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ACUTE ODONTOGENIC OSTEOMYELITIS OF THE MANDIBLE IN CHILDREN

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Abstract: This article presents information on acute odontogenic osteomyelitis of the mandible in children.

Keywords: Osteomyelitis, odontogenic, chills, possible convulsions, Vincent's symptom.

Definition

Acute osteomyelitis is a purulent infectious-inflammatory disease of the jawbone, affecting all its structural components. It is accompanied by the resorption and liquefaction of bone by purulent exudate, disruption of bone trophicity, and can lead to **osteonecrosis**. The clinical picture of acute osteomyelitis is primarily manifested by **systemic symptoms**.

The disease begins **acutely**, with body temperature rising to 38–39 °C, accompanied by chills, general weakness, and malaise. In younger children and those in puberty, fever can lead to convulsions, vomiting, and gastrointestinal disturbances, indicating **CNS irritation due to severe systemic intoxication**.

Locally, the disease presents as diffuse inflammation around the infected tooth, with **pathological mobility** of the affected and adjacent intact teeth. Purulent discharge may be observed from the gingival pockets. Diffuse purulent periostitis and subperiosteal abscesses often develop bilaterally along the alveolar process and jawbone. Acute osteomyelitis is accompanied by **marked inflammatory changes in the soft tissues of the face**, with infiltration, hyperemia, and edema of the overlying skin. Abscesses or phlegmons frequently form, most commonly **adeno-phlegmons**. In advanced cases in older children, acute odontogenic osteomyelitis may progress to **perimandibular phlegmon**.

Causes

1. **Acute odontogenic osteomyelitis** arises from the penetration of pathogenic microorganisms from carious teeth. It most commonly affects the **mandible in children aged 7–12 years**, when the prevalence of dental caries and its complications is high.
2. **Acute hematogenous osteomyelitis** results from the spread of infection from other foci. In younger children, the entry points can include **omphalitis** (inflammation of the umbilical ring in newborns) or **purulent mastitis in the mother**, affecting infants under one year. In older children, primary sources may include **purulent otitis, ethmoiditis, tonsillitis, skin infections, or osteomyelitis in other bones** (e.g., epiphyseal osteomyelitis of long bones). Hematogenous osteomyelitis often affects the **maxilla** and may involve systemic organ infections.
3. **Acute traumatic osteomyelitis** is rare (~7% of cases). It develops following **infection of a mandibular fracture line**, post-surgical interventions in the maxillofacial region, or improper treatment and immobilization of jaw fragments. Carious teeth in fracture lines or open injuries to the oral mucosa or skin also predispose to infection.

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Radiological Findings

Early radiographs (first few days) may not show bone changes. By the **end of the first week**, diffuse bone rarefaction appears, indicating liquefaction by purulent exudate. The bone becomes more radiolucent, trabecular patterns disappear, and the cortical layer thins and is interrupted in places.

Prevalence and Predisposing Factors in Children

- High **reactivity** of the child's tissues
- Reduced **immunobiological barrier** to purulent infection
- Specific **anatomical and physiological features** of the jaw

At outpatient visits:

- Correct diagnosis: 24% of patients
- Extraction of the causative tooth: 39%
- Timely hospitalization: 20%

Anatomical and Physiological Features of Children's Jaws:

1. Continuous growth and remodeling
2. Wide Haversian canals
3. Vulnerable myeloid bone marrow
4. Rich blood and lymphatic supply

Clinical Presentation

The disease usually starts acutely, either as an independent condition or following **periostitis of the jaw**. Fever rises to 38–39 °C with chills, weakness, malaise, pallor of skin and mucous membranes, irritability, sleep disturbances, and loss of appetite.

Locally, symptoms resemble **periostitis**: diffuse inflammation around the source tooth, mobility of the affected and adjacent healthy teeth, purulent discharge from gingival margins, diffuse purulent periostitis, subperiosteal abscesses, lymphadenitis, and phlegmons.

In the **maxilla**, the inflammation can involve the **maxillary sinus, orbit, and middle ear**. Diffuse processes may lead to **destruction of tooth germs**. Radiological changes typically appear on the **7th–10th day**. Over 3–4 weeks, destruction increases, with **sequestra formation**, alongside new bone formation. Within 4–6 months, excessive bone deposits resorb, restoring bone structure and shape. In severe purulent-necrotic forms, sequestration of necrotic bone occurs, later replaced by new bone or connective tissue scar. Soft tissue necrosis takes 2–3 weeks; prolonged or recurrent inflammation can lead to **chronic osteomyelitis**.

Immediate hospitalization is required for intensive antibacterial, anti-inflammatory therapy, and urgent surgical intervention.

Local Symptoms of Osteomyelitis

1. Mobility of the causative and adjacent teeth
2. Infiltration along both sides of the alveolar process
3. Purulent discharge from gingival pockets

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4. **Vincent's symptom**
5. Inflammatory approximation of the jaws

Differential Diagnosis:

- Periostitis
- Suppurating jaw cyst
- Abscess or phlegmon
- Sialoadenitis
- Ewing's sarcoma

Treatment

Treatment aims to **eliminate the purulent focus** and restore all impaired functions.

All cases require **emergency hospitalization** in maxillofacial or pediatric surgical departments with a dental surgeon on staff. Early surgical intervention significantly improves prognosis.

In **odontogenic osteomyelitis**, **removal of the causative tooth** is essential. Deciduous teeth and permanent multi-rooted teeth are usually extracted; single-rooted permanent teeth may sometimes be preserved. The extraction socket serves as natural drainage, with possible opening of bone marrow spaces to enhance pus outflow.

Post-extraction, **periostotomy or drainage of subperiosteal abscesses** is performed. Purulent foci are thoroughly cleaned of necrotic tissue, irrigated with antiseptic and antibiotic solutions, and properly drained.

Conservative therapy includes:

- Antibiotics
- Anti-inflammatory drugs
- Immunostimulants

Complications

1. Loss of tooth germs → **anodontia**
2. Growth plate damage → **jaw deformities**
3. Obstruction of maxillary sinus
4. Pathological jaw fracture
5. Osteoarthritis or ankylosis of the TMJ

Clinical experience at the **Department of Plastic and Maxillofacial Surgery, Children's Multidisciplinary Medical Center, Andijan Region**, shows that the **primary cause of acute odontogenic osteomyelitis of the mandible in children** is untreated teeth and poor oral hygiene, highlighting a serious public health concern.

Conclusion

Acute odontogenic osteomyelitis is a complication of **untreated dental disease**. Prevention requires that dentists **educate patients about timely dental care** and ensure early intervention.

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