The effect of ‘shisha’ smoking on dry socket

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ABSTRACT

This study has focused on “shisha” (hubble bubble) and Dry Socket (DS) in order to determine and compare the risks of “shisha” smokers (SS) with cigarette smokers (CS) or nonsmokers (NS), also to evaluate the impact of pre-operative and post-operative smoking habits on the incidence of DS.

Materials and Methods. 60 NS, 60 CS, and 60 SS have been administered in the surgery dentistry clinic of AL-Zahrawy University College from Aug 2019 to May 2020 for the removing of mandibular third molars. Local anesthesia with no incision or bone removal was conducted in surgeries.

Results: After 1, 4, and 7 days of surgery, smokers had 2 to 3 times NS risk for developing Alveolar Osteitis (AO), adding that SS showed a higher incidence of AO than CS. Alveolar osteitis (AO) is not age-dependent, so smokers who had smoked on the surgery day showed a significant more AO than those who smoked shisha on the 2nd day after surgery. In comparison with NS, CS who smoked on the surgery day and SS who smoked the surgery day or on the 1th day after surgery showed a significant increasing DS incidence. Thus, the most susceptible to AO is shisha smokers.

Keywords: shisha, dry socket, alveolar osteitis

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INTRODUCTION

What is Hookah “shisha” ?

Hookah is a tobacco pipe with a long, but softened tube drawn through the water in a bowl [1] and known as “piping water”; “goza”, “shisha”, “rusty bubble”, “borry”, “quayan”, “narghile”, “argileh”, “chica” and “mada’a”. in this case, Hookah is a new trend for a millennium.

Hookah

Hookah (hookah unit) is made up of a top and bottom compartment linked to a wire. (Fig.1). the top consists of a pot which is later filled with a perforated aluminum film carrying burning charcoals with tobacco or molasses. A container of water is wrapped in a gasket with a hoses, and a release valve (to remove stagnating smoke) is placed on the bottom of unit [1, 2].
Despite the common features of Hookah as liquid that smoke passes through, it is not the result of personal preferences or cultural/regional differences in case of sizes and applied materials [3, 4]. Adding that the volatility of manufacturing content can influence the smoke/chemical exposure rates. In particular, a research has shown that pipeline has various impact carbon monoxide (CO) emission rates, correlating non-porous plastic pants with more CO outputs in contrast to many porous leather pants [5]. The same principle might be used in other chemical products particularly in nicotine. Therefore, the effects of hookah can be underestimated in some studies requiring more investigations to consider these variations for more pertinent results.
The Effects of Hookah/Water pipe Smoking:
Nowadays, Hookah is used among young people for smoking with water pipes. Its consumers are subjected to the significant amount of the same harmful compounds or by-products, such as tobacco that could bring negative effects on health despite the significant higher rates. The users of Hookah are subjected to the same hazardous substances /by-products as the tobacco users and bring risks, such as infection, cancer and lung disease. In addition to cigarettes, the smoke of Hookah is due to the overlapping profile of toxicant / chemical.

Hookah Tobacco:

Three types of crooked tobacco are widely used as Mouassal, Jurak and Tumbak including different ingredients. “Honeyed” (Arabic translation) contains 30% tobacco and around 70% honey / sugarcane, glycerol and flavors [6]. The nicotine of Mouassal is measured by Hadidi and Mohammed (2004) [7] as 3.4 mg / g. In Jurak, the spices are about 20% including tobacco and sugarcane and the fruits are dried [8] used in Gulf region and Middle East. Tobacco is ultimately the pure form of unaromatic tobacco (Ajami) leaves smoked with oil and used primarily in Asia. In tobacco of hookah, majority of flavors belong to different fruit flavors [14]. Accordingly, those tobaccos with fruit-flavor were preferred by young people than unflavored ones [9]. Women prefer the candy and sweet aromas, while fruit flavors are the first priority [10], respectively. Chocolates, clove / spice, beer and other cocktails are the other flavors [8]. This indicates that flavored tobacco has a great function as a "motivator" to make good smell and taste.

Hookah Preparation and its Mechanism:
Load tobacco in a bowl before wrapping the head in aluminum foil and then perforating it by applying a pincher or toothpick (fig.1). The "entered" charcoal is subsequently put onto the perforated foil to begin the heating procedure for tobacco [11]. Inhale the hot charcoal air through the pipe, through the atmosphere and through the broken aluminum foil into the tobacco. The cool smoke reaches the surface after "bubbling" into the water, drawing and inhaling it through the tube [2, 12]. Similar to traditional cigarette smoking, hookah users tend to have a nuanced buffing behavior.

Reasons of Use:
There are many reasons encourage the user of Hookahs including (but not limited) the impression of no risk to Hookah, usability, herbal flavored tobacco, peer pressure, societal tolerance / fewer constraints, popularity, excitement, entertainment and improved socioeconomic status [13, 15, 16]. It is commonly believed that hookah has no risks or worse than tobacco that could be associated to the mythologies of intermission of hookah while its risk is decreased when combined with the regular use of tobacco [17], filtering smoke by liquids, and by ‘less addiction’ [18] [17]. On the other hand, some users argue that its smoke is not inhaled that protect them against nicotine absorption or addictive effects (keeping the smoke in the mouth). However, the mucosal lining of the oral cavity can
easily absorb nicotine [18]. It is noted that using and maintaining hookah could be assumed as "positive" attributes, such as socializing, relaxation and smells of smoke as well [8,19]. In this case, a research on social media (Twitter) has revealed the fact that social events and aromas are amongst the common experiences and contexts related with Hookah discussion in twitter [20]. Another study has referred to the sweet aroma of hookah as a preferable aroma of smoke that couldn’t be as offensive as the smoke of cigarettes. As a result, flavor plays an important role in encouraging the use of hookah [16].

**Dry Socket**

The most serious complications after extraction in dentistry are alveolar osteitis, a 'cold socket.' The pathophysiology and etiology of these statues are covered by a great body of literature about alveolar osteitis. Furthermore, numerous studies on methods and techniques for preventing this condition are available. Alveolar osteitis (AS) socket is a serious condition after removal of permanent tooth, even though it is still a controversial problem and the pathophysiology and etiology of best approaches for prevention and care. This condition is still a frequent postoperative issue, which contributes to intense pain and regular trips to the hospital. Increase in recovery time means that the surgeon is more expensive because 45% of patients who develop AO typically needseveral postoperative treatment sessions [21, 22]. Alveolar osteitis was highly investigated, but certain findings are due to considerable controversy.

**Terminology:**

There is no agreement on the terminology for this complication. “Dry socket” was primarily explicated by Crawford in 1896 [23]. Later, other words were applied for this complications as “localized osteitis”, “alveolar osteitis”, “fibrinolytic alveolitis”, “septic socket”, “alveolitis sicca dolorosa”, “alveolitis”, 'necroticsocket;alveolalgia and “localized alveolar osteitis”’[24,25].

Other terms

1. Localized osteitis
2. Necrotic socket
3. Postoperative alveolitis
4. Localized osteomyelitis
5. Alvelolalgia
6. Fibrinolyticalveolitis
7. Septicsocket
8. Alveolitis siccadolorosa

**Definition:**

A postoperative pain inside and around the extraction site that is severed between the 1st and 3rd day after the extraction and followed by a total or partial disintegrated blood clot inside the alveolar socket with (out)halitosis[24].

Incidence:
1. 3-4% following routine dental extraction
2. 1% to 45% after the removal of mandibular third molars
3. 25-30% after the removal of impacted mandibular third molars occurs 10 times more frequently following the removal of 3rd molars than from all other locations

Onset:
Mostly 1-3 day after tooth extraction [26, 27, 28], within a week in 95% and 100% of all cases of dry socket.

Duration:
The duration of dry socket differs somehow according to the severity of disease (normally ranges from 5-10 days).

Etiology:
Regarding the unknown etiology of AO, Birn has proposed that the etiology of AO is a raised local fibrinolysis led to disintegration of clot. However, several local and systemic factors could be contributed to the etiology of AO [29, 30].

Symptoms:
Symptoms of dry socket:
● Severe pain in a few days after the tooth extraction
● Partial or total loss of blood clot at the tooth extraction site which could be sensed as an empty-looking (dry) socket
● Visible bone in the socket
Pain that radiates from the socket to your eye, neck, ear or temple on the same side of your face as the extraction
● Bad breath of mouth
● Unpleasant taste in your mouth

METHODS
60 NS, 60 CS, and 60 SS were administered. Local anesthesia with no incision or bone removal was conducted in surgeries. After 1, 4, and 7 days of surgery, postoperative smoking and evaluation was recorded by the same examiner. Smokers were observed under 2-3 times in the risk of NS for developing AO. SS has a greater incidence of AO than CS, also the incidence of AO was not age dependent. Smokers who had smoked on the surgery day showed a significant more AO than those who smoked shisha on the 2nd day after surgery. In comparison with NS, CS who smoked on the surgery day and SS who smoked the surgery day or on the 1st day after surgery showed a significant increasing DS incidence (CS/NS, day 0, P = .001; SS/NS, day 0, P = .001; day 1, P = .005) [31]. Thus, the most susceptible to AO is shisha smokers.
Prevention and Management

Due to the most frequent postoperative complication of AO extraction, successful prevention method(s) are under investigation. In this study, few methods to the reduction of AO have been suggested. However, not particular approach has been commonly confirmed by now. In the following few common methods are described:

1. **Antibiotics Systemic**
   Penicillin [31, 32], clindamycin, erythromycin [33], and metronidazole were proposed to prevent AO [33][34]. Due to the resistant bacteria species, possible hypersensitive and needless disruption of host commensals, it is proposed to systemic pre/ post-operative use of antibiotics. [35].

2. **Antibiotics Topical**
   Many tests have been undertaken to check the efficacy of topical pharmaceutical items for AO prevention whether use alone or with various doses and formulations of antibiotics. Despite the lack of consistency and less study, Topical tetracycline shows promising results [36, 37, 38]. Dust, aqueous solution, dry gas and Gelfoam sponges (preferred) were used as part of the system of distribution. It is noted that by use of Topical tetracycline [40, 41], side effects as foreign body reactions were reported. In one test, myosospherulosis was caused by the oil rich carrier used for the mixture of tetracycline-hydrocortisone [39]. Zuniga and Leist have reported nerve dysesthésy six months after the use of drugs over the eye. Another study has stated that placing anything in alveolus with basic Gelfoam would raise the occurrence of AO (at least marginally).

3. **Chlorhexidine**
   Various studies have reported that 0.12% chlorhexidine decreases AO in pre and post-operative use after the 3rd molar removal from the mandibular [42, 43, 44]. Ragno et al[45] has found an overall decrement in AO incidence up to 50% in patients with chlorhexidine treatment. Caso et al. [46] also observed that 0.12% rinse of chlorhexidine on surgery day and later is benefit after the meta-analysis of literature.

4. **Acid Tranexamic**
   Antifibrinolytic drug (Tranexamic acid, THA) was used to prevent AO in the extraction socket topically [48]. However, another comparison to a placebo group has not shown a significant decrease in AO incidence (Gersel-Pedersen, 1979) [47]. The local inactivation of plasminogen couldn’t stop the AO production by itself.

5. **Acid Polylaxis**
   A Clot-supporting agent (polylactic acid, PLA) is a biodegradable ester that is considered as an ultimate solution for AO prevention. It was proposed that PLA constantly supports the blood coagulation, osteoid tissue and granulation. Brekke et al. [46] has reported the use of AO was significantly decreased. However, the success of PLA was not...
supported by the related studies [48], then some complications were observed. Thus, on using PLA, the incidence of AO was higher.

6. Steroids
Lele has found that the use of corticosteroids in 1969 could decrease the complications after the surgery without avoiding developing AO [51]. There is a significant reduction in AO after the impacted mandibular molar removal of topical use of hydrocortisone and oxytetracycline emulsion [50]. However, there is no need to define antibiotic contribution from antibiotic steroid contribution [24].

7. Containing Eugenol Dressing
The use of dressing eugenol for avoiding AO development has been investigated [52]. There is a well-documented and irritant local impact on eugenol and a pause in care of wounds owing to prophylactic packaging, but it is difficult to justify its usage in prevention of AO [53, 54].

8. Lavage
Some studies have proposed sufficient intra-operative lavage to common AO incidence. Accordingly, AO decrement in the use of 175 mL lavage compared to 25 mL was reported (Butler and Sweet, 1977) [55]. However, the lavage volume was increased to 350 mL in another study by Butler and Sweet (1977). Thus, there were no significant differences in the impact of 175 mL on the incidence of AO compared to 350 ml lavage volume.

9. Gloves Sterile
Due to no diminishing occurrence of AO, there was no need to use sterile gloves than safe non-sterile gloves. [56, 57].

10. Aminoacridine
Another study used 9-aminoacridine (anti-septic agent) to test its effectiveness in minimizing the incidences of AO [58].

Management:
Dry socket may be performed by drainage, surgical treatment and positioning of medical clothing.

1. Flooding
The use of powdered perborate sodium, codein, heated saline, iodoform gauze and subsequent sodium perborate solution irrigation were proposed in 1929. Oral hygiene and gentle warm saline rinsing were proposed to assist the irrigation of dry cone [59].
2. Dressing medicated

Because of the local complication of surgical intervention, the use of medicated dressage is suggested [62]. Turner suggested that packing the socket would delay injury treatment and increase the chance of infection. Until adding a surgical dressing comprising zinc oxide and eugenol in semi-solid consistency attached to iodide rope gauze, Fazakerley and Field have recommended the extracting sutures and irrigation with warm saline under local anesthesia. After 2-3 days, the kit would be adjusted and extracted until discomfort subsides [63]. Because of myospherulosis, the use of oil-based vehicles is not approved. Any of the medicaments are antibacterial, topical anesthesia and obtincts or combination of all three e.g. zinc and eugenol impregnated cotton balls, alvogyl (eugenol, iodine, butams), and ribbon gauze, metronidazole (BIPP) and lidocaine ointment (BIPP).

3. Psychological symptoms

A quick course of non-steroidal anti-inflammatory meds (or opioids like codeine) could be changed in the option of analgesics.

4. Surgery

Curettage may be used as a preventive tool for dry holes, but it’s not proposed because of the introduction of more discomfort. Curettage requires application of anesthesia, socket operation and main flap closure [65]. Turner has reported that curettage and granulating tissue removal results to less visits than zinc oxide eugenol or iodoform look using eugenol technology.

RESULTS AND CONCLUSION

There are many studies discussing the effect of smoking on human health [66] compared to the effect of shisha. Tests were carried out in Dentistry department of Al-Zahrawi University while highlighting AO as the most complication exposed after tooth extraction because of smoking particularly hookah smoking as the main reason. As a result, SS had 3 times the risk of NS for developing DS, but there was no statistically significant difference between SS and CS. The raised frequency of smoking and smoking along the surgery day obviously increase the incidence of DS. The managing of this complication need the patient’s knowledge and patients with defined risk factors need to be precisely informed about this anticipated complication. More studies could be essential to provide firm conclusions in order to clarify this complication.

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