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TONSILLOLITHS: CAUSES, SYMPTOMS, AND TREATMENT OPTIONS

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Abstract

Tonsilloliths, also known as tonsil stones, are calcified formations that develop in the crypts of the tonsils through the accumulation of food debris, desquamated epithelial cells, and bacteria. Although often asymptomatic, they can cause persistent halitosis, foreign body sensation in the throat, discomfort when swallowing, and recurrent episodes of tonsillitis. The diagnosis is mainly based on clinical examination, and in atypical cases, imaging investigations, such as computed tomography, can confirm the presence of deeply embedded stones. Therapeutic options range from conservative methods, such as gargling with antiseptic solutions and manual removal, to minimally invasive procedures, such as laser cryptolysis or radiofrequency. In severe or recurrent cases, tonsillectomy is the definitive solution. Prevention involves rigorous oral hygiene, proper hydration, and avoiding risk factors, such as smoking. This review explores the causes, symptoms, and treatments available for tonsilloliths, highlighting the importance of a correct diagnosis and a personalized approach for each patient, with the aim of reducing the frequency and severity of recurrent episodes.

Keywords: Tonsilloliths, tonsil stones, halitosis, chronic tonsillitis, minimally invasive treatment.

Introduction

Tonsilloliths, also known as tonsil stones, are solid, calcified formations that develop in the crypts of the tonsils, are composed of food debris, desquamated epithelial cells, and bacteria. Although often small and asymptomatic, they can cause discomfort, persistent halitosis, and, in severe cases, difficulty swallowing. Although they are not dangerous, their impact on patients' quality of life justifies the need for a correct diagnosis and prevention and treatment measures [1-3].

Tonsilloliths are more common in young adults and in people who have suffered repeated episodes of chronic tonsillitis, because recurrent inflammation favors the retention of debris in the tonsillar crypts. Predisposing factors include poor oral hygiene, insufficient salivary secretion, smoking, and a diet rich in foods that favor the accumulation of debris in the tonsils. The progressive accumulation of organic material in the crypts leads to mineralization and stone formation [1-4].

Symptoms range from chronic halitosis, one of the most common complaints of patients, to a foreign body sensation in the throat or episodes of moderate pain. In some cases, tonsil stones may be discovered by chance during a routine ENT check-up. Diagnosis is mainly based on clinical examination, but in atypical situations, imaging investigations, such as radiography or computed tomography, may be necessary to detect larger or deeper stones [1,3].

Although treatment depends on the size and associated symptoms, methods range from conservative measures (gargling with antiseptic solutions, manual mechanical removal) to

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minimally invasive techniques such as laser cryptolysis or radiofrequency. In severe cases, when tonsilloliths are associated with chronic recurrent tonsillitis, tonsillectomy may be recommended [2-4].

Prevention involves maintaining rigorous oral hygiene, optimal hydration, and avoiding risk factors such as smoking and eating foods that promote leftover retention [1,3,4]. In this review, we will take a closer look at the causes, symptoms, and treatment options available, providing a comprehensive insight into this relatively common but often underdiagnosed condition.

Causes of Tonsilloliths

Tonsilloliths, or tonsil stones, are formed by the accumulation and mineralization of food debris, desquamated epithelial cells, and bacteria in the crypts of the palatine tonsils. They are more common in patients with a history of chronic tonsillitis, where repeated inflammation leads to widening and deepening of the tonsillar crypts, facilitating the retention of organic material [3-5].

The predisposing factors of tonsilloliths are diverse, but the most important ones include poor oral hygiene, which allows the accumulation of food debris and the proliferation of anaerobic bacteria. These bacteria contribute to the degradation of proteins, generating sulfuric compounds responsible for the halitosis associated with these stones. Also, insufficient salivary secretion reduces the self-cleaning capacity of the oral cavity, favoring the stagnation of food particles [3-6].

Another major factor is chronic tonsillitis. Recurrent inflammation causes fibrosis of tonsillar tissue and the appearance of deep crypts, which act as niches for the accumulation of organic material. Patients with recurrent tonsillitis have a significantly higher risk of developing tonsilloliths compared to those without a history of tonsillar inflammation [4-6].

The oral microbiota also plays an essential role in the formation of stones. Bacterial species such as *Porphyromonas gingivalis* and *Fusobacterium nucleatum* are frequently involved in the mineralization of detritus and the formation of tonsilloliths. In addition, smoking patients are at increased risk, as smoking promotes oral dryness, irritation of the mucous membranes, and the accumulation of bacterial biofilm in the tonsil area [2,4-6].

Tonsilloliths (Fig. 1) develop as a result of a multifactorial process involving poor oral hygiene, chronic inflammation, changes in the oral microbiota, and progressive mineralization of tonsil detritus. Understanding these mechanisms is essential for the prevention and proper treatment of this condition [3,5,6].

Fig. 1. Clinical appearance of tonsilloliths at various stages of development, **I)** Prominent tonsillolith visible on the surface of the tonsils, with localized inflammation of the surrounding tissue, **II)** Tonsilloliths of small size, located deep in the tonsillar crypts, observable in the form of yellowish-white deposits.

Symptoms and diagnosis

Tonsilloliths can be asymptomatic or cause several variable clinical manifestations, depending on the size and location of the stones. The most common symptoms are persistent halitosis, pharyngeal discomfort, and foreign body sensation in the throat [4-7].

Halitosis is the main symptom reported by patients and results from anaerobic bacterial activity on proteins retained in tonsillar crypts. These bacteria produce volatile sulfuric compounds, which cause an unpleasant odor of breath, difficult to control even through rigorous oral hygiene [5-7].

Throat discomfort can range from mild irritation to moderate pain, especially when swallowing. Patients may describe the sensation of "something stuck in the throat", caused by the presence of a larger stone or associated local inflammation. In some cases, swallowing becomes difficult (dysphagia), especially if tonsilloliths are large or located deep in the crypt [6-8].

Recurrent episodes of tonsillitis may be associated with the presence of tonsilloliths, as the accumulation of organic material in the crypts can promote chronic inflammation and bacterial superinfection. Patients may experience frequent sore throat, fever, and enlarged tonsils, symptoms characteristic of tonsillitis [6-9].

Sometimes tonsil stones may be visible upon inspection of the oral cavity in the form of whitish or yellow dots on the surface of the tonsils. In more severe cases, they can cause inflammation and localized redness. The diagnosis of tonsillitis is generally clinical, based on inspection of the tonsils and anamnesis of the patient's symptoms. The examination can be performed with the help of a laryngoscope or a lingual depressor. In the case of patients with suggestive symptoms but without direct visualization of the stones, imaging investigations can be used [6-10].

Lateral cervical X-ray or computed tomography (CT) scan may reveal larger stones or stones located deep in the tonsillar tissue. These methods are especially useful in the differential diagnosis of other conditions, such as tonsil abscesses or pharyngeal foreign bodies. Tonsilloliths can be recognized based on characteristic symptomatology, and the diagnosis is based, in most cases, on clinical examination. In situations where symptoms are persistent or the diagnosis is uncertain, imaging investigations can provide additional information for an appropriate therapeutic approach [8-12].

Treatment options

The treatment of tonsilloliths depends on their size, the severity of symptoms, and the frequency of recurrent episodes. Therapeutic options range from conservative methods, used in mild cases, to minimally invasive treatments and surgeries for severe situations [8-12].

Conservative treatment

In the case of small and asymptomatic tonsilloliths, conservative measures are sufficient to control and prevent their recurrence. Gargling with salt water or antiseptic solutions, such as chlorhexidine, helps to clean the tonsil crypts and reduce the bacterial load. Oral irrigators can be used for the gentle removal of superficial stones, especially in patients who frequently suffer from this condition [10-13].

Some patients manage to remove small tonsilloliths by hand, using cotton swabs or soft-tipped applicators. However, this method must be carried out with care to avoid injuring the tonsils or favoring an infection. If tonsilloliths are associated with chronic recurrent tonsillitis, the doctor may recommend antibiotics to reduce inflammation and bacterial superinfection, but these do not eliminate the root cause of the stones [10-14].

Minimally invasive treatments

For patients with large or recurrent tonsilloliths, minimally invasive methods offer effective solutions. CO_2 laser removal is one of the most widely used modern techniques, having the advantage of vaporizing tonsil crypts and preventing the recurrence of stones. The procedure is quick, minimally painful, and requires a short recovery time. Radiofrequency cryolysis is another effective method, which involves using a radiofrequency wave device to reshape and close the amygdala crypts, reducing the risk of organic debris accumulating. This technique is preferred for patients who want a definitive solution without resorting to major surgery [11-14].

Surgical treatment

In severe cases, where tonsilloliths are large, recurrent, or associated with chronic tonsillitis, tonsillectomy (removal of the tonsils) may be recommended. This is the only definitive method of preventing tonsilloliths, but it is only indicated for patients who have persistent symptoms and significant discomfort [12-15].

Although tonsillectomy eliminates the problem, the procedure involves a longer recovery time, with significant postoperative pain and minor risks of bleeding. However, in patients with severe recurrent tonsillitis, the benefits outweigh the associated risks. Choosing the right treatment depends on the severity of the symptoms and the frequency of the episodes. In mild cases, conservative measures may be sufficient, while patients with frequent recurrence may benefit from minimally invasive procedures. For severe or complicated forms, tonsillectomy remains the definitive solution [13-16].

Prevention and recommendations

Prevention of tonsillolitis is essential for patients prone to this condition, especially those who have chronic tonsillitis or deep tonsillar crypts. Preventive measures aim to maintain optimal oral hygiene, adequate hydration, and reduce the factors that favor the accumulation of detritus in the tonsil crypts [14-16].

Effective tooth brushing, performed at least twice a day, is essential for reducing plaque and preventing the accumulation of food debris in the tonsil area. The use of antiseptic mouthwashes, such as those based on chlorhexidine or cetylpyridium, can help maintain a healthy oral environment and prevent the development of anaerobic bacteria responsible for halitosis [14-17].

In addition, cleaning the tongue with a special scraper reduces the bacterial load and prevents the accumulation of compounds that promote the formation of tonsilloliths [14-17].

Drinking enough water stimulates the production of saliva, which plays an essential role in maintaining the microbiological balance of the oral cavity and in self-cleaning the tonsils. People with a tendency to xerostomia (dry mouth) are more prone to the formation of tonsilloliths, since the lack of saliva favors the accumulation of debris in the tonsillar crypts. Smoking is an aggravating factor, as it irritates the mucous membranes, promotes oral dryness, and contributes to the development of a pathogenic bacterial biofilm. Quitting smoking reduces the risk of tonsilloliths and improves overall oral health [15-18].

Also, a balanced diet rich in fiber and hard-textured foods, such as apples and carrots, can help self-cleanse the tonsils by mechanically stimulating tonsillar tissue. Avoiding sticky or processed foods, which can promote the retention of food debris, is another effective preventive measure. People with a history of chronic tonsillitis or recurrent tonsillitis should have regular check-ups with the ENT doctor for evaluation of tonsillar crypts and prevention of complications. In case of persistent symptoms, minimally invasive methods such as laser cryptolysis or radiofrequency can be considered to reduce the risk of recurrence [16-19].

Adopting rigorous oral hygiene, maintaining good hydration, and avoiding risk factors are essential for preventing tonsillitis. Patients with recurrent episodes should be monitored

regularly and discussed with the ENT doctor about the options available to prevent the recurrence of tonsil stones [17-20].

Conclusions

Tonsillolitis is a common but often underdiagnosed condition that can affect patients' quality of life through symptoms such as persistent halitosis, discomfort when swallowing, and recurrent episodes of tonsillitis. They are formed by the accumulation and mineralization of detritus in the tonsil crypts, a process favored by factors such as poor oral hygiene, chronic inflammation, and changes in the oral microbiota.

The diagnosis is, in most cases, clinical, based on visual examination of the tonsils and anamnesis of the patient's symptoms. In situations where stones are deeply embedded or cause severe symptoms, imaging investigations such as computed tomography may be necessary to confirm the diagnosis. Treatment options vary depending on the size and severity of the symptoms. Conservative measures, such as gargling with antiseptic solutions and the use of oral irrigators, are effective in mild cases. For patients with recurrent or large stones, minimally invasive methods such as laser cryptolysis or radiofrequency offer effective solutions without requiring major surgery. In severe cases, where tonsilloliths are associated with recurrent chronic tonsillitis, tonsillectomy remains the only definitive method of treatment.

Prevention is essential and includes maintaining rigorous oral hygiene, proper hydration, and avoiding risk factors such as smoking or excessive consumption of sticky foods. Patients with a history of recurrent tonsillitis should be monitored periodically by an ENT doctor and considered for appropriate treatment options to prevent their recurrence. Tonsillitis is a treatable and preventable condition, and the therapeutic approach must be adapted to each patient depending on the severity of the symptoms and the frequency of the episodes. A combination of preventive measures and minimally invasive treatments can ensure effective control of this problem, thus improving the quality of life of affected patients.

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