

The Habit of Qat Chewing: A Causative Factor for Oral Keratosis Lesions

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Abstract

Qat leaves are generally placed in the mouth and held between the molars and cheek, for their psychostimulative effect. In Yemen, the habit is widespread as a deep-rooted socio-cultural tradition. However, in recent years, the advent of air transport has facilitated the distribution of fresh Qat to many places. The purpose of this study was to assess the occurrence of oral keratosis in a sample of 185 Yemeni men over 20 years of age, who had chewed Qat more than one year, were studied for the direct frictional effect of the qat on the chewing side and compared with the opposite side that not used for chewing. Oral keratosis was significantly more prevalent in the chewing side (71.89%) specially when the duration of chewing is too long. There was a significant association between the occurrence of oral keratosis and smokers Qat chewers when compared with non-smokers Qat chewers. The majority of the lesions were homogenous and there were no findings suspicious for pre-malignant or malignant changes. This study demonstrated a relationship between Qat chewing and oral keratosis, which attribute to chronic local mechanical and (may be) chemical irritation of the mucosa. However, this study requires further studies including longitudinal clinical inspections, biopsies of the tissue changes of Qat chewers and the effect of chemicals used to increase the production of the Qat.

Introduction

Qat leaves referred to as khat (Figure 1) are chewed for their psychostimulative effect. The habit of chewing the leaves of the Qat plant (*Catha edulis*) has existed for many hundreds, if not thousands of years in the countries of East Africa and the Arab Peninsula ⁽¹⁾.

In Yemen, the habit of Qat chewing is widespread as a deep-rooted socio-cultural tradition. However, in recent years, the advent of air transport has facilitated the distribution of fresh Qat to many places including European

Capitals ⁽²⁾. Although some people chew Qat leaves and other types of leaves for enjoyment, these plants leads to addiction and some dental problems such as gum disease, tooth discoloration and possibly oral cancer ⁽³⁾.

The chemical constituents of Qat leaves have been extensively studied by Kalix ⁽⁴⁾, who was able to demonstrate that there are three main alkaloids present; namely chatinone, norpseudoephedrine (chatine) and norephidrine. Chatinone (alpha-amino-propriophenone) has a pronounced effect on the central nervous system, although all three have similar peripheral effect. Chatinone has very similar sympathomimetic properties to amphetamine ^(1,5). Qat leaves also contain considerable amounts of tannins (tannic acid) about 7-14% in dried material, and it is presumed from which many people suffer ^(4,6,7).

Qat chewing has been rapidly expanding, and the use of chemical pesticides in Qat production has been increasing. Chewers of Qat produced in fields where chemical pesticides used regularly have more symptoms than chewers of Qat produced in fields where chemical pesticides are rarely or never used ⁽⁸⁾. However, Qat chewing can provoke the development of oral keratotic white lesions at the site of chewing. The prevalence of these lesions and its severity increases as duration and frequency increase ⁽⁹⁾. With the changing demographic structure and migration between countries, Qat chewing is of increasing significance as it may contribute to the etiology of squamous cell carcinoma in developed countries ⁽¹⁰⁾.

The purpose of the present study is to assess the prevalence and the clinical finding of oral keratotic (white lesions) in Thamar city chronic Qat chewers of Yemeni population.



Figure1. Qat leaves

Methods and Subject

A total of 200 Yemeni male Qat chewers from Thamar city were examined for oral mucosal keratotic lesion between March and June 2007, in faculty of Dentistry, University of Thamar.

Individuals included in this study were only those who provided a history of Qat chewing on one side of the mouth for at least one year and older than 20 years. Therefore, 15 out of 200 cases were excluded because they had a history of chewing on both side of the mouth. The rest 185 individuals were underwent to a personal interview that was included questions regarding their smoking habit, Qat chewing (daily or not), years of the chewing habit, and the side of chewing.

A clinical examinations for oral mucosal white keratotic lesions that could not scraped off were performed, using standard dental office lighting, mouth mirror, and the oral lesions which were recorded by a digital camera.

The side of chewing in this study represents the study side, whereas the opposite side of the mouth which was not used for qat chewing served as the control side.

SPSS 13 program was used for statistical analysis, and Chi-square test was used for analysis with the significance of $P \leq 0.05$.

Results

The sample that was studied included 185 Yemeni male Qat chewers, all of whom were from the same environment, Table 1 shows the relation between age and chewing years. One hundred thirty-three (71.89%) of the 185 individuals were associated with oral white keratotic lesion (Figure 2), whereas the remaining 52 (28.11%) were not showing clinically any signs of lesions.

The mean age was 33.3 ± 6.3 years, with a range from 20 to 74 (54 years). The duration of chewing range was from 3 to 25 years. There was no difference in the mean frequency of Qat chewing duration between the smokers and non-smokers, with a mean of 8.6 ± 10.1 years, and the persons chewing Qat at least 3-5 hours daily for 5 to 7 days/ week.

Table (1): Age & chewing duration relationship of 185 Qat chewers

Age-group (years)	Years of chewing				Total
	1-3 years	4-6 years	7-9 years	\geq 10 years	
20-29	42 (22.7%)	57 (30.81%)	1 (0.54%)	1 (0.54%)	101 (54.59%)
30-39	0 (0%)	5 (2.71%)	21 (11.35%)	7 (3.78%)	33 (17.84%)

40-49	0 (0 %)	0 (0 %)	0 (0 %)	26 (14.05%)	26 (14.05%)
50-59	0 (0 %)	0 (0 %)	0 (0 %)	14 (7.57%)	14 (7.57%)
≥ 60	0 (0 %)	0 (0 %)	0 (0 %)	11 (5.95%)	11 (5.95%)
Total	42 (22.7%)	62 (33.51%)	22 (11.89%)	59 (31.9%)	185 (100%)

Regarding the relation between the duration of Qat chewing and keratotic white lesions, the present investigation shows that the individuals with a history of Qat chewing for more than 10 years, 54(29.19%) cases have a highest frequency of keratotic lesions in the buccal mucosa of the premolar and molar region. Whereas, the individuals with a history of less than 3 years of chewing show a lowest frequency of keratosis 19 (10.27%) cases, Table 2.

Table (2): *Qat chewing duration and keratotic lesion relationship of 185 Qat chewers*

Keratotic lesion	Years of chewing				Total
	1-3 years	4-6 years	7-9 years	≥ 10 years	
Keratotic lesion	19 (10.27%)	41 (22.16%)	19 (10.27%)	54 (29.19%)	133 (71.89%)
Non-keratotic lesion	23 (12.43%)	21 (11.35%)	3 (1.62%)	5 (2.71%)	52 (28.11%)
Total	42 (22.7%)	62 (33.51%)	22 (11.89%)	59 (31.9%)	185 (100%)

Ninety-four (50.81)cases out of 134 that reported as left side chewers showed keratotic lesions on the left side, the remaining 40 (21.62%)cases were not suffering from any lesions. whereas the right chewers, 39 (21.08%)cases out of 51 suffering from keratosis on the right side buccal mucosa, and the remaining 12(6.49%) cases were not affected. For all chewers the chewing side were affected in 133 (71.89%) cases, while the opposite side (control side), the keratotic lesions were not recorded, Table 3.

Table 3: *Chewing side and keratotic lesion relationship of 185 Qat chewers*

Chewing side	Keratotic lesion			Total
	Left side	Right side	No kearatosis	
Left side chewers	94 (50.81%)	0 (0%)	40 (21.62%)	134 (72.43%)
Right side chewers	0 (0%)	39 (21.08%)	12 (6.49%)	51 (27.57%)
Total	94 (50.81%)	39 (21.08%)	52 (28.11%)	185 (100%)

One hundred thirty-six (73.52%) individuals out of 185 were cigarette smokers, while 49 (26.48%) individuals did not have a history of smoking. This study shows that, 107 (57.84%) from the total sample, and (80.5%) of the total cigarette smokers reveal keratotic lesions. The keratotic lesions appear in only 26 (14.05%) individuals without history of smoking as shown in Table 4.

Table 4: *keratotic lesion and smoking relationship of 185 Qat chewers*

Keratotic lesion	smoking		Total
	smokers	Non-smokers	
Keratosis	107 (57.84%)	26 (14.05%)	133 (71.89%)
No-keratosis	29 (15.68%)	23 (12.43%)	52 (28.11%)
Total	136 (73.52%)	49 (26.48%)	100 (100%)

The calculated Chi-square of the relation between smoking and keratotic lesion was 11.68, DF=1, which is greater than the tabulated value at $P \leq 0.05$.

All of the lesions clinically appeared as simple keratosis, which showed smooth homogenous white lesion. However, lichen planus was noticed clinically in 3 cases, while only one case showed mixed red and white patch. No white lesion was noticed to be clinically suspicious for malignant changes and no one agreed to undergo biopsy of his white lesion.



Figure 2. White lesion of the buccal mucosa in a 43 year-old individual who is a smoker and who chewed Qat for over 10 years

Discussion

Qat leaves, which are generally placed in the mouth and held between the molars and cheek, are usually chewed during social and cultural meetings where the chewing process may take up to 5 hours.

In Yemen, group of 5 or more people convene upon a house to dine and storing Qat leaves. In almost every house, there is a "mafraj or tayramana, the highest most pleasant room in the house", where Qat sessions are held. No food is served with the Qat, only water and beverage.

The present study reveals that when the chewing duration is for long time, the chance of oral mucosal keratosis is higher specially in older chewers. This might be related to mechanical strain on the cheek and other oral tissue. This has been also confirmed by Ali et al, ⁽⁹⁾ who concluded that these lesions and their severity always frequently increase because of Qat chewing.

Moreover, it is believed that the chemicals such as fertilizers, pesticides, and fungicides which are applied to soil by the farmers in order to increase the production of Qat may also contribute to the development of oral white lesions. The same conclusion has been reported by Date et al ⁽⁸⁾. In all chewers, white lesions noted have been demonstrating a possible relation between chemical irritation of the mucosa and the white mucosal lesion ⁽¹¹⁾.

The investigation also support a direct association between oral white keratosis lesions and Qat chewing, in which all of the lesions appear at the same side of the chewing (71.89%). Hill and Gibson ⁽³⁾ have reported that oral white lesions, resembling those of frictional keratosis, have been noted in 50% Qat chewers in Yemen.

Interestingly, in smoking Qat chewers, it is expected to find more white lesions in the smoking and chewing subjects. Also a significant relationship has shown between the smoking Qat chewers and the keratosis lesions,

although 14.05% non-smoker chewers have developed white keratotic lesions. This is in agreement with the report of Meir et al, ⁽¹¹⁾ and Axell et al, ⁽¹²⁾.

Takhzeen al-qat causes distinct histopathologic changes in the oral mucosa at the side of chewing, such as acanthosis, abnormal rete ridges, hyperkeratosis, and when associated with cigarette smoking may increase the risk of epithelial dysplasia ⁽¹³⁾.

Although an association between Qat chewing and oral malignancy is speculated ⁽¹⁴⁾ but this has not been proven. Kennedy et al, ⁽¹⁵⁾ who examined the oral cavity of 706 Qat users in Yemen, have reported that no oral malignancies are found. This has been also noticed in this study based on the clinical appearance, where no white lesions are clinically suspicious for malignancy or premalignancy. However, Sawair et al, ⁽¹⁶⁾ have found in study applied on 649 Yemeni patients with a history of tobacco consumption and qat chewing that, oral cancer is the most frequent cancer, and the squamous cell carcinoma is the most frequent oral cancer too.

Further studies including longitudinal clinical inspections and biopsies of the oral tissues changes of Qat chewers are needed. Also the effect of the chemicals which are used to increase the production of the Qat must be studied.

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