



Editorial

Thoughts outside the box: Unsolved issues in Class III growing patients

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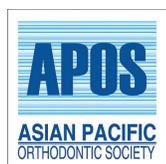
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The growing patients with Class III malocclusion might be presented with maxillary deficiency, mandibular prognathism, or combination of both.^[1,2] For the past few decades, case series, retrospective, or prospective clinical studies have been published for the treatment of maxillary deficiency in growing patients with Class III malocclusion. Depending on the dental age, from early to late, the maxillary deficiency in a growing patient could be orthopedically treated by a protraction facemask^[3,4] or reverse headgear^[5,6] in the early mixed dentition, rapid maxillary expansion and protraction facemask in the late mixed dentition,^[7,8] or by the alternate rapid maxillary expansions and constrictions and intraoral protraction springs in the early permanent dentition.^[9]

Although most of these maxillary orthopedic protraction techniques reported convincing short-term primary results, they were still not able to prove their long-term efficiencies throughout the entire puberty, especially under the relapse of maxillary orthopedic protraction and after the subsequent mandibular growth.^[7,10] Furthermore, the Class III maxillary hypoplasia includes both anteroposterior and vertical deficiency,^[11,12] and the treatment for maxillary vertical deficiency has been ignored and seldomly been addressed. These are the unsolved issues in the orthodontic treatment for growing patients with Class III malocclusion. They are first, to manage the relapse of maxillary orthopedic protraction; second, to overcome the subsequent mandibular growth after maxillary protraction throughout the entire puberty, and the third, to treat the maxillary vertical deficiency.

It is a well-known fact that every orthodontic treatment has certain percentage of relapse no matter what the technique of treatment is, and we could hardly prevent or stop the relapse, including the maxillary orthopedic protraction in growing patients with Class III malocclusion. A conventional thought on managing the relapse of maxillary orthopedic protraction is to over protract the maxilla so that the relapse could be compensated accordingly. However, the question would be whether the over protraction be feasible, or what would the accordingly amount of over protraction for compensating the relapse be? These questions are remained unknown and required further and more clinical investigations. Are there some other thoughts outside the box?

The new thoughts outside the box to manage the relapse of maxillary orthopedic protraction are to grow the maxilla not only through the growth of circumaxillary sutures by protraction but also through the periodontal (endosteal) and periosteal surface growth of maxilla, especially at the anterior dentoalveolar process of maxilla. This thought could be feasible and approached by simultaneous orthodontic protraction and extrusion of maxillary anterior teeth. Orthodontic

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extrusion grows alveolar bone along its path of extrusion and has been applied widely and successfully for dental implant sites development.^[13] Orthodontic extrusion develops dentoalveolar process both through periodontal and periosteal alveolar bone deposition. This approach could be applied to develop the anterior maxillary dentoalveolar forward for compensating the protraction relapse after circumaxillary sutural growth, and at the same time to develop the anterior maxillary dentoalveolar vertically for treating the maxillary vertical deficiency. This thought manages the relapse of maxillary orthopedic protraction and treats the maxillary vertical deficiency at the same time, and definitely requires further clinical studies to bring it to the reality.

To control the mandibular growth might include two thoughts. The conventional thought is to control the growth amount. To control the mandibular growth amount has been the major approach in contemporary orthodontics, such as the chin cap therapy.^[14] However, including the backward and downward rotation of mandible, the effect of chin cap therapy on controlling mandibular growth amount has been proved to be questionable.^[15]

The thought outside the box is to control the mandibular growth direction instead of the growth amount. A feasible way is to redirect mandibular growth backward and downward. It is interested to notice that a backward and downward rotation of mandible has usually been considered as a side effect during maxillary orthopedic protraction and been strongly recommended to avoid, although this side effect actually improves facial profile and might change mandibular growth direction. This side effect could have been opening a new thought outside the box for overcoming the mandibular growth in growing patients with Class III malocclusion.

In addition to the above mentioned, the new thought also incorporates the concepts of the role of condylar growth and the eruption of the posterior molars on the anteroposterior position of the chin and rotation of the mandible proposed by Schudy^[16] in 1997, and surgical backward and downward rotation of maxillomandibular complex for improving Class III facial profile in adult patients.^[17-19] And based on this, orthodontic dentoalveolar height development through orthodontic total arch extrusion has been preliminarily reported^[20] for the treatment of maxillary vertical deficiency, redirection of mandibular growth downward and backward, and improvement of facial profile in Class III growing patients.

Although the thoughts outside the box is important, no one would be able to picture or forecast what the orthodontic treatment for the unsolved issues in Class III growing patients would be without clinical evidences.

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