

KAP of dentists in relation to tonsillolith and halitosis

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Abstract

Aim : To evaluate the knowledge , awareness and practice of dentists in relation to tonsillolith and halitosis

Introduction : Tonsilloliths also known as tonsil stones are calcified bodies that develops in enlarged tonsillar crypts packed with bacteria and organic debris. Tonsilloliths are relatively uncommon findings .The literature states that the Otolaryngologist may come across such a case only once in their career if at all.When deposition of calcium salts occurs in an unorganized fashion in soft tissues, it is referred to as heterotopic calcification or ossification indicating the presence of calcified mass in a non physiological site in this case the tonsils. Soft tissue bone deposition may range from being minimal and inconsequential to massive and clinically significant. Heterotopic calcification is of three types based on calcium levels : metastatic , Dystrophic and calcinosis .Tonsillolith arises as a result of dystrophic calcification(which is calcification occurring in necrotic or dead tissues) owing to chronic inflammation of the tonsils. It ranges from soft and friable to hard as stone, and deposits may be single or multiple.

Materials and methods :Randomly chosen dentist were asked to fill out a questionnaire containing 12 closed ended questions regarding tonsillolith and its symptoms

Results : It was found that only 13% of the participants had above average knowledge on tonsillolith ,66%had average and 21 have below average knowledge on tonsillolith .

Conclusion: This study shows that a majority of dental practitioners are not aware of the characteristic features of tonsillolith. Therefore awareness should be created among dentists to help diagnose and treat this condition successfully.

Key words: Tonsillolith , Halitosis .

Introduction

Tonsilloliths are calcified matter that develops in enlarged tonsillar crypts packed with bacteria and organic debris [1]. Tonsilloliths are relatively uncommon findings [1]. The literature states that the Otolaryngologist may come across such a case only once in their career if at all [1].

Tonsilloliths also known as tonsil stones are calcified bodies. When deposition of calcium salts occurs in an unorganized fashion in soft tissues, it is referred to as heterotopic calcification or ossification indicating the presence of calcified mass in a non physiological site in this case the tonsils. Soft tissue bone deposition may range from being minimal and inconsequential to massive and clinically significant [2]. Heterotopic calcification is of three types based on calcium levels : metastatic , Dystrophic and calcinosis [3]. Tonsillolith arises as a result of dystrophic calcification(which is calcification occurring in necrotic or dead tissues) owing to chronic inflammation of the tonsils. It ranges from soft and friable to hard as stone, and deposits may be single or multiple [4].

A Tonsillolith is a living biofilm . The bacteria form a three-dimensional structure with dormant bacteria being in the center to serve as a constant nidus of biofilm. The Bacteria

adhere to the tonsillar surface and secrete a slimy polysaccharide substance that holds the bacteria together and protect them against the body's immune system . Cell to cell signaling (quorum sensing) and communication with different bacteria enhances the biofilm formation. Aerobic and anaerobic microorganisms are present in tonsilloliths, with aerobic bacteria predominantly present on the external surface and anaerobic bacteria on the internal surface of the tonsillolith [5]. This pattern of bacterial arrangement ensures that the aerobic bacteria and anaerobic bacteria exist in their respective and specific favourable environments ,in fact this characteristic arrangement is a natural manifestation of tonsillolith .

Most patients with tonsillolith are asymptomatic, and no surgical intervention is needed. However, it may cause symptoms, halitosis being more common with rare occurrences of dysphagia, odynophagia .the severity of the symptoms is based solely on the size of tonsillolith. Larger the size more severe the symptoms .

Halitosis is a frequent finding in dental practice. Halitosis is caused primarily by bacterial putrefaction and the generation of volatile sulfur compounds. Ninety percent of patients suffering from halitosis have oral causes, such as poor oral hygiene, periodontal disease, tongue coat, food impaction, unclean dentures, faulty restorations, oral carcinomas, and throat infection [6,7]. Tonsillolith is an uncommon cause of bad breath and therefore awareness and knowledge amongst the dental community is necessary.

Hence the aim of this study is to evaluate the knowledge, awareness and practice of dentist in relation to tonsillolith and halitosis .

Materials and methods

The study has been approved by the institutional ethical review board of saveetha dental college and hospitals.

The sample size of this study was 100 dental students . A questionnaire was used in this study in order to test the knowledge and awareness of dentists about tonsillolith and its symptoms .

Dentists were randomly selected and were asked to fill out the questionnaire containing 12 closed ended questions ,scores were given based on their knowledge. They were also informed about the study and the fact that participation was totally voluntary .At the end of the questionnaire, participants scoring below average were given information regarding tonsillolith and halitosis in order to increase their knowledge and awareness of the same.

The data was collected and sorted into tables and graphs and statistical data obtained and analysed .

RESULTS

The questionnaire was handed out to 100 participants (dentists)

Scores were obtained by scoring the participants based on the number of questions answered correctly.The participants were then divided into three categories based on the scores received :below average , average and below average .

It was found that 13% of people had above average knowledge on tonsillolith and it's relation to halitosis ,66% had average knowledge and 21 % had below average .

75% of participants answered that they were aware of what tonsillolith is but only 21% were grouped under having good knowledge of tonsillolith

When asked about the composition of tonsillolith 44% correctly answered it contains both organic and inorganic components, the majority answered it contains only organic (3%) , only inorganic(15%) or food particles ,bacteria and dead cells (38%)

59% of the participants agreed that bad oral hygiene and tonsillar crypts are the major reason for the occurrence of tonsillolith .The remaining participants chose tonsillitis (20%)

,immunocompromised state (14%) increased sugar intake (7%) to be the reason for the Occurrence of tonsillolith.

When asked about the symptoms Of tonsillolith

39% agreed that halitosis , obstruction and pain and dysphagia are all symptoms of tonsillolith , while 35% chose halitosis, 14% percent chose airway obstruction and 12 % chose pain and dysphagia to be the only symptom of tonsillolith .

58% of the participants agree that tonsillolith can be clinically seen while 42% disagree

The results of knowledge of clinical appearance and common age group of tonsillolith is given in the chart 1

37% of participants correctly answered that the clinical appearance of tosillolith is both yellowish white with varying color and varying size and color .

Also 12 % of the participants beloved tosillolith to appear advised scaling a white patch .

61% of participants agree that tonsillolith cannot occur in patients who underwent tonsillectomy .

remaining 39% disagree

33% of participants correctly reported sulfur to be the main compound released by tonsillolith .

51% choose calcium 12% choose Iron and 4% choose zinc to be the major component

The following chart shows 73% agree that surgical removal is the main treatment for enlarged tonsillolith

Discussion

Tonsillolith or more commonly known as tonsil stones are found in the palatine tonsils .

The palatine tonsil which forms a part of the waldeyers lymphatic ring has two surfaces the medial and the lateral surface .the medial surface has 12-15 orifices that lead into the tonsillar crypts which are usually small in size [8]. When tonsils get inflamed it leads to

tonsillar proliferation which eventually degenerates as the infection wears off to form tonsillar crypts that are large enough to house bacteria and food debris thus beginning the initiation of the formation of tonsillolith.

Tonsillolith is an unusual finding even though its prevalence is quite common between ages 20 to 40. The earliest known tonsillolith was found and reported in the year 1560 [9]. Till date the largest tonsillolith measured is 14.5 cm which is comparable to the size of a hand. This was reported by Rubin et al in his study "an unusually large tonsil calculus of the tonsil" in the year 1936 [10,11]. The prevalence rate of tonsillolith according to a study done by Olamide Bangbose et al was found to be 8.14% [11] but diagnosis rates are very low compared to its prevalence.

The low rate of its diagnosis leaves many dental professionals unfamiliar with common symptoms and features of tonsillolith.

To bring about a positive impact it is necessary to assess the current situation. Thus the necessity to assess knowledge, attitude and practice among dentists in relation to tonsillolith and halitosis.

The Waldeyer's ring consists of one pharyngeal tonsil, two tubal tonsils, two palatine tonsils and one lingual tonsil. It is structured in a ring pattern in the pharynx. These lymphoid tissues (tonsils) help defend the body against inhaled or ingested pathogens. Tonsils normally contain crypts that help increase the surface area of tonsil providing better immunity. These crypts however also act as pockets and accumulate food debris and bacteria which is the basis for tonsillolith formation.

Tonsillolith is a calcified mass in the tonsillar crypts which are formed due to tonsillitis. Tonsillar crypts act as pockets that trap debris and serve as a source of nutrients to the bacteria which grows into a biofilm.

Release of polysaccharides help bacteria adhere to each other and enlarge eventually calcifying into stones. Once formed a tonsillolith can enlarge by further accumulation of food debris and bacteria. This process continues concentrically around the initial tonsil stone which can lead to unusually large masses in the tonsil, which can obstruct passage into the airway and oesophagus thus causing airway obstruction and dysphagia .

Common symptoms of tonsillolith

These stones can vary greatly in size from clinically insignificant to large stones that are capable of airway obstruction ,pain and dysphagia

Though it is not a fatal issue it is a source of great discomfort . One major problem linked to tonsillolith is halitosis due to release of sulfur products from the bacteria .

100 participants were given questionnaires to assess their knowledge ,attitude and practice in relation to tonsilloliths and halitosis.

Data was collected and analysed

Participants were scored based on the number of correct answers and then divided into three groups :above average ,average and below average.

Scores from 0 to 4 were categorised as below average scores from 5 to 8 as average and scores from 9 to 12 as above average.

It was found that 13% have above average knowledge 66% have average knowledge and 21% have below-average knowledge on tonsillolith.

It was found that 75% of the participants stated to being aware of what a tonsillolith is but only 13% scored in the above average category.

This shows a 62% decline. This could be due to the ignorance on the part of dentists where superficial knowledge is often seen to be sufficient .

Also of the 75% that stated to being aware of what tonsillolith is only 61 participants were aware of it being a tonsil stone .

Composition of tonsillolith

Tonsillolith is composed of both organic and inorganic material the organic material comes from bacteria and inorganic material comes from calcium salts[12]. There are three types of calcification processes :Dystrophic ,metastatic and calcinosis .Dystrophic calcification occurs in damaged tissue for example tissue that is undergoing necrosis ,calcification occurs because the tissue is not able to maintain tissue permeability .metastatic calcification occurs because of high levels of calcium in the body and calcinosis is the deposition of calcium products in the subcutaneous tissue[13].

44% of participants agreed to the above fact and the remaining 56% opted for organic only (3%) inorganic only (15%)and food particles , bacteria and dead cells (38%).

It is seen that 38% chose food particles , bacteria and dead cells to be the composition of tonsillolith . This could be due to the misconception between the composition of tonsillolith before it has formed and after the calcification process [12,13]. Before the calcification process begins food debris is acted upon by bacteria which grows and multiplies eventually undergoing heterotrophic calcification due to inflammation of tonsils.

Aetiology and symptoms of tonsillolith .

Tonsillolith occurs mainly due to the presence of tonsillar crypts and bad oral hygiene . 59% agreed that bad oral hygiene and presence of tonsillar crypts is the major cause of tonsillolith.

The remaining participants were in favour of tonsillitis 20% immunocompromised 14% and increased sugar intake 7% to be the cause for the occurrence of tonsillolith

Tonsillolith mainly causes discomfort and halitosis in most patients but a severe case of tonsillolith may result in pain dysphagia and airway obstruction though not fatal when small, large tonsillolith can be life threatening

58% of participants correctly answered that halitosis ,pain and dysphagia and airway obstruction are all symptoms of tonsillolith.

35% chose only halitosis. Halitosis is caused due to several reasons ;one such rare cause of halitosis is tonsillolith [12] 14% chose only airways obstruction and 12% chose pain and dysphagia to be a symptom of tonsillolith

It Is important to be aware of all major symptoms related to a particular disease To avoid misdiagnosis

Clinical manifestations of tonsillolith

Tonsils can be clinically seen especially when enlarged.Thus Tonsillolith Occur in swollen tonsils and can easily be seen on clinical examination. 58 % agreed that tonsillolith can be clinically seen and 42% disagreed.

Tonsillolith occurs in various size and color mostly present as yellowish white mass most common between the ages 20-40 , the following chart shows results of knowledge among participants on clinical appearance and the common age group for occurrence of tonsillolith.

Most literature suggests that tonsillolith is common among young adults in the 3rd and 4th decade of life .However some studies also suggest higher levels amongst aged people which could be mostly due to lack personal care[14].Tonsillolith can enlarge over time and should not be considered clinically insignificant[15].

61% of participants agree that tonsillolith cannot occur in patients with tonsillectomy ,the remaining 39% disagree.

Correlation between tonsillolith and halitosis

Tonsillolith is strongly linked with halitosis this is due to the odour from sulphur compounds that is released as bacterial by product .

Only 33% correctly answered sulfur to be the major compound released by tonsillolith. 51% chose calcium 12% iron and 4% chose zinc .

The reason calcium is linked so strongly with tonsillolith [16] is because it provides and forms the major inorganic component of tonsillolith thus causing the misunderstanding amongst 51 % of participants.

In fact, release of calcium compounds will make tonsillolith weak due to demineralisation and easily dissolved, which is not the case

Management of tonsillolith

The following chart shows that 73% of participants agree to surgical treatment for enlarged tonsillolith. Management of tonsillolith is largely based on the size of tonsillolith and symptoms caused due to it. Small sized tonsillolith does not require any surgical treatment, whereas larger sized stones may need to be removed using a curettage or tonsillectomy if the tonsils are excessively inflamed [16,17,18]. If left untreated, tonsillolith can lead to a perpetually recurring cycle of inflammation, calcification and enlargement of tonsillolith. Inflammation of tonsils causes tonsillar crypts causing [21],[22] dystrophic calcification and therefore tonsilloliths. Tonsillolith is a pathological mass and thus activates body's defence system i.e. the immune system which causes inflammation. Further inflammation causes additional calcification and thus a perpetual cycle. Hence the necessity to thoroughly treat this condition.

Other symptoms of tonsillolith if left untreated are throat pain and ear pain [19,20].

CONCLUSION

This study shows that a majority of dental practitioners are not aware of the characteristic features of tonsillolith. Therefore awareness should be created among dentists. Dentists with better knowledge eventually have better practice which will help diagnose and treat this condition successfully.

Acknowledgment:

This research was supported by Saveetha dental college and hospitals that greatly assisted the research .

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Graph 1 : graph showing percentage of participants in the following categories :below average ,average ,above average . It was found that 13%scored below average ,66%scored average and 21% scored above average .

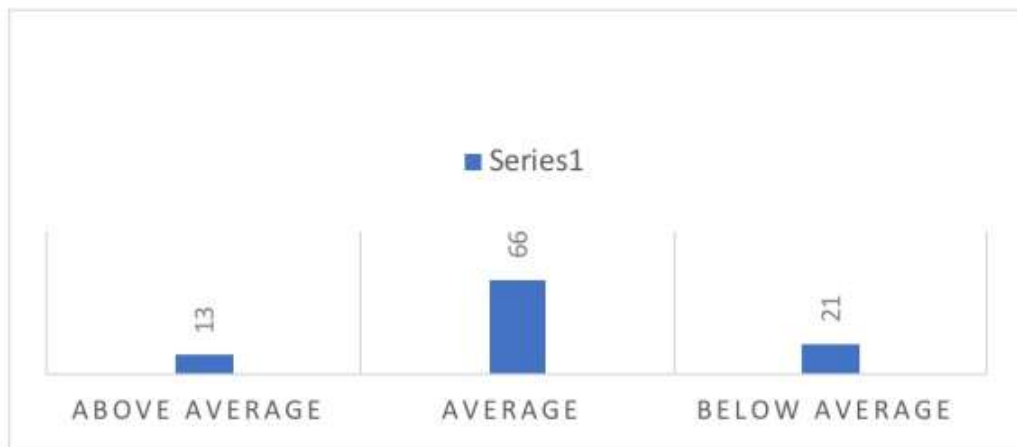


Chart 1:chart showing the knowledge of clinical appearance of tonsillolith .

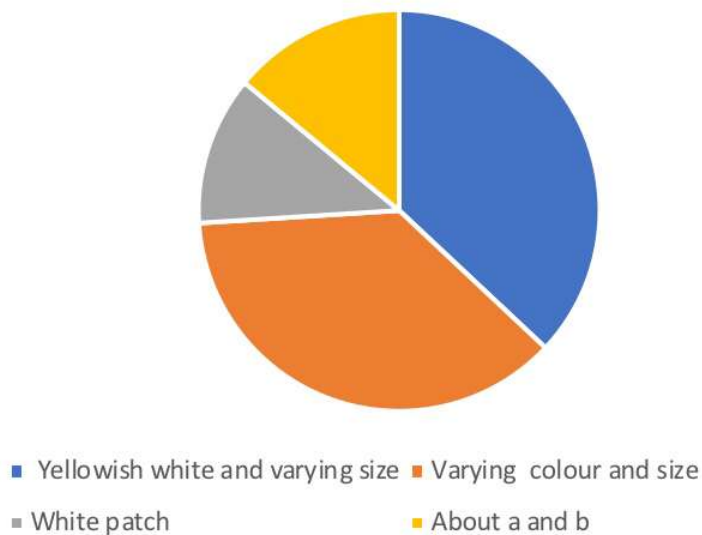


Chart 2 :chart shows the treatment option participants chose for enlarged tonsillolith.73%chose surgical removal while the remaining 27%chose no treatment required ,gargling or antibiotics as the treatment option .

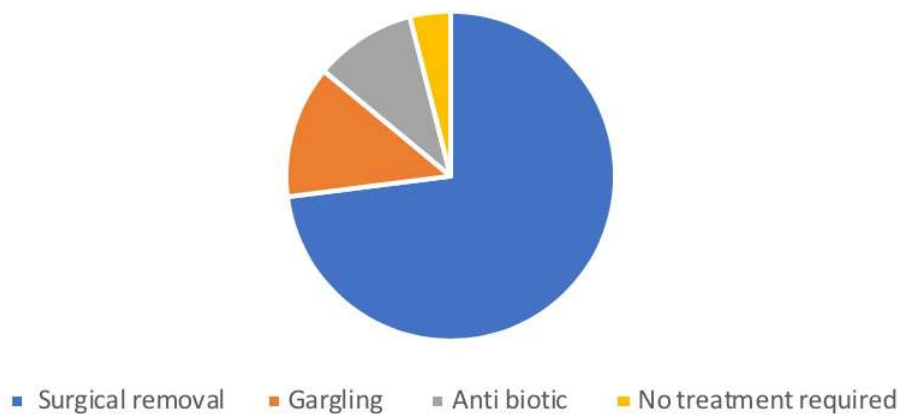


Chart 3:progression of bacterial biofilm into tonsillolith and halitosis .Inflammed tonsils have enlarged crypts which trap food debris and bacteria which eventually turns into a biofilm causing further inflammation of tonsil.dystrophic calcification of the organic and inorganic substances leads to the formation of tonsillolith . The bacterial metabolism produces sulfur byproducts thus causing a characteristic putrid smell or halitosis of the oral cavity .

