Case Report

PROSTHODONTIC REHABILITATION OF NON SYNDROMIC TOOTH AGENESIS

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ABSTRACT

Congenital Tooth Agenesis or Hypodontia is one of the most common developmental anomaly of the human dentition, presents itself with one or more missing teeth. It is a polygenetic disorder that can occur either in isolation or as a co-finding in many syndromes. The Clinical features, diagnostic characteristics and management strategies all depend on the severity of the condition, presence or absence of associated syndromes and available resources. However, a multidisciplinary team approach and early young age assessment can be the key to success in these complicated scenarios. This report states the esthetic and functional rehabilitation of a non syndromic hypodontia patient utilizing a conventional fixed partial denture prosthesis.

Keywords:
Tooth Agenesis, Hypodontia, Prosthodontic Rehabilitation.

INTRODUCTION:

Tooth Agenesis is the congenital absence of one or more of the normal complement of teeth [1] and is one of the most frequent alterations of the human dentition. Although, Tooth Agenesis does not represent a serious public health problem, it may cause both speech and masticatory dysfunction as well as aesthetic and functional problems [2].

Tooth Agenesis has been classified in Literature as Hypodontia (2-6 Teeth Missing), Oligodontia (>6 Teeth Missing) and Anodontia (all Teeth Missing) [3]. It can occur as an isolated finding which can be sporadic or familial or could be part of a syndrome. Single dominant, recessive and X-linked genes have been isolated in familial hypodontia, though expressivity and penetrance may vary depending upon dentition, gender, demographic and geographic profiles[3].

The genetic control of dental development can be divided in two pathways; specification of type, size & position of each dental organ and specific process for formation of enamel & dentin [4]. Different studies on human genetics identify genes like *MSX1, PAX9, AXIN2* and *FGFR1* but these conditions may represent a more complex multifactorial trait, influenced by a combination of gene function, environmental interaction and time of development of dental components[3].

Pawlowska E detected 11-nucleotide deletion that might interfere with the splicing and hence decresed expression of MSX1 [6]. Uptill now, 11 distinct disease causing mutations have been identified in *PAX9, w*hereas MSX1 show 5 distinct mutations associated with tooth agenesis[7,8,9].

It can also occur in association with craniofacial anomalies and other developmental syndromes like Ectodermal Dysplasia, Reiger's Syndrome, Down's syndrome and Cleft Lip/ Palate [10,11] , where genes like Eda, Edar, Edaradd, Irf6, Nemo, p63, Pitx2 and Shh have been identified as the affected genes[12].

Tooth Agenesis occurs in up to 1.5 % -3 % of the population [13]. Tooth Agenesis and its associated syndromes are more prevalent in females than males by a ratio of 3:2 [14]. The permanent dentition usually present with a distinct pattern of agenesis involving the last teeth of a dentition group to develop (Incisor 2, Premolar 2, Molar 3) [3].

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These Tooth Agenesis subjects present with a characteristic clinical picture depending upon the nature and severity of the disease condition as well presence or absence of any other syndromic predispositions [13]. These subjects usually present with shorter anterior and overall cranial base length, retrognathic jaws and counterclockwise-rotated occlusal plane [15]. They have reduced alveolar bone formation in the affected edentulous areas. These subjects they usually have reduced values of Oral Stereognostic and Oral Motor Abilities [16,17].

Different treatment options available to these affected individuals include Osseointegrated Implants, Fixed and/or Removable Prostheses with or without orthodontic management to align the teeth and to close the abnormal tooth spaces. Genetic engineering can be a new target in tooth loss therapy [18].

However, these subjects require a multi disciplinary team approach for their successful rehabilitation. This require a detailed treatment planning, patient's and family counseling and regular follow ups to provide a stable and effective functional and psychological rehabilitation which will ultimately improve the subject's quality of life [14].

This report explains the clinical prosthodontic management of non syndromic hypodontia with Conventional Fixed prosthesis.

CASE REPORT:

A Thirty two years old female school teacher visited our dental practice with the chief complaints of absence of one front tooth along with a malformed crooked tooth on the other side of the arch. She also complained for extra long prominent central teeth.

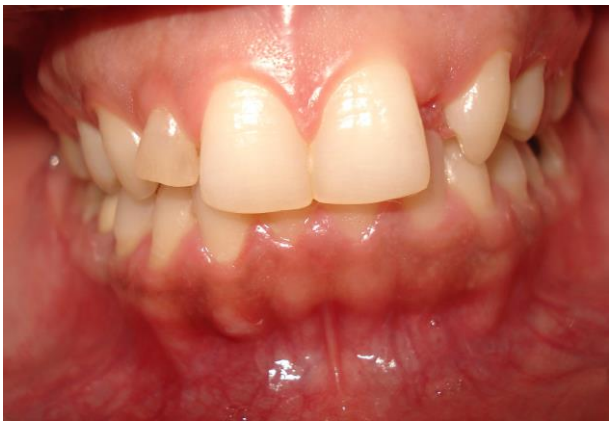

Fig 1: Pre operative Intra oral view.

There were no other significant associated medical and dental problems and her main requirement was the improvement of esthetics of these front teeth. There was no associated family history of this condition.

On extra oral examination, associated ectodermal appendages like skin, hair, nails were found to be normal with no signs of dysplasias.

On intra oral examination, there was absence of maxillary lateral incisors bilaterally along with retained discolored deciduous right lateral incisor. Both the central incisors were prominent with excessive overbite giving a Bugs bunny appearance. Both the maxillary canines were also malformed, rotated and slightly smaller in size with spaces on distal proximal side. The edentulous space of the left lateral incisor was narrowed due to mesial displacement of the left maxillary canine. Oral hygiene was found to be adequate. She had a Class II amalgam restoration on tooth 36 and a Crown on endodontically treated tooth 45 which were done many years ago.

Radigraphic presentation revealed impacted bilateral maxillary third molars with partially impacted mandibular third molars. Except for the Maxillary Lateral Incisors, No other permanent teeth were found to be absent.

Tooth 52 shows periapical radiolucent area and root resorption as well Impressions were made for cast analysis and diagnostic articulations.

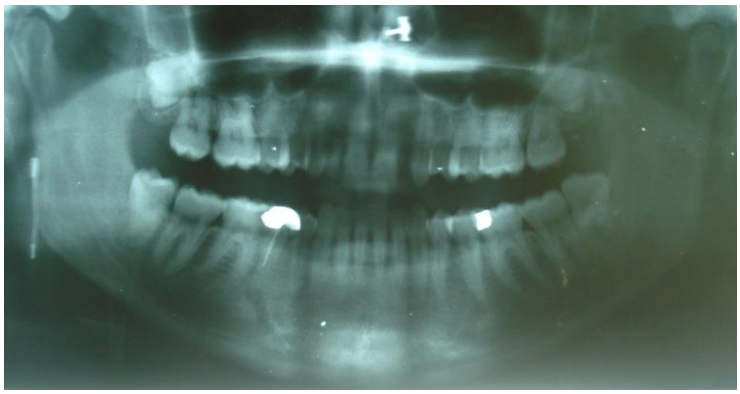

Fig 2: Radiographic View

Different treatment options like orthodontic space management, Osseointegrated implant supported prosthesis and conventional fixed prosthesis using a variety of materials were considered. After a thorough evaluation and discussion with patient, a conventional three units fixed-fixed all-ceramic prosthesis was planned to restore both sides of the arch. After the routine prosthodontic protocols for all ceramic fixed partial dentures, final prosthesis was fabricated with VITA In-Ceram® ALUMINA (Al_2O_3), Tried In and then cemented in the patients mouth. The patient was then explained with thorough post insertion care of the prosthesis. This patient was followed up after 24 hours and then after two weeks. She was comfortable and enthusiastic with her new smile and appearance.

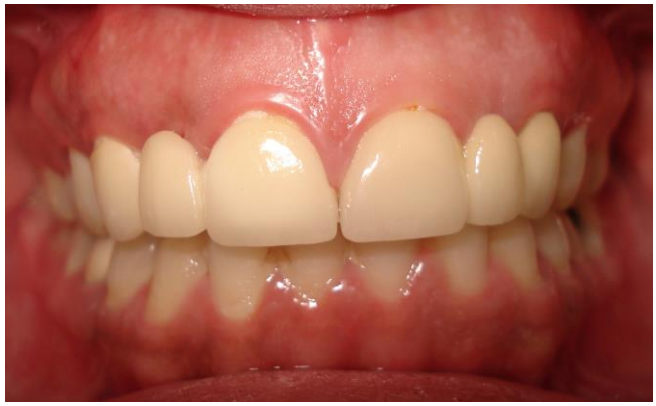

Fig 3: Post Operative Intra oral View with Prosthesis in place.

Fig 4: Pre and Post Operative Extra Oral Views.

DISCUSSION:

Tooth Agenesis, not a life threatening condition, can pose great impact on the physical, intellectual and psychological maturation of the patient. It affects the normal living pattern not only of the patient but also of the family.

Importance should be given to thorough evaluation, family counselling and proper management as these patients may become dental cripples. Sympathetic attitude and reassurance can help these patients to cope with their abnormal functions and appearance and encourage them to comply with their normal social requirements. Crucial to successful outcomes for these young patients is good communication both between professionals including paediatric dentists, orthodontists and prosthodontists in an interdisciplinary team, and also with patient and their parents. Individuals with congenital craniofacial anomalies report greater dissatisfaction with their facial appearance and lower self-esteem and quality of life [19]. Quality of life in this present context depends both on the inherent severity of a genetic disorder and also social resources available for a person to cope with that abnormality [20].

Aims and objective of the treatment modalities are improvement of aesthetics, phonetics, function and mastication, which improve the tone of facial and masticatory muscles to compensate for the reduced vertical dimensions. Joint orthodontic /restorative diagnostic clinics provide the ideal basis for successful treatment and should be considered the most appropriate mechanism for providing patients with high quality care [21].

Because early intervention and sustained treatment are required if a patient with hypodontia is to receive optimal dental treatment, the costs incurred by these families are a considerable financial burden and play a vital role in planning the treatment design [22].

Early consideration of the likely final restoration and the maintenance of the appearance and function are areas of primary concern in the management of hypodontia. Necessary restorative treatment will reflect the decision to accept, close or redistribute spacing resulting from the absence of the teeth [23].

It is important to realize that the treatment aims should be realistic without overly burdening the patient with excessively protracted treatment time fraught with iatrogenic complications. Adjunctive orthodontic treatments are best known when thorough communication and cooperation work out between different disciplines of dentistry [24].

Young people with hypodontia need early referral to a hypodontia team for optimal management. Specialist paediatric dental care is essential to ensure retention of the reduced number of teeth. Optimization of the spaces orthodontically combined with composite additions, resin retained bridges, veneers, onlays and tooth transplants contribute to an improvement in aesthetics and functions [25].

The search of the literature disclosed the complexity of the oligodontia issue, in that oligodontia is referred both as a symptom and as an individual trait. Bibliographic evidences suggest that the solitary congenital absence of more than six permanent teeth is a rare finding; however, its weak prevalence percentage is incremented in syndromic cases. Whenever encountered, hypodontia presents a challenge to the prosthodontist, as it requires an early scheduled, yet long term oriented treatment plan [26].

The treatment approach can be facilitated by codifying the cases into three groups according to their background and requirements. Firstly, cases in which the lack of teeth is the only abnormal manifestation; Secondly, cases where oligodontia is clearly part of a syndrome but comprises the main symptoms requiring treatment, all other manifestations being under control. Most Ectodermal dysplasias fall in this category, as by early childhood, symptoms like hypohidrosis are effectively faced. A third group could accommodate the more severely handicapped cases, in which oligodontia coexists with impairments such as mental retardation or general growth failure. These present more complicated clinical situations, varying according to the special

characteristics of the syndrome. In the first two groups, the prosthodontic restoration constitutes the back bone of the therapeutic design, all other interventions being built around it. But for third group cases, the Prosthodontic rehabilitation may have to be modified and perhaps postponed in order to cope with other therapies. The best example in this regard can be of non- syndromic cleft cases with accompanied hypodontia [27].

Different treatment options include cuspid lateralization, implant placement, conventional three unit bridge, Maryland bridge and direct or indirect fibre re-inforced composites bridges which provide a minimally invasive restortive option that allows for future implant placement. Selection of appropriate fibre reinforcement and placement of the fibers allows long term clinical success. Adherence to appropriate adhesive protocol is mandatory [28].

Prosthodontic management of oligodontia patients is important for functional , esthetic and psychologic reasons. Teeth replacement permits establishment of bilateral centric stops and a normal vertical dimension of occlusion and support for oro facial soft tissues.

Osseointegrated implants are documented to be helpful in the oral rehabilitation of hypodontia and anodontia patients. Lack of sufficient bone for reliable implant placement that can result from local to general decrease of growth stimuli of the jaw bone because of the absence of a number of teeth might prove a problem. Such bone defects can be rectified by augmentation procedures. Management of these patients demand several surgical interventions which increases morbidity risks. However, Data regarding treatment experience, patient satisfaction and functional improvement were also lacking [29].

This patient in particular was not convinced for Orthodontic Space Management. One reason was longer duration and the other was concerns about longer prominent central incisors along with smaller sized maxillary cuspids. The patient after detailed discussion was also not interested in osseointegrated implants. After mutual discussion, a conventional three unit FPD was planned. The Vita Alumina was selected as the treatment of choice because Aluminium oxide has graeter translucency of 72% in comparison with 48% of zirconium oxide. The Light refraction index of 1.8 of Alumina instead of 2.2 with zirconium oxide comes much closer to natural teeth [30].

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He is a friend who brings to your attention your faults and to sing praises of a person in his presence is similar to slaughtering him.

Hazrat Umar
(Razi Allah Tala Anho)