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The Prevalence of Tonsilloliths and other Oral and Maxillofacial Soft Tissue Calcifications on Panoramic Views of a Selected Population in Abha-Southern Kingdom of Saudi Arabia-2017

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Abstract:
Introduction: Tonsiliths, also known as tonsilloliths and tonsillar concretions or simply called liths, are stones that arise from calcium being deposited on desquamated cells and bacterial growth in the tonsillar or adenoidal crypts and occur in patients with or without a history of inflammatory disorders of either the tonsils or adenoids.
Aim: This study was conducted to determine the prevalence and the pattern of distribution of tonsilloliths on panoramic views.
Materials and Method: This study complied with the Helsinki Declaration as regards human subjects, in this a prevalence cross-sectional study, 401 panoramic views (266 female, 135 male, age 8 to 81 years old) of patients referring to a KKU dental clinic , between 2010 and 2017, were evaluated for the presence and pattern of tonsillolithiasis and oral and maxillofacial soft tissue calcifications.
Results: A total of 401 pantomographs among them,(135) 66.3% were male and (266) 33.7% were female , were reviewed in the oral and maxillofacial radiology clinic of King Khalid University , Therefore, 401 subjects (135 males and 266 females) aged 8 to 81 years, were included for the data analysis, 84 subjects had single tonsiliths whereas 18 subjects had multiple tonsiliths.
Discussion: Despite the fact that the cause and pathogenesis of tonsilloliths are not clearly known, the researchers believe that unresolved tonsillitis is the main factor .
Conclusion: This study was done to, first, determine the prevalence of tonsiliths in patients attending the KKU Dental Clinic and, secondly, to investigate a correlation between ton siliths and other concretions. Tonsiliths are a major source of halitosis that is often overlooked by clinicians.

I. INTRODUCTION

A. Tonsiliths

Tonsiliths, also known as tonsilloliths and tonsillar concretions or simply called liths, are stones that arise from calcium being deposited on desquamated cells and bacterial growth in the tonsillar or adenoidal crypts and occur in patients with or without a history of inflammatory disorders of either the tonsils or adenoids [1, 2]. Tonsiliths may be associated with symptoms, including nonspecific chronic sore throat, irritable cough, dysphagia, otalgia, chronic halitosis, a foreign body-like sensation, or foul taste [1–7]. Patients with tonsiliths may also be asymptomatic, with the liths discovered incidentally on pantomographic or lateral cephalometric radiographs [7–9]. Superimposition of hard and soft tissue structures on such radiographic images is common, creating a diagnostic challenge. This necessitates the consideration of several interpretations of radiopacity in the mandibular molar-ramus region including sialolith, tonsilith, phlebolith, calcified lymph node, carotid artery arteriosclerosis, stylohyoid ligament ossification, and dystrophic calcification in acne scars [3].

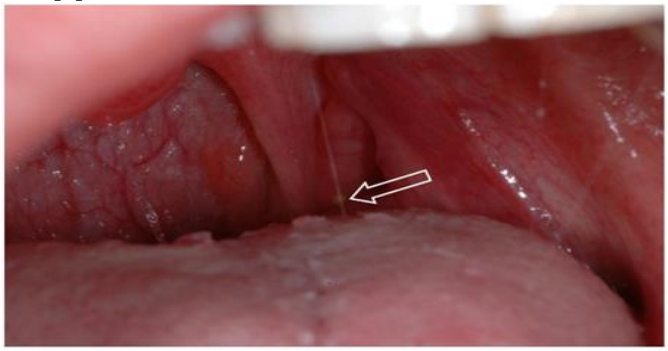

Figure 1: Clinical Photograph of a Patient with Small, Superficial Tonsilith in the Left Tonsillar Crypt (Arrow).

Treatment is usually removal of the tonsilith by curettage. Larger concretions may require local excision under topical or local infiltration anesthesia. If there is evidence of chronic tonsillitis, tonsillectomy offers definitive therapy [5, 10].

Tonsiliths are composed of phosphate and/or carbonate salts of calcium. These are arranged in a structure similar to that of bone crystals of hydroxyapatite Ca5[OH (PO4)3]. The hydroxyl ion (OH−) in the hydroxyapatite can be replaced by fluoride, carbonate, or chloride. The hydroxyapatite crystal has a specific gravity of 3.08 and is 5 on the Mohs hardness scale [10, 12]. A protein matrix has also been demonstrated as part of the composition of tonsilith [12–13].

Although a pantomograph is a reliable and standard modality for interpreting the presence of tonsiliths, superimposition of a lesion involving one side of the jaw may create a pseudotonsilith or ghost image on the contralateral side which could lead to a misinterpretation of bilateral lesions . A ghost image is formed when the object is located between the X-ray source and the center of rotation of the cassette . On the pantomograph, tonsiliths commonly appear as multiple, small, and ill-defined radiopacities, (Figures 2, 3, 4, and 5).

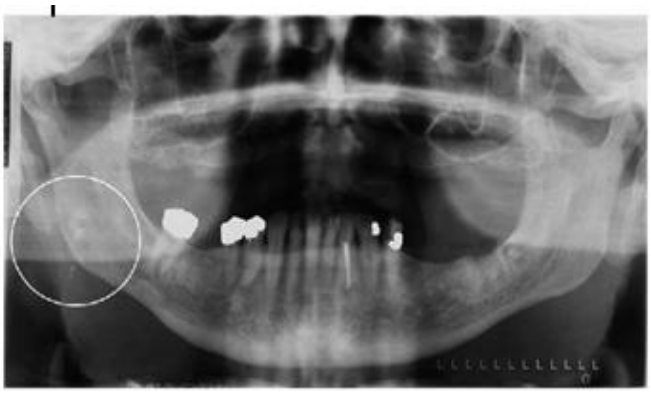

Figure 2: Multiple, Well-Defined Calcifications in the Right Tonsil (Circle) in A 66-Yearold Male.

Figure 3: Multiple, Well-Defined Calcifications in the Right Tonsil (Circle) In A 51-Yearold Male.

Figure 4: Multiple, Well-Defined, Bilateral Calcifications in the Angle-Ramus Region of the Mandible (Circle) in A 59 - Year-Old Female. Note Ghost Images on the Right (arrow).

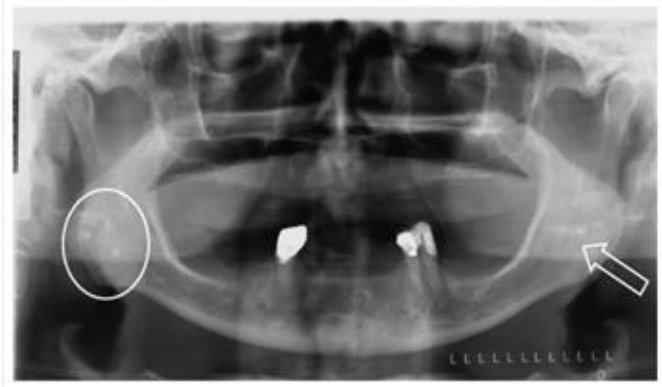

Figure 5: Multiple, well-defined, and Bilateral Calcifications in the Angle-Ramus Region of the Mandible (circle and arrow) in a 67-year-old female.

Other Stones. Stones or liths can occur in various organs and ducts in the body, including the gallbladder (cholelith), kidneys (nephrolith), and lower urinary tract (urolith). Liths are also seen in the nasolacrimal duct (dacryolith), nasal cavity (rhinolith), maxillary antrum (antrolith), lymph nodes, liver (intrahepatic lith), testes (testicular microlith), intestine (fecalith), and the semicircular canal (canalolith) [9]. Other liths include dental calculus, ocularlith, pancreatolith, sialolith, and phlebolith.

II. AIM

This study was conducted to determine the prevalence and the pattern of distribution of tonsilloliths and other oral and maxillofacial soft tissue calcifications on panoramic views.

III. MATERIALS AND METHOD

This study complied with the Helsinki Declaration as regards human subjects, in this a prevalence cross-sectional study, 401 panoramic views (266 female, 135 male, age 8 to 81 years old)

of patients referring to a KKU dental clinic , between 2010 and 2017, were evaluated for the presence and pattern of tonsillolithiasis and other oral and maxillofacial soft tissue calcifications .

Panoramic radiographs were acquired using a digital panoramic(Figure 6) All panoramic views of acceptable quality were recruited in the study. The presence of tonsillar calculi and other oral and maxillofacial soft tissue calcifications was evaluated on panoramic radiographs by 4 a undergraduate dental student, using the criteria reported by Ram et al. that mentioned tonsilloliths as radiopaque nodular mass, or masses piled up on the mandibular ramus and soft palate.

Unilateral or bilateral occurrence, number, and size of the stones were recorded. The cases with tonsilloliths were divided to subgroups, Since the radiographs had been taken for other dental purposes, no extra dose was exposed to the patients and no name or personal information of patients was recorded in reports and figures, hence, there was no ethical limitation to conduct the study , Data were described using frequency and percentage , Individuals below the age of three or whose pantomographs were of poor diagnostic quality or with a history of tonsillectomy were excluded , Tonsiliths measuring 2 mm or less were excluded because this dimension did not give a high confidence level of interpretation. The radiographs were viewed in the computer screen. A digital magnification was used to assist in viewing the concretions on the radiographs.

A. Ascertainment of Tonsillitis

An interpretation of tonsillitis was made when radiopaque masses not deemed to be part of the stylohyoid complex, sialoliths, calcified lymph nodes, phleboliths, or changes in the bone pattern were seen over or near the angle and ramus of the mandible. The concretions needed to have a radiopacity similar to, but demarcated from, the overlying bone. Unilateral and bilateral concretions , the size, site, and number of concretions were recorded. Unique identifiers (chart numbers) of the subjects were recorded , a standardized chart abstraction form was used to extract relevant information from the dental records of the subjects. The information extracted included demographics such as age and sex and radiographic appearance of tonsiliths.

B. Selection Criteria

a). Inclusion Criteria

- Age range: 7–85 years.
- subjects with and without tonsiliths on pantomographs were included.
- Diagnostic quality pantomograph.

b). The Features of A Diagnostic Quality Pantomograph Include

- (both rami of the mandible visible on the radiograph;
- proper positioning of the patient in the unit when the radiograph was made;
- areas of the tonsils included in the image;
- the overall density of the radiograph acceptable for interpretation;
- no artifacts over the rami of the mandible to preclude the visualization of tonsiliths

c). Exclusion Criteria

- Subjects below the age of 7 years.
- Subjects with poor diagnostic quality pantomographs.
- Subjects who declined to give informed consent.
- Subjects with a history of tonsillectomy.

Figure 6 : Digital Standard Panoramic View.

IV. RESULTS

A total of 401 pantomographs among them,(135) 66.3% were male and (266) 33.7% were female , were reviewed in the oral and maxillofacial radiology clinic of King Khalid University , Therefore, 401 subjects (135 males and 266 females) aged 8 to 81 years, were included for the data analysis. 102 subjects with possible tonsiliths were identified. 84 subjects had single tonsiliths whereas 18 subjects had multiple tonsiliths(Table1), location of tonsiliths (Table2) ,Side of jaw (Table3).

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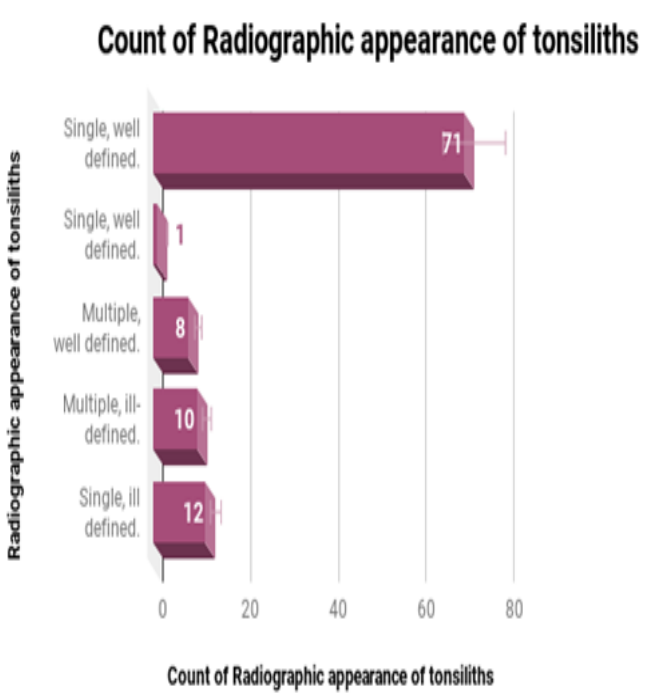

Table1: Count of Radiographic Appearance of Tonsiliths

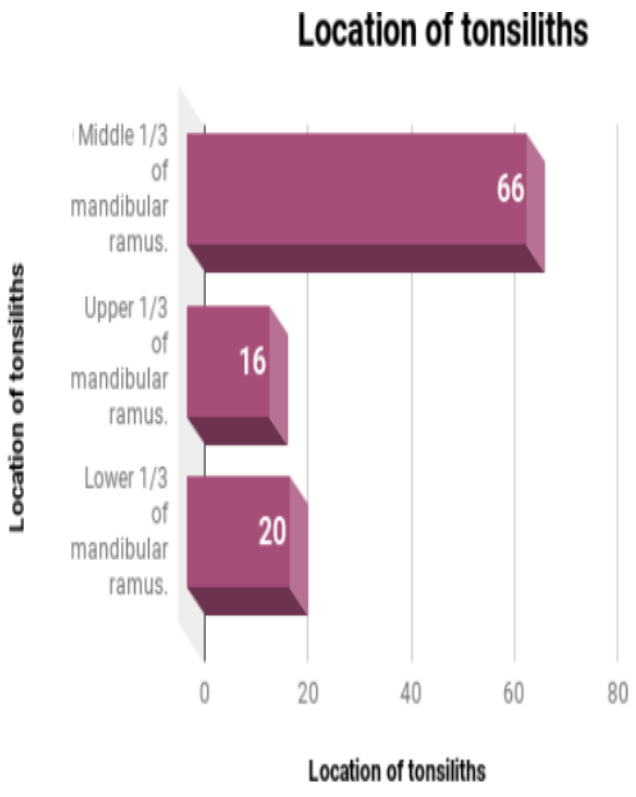

Table 2: Location of Tonsiliths

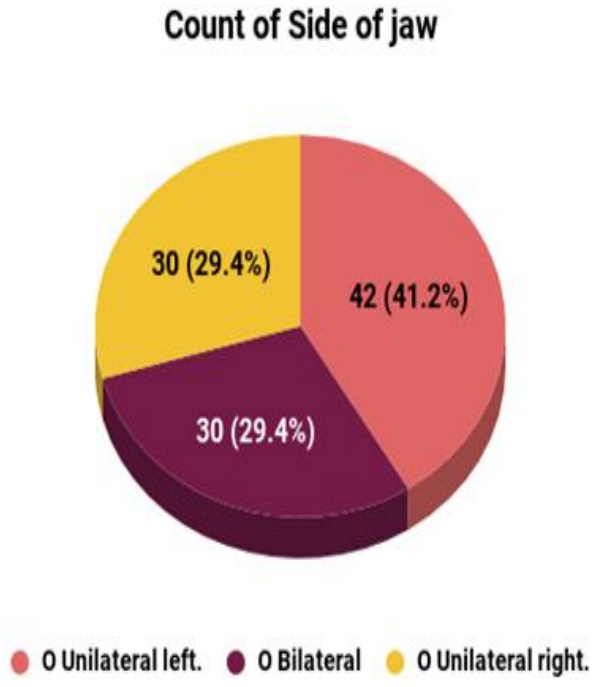

Table 3: Count of Side of Jaw

The prevalence of tonsiliths in the study population was 25.4% , the size of stones varied on panoramic radiographs and was 3-5 mm in 36 cases ,5-7 mm in 32 cases,7-11 mm in 22 cases , 7-9 mm in 12 cases (Table4).

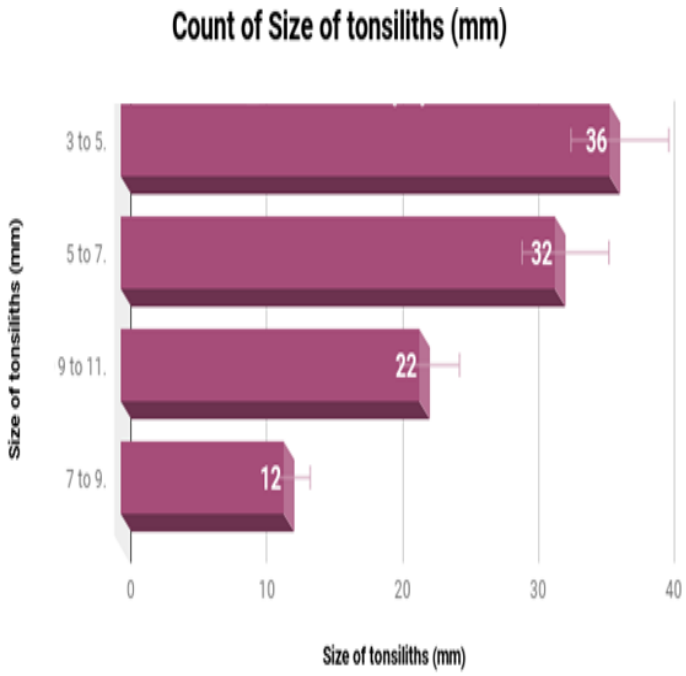

Table 4: Count of Size of Tonsiliths (mm)

Calcifications biodata	Perc and total of M+F*
presence of calcifications	25.4% - 102
absence of calcifications	74.6% - 299
Single, well defined calcifications .	70.6% - 71
Single, ill defined calcifications.	11.8% - 12
Multiple, well defined calcifications.	9.8% - 10
Multiple, ill-defined calcifications.	7.8% - 8
Upper 1/3 of mandibular ramuscalcifications.	15.7% - 16
Middle 1/3 of mandibular ramus calcifications.	64.7% - 66
Lower 1/3 of mandibular ramus calcifications.	19.6% - 20
Unilateral left calcifications.	41.2% - 42
Unilateral right calcifications.	29.4% - 30
Bilateral calcifications.	29.4% - 30
3 to 5 mm calcifications.	35.3% - 36
5 to 7 mm calcifications.	31.4%- 32
7 to 9 mm calcifications.	11.8% - 12
9 to 11 mm calcifications.	21.6% - 22

• This color indicates the overall large proportion

Table 5 : *Total Percentages and Total Number of Men and Women Patients

V. DISCUSSION

Despite the fact that the cause and pathogenesis of tonsilloliths are not clearly known, the researchers believe that unresolved tonsillitis is the main factor. Meanwhile, many other authors have suggested that tonsilloliths developed as a result of stasis of the saliva in the efferent ducts of the accessory salivary glands secondary to mechanical obstruction arising from post -tonsillectomy scars or chronic inflammation. Frequent episodes of inflammation may cau se fibrosis at the openings of the tonsillar crypts, causing bacterial and epithelial debris accumulation which leads to retention cysts formation. Subsequent calcification due to deposition of inorganic salts and enlargement of the formed concretion take place gradually. Diagnosis of tonsilloliths will be confirmed through clinical presentation, examination and imaging. In physical examination, enlargement and hardening of the tonsil is a common finding. On extra-oral radiographs, these calcifications may be confused with other lesions such as tooth, foreign bodies, salivary gland and lymph nodes calcifications or stylohyoid ligament elongation.

VI. CONCLUSION

This study was done to, first, determine the prevalence of tonsiliths in patients attending the KKU Dental Clinic and, secondly, to investigate a correlation between tonsiliths and other concretions.

Tonsiliths are a major source of halitosis that is often overlooked by clinicians. Fainally , The prevalence of tonsiliths in the study population was 25.4% , the size of stones varied on panoramic radiographs and was 3-5 mm in 36 of the cases and 5-7 mm in 32 of cases, 7-11 mm in 22 of the cases , 7-9 mm in 12 of the cases .

VII. ACKNOWLEDGEMENT

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