

Clinical Features of Fissured Tongue: Modern View on Etiology, Diagnosis and Clinical Manifestations

Khaydar Kamilov

Head of Hospital Therapeutic Dentistry Department, MD, Professor, Tashkent State Medical University, Tashkent, Uzbekistan

Aliya Kadirbaeva

Hospital Therapeutic Dentistry Department, MD, Associate Professor, Tashkent State Medical University, Tashkent, Uzbekistan

Saodat Musaeva

Teaching Assistant, Medical Faculty, Termez, Uzbekistan

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Abstract

Fissured tongue (lingua plicata, scrotal tongue) is one of the most common benign developmental anomalies of the tongue characterized by multiple grooves and fissures located predominantly on the dorsal surface. Despite the benign nature of the condition, fissured tongue may be associated with burning sensation, halitosis, food retention, secondary inflammation, and several systemic disorders. The prevalence varies widely from 2% to 30% depending on geographic region, age, and diagnostic criteria. The condition is frequently associated with geographic tongue, psoriasis, Down syndrome, Melkersson-Rosenthal syndrome, diabetes mellitus, and nutritional deficiencies. Modern literature demonstrates increasing interest in the relationship between fissured tongue and systemic diseases, immunological disorders, and oral microbiome changes. This review summarizes contemporary data regarding epidemiology, etiopathogenesis, classification, and especially the clinical manifestations of fissured tongue. Particular attention is paid to differential diagnosis and modern approaches to management and prevention.

Keywords: Fissured tongue, lingua plicata, oral mucosa, tongue disorders, clinical manifestations, oral diagnosis.

Introduction

The tongue is considered an important indicator of both oral and systemic health. Changes in its morphology may reflect developmental anomalies, inflammatory diseases, metabolic disorders, or syndromic conditions. Fissured tongue (FT), also known as lingua plicata or scrotal tongue, represents a benign condition characterized by grooves of varying depth on the dorsal and lateral surfaces of the tongue.

Although fissured tongue is generally asymptomatic, some patients experience discomfort, burning sensation, halitosis, and irritation caused by retention of microorganisms and food debris within the fissures. The condition has gained increasing attention because of its possible association with systemic diseases including psoriasis, diabetes mellitus, Down syndrome,

Melkersson–Rosenthal syndrome, and immunological disorders.

The aim of this review is to summarize contemporary literature data regarding the clinical manifestations and diagnostic features of fissured tongue [1,2].

Epidemiology

The epidemiological distribution of fissured tongue demonstrates considerable variability among different populations worldwide, with reported prevalence rates ranging from 2% to 30%. Such substantial differences may be attributed to multiple factors, including ethnic and genetic characteristics of the studied populations, heterogeneity of diagnostic approaches and classification systems, age-related demographic variations, as well as

environmental and lifestyle influences. Furthermore, disparities in oral hygiene practices, nutritional status, and prevalence of associated systemic diseases may also contribute to the observed epidemiological inconsistency [1,3].

Recent epidemiological investigations have provided important data regarding the frequency of fissured tongue in various geographic regions. In particular, studies conducted among patients attending oral medicine clinics in Nepal revealed a prevalence of approximately 13.5%, whereas investigations among dental patients in Turkey demonstrated a prevalence of 12.1%. These findings confirm that fissured tongue represents a relatively common condition encountered in routine dental and oral medicine practice.

Age-related analysis indicates that fissured tongue is observed predominantly in adult and elderly populations, while its occurrence in children is comparatively infrequent. The increased prevalence among older individuals may be associated with progressive epithelial alterations, chronic mechanical irritation, age-related degenerative changes of the oral mucosa, and cumulative exposure to local and systemic predisposing factors throughout life [4,5].

With regard to gender distribution, several authors have reported a slightly higher prevalence of fissured tongue in males compared with females. Nevertheless, the issue of sex predilection remains controversial, as other studies failed to demonstrate statistically significant gender differences. These inconsistencies may reflect variations in sample size, population characteristics, and methodological design among epidemiological investigations.

Etiology and Pathogenesis

The precise etiology and pathogenesis of fissured tongue have not yet been fully elucidated. Contemporary scientific literature considers this condition to be multifactorial in origin, involving the interaction of genetic, local, and systemic factors. Among the proposed mechanisms, hereditary predisposition is regarded as one of the most significant etiological contributors. Numerous studies have reported familial clustering of the condition, suggesting the possible involvement of polygenic inheritance and genetically determined alterations in the structure and keratinization of the lingual epithelium.

In addition to genetic susceptibility, several predisposing and contributing factors have been identified. Age-related changes appear to play an important role in the development and progression of fissured tongue, as the condition is more frequently observed in elderly individuals. Degenerative alterations of the oral mucosa, reduction of epithelial regenerative capacity, and prolonged exposure to mechanical and chemical irritants may contribute to the formation of fissures over time [6,7].

Chronic inflammatory processes within the oral cavity are also considered important pathogenic factors. Persistent low-grade inflammation may induce structural changes in the lingual epithelium, leading to the development of grooves and fissures. Nutritional deficiencies, particularly

deficiencies of B-complex vitamins, have likewise been implicated in the pathogenesis of fissured tongue due to their role in epithelial metabolism and mucosal integrity.

Xerostomia represents another significant contributing factor. Reduced salivary secretion may impair the protective and cleansing functions of saliva, thereby increasing susceptibility to mucosal irritation, microbial colonization, and epithelial damage. Similarly, tobacco consumption has been associated with various morphological alterations of the oral mucosa, including hyperkeratosis and epithelial irritation, which may facilitate fissure formation [8].

A number of systemic diseases have also been linked to fissured tongue, including diabetes mellitus, psoriasis, Down syndrome, Melkersson–Rosenthal syndrome, and certain immunological disorders. In many cases, fissured tongue may serve as an oral manifestation or accompanying sign of these systemic conditions.

Local irritative factors, such as mechanical trauma, poorly fitting dental prostheses, sharp tooth edges, and chronic exposure to spicy or acidic foods, may additionally contribute to the development or exacerbation of fissures [9].

Histopathological examination of fissured tongue typically reveals epithelial hyperplasia, elongation of rete ridges, focal loss or atrophy of filiform papillae, and chronic inflammatory cell infiltration within the underlying connective tissue. These microscopic findings support the hypothesis that chronic irritation and inflammatory processes are involved in the pathogenesis of the condition.

A particularly strong association has been consistently documented [10] between fissured tongue and geographic tongue. Many patients present with both lesions simultaneously, suggesting the possibility of a common etiopathogenetic mechanism. Some investigators propose that long-standing geographic tongue may predispose to the subsequent development of fissures due to chronic inflammatory and degenerative alterations affecting the dorsal surface of the tongue.

Clinical Manifestations

Clinically, fissured tongue is characterized by the presence of multiple grooves and fissures predominantly localized on the dorsal surface of the tongue, although in some cases the lateral borders may also be involved. The morphological characteristics of the fissures demonstrate considerable variability among patients. The grooves may differ significantly in their number, depth, length, orientation, and branching configuration, resulting in a wide spectrum of clinical presentations.

The most frequently observed clinical pattern consists of a prominent central longitudinal fissure extending along the median line of the tongue, accompanied by multiple smaller transverse or obliquely oriented fissures radiating laterally from the central groove. In more pronounced cases, numerous intersecting fissures and irregular grooves create a complex folded appearance resembling the convolutions of the cerebral cortex, often described in the

literature as a “cerebriform” or “scrotal” tongue.

The depth of the fissures may vary from superficial shallow grooves to deep clefts penetrating several millimeters into the lingual mucosa. In most cases, the fissures range from approximately 2 to 6 mm in depth. Deep fissures may facilitate the accumulation of food debris, desquamated epithelial cells, and microorganisms, thereby predisposing the patient to halitosis, irritation, secondary inflammation, and discomfort during eating.

The dorsal mucosal surface between the fissures may appear normal or may demonstrate mild depapillation, erythema, or inflammatory changes, particularly in patients with associated geographic tongue or poor oral hygiene. In the majority of cases, fissured tongue remains asymptomatic; however, some individuals report burning sensation, increased sensitivity to spicy foods, or mild soreness associated with secondary irritation [11].

Classification of Clinical Forms

Several clinical forms of fissured tongue have been described based on the morphology and distribution of the grooves and fissures.

The central longitudinal type is characterized by the presence of a single deep fissure located along the midline of the dorsal tongue surface. This represents one of the simplest and most commonly recognized forms of the condition.

The branching type demonstrates a central longitudinal fissure accompanied by numerous smaller lateral branches extending outward in various directions. This pattern creates a tree-like or reticular appearance and is frequently encountered in clinical practice.

The diffuse type is characterized by multiple irregular fissures distributed across the entire dorsal surface of the tongue without a dominant central groove. The fissures may intersect extensively, producing a markedly folded or cerebriform appearance.

In the transverse type, the fissures are oriented predominantly perpendicular to the longitudinal axis of the tongue. This form is less common and usually presents with several parallel transverse grooves [12].

The mixed type represents a combination of two or more fissure patterns within the same patient. Mixed morphological presentations are relatively common due to the progressive and variable nature of the condition.

Among these variants, the diffuse and branching forms are considered the most frequently encountered in routine dental and oral medicine practice. The degree of fissuring may gradually increase with age, reflecting the chronic and progressive character of the condition.

Symptoms

In the majority of cases, fissured tongue is asymptomatic and does not cause significant functional impairment. Consequently, the condition is frequently identified

incidentally during routine dental or oral examinations. Many patients remain unaware of the presence of fissures until informed by a dental practitioner. The benign and chronic nature of the lesion generally contributes to the absence of severe clinical complaints.

Nevertheless, symptomatic forms of fissured tongue may occur, particularly in cases involving deep fissures, inadequate oral hygiene, secondary infection, or concomitant inflammatory conditions of the oral mucosa. Patients with symptomatic fissured tongue may complain of a variety of subjective sensations and discomforts affecting oral function and quality of life.

One of the most commonly reported symptoms is a burning sensation involving the dorsal surface of the tongue. This symptom may vary in intensity and is often aggravated by the consumption of spicy, acidic, salty, or hot foods and beverages. Some patients additionally experience soreness and persistent irritation of the tongue, especially when deep fissures become mechanically traumatized during mastication or speech.

Halitosis is another frequent complaint associated with fissured tongue. The irregular topography of the tongue surface creates favorable conditions for the retention of food debris, desquamated epithelial cells, and bacterial biofilm within the fissures. The accumulation and subsequent decomposition of organic material may result in unpleasant oral odor and contribute to microbial overgrowth.

Certain patients may also report taste disturbances, including altered taste perception or unpleasant taste sensations. These symptoms may be associated with chronic inflammatory changes affecting the lingual mucosa or microbial colonization within the fissures.

Increased sensitivity to spicy, acidic, or irritative foods is commonly observed in symptomatic individuals. Deep fissures expose the underlying mucosal tissues to mechanical and chemical irritation, thereby increasing mucosal sensitivity and discomfort during eating. In more severe cases, patients may experience pain or discomfort during mastication, particularly when fissures become inflamed or secondarily infected [13].

The development of symptoms is generally associated with retention of food particles and microorganisms within the fissures. Such retention may promote chronic irritation, secondary inflammatory reactions, and, in some cases, candidal colonization. Opportunistic fungal infection, particularly by *Candida albicans*, may further exacerbate burning sensation, soreness, and erythema of the tongue surface.

Poor oral hygiene, xerostomia, smoking, systemic diseases, and nutritional deficiencies may additionally contribute to symptom severity and increase the likelihood of secondary complications. Therefore, adequate tongue hygiene and elimination of predisposing factors play an important role in the prevention of symptomatic manifestations in patients with fissured tongue.

Conclusion

Fissured tongue represents a relatively common benign developmental anomaly of the oral mucosa characterized by the presence of multiple grooves and fissures on the dorsal surface of the tongue. The condition demonstrates considerable clinical variability with respect to the number, depth, orientation, and distribution of fissures, resulting in diverse morphological presentations. In most individuals, fissured tongue remains asymptomatic and is detected incidentally during routine dental examination. However, in certain cases, particularly when deep fissures are present, the condition may contribute to oral discomfort, burning sensation, halitosis, food retention, and increased sensitivity to irritative stimuli, thereby negatively affecting the patient's quality of life.

Contemporary scientific evidence indicates that fissured tongue should not always be regarded solely as an isolated benign anomaly. Numerous investigations have demonstrated clinically significant associations between fissured tongue and a variety of systemic and syndromic conditions, including psoriasis, diabetes mellitus, Down syndrome, Melkersson–Rosenthal syndrome, immunological disorders, and nutritional deficiencies. These associations suggest that fissured tongue may, in some patients, serve as an important oral indicator of underlying systemic pathology.

Accurate diagnosis of fissured tongue is primarily based on careful clinical examination and thorough evaluation of the patient's medical and dental history. Proper differential diagnosis is essential to distinguish fissured tongue from other inflammatory, infectious, and potentially premalignant lesions affecting the tongue. In symptomatic cases, additional investigations may be necessary to identify associated local or systemic contributing factors.

Despite numerous studies devoted to fissured tongue, many aspects of its etiopathogenesis remain insufficiently understood. Further clinical, histopathological, microbiological, and genetic investigations are required to clarify the precise mechanisms underlying the development of this condition and its relationship with systemic diseases. Improved understanding of the pathogenic pathways and clinical significance of fissured tongue may contribute to earlier detection of associated disorders and optimization of preventive and therapeutic strategies in oral medicine practice.

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