

ORIGINAL ARTICLE

Association between optimism and self-reported facial pain

KIRSI SIPILÄ^{1,2}, PEKKA V. YLÖSTALO¹, ELLEN EK³, PAAVO ZITTING⁴ & MATTI L. KNUUTTILA^{1,5}

¹Institute of Dentistry, University of Oulu, Oulu, Finland, ²Health Centre of Oulu, Oulu, Finland, ³Oulu Regional Institute of Occupational Health, Oulu, Finland, ⁴Department of Public Health Science and General Practice, University of Oulu, Oulu, Finland and ⁵Oral and Maxillofacial Department, Oulu University Hospital, Oulu, Finland

Abstract

Objective. The objective of this study was to assess the association between optimism and self-reported facial pain. **Material and methods.** Data were obtained for 5,696 subjects born in 1966 in Northern Finland and included in the study of the Northern Finland Birth Cohort. Data on facial pain were collected using a questionnaire. Optimism was measured using the revised version of the Life Orientation Test. **Results.** The data showed that optimism was inversely associated with facial pain. Associations were found only among non-depressive subjects. **Conclusions.** It can be concluded that optimism is an independent psychosocial determinant of pain experience that should be taken into account in assessing the prognosis of facial pain and its treatment.

Key Words: Facial pain, optimism, temporomandibular disorders

Introduction

Temporomandibular disorders (TMDs) are characterized as a heterogeneous set of clinical problems involving the masticatory musculature and/or the temporomandibular joint (TMJ). The etiology and pathology of TMD varies and is partly controversial, and the disorders are usually subclassified as myogenous, arthrogenous, or as combined disorders [1]. The symptoms of TMD include joint sounds, restricted mandibular movements, and facial pain [1]. Facial pain related to TMD has been estimated to occur in between 5% and 18% of the adult population [2–4].

It has been shown that psychological factors are related to the etiology and pathogenesis of TMD [5–7]. They are thought to play a role in the cause or persistence of TMD [8], and they may predispose the condition to chronicity [9]. Moreover, it has been stated that psychological disturbances may be a direct consequence of chronic pain in TMD patients [8,10]. Earlier studies show that stress [11,12], anxiety, and depression [13–19], for example, influence the occurrence of TMD symptoms and their severity. Furthermore, it has been noted that beliefs,

catastrophizing, and coping strategies are related to the experience of TMD pain [20–22]. In terms of personality profiles, it has been shown that TMD correlates with personality characteristics in a similar way to those of other chronic pain patients [23,24]. On the other hand, there are studies that have found no evidence of a connection between personality and TMD [25,26].

Optimism is regarded as the generalized expectation of positive outcomes in the future [27], and it has been found to associate with several positive health outcomes [28–32]. There is also evidence that optimism (or the lack of optimism) is related to pain conditions. Optimism has shown to be associated with lower levels of bodily pain [32], and, conversely, dispositional pessimism has been found to relate to the experience of chronic pain [33,34], to low pain tolerance [35], and to poor coping with chronic pain [36]. Moreover, lack of optimism has also been found to be a significant factor in explaining the relation between pain and pain-related distress [37].

The above findings suggest that optimism is inversely associated with the presence of pain con-

Correspondence: Kirsi Sipilä, Department of Prosthetic Dentistry and Stomatognathic Physiology, Institute of Dentistry, University of Oulu, P.O. Box 5281, FIN-90014 Oulu, Finland. Tel. +358 8 537 5011. Fax +358 8 537 5560. E-mail: kirsi.sipila@oulu.fi

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Table I. Basic characteristics of study population according to the level of optimism

Optimism	I (Highest) %	II %	III %	IV (Lowest) %
Socio-economic characteristics				
Gender, men ($n=8,475$)	46	47	51	48
Married or co-habiting ($n=8,424$)	78	76	71	65
Education, with matriculation examination ($n=8,447$)	54	47	36	29
Income per adult member of family				
Proportion of those earning at least USD 20,330 ($n=7,431$)	59	56	47	38
Self-reported general diseases				
Depressiveness*	4	8	15	36
Diagnosed migraine ($n=8,468$)	13	13	15	17
Reported toothache ($n=5,640$)	40	46	52	57
Diagnosed allergy ($n=6,877$)	25	27	24	24

*SCL-25 depression subscale >1.75 .

ditions. However, the possibility that pain condition may have an effect on optimism cannot be excluded. The aim of this study was to assess the association between optimism and facial pain.

Material and methods

This study is part of the Northern Finland Birth Cohort 1966 study. The original sample was collected from a geographically defined area of the two northernmost provinces in Finland. It consisted of an unselected, general population based birth cohort of 12,058 live births, whose expected date of delivery was in 1966, representing 96.3% of all such births [38]. In 1997, the members of the cohort were sent a postal questionnaire ($n=11,541$). The number of eligible replies was 8,690 and the response rate was 75.3%.

Those who lived in Northern Finland or in the Helsinki area in 1997/1998 were invited to attend a general medical examination ($n=8,463$). Data were obtained from 5,696 subjects, representing 67.3% of those who were invited to the clinical examination. The subjects answered a computer-aided questionnaire. Facial pain was determined on the basis of the following questions: "Have you had any pains or aches in the face *during the past year?*" and "Have you had symptoms in the area of the jaw joint?" (pain at jaw rest, pain on jaw movement). The answers were dichotomized as no/yes.

Information about optimism was obtained through the postal questionnaire. Optimism was measured using the revised version of the Life Orientation Test (LOT-r) [39]. The test assesses individual differences in generalized outcome expectancies, where positive expectancies are associated with optimism and negative ones with pessimism. In the test, respondents were asked to rate how well they agreed with 6 items across a 5-point Likert-type scale ranging from 0 (strongly disagree) to 4 (strongly agree). Test scores were classified into four categories based on distribution

(0–13, 14–16, 17–19, 20–24). Cronbach's alpha for the present sample was 0.78.

Depressiveness was measured using the Symptom Checklist-25 (SCL-25) [40], which is a 25-item shortened version of an originally 90-item questionnaire designed by Derogatis et al. [41]. A depression subscale containing 13 questions was used in this study. Subjects recorded their own estimates of the severity of their symptoms on a scale of 1 (not at all) to 4 (very much). The responses were summed and divided by the number of answers (mean). A score of over 1.75 indicated depression, while scores of 1.75 or less indicated non-depression [42,43].

Information about socio-demographic background (marital status, basic education, income level) and other possible sources of facial pain than TMD (migraine, toothache, allergies) was obtained from the postal questionnaire and included in the analysis.

Statistical analyses

Since this is a cross-sectional study we used the prevalence proportion ratio (PPR) as a measure of effect, which is the ratio of two proportions at the time of the study. It is interpreted the same way as relative risk, i.e. a PPR >1 indicates increased 'risk' and a PPR <1 indicates decreased 'risk'. In the study, prevalence proportion ratios with 95% confidence intervals (CI) were estimated by applying a generalized linear model where the distribution of the outcome variable is binomial and the link function is a log (log-binomial model) [44]. The statistical analyses were performed using the SAS GENMOD procedure, version 8.02.

Results

Of the subjects who responded to the questionnaire concerning facial pain, 52.5% were women and 47.5% were men. Facial pain during the past year was reported by 17.9% of the women and by 12.2% of the men. The values for 'pain at jaw rest' and 'pain

Table II. Association of gender, socio-economic background, optimism, depressiveness, and other pain conditions to reported facial pain in 5,696 subjects born in 1966 in Northern Finland, calculated with prevalence proportion ratios (PPR) and 95% confidence intervals (CI)

	Facial pain		Pain at jaw rest		Pain on jaw movement	
	<i>n</i> (Yes/No)	PPR (95% CI)	<i>n</i> (Yes/No)	PPR (95% CI)	<i>n</i> (Yes/No)	PPR (95% CI)
Gender						
Women	531/2431	1.47 (1.30–1.68)	380/2587	1.15 (1.00–1.33)	398/2567	1.24 (1.08–1.44)
Men	326/2355	1.00	298/2383	1.00	289/2390	1.00
Marital status						
Married or cohabiting	588/3476	0.84 (0.74–0.96)	468/3603	1.16 (0.99–1.35)	498/3573	1.00 (0.85–1.17)
Other	267/1281	1.00	206/1340	1.00	188/1356	1.00
Basic education						
At least matriculation examination	334/1891	0.98 (0.86–1.11)	254/1973	1.08 (0.94–1.25)	288/1938	0.90 (0.78–1.04)
Other	521/2869	1.00	419/2974	1.00	396/2994	1.00
Income per adult member of family (USD)						
I >40,660	30/184	0.72 (0.49–1.03)	23/192	0.74 (0.47–1.11)	28/186	1.05 (0.69–1.56)
II 20,330–40,660	284/1826	0.69 (0.57–0.84)	242/1869	0.80 (0.64–1.00)	248/1864	0.94 (0.75–1.21)
III 10,165–20,329	308/1690	0.79 (0.66–0.96)	240/1761	0.83 (0.67–1.05)	262/1737	1.06 (0.84–1.35)
IV 0–10,164	123/511	1.00	91/541	1.00	78/553	1.00
Optimism						
I (highest)	154/1187	0.58 (0.48–0.70)	114/1228	0.55 (0.44–0.69)	128/1213	0.67 (0.54–0.83)
II	225/1399	0.70 (0.59–0.82)	198/1428	0.79 (0.66–0.96)	202/1422	0.87 (0.72–1.06)
III	234/1187	0.83 (0.70–0.98)	185/1238	0.85 (0.70–1.03)	185/1238	0.91 (0.75–1.11)
IV (lowest)	227/913	1.00	175/964	1.00	163/977	1.00
Depressiveness (SCL-25 depression >1.75)						
Yes	200/564	1.93 (1.68–2.22)	149/613	1.80 (1.53–2.13)	134/628	1.55 (1.30–1.84)
No	655/4195	1.00	525/4332	1.00	550/4303	1.00
Diagnosed migraine						
Yes	180/619	1.61 (1.38–1.86)	131/544	1.45 (1.21–1.72)	139/660	1.54 (1.29–1.82)
No	674/4150	1.00	669/4284	1.00	545/4280	1.00
Toothache						
Yes	583/2135	2.29 (2.01–2.63)	403/2317	1.58 (1.35–1.82)	393/2324	1.43 (1.25–1.66)
No	273/2649	1.00	275/2649	1.00	294/2629	1.00
Diagnosed allergy						
Yes	228/910	1.39 (1.21–1.60)	158/982	1.15(0.97–1.35)	167/973	1.24 (1.05–1.46)
No	531/3159	1.00	446/3247	1.00	435/3256	1.00

on jaw movement' were 12.8% and 13.4% for women and 11.1% and 10.8% for men, respectively. The basic characteristics of the study population according to the level of optimism are presented in Table I. Factors associated with outcome variables are presented in Table II. The results showed that optimism was inversely associated with facial pain, pain at jaw rest, and pain on jaw movement.

Depression was also associated with facial pain as well as jaw rest and jaw movement pain [Table II]. Optimism was inversely associated with facial pain and jaw rest pain among a subgroup of non-depressive subjects. Among depressive subjects, optimism was not associated with either facial or jaw rest pain (Table III).

Discussion

We found that optimism was inversely associated with facial pain as well as with pain at jaw rest and pain on jaw movement. We expected that depression would confound or modify the association between optimism and facial pain. Therefore, we stratified the data according to depression. Indeed, associations were only found among non-depressive subjects, indicating that depressiveness is a more powerful determinant of pain in the facial area than optimism. This is understandable, taking into account the seriousness of depressiveness. On the other hand, this finding is important since it indicates that optimism is an independent determinant despite its correlation with depression. This is in accordance with previous findings, which suggest that optimism measured with LOT has adequate discriminant validity in relation to depression [32].

The strength of this study with a relatively high response rate is its representativeness. The highest prevalence of facial pain has been noted to occur among adults under 45 years of age [3] and the subjects in this study, who were 31-year-olds, thus belong to the risk age for facial pain. A high response rate and birth cohort data means that there is no

selection bias arising from differences in treatment-seeking. The selection bias arising from non-response is possible, but it is unlikely to be large due to the high response and participation rates. Using birth cohort data also means that age does not have a confounding effect.

The limitations of the study include reliance on self-report data and lack of clinical diagnosis. Due to the fact that facial pain is fluctuating in nature [12] we used questions describing the subjects' past pain experience. This was done to improve the confidence of pain report. According to the clinical examination performed earlier in a subsample of this cohort, reported facial pain was strongly associated with clinically diagnosed TMD [45]. This implies that the effect of other pain conditions is most likely negligible in the case of facial pain as well. Another limitation of the study is the cross-sectional study design, which is why the causality between facial pain and optimism was not resolved. Among subjects with facial pain, lack of optimism may also be a consequence of suffering from pain.

Previously, it has been shown that facial pain perception is dependent on a variety of psychological and cognitive factors [11–22]. The association between depression and facial pain is well known. In contrast, to our knowledge there is only one study about the association between optimism and TMD pain. Costello et al. [35] found that TMD patients with a less optimistic style (measured with the LOT) exhibited low pain tolerance and high pain unpleasantness. Moreover, they noticed that optimism affected the immune system and stress responses; less optimistic patients had higher norepinephrine and interleukin-6 levels during stress compared with optimistic TMD patients.

Differences in coping strategies have also been found between optimists and pessimists in earlier studies. In these studies it has been found that optimists, for example, have more problem-focused coping strategies than pessimists [46,47]. This may affect the way optimists cope with pain. Moreover,

Table III. Association of optimism with reported facial pain in 5,696 subjects born in 1966 in Northern Finland, calculated with prevalence proportion ratios (PPR) and 95% confidence intervals (CI)

	Facial pain PPR (95% CI)	Pain at jaw rest PPR (95% CI)	Pain on jaw movement PPR (95% CI)
Among non-depressive subjects			
Optimism			
I (highest)	0.63 (0.51–0.79)	0.60 (0.46–0.77)	0.78 (0.60–1.02)
II	0.75 (0.61–0.93)	0.84 (0.67–1.06)	1.05 (0.83–1.33)
III	0.87 (0.71–1.07)	0.88 (0.70–1.12)	1.04 (0.82–1.34)
IV (lowest)	1.00	1.00	1.00
Among depressive subjects			
Optimism			
I (highest)	1.16 (0.70–1.76)	0.95 (0.47–1.66)	0.84 (0.39–1.53)
II	0.98 (0.68–1.35)	1.17 (0.78–1.69)	0.73 (0.44–1.14)
III	1.03 (0.77–1.38)	1.05 (0.73–1.49)	0.94 (0.64–1.34)
IV (lowest)	1.00	1.00	1.00

differences in coping strategies have been found among TMD patients [48] as well as between subjects with and without a TMD history [49]. These findings indicate that coping strategies play an important part in TMD pain experience.

In an earlier study in this cohort it was found that optimism was inversely associated with oral pain. In addition, optimism was associated with favorable dental health behaviour, including treatment-seeking behavior [50]. Accordingly, a complementary or alternative explanation to our results could be that optimists seek treatment in early stages of TMD, leading to relief of symptoms in most cases.

The findings suggest that, in addition to depressiveness, optimism is an independent psychosocial determinant of facial pain. These findings emphasize the role of psychosocial factors in the experience of facial pain. Psychosocial factors should be taken into account in clinical practice since they may affect the prognosis as well as the individual treatment outcome.

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