ORIGINAL RESEARCH

Parenting Styles of Divorced Parents and Their Influence on Their Children's Bruxism: A Cross-Sectional Study

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Purpose: Parental divorce is one of the most common adverse events in childhood and can cause children emotional problems and influence their oral health. To explore differences in possible bruxism, state anxiety, coping and parenting styles between a group of divorced parents and a group of cohabiting parents.

Patients and Methods: A cross-sectional study was conducted, with data collected through self-report questionnaires filled in by 186 patients (8–16 years) and their parents. Children completed State Trait Anxiety Inventory (STAI), Self-Report Coping Measure (SRCM) and Parenting Style Scale. The Self-Reported Bruxism Questionnaire (SBQ) was completed by their parents.

Results: The results showed significant differences were seen between the group of divorced parents (n=93) and the control group (n=93), with higher levels of state anxiety and possible bruxism in the group of children of divorced parents. In addition, in terms of coping strategies, externalisation and problem-solving deficits stood out. In terms of parenting style, autonomy promotion was higher. Additionally, possible bruxism was influenced by coping strategies (seeking social support), attachment-based parenting style and communication, behavioural control and state anxiety. Finally, it was found that high anxiety may act as a moderating variable in the relationship between divorced parents and possible bruxism.

Conclusion: Children of divorced parents showed more possible bruxism, anxiety, coping and behavioural problems.

Keywords: divorced parents, anxiety, bruxism, coping

Introduction

Parental divorce is one of the most common adverse events in childhood, affecting 30–40% of children before they reach 15 years of age.[1] Adolescents may be especially vulnerable to stressful events such as parental divorce due to the many physical, mental, emotional, and social changes during this phase of development, which lay the foundation for future health patterns.[2]

The children of divorced parents may develop coping techniques that lead to internalised problematic behaviour (associated with depressive symptoms, anxiety, and withdrawn behaviour)[3] and show higher levels of externalised problematic behaviour (related to the occurrence of oppositional behaviour, behavioural problems, and aggression)[4] when compared to the children of non-divorced parents, as parental parenting patterns play a key role in the child's developmental progress.[5]

Divorce could be a possible cause of declining physical and psychological health in children, not due to the divorce itself, but because of the risk factors associated with it, such as inter-parental conflict, which could act as a driving factor for parenting styles that clearly compromise the proper development of their children; parental psychopathology; inconsistency in parenting styles; a conflictive shared parenting relationship between parents; and low levels of social support.[5]

Therefore, through their parenting style, parents, as primary caregivers, have a determining influence on the development of emotional health, well-being, personality, present and future character, social and cognitive development, and the type of coping mechanisms that their children develop.[6]

Previous studies have attempted to understand the onset of anxiety in childhood. Aetiological models of anxiety have identified vulnerability factors, genetic factors, and various environmental factors, including parenting styles.[7] Anxiety is an unpleasant emotional state, ranging from mild uneasiness to intense fear. It presents with physical features and psychological symptoms, which may inhibit normal thinking and interfere with daily activities.[8] In addition, anxiety can affect both systemic health and oral health. Regarding the latter, the increase in carious lesions, gingival lesions, and temporomandibular disorders is noteworthy. In particular, children with psychological problems such as anxiety and stress have been found to be 36–40% more likely to develop bruxism.[9] Zieliński et al conducted a meta-analysis on children not exposed to stress factors with sleep bruxism, showing a prevalence rate of approximately 9%.[10]

Bruxism is defined as a repetitive muscle activity characterised by repeated unconscious jaw clenching, teeth grinding, and/or the thrusting of the jaw; it is split into two categories, namely sleep bruxism (SB) or awake bruxism (AB), depending on its circadian phenotype.[11] Bruxism should be considered a risk factor rather than a disorder in individuals with no other pathology.[11]

Depending on the diagnostic method, bruxism is classified as possible, probable or definite bruxism.[11] Possible SB or AB is based on a positive self-report only, probable SB or AB is based on a positive clinical inspection, with or without a positive self-report, and definite SB or AB is based on a positive instrumental assessment with or without a positive self-report and/or a positive clinical inspection.[12,13]

Although the pathophysiology of bruxism remains unknown, its aetiology has been found to be multifactorial and may be associated with local, systemic, psychological, occupational, and hereditary factors, as well as other sleep disorders.[14] The aims of this study were to explore the differences in possible sleep bruxism as well as awake bruxism, state anxiety, coping mechanisms, and parenting styles between a group of individuals whose parents live separately and a group of individuals whose parents live in the same household (control group) to analyse possible predictors of possible bruxism and assess whether the relationship between parental separation and possible bruxism is moderated by anxiety.

Materials and Methods
Study Design and Setting
This observational, descriptive, and cross-sectional study was carried out in Alcorcon, Spain, between October 2024 and November 2024. The study sample consisted of 186 subjects, with ages ranging from 8 to 16 years. The sample size was selected based on previous results on the prevalence of bruxism in the Spanish population in the age range described.[15]

It was estimated that a random selection of the subjects would be representative of the cohort at their particular age (with 95% confidence intervals and based on 3 degrees of precision). The value of 174 individuals would be optimal if it were a randomised study; however, as it was a convenience sample, this value was taken as a reference.

The inclusion criteria were as follows: willingness of the child to participate in the study on a voluntary and anonymous basis, parental consent, age between 8 and 16 years old, proficiency in Spanish, good general health (ASA=1). Subjects were excluded from the study if they were undergoing orthopaedic/orthodontic treatment, had dental pain or jaw dysfunction, had ASA > 1, had a systemic (cardiovascular, pulmonary, neuromuscular, and digestive) and/or mental health-related pathology, were experiencing neurological and/or neuropathic pain, and if they were on medication that alters the neuromuscular system. Subjects who always had a single parent (ie, never experienced parental separation), a widowed parent, or were living with a family member (or multiple family members) other than their parent were also excluded.

The sample was divided into two groups: one group consisted of individuals with separated or divorced parents (ie, parents who do not live together), and the other group comprised individuals with cohabiting parents (ie, parents who do live together).

Data were collected through a questionnaire completed by the children at the CEM Valderas Medical Specialty Center in Alcorcón (Madrid). Ethical approval was obtained from the Research Ethics Committee of the University Rey Juan Carlos (reference number: 040720243962024).

Measures

In terms of socio-demographic variables, data were collected on parents' age, gender and marital status.

In the present study, previously validated instruments were used to assess the variables of interest. The psychometric properties of each questionnaire used are described below:

Anxiety was measured using the state anxiety subscale of the State-Trait Anxiety Inventory (STAI) consisting of 20 items.[16] Participants used a 3-point Likert-type scale, where 1 meant "almost never" and 3 meant "almost always". The total score was calculated as the sum of each child's responses, which could range from 0 to 60 (higher scores indicated greater levels of anxiety).

Individuals' coping strategies were quantified using the Self-Report Coping Measure (SRCM) scale developed by Causey and Dubow in 1992.[17] For this measure, the responses of the participants were recorded via a 5-point Likert-type scale, where 1= "never" and 5= "always". This scale included 5 subscales measuring social support seeking, problem solving, distancing, and internalising and externalising strategies. Subscale scores were obtained by summing the subscale item scores for each subject; higher scores indicated greater support for that coping strategy.

Information on maternal and paternal educational styles was obtained through the 41-item Parenting Style Scale, the validated Spanish version was used.[18] This scale consists of 6 subscales: affect and communication (8 items), autonomy promotion (8 items), behavioural control (6 items), psychological control (8 items), disclosure (5 items), and mood (6 items). The response format uses a 6-point Likert scale that ranges from 1 (strongly disagree) to 6 (strongly agree). The final score was obtained by summing the child's responses for each subscale.

Finally, bruxism was assessed using the self-reported bruxism questionnaire (SBQ), which was completed by the parents. This questionnaire has demonstrated adequate psychometric properties, with content validity supported by experts in the assessment of bruxism and satisfactory internal reliability in previous studies.[15] Specifically, this questionnaire consists of 11 items that unify the most frequently asked questions for the self-reported diagnosis of bruxism.[19] Examples include the following: "Have you noticed that your child grinds or clenches his or her teeth frequently during sleep? Have you noticed that your child grinds or clenches his or her teeth during the day? Has your child ever felt a momentary headache when waking up in the morning?" A 5-point Likert-type response system, ranked according to intensity (ranging from 1 = not at all to 5 = very much), was used. The scores of the participants were obtained by summing the 11 items. Ranging from 11 to 55 items.

Statistical Analysis

The statistical program SPSS (Statistical Package of the Social Sciences Program for Windows 28.0) was used for statistical calculations. Data analysis included descriptive statistics of sociodemographic variables (mean ± standard deviation) and the Kolmogorov–Smirnov test to assess the assumption of normality, which was confirmed. Student's t-test was used to compare both groups of subjects (those with cohabiting parents and those with non-cohabiting parents) on possible bruxism, state anxiety, parenting styles, and coping. Cohen's d statistic was used to assess effect size. According to Cohen (1988),[20] small Cohen's d values are ≈ 0.2, medium ones are ≈ 0.5, and high ones are ≈ 0.8. However, we have updated the rules of thumb for interpreting effect sizes, according to Sawilowsky (2009), d (0.01) = very small, d (0.2) = small, d (0.5) = medium, d (0.8) = large, d (1.2) = very large, and d (2.0) = huge.[21] Hierarchical linear regression models were used to search for predictors of bruxism in the group of individuals with separated parents. In addition, a two-way ANOVA was conducted to assess the influence of the interaction between subjects' family's legal cohabitation status variables and anxiety levels on self-reported bruxism. A cut-off point of 39–40 has been suggested in the literature to detect clinically significant symptoms using the STAI–S scale (Low anxiety < 39; high anxiety ≥ 39).[22] Differences were considered significant at p < 0.05.

Results

Sociodemographic Characteristics

The average ages of the two participant groups were 11.16 (±2.49) years for the separated parents group and 10.67 (±2.16) years for the control group (t=1,43, p=0,153). The gender distribution was similar in both groups: the group of individuals with separated parents consisted of 40 boys and 53 girls, while the control group comprised 38 boys and 55 girls (x₂=0,0221, p=0,88).

Comparison of Possible Bruxism, State Anxiety, Parenting Styles, and Types of Coping Strategies in the Separated Parent Group and the Control Group

Group comparisons are shown in Table 1. The children of separated parents showed greater levels of possible bruxism and state anxiety; however, in terms of coping strategies, they possessed fewer problem-solving strategies and higher levels of externalisation. In terms of parenting style, separated parents seemingly promote the autonomy of their children more. Medium effect sizes were observed in the comparisons for bruxism; however, for the rest of the variables, the effect size was small.

Predictor Variables of Possible Bruxism in the Group of Individuals with Separated Parents

Hierarchical multiple regression was performed to determine whether the sum set of affection and family communication, behavioural control, social support seeking, and state anxiety significantly predicted bruxism.

Table 1 Comparison of Possible Bruxism, State Anxiety, Parenting Styles and Types of Coping in the Separated Parents Group and the Control Group

	Separated M (SD)	Control Group M (SD)	P-value	D Cohen
Possible bruxism	14.67 (4.18)	12.38 (1.87)	< 0.001**	0.70
Anxiety state	15.97 (11.08)	13.01 (9.99)	0.042*	0.29
Parental styles				
Affection and communication	44.58 (3.24)	43.9 (4.28)	0.226	0.17
Behavioural control	26.69 (10.01)	27.24 (8.69)	0.691	0.05
Psychological control	20.33 (8.24)	20.40 (7.89)	0.949	0.009
Autonomy promotion	42.13 (4.84)	40.34 (6.55)	0.035*	0.31
Disclosure	23.58 (5.81)	23.69 (5.64)	0.888	0.021
Humour	31.40 (4.79)	31.81 (4.6)	0.554	0.08
Coping				
Problem-solving	15.07 (3.11)	16.11 (2.55)	0.014*	0.36
Search for social support	12.05 (3.36)	11.92 (4.11)	0.815	0.03
Internalisation	11.97 (3.08)	11.41 (3.54)	0.253	0.16
Externalisation	7.98 (3.66)	6.87 (2.89)	0.022*	0.33
Distancing	7.76 (4.03)	8.12 (3.28)	0.499	0.09

Notes: *p<0.05; **p<0.01.

As you can see in Table 2, Model 1 included AC as the sole predictor. Model 2 added CC to examine its additional contribution. Model 3 incorporated BAS to evaluate its effect. Model 4, the full model, included AS as the final predictor. The full model (Model 4) was statistically significant (R^2 = 0.278, F (1, 88) = 8.470, p < 0.001; adjusted R^2 = 0.245), indicating that the combined predictors explained approximately 27.8% of the variance in self-reported bruxism.

The Influence of Anxiety Levels and Subjects' Family's Legal Cohabitation Status on Possible Bruxism

Through applying a two-way ANOVA, statistically significant differences were found (with a confidence level of 95%) between anxiety levels, with high, medium, and low anxiety producing differing effects on possible bruxism (F= 5.08; p< 0.01). Taking into account the second independent variable (subjects' family's legal cohabitation status), the null hypothesis was rejected in favour of the alternative hypothesis, confirming that there are statistically significant differences between one's parents being divorced or not and possible bruxism. (F= 19.23; p< 0.01). The interaction between the two independent variables (anxiety levels and subjects' family's legal cohabitation status) was found to be significant (p< 0.05); therefore, this led us to reject the null hypothesis, establishing that there is a correlation between anxiety levels and subjects' family's legal cohabitation status, with a confidence level of 95%. (See Table 3 and Figure 1).

Our post-ANOVA results revealed a correlation between anxiety levels and subjects' family's legal cohabitation status. We found no significant difference in children's bruxism at the medium and high anxiety levels (significance value: 0.584). However, we found significant differences in children's bruxism at the medium and low anxiety levels (significance value: 0.033) and at the low and high anxiety levels (significance value: 0.005) (see Table 4).

Table 2 Results of the Regression Analysis to Predict Possible Bruxism Based on Affection and Family Communication, Behavioural Control, Social Support Seeking and State Anxiety

|	Possible Bruxism							
	Model 1		Model 2		Model 3		Model 4	
Variable	**B**	**β**	**B**	**β**	**B**	**β**	**B**	**β**
Constant	13.64**		12.11**		6.31**		6.11**	
AC	0.05**	0.1	−0.05	−0.009	0.2	0.05	0.03	0.07
CC			0.34**	0.3	0.21*	0.20	0.24*	0.24
BAS					0.51**	0.41	0.55**	0.44
AS							0.05	−0.13

Notes: *p<0.05; **p<0.01.
Abbreviations: AC, Affect and Communication; BC, Behavioural Control; SSS, Seeking Social Support; AS, Anxiety Status.

Table 3 Effect of Anxiety Levels and Legal Family Status on Possible Bruxism

Dependent Variable: Possible Bruxism					
Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Corrected Model	427.653a	5	85.531	8.886	<0.001
Intercept	9201.167	1	9201.167	955.881	<0.001
Legal family status	185.118	1	185.118	19.231	<0.001
Anxiety level	97.899	2	48.949	5.085	0.007
Legal family status * Anxiety level	74.486	2	37.243	3.869	0.023
Error	1732.653	180	9.626		
Total	36221.000	186			
Corrected Total	2160.306	185			

Notes: a.R squared = 0.198 (R squared adjusted = 0.176).
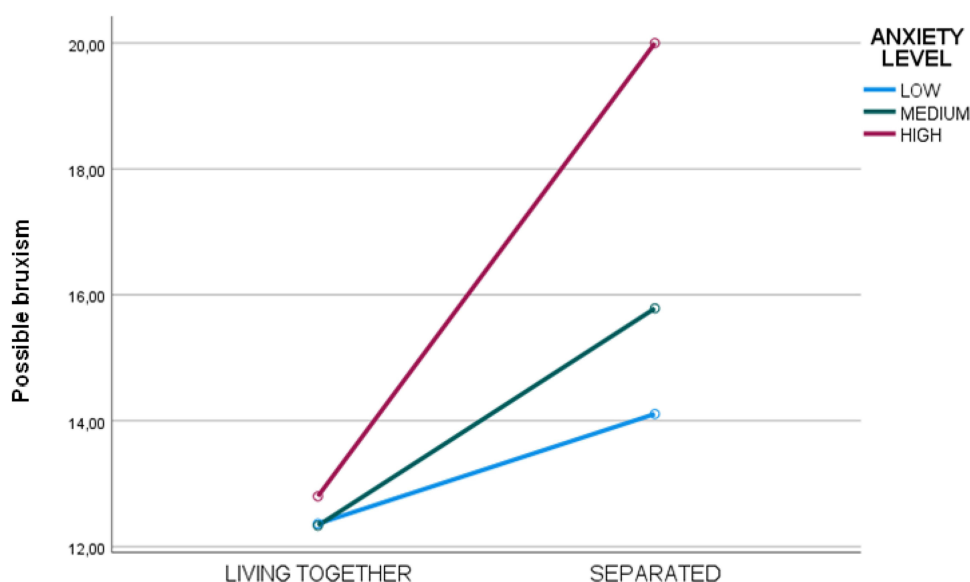
Figure 1 Two way Anova for the variables of separated (yes/no) and anxiety level (high/medium/low) on self-reported bruxism.

Discussion

The results of this study show that children of separated parents, compared to children of non- separated parents, have higher levels of possible bruxism and state anxiety, externalise their emotions more, and have fewer coping strategies to solve problems. However, the effect size for bruxism was medium in this study and small for the rest of the variables. In terms of parenting style, separated parents seemingly promote the autonomy of their children to a greater extent.

Regarding bruxism, previous evidence has reported different prevalence rates of bruxism in children and adolescents. For example, Zielinski (2024) reported that 9% of male and female minors have this condition.[10]

Previous studies have shown that having separated parents is a predictor of bruxism being self-reported by the child, as family environments that are less reassuring for the child, such as situations where parents are divorced, are likely to increase the child's self-perception of sleep bruxism (SB).[23,24]

In turn, emotional factors such as anxiety appear to be associated with SB.[24] According to the results of the present study, high anxiety acts as a moderator in the relationship between parental separation and possible bruxism, and this finding aligns with previous studies, wherein higher levels of anxiety were found in children with bruxism.[25] The results

Table 4 Post-ANOVA Follow-up Test Using Tukey

Bruxism Tukey HSD						
Levels of anxiety	**Levels of Anxiety**	**Mean Differences**	**Std. error**	**Sig.**	**95% Confidence Interval**	
					Lower bound	**Upper bound**
Low anxiety	Medium anxiety	−2.0004*	0.79169	0.033	−3.8713	−0.1294
	High anxiety	−3.2239*	1.01150	0.005	−5.6143	−0.8335
Medium anxiety	Low anxiety	2.0004*	0.79169	0.033	0.1294	3.8713
	High anxiety	−1.2235	1.23645	0.584	−4.1456	1.6985
High anxiety	Low anxiety	3.2239*	1.01150	0.005	0.8335	5.6143
	Medium anxiety	1.2235	1.23645	0.584	−1.6985	4.1456

Notes: *p<0.05.

of a study by Seijo et al showed that parental separation led to an increase of approximately 20% in depressive symptoms, anxiety, and hostility related to continued exposure to parental divorce stressors.[26] Previous research has also shown that children whose parents are divorced have more emotional and behavioural problems.[4] Nicolotti et al suggest in their study that active forms of coping in the context of marital conflict may involve problem-solving strategies that lead the child to become involved in the conflict, which in turn may be associated with externalising problems.[27]

Saczuk et al showed that subjects with sleep bruxism more frequently used maladaptive coping strategies, aligning with the results of the present study.[28] Positive coping strategies are said to reduce stress and be correlated with a high level of well-being, and in the present study, they were more frequent among participants in the control group and less visible in the bruxing group. Other studies have also demonstrated a lack of coping strategies in subjects with sleep bruxism.[29] Coping mechanisms, although rarely investigated in relation to SB, have gained a lot of attention as possible causal factors.[29] O'Hara et al found that problem-focused coping and coping efficacy appear to be effective for children facing parental divorce, being particularly useful for those exposed to high levels of post-divorce conflict.[30] Therefore, reinforcing these strategies may be beneficial as a protective mechanism, thus providing potential child-centred preventive interventions. This is consistent with previous studies that have reported the positive effects of coping interventions for children of divorce.[31]

A key characteristic in parenting styles is the support of children's autonomy, which is defined as parents' promotion of independent expression, thinking, and decision making in their children. An autonomy-supportive family environment is key, especially in negative situations such as those that can regularly occur in divorced families.[32] Lan et al found that for adolescents from divorced families,[33] lower parental autonomy support is related to problematic behaviours, which interacts with individual characteristics and may explain adolescents' problematic behaviours.[32] However, the findings of the present study show that separated parents provide higher levels of autonomy support to their children, although higher levels of externalising behavioural problems were also found amongst the group with separated parents.

Previous studies have found that, when children are exposed to highly conflictual parental interactions, they are more likely to externally exhibit emotionally dysregulated behaviours, which is consistent with our results.[4] However, Lan et al observed that adolescents who experienced parental divorce reported greater internalisation problems than adolescents who remained in non-divorced families.[34]

To our knowledge, there is only two studies similar to the present one that analyzes bruxism in children of separated parents.[24,25] However, these studies do not include key variables considered in our research, such as anxiety and coping strategies, which differentiates our work and brings a new perspective on the subject.

There are several limitations to the present study that should be taken into account when interpreting the results. Firstly, due to the cross-sectional design of the study, it is not possible to establish cause–effect relationships. Secondly, the use of a convenience sample makes it difficult to extrapolate the present study's results. A third possible limitation stems from the use of self-report measures, which may be altered by responses based on social desirability and recall bias.

A limitation to be considered in this study is the omission of the variable of self-esteem, which has been identified in the literature as a key factor in the relationship between anxiety and coping strategies in children. Self-esteem plays a key role as a modulator of emotional response and can significantly influence how children perceive and cope with stressful situations.[35] The absence of this variable in the analysis may have limited the study's ability to capture more comprehensively the psychological factors involved in coping with anxiety. Future research should include measures of self-esteem to explore its interaction with anxiety and coping strategies, which would allow the development of a more complete conceptual framework for effective interventions.

Another limitation of the present study is that information on bruxism was obtained indirectly, through questionnaires completed by parents. The questionnaire does not explicitly differentiate between SB and AB, it is not possible to establish a clear distinction between the two types. This approach, although useful for assessing perceptions and observed behaviors, does not provide a definitive clinical diagnosis. As a result, the identified cases have been classified as "possible bruxism", according to the criteria established in the literature.[11] This limitation underscores the importance of

considering that the data reported by parents may be influenced by their subjective perception or lack of knowledge about specific symptoms of bruxism. For future research, it would be advisable to combine parental questionnaires with clinical assessments by specialists and, as far as possible, to include self-reports from children, especially at ages when they can provide reliable information about their symptoms. This approach would allow a more complete and accurate assessment of the prevalence and characteristics of childhood bruxism.

Finally, regarding the diagnosis of bruxism, previous research points to polysomnography as the gold standard for the diagnosis of bruxism; on the other hand, this is not feasible for children, and parental reporting is still the most widely accepted method.

Regarding practical applications, it is important to collect data in the anamnesis on the marital status of individuals' parents and possible symptomatology due to the psychosocial factors associated with these factors, as they can be considered potential factors linked to the aetiology or presence of bruxism.

Future studies based on the use of prospective longitudinal study designs are needed to elucidate the temporal order of the associations studied. The present study provides a basis for these types of research studies to be conducted in the future.

Conclusion

The children of separated parents have higher levels of state anxiety and possible bruxism, based on parental perception. In addition, in terms of coping strategies, externalisation and problem-solving deficits stand out.

Abbreviations

STAI, State Trait Anxiety Inventory; SRCM, Self-Report Coping Measure; SBQ, The Self-Reported Bruxism Questionnaire; ASA, American Society of Anesthesiologists; AC, Affect and Communication; BC, Behavioural Control; SSS, Seeking Social Support; AS, Anxiety Status; SB, Sleep Bruxism; AB, Awake Bruxism.

Ethics Approval and Informed Consent

The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of Rey Juan Carlos University (protocol code 040720243962024 and date of approval 8 October 2024).

Informed consent was obtained from all subjects involved in the study.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Disclosure

The authors declared no conflicts of interest.

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