regard to follow-up. Dysplasia is an abnormal condition in cells that leads to tissue enlargement or the creation of precancerous cells. Developmental dysplasia is common in children, but in adults it is usually associated with an increase in abnormal cell growth. Different types of dysplasia disease have their own specific complications and risks, and its identification is considered a key step towards its treatment. Avoiding risk factors can also help prevent certain types of dysplasia. Dysplasia can occur anywhere in the body and can be accompanied by other abnormalities. Although there are hundreds of different types

of dysplasia, dental dysplasia is said to be a type of abnormality that is genetic and congenital in people. This abnormality affects the teeth and is a lesion that you will see in the mouth. Another name for dental dysplasia is rootless tooth. Dental dysplasia is generally seen in upper front teeth. In some cases, the patient goes to the doctor for orthodontic treatment and then it is observed that the person has dysplasia. In this case, the orthodontist diagnoses the problems and abnormalities by examining the condition of the patient's mouth and teeth and taking radiographs and takes treatment. If the problem can be solved by orthodontics, fixed orthodontics or mobile orthodontics will be treated, and otherwise, a referral will be made to a dentist. Since dysplasia is a type of congenital and hereditary abnormality, always pay attention to this matter so that if you see symptoms, you can take preventive treatments.

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