

Physiotherapy in Bruxism: A Scoping Review

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ABSTRACT

Background: Bruxism is a parafunctional activity comprising of spasmodic non-functional gnashing, grinding, or clenching of teeth or involuntary rhythmic movement which may cause occlusal trauma. Bruxism causes muscular pain, stiffness, jaw restriction, sleep disturbances and degraded quality of life. The awareness of bruxism in population is extremely low. Physiotherapy has proven effective in many musculoskeletal and neurological conditions as a non-pharmacological treatment. Thus, the aim of this study to explore the recent physiotherapy treatments available for the better prognosis and improved quality of life for the patient suffering from bruxism.

Methodology: In this scoping review articles are researched from the search engines like PUBMED, GOOGLE SCHOLAR, etc. These articles are reviewed according to the inclusion criteria which include last 5 years of articles, experimental and clinical trials, randomized and non-randomized control trials, etc. 9 articles were selected according to it. Later the qualities of these articles were analyzed with help of PEDRO Scale.

Conclusion: Pain, muscle activity reduction and increase jaw mobility are the key symptoms to be focused on by physiotherapy management. Physiotherapy has recently provided different techniques like Kinesiotaping and dry needling effective, myofascial trigger point release in reducing pain in bruxism. There are modalities like contingent electrical stimulation which help in reducing episodes, low level laser therapy reduces bruxism pain. Exercises and relaxation and PNF techniques and massage therapy all help in increasing the range of motion, strengthening, pain reduction, better oral and sleep habits. More research needs to be done on effect of different stretching on bruxism. Overall a combination of this management can provide a better and quality treatment for Bruxism.

Keywords: Bruxism, Physiotherapy.

INTRODUCTION

Bruxism is a parafunctional activity comprising of spasmodic non-functional gnashing, grinding, or clenching of teeth or involuntary rhythmic movement which may cause occlusal trauma.^{1, 2} It is a repetitive jaw muscle activity which do not have functional objectives like mastication, phonation and swallowing. It is an oral habit which is differentiated with two types (1) Awake Bruxism (AB) also called Diurnal Bruxism which occurs predominately in the consciously awake time. It is usually due to anxiety and low stress coping response.³

Sleep Bruxism (SB) is a movement disorder which is evident while non-REM sleep or nocturnally labeling as parasomnia.^{1, 4}

The awareness of bruxism is quite less in the population, the prevalence varies ranging from 5% to 90%, approximately 20% in adults, 13% in adolescents, 14-20% in children and 3% in elderly all over the world. Prevalence in Dutch population 5-16% and in Brazil 31%.^{5, 6} The incidence of Sleep Bruxism (SB) in adults varies from 3%±13% and Awake Bruxism (AB) in adults varies from 22%±31%. There is no evidence of any genetic marker for bruxism

but Awake Bruxism (AB) has a considerable higher rate in females and younger individuals.^{7, 8} A Study on 12–15-year-old adolescents of Faridabad state, India from concluded 92 (30.7%) out of which 56% were mild, 19% moderate, 10% severe bruxism.⁹ Another study suggested the prevalence of self-reported diurnal bruxism among information technology (IT) professionals was 59% Bangalore, India.¹⁰

In adults with social anxiety disorder, emotional stress, heavy smoking, and excessive alcohol consumption are at high risk of bruxism. Lower age, female gender, caffeine usage, psychosocial factors, depression, sleep disorders (e.g. obstructive sleep apnea), genetics and medications have higher chances of experiencing bruxism. Children and adolescents with behavioral disorders, Attention deficit hyperactive disorder (ADHD), somnolence are at higher risk of bruxism. Bad night sleep, late night media consumption also affects bruxism in children.^{11, 12}

Bruxism involves the repetitive activity of muscles for jaw opening muscles like digastric and jaw closing muscles like masseter, temporalis, medial and lateral pterygoids. During sleep the muscle tone reduces and spontaneous rhythmic masticatory muscle activity (RMMA), occurs once or twice per hour in normal population but increases in bruxers. These activity are caused by transient increase in electrical activity of brainstem central pattern generator (CPG) consisting of a neuronal network that produces alternate jaw movements.¹³ The oral parafunctional activity (bruxism) shows muscle hyperactivity of masseteric sling muscle resulting in myalgia, muscle spasm and in long term hypertrophic masseter. Patients with sleep bruxism have significantly diagnosed with temporomandibular disorders (TMDs) and temporal headaches, and chronic episodic migraine and tension type headache. Temporomandibular disorders (TMD) symptoms include muscle and joint pain, morning muscle pain, stiffness, joint noises headaches and jaw

locking. These symptoms elicit vertigo, tinnitus and auditory changes worsening with Awake Bruxism (AB). Clinically bruxers perceived with damage to tooth structure including fractured teeth, hair line cracks and restorations, worn facets, abfraction lesions, and eventually loss of teeth. Periodontal changes, including widening of the periodontal ligament, tooth mobility, and recession, oral soft tissue and jawbone changes are also observed.⁸

Mechanism for bruxism and temporomandibular disorders is a biopsychosocial framework consisting of stress sensitivity and anxious personality traits related to increase temporomandibular pain. Sleep Bruxism (SB) and Awake Bruxism (AB) have different reasons of pain in clenching and grinding motor phenomenon resulting in muscle fatigue and joint stress. Myofascial pain is related to sleep bruxism with a cause-effect view where sustained elevated muscle activity (SEMA) causes transient pain. Isometric persistent high intensity bruxism may trigger temporomandibular pain, if onset of the pain is early, protective response reduces the muscle activity for recovery leading to spasm.^{14, 15} Bruxers with temporomandibular disorders (TMD) complained of tightness and pressure pain over the frontotemporal area. This can be proposed on the hypothesis that the nociceptive stimulus from the temporomandibular joint (TMJ) and masticatory muscles increase the excitability or central sensitization of trigeminal subnucleus caudalis nociceptive neuron which prompts generalized pain.¹⁶ Recurrent headaches and masticatory muscle tenderness caused by over activity of muscle in bruxers lead to hypermobility of jaw.¹⁷ Bruxers during a triangular bite force task show greater jaw tremor at ~8 Hz relative to controls. The measurement of tremor in bruxism may require higher forces rather than normal, with more importance to the dynamics of bite force production.¹⁸

Lobbezoo et al. proposed a grading system for clinical diagnosis of bruxism.

The subcategorized bruxism into “possible” “probable” and “definite” bruxism. Based on “probable” with self-reported questionnaire, if with even clinical investigation then “possible” bruxism. “Definite” bruxism is suggested with polysomnography or video. American Academy of Sleep Medicine (AASM) proposed a diagnostic criteria of sleep bruxism updated on the International Classification of Sleep Disorder (ICSD) which is a clinical protocol based on one or more of these symptoms. Abnormal wearing of tooth with sleep grinding or momentary morning jaw pain or fatigues or temporal headaches or jaw locking.¹⁹ The gold standard for investigating bruxism is the recording of electromyography (EMG) activity during sleep (polysomnography).¹⁸ Polysomnography is expensive, while takes more time for observation and labour intensive and due to laboratory setup is unable to monitor oral hygiene. Portable electromyography (EMG) with Electrocardiogram is used which is slightly less accurate than polysomnography.²⁰ A combination of thoracic activity and body position, electro-encephalography, electro-oculography, with cardiac and muscular monitoring is helpful in diagnosing Sleep Bruxism events.²¹

Bruxism is treated conservatively mainly by reducing the muscle activity and managing pain. To Decrease the risk of causing crazy lines and restorations and reducing the frequency of Awake Bruxism (AB) for even decreasing pain. Even the damage in Sleep Bruxism (SB) can be prevented with occlusal guard. The “Multiple-P” approach with pep talks, plates and pills, psychology, physiotherapy. This includes the psychological counselling, occlusal stabilizing splint, and short-term pharmacological therapy. The psychosocial component include stress reduction therapy, lifestyle changes, counseling, and hypnotherapy.^{8,11,22} Techniques like muscle relaxation and reaction competence can be used to reduce jaw muscular activity and anxiety have been proven beneficial.²³

Behavior modification such as habit attentiveness, habit reversal therapy, relaxation techniques and biofeedback therapy. Patient awareness is increased by giving cards to be pasted in their regular visible places with note stating to “Lips together, teeth apart”.^{8,11} Reduction in sleep habit like snoring, restless sleep, mouth breathing, drooling, lack of sleep, stomach position during sleep facilitates decreasing bruxism.²⁴ The occlusal therapy are made of hard acrylic splint, NTI-tss devices. Pharmacological interventions include muscle relaxers and botulinum toxin injections into to muscles involved. Botulinum toxin reduces the intensity whereas not that effective in reducing frequency or muscle pain level. Neuroleptic drug gabapentin in patients with poor sleep quality has proven effective. Benzodiazepine clonazepam and antihypertensive clonidine which act centrally on nervous system are effective in reducing sleep bruxism whereas peripherally acting drugs are not that effective.^{8,11} Recent study states Librium, which contains chlordiazepoxide HCl has antianxiety, appetite stimulating, sedative and weak analgesic action. It relieves jaw pain and tenderness and improves the quality of life. It shortens the duration of bruxism episodes by blocking the Electroencephalogram (EEG) arousal from stimulation of the reticular formation in brainstem.²³ Physical Therapy has been used to treat several musculoskeletal and neurological conditions. Some studies have included the use of manual therapy, relaxation therapies, electrotherapy, kinesiotaping, cognitive behavioral therapy, postural awareness in treatment of bruxism. Symptomatic management with the help of physical therapy is also been effective in pain reduction and increasing the range of motion with short-term relief.²² A study of the effect of patient in masticatory muscle pain with encouragement, self-education, stretching, jaw relaxation, exercises and home advice was assessed which suggested faster reduction in pain intensity and

increase in functions of the muscle in early management. Patient education and counselling related to the importance of patient and psychology is crucial for improvement of patient quality of life in temporomandibular disorders (TMD). Physiotherapy influences the pain intensity, inability, self- confidence, fear of movement and reinjury.²⁵ There are various physiotherapy treatment for the management of Bruxism which we will discuss further ahead.

METHODOLOGY

Study setting: Dr. A. P. J. Abdul Kalam College of Physiotherapy, Loni

Study Design: Scoping Review. This Scoping Review is a technique to ‘map’ relevant evident based literature in the field of interest.

Database and Search Strategy: The search will be done on Search Engines: PUBMED, Google Scholar, CINAHL, PEDro. The key words which will be used for the research are: Bruxism, Physical Therapy, Awake Bruxism and Sleep Bruxism.

Study Duration: 6 months

Equipment to be used: Laptop.

Selection Criteria: Information sources will be independently used to search articles. The relevance of the article to the research question is been observed before reviewing it. The articles for review will be selected according to their inclusion or exclusion in the criteria set. The full text of the article will be reviewed by the co-investigator and the considerable relevance of the article will be considered for deciding if the article should be reviewed.

Eligibility Criteria:

Phenomenon of Interest: Physiotherapy in Bruxism

Inclusion Criteria^{2, 22}:

1. Articles from last 5 years
2. Articles published in English
3. Articles with abstract and Full text available

4. Experimental Study
5. Randomised and Non Randomised control trial
6. Pre-test/ Post-test
7. Comparison study
8. Sleep and Awake Bruxism
9. TMD and Headache

Exclusion Criteria^{2, 22}:

1. No Geographic restriction
2. Descriptive Study
3. Abstract and Poster
4. Medical and other than physiotherapy management

PROCEDURE

Evidence based articles elaborating the objectives of the study will be selected for scoping review, data will be collected on the bases of eligibility criteria from the selected sites and index. The quality of the articles are assessed and the articles are discussed and drawing a conclusion for the study.

Table: 1

Search Engine	Search Topic	No. of articles present	No. of articles selected
Pubmed	Bruxism	4002	0
	Bruxism, Physical Therapy	141	3
Google Scholar	Bruxism, Physical Therapy	14300	6

Outcome Measures:

Physiotherapy Evidence Database (PEDro) scale is a 10 component scale to assess the methodological quality of clinical trial. It is also used to rate systematic reviews. The PEDro scale was developed from Delphi List. As per author’s suggestion the scores are: < 4 is reflected ‘poor’, 4-5 is fair, 6-8 is ‘good’ and 9-10 is ‘excellent’. Eligibility criteria are not countable. The Inter-rater reliability of this PEDro scale is ICC= 0.53 to 0.91 for clinical trial of physiotherapy related intervention.²⁶

Table:2

Author	Gouw S, et.al ²⁷	Keskinruzgar A, et.al ²⁸	Blasco-Bonora PM, et.al ²⁹	Yazici G,et.al ³⁰	Calisgan E, et.al ³¹	Sya A,et.al ³²	Lietz-Kijak D, et.al ³³	Quaresma MC, et.al ³⁴	Rathi M, et.al ³⁵
Random allocation	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Concealed allocation	Yes	Yes	No	No	Yes	No	No	Yes	No
Baseline characteristics comparable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subject blinded	No	No	Yes	Yes	No	No	No	No	No
Therapist blinded	No	No	No	Yes	No	No	No	No	No
Assessor blinded	Yes	No	Yes	Yes	No	No	No	Yes	No
Outcome for 85% of initial participants	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Intention to treat	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Comparison between group statistical	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Point variability	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Total score	08/10	07/10	07/10	08/10	07/10	06/10	06/10	08/10	06/10

RESULT

Table: 3

Author	Year	Topic	Objective	Sample size	Outcome measures	Conclusion
Gouw S, et.al ²⁷	2018	Masticatory muscle stretching for the management of sleep bruxism: a randomised control trial	To determine the effectiveness of stretching of the masticatory muscles for sleep bruxism.	24	The outcome measures were based on the Graded Chronic Pain Scale (GCPS) and the Mandibular Function Impairment Questionnaire (MFIQ). Clinically examination with measuring the mandibular range of motion (ROM) with a millimeter ruler, maximum voluntary bite force by a calibrated tensile tester, and pain threshold and tolerance with the Wagner algometer. The sleep quality was also assessed. The bruxism episodes were daily reported with polysomnography.	Static stretching is not effective in relieving bruxism.
Keskinruzgar A, et.al ²⁸	2018	Comparison of kinesiotaping and occlusal splint in the management of myofascial pain in the patients with sleep bruxism	To evaluate the efficacy of Kinesio taping (KT) in patients with sleep bruxism (SB) and to determine whether KT may be an alternative for occlusal splint (OS) for the treatment of SB	34	The participants were clinically examined for bruxism. The outcome measures were Visual Analogue Scale (VAS), Pressure pain threshold of temporalis and bilateral masseter muscle and the mouth opening measurement.	OS and KT are equally effective in patients with bruxism. KT is effective in reducing muscle pain and increasing mouth opening size. KT can be used as an ideal treatment in the patients were OS is contraindicated.
Blasco-Bonora PM, et.al ²⁹	2016	Effect of myofascial trigger point dry needling in the patients with sleep bruxism and temporomandibular disorders: a prospective case series	To investigate the effects of deep dry needling (DN) of myofascial trigger points (MTrPs) of the masseter and temporalis on pain, pressure pain threshold (PPT), pain-free maximal jaw opening and temporomandibular disorder (TMD)-related disability in patients with sleep bruxism (SB) and myofascial TMD.	23	The outcome measures were Visual Analogue Scale (VAS), mouth opening measured with a ruler, Pressure pain threshold (PPT) measured with an algometer and jaw disability checklist (JDC) questioner.	Application of Dry needling resulted in reduction of pain, tenderness and had maximal jaw opening and functioning immediately after the treatment and one week later.

<i>Table:2 Continued...</i>							
Yazici et.al ³⁰	G,	2020	Evaluation of single session physical therapy method in bruxism patients using shear wave ultrasonography	To compare the immediate effects of a single session of manual therapy (MT) or Kinesiotaping following MT (KTMT) in patients with bruxism using shear wave ultrasonography.	39	Effect of the treatment on muscle thickness was observed with shear wave ultrasonography and muscle stiffness with SWE. Pressure pain threshold was examined on MTrP with an algometer.	There is a visible effect of MT on muscular parameter on one session stating a long term use can be more effective. The KT is an additional technique which main emphasis is on pain reduction. KTMT is more effective than only MT as muscle activity and pain both are managed together.
Calisgan E, et.al ³¹		2018	The effect of proprioceptive neuromuscular facilitation, myofascial releasing maneuvers and home exercises on pain and jaw function in patients with bruxism	Evaluate the effects of proprioceptive neuromuscular facilitation exercises, myofascial releasing maneuvers and home exercises on temporomandibular joint pain and jaw function in patients with bruxism.	32	The patients were evaluated with Visual Analogue Scale (VAS), Jaw restriction scale and oral habit checklist.	The combination of the PNF, MTrP and home exercise have effective reduction in pain of TMJ, oral habits with increase jaw mobility. Myofascial relaxation with home exercise also is effective in reducing bruxism. Head and neck strengthening increases oral behaviour.
Sya A, et.al ³²		2020	The effect of Low level LASER, BOTAX, and occlusal splints in the treatment of muscle pain of bruxism using electromyography	To assess the effect of low level LASER therapy, BOTAX, and occlusal splints using electromyogram on muscle activity in management of muscle pain of bruxism.	120	The muscle activity after different treatment is evaluated with electromyography on temporalis and masseter muscle.	The study stated that all the groups showed significant difference of muscle activity after the treatment at all intervals. The Low level LASER was effective in reducing the pain intensity. BOTAX treatment showed immediate respond in the muscle activity but reduced in long term. The splinting was effective in patients only till the patients were continuously using the splints. Thus the study showed BOTAX as a classical treatment and LASER as a long term effective treatment.
Lietz- Kijak D, et.al ³³		2018	Assessment of the short term effectiveness of kinesiotaping and trigger point release used in functional disorders of the masticatory muscle	To evaluate the effect of the kinesiotaping method and trigger points inactivation on the non-pharmacological elimination of pain in patients in functional disorders of mastication.	60	It is a short term study which records the pain intensity with Visual Analogue Scale (VAS) before the treatment and immediately after the treatment.	The importance of this study was the analgesic effect provided instantly with the treatment. Both the KT and MTrP have a significant decrease in the intensity of pain. But KT provides better pain relief. If the short term effectiveness of this treatment is appreciable then the clinical use with other physical therapeutic exercises will provide better results. There is no age related preference or changes in the treatment.

Table:2 Continued...

Quaresma MC, et.al ³⁴	2020	Effect of contingent electrical stimulation in sleep bruxism: a randomized clinical trial	The effects of a 4- and 8-week consecutive use of contingent electrical stimulation on self-reported pain, jaw muscle activity, and threshold intensity in teeth grinding during sleep, over 6 months.	48	The outcome measures considered are the number of grinding episodes per night by Electromyographic monitoring, threshold intensity and the pain intensity with the use of Numerical Pain Rating Scale (NPRS). There is a complete sleep monitoring of the episodes of bruxism with intensity.	There is a significant decrease in the pain level and grinding intensity in both the groups. There is a minor improvement in the treatment in 8 weeks in comparison to that of 4 weeks. As it is more feasible to conduct a short term treatment in a clinical setup thus 1 month of contingent therapy to reduce pain and grinding intensity is sufficient.
Rathi M, et.al ³⁵	2019	Effect of kinesiotaping on pain and muscle activity in individuals with bruxism	To find effect of KT on Pain and Muscle activity in an experimental group with respect to the control group.	30	The outcome measures of pain assessment by Numerical Pain Rating Scale (NPRS) and surface Electromyography for recording the muscle activity.	This study records the pain intensity and muscle activity after the application of kinesiotaping post 24 hours treatment and after 48 hours post tape removal. The outcome recorded a significant reduction in pain intensity and muscle activity in comparison with the baseline and 24 hours on removal of the taping and 48 hours post carryover period.

DISCUSSION

This Present study titled “Physiotherapy In Bruxism: A Scoping Review” was conducted in Pravara Institute of Medical Sciences, Loni. This scoping review is aimed to provide an overview of the recent physiotherapy treatment available in the treatment of Bruxism approaching on electrotherapy, manual therapy, biofeedback systems and other techniques. The articles were researched on search engines Like Pubmed, Google Scholar. Later the articles were selected according to inclusion and exclusion criteria. Furthermore, the Quality of the article were assessed PEDRO Scale. Thus, an impression of the articles is present.

Bruxism is defined as a parafunctional activity comprising of spasmodic non-functional gnashing, grinding, or clenching of teeth or involuntary rhythmic movement which may cause occlusal trauma.¹ The symptoms include muscle and joint pain, pain while biting, morning muscle pain, stiffness, joint

noises, headaches, jaw locking, hair line cracks, weared facets and periodontal changes. Additional there is stiffness and reduced mobility of the neck and shoulder.

Keskinruzgar A, et. al used kinesiotaping in treating bruxism where the observed reduction in the pain and increased joint range of motion and pressure pain threshold. It is equally effective as occlusal splint.²⁸ Another study stated its efficacy in reducing its muscle stiffness and muscle thickness moreover drastic pain reduction in a short-termed treatment. It also provides better result when applied in accordance with Manual Therapy.³⁰ One study concludes Kinesiotaping provides better than Myofascial trigger point release pain relief due to the local response which facilitates blood flow and lymph circulation. If the short-term effectiveness of this treatment is appreciable then the clinical use with other physical therapeutic exercises will provide better results. Both are effective in pain reduction.³³ Another study states reduction in muscle activity as well.²⁵

Gouw S, et. al stated that muscle stretching is not effective in relieving bruxism. Their study showed reduction in bruxism burst more and even episodes but not clinically significant. There was increase in the range motion also. They stated that long term treatment or other stretching than static stretch might provide a better result.²⁷

Blasco- Bonora PM, et. al concluded that Dry needling technique has an effective reduction in pain, increases temporomandibular range of motion and pressure pain tolerance.²⁹ Calisgan E, et. al stated Proprioceptive Neuromuscular Facilitation, Myofascial releasing maneuver and home exercises are effective in pain reduction, jaw mobility and oral habits. It provides facial control, functionality, relaxation and strengthening of the muscles also leading to benefits on physiological pain. Strengthening of neck and shoulders also facilitate the effects.³¹

Sya A, et.al concluded from their study that Low level LASER was effective in reducing the pain intensity and having a long term effect. LASER is applied on trigger points which cause vasodilatory mediators and decreased inflammatory response.³² Another study explained that it encourages pain reduction as changes in cell membrane permeability, vasodilation, and edema reduction, blocking the nerve fibers in response to the release of endogenous opioids (endorphins and enkephalin). Leading to a decrease in histamine and acetylcholine release and bradykinin synthesis.³⁶

Quaresma MC, et. al treated bruxism with contingent electrical stimulation. They observed significant reduction in pain and grinding intensity. There is no clear explanation as to how does stimulation reduce the pain more over due to the central neural alteration. There is decrease in the grinding episodes by the biofeedback mechanism. They advised administration of this treatment for 1 month as to more feasible.³⁴

One Study states that massage therapy reduces pain and quality of life in

patients with sleep bruxism with the use of occlusal splints.³⁷ Another study mentions a reduction in the muscular activity as well.³⁸ A study concludes Exercise therapy with jaw mobility exercise and Psychological intervention reduces temporomandibular pain and jaw movement in parafunctional activity patients.³⁹

CONCLUSION

Pain, muscle activity reduction and increase jaw mobility are the key symptoms to be focused on by physiotherapy management. Physiotherapy has recently provided different techniques like Kinesiotaping and dry needling effective, myofascial trigger point release in reducing pain in bruxism. There are modalities like contingent electrical stimulation which help in reducing episodes, low level laser therapy reduces bruxism pain. Exercises and relaxation and PNF techniques and massage therapy all help in increasing the range of motion, strengthening, pain reduction, better oral and sleep habits. More research needs to be done on effect of different stretching on bruxism. Overall a combination of this management can provide a better and quality treatment for Bruxism.

ETHICAL APPROVAL

An Ethical permission was obtained from Institutional Ethical Committee held on 16 December 2020 at Dr APJ Abdul Kalam College of Physiotherapy, Pavara Institute of Medical Sciences, Loni, Maharashtra, India- 413736.

Ethical Approval Ref. no: BPT/INT/2020/36

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Conflict of Interest: None

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