



IN THE NAME OF GOD



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Shiraz University of Medical Sciences

School of Dental Medicine

THESIS

For D.M.D. Degree

Etiology, Significance, Diagnosis and

Treatment of Bruxism

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My dear parents. I am very thankful
for their support and guidance in all my
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With best wishes

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Dedicated To:

My parents, the most valuable teachers
of my life, with whose excellent guidance and
precious encouragement I found my path of life.

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Chapter 1

Etiology of Bruxism

Introduction :

The term "bruxism" refers to nonfunctional grinding of the lower teeth against the upper teeth.²

The term bruxism is derived from the French La bruxomanie , suggested by Mary and Pietkiewicz in 1907. Frohman, in 1931 , was probably the first to use the word bruxism to designate gnashing and grinding of the teeth for nonfunctional purposes.

Many other terms have been used such as : " neuralgia traumatica " (Karolyi), " Karolyi effect " (Weski), " occlusal habit neurosis (Tishler), and, more recently, " parafunction " (Drum).

Miller suggested a differentiation between nocturnal grinding of the teeth, which he called bruxism, and habitual grinding of the teeth in the daytime, which he called bruxomania.

The tendency to gnash and grind of the teeth in association with anger or aggression has been recognized since biblical times; it has been a topic of study both for humans and for animals. Gnashing of teeth has historically been linked to tense and unhappy circumstances.

Nonspecific acute nervous tension and even physical stress of a high degree (lifting or pushing heavy objects, or performance

of difficult tasks) is often accompanied by a clenching by the jaws and the teeth.

Anger and determination are so commonly expressed, and emotions likewise suppressed, by pressing or clamping the jaws and teeth together that this activity is not usually considered bruxism.

Another group of conditions closely related to bruxism but usually classified as occlusal habits rather than bruxism includes: biting forcefully into a locked malposition of the jaws; lip, tongue and cheek biting, chewing on objects such as fingernails, pencils, and pressing on the teeth by the fingers.

Although all of these habits or conditions have a definite psychogenic background and serve as outlets for emotional stress, they are considered dysfunctional biting or occlusal habits rather than bruxism.

The incidence of bruxism appears to be elevated in children with brain damage.¹

Bruxism is an oral habit that is usually due to psychological stress or occlusal discrepancy. It occurs more often in children than adults. Damage to the teeth caused by bruxism is irreversible. However, the underlying cause should be treated in order

to avoid further dental and periodontal problems.⁴

Fundamental to the understanding of the bruxism phenomenon is that nocturnal and diurnal bruxism be discussed as two separate processes. The description and investigation of diurnal and nocturnal bruxism as a single process is open to question, as the two phenomena occur during different states of consciousness. Sleep studies show that nocturnal bruxism is triggered by abrupt lightening of sleep and occurs as an autonomic arousal reaction.

Nocturnal bruxism episodes are accompanied by changes in heart rate, digital vasoconstriction and electroencephalogram (EEG) activity. Diurnal bruxism, on the contrary, has been shown to involve a specific muscular response to stress but no signs associated with generalized autonomic arousal. Diurnal bruxism therefore is qualitatively different from nocturnal bruxism, based on the absence of centrally initiated correlates of autonomic arousal.⁵

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Epidemiology of Bruxism :

The incidence of bruxism vary over a wide range, depending on how the figures are obtained.

Bruxism is performed on a subconscious reflex-controlled level and is therefore, in most instances, unrecognized by the patient unless it has been called to the patients attention by somebody else.

As a result, it has been difficult to study the incidence of bruxism. Recently, however, recording devices have become available that can record and store information about the activity of the jaw muscles day and night. The most severe bruxism usually occurs at night, but may individuals also grind their teeth during the day , when they are under stress.

In an extensive electromyographic study of 167 patients, Kraft reported that about half of the patient gnashed their teeth during sleep and the other were only biting or pressing them together.

The muscle activity recorded during sleep varied from a few contractions to as many as 259. The subjects usually had 88 contractions, each less than 1 sec long. Only 11 percent of the patients had sustained longer contractions of 2.5 sec to 1 min. The muscle action was distributed fairly evenly throughout the night in 67

percent of the patients. In the remaining patients, most of the activity occurred just before sleep and after awaking in the morning.

Questionnaires or case historians usually list a relatively low incidence of bruxism (8 percent-15 percent) but a thorough history, including information from family members, and examinations for sign and symptoms indicate the presence of bruxism in 60-90 percent in patients with periodontal disease, and in 78 percent of all children between 2 and 5 years of age. However, in another survey, only 15 percent of the children between 10 and 15 years of age proved to be bruxers.

Karolyi's suggestion in 1902 that practically all persons may at one time or another grind their teeth may not be far from the truth.¹

In the another report, incidence of bruxism varies from 5% to 96%. In a study of 1052 patients, Glaros reported 30.7% were past and current bruxers, and 21.2% were current bruxers. Love and Clark concluded that the variance in reported incidence of bruxism is influenced by the definition used, diagnostic criteria applied, type of population sampled, types of questionnaires, and design of the study. During the past four decades much evidence supports the

concept that bruxism is one of the most prevalent, complex and destructive of all dental functional disorders.³

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Etiology of Bruxism :
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The etiology of bruxism is multicausal, complex, and often difficult to ascertain. Its effect is varied, and treatment options are numerous and uncertain.

Bruxism is a complex disorder that consist of multiple causative factors. Although it is frequently difficult to seperate etiologic factors, they are classified as 1- psychologic, 2- emotional, 3- dental, 4- systemic, 5- occupational, and/or 6-idiopathic.

Ramfjord and Ash, Arnold, Suzuki, and Nudler present evidence that support psychologic and occlusal factors as being the most predominant causes of bruxism. Investigators who support psychologic theories report that anger, fear, aggression, stress, and frustration may be reflected in the development of bruxism. Although occlusal factors often cannot be seperated from psychologic factors , large population studies and reports from numerous clinicians present sufficient data to suggest that both psychologic and occlusal factors play major roles in etiology of bruxism. Emotion, stress , frustration or drive may predispose an individual to the development of moderate or mild habitual nondestructive bruxism. As stated, such conditions may be considered as acceptable functional activity.

The difficulty lies in developing differential diagnostic criteria to separate destructive from normal or acceptable bruxism.

There are increasing evidence that dental factors such as type of occlusion, tooth position, tooth mobility, mandibular movement patterns, dental morphology, and restorative dentistry play a predominant role in the etiology of bruxism.

For example in a carefully conducted electromyographic study, Ramfjord reported that of 34 bruxing patients all but five were treated successfully by occlusal equilibration.³

At the beginning of this century, Karolyi postulated that both psychic factors and occlusal interferences play important roles in the development of bruxism. He stated that even mild occlusal trauma or a minor occlusal defect, such as a sharp cusp, could receive undue attention from neurotic individuals and resulting in grinding habits.

During the last two decades, a large number of neurophysiological and clinical studies have been concerned with the occurrence and etiology of bruxism. These studies have incorporated EMG, EEG, Telemetry, and various other techniques to monitor bruxism during sleep. Bruxing contacts during sleep can be separated from

swallowing contacts of the teeth. In bruxers, a large but varying number of bruxing contacts have been recorded, and muscular forces during bruxism may, by far, exceed the forces of mastication.

It was first reported that bruxism occurs mainly during the rapid eye movement (REM) stage of sleep, along with a change in the brain wave (EEG) pattern, an increase in the puls rate, and irregular respiration. Since dreaming also occurs during the REM stage, it was suggested that bruxism is related to dreaming. However, more recent studies indicate that bruxism occurs during all stages of sleep, but occurs primarily during deep sleep. The increased puls rate has been confirmed, but the EEG pattern appears to be unusual and not affected by a relationship with bruxism.¹

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Neurophysiological Studies Related to Bruxism :

It has been demonstrated that stress increases activity in the jaw-closing muscles, both in human and in animals. The connection between this increased activity and bruxism, however, is less clear. More prolonged and more frequent tooth contacts have been reported in persons under stress than in those with no stress, and the subjects indicated that they clenched their teeth during the experimental stress. Increase of tooth mobility related to stress also supports the theory of increased occlusal forces related to stress.

Inducing hostility in a patient increases basic jaw muscle activity, so does a demanding physical task.

A number of studies have been concerned with what kind of stress precipitates bruxism. Experimentally induced frustration increases biting activity in monkeys. A number of surveys have attempted to compare personality traits of bruxers with those of nonbruxers. One of the best conducted tests indicated that bruxers had higher anxiety levels than nonbruxers, and they tended to turn their hostility inward to remove frustration, whereas the nonbruxers turn their frustration to primitive action against an object or another person. It has been suggested that the relatively small and not