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Fissured tongue: A sign of tongue edema?

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ABSTRACT

Fissured tongue (FT) is a condition frequently seen in the general population. Clinically, FT is characterized by grooves that vary in depth and are noted along the dorsal and/or dorsolateral aspects of the tongue. Furthermore, FT presents many enlarged, smooth filiform papillae and subepithelial inflammatory infiltration. Despite of many studies, the etiology of FT remains obscure. FT is believed to be a congenital anomaly associated with several disorders and with geographic tongue (GT).

We hypothesize that FT is not a congenital anomaly, and FT with swollen filiform papillae may represent edema in the subepithelial tissue of the tongue.

According to the literature, the difference in prevalence among different age groups indicates that FT is not a congenital disorder. FT appears to occur more commonly in adults, and it is very rare or not at all in children younger than 10 years old. An association between FT and GT is well established in the literature, supporting the results of previous authors suggesting that FT might be a consequence of GT. The most remarkable finding in the region of swollen papillae of FT samples has been the subepithelial infiltrates of polymorphonuclear leucocytes and lymphocytes causing the subepithelial edema. The clinically visible grooves and large edematic papillae clustered on the region of the fissures might be caused by the inflammation and edema underneath the epithelium.

In the future, FT and GT must be researched together as two different entities of the same disease so that GT is a prestage of FT. The diagnosis of FT must be taken to consideration whether the tongue surface have smooth and swollen papillae or normal-appearing filiform papillae.

Introduction

Fissured tongue (FT), also known as lingua fissurata, plicated tongue, scrotal tongue and grooved tongue, is a condition frequently seen in the general population. FT is believed to be a congenital anomaly. Clinically, it is characterized by grooves that vary in depth and are noted along the dorsal and/or dorsolateral aspects of the tongue [1]. Furthermore, FT presents many enlarged, smooth papillae [2–4], which are filiform papillae without hairs seen by scanning electron microscopy [5].

Despite of many studies, the etiology of FT remains obscure, but several conditions associated with FT have been reported including psoriasis [6–11], orofacial granulomatosis [12,13], pernicious anemia [14], low serum levels of vitamin A [15], down syndrome [16,17], diabetes mellitus [18] and certain autoimmune diseases [19]. Furthermore, FT is one of the three symptoms of Melkersson–Rosenthal syndrome (MRS) [20,21]. Our review of scientific literature found many studies demonstrating the association between FT and geographic tongue (GT) which is a common immunological tongue disease of unknown etiology [9,22–24]. Furthermore, it is suggested a genetic basis for the development of these two tongue disorders [25–27].

In this study, we hypothesize that FT is not a congenital anomaly, but it is a sequel of GT. Furthermore, FT with swollen papillae may represent edema in the subepithelial tissue of the tongue. Our understanding of this is based on the literature review, our own investigations and long-term clinical follow-up.

Diagnosis and clinical appearance of FT

The clinical diagnosis of FT is based on deep grooves or fissures on the dorsal and lateral surfaces of the tongue. At present, there is

Abbreviations: FT, fissured tongue; GT, geographic tongue; MRS, Melkersson–Rosenthal syndrome.

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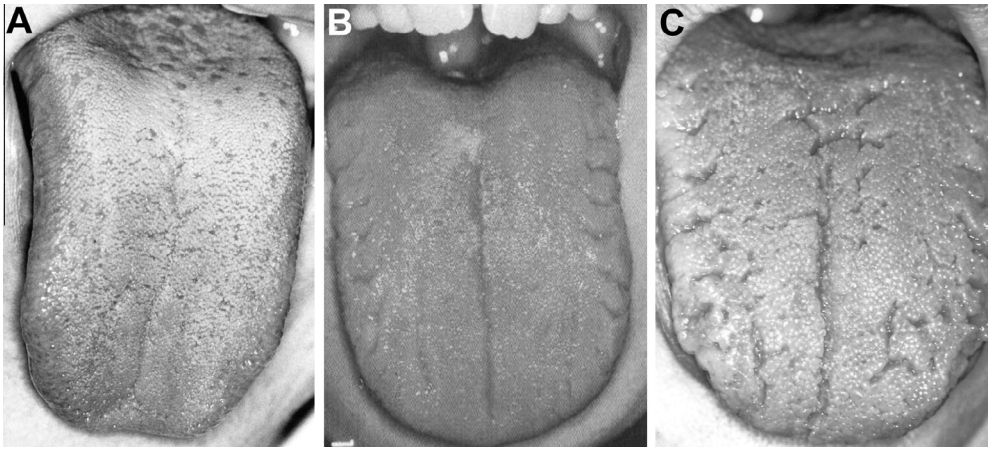

Fig. 1. (A) Clinically healthy tongue contains filiform papillae interspersed with hairs and smooth fungiform papillae among them. (B) Fissured tongue with enlarged papillae clustering on the region of the fissures along the dorsolateral aspects of the tongue. (C) The dorsal surface of FT contains enlarged smooth papillae.

no consensus regarding the establishment of more universal criteria for the diagnosis of FT. Review of the literature faces considerable diagnostic problems because of the absence of standard protocols. Because the clinical appearance of FT and the pattern of grooves vary widely, it is difficult to estimate the degree of fissuring and the extent to which fissuring must be present before a tongue can actually be called fissured.

Two main types of FT have been found clinically: fissures cover the whole surface of the dorsal tongue or they localized on the dorsolateral part of the tongue. In some investigations, attention has been paid to the varied structure of the papillae and the fissures have been combined with unusually large swollen papillae [2–5]. We focused on the papillary structure of FT tongues, and indeed, the enlargement of lingual papillae of the tongue is a main clinical feature of FT (see Fig. 1).

The variation in the anatomy of the tongue papillae and especially the size of papillae may itself be the diagnostic criteria of FT. In our own investigations, we have used the following criteria: (a) healthy tongue with filiform papillae (Fig. 1A) and (b) fissured tongue with grooves and smooth-surfaced papillae, which are clustered on the region of the fissures (Figs. 1B, C and 2A).

Because the papillary topography and morphology of the tongue is complex, FT may be misdiagnosed in many studies. Some tongue entities as "Eruptive lingual papillitis" [28,29], "fungiform papillary glossitis" [30] and "chronic lingual papulosis" [31] with swollen lingual papillae have been documented in recent years. We believe that almost all of those entities may be classified as fissured tongue.

Epidemiology

FT is a common oral lesion occurring in approximately 5–6% of the general population, although the prevalence has been reported to vary from 1% to 42.8% [1,32–35]. FT rarely or not at all occurs before the age of 4 years and has been observed in only 0–2.11% of children younger than 10 years old [36–40]. It has been shown clearly that the prevalence of FT increases with age [1,36]. On the other hand, GT starts in childhood, and it is one of the most common conditions of the oral mucosa observed in children [39,40].

Consequently, the prevalence found for FT varies widely among research groups, like students, dental outpatients, or special clinic referrals. Secondly, the clinical diagnosis of FT may be different and this could be explained by a wide range of differences in sampling and diagnosis as mentioned above.

Histopathology

While the true etiology of FT remains unknown, the histopathology of this disorder is different from that of the healthy tongue. The pathophysiological characteristics of FT include intraepithelial and subepithelial infiltrates of polymorphonuclear leucocytes and lymphocytes [4]. Furthermore, clear histoquantitative differences in the epithelium, connective tissue and uppermost muscles layers have been found between FT and healthy tongue samples, suggesting that the subepithelial connective tissues of FT may also differ from the healthy tongue [41]. Inflammation may cause edema, which could explain the increase in the thickness of subepithelial connective tissue. Furthermore, inflammation may induce breaking of the muscle bundles.

The inflammatory infiltration in the FT samples is most prominent in the subepithelial connective tissue layers [4], whereas GT presents with edema, particularly within the epithelium [42]. These findings support the results of previous authors suggesting that LF might be a consequence of GT [15,42–45].

FT contains several prominent papillae of various sizes, which are visible with scanning electron microscopy (Fig. 2A and B). These large papillae are filiform papillae without taste buds [5]. The association of smooth and swollen filiform papillae with inflammation is present in this condition [4,41].

Etiology and treatment

Scientists have long searched for what is causing FT, delving deeply into epidemiology. Numerous etiological factors, however, have been proposed for FT. FT is suggested to be inherited because the condition is seen clustering in families who are affected. Melkersson–Rosenthal syndrome is a complex neuromucocutaneous disorder of unknown etiology that is characterized by orofacial edema and perivascular lymphocytic infiltrates [20]. FT was seen in 20–40% of MRS patients [21]. The literature suggests that both FT and geographic tongue (GT) are relatively frequent in patients suffering from psoriasis [6–11]. Some reports in the literature indicate that GT may relate to immunological diseases and allergic conditions [37,46,47].

Effective treatment for FT is not known, as its etiology has not been well elucidated. Indeed, FT may be a reversible entity, because some cases have been improved. Our previous observations indicate that there is a deficiency in the defence mechanisms of patients suffering from FT and GT [48]. However, no definitive medication or therapy is suggested for FT. D'Erme and colleques [49]