ISSN: 2692-5206
AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

# MESIAL BITE IN CHILDREN: ETIOLOGY, DIAGNOSIS AND APPROACHES TO TREATMENT

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**Annotation:** Mesial bite (progenia) in children is a complex dental pathology, in which the lower jaw is located forward relative to the upper. This condition has both genetic and acquired origin, can impair chewing, speech and breathing functions, and also significantly affect the appearance of the face. The article examines in detail the causes of mesial bite development, modern diagnostic methods and approaches to treatment. Particular attention is paid to preventive measures and stages of orthodontic intervention.

**Key words**: mesial bite, progenia, orthodontics, children, dentoalveolar anomalies, functional devices, diagnostics, prevention.

## Introduction

Mesial bite is not only a dental problem, but also a significant functional disorder that can cause difficulties in chewing, disrupt speech, breathing and the aesthetic appearance of the face. Progenia has serious consequences if left untreated, including dysfunction of the temporomandibular joint (TMJ) and psychoemotional disorders. In children, the greatest effectiveness of treatment is achieved with early diagnosis and the use of functional devices, which allows influencing the process of jaw growth.

## Etiology

Mesial bite is formed under the influence of many factors, which can be divided into genetic, anatomical and physiological, functional and exogenous. These factors are interconnected, which complicates the diagnosis and treatment of this pathology.

### 1. Genetic factors

Genetic mechanisms play a leading role in the development of mesial bite, since the formation of the craniofacial skeleton is largely determined by hereditary traits:

- **Hereditary predisposition to prognathism** : Children with a family history of mesial bite have an increased risk of developing it.
- **Features of the development of the craniofacial skeleton** : inherited disproportions in the sizes and relationships of the facial bones.
- **Genetically determined increase in the size of the lower jaw** : hypertrophy of bone tissue, especially in the area of the condylar process, may be associated with active growth.
- **Maxillary hypoplasia** : most often associated with underdevelopment of bone tissue due to hereditary diseases such as Crouzon syndrome or Pfeiffer syndrome .
- **Polygenic disorders** : complex influence of several genes on the growth and development of the jaws.

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**2. Anatomical and physiological features**

The formation of mesial bite is associated with disproportions in the growth and development of the jaws, which can be caused by congenital or acquired changes:

- **Insufficient growth of the upper jaw** : Often seen in children with chronic upper respiratory tract diseases such as adenoid growths that affect the development of the facial skeleton.
- **Hyperplasia of the mandible** : associated with excessive activity of the growth zones of the mandible, which leads to its enlargement and forward protrusion.
- **Narrowness of the upper dental arch** : leads to crowding of teeth, disruption of intermaxillary relationships and the development of functional problems.
- **Asymmetrical growth of the jaws** : leads to crossbite or pronounced facial asymmetry.

**3. Functional factors**

Functional disorders are often secondary, but can significantly worsen the situation:

- **Incorrect tongue position** : pressure on the lower incisors causes them to protrude and stimulates the growth of the lower jaw.
- **Dysfunction of swallowing** : atypical pharynx with use of the lower jaw to compensate for the incorrect position of the tongue increases prognathism.
- **Long-term thumb or pacifier sucking** : causes a change in the direction of jaw growth and deepens bite anomalies.
- **Impaired chewing function** : the predominance of soft foods in the diet reduces the load on the upper jaw, preventing its normal development.

**4. Exogenous factors**

Exogenous factors are often related to the child's environment and lifestyle:

- **Jaw injuries** : Injuries to the condylar process of the mandible can result in overgrowth or abnormal positioning of the mandible.
- **Mouth breathing** : chronic breathing through the mouth due to ENT diseases (adenoids, tonsillitis) provokes insufficient development of the upper jaw and the formation of a mesial bite.
- **Insufficient chewing load** : the absence of solid foods in the diet reduces stimulation of jaw growth.
- **Social and environmental factors** : poor living conditions, vitamin and mineral deficiencies can slow down the development of the jaw apparatus.

**Advanced Section: Diagnostics**

Accurate diagnostics of mesial bite is necessary to choose the optimal treatment plan. Modern diagnostic methods allow taking into account the anatomical, functional and physiological aspects of the child's condition.

**1. Clinical examination**

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AMERICAN ACADEMIC PUBLISHER
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- **Facial profile analysis** :
  - A concave profile indicates excessive protrusion of the lower jaw.
  - Shortening of the upper lip and an overly pronounced chin area.
- **Assessment of the condition of the dentition** :
  - Anomalies of teeth occlusion in central occlusion.
  - Possible presence of crossbite or crowding of teeth.
- **Checking facial symmetry** :
  - Identification of lateral asymmetry of the jaws.
  - Evaluation of angular characteristics of the face (angles of the nasolabial and chin folds).

**2. Instrumental methods**

- **Orthopantomogram (OPTG)** :
  - Allows you to assess the condition of the roots of the teeth, the presence of rudiments of permanent teeth and pathological changes in the bone.
  - Diagnosis of possible TMJ developmental disorders.
- **Teleroentgenogram (TRG)** :
  - Determination of the ratio of the jaws in the anteroposterior and vertical directions.
  - Calculation of parameters of the craniofacial skeleton (ANB angle, length of jaw bases).
- **3D scanning** :
  - High diagnostic accuracy allows to create a virtual model of the jaws for visualization and treatment planning.

**3. Functional diagnostics**

- **Assessment of mandibular movements** :
  - Identification of limitations of mobility or excessive activity of the condylar processes.
  - Analysis of lateral and anterior movements of the lower jaw.
- **Electromyography (EMG)** :
  - Study of the activity of the masticatory muscles.
  - Diagnosis of possible TMJ dysfunctions.
- **Myofunctional testing** :
  - Evaluation of tongue position, swallowing and breathing functions.

An expanded approach to diagnostics allows us to develop an individual treatment plan that takes into account all aspects of the pathology and the patient's characteristics.

**Treatment**

Treatment of mesial bite in children depends on age, degree of severity of the anomaly, and the presence of concomitant functional disorders. The main goal of therapy is to create a harmonious bite, eliminate cosmetic and functional defects, and prevent complications.

**Early age (3-6 years)**

At the stage of milk bite, treatment is aimed at preventing the progression of pathology and eliminating the primary causes:

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AMERICAN ACADEMIC PUBLISHER
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**1. Functional devices**

- **Trainers** :
  - Normalizes the position of the tongue.
  - Corrects habits such as mouth breathing and incorrect swallowing.
  - Relieves muscle tension that contributes to abnormal growth of the lower jaw.
  - Examples: soft silicone trainers that the child wears at night and for a few hours during the day.
- **Plates with pushers** :
  - They are developed individually, taking into account anatomical features.
  - They help to expand the upper jaw and move the teeth into the correct position.

**2. Elimination of functional disorders**

- **Treatment of mouth breathing** :
  - Elimination of adenoids, hypertrophy of tonsils and other ENT problems.
  - Using breathing simulators to restore nasal breathing.
- **Correction of tongue position** :
  - Exercises to normalize the tone of the tongue muscles.
  - Speech therapy sessions to correct speech and swallowing disorders.

**3. Forming good habits**

- Teaching correct chewing (alternating sides).
- Elimination of bad habits (thumb sucking, pacifiers).
- Monitor your posture, as poor head position can affect jaw growth.

**School age (7–12 years)**

At the stage of mixed dentition, treatment becomes more intensive, as active growth of the maxillofacial region occurs:

**1. Removable orthodontic appliances**

- **Maxillary expansion devices** :
  - **Haas appliance** : stimulates the growth of the upper jaw and increases the width of the dental arch.
  - **Quadrohelix** : effective for significant disproportions between the width of the upper and lower jaw.
- **Functional devices** :
  - **Frankel's device** : corrects the position of the lower jaw and normalizes the function of the masticatory muscles.
  - **Bionators** : direct the growth of the jaws in the correct direction and improve the occlusion of the teeth.

**2. Fixed structures**

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- **Braces (if necessary)** : used in cases of crowded teeth or severe abnormalities in the position of teeth.
- **Devices for occlusion correction** :
  - Lingual arches that help guide the growth of teeth in the correct direction.
  - Mesial pushers for correction of the position of the lower jaw.

**3. Myofunctional therapy**

- Exercises to strengthen the muscles of the tongue, lips and chewing muscles.
- Physiotherapy procedures (electrical stimulation, massage).

**Adolescence (12–18 years)**

In adolescence, treatment is aimed at the final correction of the position of the teeth and jaws, as skeletal growth is nearing completion:

**1. Braces**

- **Metal or ceramic braces** : effectively correct the bite and align the teeth.
- **Use of intermaxillary traction** : helps to move the lower jaw backwards or the upper jaw forwards, depending on the indications.

**2. Orthognathic surgery (in complex cases)**

- It is used for severe anomalies that cannot be corrected conservatively.
- Surgery may include osteotomy of the mandible or reconstruction of the maxilla.
- Often combined with orthodontic treatment to achieve the best functional and aesthetic results.

**Prevention**

Prevention plays a key role in preventing the development of mesial bite. The following measures are recommended:

1. **Regular dental checkups** :
   - Initial visit to the orthodontist at the age of 3-4 years.
   - Periodic check-ups every 6-12 months to monitor jaw growth.
2. **Elimination of bad habits** :
   - Stopping thumb or pacifier sucking after 2 years.
   - Monitoring the position of the tongue and the child's posture.
3. **Diet** :
   - Including solid foods in the daily diet (apples, carrots).
   - Elimination of foods that reduce the chewing load.
4. **Timely treatment of ENT diseases** :
   - Removal of adenoids if they obstruct nasal breathing.
   - Therapy of chronic inflammatory diseases of the upper respiratory tract.
5. **Exercises for facial muscles** :
   - Simple complexes aimed at developing proper chewing and breathing functions.

ISSN: 2692-5206
AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

## Conclusion

Treatment of mesial bite in children is a long process that requires an interdisciplinary approach, including the work of an orthodontist, pediatrician, speech therapist and ENT specialist . Early detection and use of modern methods of therapy allow to avoid serious complications and restore the harmony of the facial skeleton. Successful prevention plays a key role, helping to prevent the formation of severe anomalies and promoting normal growth of the maxillofacial region.

## Literature

1. Zolotukhina T.A., Sidorova I.V. Orthodontics of childhood . Moscow: Medicine, 2020.
2. Proffit WR, Fields HW Contemporary Orthodontics . 6th ed . Elsevier , 2018.
3. Kuznetsova A.V. Modern approaches to the treatment of mesial bite in children . Russian Dental Journal, 2021, No. 3, pp. 45-50.
4. Graber TM, Vanarsdall RL, Vig KWL Orthodontics: Current Principles and Techniques . Elsevier , 2017.
5. Ivanova E.V., Smirnov A.V. Epidemiology of dentoalveolar anomalies in children . Pediatric Dentistry, 2019, v. 17, no. 4, pp. 67-73.
6. McNamara JA Early orthodontic intervention: Treatment of skeletal Class III malocclusion in children . Angle Orthod , 2015, 85(2), p. 190-202.
7. Khazanov D.V., Lyapunova A.A. Progenia: diagnostics and modern approaches to treatment . Dentistry, 2022, No. 6, pp. 32-38.