

# Comprehensive Orthodontic and Prosthodontic Rehabilitation of Hypodontia: A Case Report of Interdisciplinary Approach

Sudipa Meyur<sup>1</sup>, Asish Kumar Barui<sup>2</sup>, Rup Kumar Das<sup>3</sup>, Sugata Mukherjee<sup>4</sup>

## ABSTRACT

**Introduction:** Aesthetically compromised smile due to hypodontia needs correction to enhance individual's facial appearance. Not only cosmetic but also functional improvement after dental rehabilitation will boost up one's confidence and positively influence quality of life.

**Case Report:** The case report delineates combined ortho-prostho approach during treatment of a 17-year-old female patient with congenitally missing maxillary lateral and mandibular central incisors, collapsed anterior arches and spacing. The treatment started with orthodontic correction for space creation and distribution, followed by prosthetic management with all ceramic fixed dental prosthesis for upper anterior arch and porcelain laminate veneers for lower anterior teeth.

**Conclusion:** The step by step interdisciplinary approach, which is the principal factor for treating hypodontia in an ideal way among many options, gives the patient optimum esthetic and functional satisfaction.

**Keywords:** Hypodontia, Interdisciplinary, Porcelain Laminate Veneers

The report demonstrates the outline of the treatment procedure of a female patient with missing upper lateral incisors and lower central incisors undergoing orthodontic treatment, later on prosthetic management for dental rehabilitation. The factors governing the need for orthodontic treatment depend on position of missing and adjacent teeth, amount of space, amount of overjet and overbite, tooth morphology, type of malocclusion, facial pattern etc. It will act as an aid to prosthetic correction using all ceramic bridgework in upper anterior region and porcelain veneering in lower incisors to achieve stable and functional occlusion as well as cosmetic dental masking of absent teeth.

## CASE REPORT

A 17 years old female patient reported to Dr. R Ahmed dental college and hospital with the chief complaint of unpleasant smile revealing spacing in between front teeth.

On examination, it was found that the patient had permanent dentition without any over-retained deciduous teeth, normal lip length, class I molar relation on both side, normal facial form and facial height, concave facial profile, generalized anterior spacing due to missing upper bilateral lateral incisors and lower both central incisors leading to collapsed anterior arches (fig.1). Any syndrome or systemic disorder associated with hypodontia was not reported.

**Treatment objectives-** Reduction of space and keeping proportionate and adequate spaces for restoring the missing teeth with prosthesis, proper axial alignment and leveling of teeth maintaining proper class I molar and canine relationship and adequate overjet and overbite, restoring lip fullness, achieving stable and functional occlusion, lastly

## INTRODUCTION

Hypodontia (congenital absence of <6 teeth) is very common occurrence and is considered one of the most frequent dental anomalies<sup>1</sup>. The highest probability of missing teeth among permanent dentition is the upper lateral incisors followed by the mandibular second premolars and mandibular central incisors<sup>2</sup> apart from third molars. The etiology of hypodontia (unilateral or bilateral) can be associated with syndromes or non-syndrome e.g. disturbance due to trauma, infection during preliminary stages of tooth development.<sup>3</sup>

Unfavorable facial appearance specially during smile due to hypodontia has negative impact on social, psychological, functional aspects of life<sup>4</sup>. It not only lowers the self-esteem during communication but also compromises masticatory ability creates complications leading to dental malocclusion (e.g. rotation, spacing etc.) and skeletal malocclusion (e.g. class II div II condition, class III appearance due to hypoplastic maxilla etc.), inappropriate pronunciation.<sup>5</sup> This esthetically and functionally challenging situation arouses dilemma of most advantageous treatment plan among multiple treatment choices like single or multiple restoration to extensive orthodontic management or complex surgery. But ideally the most conservative, less time consuming, cost-effective option for treatment involving interdisciplinary team of orthodontists, prosthodontists will satisfy the requirements of optimal outcome in modification of functional esthetics.

<sup>1</sup>Post Graduate Student, Department of Orthodontics and Dentofacial Orthopedics, Dr. R Ahmed Dental College and Hospital,

<sup>2</sup>Post Graduate Student, Department of Prosthodontics and Crown and Bridge, Dr. R Ahmed Dental College and Hospital, <sup>3</sup>Professor, Department of Orthodontics and Dentofacial Orthopedics, Dr. R Ahmed Dental College and Hospital, <sup>4</sup>Professor and Head of the Department, Department of Prosthodontics and Crown and Bridge, Dr. R Ahmed Dental College and Hospital, India

**Corresponding author:** Dr. Sudipa Meyur, Post Graduate Student, Department of Orthodontics and Dentofacial Orthopedics, Dr. R Ahmed Dental College and Hospital, India

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**Figure-1:** A 17-year-old female with class I molar relationship on both side with anterior spacing in maxillary and mandibular arch, missing both upper lateral and lower central incisors



**Figure-2:** Mid ortho- treatment photograph showing proportionate space creation for later prosthesis



**Figure-3:** After crown preparation for all ceramic fixed dental prosthesis for upper anterior arch and porcelain laminate veneers for lower anterior teeth.



**Figure-4:** A patient after complete orthodontic and prosthodontic treatment showing, well-aligned maxillary and mandibular arches with adequate overjet and overbite and improvement of smile.

beautiful smile

**Treatment progress** - Orthodontic treatment started with Pre-adjusted Edgewise appliance with .022 inch by .028 inch MBT bracket bonding in upper and lower arches and molars were banded. Initial alignment and leveling was done with .016 NiTi wire in upper and lower arch, then sequentially arch wires were changed upto .019 x .025" stainless steel arch wire. Open coil springs were used in between maxillary central incisors and canine in both sides to create proportionate space (fig.2).

After achieving orthodontic goals, debonding of brackets and bands were done and prosthetic treatment was started immediately to avoid unwanted relapse. (fig.3)

As the patient did not want any removable prosthesis as well as surgical procedure for implant placement, a three unit zirconia bridge (A2 shade-vita classic shade guide) was considered esthetically and functionally to rehabilitate missing maxillary lateral incisors on both sides. Spacing (less than 1.5 mm) between two mandibular central incisors was managed by porcelain laminate veneers.

**Treatment results**- After 11 months long orthodontic treatment, well aligned and leveled arches, normal overbite and overjet, proportionate space for prosthesis were achieved with class I molar and canine relation. After prosthetic rehabilitation, lateral incisors in both sides appeared to be in golden proportion with central incisors and so were canines. Both the arches were symmetrical.

After complete orthodontic and prosthetic correction patient appeared with improved smile and facial profile.

(fig.4) No periodontal problem has been reported yet during follow up for more than 6 months. Apart from esthetics functional aspects of treatment outcome were also satisfying.

## DISCUSSION

Hypodontia due to congenitally missing permanent maxillary lateral incisors and mandibular central incisors is not so uncommon phenomenon but the complexity lies in choosing most feasible treatment plan among many options. If early diagnosis can be done, primary predecessors (if present) should be prevented from early loss or if it is inevitable space maintenance or timely extraction should be done judiciously. But definitive treatment can be performed mostly after eruption of all permanent teeth <sup>6</sup>. Presence of dominant malocclusion symptoms like midline shifting, generalized spacing, collapsed arches, rotation of adjacent teeth, altered skeletal relation, reduced chewing efficiency can lead to treatment dilemma of choices between opening space for prosthetic rehabilitation of congenitally missing teeth and space closure with canine substitution for upper lateral incisors omitting further prosthetic treatment <sup>7</sup>. But interdisciplinary approach, to gain occlusion equilibrium and satisfactory functional esthetics, optimizes the outcome of comprehensive oral rehabilitation depending on different factors like –number and position of missing teeth, condition of the primary predecessors, overall alignment and occlusion, overjet and overbite, post treatment maintenance and most

importantly patient's preference <sup>8</sup>.

Prosthetic treatment alternatives include removable partial dentures, conventional metal-ceramic or all ceramic fixed bridges, resin bonded bridges (recently fibre-reinforced composite resin bridges are often used), porcelain or composite veneers, single tooth implant, autotransplantation <sup>8</sup>. But from economic and technical considerations all ceramic fixed prosthesis in upper anterior region and porcelain veneers in lower central incisors were preferred for this case, that also helped in preventing post orthodontic relapse

In this case, etiology of hypodontia was undetermined and the patient had normal physiological status. After complete ortho-prostho management, when a balanced smile<sup>9</sup> (posed smile) was produced it was very satisfactory, as patient's chief concern was unpleasing and unattractive smile. Following are the features of corrected smile-

- There is **optimal lip line** as upper lip is reaching gingival margin displaying full cervico-incisal length of crown along with interproximal gingiva during smile (patient's lip length and tonicity were normal prior treatment)
- **Consonant smile arc** is there as curvature of upper incisor edges coinciding to the lower border of lip during smile
- **Lateral negative space** is adequate as proper buccal corridor between posterior teeth and corner of the mouth is present during smile.
- **Symmetrical smile** without any canting of frontal occlusal plane
- **Dental components** –size of the teeth (proper crown height and width ratio, incisors and canines following "golden proportion"), shape (crowns with normal anatomical features), color (matching value, hue, chroma of the prosthesis with other natural teeth present in the mouth as close as possible), crown height, crown angulation, root position (more parallel the roots more post orthodontic retention, ease in prosthesis placement), alignment and leveling of all teeth were optimally scrutinized.
- **Arch coordination** with symmetrical proper arch form, facial midline coinciding with dental midline without any deviation
- **Gingival display** during smile is one of the crucial factors for esthetic smile. Any abnormality in color, contour, texture, height of the gingiva (level of gingival margins of central incisors are at the same level of the canines and higher than the lateral incisors) is not detected.

Apart from these, patient's facial height, facial profile (straight profile after treatment), soft tissue balance were also analyzed from radiographs to detect any disharmony.

Functional improvement has been achieved by proper class I molar relation, canine guided occlusion and also better chewing and cutting efficiency with restored teeth. During



follow up no periodontal problem was reported as patient followed the instructions for maintenance very well and that is very important key for success in any ortho-prostho interdisciplinary case.

## CONCLUSION

For treating any adult hypodontic patient, a well co-ordinated orthodontic, prosthodontic and periodontal treatment approach with careful concern towards patient's expectations can give successful outcome and optimum patient satisfaction, overcoming all complications and increasing quality of dental treatment prognosis.

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