

# Management of Anterior Spacing with Peg Lateral by Interdisciplinary Approach : A Case Report

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## ABSTRACT

Anterior spacing is a common esthetic problem of patient during dental consultation. The most common etiology include tooth size and arch length discrepancy. Maxillary lateral incisors vary in form more than any other tooth in the mouth except the third molars. Microdontia is a condition where the teeth are smaller than the normal size. Microdontia of maxillary lateral incisor is called as "peg lateral", that exhibit converging mesial and distal surfaces of crown forming a cone like shape. A carefully documented diagnosis and treatment plan are essential if the clinician is to apply the most effective approach to address the patient's needs. A patient sometimes requires a multidisciplinary approach to correct the esthetics and to improve the occlusion. This case report describes the management of an adult female patient with a proclined upper anterior teeth, upper anterior spacing, deep bite and peg shaped upper right lateral incisor tooth through orthodontic and restorative treatment approach.

**Key words:** Anterior spacing, Peg lateral, Esthetic, Interdisciplinary approach

## INTRODUCTION

Maxillary lateral incisors vary in form more than any other tooth in the mouth except the third molars. If the variation is too great, it is considered a developmental anomaly.<sup>1</sup> Developmental alterations which are most commonly associated with maxillary lateral incisors either unilaterally or bilaterally are microdontia, hypodontia, dens invaginatus and dens evaginatus (talon cusp).<sup>2-7</sup>

Microdontia is a condition where the teeth are smaller than the normal size, which may involve all the teeth or be limited to a single tooth or a group of teeth.<sup>8</sup> However, involvement of single tooth is a rather common condition, especially involving maxillary lateral incisor. Microdontia of maxillary lateral incisor is called as "peg lateral", that exhibit converging mesial and distal surfaces of crown forming a cone like shape. The root on such a tooth is usually shorter than usual.<sup>2,9</sup>

Abnormalities in tooth size, shape, and structure result from disturbances during the morpho-differentiation stage of development, and ectopic eruption, rotation and impaction of teeth result from developmental disturbances in the eruption pattern of the permanent dentition.<sup>1,10-12</sup>

Peg shaped lateral incisors occur in approximately 2% to 5% of the general population, and women show a slightly higher frequency than men. Usually they are found equally on the right and left, uni or bilaterally, however some studies have shown their bilateral occurrence slightly higher than the unilateral occurrence. Peg lateral is usually associated with other dental anomalies like tooth agenesis, maxillary canine first premolar transposition, palatal displacement of one or both maxillary canine teeth, buccally displaced canine, and mandibular lateral incisor-canine transposition.<sup>1,12</sup>

When peg-shaped laterals erupt in the mouth, esthetically it can be a disappointment to the patient that their teeth are not perfect or too small in comparison to the rest of the anterior teeth. Diagnosis is usually made clinically when peg lateral erupts. There are various treatment options available.

It is essential to discuss all options with patients so that they are involved in the decision making process. Treatment could be the combination of orthodontic treatment first to align the teeth in the arch, direct composite bonding onto peg laterals, indirect composite placement, bonded crowns, porcelain bonded to metal crowns, crown lengthening surgery to get better gingival heights then direct bonding, extractions and implant placement.<sup>13</sup>

A combination of dental problems such as anterior spacing, deep bite, peg lateral cannot be satisfactorily treated by orthodontic approach alone.<sup>14,15</sup> Efforts to treat the patient as a whole using a multidisciplinary approach will provide satisfactory results.<sup>14-16</sup>

### CASE REPORT

#### Diagnosis and Etiology

A 23 year old female patient was referred for orthodontic consultation. Her chief complaint was gap present in the front region of jaw. She had no relevant family history, no significant prenatal, postnatal and medical history and no history of parafunctional habits. She was very conscious of her gap present in between the teeth, protrusion and smile (Figure 1).

On clinical examination, She had a convex profile with a symmetric face and incompetent lips. Intraoral

examination revealed Class I molar relationship bilaterally, a peg shaped lateral incisor on the right side of the upper arch, gap between the teeth in the front and deepbite.

The both maxillary and mandibular arch were U-shaped and had spacing in the maxillary arch.

The cephalometric analysis showed a skeletal Class II anteroposterior discrepancy (Figure 2) with an ANB angle of  $6^\circ$  and vertical growth pattern, as shown by an FMA of  $31^\circ$  and SN-GoGn of  $34^\circ$ , proclined and forwardly placed maxillary incisor and nearly normally inclined and normally placed mandibular incisors with acute nasolabial angle.

The panoramic radiograph showed the presence third molars in the mandibular arch. The overall alveolar bone level was within normal limits (Figure 3).



Figure 1: Pretreatment Intraoral and Extraoral Photographs

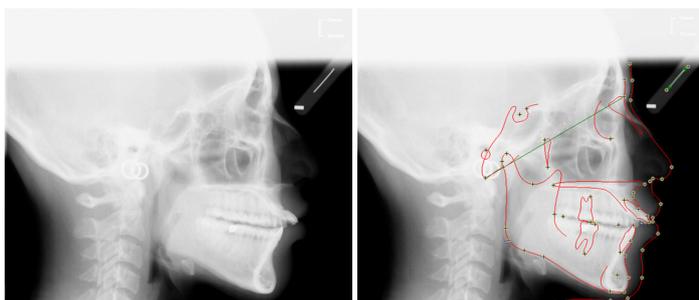


Figure 2: Pretreatment lateral cephalograms



Figure 3: Pretreatment orthopantamogram



Figure 4: Mid treatment photographs

### Treatment Objectives

The treatment objectives were to correct spacing and deep bite, correction of proclined and forwardly placed maxillary incisors, correction of protrusive strained upper lip and to restore the peg shaped lateral incisor tooth to the normal shape and size.

### Treatment plan

Patient had skeletal class II pattern and horizontal growth pattern but as the patient had already crossed the active growth phase so growth modulation was not feasible and the patient profile was not bad enough for orthognathic surgery hence orthodontic camouflage was planned.

### Treatment Progress

Both the maxillary and mandibular teeth were banded and bonded with fully programmed preadjusted 0.022 slot MBT prescription brackets. The arches were aligned using the following sequence of archwires; 0.014" NiTi and 0.016" NiTi (Figure 4). Later, 0.018" ss wire followed by 0.019 x 0.025" ss wire was placed to level and express the prescription of the bracket (Figure 5). Finishing and detailing was done and the appliance was debonded. Just before debonding, upper peg lateral incisors were restored with composite to simulate with contralateral lateral incisor. The total treatment time was 10 months. In retention phase, fixed bonded retainers were placed in both the arches.

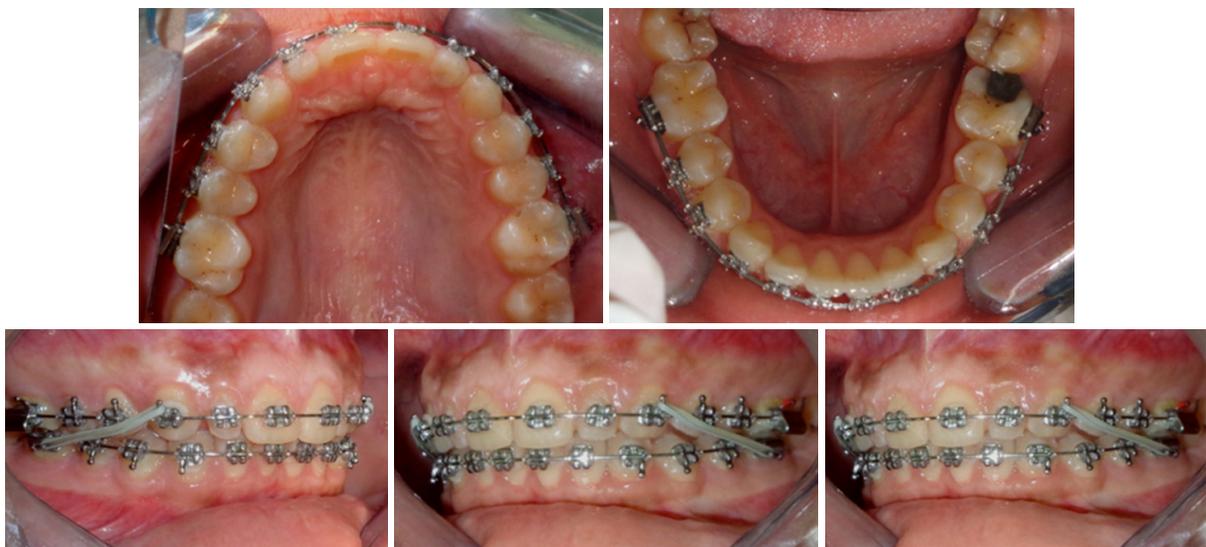


Figure 5: Mid treatment photographs after space closure



Figure 6: Post treatment extraoral and intraoral Photographs

**Treatment results:**

The post treatment facial photographs showed a remarkable improvement in patient profile and facial esthetics. Facial balance and smile esthetics were improved. Lip support improved for both upper and lower lip (Figure 6).

Intraorally, an optimal overbite and overjet relationship was established. A well-interdigitated buccal occlusion with Class I canine and molar relationships was created. There was canine guidance in lateral excursions with proper anterior guidance without balancing side

interferences.

The posttreatment cephalometric radiograph (Figure 7) and superimposed tracings (Figure 8) showed significant changes in the dental and skeletal measurements after treatment. The lip profile of the patient improved significantly.

The pretreatment and post treatment cephalometric parameters is compared in Table no. 1. The posttreatment panoramic radiograph showed good root parallelism. (Figure 9)

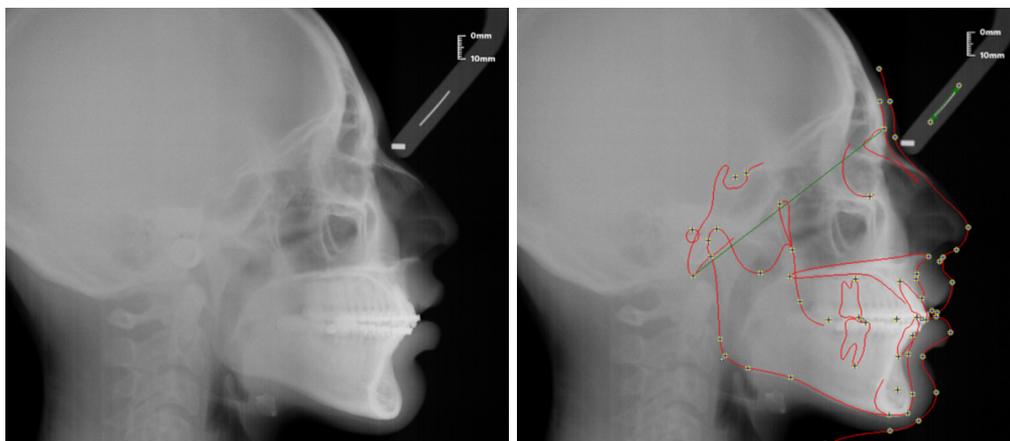


Figure 7: Post treatment cephalograms

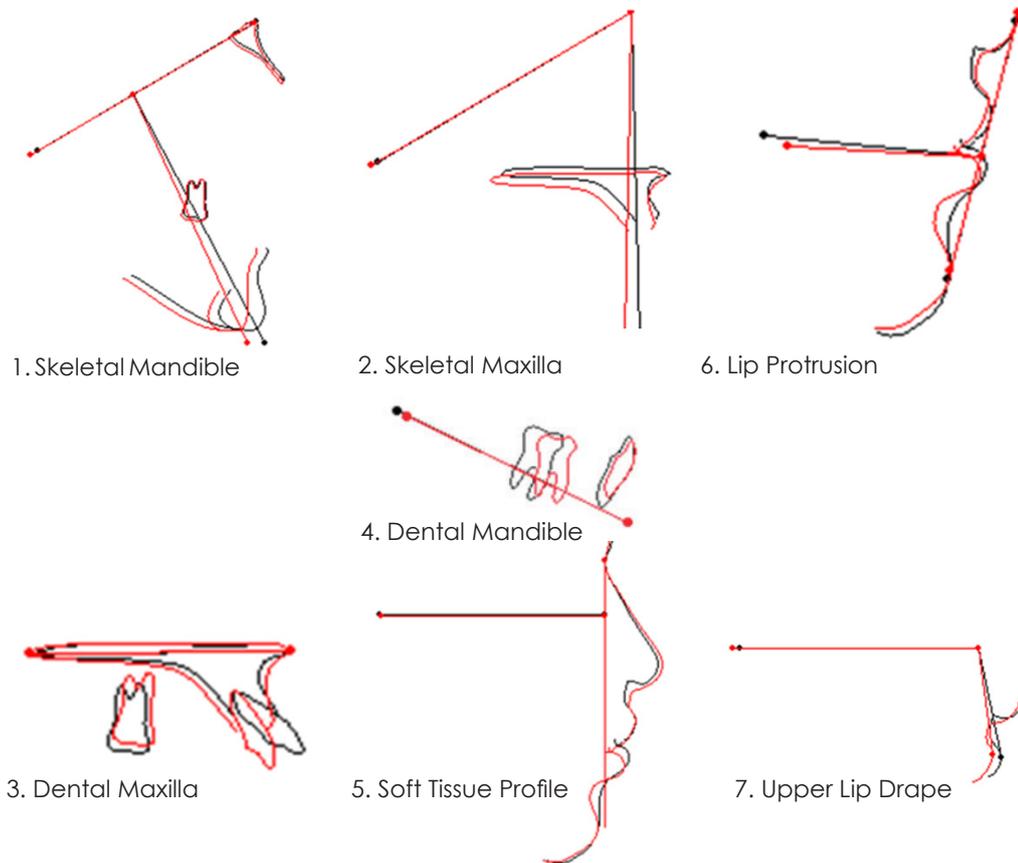


Figure 8: Superimposed tracing

Table 1: Comparative cephalometric parameters

Cephalometric parameters	Clinical norms	Pre-treatment values	Post-treatment values
SNA	82±2°	86°	85°
SNB	80±2°	80°	80°
ANB	2±2°	6°	5°
Wits	0-(-)1mm	2mm	2mm
FMA	25±2°	31°	32°
SN-GoGn	32±2°	34°	35°
Max.I-NA	22±2°	43°	22°
Man.I-NB	25±2°	26°	28°
LI-A-Pog	2.7±1.7mm	1mm	1mm
IMPA	90±2°	90°	95°
Interincisal angle	134°	106°	121°



Figure 9: Post treatment orthopantomograms

## DISCUSSION

There are several treatment options orthodontically to consider for peg laterals. Counihan<sup>17</sup> recommends that there are two basic approaches.

First, the lateral incisor can be extracted and the resultant space closed. However, this will often give a narrow unaesthetic smile. The canine is too yellow and the gingival margin is too high.

The second, preferred, option is often to open the space mesial and distal to the peg-lateral and create a proper space for a normal-sized lateral incisor. The restorative dentist has to build up the peg-lateral to simulate a normal-sized lateral incisor.

Sometimes the gingivae will require crown lengthening surgery to create the correct crown heights- harmony with central incisor teeth.<sup>13</sup> Orthodontic intervention often is required prior to the restorative treatment phase to address unfavorable spacing or occlusal issues and to optimize the position of the teeth.<sup>18,19</sup>

It is recommended that the restorative dentist evaluate the patient prior to orthodontic treatment and close to its completion. Information on the restorative treatment may influence the orthodontic result, and in some cases, minor modifications prior to the removal of the brackets will improve the restorative result.

The arrangement and proportion of maxillary anterior teeth are the major determinants for a pleasing appearance. To evaluate and describe the ideal tooth-to-tooth proportion, Levin applied the golden proportion (proportion of 1.618:1.0) to relate the successive widths of the anterior teeth as viewed from the front.<sup>20</sup>

The golden proportion implies that the maxillary central incisor should be 62% wider than the lateral incisor, which is consistent between the widths of the maxillary lateral incisor and canines. However, Preston reported that only 17% of the patients had the golden proportion in terms of the relationship between the maxillary central and lateral incisors.<sup>21</sup>

In addition, when using the golden proportion, the lateral incisors and canines appeared too narrow. Therefore, Ward indicated that the recurring esthetic

dental (RED) proportion was more appropriate to individually fit the face, gender, and body type of each patient.<sup>22</sup> The average range of RED proportion from 62% to 80% was considered acceptable.

Esthetics as well as occlusion must be considered in the final orthodontic positioning of the teeth adjacent to the edentulous space. To satisfy the "golden proportion" principle of esthetics, the space for the maxillary lateral incisor should be approximately two-thirds of the width of the central incisor.<sup>23,24</sup> However, if the patient is missing only one maxillary lateral incisor, the space required to achieve symmetrical esthetics and occlusion is primarily dictated by the width of the contralateral incisor.<sup>23</sup> When both laterals are congenitally absent, the occlusion may influence the amount of space required for the implant restoration and the proportional relationship between the central and lateral incisors.<sup>23</sup>

In the case discussed above, orthodontic treatment alone would not have given the smile the patient so much desired. Restorative treatment alone would not have corrected the proclination and lip profile. Hence multidisciplinary treatment approach were considered for satisfactory result.

## CONCLUSION

Patients with peg-shaped laterals teeth should be prepared for the careful interdisciplinary treatment planning to obtain excellent results. A staged approach can be undertaken with orthodontic treatment as the first part of the treatment plan followed by simple direct composite bondings to treat peg lateral teeth prior to the final retention phase of the orthodontic treatment. Appointments should be carefully co-ordinated so that this type of treatment can be efficiently and successfully carried out.

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**OJN**

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