

# Multidisciplinary Treatment of Class I Angle Malocclusion with Severe Crowding and Peg Lateral Incisor: A Case Report

Ida Bagus Narmada, DDS, PhD, Sp.Ort (K), Vindira Putri, DDS, Sp.Ort, Dimas Iman, DDS, Sp.Ort, Irina Fardhani, DDS, Sp.Ort and Gemelli Nur Illahi, DDS

*Orthodontic Department, Faculty of Dentistry, Airlangga University, Surabaya, Indonesia*

## ABSTRACT

Class I malocclusions with severe crowding and tooth size discrepancies may be successfully treated orthodontically with extraction therapy, and co-management with other specialists. Correction of the discrepancies will optimize occlusal result (overjet, overbite, midline shift, and smile esthetics). This is a case of a 19-year-old male with severe crowding in upper and lower teeth and peg lateral incisor. The patient had malocclusion Class I. This case was treated comprehensively and successfully using fixed orthodontic appliances with extraction of four premolars, and veneer composite for peg lateral incisor with the help of a conservative dentist at the end of orthodontic treatment.

*Keywords: peg lateral incisor, severe crowding, multidisciplinary treatment*

## INTRODUCTION

Peg-shaped lateral incisors are common dental forms of aberration which could distort the smile because the smaller shape and size are in disharmony with the other teeth.<sup>1</sup> A tooth size discrepancy can affect the final outcome and stability of orthodontic treatment. Ratios for the estimation of tooth size discrepancy have been reported as the "Bolton's standards".<sup>2</sup> Bolton's ratios allow the orthodontist to gain insight into the functional and aesthetic outcome of a given case without the use of a diagnostic setup. Clinically, the Bolton's analysis is used as a tool in anticipating the need for additional treatment of tooth size discrepancies e.g.; upper lateral veneers, lower anterior IPR in order to achieve optimum overbite and overjet relationship.<sup>3</sup> Multidisciplinary dental treatment is the new approach in dentistry with different specialists working as a cohesive unit in order to deliver treatment plans.<sup>4</sup> The aim of this case report is to assess the treatment outcome in dentofacial structures using multidisciplinary approach.

## CASE REPORT

A 19-year-old Deutro-Melayu (Asian) male came to the Department of Orthodontics, Faculty of Dentistry, Airlangga University, for orthodontic treatment with the chief complaint of upper and lower crowding. He was in the permanent dentition and had a symmetric face with straight profile (Figure 1). He had no significant dental and medical history.

Corresponding author:  
Ida Bagus Narmada, DDS, PhD, Sp.Ort (K)  
Orthodontic Department  
Faculty of Dentistry  
Airlangga University  
Jl. Mayjen Prof. Dr. Moestopo No.47, Mojo, Kec. Tambaksari,  
Surabaya, East Java, 60132, Indonesia  
Email: dr\_narmada@yahoo.com



Figure 1. Pretreatment facial photographs.



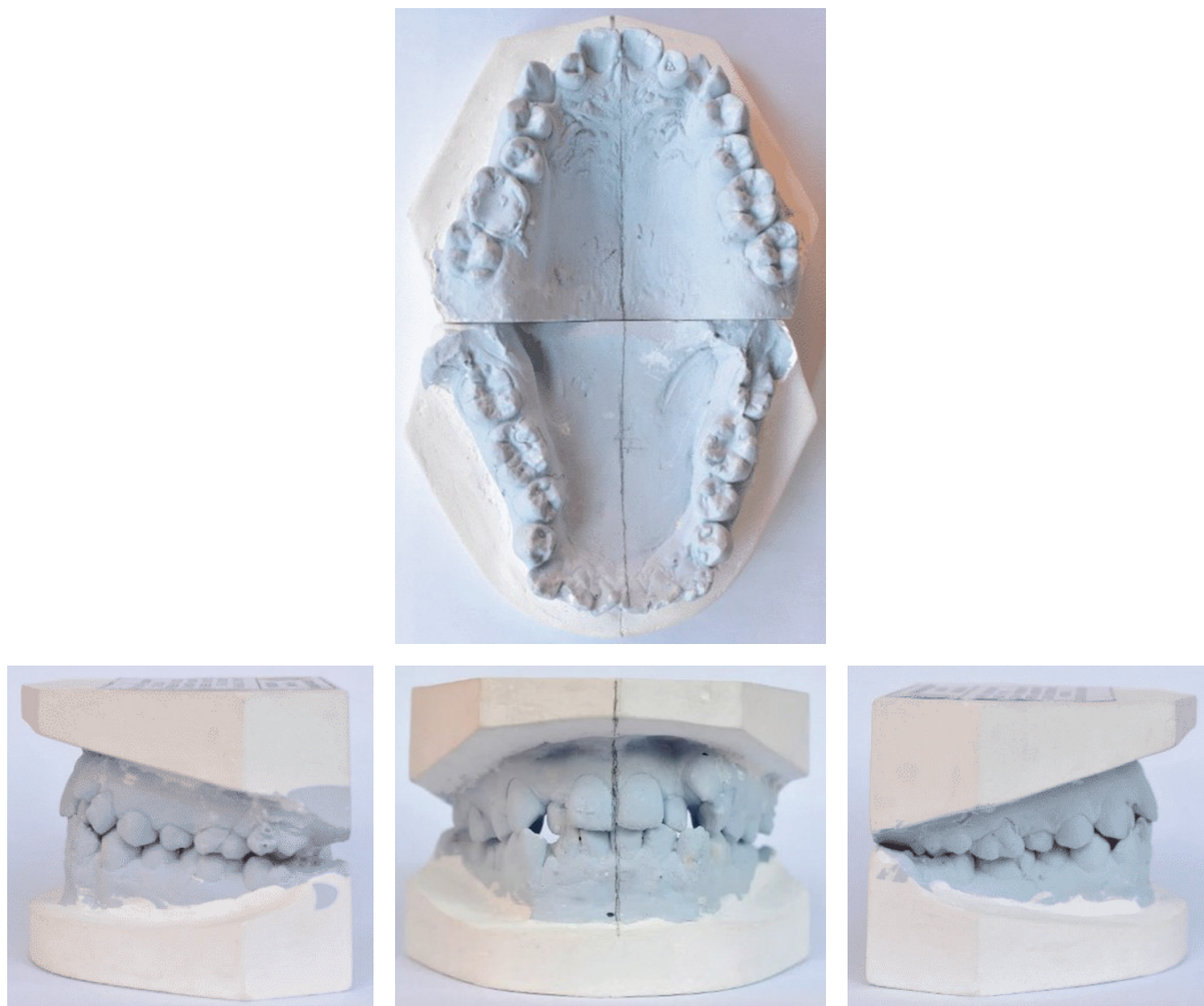
Figure 2. Pretreatment intraoral photographs.

Intraoral examination showed that there was severe crowding in the upper arch and mild crowding in the lower arch (Figure 2). He also had peg lateral incisors (Tooth 12 and 22) and reverse bite tooth of 12 42 and 22 32. In the occlusion shown in Figure 3, he had a 1 mm overbite and overjet. There was Class I molar relationship on the left side and right side. His maxillary midline was normal but her mandibular midline was shifted 2 mm to the right. No mandibular shift was detected on closure. The size of the six anterior mandibular was 30.9 mm and the size of the six anterior maxillary was 34 mm, meaning that the tooth discrepancy in the maxilla was smaller based on the Bolton analysis table. The deficiency of space in the maxillary teeth

was due to the smaller size of the lateral peg-shaped teeth so it needs 6 mm more space, and the mesial and distal sides of teeth 12 and 22 required 1.5 mm on each side.

Radiographic examination revealed that all permanent teeth were present or developing (Figure 4). Cephalometric evaluation showed that he had a skeletal Class III relationship with high angle pattern and normal lips to the "E" line. The maxilla and the mandible were both orthognathic relative to the cranium (Table 1). After extra and intraoral evaluations as well as radiographic examination, another dentist (conservation) was consulted for a peg-shaped treatment plan.

The goals of orthodontic treatment for the patient were to eliminate the dental crowding in the lower and upper arch,



**Figure 3.** Pretreatment dental cast.

correct the reverse bite tooth of 12 42 and 22 32, correct the mandibular dental midline discrepancy, correct the peg lateral incisors, maintain a Class I Angle molar and canine relationship, maintain the overjet and overbite, and provide a more regular alignment of the maxillary and mandibular teeth for aesthetics, function and hygiene. A diagnostic model was measured using Nance's and Bolton's analyses for evaluation of the treatment outcomes. It showed the discrepancies of maxilla is -6 mm and mandibula is -8.5 mm. It needed extraction of two of first premolars of maxilla and two of first premolars of mandibular, and that overjet, overbite and posterior occlusion would be acceptable. The four of first premolars were extracted, and treatment started with a fixed appliance in the lower and upper arches (Preformed Wire 0.022", Conventional Roth Set-up). Initial levelling was accomplished with the use of nickel titanium arch wires over 6 months. After initial levelling, segments

**Table 1.** Pretreatment and posttreatment cephalometric measurements

Variable	Pretreatment	Posttreatment
S-N-A (°)	82	83.5
S-N-B (°)	82	82.5
A-N-B (°)	0	1
S-N/Go-Me (°)	32	28
ANS-PNS/Go-Me (°)	24	19
Wits appraisal	-6	-8
Interincisal angle (°)	110	147
Lower lip to E-Line (mm)	1.5	2
Nasolabial angle (°)	86	75



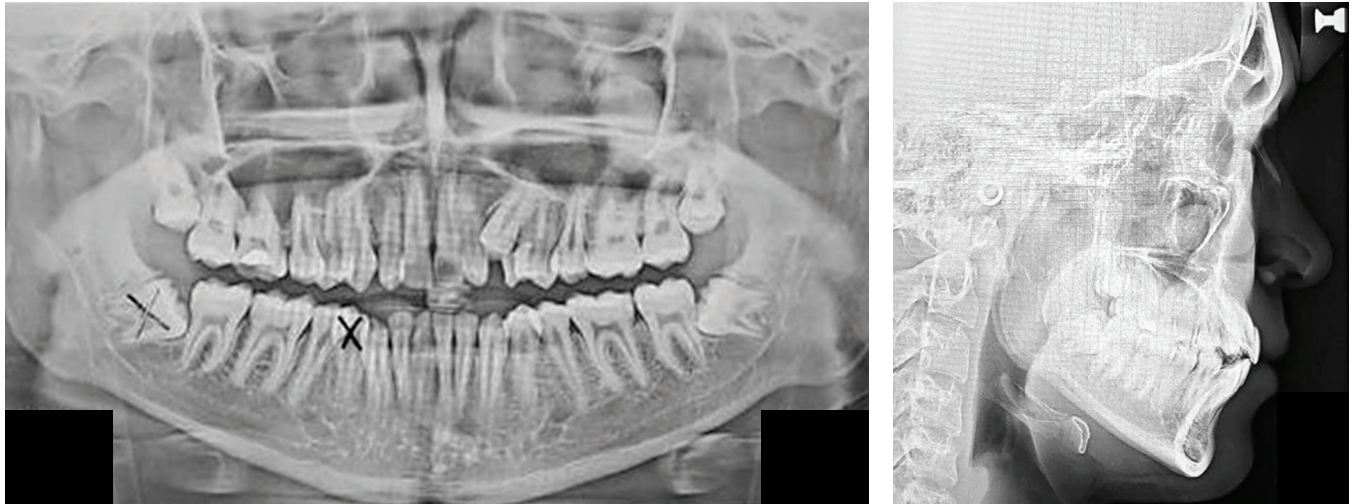


Figure 4. Pretreatment panoramic (left) and cephalometric lateral (right) radiographs.

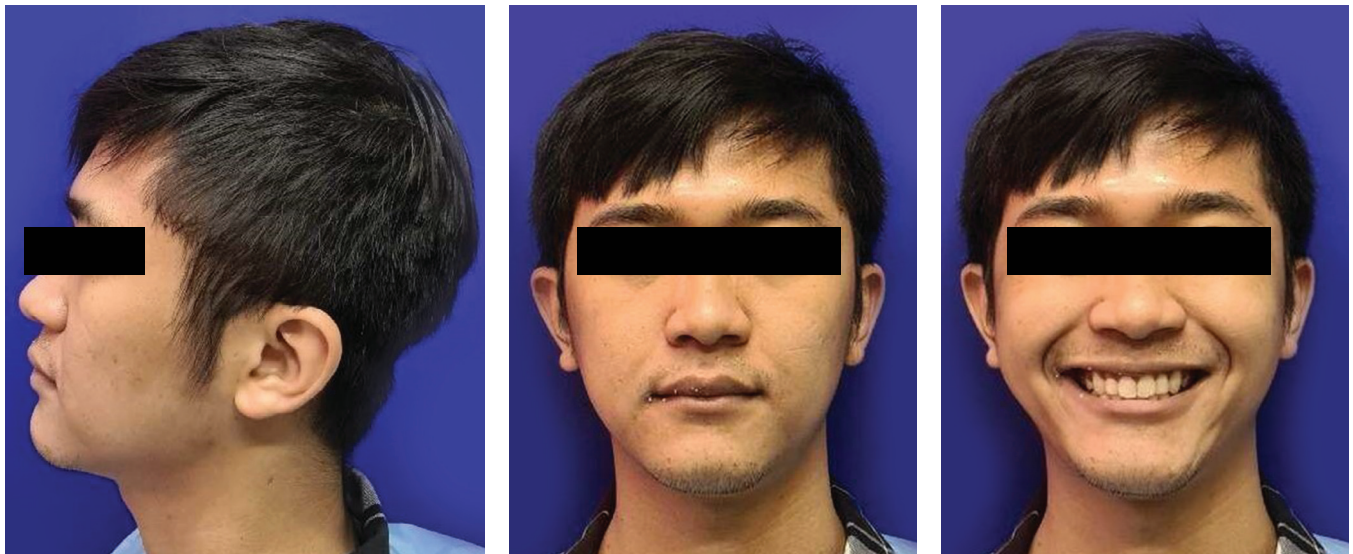


Figure 5. Posttreatment facial photographs.

of elastomeric chain were used at the onset of treatment to retract the left and right canines with stopper in the mesial of first left and right molars with 0.016 x 0.016-inch square arch stainless steel in the upper and lower arches. T-loop bends with 0.016 x 0.016-inch square arch stainless steel was placed in the upper and lower arch wires to four incisors retraction. The treatment was delayed due to the Covid-19 pandemic, so it needed releveilling and re-aligning using 0.16-inch nickel titanium and 0.016 x 0.016 square arch nickel titanium wires for upper and lower arches. A compressed coil spring was applied to open space for veneer in the upper left and right lateral incisor with 0.016 x 0.022 square arch stainless-steel wires. After 6 months, 0.016 x 0.022-inch square arch stainless-steel wires were used for torque corrections, paralleling the roots and detailing the occlusions. After

48 months (since placing of full appliances), all teeth were aligned and the extraction space was closed. (Figure 5).

A 0.017 x 0.025-inch square arch stainless-steel wires were used for passive treatment. After satisfactory interdigitation was achieved, the fixed appliance was de-bonded, and the maxillary and mandibular removable retainers were placed using Hawley's Retainer. The active orthodontic treatment time was 48 months. (Figure 6).

## DISCUSSION

The Class I molar and canine relationship was maintained with satisfactory interdigitation of posterior and anterior teeth. The overjet and overbite were maintained. The upper and lower arch length deficiencies were eliminated and



Figure 6. Posttreatment intraoral photographs.

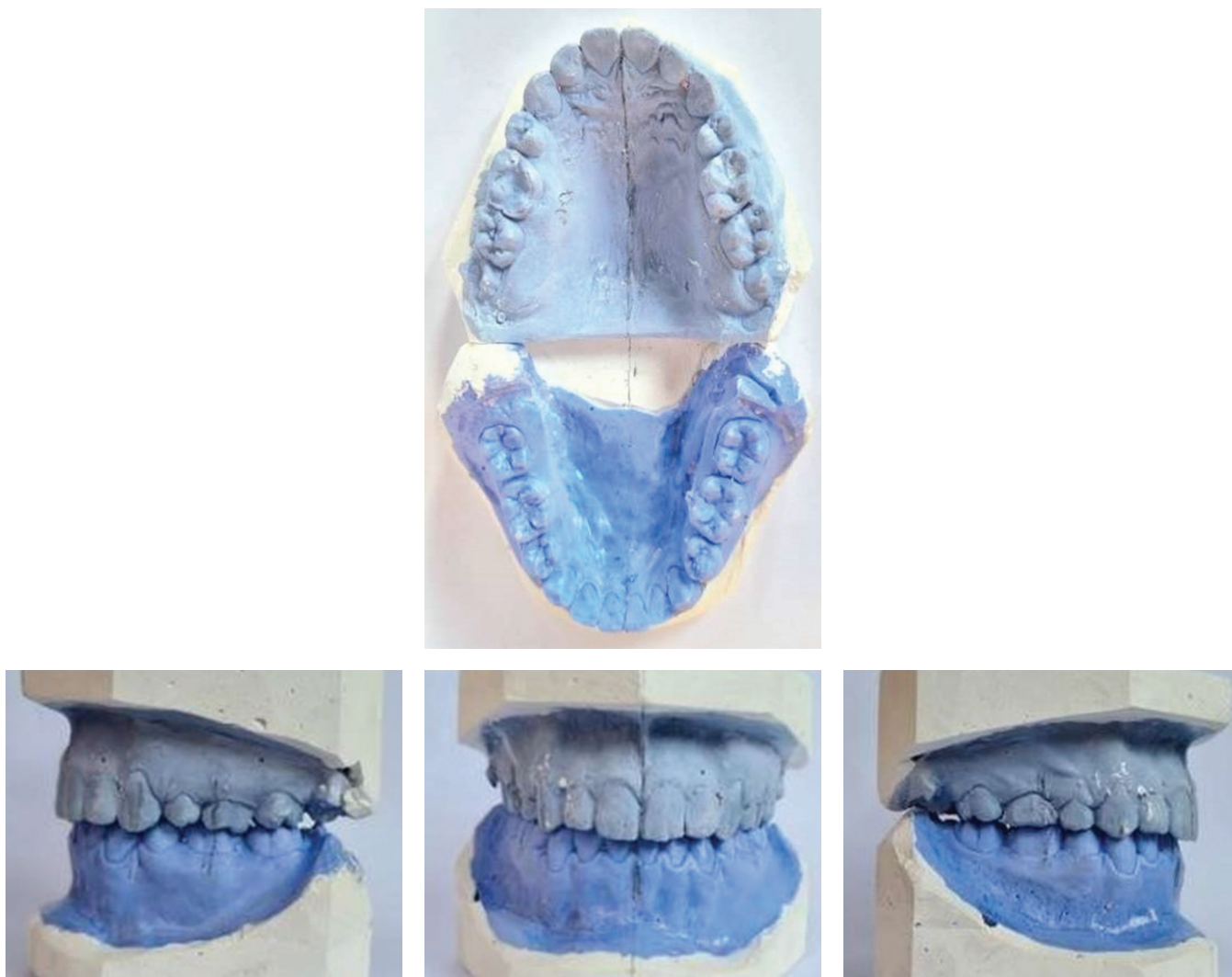
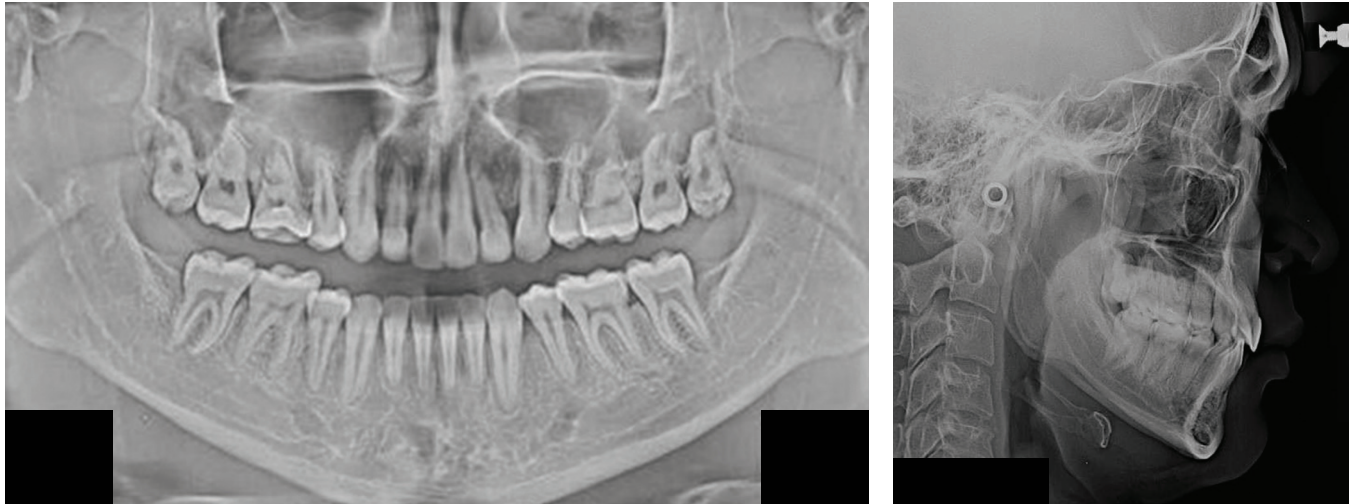


Figure 7. Posttreatment dental cast.



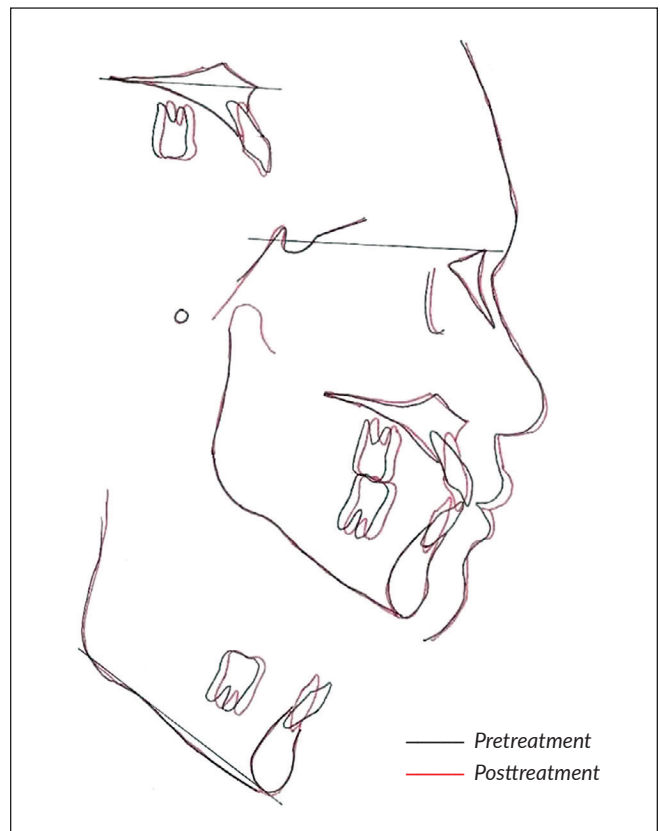


**Figure 8.** Posttreatment panoramic (left) and cephalometric lateral (right) radiographs.

the tooth-size discrepancy was managed successfully. The dentition and the periodontal tissues remained healthy during treatment. There is a discrepancy in the gingival heights of the restored peg lateral maxillary, with the right lateral incisor appearing to have diminished crown height due to its shorter gingival height. The posttreatment dental cast in occlusion showed overbite was normal, overjet was normal, molar/canine occlusion (Class II canine on the right side), and midline deviations (slight deviation of mandibular dental midline to the right) (Figure 7). Posttreatment radiographs showed that minimal root resorption and paralleling of roots had occurred in upper and lower dentition. Cephalometric evaluation revealed that everything was normal except the lower anterior incisors were slightly retroclined (Figures 8 and 9).

A mandibular tooth-size excess greater than 1.2 mm, as determined by the Bolton analysis<sup>5</sup> is considered significant and can typically be handled in 1 of 3 ways, which are interproximal reduction, extraction, or restoration. The treatment alternative for this case is by extraction of one mandibular incisor which is generally done with Bolton discrepancies greater than 2.0 mm. The decision to extract should be supported by initial records and clinical experience. Additional information, such as Bolton analysis, shape of maxillary incisor crowns, and amount of interproximal enamel are also important.<sup>6</sup> As we mentioned before, we were doing multidisciplinary approach with another dentist specializing in conservative management to treat the peg-shaped lateral incisor. For peg-shaped lateral incisors, many therapeutic treatments could be done: full crowns, veneers, and direct or indirect composite resins. For this case, the lateral has good physical properties, esthetic quality, and marginal integrity making the composite resin a reliable material.<sup>7</sup>

Peg-shaped treatment can also be done before the orthodontic treatment. Definitive mesiodistal diameter and final vertical position of the teeth involved must be deter-



**Figure 9.** Superimposition of pretreatment and posttreatment cephalometric tracings.

mined before the orthodontic phase begins. To facilitate active orthodontic treatment, peg-shaped lateral incisors can be temporarily reconstructed according to the esthetic and functional decided criteria (shape, mesiodistal width, and color according to the adjacent teeth) before the placement of any orthodontic appliance.<sup>8</sup>

For this case, we decided to treat the lateral peg-shaped after the orthodontic treatment has been done because the restoration of peg-shaped cannot be achieved when maxillary arch has other dental discrepancies (crowding, rotation, and palatally tipped teeth), which require an initial orthodontic treatment for teeth aligning and leveling.

## CONCLUSION

The patient was happy with the overall treatment results and was satisfied with the pleasant and esthetic smile achieved at the end of the treatment. Coordination with various specialties in orthodontics in an organized and systematic manner is required to diagnose and resolve esthetic problems.

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## Statement of Authorship

IBN contributed in the drafting and revising of manuscript, and final approval of the version to be published; VP, DI and IF contributed in the acquisition and analysis of data; GNI contributed in the conceptualization of work.

## Author Disclosure

All authors declared no conflicts of interest.

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