

## DEVELOPMENT OF POST-TRAUMATIC OPEN BITE IN CHILDREN AND ADULTS

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### Abstract

Post-traumatic open bite is a malocclusion that may occur following injuries to the teeth, alveolar bone, or temporomandibular joint. The development and progression of post-traumatic open bite differ between children and adults due to variations in craniofacial growth, bone remodeling capacity, and adaptive mechanisms. In children, trauma may interfere with growth centers and tooth eruption patterns, often leading to progressive skeletal and dentoalveolar abnormalities. In adults, post-traumatic open bite is more commonly associated with structural damage such as condylar fractures, dentoalveolar displacement, or degenerative changes of the temporomandibular joint. Understanding the differences in pathogenesis between children and adults is essential for selecting appropriate treatment strategies. This article reviews the mechanisms through which post-traumatic open bite develops in different age groups and highlights their clinical implications.

**Keywords:** post-traumatic open bite, dental trauma, children, adults, temporomandibular joint injury, orthodontics

### Introduction

Open bite is a type of malocclusion characterized by the absence of vertical overlap between the upper and lower teeth when the jaws are closed. It may affect either the anterior or posterior region of the dental arches. The etiology of open bite is multifactorial and may include skeletal, dentoalveolar, and functional factors.

Among the various causes of open bite, trauma represents an important but often underestimated factor. Injuries to the teeth, jaws, and temporomandibular joint can significantly alter the occlusal relationship between the maxilla and mandible.

The mechanisms through which post-traumatic open bite develops may differ depending on the age of the patient. In children, trauma can interfere with craniofacial growth and tooth eruption, while in adults the condition is usually related to structural damage of the dentoalveolar complex or temporomandibular joint.

Therefore, it is important to understand the differences in the development of post-traumatic open bite in children and adults in order to improve diagnosis and treatment planning.

### **Materials and Methods**

This article is based on a review of orthodontic and maxillofacial surgery literature concerning traumatic injuries and their impact on occlusion. Scientific sources included orthodontic textbooks, clinical case studies, and research publications related to dental trauma and open bite malocclusion.

The analysis focused on identifying the main mechanisms responsible for the development of post-traumatic open bite in different age groups. Particular attention was given to growth disturbances in children and structural changes observed in adult patients.

### **Results and Discussion**

#### **Development of Post-Traumatic Open Bite in Children**

Children are particularly susceptible to occlusal disturbances after trauma because their craniofacial structures are still developing. Trauma affecting the teeth, alveolar bone, or mandibular condyle may disturb normal growth processes.

One of the most common mechanisms is traumatic ankylosis of teeth. When the periodontal ligament is damaged following trauma, the tooth root may fuse with the surrounding alveolar bone. As the child continues to grow, the ankylosed tooth fails to erupt along with adjacent teeth, leading to vertical discrepancies and open bite formation.

Another important factor is trauma to the **mandibular condyle**, which serves as a major growth center for the mandible. Condylar fractures in children may result in reduced mandibular growth on the affected side, leading to facial asymmetry and open bite malocclusion.

In addition, trauma may alter the eruption path of developing permanent teeth, further contributing to occlusal abnormalities.

#### **Development of Post-Traumatic Open Bite in Adults**

In adults, craniofacial growth has already been completed; therefore, trauma usually causes structural rather than developmental changes.

Common causes of post-traumatic open bite in adults include:

- condylar fractures
- temporomandibular joint injuries
- dentoalveolar fractures
- displacement or intrusion of teeth

Condylar fractures may reduce the vertical height of the mandibular ramus, causing posterior rotation of the mandible. This rotation increases the lower facial height and may produce anterior open bite.

Degenerative changes in the temporomandibular joint following trauma may also lead to progressive condylar resorption, further worsening occlusal discrepancies.

### **Functional Changes After Trauma**

Both children and adults may develop compensatory functional habits following trauma. These may include tongue interposition, abnormal swallowing patterns, and altered mandibular posture.

Such functional adaptations may maintain or exacerbate the open bite deformity by preventing proper occlusal contact between the dental arches.

### **Differences Between Children and Adults**

The development of post-traumatic open bite differs significantly between children and adults.

In children:

- trauma may disturb craniofacial growth
- ankylosis may lead to eruption disturbances
- skeletal open bite may gradually develop during growth

In adults:

- trauma primarily causes structural damage
- condylar fractures often lead to mandibular rotation
- occlusal changes occur more rapidly but are less related to growth disturbances

These differences must be considered when planning treatment.

### **Conclusion**

Post-traumatic open bite may develop in both children and adults, but the underlying mechanisms differ significantly between age groups. In children, trauma often interferes with craniofacial growth and tooth eruption, leading to progressive skeletal and dentoalveolar abnormalities. In adults, the condition is more commonly associated with structural damage such as condylar fractures and temporomandibular joint disorders.

Early diagnosis and proper management of traumatic injuries are essential to prevent the development of severe malocclusion. Treatment of post-traumatic open bite often requires an interdisciplinary approach involving orthodontic therapy, surgical intervention, and long-term monitoring.

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