

Review Article

Clinical patterns, causes, and treatment of torus palatinus

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ABSTRACT

There are two types of tori, including torus palatinus and torus mandibularis. Evidence shows that these lesions usually progress slowly, and a spontaneous growth stop is usually another characteristic. Affected patients are usually asymptomatic. However, symptoms might be reported in edentulous patients and cases when the lesion is huge. In the present study, we elaborated on the causes, clinical patterns, and treatment of torus palatinus. The etiology of the condition is unclear, and different theories were reported in the literature, suggesting that the etiology of these cases is usually attributed to environmental and genetic predisposition. It has been defined as a benign tumor that presents in the maxillary bone and is usually asymptomatic. Therefore, the diagnosis of the condition is usually easy. However, it is recommended to conduct a differential diagnosis with other relevant malignant lesions in this area. Surgical interventions are not usually needed as the condition is usually discovered accidentally. However, in cases of tori-related prosthetic or functional discomfort, surgery can be conducted.

Keywords: Torus palatinus, Palatal torus, Epidemiology, Etiology, Management, Clinical

INTRODUCTION

The term tori is a Latin word that means lump or stand out and has been used to describe bone exostosis with a dense cortex with a minimal amount of bone marrow and is covered by a poorly vascularized thin mucosa.¹

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usually another characteristic.^{1,2} Affected patients are usually asymptomatic. However, symptoms might be reported in edentulous patients and cases when the lesion is huge. The epidemiology of the condition is inconsistent among different studies in the literature, and evidence from various studies suggests that the prevalence usually ranges between 2% to 56%.³⁻⁷ Many data are reported in the context of the etiology and pathology of these lesions. Moreover, many factors were reported to predispose to its occurrence. However, no evident data was found among the different studies regarding the origin of these lesions.^{8,9}

The aim of the study was to discuss the causes, clinical patterns, and treatment of torus palatinus based on evidence from previous studies.

METHODS

This literature review is based on an extensive literature search in Medline, Cochrane, and EMBASE databases on which was performed 3rd December 2021 using the Medical subject headings (MeSH) or a combination of all possible related terms, according to the database. To avoid missing potential studies, a further manual search for papers was done through Google Scholar, while the reference lists of the initially included papers. Studies discussing clinical patterns, causes, and treatment of torus palatinus were screened for useful information, with no limitations posed on date, language, age of participants, or publication type.

DISCUSSION

Causes

Evidence shows that there is no clear etiology for the pathogenesis and development of torus palatinus among the different studies. However, it should be noted that some studies suggested that genetic predisposition usually plays a role in this context. On the other hand, previous studies indicated that oral exostoses are usually attributed to different environmental factors that contribute to the pathology of torus palatinus. Some studies also indicate that masticatory parafunction and hyperactivity might be key factors for developing these disorders. Moreover, others reported that diet, including calcium and unsaturated fatty acids, might also have a role in this context.¹⁰⁻¹² However, this evidence is not adequately validated among the current studies. Overall, it has been shown that multiple factors are usually involved in the etiology of torus palatinus. In this context, it has been shown that both environmental and genetic factors usually have a role in the development and pathogenesis of oral exostosis. However, this evidence needs further validation.¹²

Studies also reported that the etiology of the condition might be attributed to the presence of superficial injuries among patients with abraded teeth or well-developed chewing muscles. A previous investigation reported that the incidence of tori was significantly associated with the presence of abraded teeth.^{1,5,6,11,13-17} However, it should be noted that such findings were observed for patients from Thailand, while no significance was reported for patients from Germany.¹⁸ Moreover, previous studies reported that functional habits were also significantly associated with the incidence of torus mandibularis.^{5,13-15,19} However, these studies also reported that these factors were not associated with torus palatinus. In another context, studies also indicated that the nature of the diet, states of supplements rich in calcium and vitamin deficiency, and eating habits might also predispose to developing these

conditions.^{5,13,14,16,17,20,21} In these relevant investigations, it has been reported that the presence of tori is significantly associated with fish consumption. This has been attributed to vitamin D3 unsaturated $\Omega 3$ fatty acids in fish, promoting bone growth.^{14,21} A previous study also aimed to determine a potential correlation between the prolonged administration of phenytoin and the occurrence of tori.²² However, no significant association could be estimated in this event. However, it has been shown that this modality can contribute to the size of tori because it significantly acts as an osteogenic agent, increasing calcium homeostasis. Previous studies also reported that there might be a correlation between the presence of tori and the number of teeth in the patient's mouth.^{20,23} However, this correlation is more evident in cases of mandibular tori only, while evidence regarding torus palatinus needs further validation.

Epidemiological data also show that the condition is more common among females, and some even claimed that it might be linked to the X chromosome.^{1,4,21} Although most of the relevant studies in the literature reported that these findings are significant, some studies reported that the correlation was insignificant, although the prevalence was higher among females than males in their population.⁸ Another study in Saudi Arabia reported that the condition was more common among males.³ However, no statistical significance was estimated in terms of age and sex. Other studies also linked the presence of tori to certain populations and ethnic groups (including the United States, Japanese, Eskimos).⁸ In this context, a previous investigation reported that the prevalence of torus palatinus was more significant among Caucasians. In contrast, the prevalence of torus mandibularis was significantly higher among African Americans and North Americans.¹⁵ However, it should be noted that the incidence of the condition is not consistent among individuals and studies within a specific population, and huge variations were reported. For instance, a previous study reported that the prevalence of torus palatinus was 9.22% in a Norwegian population.⁷

On the other hand, another study reported a much higher prevalence rate, being 36.1%.²⁴ Similar contraindications were also found among studies in Thailand. For instance, a study reported that the prevalence of torus palatinus was 23.1% in their population,¹⁸ while another study estimated a prevalence rate of 58%.¹³ The age might also be an interesting finding to consider when studying tori. However, findings among relevant studies are inconsistent and make it hard to compare these events and link them to a certain age group. Among the different studies, it has been reported individuals usually experience tori at an average age of 34 years old.⁵ Another study also reported that patients are usually 39.2 years old when they experience torus palatinus.¹⁴ These factors might help understand the pathology and etiology of the condition. However, the findings among different studies are inconsistent and need further elaboration by future research. Accordingly, further studies are encouraged.

Clinical patterns

Among the different studies in the literature, it has been concluded that most cases with torus palatinus are usually asymptomatic. Therefore, these conditions are usually accidentally discovered by the patients or during routine examination by practitioners.^{25,26} Therefore, the diagnosis is usually based on clinical parameters. However, it has been furtherly shown that pathological and radiological studies might also help confirm the diagnosis of these cases.^{12,27} They are usually found as hard, symmetrical, and median palatal tumefactions that are usually present across the longitudinal ridge of the hard palate. Moreover, it has been shown that these conditions can either be lobular, fusiform, nodular, or flat in shape. Reports show that the most common shape that is usually observed is the flat one. Evidence shows that it usually has a smooth appearance and symmetric distribution. Besides, these lesions are usually covered by mucosa that appears hypovascularized, thin, and normal. When exposed to traumatic events, it has been shown that these structures usually induce inflammation and ulceration.^{12,27-29}

Using an orthopantomogram can adequately detect these lesions. However, studies indicate that for better evaluation of torus palatinus and establishing a proper diagnosis of the condition, using computed tomography is favorable in these cases, revealing all of the associated characteristics.^{30,31} In this context, reports show that the characteristic findings include that the lesions have a density similar to combat bone, with a median mass lifting the palatal mucosa. Besides, they are usually observed as oblong, symmetrical, and hyperdense. It has been furtherly reported that a spongy bone core might feature large palatal tori (Figure 1).^{12,32}

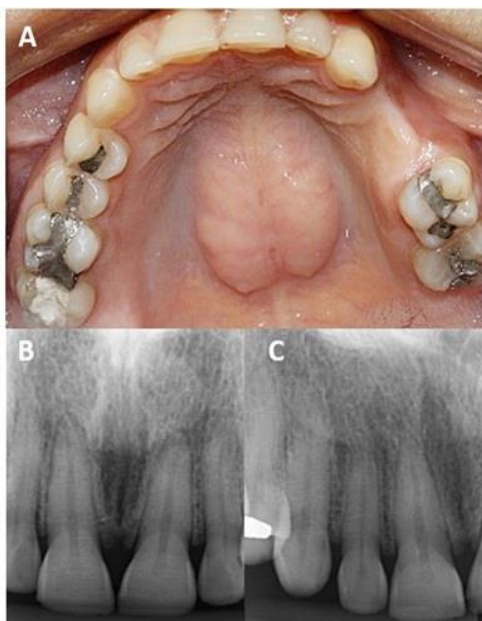


Figure 1: (A) Exuberant torus palatinus; (B) periapical radiograph of central incisors; and (C) Periapical radiograph of the upper right canine.³²

Treatment

Evidence indicates that no specific management approaches are usually required for patients with palatal tori. This has been attributed to the fact these patients are usually asymptomatic, and the condition is a benign tumor of the maxillary bone. However, it has been reported that surgical approaches can be conducted in pre-prosthetic surgery or prosthetic instability cases. In this context, it has been reported that the presence of palatal tori might deprive a basic supporting area for prosthetic sustention and stability. Accordingly, these lesions can significantly impair the quality of removable prosthetic rehabilitation or make it unachievable.

Other indications for surgical management might include the presence of therapeutic complications (including osteochemonecrosis secondary to the administration of bisphosphonates and spontaneous bone exposure), the presence of functional disorders (phonation, swallowing, chewing, and others), and pre-implant development (autogenous bone collection site). Other events might also include psychological conditions (carcinophobia), hygiene issues (accumulation of food debris), and the development of traumatic events during chewing (including mucosal ulceration and erosions). When these events are present (and surgery is indicated), evidence shows that it is the only valid option in these situations.^{33,34}

The main aim of conducting surgical approaches is to enhance the quality of prosthetic rehabilitation and restore the physiological functions of the orofacial region with no apparent adverse events and secondary complications. Therefore, local anesthesia is usually required for most cases. This is usually achieved by nasopalatal and large palatal nerve blocks inducing complete analgesia to the intervention's intended area. Moreover, it has been demonstrated that general anesthesia might be indicated in cases of the presence of a very posterior localization and a large palatal torus.^{6,8,10-12,15,27-29,32,35,36}

Two essential phases were described in the literature for this surgical approach. These include the bone phase and mucosal phase. Based on the morphology and location of palatal tori, four types of incisions can be induced. These include a Y incision, a double Y incision, a simple linear incision, or a double curvilinear incision. This is to delimitate an elliptical mucosal surface where the surgical incision is intended.

Accordingly, these are usually done with a long anteroposterior axis.¹² However, evidence also indicates that during these surgical approaches, and when mucoperiosteal detachment is achieved, there is an increased risk of inducing damage to the large palatal vessels and injuring corresponding mucosa and related structures, usually located at the boundaries of the torus palatinus. Rotating instruments together with curved bone scissors can be successfully used to achieve cleavage of the bony torus.

In another context, previous studies suggested that piezosurgery can be alternatively conducted to intervene against radiating fractures and traumatic oro-nasal communications by monitoring the cleavage plane direction continuously. However, it has been demonstrated that before removing large palatal tori, they might fragment. Accordingly, bone regularization is usually approached following cleavage.^{9,12}

In addition, it is critical to confirm that the mucous membrane has adequately adapted to the new palatal environment before the mucosal tissue has been closed. Besides, surgeons should perform a mucosal resection in cases when it was not adequate during the initial incision or it was not performed when the surgical procedure was conducted. Finally, to provide local compression, it has been suggested that in cases of total or partial teeth loss, a preoperatively prepared removable prosthesis or resin palatal plate can be placed at the end of the surgical procedure. This step has been associated with various advantages. These include reduced postoperative sensitivities, enhanced protection of the mucosal wound, and reduced incidence of postoperative bleeding. Moreover, some studies even reported that such approaches would significantly reduce the risk of recurrence among operated patients.

Further evidence suggests decreasing the risk of over-correction or under-correction can be achieved by inducing a surgical resection guide to proximate the peripheral anatomical structures. It has been shown that some complications might develop postoperatively. These include mild pain, hematoma, edema, and other similar complications related to such surgical approaches. Accordingly, postoperative care for these patients should include prescribing medications like anti-inflammatory, analgesics, and antibiotics. Furthermore, advising the patient to practice adequate oral hygiene is also recommended to enhance the outcomes and prognosis in these events.^{12,18,28}

CONCLUSION

The etiology of the condition is unclear, and different theories were suggesting that these cases are usually attributed to environmental and genetic predisposition. It has been defined as a benign tumor that presents in the maxillary bone and is usually asymptomatic. Therefore, the diagnosis of the condition is usually easy. However, it is recommended to conduct a differential diagnosis with other relevant malignant lesions in this area. Surgical interventions are not usually needed as the condition is usually discovered accidentally. However, in cases of tori-related prosthetic or functional discomfort, surgery can be conducted.

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