



# THE INTRUSION OF ANTERIOR TEETH WITH iPANDA: A CASE REPORT AND FINITE ELEMENT ANALYSIS

PAVITRA WAIKASETKORN, BOONSIVA SUZUKI, EDUARDO YUGO SUZUKI  
Department of Orthodontics, Faculty of Dentistry, Bangkokthonburi University, Chiang mai, Thailand



## INTRODUCTION

Non - surgical correction of severe gummy smile through the intrusion of anterior teeth aided by miniscrews has become an important treatment alternative. Recently, the Indirect Palatal Anchorage and Distalization Appliance (iPanda)<sup>1</sup> has been developed to permit maxillary molar anchorage. It is possible to use such molars as indirect anchorage to apply intrusion forces to the maxillary incisors, without undesirable side effects to the molars. Moreover, with indirect anchorage and intrusion force, the use of buccal miniscrews can be eliminated.

### Aims of the study

- To present an alternative treatment for correcting Gummy smile.
- To demonstrate combined use of the iPanda and an intrusion arch in Class II deepbite malocclusion.
- To illustrate the pattern of tooth displacement and to define the stress distribution in anterior and first molar teeth using finite element analysis (FEA).

## CASE REPORT and DIAGNOSIS

- A 38-year-old woman presented with a mesofacial pattern with a convex profile. She had had previous orthodontic treatment twice with unsatisfactory results.
- **Intraoral photos:**
  - Anterior complete deep bite, gummy smile, crowded maxillary and mandibular anterior teeth.
  - Class II malocclusion and four missing premolars from previous orthodontic treatment.
- **Diagnosis:** Skeletal Class II relationship with vertical maxillary excess and altered passive eruption.



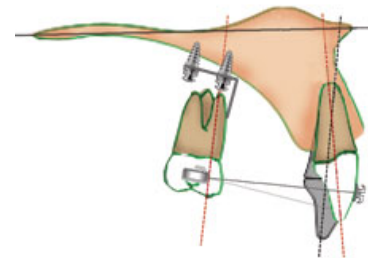
## DISCUSSION

Intrusion arch mechanics with iPanda show intrusion movement with labial crown torque produced the same effect as Labial miniscrew<sup>2</sup>



**RETENTION**

The side effect on molar extrusion was minimised with intrusion mechanics compared to conventional Burstone mechanics<sup>3</sup>

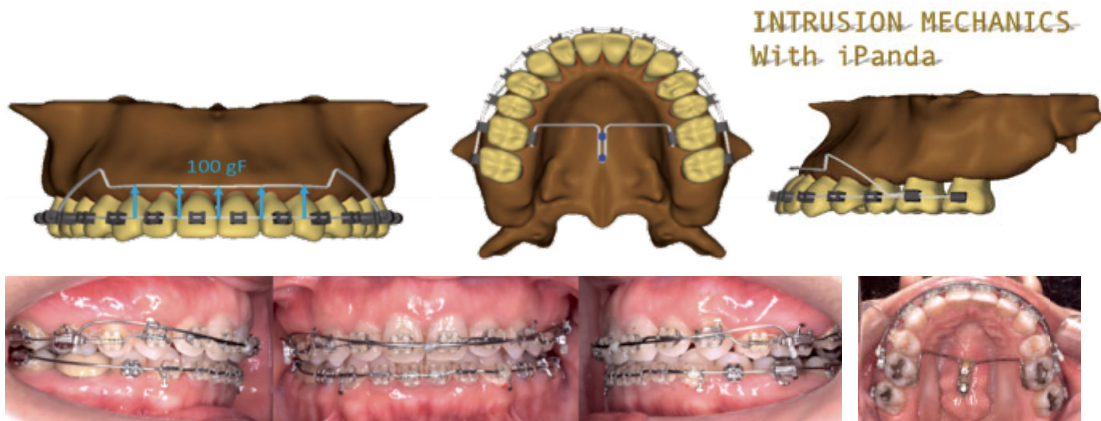


- **No Molar extrusion;** Reduced side effect from intrusion arch due to iPanda maximum anchorage
- **Intrusion ~ 2.33 mm**

## TREATMENT PLANNING and MECHANICS

iPanda with intrusion arch was proposed as an alternative treatment because the patient refused labial miniscrews for aesthetic reasons and because of potential discomfort.

- Anterior intrusion to correct gummy smile and deep bite with intrusion mechanics and nonsurgical approach.
- Intrusion mechanics by using two titanium miniscrews (1.6 x 6mm) in the midpalatal suture
  - iPanda: increased anchorage for anterior intrusion
  - Main archwire: sectional, on anterior and posterior teeth (0.016 x 0.022 LH)
  - Intrusion arch (0.017 x 0.025 NITI): intrusive force applied to canines and between central incisors

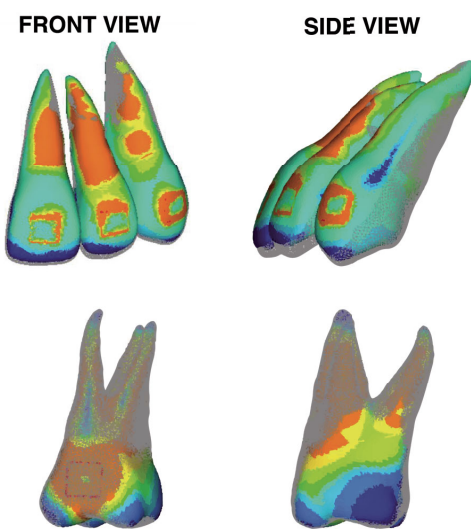


Gummy smile reduction was successfully improved with a nonsurgical approach

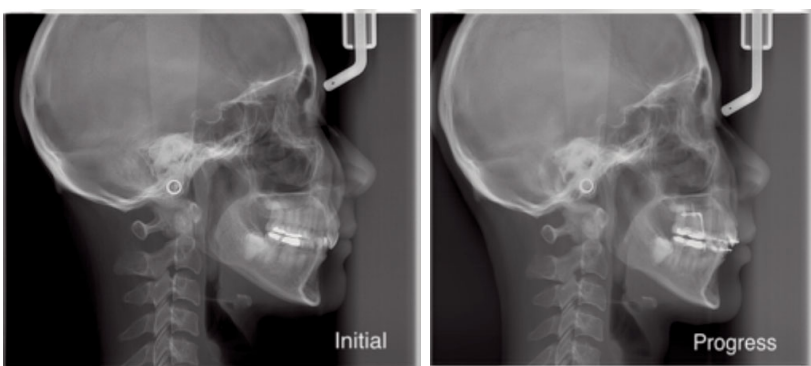


- The maximum von Mises stress was distributed across the central and lateral incisors and the canine and applied along the labial surfaces of the root area and followed the result of treatment in this patient.
- From this analysis, the lateral incisor showed the highest stress value and the largest concentrated stress area, due to the lateral incisor having the weakest tooth structure in this area. Therefore, clinicians should be aware of the potential for root resorption when considering force application.
- Greater stress was distributed in all the molar roots higher than in those of the anterior teeth. However movement was constrained by the iPanda device

Contour Plot Stress(vonMises)  
Analysis system  
Min = 0.000E+00  
Max = 9.039E+00  
ELEMENT\_SOLID\_834753  
Min = 7.027E+04  
ELEMENT\_SOLID\_47071



## TREATMENT PROGRESS

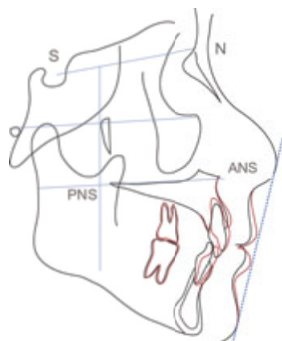


Initial and Progress Lateral Cephalogram, Superimposition

Measurement	Norm ± SD	Before	After
SNA (°)	85 ± 3.5	88.6	88.6
SNB (°)	81.2 ± 2.8	81.6	81.6
ANB (°)	3.8 ± 1.8	7.1	7.1
U1-PP (mm)	28 ± 3	29.5	27.2
U6-PP (mm)	23 ± 2	22.6	22.4
Interincisal angle (°)	121.3 ± 7.1	168.3	155.9

Table I. Cephalometric analysis

■ Initial      ■ After Intrusion  
Improvement of Interincisal angle, as well as, Patient's soft tissue profile related to E-line



## CONCLUSIONS

The iPanda with an intrusion arch is an

alternative to effectively intrude anterior teeth without the need of additional mini-screws. Moreover, intrusion mechanics can reduce the risk of maxillary molar extrusion.



### REFERENCES

- (1) Suzuki EY, Suzuki B. Maxillary molar distalization with the indirect Palatal miniscrew for Anchorage and Distalization Appliance (iPANDA). Orthodontics (Chic.) 2013;14(1):e228-41.
- (2) Kaku M, Kojima S, Sumi H, et al. Gummy smile and facial profile correction using miniscrew anchorage. Angle Orthod 2012;82(1):170-7.
- (3) Burstone CJ. The mechanics of the segmented arch techniques. Angle Orthod 1966;36(2):99-120.