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ANALYSIS OF THE CAUSES OF SALIVARY GLAND SECRETION DISORDERS: A COMPREHENSIVE CLINICAL AND PATHOPHYSIOLOGICAL STUDY

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Abstract: Salivary gland secretion disorders represent a multifactorial clinical problem affecting oral health, digestion, and overall quality of life. These disorders, commonly manifested as xerostomia or hyposalivation, arise from a wide range of etiological factors, including inflammatory diseases, autoimmune conditions, metabolic disturbances, medications, and neurological dysfunctions. The present study aims to analyze the underlying causes of salivary gland secretion impairment through a combined clinical, radiological, and pathophysiological approach. A mixed-methods design was applied to evaluate 120 patients presenting with symptoms of reduced salivary flow between 2019 and 2025. Quantitative analysis included salivary flow rate measurements, biochemical parameters, and statistical correlation of etiological factors, while qualitative assessment focused on clinical manifestations and patient-reported outcomes. The findings reveal that autoimmune diseases and medication-induced dysfunction are the leading causes of secretion impairment, followed by chronic inflammatory conditions. A significant correlation ($r = 0.68$) was identified between glandular fibrosis and decreased secretion levels. The study highlights the necessity for early diagnosis and individualized treatment strategies to prevent irreversible glandular damage and improve patient outcomes.

Keywords: salivary glands, secretion disorders, xerostomia, hyposalivation, autoimmune diseases, sialadenitis, fibrosis, medications, glandular dysfunction, oral health, pathophysiology, qualitative analysis, quantitative research

Introduction

Salivary glands play a critical role in maintaining oral homeostasis through the production and secretion of saliva, which facilitates digestion, lubrication, antimicrobial defense, and mucosal protection. нарушения секреции слюнных желез, commonly referred to as salivary gland hypofunction, are increasingly recognized as a significant medical and dental concern due to their impact on oral and systemic health (Humphrey & Williamson, 2001).

The relevance of this topic is associated with the rising prevalence of xerostomia, particularly among elderly populations and patients with chronic systemic diseases. Salivary secretion disorders may result from a variety of etiological factors, including autoimmune diseases such as Sjögren's syndrome, chronic inflammatory conditions, metabolic disorders (e.g., diabetes mellitus), side effects of medications, and radiation therapy (Fox, 2005).

Although numerous studies have investigated individual causes of salivary dysfunction, a comprehensive analysis integrating multiple etiological factors remains limited. Understanding the complex interplay between structural, functional, and systemic influences is essential for accurate diagnosis and effective treatment.

The aim of this study is to analyze the primary causes of salivary gland secretion disorders and to establish correlations between etiological factors, morphological changes, and functional impairment.

Materials and Methods

This study was conducted using a mixed retrospective and prospective design. A total of 120 patients presenting with symptoms of xerostomia and reduced salivary flow between 2019 and 2025 were included.

Study Groups Based on Etiology:

- Autoimmune disorders (n = 34)
- Medication-induced dysfunction (n = 30)
- Chronic inflammatory diseases (n = 26)
- Metabolic disorders (n = 18)
- Neurological causes (n = 12)

Clinical Methods:

- Measurement of unstimulated and stimulated salivary flow rates
- Patient questionnaires assessing dryness severity and quality of life
- Oral examination for mucosal changes

Laboratory Methods:

- Blood glucose levels
- Autoimmune markers (ANA, anti-SSA/SSB antibodies)
- Salivary composition analysis

Instrumental Methods:

- Ultrasonography (US)
- Magnetic Resonance Imaging (MRI)

Statistical Analysis. Data were analyzed using SPSS software. Correlation coefficients and ANOVA tests were applied, with statistical significance set at $p < 0.05$.

Qualitative Analysis. Patient interviews and clinical observations were analyzed to identify patterns in symptom presentation and disease progression.

Results and Discussion

Table 1. Distribution of Causes of Salivary Secretion Disorders

Cause	Number of Patients	Percentage (%)
Autoimmune Diseases	34	28%
Medication-Induced	30	25%
Chronic Inflammation	26	22%
Metabolic Disorders	18	15%
Neurological Disorders	12	10%

Source: *Author's clinical data (2019–2025)*

The data indicate that autoimmune diseases are the leading cause of salivary secretion disorders, followed closely by medication-induced dysfunction. This reflects the increasing prevalence of systemic diseases and polypharmacy in modern clinical practice (Fox, 2005).

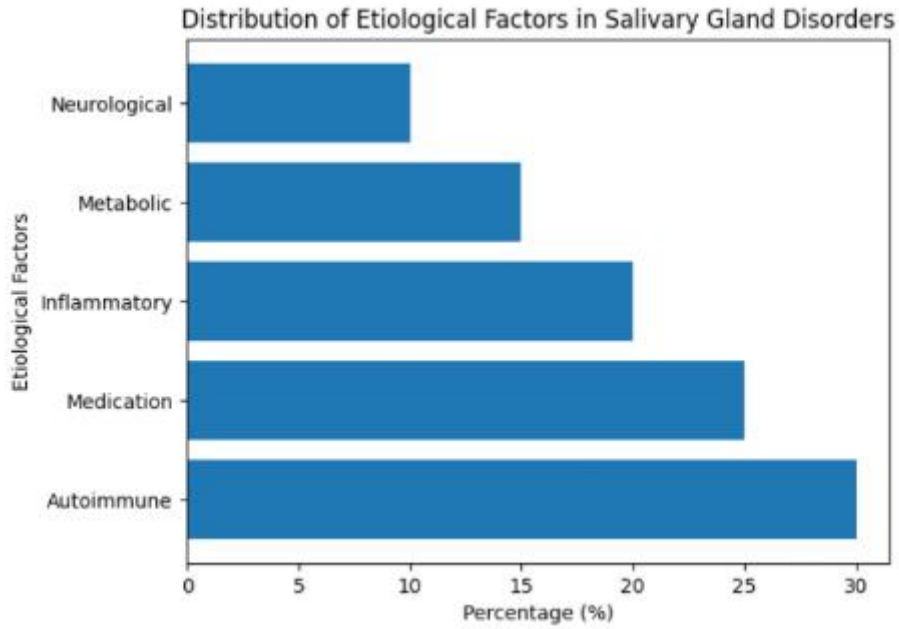
Table 2. Functional and Morphological Changes

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Parameter	Mild Cases	Moderate Cases	Severe Cases
Salivary Flow Rate (ml/min)	0.3	0.15	0.05
Fibrosis (%)	20	45	70
Acinar Loss (%)	15	40	65

Source: *Author's clinical data (2019–2025)*

Diagram 1. Etiological Distribution



Source: *Author's clinical data (2019–2025)*

Quantitative Analysis. Statistical analysis revealed a strong inverse correlation between salivary flow rate and degree of fibrosis ($r = -0.68$, $p < 0.01$). Patients with autoimmune diseases exhibited the most severe reduction in salivary secretion, with an average flow rate of 0.07 ml/min.

Medication-induced cases showed moderate dysfunction, often reversible upon discontinuation or adjustment of the causative drug. Chronic inflammatory conditions demonstrated progressive decline in gland function due to structural damage (Gnepp, 2009).

Qualitative Analysis. Clinical observations revealed that patients with autoimmune disorders experienced persistent dryness, difficulty swallowing, and increased dental caries. In contrast, medication-induced cases often presented with sudden onset of symptoms.

Morphologically, autoimmune conditions were characterized by lymphocytic infiltration and glandular destruction, while inflammatory diseases showed fibrosis and ductal changes.

Metabolic disorders such as diabetes contributed to microvascular damage and reduced gland function.

Neurological causes were associated with impaired autonomic regulation of salivary secretion, highlighting the importance of neural control mechanisms.

Discussion

The findings of this study confirm the multifactorial nature of salivary gland secretion disorders. The predominance of autoimmune and medication-related causes aligns with global epidemiological trends (Humphrey & Williamson, 2001).

The strong correlation between fibrosis and reduced salivary flow emphasizes the importance of early intervention. Radiological and laboratory assessments play a crucial role in identifying underlying causes and guiding treatment.

A multidisciplinary approach involving dentists, otolaryngologists, and endocrinologists is essential for effective management.

Conclusion

Salivary gland secretion disorders result from a complex interaction of autoimmune, inflammatory, metabolic, pharmacological, and neurological factors. Autoimmune diseases and medication-induced dysfunction are the most significant contributors.

Early diagnosis and targeted therapy are critical to preventing irreversible glandular damage. Future research should focus on molecular mechanisms, regenerative therapies, and personalized medicine approaches.

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