

Bruxism and Psychobiological Model of Personality

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ABSTRACT

Bruxism is an abnormal activity of the masticatory system, caused by both psychological and occlusal factors. The aim of the study was to determine the possible correlation between the temperament and character of patients and bruxism. Personality profile of 35 bruxism patients, with no history of psychiatric disorder, was studied by means of Cloninger's seven factor model of temperament and character. For diagnosis of bruxism, muscle activity was analysed and occlusal interferences and facets were registered by clinical functional analysis. Temperament and Character Inventory assesses four dimensions of temperament and three dimensions of character. Results suggest that bruxism patients can have following personality traits: exploratory, impulsive, extravagant and irritable, pessimistic, fearful, shy and fatigable, critical, aloof, detached and independent, lazy, spoiled, underachiever and pragmatist. Combined scores of character dimension indicate immature dimensions of character. Inventory is not standardized for the Croatian population, therefore the result should be taken with caution.

Introduction

Despite extensive research during the last two decades the etiology of bruxism is still controversial and not entirely understood¹. Many researchers believe that bruxism is related to certain personality characteristics such as aggressiveness, anxiety, hyperactivity, and need for control²⁻⁵. Chronic bruxers are shy, stiff, cautious and aloof, preferring things rather than people, avoiding compromises, rigid in their ways, apprehensive and given to worrying⁶. Some authors^{7,8} found that bruxism is associated with type A behavior⁹ described as »action emotion complex

that can be observed in any person who is aggressively involved in a chronic, incessant struggle to achieve more and more in less and less time, and if required to do so, against the opposing efforts of other things or other persons«. The bruxers had significantly higher scores in the somatic anxiety and muscular tension scales, but lower scores in the socialization scales. This leads to a conclusion that bruxers are more anxiety prone, and that they are vulnerable for psychosomatic disorders, being less socialized¹⁰. There was a statistically significant relationship between occlusal habits (BMS) and anxiety¹¹.

Psychobiological model of personality^{12,13}

Psychobiological model of personality offers a systematic method for clinical descriptions and classification of both normal and abnormal personality variants. Personality is a dynamic organization of multiple personal and social needs as an adaptive response to changing environment. Personality can be broadly defined as the dynamic organization within an individual of the psychobiological systems that modulate adaptation to a changing environment^{12,14}. Personality traits are enduring patterns of perceiving, relating to, and thinking about oneself, other people, and the world as a whole. Personality is comprised of both temperament and character traits.

Temperament refers to differences between individuals in their automatic responses to emotional stimuli, which follow the rules of associative conditioning or procedural learning of habits and skills. Temperament traits include basic emotional response patterns, such as fear, anger, and attachment. Temperament has been variously defined as those component of personality that are heritable, fully manifest in infancy, and stable throughout life regardless of culture or social learning^{15,16}.

In contrast to temperament, character refers to individual differences in our voluntary goals and values, which are based on insight learning of intuitions and concept about our self, other people and other objects¹⁷. Character refers to individual differences in self object relationship, which develop in a stage-like manner as a result on non-linear interaction among temperament, family environment, and individual life experiences. The development of character is strongly influenced by non-linear interactions among the heritable temperament dimensions and social learning in the home and culture^{17,18}.

Temperament refers to the way we are born (our emotional predispositions), character is what we make of ourselves intentionally¹². Four independently inherited dimension of temperament are distinguished by the TCI: Novelty Seeking (NS), Harm Avoidance (HA), Reward Dependence (RD) and Persistence (PS). Different dimension can be linked to specific neuronal systems and function under a predominant influence of given neurotransmitters^{19,20}. Each of these is inherited independently of one another, so all possible combinations of high or low scores on these dimensions occur.

Individual differences in personality structure and development have a strong influence on the risk of all forms of psychopathology²¹. According to psychological model of personality risk of psychopathology can be seen as a complex interaction between the four dimension of temperament and maturity of character.

Accordingly, individuals with the same temperament may behave differently as a result of differences in character development. For example, an individual high in Novelty Seeking and low in Harm Avoidance may have an impulsive personality disorder if they are low in Self Directedness and Cooperativeness, or they may be a mature and daring explorer, inquisitive scientist or acquisitive businessman, if they are high in Self Directedness.

Subjects and methods

Assessment of personality and psychiatric disorders

Temperament and Character inventory (TCI) was developed for clinical and research use^{16,22,23}. The Temperament and Character Inventory (TCI) used in this study is a Croatian translation of the original 240 items of American TCI^{13,16}. The TCI has not yet been validated and normative data have not been obtained

TABLE 1
DESCRIPTION OF INDIVIDUALS WHO SCORE HIGH AND LOW ON THE FOUR
TEMPERAMENT DIMENSIONS²³

Temperament dimension	Descriptors of extreme variants – high	Descriptors of extreme variants – low
Harm avoidance	pessimistic fearful shy fatigable	optimistic daring outgoing energetic
Novelty seeking	exploratory impulsive extravagant irritable	reserved rigid frugal stoical
Reward dependence	sentimental open warm sympathetic	critical aloof detached independent
Persistence	industrious determined ambitious perfectionist	lazy spoiled underachiever pragmatist

from Croatian populations. The TCI norms used in this study is data from community USA sample¹³. The results in distribution of dimensional personality traits in Czech, Italian and Yugoslavian community sample are consistent with those observed with the original instrument in USA, so this suggests the universal quality of measured dimensions of temperament and character traits^{24–26}. The Temperament and Character Inventory (TCI)¹³ is a self reported measure of four dimensions of temperament and three dimensions of character.

Dimensions of temperament

Four independently inherited dimension of temperament are distinguished by the TCI: Novelty Seeking (NS), Harm Avoidance (HA), Reward Dependence (RD) and Persistence (PS).

Harm Avoidance (HA) is a multifaceted, higher order temperament trait consisting of four aspects or lower order

traits: Anticipatory Worry and Pessimism vs. Uninhibited Optimism (HA1) Fear of Uncertainty (HA2) Shyness with Strangers (HA3) and Fatigability and Asthenia vs. Vigor (HA4). Novelty Seeking is a multifaceted, high order temperament trait consisting of the following four aspects or lower order traits: Exploratory Excitability vs. Stoic Rigidity (NS1), Impulsiveness vs. Reflection (NS2), Extravagance vs. Reserve (NS3) and Disorderliness vs. Regimentation (NS4). Persistence refers to maintenance of behavior.

Dimensions of character

Three dimensions of character are distinguished by the TCI Self-Directness (responsible, goal directed vs. insecure, aggressive), Cooperativeness (helpful, empathic vs. hostile, aggressive) and Self-Transcendence (imaginative, unconventional vs. controlling, materialistic). All possible combination of three character dimensions can occur also.

TABLE 2
DESCRIPTION OF INDIVIDUALS WHO SCORE HIGH AND LOW ON THE THREE
CHARACTERS DIMENSIONS²³

Character dimension	Descriptors of extreme variants – high	Descriptors of extreme variants – low
Self-directedness	responsible purposeful resourceful self-accepting disciplined	blaming aimless inept vain undisciplined
Cooperativeness	tender-hearted emphatic helpful compassionate principled	intolerant insensitive hostile revengeful opportunistic
Self-transcendent	self-forgetful transpersonal spiritual enlightened idealistic	unimaginative controlling materialistic possessive practical

Self Directedness (SD) is multifaceted, higher order character trait consisting of the following five aspects or lower order traits: Responsibility vs. Blaming (SD1), Purposefulness vs. Lack of Goal Direction (SD2), Resourcefulness vs. Inertia (SD3), Self Acceptance vs. Self Striving (SD4) and Congruent Second Nature vs. Bad Habits (SD5).

Cooperativeness (CO) is multifaceted, higher order character trait consisting of the following five character aspects or lower order traits: Social Acceptance vs. Social Intolerance (C1), Empathy vs. Social Disinterest (C2), Helpfulness vs. Unhelpfulness (C4) and Pure Hearted Principles (Integrated Conscience) vs. Self Serving Advantage (C5).

Self-transcendence (ST) is multifaceted, higher order characters trait consisting of the following three lower order traits: Creative Self-Forgetfulness vs. Self-Conscious Experience (ST1), Transpersonal Identification vs. Personal Identification (ST2) and Spiritual Acceptance vs. Rational Materialism (ST3).

Mature character is defined as combined score for Self-Directedness and Cooperativeness of greater than 58, which is the 33rd percentile for the TCI Community sample.

An experienced psychiatrist using Croatian translation of SADS-L²⁷ personally interviewed all selected bruxism patients. The patients without psychiatric morbidity were selected for this study.

Assessment of bruxism

Out of 287 patients suffering from periodontal problems, 35 were selected for this study. The main selection criteri were positive clinical signs of bruxism: muscle hyperactivity, gingival recession on at least three teeth in both jaws, and, as the main sign, the wearing of occlusal facets. All 35 bruxism patients were studied by means of Cloninger's seven factor model of temperament and character (TCI; Temperament and Character Inventory).

Statistical analysis of the data obtained from the interviews was performed in Microsoft Office programme Excel 7.0, on

a DTK personal computer. Student t-test, Chi-square test, Z-test and Pearson correlation coefficient were computed for both Bruxism and Community sample group.

Results

Table 3 and 4 show the comparison of mean values of TCI factors between Zagreb patient group and control group (Community sample, USA). No statistically significant difference could be found in the higher order and suborder dimensions of temperament (NS, HA, RD, P, NS1, NS4, HA1-4, RD1-3) and character (SD, CO and ST, S1-S4, C1-C5, ST1-3) between bruxism patient and normative data.

Table 5 shows cut-off scores for Temperament Typology in both Zagreb and Community sample groups (HA, NS and RD).

Discussion

A close relationship between psychic stress and bruxism has been obvious to the most researchers of the habit. Although the possible cause-and-effect relationship has been studied extensively, especially in the last three decades, there are still gaping voids in the present knowledge. However, repressed aggression, emotional tension, anger, fear and frustration are continually cited as the most important or sole factors in the etiology of bruxism. Much more controversial is the possible role of occlusion in the etiology and treatment of this particular habit. At the beginning of this century, Karolyi postulated that both psychic factors and occlusal interferences play important roles in the development of bruxism²⁸⁻³⁰. This view was supported by Tishler more than 50 years ago and has been receiving extensive clinical evidence since that time³¹. During last decades, a

TABLE 3
TEMPERAMENT DIMENSIONS OF BRUXERS IN COMPARISON WITH THE COMMUNITY SAMPLE FROM THE USA

SCALE	Bruxism group (N=35)		Community Sample (USA) (N=300)	
	mean	stand. deviation	mean	stand. deviation
Novelty Seeking (NS)	20.62	3.36	19.3	6.0
Explorative Excitability (NS1)	6.18	1.49	6.3	2.3
Impulsiveness (NS2)	4.71	1.85	3.7	2.2
Extravagance (NS3)	4.82	1.24	5.0	2.3
Disorderliness (NS4)	4.91	1.58	4.3	2.1
Harm Avoidance (HA)	15.53	3.89	12.6	6.8
Worry/Pessimism (HA1)	4.91	1.94	3.2	2.4
Fear of Uncertainty (HA2)	4.56	1.42	3.6	2.0
Shyness (HA3)	3.62	1.18	3.3	2.3
Fatigability (HA4)	2.44	1.65	2.5	2.2
Reward Dependence (RD)	13.12	1.53	15.5	4.4
Sentimentality (RD1)	5.94	1.50	7.3	2.1
Attachment (RD3)	3.65	1.39	4.7	2.3
Dependence (RD4)	3.53	1.16	3.5	1.6
Persistence (PS)	3.82	1.17	5.6	1.9

TABLE 4
CHARACTER DIMENSIONS OF BRUXISM GROUP IN COMPARISON WITH THE COMMUNITY
SAMPLE FROM THE USA

SCALE	Bruxism group (N=35)		Community Sample (USA) (N=300)	
	mean	stand. deviation	mean	stand. deviation
Self-Directedness (SD)	27.5	3.96	30.7	7.5
Responsibility (S1)	5.32	1.36	5.8	2.0
Purposefulness (S2)	4.79	1.03	5.5	1.8
Resourcefulness (S3)	2.53	0.96	4.0	1.2
Self-Acceptance (S4)	7.11	2.02	6.4	2.8
Enlightened 2nd Nature (S5)	7.74	1.24	9.0	2.5
Cooperativeness (CO)	28.06	3.91	32.3	7.2
Acceptance (C1)	5.91	1.19	6.7	1.5
Empathy (C2)	3.91	1.08	5.3	1.4
Helpfulness (C3)	5.35	1.37	6.3	1.6
Compassion vs. Revenge (C4)	7.03	1.42	7.6	2.8
Integrated Conscience (C5)	5.85	1.13	6.5	2.0
Self-Transcendence (ST)	18.65	4.55	19.2	6.3
Self-Forgetfulness (ST1)	7.38	2.59	5.9	2.7
Transpersonal Identification (ST2)	6.59	1.52	4.6	2.4
Spiritual Acceptance (ST3)	4.68	1.89	8.7	2.9

TABLE 5
CUT OFF SCORES FOR TEMPERAMENT TYPOLOGY¹³

	Cut off scores for temperament typology								
	Harm avoidance			Novelty seeking			Reward dependence		
	Low	Median	High	Low	Median	High	Low	Median	High
Community sample (N=300)	8	12.6	16	16	19.5	22	13	15.5	18
Bruxism group (N=35)	15.53 (3.89)			20.62 (3.36)			13.12 (1.53)		

large number of neurophysiological and stomatological studies has been concerned with the occurrence and etiology of bruxism. It has been demonstrated that stress increases activity in the jaw-closing muscles both in humans and animals³². The connection between increased activity and bruxism, however, is less clear. A number of studies has questioned what kind of stress precipitated bruxism.

The relationship between personality and psychopathology found in psychiatric

patients were similar in pattern and strength to those observed in the general population of the United States (11).

In this study, we have studied personality of bruxism patients in comparison with personality data from the community US sample. The results from studies on other population samples are in favour of the universally observed values, so it was decided that it could be possible to compare the Croatian sample with the sample from the United States. Our

study showed no statistically significant ($p < 0.001$) differences in all the measured factors of both temperament and character between the compared groups. Compared to the community sample from the United States, our group has following characteristics of temperament: high in HA, high in NS, low in RD and low in PS. Character dimensions are as follows: combined score for SD (27,5) and CO (28,06) is less than 58, which indicates immature character of bruxers.

Conclusion

Personality profile analysis suggests that the bruxism patients can have follow-

ing personality traits: exploratory, impulsive, extravagant and irritable (high in NS), pessimistic, fearful, shy and fatigable (high in HA), critical, aloof, detached and independent (low in RD), lazy, spoiled, underachiever and pragmatist (low in PS). Combined scores in character dimension indicate influence of environmental factor, so indicate psychological ethiology. All types of anxiety disorder were associated with elevated Harm Avoidance. High scores in HA of bruxers indicate possible relation with anxiety disorder. It should be noted that TCI has not yet been standardized for the Croatian population and therefore the result should be taken into consideration with caution.

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BRUKSIZAM I PSIHOBIOLOŠKI MODEL LIČNOSTI

SAŽETAK

Bruksizam je abnormalna aktivnost mastikatornog sustava, uzrokovana psihološkim i okluzijskim faktorima. Svrha rada bila je odrediti moguću povezanost temperameta i karaktera pacijenata i bruksizma. Osobni profil 35 pacijenata koji boluju od bruksizma, bez psihijatrijskih poremećaja u anamnezi, određen je pomoću Cloningerovog modela sedam faktora temperameta i karaktera. Dijagnoza bruksizma postavljena je nakon analize muskularne aktivnosti i funkcijske analize kojom su određene okluzijske interference i brusne fasete. Temperament and Character Inventory procjenjuje četiri dimenzije temperameta i tri dimenzije karaktera. Rezultati govore da pacijenti koji boluju od bruksizma mogu imati sljedeće osobine: radoznalost, impulzivnost, ekstravagantnost i iritabilnost, pesimističnost, prestrašenost, sramežljivost i zamorenost, kritičnost, nesimpatičnost, odvojenost i samostalnost, lijenost, razmaženost i pragmatičnost. Kombinirani rezultati dimenzija karaktera govore u prilog nezrelih dimenzija karaktera. Test još nije standardiziran na hrvatskoj populaciji, pa rezultate treba uzimati s oprezom.