

**CASE REPORT*****Prosthetic Rehabilitation Of Missing Anterior Teeth With Smile Design: A Case Report.***Medha Upadhyay<sup>1</sup>, Vinay Rana<sup>1</sup>, Ravi Madan<sup>2</sup>, Lakshay Tuteja<sup>1</sup>**Abstract**

*Prosthodontic rehabilitation not only encompasses reconstruction of form and function but also aesthetics. A beautiful, confident smile is one of a person's greatest beauty assets, and with increasing concern over aesthetic issues in anterior teeth, achieving an attractive smile has become a common desire.<sup>1,2</sup> Smile, a person's ability to express a range of emotions with the structure and movement of the teeth and lips, can often determine how well a person can function in society. Improving smile aesthetics through dental treatments can significantly boost a person's self-esteem and overall quality of life. In treating aesthetic issues, it is important to adopt a holistic approach to patient care. This involves recognizing the interconnections between all supporting oral components, such as muscles, bones, joints, gingival tissues, and occlusion, to achieve a healthy, functional, and successful outcome. Key features of smile to help achieve optimal results in aesthetic oral rehabilitation are based on four criteria: (1) smile type (high, average, low), (2) the parallelism of the maxillary incisal curve with the lower lip, (3) the position of the incisal curve in relation to the lower lip and (4) the number of teeth visible in a smile.<sup>1</sup> To plan a proper aesthetic rehabilitation, it is necessary to meet the expectations of patients at the end of the treatment. This case report discusses smile reconstruction of missing maxillary right as well as left lateral incisors with deep bite of maxillary central incisors.*

**Case Report**

A 56 years old male patient reported to the Department of Prosthodontics and Crown & Bridge, Kothiwal Dental College and Research Centre, Moradabad, with a chief complaint of unpleasant appearance due to missing anterior teeth. A thorough examination and investigation were done to evaluate the clinical situation of the patient. On intraoral examination of maxillary arch both the lateral incisors i.e. 12 and 22 were missing and fractured occluso-palatal cusp irt 25 was seen. The central incisors were supraerupted, which impinged the lower lip on smiling. The patient had a low smile line. In mandibular arch 36, 45, 46 and 47 was missing. Both maxillary central incisors were present in a deep bite relation, covering the whole of the cervico-incisal length of mandibular incisors. Clinical examination revealed no mobility or tenderness on percussion, irt 11, 13, 21 and 23. Radiographic evaluation revealed no pathology in respect to maxillary anteriors. Following a comprehensive examination, the treatment plan was formulated considering the patient's aesthetic needs as well as his socioeconomic status. The implant was opted out due to the financial constraints of the patient.

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Fig 1: Preoperative extraoral view

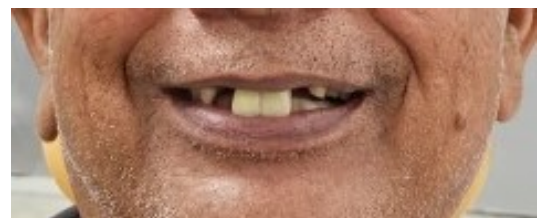


Fig 2: Smile of the patient with missing lateral incisors and central incisors impinging the lower lip



Fig 3: intraoral view



Fig 4: Diagnostic maxillary cast



Fig 5: Occlusion from right and left side

On analysing patient's smile, it was decided to reduce the height of the anteriors for which intentional RCT was advised irt 11,13, 21 and 23. Which was followed by tooth preparation (with reduced cervico-incisal height of central incisors) for PFM bridge with respect to 11, 12, 13 and 21, 22, 23.



Fig 6: Tooth preparation post root canal: occlusal view and while smiling

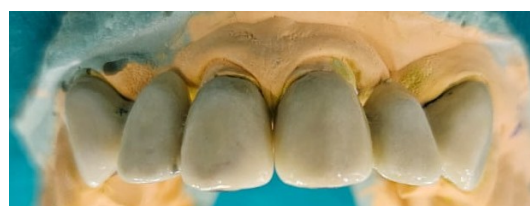


Fig 7: PFM bridge



Fig 8: Patient's smile post cementation of the prosthesis in normal (left) and exaggerated (right) smile



Fig 9: Pre-op and post- op frontal view of patient smile.

## Discussion

Smile plays a major role in how we perceive ourselves, as well as the impressions we make on the people around us. Smile is dependent on the musculature and the presence of the teeth.<sup>3-6</sup> The anatomical elements of the face and the biological elements that include the functional and phonetic elements, provide the reference frames, guidelines and points. These elements help the dentist to achieve a general sense of orientation and diagnosis. References can be classified as: 1. Horizontal references, 2. Vertical references, 3. Sagittal references and 4. Phonetic references.

**Horizontal references:** The horizontal perspective of the face is provided by the interpupillary line and the commissural line. The inter-pupillary line helps to evaluate the orientation of the incisal plane, the gingival margins and the maxilla. An imaginary horizontal line through the incisal plane and the gingival margins should be visibly parallel to the inter-pupillary line. This helps to diagnose any asymmetry in the tooth position or gingival location.<sup>4,7</sup>

**Vertical references:** The facial midline serves to evaluate the location and axis of the dental midline and the medio-lateral discrepancies in tooth position.<sup>4</sup> It should be parallel to the long-axis of the face, perpendicular to incisal plane and over the papilla.<sup>2,6</sup> Nose, forehead, chin, philtrum and interpupillary plane are various anatomical landmarks used to establish midline among which philtrum is seen to be most accurate.<sup>2</sup> Axial inclination is the direction of the anterior teeth in relation to the central midline and becomes progressively more pronounced from the central incisor to the canine. There is a definite mesial inclination to all the anterior teeth related to the midline.<sup>2,4</sup>

**Sagittal references:** Soft tissue analysis at a standardized position helps in studying the profile of an individual. The lip protrusion, the amount of prominence of chin, recession or prominence of the nose and its degree, all help in profile analysis for diagnosis and treatment planning. The E-line or esthetic line is an imaginary line connecting the tip of the nose to the most prominent portion of the chin on the profile. Ideally the upper lip is 1-2 mm behind and the lower lip 2-3mm behind the E-line. Any change in the position of the E-line indicates the abnormality in the upper or lower lip position.<sup>8</sup>

**Phonetic references:** Phonetics play a part in determining maxillary central incisor design and position. 'F' and 'V' sounds are used to determine the tilt of the incisal third of the maxillary central incisors and their length. The 'M' sound is used to achieve relaxed rest position and repeated at slow intervals can help evaluate the incisal display at rest position. 'S' or 'Z' sounds determine the vertical dimension of speech.<sup>6</sup>

**LIPS-** There are three aspects of the lip morphology that should be considered: width, fullness, and symmetry. Wide lips make for a wide smile. The fullness and symmetry of the upper and lower lips should also be documented. The fullness of the lip, or lip volume, can be categorized as full, average, or thin. Lip symmetry involves the mirror image appearance of each lip when smiling. When smiling, the inferior border of the upper lip as it relates to the teeth and gingival tissues is called the lip line.<sup>4</sup> An average lip line exposes the maxillary teeth and only the interdental papillae. A high lip line exposes the teeth in full display as well as gingival tissues above the gingival margins. A low lip line displays no gingival tissues when smiling. In most cases, the lip line is acceptable if it is within a range of 2 mm apical to the height of the gingiva on the maxillary centrals.<sup>1-4</sup> There are six basic smile-zone shapes: straight, curved, elliptical, bow-shaped, rectangular, and inverted. The first three shapes are the most common.<sup>4</sup>

**Gingival zenith-** Gingival esthetics has always been an important component of a beautiful smile. The gingival zenith level (GZL) for both right and left lateral incisors relative to the adjacent gingival zenith position of the central incisor and canine teeth were coronal by approximately 1 mm.<sup>4,6</sup>

**GOLDEN PROPORTION-** The position of the tooth in the arch, the relationship between the width, the length and the face of the tooth can also be numerically established in relation with certain anatomic landmarks.<sup>4</sup> Gold Proportion is expressed in numerical form and applied by classical mathematicians such as Euclid and Pythagoras in pursuit of universal divine harmony and balance. It has been applied to a lot of ancient Greek and Egyptian architecture and may be expressed as the ratio 1:1.618.<sup>4,9</sup> If the ratio is applied to the smile made up of the central, lateral incisor and the mesial half of the canine, it shows that the central incisor is 60% wider than the lateral incisor which in turn is 60% wider than the visible portion of the canine which is the mesial half, when viewed from the front.<sup>6</sup> The natural pleasing smile may not necessarily comply with all rules of symmetry or golden proportion or may not exhibit perfect balance without irregularity of shape.

The creation of an ideal smile necessitates an examination and appraisal of the face, lips, gingival tissues, and teeth, as well as an understanding of how they appear combined. Davis (2007) defines smile design as a collection of aesthetic factors that make face aesthetics compatible with dent gingival structures.<sup>5</sup> The present case report describes the rehabilitation of anterior missing lateral incisors and



providing a harmonious smile to the patient using PFM crowns and intentional root canal treatment of the anterior teeth. The final prosthesis was cemented using GIC cement. The anterior guidance was verified in centric and eccentric movements. The patient was satisfied with the outcome of the prosthesis.

#### **Conclusion:**

Happiness is a state of mind. It is brought about by a feeling of well-being, security and confidence in one's self. It is thus essential for the dentist to give a pleasing smile to the patient when working in the anterior zone. The treatment plan has to be thoroughly discussed with the patient and if needed, interdisciplinary approach can be executed.

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