Chronic Pain in Patients With Atypical Facial Pain and Smoking: Association and Patterns of Smoking Behavior

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Abstract- This study was conducted with the aim of investigating the pattern of smoking and its relationship with chronic pain in patients with atypical facial pain (AFP). This descriptive cross-sectional study was conducted on patients with AFP referred to the Oral and Maxillofacial Medicine department of Mashhad Dental faculty. Patients whose disease was confirmed through clinical and psychiatric examinations, and standard diagnostic criteria were included in the study. The information based on the designed checklist includes demographic characteristics, pain characteristics, and information related to tobacco use was extracted and recorded. Out of 77 patients included in the study, 23 were smokers and 54 were non-smokers. The most common site of pain in the smoking group was the face and, in the non-smoking group was the mandible. The most reported pain type was sharp pain in both groups. In non-smokers, a history of mental stress at the same time as the onset of pain was reported in 56% of people, and in the population of smokers, it was reported in 73% of people. In both groups, most people reported that pain does not affect sleep patterns. No significant difference was observed between the smoking and non-smoking groups in terms of pain intensity. According to the findings of present study, Smoking does not play a role in the pain intensity and sleep pattern of people with AFP, and other factors such as economic status, stress, anxiety, and smoking compounds may be effective, which should be investigated in future studies.

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Introduction

The prevalence of chronic pain in the head and face areas, although it is difficult to measure it accurately, is reported to be 26%. One of the subtypes of facial pain is Persistent Idiopathic Facial Pain (PIFP), which used to be called Atypical Facial Pain (AFP). The prevalence of these pains is reported as 0.03%. These pains are difficult to diagnose and may involve the patient in unnecessary dental, medical, or even psychiatric treatments. PIFP/AFP is defined as pain for more than two hours a day and for more than three months without a specific pathological reason in a person (1,2).

The pain has been reported as Nociceptive, Neuralgia (burning), aching, and stabbing. The patient reports changes in intensity, location, and pain quality at different times. The pain intensity varies from mild to severe under the influence of emotions and stress (1).

No specific clinical cause for AFP is found. The possible mechanism of causing AFP can be due to hyperactivity of central neurons to afferent neurons. Although AFP is considered to be influenced by

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biological and psychological factors (1,3).

Smoking has a negative effect on almost all tissues and systems of the body and is a proven risk factor for many diseases including cancer and cardiovascular disorders (4). The high prevalence of nicotine consumption (about 20%) has made it one of today's societal challenges (4,5).

In literature, Smoking is associated with several pain-related diseases, Few studies have documented associations between tobacco use and painful oral symptoms or pain-related behavioral effects (5,6). About one-third of American adults suffer from chronic pain and more than two-thirds of them have reported a history of smoking (6). It has also been reported that the duration of smoking has a significant relationship with the presence of chronic pain, pain intensity, and sensitivity to pain (7).

In people, smoking may be associated with the severity of chronic pain, or it may be an escape way for complications of these pains. The relationship between oral pain and smoking is somewhat ambiguous. On the other hand, due to the psychological origins of AFs, there may be connections with smoking. Studies have shown that smoking in people with chronic pain is more than in normal people (8,9). Although the relationship between smoking and various pains and even facial pains has been investigated in the literature (10), however, the relationship between smoking and chronic oral pain, especially AFP, has not been investigated so far. For this reason, the present study aims to investigate the smoking pattern and its relationship with chronic pain in patients with AFP.

Materials and Methods

Participants and ethical considerations

This descriptive cross-sectional study was conducted on patients with AFP referred to the Department of Oral and Maxillofacial Medicine of Mashhad Dental Faculty. Patients whose AFP was confirmed through clinical and psychiatric examinations, and standard diagnostic criteria (newly diagnosed patients) were included in the study (11). In the present study, all the ethical standards have been met, and the study was approved by the vice-chancellor of the Mashhad University of Medical Sciences with the ethics code of IR.MUMS.DENTISTRY.REC.1400.133.

Data acquisition

Pain characteristics

Our diagnostic criteria for atypical facial pain were pain that lasted more than two hours a day and lasted more than three months without a specific cause (12). Data was obtained using a structured checklist including demographic data, medical history, chief complaint, and pain duration before referral.

Regarding the patient's pain, the pain characteristics including the location, duration, nature, distribution, aggravating/alleviating factors, and the pain intensity based on the Visual Analogue Scale (VAS), were documented.

Smoking pattern characteristics

In terms of smoking, any tobacco type (pipe, cigarette, hookah, etc.), age of initiation, frequency, duration, quit attempts in the last year, cigarettes reverse use, unfiltered cigarettes, secondhand smoke exposure, and post-AFP changes in smoking behavior, the time interval between smoking and causing pain were recorded in the relevant checklist.

People who had smoked more than 100 cigarettes in their lifetime were classified as smokers' group and the rest as non-smokers' group (12).

Sleep pattern

The participants were asked about sleep status (including the quality and quantity of sleep) and any treatments. They were also asked about stressful life events coinciding with pain onset.

Haven-yale multidimensional questionnaire

One of the tools prepared to examine chronic pain is the Haven-Yale Multidimensional Questionnaire. This questionnaire is standardized for patients with chronic pain (13). This questionnaire consists of three independent parts: the first part (pain experience) contains 20 questions and asks the patient to report his assessment of pain interference, support and self-control, pain severity, pain perception and negative mood in the form of 5 subscales. The second part (responses by significant other) has 14 questions in the form of three subscales to evaluate punishing, solicitous, and distracting responses. The third part (daily activity) has 18 questions and evaluates in the form of five subscales including household chores, outdoor work, activities away from home, social activities and general activity. The score obtained for each section in the Haven-Yale questionnaire was 0 to 6, and the average of the total scores is presented as the final report (14).

Statistical analysis

Data was analyzed using SPSS v25 (IBM, USA). Normality was verified (Kolmogorov–Smirnov, Shapiro–

Wilk). ANOVA, t-test, and chi-square tests compared variables. Regression methods were used to determine the relationship between pain intensity and other variables. Significance was set at $P<0.05$.

Results

Participant data

Seventy-seven newly diagnosed AFP patients participated between May 2021–June 2022: 23 smokers and 54 non-smokers.

The average age of the participants was 50.15±57.74 (range 23-74 years), significantly different between the two groups of smokers and non-smokers ($P=0.028$). Men significantly smoke more than women ($P<0.001$). Education and marital status showed no significant differences ($P>0.05$). A summary of the participants' demographic information can be seen in Table 1.

As can be seen in Table 1, In terms of medical history, most participants in the smoking group had no systemic disease; but in the non-smoking group, a positive medical history or systemic disease was reported.

Mental stress at pain onset occurred in 73% of smokers vs. 56% of non-smokers, and dental trauma was more frequent in smokers (62% vs. 40%).

Pain was the main complaint in both groups; burning sensation was more common among non-smokers. Complaint duration was usually 1-2 years in smokers and >2 years in non-smokers (Table 1).

Table 1. Demographic and medical information of patients

Variable	Non-smokers	Smokers	*P* *
Medical information			
Age, mean±SD	53.15±12.34	44.15±56.32	0.028[1]
Gender, n (%)			
Male	9 (34.61%)	17 (65.39%)	<0.001[2]
Female	45 (88.23%)	6 (11.77%)	
Education level, n (%)			
Illiterate	14 (82.35%)	3 (17.65)	
Under diploma	15 (78.94%)	4 (21.06%)	0.261[2]
Diploma	10 (55.55%)	8 (44.45%)	
Academic degree	15 (65.21%)	8 (34.79%)	
marital status, n (%)			
Single	5 (45.45%)	6 (54.55%)	0.068[3]
Married	44 (77.19%)	13 (22.81%)	
Divorced	5 (55.55%)	4 (44.45%)	
Employment status, n (%)			
Unemployed	1 (25.00%)	3 (75.00%)	
Housekeeper	37 (90.24%)	4 (9.76%)	
Self-employed	4 (26.67%)	11 (73.33%)	<0.001[3]
Employee	4 (66.67%)	2 (33.33%)	
Retired	6 (66.67%)	3 (3.33%)	
Student	2 (100%)	0 (0%)	
Medical information			
Systemic disease (yes)	39 (79.51%)	10 (20.41%)	0.883
Main complaint, n (%)			
Pain	46 (69.66%)	20 (33.34%)	
Burning	4 (80.00%)	1 (20.00%)	
Tingling	2 (100%)	0 (0%)	
Paresthesia	2 (66.66%)	1 (33.34%)	0.65[3]
Edema	0 (0%)	1 (100%)	
Complaint duration, n (%)			
0-6 months	17 (80.95%)	4 (19.05%)	
6-12 months	11 (64.70%)	6 (35.30%)	
1-2 years	7 (50.00%)	7 (50.00%)	0.209[4]
> 2 years	19 (76.00%)	6 (24.00%)	

* $P<0.05$ was considered Significant
1. independent t-test
2. chi-square test
3. Fisher exact test
4. Chi-square test

Pain characteristics

A significant difference was observed between the groups in pain distribution (P=0.024). In the non-smoking group, the face was the most affected site (27.78%), whereas in smokers, pain distribution was absent in most cases (56.53%). As shown in Table 2, neuropathic (sharp) pain was the most frequent type in both groups, followed by stinging pain. The lower jaw was the most common pain site in non-smokers, while the face was most common in smokers. In both groups, the majority of participants reported continuous pain lasting 24 hours per day (Table 2).

Stress was the most common factor aggravating pain in both smokers and non-smokers. Non-smokers mainly used analgesics for relief, whereas smokers used other methods such as massage, heat, or chewing. No significant differences were found between the groups in pain triggers, relieving factors, sleep effects, prescribed medications, or pain intensity (P=0.85, P=0.164, P=0.707, P=0.709, and P=0.186 respectively). Additionally, neither smoking duration nor daily cigarette consumption was associated with pain intensity, indicating that smoking had no significant impact on pain (P=0.95, and P=0.335respectively).

Smoking pattern characteristics

Table 3 shows the smoking patterns of 23 participants: 19 reported no change in smoking after AFP onset, 2 increased, and 2 decreased their smoking. Most had been smoking for over 20 years, and for 69.6% of smokers, more than 5 years had passed between the start of smoking and pain onset.

Sleep pattern

There was no significant difference in sleep patterns between the two groups after the start of the intervention (P=0.7). Despite this, smokers (56.5%) had more sleep pattern changes than non-smokers (51.9%).

Logistic regression showed that age, employment status, and gender did not significantly affect sleep pattern changes in either group (P>0.05).

Haven-yale multidimensional questionnaire

In the Haven-Yale questionnaire, pain severity scored highest in the pain experience section, while solicitous responses and household chores scored highest in the interests/concerns and daily activities sections, respectively. After adjusting for age, gender, and employment status, none of the questionnaire sections showed significant differences between smokers and non-smokers (P>0.05) (Table 4).

Table 2. Pain characteristics among smokers and non-smokers

Variable	Non-smokers	Smokers	*P*
Pain Location			
Upper jaw	12 (66.7%)	6 (33.3%)	
Lower jaw	24 (80.0%)	6 (20.0%)	
Face	7 (50.0%)	7 (50.0%)	0.247[1]
Oral mucosa	7 (87.5%)	1 (12.5%)	
Teeth	2 (66.7%)	1 (33.3%)	
TMJ	2 (50.0%)	2 (50.0%)	
Pain Type			
Neuropathic (sharp)	32 (64.0%)	18 (36.0%)	
Unlocated pain	4 (80.0%)	1 (20.0%)	
Numbness (tingling)	4 (80.0%)	1 (20.0%)	0.91[1]
Neuralgia (stinging)	6 (75.0%)	2 (25.0%)	
Nociceptive (pulsating)	6 (85.7%)	1 (14.3%)	
Pain distribution			
Negative	10 (43.5%)	13 (56.5%)	
Ear	8 (80.0%)	2 (20.0%)	
Face	15 (75.0%)	5 (25.0%)	0.024[1]
Oral mucosa	8 (88.9%)	1 (11.1%)	
Others	13 (86.7%)	2 (13.3%)	
Pain Duration During the Day			
< 1 hour	13 (76.5%)	4 (23.5%)	
1–12 hours	18 (90.0%)	8 (30.77%)	0.87[1]
12–24 hours	3 (60.0%)	2 (40.00%)	
24 hours (continuous)	20 (69.0%)	9 (31.04%)	

*¬ $P<0.05$ was considered Significant
1.¬ Fisher exact test

Table 3. Smoking pattern characteristics

Variable	Frequency, n (%)
Smoking duration	
< 5 years	7 (30.43%)
5-10 years	4 (17.39%)
10-15 years	3 (13.04%)
> 20 years	9 (39.13%)
Tried to quit in past 12 months	
Yes	0 (0%)
No	23 (100%)
Reverse smoking	
Yes	0 (0%)
No	23 (100%)
Use of unfiltered cigarettes	
Yes	0 (0%)
No	23 (100%)
Exposure to secondhand smoke	
Yes	24 (31.16%)
No	54 (68.84%)
Change in consumption pattern	
Unchanged	19 (82.60%)
Increased	2 (8.69%)
Decreased	2 (8.69%)
Time between start of smoking and pain onset	
< 1 year	3 (13.04%)
1-5 years	4 (17.39%)
> 5 years	16 (69.56%)

Table 4. Haven-yale multidimensional questionnaire

Variable	Result	Regression model, β [95% CI]		
		Employment status	Gender	Age
First section (pain experience), mean ± SD				
Support and self-control	2.57±2.13			0.002 [-0.008, 0.011]
Pain severity	4.04±1.33	-0.003 [0.132, 0.126]	-0.749 [-1.167, 0.33]	
Pain perception	3.12±1.12			
Negative mood	3.44±1.03			
Second section (responses by significant other), mean ± SD				
Punishing responses				
solicitous responses	1.25±1.66	0.106 [-0.078, 0.023]	-0.542 [-1.141, 0.056]	0.01 [-0.004, 0.023]
Distracting responses	2.46±1.83			
	1.90±1.88			
Third section (daily activity), mean ± SD				
Household chores	4.00±2.10	0.055 [-0.04, 0.149]	0.105 [-0.201, 0.412]	-0.015 [-0.022, 0.009]
Outdoor work	0.73±1.17			
Activities away from home	1.07±1.07			
Social activities	1.66±1.66			
General activity	1.85±1.85			

Discussion

Atypical facial pain (AFP) is a debilitating condition whose etiology and characteristics remain incompletely understood. Because its symptoms can overlap with other types of head and neck pain, patients may often receive inappropriate or even invasive treatments. In several studies, smoking and tobacco use have been suggested as contributing factors in chronic pain conditions (1,3). The present study aimed to examine smoking patterns and their relationship with chronic pain in patients with AFP, and also to explore whether pain influences smoking

behavior. Identifying factors that affect AFP can help clarify its underlying pathophysiology and improve treatment strategies.

The mean age of participants in this study was 57.74±50.15 years. Macfarlane *et al*., (16) reported that facial pain was most common in individuals aged 51-55 years, which is consistent with the present findings. Similar to previous research, most participants were women, supporting earlier evidence that chronic pain is more prevalent among females (17-22), possibly due to higher susceptibility to stress and depressive symptoms (20).

In the current study, no significant correlation was observed between the intensity of AFP and smoking status. This is consistent with the findings of Burris *et al*., (9), who also reported no association between smoking and chronic facial pain. However, Riley *et al*., (23) found a significant relationship between smoking amount and severity of chronic oral pain. Such discrepancies may arise from differences in study design, population characteristics, cultural contexts, and sample sizes. Moreover, socioeconomic and environmental factors could also influence pain perception and smoking behavior. Exposure to cigarette smoke—even passive exposure—may contribute to pain modulation through inflammatory or neurochemical pathways. Hence, future studies should include biochemical assessments of nicotine metabolites to clarify these associations.

When situated within the broader smoking–pain literature, the current findings contribute to the evidence that the relationship between smoking and chronic pain is complex and inconsistent. While some studies report that smoking is associated with heightened pain perception in conditions such as low back pain, fibromyalgia, and temporomandibular disorders (11,16,24,25), our results did not find a significant effect of smoking on atypical facial pain. This discrepancy may be explained by differences in study populations, types of pain, smoking patterns, psychosocial factors, and exposure levels. Experimental evidence also suggests that nicotine may exert short-term analgesic effects, but chronic exposure can alter pain processing, potentially leading to hyperalgesia and central sensitization. Our findings highlight that, at least in AFP, smoking may not be a major determinant of pain intensity.

In the review by Shi *et al*., (25), similar to our study, no significant association was found between smoking intensity and chronic oral pain severity, suggesting that the influence of smoking may depend more on individual smoking patterns, psychological stress, and other chemical constituents of cigarettes. Furthermore, psychosocial stress has been strongly linked to both increased smoking behavior and pain chronification (25,26,27). The predominance of male smokers in the present study may reflect higher exposure to occupational stressors, consistent with the notion that stress-related pathways contribute to both nicotine use and pain persistence.

In the present study, no relationship was observed between smoking and sleep quality. By contrast, Riley *et al*., (23) reported that smoking was associated with sleep disturbances, as did other studies (9,16). The discrepancy in findings may relate to differences in pain medication use—such as analgesics or benzodiazepines—that can alter sleep patterns and mask the potential effects of smoking.

Additionally, 40% of non-smokers and 62% of smokers reported a history of dental pain or trauma coinciding with pain onset. Similar to Riley *et al*., (23), who found that 52% of subjects experienced dental pain during the onset of chronic pain, our findings suggest that dental trauma may play a role in the initiation or perpetuation of AFP, though causality remains uncertain.

Consistent with prior evidence (28), a high prevalence of psychological stress and depressive symptoms was observed among AFP patients, particularly among smokers (73%) compared to non-smokers (56%). This aligns with studies demonstrating that psychological distress can amplify pain perception and promote smoking as a coping mechanism.

Finally, patient responses on the Haven–Yale questionnaire indicated no significant differences in social or functional aspects between smokers and non-smokers. Thus, smoking did not appear to alter daily activities or interpersonal functioning in this sample. However, larger studies that integrate psychological, biochemical, and socioeconomic variables are needed to clarify these relationships.

This study has several limitations. First, since no previous research has specifically investigated the effect of smoking on atypical facial pain (AFP), the comparison of our findings with earlier studies is limited, highlighting an existing knowledge gap in this field. Second, the sample size was relatively small, which may limit the statistical power and the generalizability of the findings. Third, biochemical confirmation of the outcomes was not performed, and the results were based solely on clinical or record-based assessments. Fourth, as this was a single-center study, the findings may not be fully generalizable to other settings or populations. Moreover, the present study did not examine patients' economic status or anxiety levels, compare pain intensity based on serum

levels of nicotine derivatives, or classify smokers according to the amount consumed. These aspects will be addressed in future studies.

In this study, the characteristics of atypical facial pain in smokers and non-smokers were investigated. In this study, there was no relationship between smoking and the severity of AFP in patients. According to the findings of this study, it seems that smoking alone did not affect the pain severity in patients with AFP, and other factors such as economic status, anxiety, and stress may be effective on the patients' pain intensity.

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References

1. Maarbjerg S, Wolfram F, Heinskou TB, Rochat P, Gozalov A, Brennum J, et al. Persistent idiopathic facial pain–a prospective systematic study of clinical characteristics and neuroanatomical findings at 3.0 Tesla MRI. Cephalalgia 2017;37:1231-40.
2. Benoliel R, Gaul C. Persistent idiopathic facial pain. Cephalalgia 2017;37:680-91.
3. Nguyen CT, Wang MB. Complementary and integrative treatments: atypical facial pain. Otolaryngol Clin North Am 2013;46:367-82.
4. Mohammadpoorasl A, Nedjat S, Fakhari A, Yazdani K, Rahimi Foroushani A, Fotouhi A. Smoking stages in an Iranian adolescent population. Acta Med Iran 2012;50:746-54.
5. Goesling J, Brummett CM, Meraj TS, Moser SE, Hassett AL, Ditre JW. Associations between pain, current tobacco smoking, depression, and fibromyalgia status among treatment-seeking chronic pain patients. Pain Med 2015;16:1433-42.
6. Dani JA, De Biasi M. Cellular mechanisms of nicotine addiction. Pharmacol Biochem Behav 2001;70:439-46.
7. Substance Abuse and Mental Health Services Administration (SAMHSA). Center for Behavioral Health Statistics and Quality. National Survey on Drug Use and Health, 2010. ICPSR32722-v1. 2010.
8. Pisinger C, Aadahl M, Toft U, Birke H, Zytphen-Adeler J, Jørgensen T. The association between active and passive smoking and frequent pain in a general population. Eur J Pain 2011;15:77-83.
9. Burris JL, Perez C, Evans DR, Carlson CR. A preliminary study of cigarette smoking in female orofacial pain patients. Behav Med 2013;39:73-9.
10. Ditre JW, Zale EL, LaRowe LR, Kosiba JD, De Vita MJ. Nicotine deprivation increases pain intensity, neurogenic inflammation, and mechanical hyperalgesia among daily tobacco smokers. J Abnorm Psychol 2018;127:578.
11. Alamir AH, Quadri MFA. Tobacco use and orofacial pain: a meta-analysis. Nicotine Tob Res 2020;22:1957-63.
12. Glick M, Greenberg MS, Lockhart PB, Challacombe SJ. Burket's Oral Medicine. 13th ed. Hoboken, NJ: Wiley Blackwell; 2021. Available from: http://dx.doi.org/10.1002/9781119597797.
13. Nonnemaker J, Rostron B, Hall P, MacMonegle A, Apelberg B. Mortality and economic costs from regular cigar use in the United States, 2010. Am J Public Health 2014;104:e86-91.
14. Mirzamani SM, Safari A, Holisaz MT, Sadidi A. Validation of the West Haven-Yale Multidimensional Pain Inventory [WHYMPI] for Iranian patients with chronic pain .Qom Univ Med Sci J 2007;1:13-25.
15. Flor H, Rudy T, Birbaumer N, Streit B, Schugens M. The applicability of the West Haven-Yale multidimensional pain inventory in German-speaking countries. Schmerz 1990;4:82-7.
16. Macfarlane TV, Beasley M, Macfarlane GJ. Self-reported facial pain in UK Biobank study: prevalence and associated factors. J Oral Maxillofac Res 2014;5:e2.
17. Brailo V, Zakrzewska JM. Grading the intensity of nondental orofacial pain: identification of cutoff points for mild, moderate, and severe pain. J Pain Res 2015;8:95.
18. Xu A, Hilton E, Arkema R, Tintle NL, Helming LM. Epidemiology of chronic pain in Ukraine: findings from the World Mental Health Survey. PLoS One 2019;14:e0224084.
19. Pereira FG, França MH, Paiva MCAd, Andrade LH, Viana MC. Prevalence and clinical profile of chronic pain and its association with mental disorders. Rev Saude Publica 2017;51.
20. Bartley EJ, Fillingim RB. Sex differences in pain: a brief review of clinical and experimental findings. Br J Anaesth 2013;111:52-8.
21. Antunes F, Pereira RM, Afonso V, Tinoco R. Prevalence and characteristics of chronic pain among patients in Portuguese primary care units. Pain Ther 2021;10:1427-37.
22. Sotorra-Figuerola D, Sánchez-Torres A, Valmaseda-Castellón E, Gay-Escoda C. Continuous neurophatic orofacial pain: a retrospective study of 23 cases. J Clin Exp Dent 2016;8:e153-9.
23. Riley III JL, Tomar SL, Gilbert GH. Smoking and

smokeless tobacco: increased risk for oral pain. J Pain 2004;5:218-25.

24. Weingarten TN, Iverson BC, Shi Y, Schroeder DR, Warner DO, Reid KI. Impact of tobacco use on the symptoms of painful temporomandibular joint disorders. Pain 2009;147:67-71.
25. Shi Y, Weingarten TN, Mantilla CB, Hooten WM, Warner DO. Smoking and pain: pathophysiology and clinical implications. Anesthesiology 2010;113:977-92.
26. Buhelt LP, Pisinger C, Andreasen AH. Smoking and stress in the general population in Denmark. Tob Prev Cessat 2021;7:27.
27. LaRowe LR, Ditre JW. Pain, nicotine, and tobacco smoking: current state of the science. Pain 2020;161:1688.
28. Taiminen T, Kuusalo L, Lehtinen L, Forssell H, Hagelberg N, Tenovuo O, et al. Psychiatric (axis I) and personality (axis II) disorders in patients with burning mouth syndrome or atypical facial pain. Scand J Pain 2011;2:155-60.