

# The Relationship between Smoking and Sublingual Varices in the Elderly

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## ABSTRACT

**Objectives:** We investigated the existence of any connection between smoking and sublingual varices (SLV) in the older population. **Methods:** This case-control study was conducted in 2019 on adults > 65 years old at Kahrizak Charity Nursing Home, Alborz, Iran. We conducted clinical examination and inspection of 222 elderly patients. Both the case group and control group contained the same number of patients (n = 111). SLV were classified as grade 0 (few or none visible) and grade 1 (moderate or severe). The case group included patients with SLV and the control group consisted of those older adults without SLV and who were matched with the case group based on age, gender, blood pressure, denture wearing, and varicose veins in their legs. Cigarette smoking habits were investigated in both groups. Smokers were considered those who smoked at least one cigarette per day for more than six months. Chi-square and odds ratio (OR) were used to statistically analyze the exposure of participants to smoking in both groups. **Results:** Among 222 participants, 21.6% and 5.4% were smokers in the case and control groups, respectively. The results of our data analysis revealed that SLV were significantly associated with smoking ( $p < 0.001$ , OR = 4). **Conclusions:** Elderly patients with SLV are more likely to be cigarette smokers. Therefore, cigarette smoking cessation programs are recommended for older adults in society.

Varices, varix, or varicosities are abnormally dilated and twisted veins in the legs and oral area. Sublingual varices (SLV) are the most common type of oral varicosities. It often appears as several elevated blue-purple lesions on the ventral surface or lateral border of the tongue,<sup>1</sup> and they are more likely to be discovered during routine dental visits. However, if the patients find them in their mouths for the first time, it may cause cancerophobia due to the ominous look of the varicose veins. In rare situations, if these lesions are traumatized, minor hemorrhage may occur. Because of their vascular origin, they tend to blanch under pressure (positive diascopy). A negative diascopy test can be the result of a thrombus that can happen in long-lived oral varices.<sup>2</sup> The presence of varicosities increases the risk of clotting in affected veins due to the alteration of local blood flow, resulting in thrombosed veins formation (phlebothrombosis).<sup>3</sup> Thrombosed varices in the mouth are often small and localized. They mostly develop in the lips and buccal mucosa. However, a recent study reported a rare case of large thrombosed sublingual varix (2 cm in diameter) with an initial tumor diagnosis.<sup>4</sup>

SLV should be distinguished from the following conditions: hemangioma, lymphangioma, Kaposi's sarcoma, melanoma, or blue rubber bleb nevus syndrome. Therefore, proper knowledge of SLV clinical characteristics, obtaining a thorough medical history, and performing a detailed clinical evaluation are essential factors in establishing a diagnosis.<sup>2</sup>

Some of the potential risk factors for SLV are age, gender, smoking, cardiovascular diseases, denture wearing, and leg varicosity.<sup>5-10</sup> Age appears to be an important etiologic factor since varices, in general, are more common in the elderly than children. This suggests that their occurrence may be an age-related degeneration, in which a loss of connective tissue of the vessels occurs.<sup>1</sup> Furthermore, some studies on oral mucosal lesions in older people reported SLV to be among the four most prevalent lesions in the mouth.<sup>11-16</sup>

As mentioned previously, smoking is one of the possible etiologies of SLV. There are very few studies that have investigated the connection between SLV and smoking. Some studies have reported an association. For example, Al-Shayyab and Baqain,<sup>5</sup> in a study of 391 patients, found a significant

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relationship between smoking and SLV. Hedström et al,<sup>6,7</sup> also reported a significant association in two different observational clinical studies with a five-year gap. However, in their second study, the criterion of being a smoker was not clearly stated. In contrast to the previous studies, Akkaya et al,<sup>10</sup> in a recent study of 691 patients, reported that smoking does not significantly affect the incidence of SLV. They suggested that this finding might be linked with nicotine's preventive effect on the formation of varicose veins due to its vasoconstrictive effect. Thus, this connection remained controversial.

On the other hand, the number and proportion of older people in the world is increasing. In 2015, 12% of the world population was over 60 years of age. By the middle of the century, the global average will be 22%. In countries like Iran, Russia, Chile, and China, people > 60 years old will be close to 30% of the population.<sup>17</sup> Considering the growth in the percentage of elderly in the world population and the world's busy and mechanical lifestyle, the number of elderly residents in nursing homes is increasing. Thus, soon, the elderly make up a great portion of dental service users. In other words, oral diseases and conditions related to aging will increase the need for regular oral examinations. Therefore, being acquainted with common oral mucosal lesions in the elderly can be very helpful for dentists and can prevent further unreasonable and invasive treatments.

Therefore, this study aimed to investigate whether there is any connection between SLV and smoking in older adults.

## METHODS

This case-control study was conducted over four months in 2019 on adults > 65 years old in Kahrizak Charity Nursing Home in Alborz, Iran. Each participant signed a letter of consent after the purpose and procedure of the study were explained to them. Overall, 428 people participated in this study.

We obtained the following information from every participant: age, denture use, and varices in the legs. Additionally, the participant's blood pressure was calculated as the average registered blood pressure obtained from their daily medical check-up list over a week. Hypertension was considered blood pressure above 140/90 mmHg.<sup>18</sup> The next step was the examination of the mouth to investigate the

presence of SLV. We asked patients to move their tongue upward and then left and right to examine the tongue's ventral surface and lateral borders. For more accurate inspection, we used disposable dental mirrors in this assessment. A flashlight was our light source.

The results of the SLV check-up were recorded and categorized in two groups: grade 0, few or non-visible; and grade 1, moderate or severe.<sup>5-7</sup>

The last piece of information was obtained by asking the participants about their smoking habits. The criteria for being a smoker was to smoke at least one cigarette per day for more than six months.<sup>19</sup>

We matched the participants into case and control groups. The case group consisted of participants with SLV, and the control group included participants who did not have SLV and were matched with the case group based on age (up to five years older or younger), gender, blood pressure, denture wearing, and varicose veins in legs. The participants whom we could not find a match with were excluded from the study. This reduced our sample size to 222. The smoking status of the participants (smoker/non-smoker) was then compared between matched case and control groups.

Chi-square and odds ratio (OR) were calculated to statistically analyze the exposure of participants to smoking in both groups. A *p*-value < 0.050 was considered statistically significant.

## RESULTS

Out of 428 elderly who participated in this study, 222 people, including 136 females and 86 males, were selected as case and control groups; 111 elderly with SLV in the case group and 111 elderly without SLV in the control group were matched based on age, gender, blood pressure, denture wearing, and varicose veins in their legs.

Table 1 shows the distribution of the elderly in both groups based on the characteristics given.

The distribution of participants based on SLV conditions against smoking habits is presented in Table 2. It shows that the proportion of smokers for the case group and the control group was 24 (21.6%) and 6 (5.4%), respectively.

The chi-square test results revealed that SLV was significantly associated with smoking (*p* < 0.001). OR showed that older adults with SLV are four times more likely to be smokers (OR = 4).

**Table 1:** The distribution of elderly in both groups based on characteristics.

Characteristics (risk factors) Sublingual varices	Gender		Age, years	Wearing denture		High blood pressure		Leg varicosity	
	Female	Male		No	Yes	No	Yes	No	Yes
Control group, n = 111	68	43	77.0 ± 8.5	47	64	74	37	67	44
Case group, n = 111	68	43	77.4 ± 8.0	47	64	74	37	67	44
Total, n = 222	136	86		94	128	148	74	134	88

## DISCUSSION

The present study showed that SLV was significantly associated with smoking ( $p < 0.001$ ). This result was in agreement with several previous studies.<sup>5-7,11,12,16</sup>

Al-Shayyab and Baqain investigated the relation between SLV and potential risk factors.<sup>5</sup> Their work was a cross-sectional study with a sample size of 391 people. Their study population consisted of patients who attended the dentistry department and were aged 13–74 years old. In their study, the status of smoking was categorized based on Centers for Disease Control and Prevention's standard into three groups: current smokers (who had smoked daily or occasionally, any types of smoking including cigarettes, water pipe, pipes, and cigar within the last 30 days), ex-smokers (who had smoked before but reported cessation at the time of the study), and non-smokers (who never smoked in their lifetime). They reported that smoking and its duration were strongly associated with SLV ( $p = 0.002$ ).<sup>5</sup>

Hedström and Bergh's observational clinical study confirmed a significant association between SLV and smoking in dental patients ( $p = 0.023$ ).<sup>6</sup> However, their criterion for being a smoker was different from our study. They considered a person a smoker if they smoked at the time of the study,<sup>6</sup> whereas in our study the patient was considered a smoker if they smoked at least one cigarette per day for more than six months.

**Table 2:** The proportion of smokers in the case and control groups.

SLV/ smoking	Grade 0 control group	Grade 1 case group
Non-smoker	105 (94.6)	87 (78.4)
Smoker	6 (5.4)	24 (21.6)
Total (%)	111 (100%)	111 (100%)
Result		$p < 0.001$

SLV: sublingual varices.

Hedström et al,<sup>7</sup> conducted another observational clinical study to investigate whether there is any connection between SLV and hypertension. They also recorded smoking status and reported an association between SLV and smoking ( $p = 0.025$ ); however, the criterion for being a smoker was not clearly stated. Furthermore, the prevalence of SLV in hypertensive non-smokers was reported 44.7% and 64.7% in hypertensive smokers.<sup>7</sup>

Another descriptive and analytical study by Motaleb Nejad and Shirvani on 275 participants over 65 at Kahrizak Charity Nursing Home in Tehran revealed similar results.<sup>11</sup> The authors found that SLV were the most common lesions in the mouth of the elderly (44.7%) and that they were more common in tobacco users ( $p < 0.05$ ).<sup>11</sup>

Lynge Pedersen et al,<sup>12</sup> also found that SLV is the most prevalent lesion in the mouths of the elderly (28.3%). Additionally, they reported that SLV were more prevalent in the elderly with systemic diseases and medication intake, especially if they had cardiovascular disease. In this study, oral mucosal lesions were generally associated with current tobacco smoking ( $p = 0.047$ ).<sup>12</sup>

Another study by Bozdemir et al,<sup>16</sup> reported SLV as the most common type of oral mucosal lesion in elderly dental patients. They classified participants into three groups (smokers, former smokers, and non-smokers) based on their smoking habits. The most prevalent lesion in the smokers' group was SLV (9.9%). Moreover, oral mucosal lesions were significantly associated with smoking and the history of smoking ( $p = 0.045$ , OR = 3.385).<sup>16</sup>

Finally, a more recent study found an inconsistent result with the previous studies. Akkaya et al,<sup>10</sup> reported that ex-smokers had a higher prevalence of SLV compared to current smokers. They suggested that this finding might be related to the preventive effect of nicotine on the development of varicose veins due to its vasoconstrictive effect.<sup>10</sup> However, in the study mentioned above, only the effect of

nicotine was considered, while it is known that tobacco smoke contains over 7000 chemicals, of which at least 250 are known to be harmful, and at least 69 are known to cause cancer.<sup>20</sup>

Our study was limited by the fact that we could not obtain reliable information about years of smoking due to the hesitant and inaccurate answers of the smokers.

## CONCLUSION

The data suggest that elderly patients with SLV are more likely to be smokers. Therefore, cigarette smoking cessation programs are recommended for older people in society. Based on the results of this study and other previous published papers, we suggest an etiologic study that investigates the metabolism and pathophysiology of smoking on SLV development.

### Disclosure

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