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### FREQUENCY OF SURGICAL PROCEDURES INVOLVING THE MAXILLARY SINUS IN ODONTOGENIC SINUSITIS

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#### Abstract

Diseases of the nasal cavity and paranasal sinuses represent the most prevalent pathological conditions of the upper respiratory tract. Odontogenic sinusitis accounts for a substantial proportion of maxillary sinus inflammatory diseases and continues to demonstrate an increasing incidence worldwide. The present study analyzed the frequency and structure of surgical interventions performed on the maxillary sinus in cases of odontogenic sinusitis and identified priority directions for the development of minimally invasive surgical techniques. The obtained findings provide a rationale for advancing outpatient-based, inpatient-replacement technologies, optimizing specialist training, and expanding the implementation of endoscopic procedures in routine dental surgical practice.

**Keywords:** Surgical intervention, maxillary sinusitis, odontogenic pathology.

#### Introduction

Among pathological processes affecting the respiratory tract, disorders of the nasal cavity and paranasal sinuses are the most widespread. Epidemiological data indicate that approximately 5–15% of the adult population worldwide is affected by various forms of sinusitis, with a threefold increase in prevalence reported

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over the past decade. Notably, odontogenic etiologies account for 26–40% of all sinusitis cases, highlighting the clinical significance of dental-origin inflammatory processes.

The development of odontogenic maxillary sinusitis is largely обусловлено the close anatomical and topographical relationship between the maxillary sinus and the periapical regions of posterior maxillary teeth, particularly premolars and molars. The first molar most frequently exhibits proximity to the sinus floor, followed by the second molar and second premolar, whereas the third molar and first premolar are involved less often.

Sources of odontogenic infection include chronic periapical inflammatory lesions, subperiosteal abscesses, marginal periodontitis, and foreign bodies within the maxillary sinus. Such foreign materials may consist of root canal filling substances, fragments of endodontic instruments, extracted teeth or roots, and dental implants. Previous studies report a direct association between odontogenic pathology and maxillary sinusitis in 10–40% of cases.

Of particular concern is the high prevalence of iatrogenic forms of odontogenic sinusitis, which reportedly constitute up to two-thirds of all odontogenic cases. A significant proportion of these are related to the displacement of filling materials into the sinus cavity, which may induce chronic inflammatory changes, including polypoid transformation of the sinus mucosa.

The disease predominantly affects individuals of working and reproductive age, thereby representing a major component of the clinical workload of oral and maxillofacial surgeons.

### **Aim of the Study**

The aim of this study was to analyze the frequency and characteristics of surgical interventions performed on the maxillary sinus in cases of odontogenic sinusitis and to determine directions for further research into minimally invasive surgical approaches.

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### Materials and Methods

A retrospective analysis was conducted on 226 (100%) surgical protocols involving interventions on the maxilla. Of these, 80 patient records corresponded to individuals treated in a multidisciplinary hospital over one calendar year for foreign bodies of the maxillofacial region.

The age of patients ranged from 18 to 70 years. The sex distribution included 51 women (63.8%) and 29 men (36.2%). The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki, the Universal Declaration on Bioethics and Human Rights, and the Convention on Human Rights and Biomedicine. Patient anonymity was strictly maintained.

Statistical analysis was performed using descriptive statistical methods with STATISTICA 10.0 (StatSoft Inc., USA) and Microsoft Excel 2007.

### Results and Discussion

Of all surgical procedures performed on the maxilla, interventions involving the maxillary sinus accounted for 58.8% ( $n = 133$ ), while other types of maxillary surgeries constituted 41.2% ( $n = 93$ ).

Among patients treated for foreign bodies of the maxillofacial region, 58.8% ( $n = 47$ ) were diagnosed with foreign bodies localized within the maxillary sinus. Women predominated in this subgroup (70.2%), compared with men (29.8%).

According to World Health Organization age classification, the majority of patients with maxillary sinus foreign bodies belonged to the young adult group (18–44 years), accounting for 74.4% of cases. Middle-aged individuals (45–59 years) constituted 21.3%, while elderly patients (60–74 years) represented only 4.3%.

Analysis of lateralization demonstrated comparable involvement of the right and left maxillary sinuses, with right-sided lesions identified in 53.2% and left-sided lesions in 46.8% of cases, indicating no significant lateral predominance.

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Chronic inflammatory processes overwhelmingly prevailed, accounting for 81.2% of cases, whereas acute sinusitis was observed in only 12.8% of patients. Molar teeth were identified as the primary etiological factor in 63.8% of cases, with the first maxillary molars contributing most frequently. Premolars accounted for 8.5% of cases, while anterior teeth were rarely implicated. In approximately one-quarter of cases, precise identification of the causative tooth was not possible. Most patients underwent multiple surgical procedures during a single operative session. Two procedures were performed in 34.0% of cases, three in 49.0%, four in 10.6%, and five in 6.4%, underscoring the complexity of odontogenic sinusitis management.

Foreign bodies were most commonly located at the sinus floor (89.4%). Less frequent localizations included the lower-lateral wall or diffuse distribution throughout the sinus cavity. In a minority of cases, the foreign body was mobile within the sinus.

Histopathological examination was available in 85.1% of patients. The sinus mucosa was intact in 17.0% of cases, whereas polypoid changes were observed in 74.5%. Other pathological alterations, including mucosal atrophy, hyperplasia, and cystic lining, were detected in 8.5% of patients.

The frequent localization of foreign bodies and inflammatory changes at the sinus floor supports the feasibility and clinical relevance of minimally invasive, inpatient-replacement surgical technologies.

### Conclusion

The results of this study provide objective evidence supporting the refinement of existing surgical techniques and the development of novel minimally invasive, inpatient-replacement approaches for the management of odontogenic maxillary sinusitis. The findings also justify enhanced specialist training and the broader integration of endoscopic procedures into outpatient dental and maxillofacial surgical practice.

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