

Prevalence of Temporomandibular Disorder Symptoms and Their Association with Alcohol and Smoking Habits

Ossi Miettinen, DDS

Clinical Teacher
Institute of Dentistry, University of
Eastern Finland
Oral and Maxillofacial Department,
Kuopio University Hospital
Kuopio, Finland
Research Unit of Oral Health Sciences
and Medical Research Center Oulu
(MRC Oulu)
Oulu University Hospital and University
of Oulu, Oulu, Finland

Vuokko Anttonen, DDS, PhD

Docent
Research Unit of Oral Health Sciences
and Medical Research Center Oulu
(MRC Oulu)
Oulu University Hospital and University
of Oulu, Oulu, Finland

Pertti Patinen, DDS, PhD

Chief Dentist
Center for Military Medicine
Finnish Defense Forces
Riihimäki, Finland

Jari Pääkkilä, MSc

Senior Lecturer
Department of Mathematical Sciences
University of Oulu, Oulu, Finland

Leo Tjäderhane, DDS, PhD

Professor
Department of Oral and Maxillofacial
Diseases
University of Helsinki and Helsinki
University Hospital
Helsinki, Finland

Kirsi Sipilä, DDS, PhD

Professor
Institute of Dentistry, University of
Eastern Finland
Oral and Maxillofacial Department,
Kuopio University Hospital
Kuopio, Finland
Research Unit of Oral Health Sciences
and Medical Research Center Oulu
(MRC Oulu)
Oulu University Hospital and University
of Oulu, Oulu, Finland

Correspondence to:

Ossi Miettinen
Institute of Dentistry
University of Eastern Finland
PO Box 1627, 70211 Kuopio, Finland
Email: ossi.miettinen@uef.fi

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Aims: To evaluate the prevalence of temporomandibular disorder (TMD) symptoms and their associations with alcohol consumption and smoking habits among young Finnish adults. **Methods:** The total sample consisted of 8,678 conscripts (8,530 men and 148 women, response rate 62.8%). Data on TMD symptoms, health behavior, and background/demographic factors were acquired by using a questionnaire. Self-reported facial pain and symptoms of TMD were used as outcome variables. The frequency of smoking and consumption of alcohol and snuff were used as explanatory variables. Chi-square tests, as expressed by odds ratios (OR) and 95% confidence intervals (95% CI), were used as statistical methods in the analysis. Statistical significance was determined at $P < .05$. **Results:** The prevalence of different self-reported, at least occasional TMD symptoms varied between 5.8% (difficulty in jaw opening) and 27.8% (temporomandibular joint [TMJ] clicking) in the male population, with higher prevalences for all symptoms in the female population except for TMJ clicking. Smoking was significantly associated with TMD symptoms, except TMJ clicking. Consumption of alcohol at least once a week was associated significantly with facial pain, TMJ pain, TMJ pain at jaw rest, TMJ pain on jaw movement, and TMJ clicking. Use of snuff was associated significantly with facial pain. **Conclusion:** Daily smoking and increased frequency of alcohol consumption are associated with TMD symptoms among young Finnish adults. Dentists should be prepared to influence alcohol and tobacco consumption among young males to improve their health and quality of life. *J Oral Facial Pain Headache* 2017;31:30–36. doi: 10.11607/ofph.1595

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Temporomandibular disorders (TMD) are defined as a collective term embracing a number of clinical problems that involve the masticatory muscles, the temporomandibular joint (TMJ) and associated structures, or both. The most common signs and symptoms of TMD are pain, limited range of jaw movement, and TMJ sounds.¹

The prevalence of TMD symptoms and signs is quite common in the adult population. On average, 41% of the population report at least one symptom associated with TMD, and 56% report at least one clinical sign.¹ In addition, TMD signs and symptoms are more common among women than men in the general population.^{2–4} Epidemiologic studies have revealed that the prevalence of TMD is highest among subjects 20 to 40 years of age.^{5,6} The etiology of TMD is complex and multifactorial; it can include occlusal disturbances, traumas, psychological factors, and/or parafunctional activities such as bruxism.¹ At present, the roles of different factors in the background of TMD are still unclear and require future studies.

The role of factors related to health behavior and lifestyle has recently been a focus in research related to chronic pain and TMD.^{7–9} However, there are only a few studies about alcohol consumption¹⁰ and smoking^{11–14} in association with TMD. Smoking and use of snuff (smokeless tobacco) are relatively common among young Finnish adults. According to the Finnish Adolescent Health and Lifestyle Survey in 2011,¹⁵ as many as 25.4% of 18-year-old males were daily smokers, and 14.4% of them used snuff occasionally or every day. The

corresponding figures for females were 23.0% and 2.7%. In a recent study of Finnish conscripts, 39.4% and 9.0% reported daily smoking and daily snuff use, respectively, whereas 10.5% reported the use of both.¹⁶ Both Melis et al¹³ and de Leeuw et al¹² found that smokers with TMD report higher pain severity than nonsmokers. Furthermore, Sanders et al¹¹ found that smoking is associated with an increased risk for TMD in young adulthood.

Symptoms of TMD and their associations with alcohol consumption and smoking have mostly been investigated in clinical studies with TMD patients,^{11,12,14} which is why the results cannot be generalized to the entire population. So far, no strong evidence has been established for an association between smoking and alcohol consumption and TMD.¹⁴ Thus, there is a need for epidemiologic, population-based studies.

An epidemiologic, cross-sectional collection of data, including TMD symptoms and the use of alcohol and tobacco products, was carried out in conscripts in the Finnish Defense Forces in 2011. In Finland, military service is mandatory for men, unless they have a physical or mental disability, and voluntary for women. About 25,000 young adults enter military service annually, which means that about 80% of males in each age cohort complete their service.¹⁷ Thus, this study population provides a great opportunity to study the prevalence of TMD symptoms and their associations with psychoactive substances. The aim of the present study was to evaluate the prevalence of TMD symptoms and their associations with alcohol and smoking habits in young Finnish adults.

Materials and Methods

This epidemiologic, cross-sectional study was carried out in 20 garrisons (out of a total of 24) of the Finnish Defense Forces in January and July 2011. The total sample of the study consisted of 13,819 conscripts (13,564 men and 255 women, mean age 19.6 years, response rate 62.8%). Conscripts born in 1990, 1991, or 1992 were used for statistical analyses ($n = 8,678$; 8,530 men and 148 women, mean age = 19.6 years). Four garrisons were excluded from the study because their dental services were outsourced; however, those garrisons were small, with the total number of conscripts serving in them being less than 400. The screening of the conscripts' symptoms took place during the obligatory general health inspection during the conscripts' first week in the military service. All conscripts from 15 garrisons and every fifth conscript in alphabetical order from the 5 largest garrisons were included in the study, and their oral health was screened.

The subjects gave their informed consent for the use of the data, and only data from those who had given their consent were used in the study. Their identifications were excluded for the analyses. The research plan was approved by the Ethics Committee of the Northern Ostrobothnia Hospital District on March 29, 2010. The Center for Military Medicine and the Defense Staff gave the permission for the study in June 2010 (AG14218/June 23, 2010).

In connection with the oral examination, the conscripts answered a computer-based questionnaire developed in the Institute of Dentistry, University of Oulu, Finland, for investigating individual background factors and health behavior. This questionnaire has been validated in several previous studies.^{18–20} The answers can be analyzed individually or as summarized variables. A convenience sample of the respondents was used; the conscripts who were waiting for their turn for the oral inspection answered the questionnaire when the computer, placed in the waiting area, was available. Three computers were available in each garrison for the respondents, who were assisted by trained auxiliary staff during the process.²¹

The questionnaire considered the time before entering military service. The information was automatically recorded and saved for later statistical analyses. The questionnaire comprised a total of 50 questions, including 6 questions on facial pain and symptoms of TMD.²⁰

Answering the questionnaire was voluntary, and by answering it the conscripts gave their permission for use of their personal military records. All identification of each of the conscripts was excluded from the data before analyses. The key to the identifications was held by the University of Oulu and the Defense Forces as agreed in the project agreement between the parties.

Outcome Variables

Self-reported facial pain and symptoms of TMD were used as outcome variables. The TMD symptoms were inquired using the following questions: "Have you had pain or ache in the face during the last year?"; "Have you had pain or ache in the jaws during the last year?"; and "Have you had symptoms in the area of the jaw joint (pain at jaw rest, pain on jaw movement, clickings, difficulties in mouth opening)?" The response options for all these questions were yes/no (yes answers included "now and then," "fairly often," and "often or continuously").

Explanatory Variables

The frequency of smoking and consumption of alcohol and snuff were used as explanatory variables. Smoking was determined by using the following question: "Do you smoke?" The response options

Table 1 Prevalence of TMD Symptoms Among Finnish Conscripts (n = 8,678)

Symptom	Female n (%)	Male n (%)	P value
Facial pain			.924
Never	126 (85.1)	7,366 (86.4)	
Occasionally	21 (14.2)	1,101 (12.9)	
Fairly often	1 (0.7)	49 (0.6)	
Frequently or continuously	0 (0.0)	14 (0.2)	
Jaw pain			.070
Never	98 (66.2)	6,370 (74.7)	
Occasionally	43 (29.1)	1,957 (22.9)	
Fairly often	6 (4.1)	174 (2.0)	
Frequently or continuously	1 (0.7)	29 (0.3)	
TMJ pain at jaw rest			.002
Never	126 (85.1)	7,910 (92.7)	
Occasionally	19 (12.8)	564 (6.6)	
Fairly often	3 (2.0)	45 (0.5)	
Frequently or continuously	0 (0.0)	11 (0.1)	
TMJ pain on jaw movement			.159
Never	120 (81.1)	7,383 (86.6)	
Occasionally	26 (17.6)	1,043 (12.2)	
Fairly often	1 (0.7)	84 (1.0)	
Frequently or continuously	1 (0.7)	20 (0.2)	
TMJ clicking			.620
Never	109 (73.6)	6,155 (72.2)	
Occasionally	29 (19.6)	1,873 (22.0)	
Fairly often	8 (5.4)	324 (3.8)	
Frequently or continuously	2 (1.4)	178 (2.1)	
Difficulties in jaw opening			.000
Never	129 (87.2)	8,034 (94.2)	
Occasionally	12 (8.1)	421 (4.9)	
Fairly often	3 (2.0)	50 (0.6)	
Frequently or continuously	4 (2.7)	25 (0.3)	

were: “no,” “1–5 cigarettes a day,” “10–20 cigarettes a day,” and “over 20 cigarettes a day.” These options were dichotomized as yes/no. Data about consumption of alcohol were acquired with the following question: “Do you use alcohol?” The response options were: “no,” “less than once a month,” “once a month,” “every other week,” “every week,” and “more than once a week.” The options were further categorized into three classes: once a month or less, every other week, and once a week or more. The consumption of snuff was determined by using the following question: “Do you use snuff?” The response options were “never or hardly ever,” “sometimes,” “almost every day,” and “every day.” These options were dichotomized as yes/no.

Data on several background/demographic factors, ie, education, parental status, chronic diseases, dental attendance, and dental symptoms, were obtained by using the questionnaire. In addition, information on gender was obtained from the Defense Forces' database. Education was determined by using a question with six options: “comprehensive school,” “vocational school,” “vocational high school/technical college,” “vocational and sixth form college,” “sixth form college,” and “secondary school graduate and university.” The options were dichotomized as primary school and higher education. Parental marital status was determined with the following options: “Your parents: live together/are divorced.” Chronic diseases were inquired with the following question: “Do you have any disease (that has

lasted for more than 2 months) that requires medication?” (yes/no). The time from the last visit to a dentist or dental hygienist was determined using a question with five response options: “less than a year,” “1 to 2 years,” “3 to 4 years,” “5 years or more,” and “don't remember.” The options were further dichotomized as 2 years or less/3 years or more.

Statistical Analyses

For statistical analyses, data from the conscripts born in 1990, 1991, or 1992 (a total of 8,530 men and 148 women, mean age 19.6 years, response rate 62.8%) were investigated. The prevalence of TMD symptoms was calculated by gender. The associations between TMD symptoms and explanatory variables were evaluated using chi-square tests and described by crude odds ratios (ORs) and their 95% confidence intervals (CI). Unconditional multivariable logistic regression analysis was used to assess the associations between outcome and explanatory variables when adjusting for background factors. The associations were described by ORs and their 95% CIs. Statistical significance was set at $P < .05$.

All analyses were executed and figures drawn out using the SPSS software (version 18.0, SPSS) and R software (version 2.13.2 patched, R Foundation for Statistical Computing).

Results

Most of the TMD symptoms reported occurred only occasionally. The most prevalent TMD symptoms were TMJ clicking and jaw pain (Table 1). The prevalence of self-reported TMD symptoms that occurred at least occasionally varied between 5.8% (difficulty in jaw opening) and 27.8% (TMJ clicking) among the male population. The prevalence of self-reported facial pain was 13.6% for males and 14.9% for females, and the corresponding levels for jaw pain were 25.3% and 33.8%, respectively. The prevalence of all symptoms was higher among female conscripts, except for TMJ clicking (male = 27.8%; female = 26.4%) (Table 2). The difference between the genders in the prevalence of TMJ pain at jaw rest and difficulty in jaw opening was statistically significant (Table 2). The prevalence of all six TMD symptoms was also significantly higher among those who reported toothache and among smokers than nonsmokers, and

Table 2 Prevalence of TMD Symptoms by Socioeconomic and Health-Related Background Factors, Frequency of Smoking, Use of Snuff, and Alcohol Consumption Among Finnish Conscripts (n = 8,678)

	Facial pain %	Jaw pain %	TMJ pain at jaw rest %	TMJ pain on jaw movement %	TMJ clicking %	Difficulties in jaw opening %
Gender						
Male (n = 8,530)	13.6	25.3	7.3	13.4	27.8	5.8
Female (n = 148)	14.9	33.8	14.9	18.9	26.4	12.8
P value	.924	.070	.002	.159	.620	< .000
Education						
Higher education (n = 7,837)	13.7	25.3	7.4	13.5	28.0	6.1
Primary school only (n = 841)	16.9	30.1	11.0	17.6	29.0	7.9
P value	.007	.002	< .000	.001	.286	.028
Parental status^a						
Live together (n = 5,230)	12.9	24.4	7.3	13.3	27.5	5.7
Divorced (n = 2,384)	15.7	29.1	8.4	15.1	29.3	7.2
P value	.001	< .000	.048	.017	.054	.007
Chronic disease						
No (n = 7,993)	13.6	25.1	7.5	13.4	27.4	6.0
Yes (n = 685)	17.4	32.3	9.5	18.1	34.9	7.9
P value	.004	< .000	.036	.001	< .000	.035
Consumption of alcohol						
Once a month or less (n = 3,653)	12.1	23.4	6.6	12.0	26.6	5.4
Every second week (n = 2,870)	12.8	25.1	7.0	13.3	27.4	6.2
Once a week or more (n = 2,155)	17.8	29.7	9.6	16.8	30.8	6.9
P value	< .000	< .000	< .000	< .000	.002	.064
Smoking						
No (n = 5,283)	11.8	23.1	6.5	12.0	27.7	5.4
1–5 cigarettes/d (n = 1,114)	14.8	26.8	8.0	13.1	25.3	5.7
10–20 cigarettes/d (n = 2,059)	16.8	29.8	8.6	16.8	29.2	7.3
20+ cigarettes/d (n = 222)	25.7	39.2	18.0	25.7	33.3	9.9
P value	< .000	< .000	< .000	< .000	.033	.002
Use of snuff						
No (n = 7,050)	13.0	25.2	7.3	13.2	27.9	6.0
Yes (n = 1,628)	16.9	27.0	8.1	15.5	27.6	6.1
P value	< .000	.068	.154	.009	.414	.469
Most recent dental visit						
0–2 years (n = 7,088)	13.4	25.2	7.2	13.2	27.9	5.8
3 years or more (n = 1,590)	14.8	26.5	8.6	15.2	27.6	6.7
P value	.087	.150	.033	.023	.426	.104
Toothache						
No (n = 7,396)	11.5	22.0	5.9	11.6	26.4	5.1
Yes (n = 1,282)	26.1	45.6	16.3	25.0	36.0	10.8
P value	< .000	< .000	< .000	< .000	< .000	< .000

^aNot all patients responded to this question (n = 7,614).

increased with increasing frequency of alcohol consumption. Additionally, the prevalence of most TMD symptoms was higher among those who used snuff than among those who did not. The crude ORs and their 95% CIs are presented in Table 3. Smoking at least 10 cigarettes per day, use of alcohol once a week or more, and use of snuff increased the risk for all TMD symptoms, except for TMJ clicking.

The logistic regression analysis revealed OR and 95% CI values indicating that heavy smoking (over 20 cigarettes/day) was associated significantly with facial pain, jaw pain, TMJ pain at jaw rest, and TMJ pain on jaw movement (Table 4). Using alcohol at least once a week was associated significantly with facial pain, jaw pain, TMJ pain at jaw rest, TMJ pain on jaw movement, and TMJ clicking. The use of snuff was associated significantly with facial pain.

Of the background factors, toothache had the strongest association with all TMD symptoms (Table 3). In addition, the logistic regression analysis indicated a significant association between female gender and all TMD symptoms, except for TMJ clicking (Table 4).

Discussion

The results of this epidemiologic study showed that the prevalence of self-reported TMD is relatively high among subjects in their early adulthood. The majority of the participants were 18 to 20 years of age (mean age = 19.6 years). Of the TMD symptoms, the prevalences of TMJ clicking and jaw pain were the highest, both representing from a quarter to a third of the study

Table 3 Associations of TMD Symptoms with Frequency of Smoking, Use of Snuff, and Alcohol Consumption Among Finnish Conscripts (n = 8,678), as Described by Crude Odds Ratios (ORs) and 95% Confidence Intervals (CI)

	Facial pain		Jaw pain		TMJ at jaw rest		TMJ pain on jaw movement		TMJ clicking		Difficulties in mouth opening	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Smoking												
No*	1	–	1	–	1	–	1	–	1	–	1	–
1–5 cigarettes/d	1.31	1.08, 1.57	1.22	1.06, 1.42	1.26	0.99, 1.61	1.12	0.92, 1.35	0.89	0.77, 1.03	1.06	0.80, 1.40
10–20 cigarettes/d	1.50	1.30, 1.73	1.41	1.26, 1.59	1.33	1.10, 1.61	1.48	1.28, 1.71	1.07	0.96, 1.20	1.36	1.11, 1.67
20+ cigarettes/d	2.59	1.90, 3.54	2.16	1.64, 2.85	3.20	2.23, 4.58	2.56	1.87, 3.49	1.31	0.98, 1.74	1.94	1.23, 3.07
Consumption of alcohol												
Once a month or less*	1	–	1	–	1	–	1	–	1	–	1	–
Every second week	1.08	0.93, 1.25	1.10	0.98, 1.23	1.06	0.88, 1.29	1.13	0.98, 1.31	1.04	0.93, 1.16	1.18	0.96, 1.45
Once a week or more	1.59	1.37, 1.84	1.38	1.23, 1.56	1.49	1.23, 1.82	1.48	1.27, 1.72	1.23	1.09, 1.38	1.29	1.04, 1.62
Use of snuff												
No*	1	–	1	–	1	–	1	–	1	–	1	–
Yes	1.36	1.18, 1.58	1.10	0.97, 1.24	1.12	0.92, 1.37	1.21	1.04, 1.41	0.99	0.87, 1.11	1.02	0.81, 1.28

*Reference value.

Table 4 Associations Between TMD Symptoms and Frequency of Smoking, Use of Snuff, and Alcohol Consumption in Finnish Conscripts (n = 8,678), as Described by Unconditional Multivariate Logistic Regression Analyses Expressed by Odds Ratios (ORs) and 95% Confidence Intervals (95% CI)

	Facial pain (n = 1,193)		Jaw pain (n = 2,210)		Pain at jaw rest (n = 642)		Pain on jaw movement (n = 1,175)		TMJ clicking (n = 2,414)		Difficulties in jaw opening (n = 515)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Gender												
Male	1	–	1	–	1	–	1	–	1	–	1	–
Female	1.29	0.77, 2.15	1.64	1.11, 2.42	2.60	1.54, 4.39	1.81	1.14, 2.87	0.81	0.53, 1.24	2.53	1.45, 4.42
Education												
Higher education	1	–	1	–	1	–	1	–	1	–	1	–
Comprehensive school only	0.95	0.75, 1.19	0.96	0.80, 1.15	1.14	0.86, 1.51	1.11	0.89, 1.38	0.96	0.81, 1.15	1.09	0.79, 1.50
Parental status												
Live together	1	–	1	–	1	–	1	–	1	–	1	–
Divorced	1.15	1.00, 1.33	1.18	1.06, 1.33	1.03	0.86, 1.25	1.06	0.91, 1.22	1.07	0.96, 1.20	1.19	0.97, 1.46
Chronic disease												
No	1	–	1	–	1	–	1	–	1	–	1	–
Yes	1.26	1.00, 1.58	1.36	1.13, 1.64	1.29	0.96, 1.74	1.41	1.13, 1.76	1.39	1.17, 1.66	1.21	0.87, 1.69
Smoking												
No	1	–	1	–	1	–	1	–	1	–	1	–
1–20 cigarettes/d	1.26	1.09, 1.46	1.23	1.10, 1.38	1.18	0.98, 1.44	1.19	1.03, 1.38	0.93	0.83, 1.04	1.12	0.90, 1.38
20+ cigarettes/d	1.79	1.24, 2.59	1.74	1.26, 2.40	2.51	1.66, 3.80	1.91	1.33, 2.74	1.12	0.81, 1.55	1.48	0.86, 2.52
Use of alcohol												
Once a month or less	1	–	1	–	1	–	1	–	1	–	1	–
Every second week	0.99	0.84, 1.17	1.06	0.93, 1.20	1.09	0.88, 1.35	1.11	0.94, 1.30	1.05	0.93, 1.19	1.20	0.95, 1.51
Once a week or more	1.31	1.10, 1.55	1.21	1.05, 1.38	1.37	1.09, 1.71	1.28	1.08, 1.52	1.20	1.06, 1.38	1.22	0.95, 1.58
Use of snuff												
No	1	–	1	–	1	–	1	–	1	–	1	–
Yes	1.25	1.06, 1.47	1.00	0.88, 1.15	1.04	0.83, 1.29	1.11	0.94, 1.31	0.96	0.84, 1.09	1.02	0.79, 1.30
Toothache												
No	1	–	1	–	1	–	1	–	1	–	1	–
Yes	2.55	2.18, 2.98	2.74	2.40, 3.13	2.82	2.32, 3.42	2.38	2.03, 2.79	1.52	1.33, 1.74	2.04	1.63, 2.56

population. The prevalence of self-reported facial pain was 13.6% for males and 14.9% for females, and the corresponding levels for jaw pain were 25.3% and 33.8%, respectively. Lower prevalence levels have been shown in a Swedish study by Nilsson et al²²

among an adolescent population. They found that the prevalence of self-reported overall weekly TMD pain was 2.0% for males and 2.7% for females at the age of 12, whereas corresponding levels at the age of 19 were 2.9% and 7.9%, respectively.²² However, their

study used questions about current TMD symptoms once a week or more often, whereas in the present study the time intervals were wider (ever/during the last year), which likely explains the differences. Despite the limited number of female participants, a gender difference in the prevalence of TMD symptoms was obvious in the present study. The prevalence was higher among female conscripts, except for TMJ clicking. This finding is in accordance with earlier studies.^{2,3,22}

The present study also showed that smoking was significantly associated with all TMD symptoms, except for TMJ clicking. Previous studies have investigated the association between smoking and TMD, leading to contradictory results. In a follow-up study, Wänman¹⁴ found that smoking was not related to the presence or development of signs and symptoms of TMD among an adult population (30–65 years of age). However, the present results are in line with those of Sanders et al,¹¹ who showed that smoking is associated with TMD in females, but only in young adulthood. In addition, the present study revealed that the use of snuff was associated significantly with facial pain and also with most of the other TMD symptoms. An association between use of snuff and TMD has not been studied. The literature on the association between consumption of alcohol and TMD is also vague, which enhances the value of the present study. The present results suggest that the prevalence of TMD symptoms is related to an increased frequency of alcohol consumption, and the consumption of alcohol once a week or more is often associated significantly with TMD symptoms.

A questionnaire on TMD symptoms identical to the one used in the present study has been used in an earlier study, the Northern Finland 1966 Birth Cohort (NFBC 1966) project,²³ which provided data collection at a time when the cohort members were 31–32 years old. The prevalence of jaw pain (25.3% among males and 33.8% among females) in the present study was considerably higher than the corresponding levels found in the NFBC study (12.8% among males and 18.4% among females). Considering the findings that TMD prevalence increases from the age of 20 years to 30 years,¹ the results are somewhat surprising. One explanation for this difference could be that symptoms of wisdom tooth eruption are relatively common at the age of 18–20 years. In addition, in the present study, toothache had the strongest association of all explanatory factors with all TMD symptoms. Therefore, the symptoms reported here cannot be regarded as only related to TMD, but may also be referral pains related to dental causes, or the other way around.

The mandatory military service in Finland provides a great opportunity for conducting epidemiologic studies. The strength of the present epidemiologic

study is its uniquely large study population, minimizing the effect of low power due to a small sample size. The study group comprised a male cohort born in the early 1990s. There are several clinical studies on the present topic,^{11,12,14} but few epidemiologic studies.¹³ Variables related to general health and health behavior seem to associate strongly with TMD symptoms. In the present study, several potential background factors were considered in the analysis, including sociodemographic and health-related factors.

A limitation of the present study was its cross-sectional study design, which did not allow making any deductions about the causality between the variables. Furthermore, the data on TMD symptoms were based solely on the questionnaire. This was due to practical reasons because of the large sample size. Additionally, although the earlier NFBC study found that facial pain based on these questions was associated strongly with clinically assessed TMD, the questions on TMD used in the study have not been validated for screening TMD.²⁴ Thus, all the symptoms reported here did not necessarily represent solely TMD, and there may be other possible causes of these symptoms, such as erupting wisdom teeth and dental pathologies. In addition, referred pain from the tooth can be sensed in masticatory muscles and the TMJ, and vice versa.¹

The study population consisted of young healthy adults who had no severe diseases or conditions. All participants were evaluated to be fit for demanding physical and mental challenges. As a result, the study sample used in the present study does not represent the general young Finnish adult population, even though it represents the 80% who complete their military service. TMD conditions are known to correlate with general diseases.²⁵ Therefore, it can be assumed that TMD conditions are even more common among young adults than the numbers in the present study indicate. Besides military service, about 1,700 males complete nonmilitary service each year in Finland for ethical reasons. There are, however, no data on their physical, mental, or TMD status. Due to the small number of female participants, generalizations concerning females must be done with great caution.

The association found between TMD symptoms and psychoactive agents may be mediated through bruxism. A recent study¹⁰ has suggested that increased alcohol intake and current smoking, including nicotine dependence, are independent risk factors for sleep bruxism, which has been shown to be associated with disorders of the dopaminergic system.^{26–28} Psychoactive substances including alcohol and nicotine affect the central nervous system and cause changes in the functional characteristics of neurotransmitters or their receptors. However, no clear evidence exists for a specific mechanism that would

explain the pathogenesis of bruxism. Smoking is also known to associate positively with alcohol consumption.^{29,30} In addition, smoking and increased alcohol intake have a correlation with unhealthy lifestyle.¹⁶

Conclusions

TMD symptoms were found to be quite prevalent among otherwise generally healthy young Finnish adults. Current smoking and increased alcohol intake were associated with TMD symptoms among the young adults. Dentists should be aware that TMD symptoms are common among young people. Dentists should also be prepared to influence alcohol and tobacco consumption among young males to improve their health and quality of life.

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