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Taking a Bite out of Bruxism

In this paper, I will be covering parafunctional habits, bruxism (teeth grinding), and other related dental topics that should not only be of interest to anyone with teeth, but have direct application to overall health. Some of the information in this paper may come as news for some, such as the fact that dentists have begun using botox to help relieve some of the symptoms of bruxism (Nayyar et al). This paper will help educate you about dental health and also might supply important information about dental issues you are already facing. Some of these topics might already be familiar to you, however there should be something new for everyone. An old joke that was once told to me, reminds us, “Be true to your teeth and they won’t be false to you.” Dental health is very important for leading a happy, productive life and even though science continues to make important discoveries every day, the fact is that all humans are diphyodonts, therefore we should treat our teeth well, whether they be deciduous or permanent, because once they are gone, a third dentition will not occur. Diseased teeth can wreak havoc on every aspect of a person’s life and this paper should help you keep yours alive and well for many years to come.

Upon reading the opening paragraph, one might well ask, “what are parafunctional habits?” I know when I first heard those words, I did. According to the 4th edition of *Illustrated Dental Embryology, Histology, and Anatomy,* parafunctional habits are, "Mandible movements not within normal motions associated with mastication, speech, or respiratory movements" (Fehrenbach). Parafunctional habits are the practice of habitually using a part of the body in ways that are uncommon or not generally within that body part’s design. In layman’s terms, if someone is developing habits with their teeth and mouth which do not include eating, speaking, or breathing, he or she may be exhibiting different types of parafunctional habits. But how can a patient know if he or she has any parafunctional habits? What are some possible signs of these potentially destructive behaviors? These are no doubt questions that many patients ask their dental care professionals each and every day. Signs of possible parafunctional habits include but are not limited to: clenching teeth during the day, bruxism while awake or asleep, chewing gum excessively, biting fingernails, biting pens--anything that does not involve consuming food, verbally communicating with others or inhaling and exhaling.

Daytime Bruxism

Nighttime Bruxism

How important is it to prevent and stay aware of one’s parafunctional habits? Extremely.

According to Dentistry by Design, parafunctional habits can "lead to a variety of mouth disorders, making them the most destructive cause of wear on teeth" (Chirillo, 2016). In his journal article "Occlusion, Function, and Parafunction" Dr. Steven D. Bender reveals that the primary cause of tooth wear is not eating or chewing of food, but in fact the result of parafunctional habits such as bruxism and jaw-clenching. He reports that the development of headaches and severe migraines may well be from these same parafunctional habits (Bender). Sounds to me like parafunctional habits, are definitely something everyone should be aware of, right? And thus, began my research into bruxism…

"They certainly give very strange names to diseases" - Plato

Sadly, bruxism, is a condition from which too many people around the world suffer. Very few people truly understand the profound implications of this odd, seven-letter word. Bruxism is defined as, "the habit of unconsciously gritting or grinding the teeth especially in situations of stress or during sleep" (Merriam-Webster).

Table 2

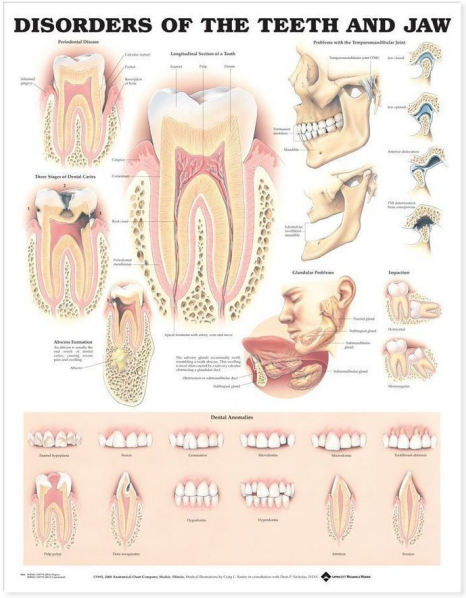
Means and standard deviations (SDs) for OBF measurements, difference between means, and standard error of the difference (SE) in each group in respect to gender. OBF, Occlusal bite force; MOBF, maximum occlusal bite force.

Group	Males	Females	Gender differences	Total
	MOBF (*N*), mean (SD)	MOBF (*N*), mean (SD)	Mean (SE)	MOBF (*N*), mean (SD)
Early primary dentition stage (group 1)	182.85 (74.84)	169.04 (66.53)	13.81 (10.01)	175.94 (70.97)
Late primary dentition stage (group 2)	255.15 (89.30)	225.01 (93.81)	30.15 (12.82)*	240.37 (92.56)
Early mixed dentition stage (group 3)	314.24 (105.24)	264.28 (93.50)	50.02 (14.08)***	289.28 (102.41)
Late mixed dentition stage (group 4)	454.17 (90.91)	411.07 (80.12)	44.21 (12.19)***	432.62 (88.15)
Permanent Dentition Stage (group 5)	522.34 (80.34)	531.36 (92.72)	9.02 (12.04)	526.70 (86.45)

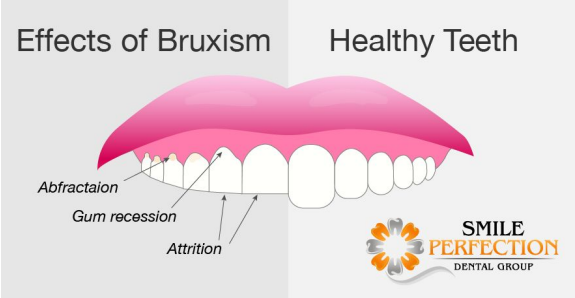
*$P < 0.05$, ***$P < 0.001$.

According to Bender, bruxism can lead to pain and other dental problems. Bruxism puts enormous strain on the teeth, generating up to "60 percent of the force generated during voluntary maximum clenching prior to sleep" and can exert nearly 1,000 pounds for force per square inch (Bender).

Because of this, Bender notes, one should not be surprised at the extensive damage to the teeth that bruxism causes. Research shows that bruxism is directly related to overly sensitive teeth, breakage of teeth, and loosening of teeth from the gums (Bender).

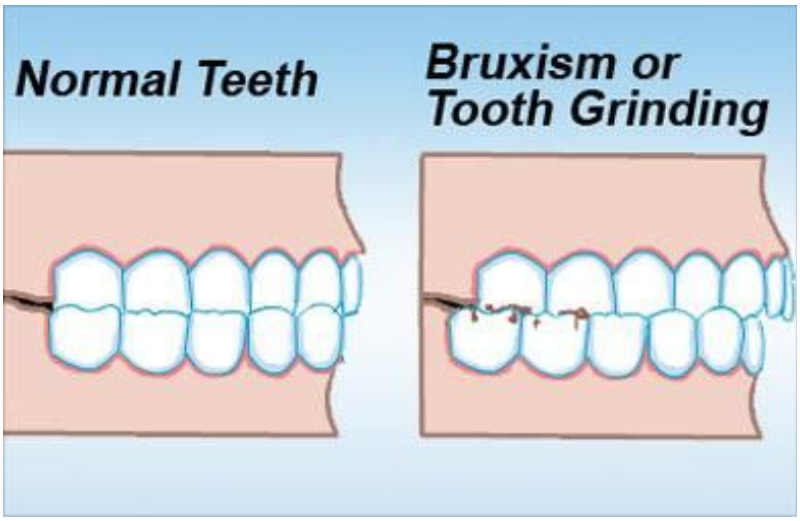


Bruxism can cause attrition, abfraction and gum recession. Attrition can be defined as the loss of tooth tissue, due to tooth-to-tooth contact, that can occur especially in patients suffering from bruxism.



Sleep among other anxiety ridden activities like work, paying bills, and family concerns, cause a greater risk of bruxism. Because bruxism often happens during sleep, people can develop painful and potentially debilitating symptoms without being aware of the root cause and therefore being able to adequately address it. Bruxism can happen to people of all ages, races, genders, and ethnicities. That being said, "prevalence of bruxism tends to decrease with age, with the highest prevalence during childhood and the lowest in people over 65" (Falace).

As discussed, there are two types of bruxism. Bruxism which occurs during the day and bruxism that occurs while asleep (seen on the previous page). Bruxism during periods when the person is awake most typically manifests itself as "tooth clenching or tapping and jaw-bracing" often without the teeth coming into contact; when people with bruxism are awake they rarely engage in grinding of their teeth (Bender). However, when night comes, everything changes. Sleep bruxism, as noted above, is much more intense and potentially damaging to dental health. Research shows that sleep bruxism affects one out of five people, with women more prone to developing the condition than men (Bender). Experts believe that sleep bruxism is a cyclical process that is associated with an increase in heart and brain activity during the night and tends increase and decrease at regular intervals while a person is sleeping. Sleep bruxism occurs in "clusters" followed by spaces of time during which a person's jaw is relaxed and he or she is not engaged in bruxism (Bender).



The image above is comparing the normal occlusion of a person without bruxism on the left side, and on the right, we are able to see a typical example of what the occlusion pattern looks like when someone is grinding their teeth. What is occlusion? Occlusion means, the fitting together of the lower arch (mandible) with the upper arch (maxilla) while the jaws are closed.

Bruxism in Children

"It is easier to build strong children than to repair broken men"- Frederick Douglass

If your child has bruxism-like symptoms, it is important to address this issue early on, rather than later in time. Research shows that the "incidence of teeth grinding noises during sleep in children younger than 11 years of age is between 14 and 20 percent" furthermore, dentists find signs of bruxism in "approximately 10 to 20 percent of children" (Bender). With these statistics, it is clear bruxism is not a matter to be overlooked in a child's dental health. Dental health care professionals are still unclear on the precise causes of bruxism in children, although as is the case with adults, stress and tension can contribute to children developing the condition (Dombrowski). Other factors can also lead to bruxism in children including teeth that are not in proper alignment, dental pain of one form or another; childhood bruxism can also be the result of "hyperactivity, cerebral palsy or even a reaction to common medications" (Dombrowski). The symptoms of childhood bruxism are very similar to those of adults who suffer from the same condition. Children who grind their teeth often report headaches, ear pain, or soreness in their faces and/or jaws. Dentists advise parents to be especially aware of signs of bruxism such as chipped teeth or worn enamel which can cause/lead to more permanent issues once a child's adult teeth have come in (Dombrowski). The enamel is extremely important in long-term dental health because it provides a protective cover for the nerves and blood vessels that allow your tooth to function in a healthy way. If bruxism goes untreated, it can "erode your teeth through both the enamel and dentin to expose the pulp of nerves and vessels. Not only does this compromise the integrity of your teeth, but can also lead to intense pain" (Giraki et al).

Diagnosing bruxism in children can be challenging for adults who are not familiar with the condition as children, like adults, might grind their teeth during sleep while being totally unaware that they are doing so. Also, children lack the vocabulary of adults to precisely communicate the nature of pain or other difficulties they might be experiencing due to the effects of bruxism (Dombrowski). Dental experts suggest that parents can look in on their children why they sleep to see if they are engaging in activities that might be associated with bruxism, and to ask sibling of the child in question whether or not they are aware of night-time teeth grinding. If a parent suspects that their child is experiencing bruxism due to stress or tension, that relaxing nightly routines like story time, warm baths, or calming music might well be beneficial coping strategies (Dombrowski). Once someone is diagnosed with bruxism, child or adult, preventative measures should be taken to improve the patient's chance of their condition and their overall dental health improving.

Special Issues of Bruxism and other Parafunctional Habits in Adolescents

"The child whose ball doesn't bounce back" - Paul Violi

Because adolescence is a time when people experience growth spurts and rapid physiological changes, this age group is particularly vulnerable to temporomandibular disorder (TMD) which can cause them a great deal of pain. Research shows that bruxism is directly related to TMD in people this age (Fernandes, et al 2016). Studies also show that it is important to differentiate between waking bruxism and sleeping bruxism in order to fully understand this parafunctional habit's impact on TMD. As noted, sleep occurs when the subject is unconscious and grinds his or her teeth, while waking bruxism is more often manifested as jaw-clenching. Even though these types of bruxism differ, they are intricately related and the presence of one greatly increases the likelihood of the other (Fernandes et al). According to the data, the most common parafunctional habits in adolescents that manifest as bruxism are "nail/pen/pencil/and lip/cheek biting, resting their head on their hand, and gum chewing" (Fernandes et al).

Both forms of bruxism are directly linked to the pain of TMD. A research study conducted by Giovana Fernandes and her colleagues from the Universidade Estadual Paulista the Universidade de São Paulo in Brazil examined a group of 12-14 year olds experiencing painful TMD, and sought to find correlations between this condition and bruxism among other parafunctional habits. This is very interesting to me to see that culture and environment do not seem to be factors in the development of bruxism and related problems; adolescents in Brazil are as likely to show these disorders as much as their peers in other countries throughout the world.

Fernandes and her colleagues began the process by asking the participants a series of questions regarding whether or not they had experienced facial or jaw pain in the preceding month, how long they had been experiencing TMD-related pain, and if they had ever experienced a time when their jaws seemed stuck or didn't open all the way. Based on the answers to the questions and a medical examination, the adolescents were sorted into two groups, one with myofascial pain, "athralgia" and osteoarthritis; others without symptoms or without pain became the control group (Fernandes et al). The two groups were also asked if they noticed whether or not they clenched or ground their teeth at night or if they had been told they do so. They also were asked if they noticed if they clenched their jaws during the day or engaged in the parafunctional habits like pencil or nail chewing mentioned above.

Table 1 Demographic characteristics of the sample and their association with painful TMD.

	Group						
	Total		N Control	Case			
	n	%	n (%)	n (%)	p value	OR	95%CI
Gender							
Boys	499	45.6	386 (77.4)	113 (22.6)	0.041	1.3	1.01-1.75
Girls	595	54.4	428 (71.9)	167 (28.1)			
Menarche							
Girls without menarche	119	20.0	91 (76.5)	28 (23.5)	0.218	1.3	0.84-2.14
Girls with menarche	476	80.0	337 (70.8)	139 (29.2)			
Race							
White	735	67.4	547 (74.4)	188 (25.6)	0.915	1.0	0.76-1.36
Others	355	32.5	263 (74.1)	92 (25.9)			

(Fernandes et al, 2016).

After studying the adolescents and reviewing the data, Fernandes et al found a solid connection between both types of bruxism, parafunctional habits like pencil chewing and nail chewing, and the onset of painful TMD. Interestingly, they found that these habits led to TMD in female adolescents more often than males. The reasons for this are not entirely clear, but Fernandes and her colleagues found that the "presence of reproductive hormones seems to increase the risk of developing pain during the time that girls go through puberty" (Fernandes et al). What Fernandes et al also discovered was that feelings of stress tended to increase the incidence of bruxism and parafunctional habits that led directly to painful TMD.
The present study confirmed that sleep and awake bruxism, as well as parafunctional habits, are strongly associated with painful TMD. They found that bruxism can be used as an accurate predictor of the likelihood of a person developing painful TMD and discovered that "reported "prolonged and sustained, low intensity chewing, clenching, and grinding movements" could increase TMD pain not only in adolescents, but in adults as well.

One very interesting aspect of the Fernandes study was the "chicken and egg" relationship between quality of sleep and night-time bruxism. On the one hand, stress can lead to bruxism, which in turn leads to a reduced quality of sleep among adolescents and other age groups. At the same time, when one has a poor night's sleep one is more likely to engage in bruxism. Given this insight, it is interesting to examine the psychological aspects of bruxism and parafunctional habits and their relationship to stress. I will take a look at this later in the paper and see if stress management techniques or even medications like Zoloft and Xanax can provide

relief for bruxism, parafunctional habits, and the dental problems that they can lead to. In considering the line from Violi's poem, "The child whose ball doesn't bounce back", if these issues can be addressed during a person's childhood or adolescence, he or she might be able to enjoy a life free of these conditions and the resulting pain and oral damage.

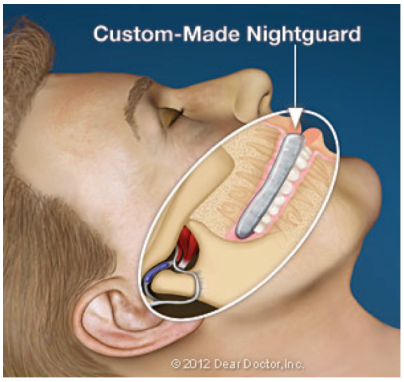
Treatment of Bruxism

"Life is short. Smile while you still have teeth." - Anonymous

Despite the extensive damage that bruxism can cause, health care professionals can offer a variety of ways to reduce its impact on oral health and in some cases, alleviate the condition entirely. The Mayo Clinic notes that in many cases it is not necessary to treat bruxism at all, especially if the symptoms are manageable and are not causing permanent damage. Many children outgrow the condition as they age, and a significant portion of adults are not harming themselves due to their habitual bruxism. However, in those people for which bruxism is an issue and has the potential to damage their health and quality of life, dentists and others can offer a variety of ways to help treat the condition.

"Prepare and prevent, don't repair and repent." – Anonymous

A simple way to lessen the impact of bruxism in those for whom it is a problem is through the use of mouthguard or splint worn at night to prevent damage to the teeth from grinding. These devices can be made in either soft or rigid forms, and are custom-made to fit an individual's specific dental structure (Mayo Clinic). Most night mouth guards provide enough of a layer of protection between the maxillary and mandibular arches, which protect during night bruxation. When suggesting a nightguard, a dentist will usually suggest to their patient use a custom nightguard instead of a generic store bought one, to ensure a more secure and snug fit.



Custom nightguards can range from $300-$500. Some may see this price tag and think, "how can a piece of rubber be worth my hard-earned money?!" Well, the amount of money

being saved over the years from not having to add additional dental visits alone more than justify the cost. The benefit nightguards can provide on a child's occlusion and overall dental health also represent a very worthwhile investment. The likelihood of bruxism decreasing over time is greatly impacted if proper care and preventative measures are taken. Bruxism is not the only reason someone should wear a nightguard to help better protect their teeth while they sleep, however, patients suffering from bruxism who used a nightguard saw their grinding episodes had improved.

The Mayo Clinic indicates that in more severe cases, realignment of the teeth might be an effective treatment in order to minimize the surface contact that can damage teeth. When the effects of bruxism have resulted in a patient having difficulty chewing or experiencing tooth sensitivity or pain, a dentist "may need to reshape the chewing surfaces of your teeth or use crowns. In certain cases, your dentist may recommend braces or oral surgery" (Mayo Clinic).

Other non-invasive therapies such as meditation, massage, psychological counseling, or other stress-reducing interventions that have the potential to reduce bruxism can be highly effective. Furthermore, those with bruxism can also be trained to hold their mouth and jaws in proper position in order to minimize the damaging effects of bruxism (Mayo Clinic).

Typically, medications are ineffective in treating bruxism, according to the Mayo Clinic, however some doctors might suggest the short-term use of muscle relaxants to decrease jaw tension. In severe cases, as noted earlier, a physician or dentist might use botox injections in those patients with severe and damaging muscle-related bruxism for whom other therapies are inappropriate or ineffective (Mayo Clinic).

In their study "Therapies for bruxism: a systematic review and network meta-analysis" Mesko et al (2016) are currently seeking to find out which of the many available therapies including medication, physical therapy, mouthguards, and psychotherapy among others was the most effective in treating bruxism in adults. First, they will investigate the causes of bruxism, many of which are discussed in greater detail in this paper. They have found that smoking, certain medications, and problems with breathing can play an important role in the development of bruxism, however they agree with the majority of the dental literature which indicates that bruxism is primarily "abnormal rhythmic mandibular movements...caused by [the] central and autonomic nervous system (Mesko et al 2016). They note that in the past, stints designed to facilitate "occlusal equilibration" or in layman's terms, the alignment of the upper and lower teeth in an even pattern throughout the mouth did not seem to be effective because they did not address or remediate the root causes of bruxism and instead merely lessened the symptoms that the patient might be experiencing (Mesko et al 2016). Other therapies like relaxation, biofeedback and cessation of caffeine use and relaxation techniques before bedtime do not seem to have any real effect on controlling muscular activity during sleep nor on autonomic activity of the muscles. Are these therapies useless? Not at all, because they are of limited effectiveness in reducing patients' pain and symptoms, however as a long-term remedy, they did nothing about the initial issue. Nonetheless, Mesko et al's research is a stepping stone in the right direction.

Mesko et al are evaluating other therapies that have shown promise in treating bruxism. They note that the combined use of a medication known as Clonidine, primarily used to treat high blood pressure, ADHD, and anxiety disorders along with "mandibular advancement appliances" has been successful at controlling the muscular activity associated with bruxism, however they stress that more follow-up research is needed to truly test the efficacy of this

approach (Mesko et al 2016). Another alternative treatment of note in the study is the use of botulinum toxin injection into the muscles responsible for chewing, however as is the case with other therapies, more research is needed to determine the long-term success rate of this approach as well as more time to collect data on possible negative side-effects, which this paper will explore in greater detail. Mesko et al notes that the most successful treatment of bruxism will be one that controls the patient's pain, reduce tooth wear, and address the root causes of this parafunctional activity. Because as many as one-third of adults have bruxism, therefore it is extremely important for both dentists and patients to be able to choose the best treatment option based on a thorough study of current methods which are "based on evidence and not only on expert's opinion" (Mesko et al 2016).

Mesko et al are in the process of conducting their study using a population of adults who had received a diagnosis of bruxism and compared the effectiveness of soft tissue surgery, medications, botulinum injections, electric stimulation of the muscles, along with other physical and psychological treatments to see which approach, or combination of approaches, produced the best results across a large sample. The considered outcomes will be assessed in terms of primary effects, which they measure in terms of duration and intensity of muscular activity; secondary effects such as improvement in the quality of sleep, quality of the patients' lives, and the level of stress they experienced; taking into consideration the side effects including the cost and time span of the treatment, and how well the patients complied with each of their prescribed therapies (Mesko et al 2016). Ongoing studies like this are vitally important in enabling dentists to make strides forward in the treatment of bruxism. Continuing to develop an evolving body of literature on this disorder, while continuing to search for new and better therapies is extremely important as dental health care advances. As is the case with the treatment of other disorders and diseases, the work that Mesko et al and others are doing might find that combining therapies will provide the most favorable outcome for those suffering from bruxism.

"As laser-bright moments; diamond-hard memories; crisp and clear. A future lived, a future savored" - Robert J. Sawyer

Lasers?

One such innovative new approach is the combined use of low-level laser irradiation and medications to treat the pain caused by bruxism and other dental parafunctional activities.

In their study "Comparative Study of the Physiotherapeutic and Drug Protocol and Low-Level Laser Irradiation in the Treatment of Pain Associated with Temporomandibular Dysfunction" Cavalcanti et al (2016) investigated the use of low-level laser therapy (LLL) and compared it with with the use of "physiotherapeutic and drug protocol" in a population of women between the ages of twenty and fifty who are suffering from bruxism. They found that, indeed, the use of lasers can be helpful in reducing the pain that comes along with TMD, although to address the concerns of Mesko et al

(2016), LLL is better at addressing the symptoms of bruxism and other parafunctional activities than it is as eliminating the causes of these disorders. Cavalcanti et al note that in eight out of ten patients, the pain associated with TMD and bruxism is caused by spasms of the muscles used for chewing which are created by fatigue, stress, and overuse from parafunctional habits initiating a vicious cycle which they and other researchers have tilted the "pain-spasm-pain syndrome" (Cavalcanti et al 2016). As a person experiences TMD pain, he or she tenses the muscles in the affected area, increasing the likelihood of bruxism and igniting more pain. The greater the pain, the higher levels of muscular tension. Cavalcanti et al's thesis is that LLL can relax these powerful muscles, reduce inflammation in the area, thereby lessening the amount of pain that a patient experiences.

In their research, Cavalcanti et al compared a group of people receiving LLL therapy with another who was treated with hot packs three times a day along with medications designed to relax the facials muscles and to reduce inflammation in the affected area. A third group was the placebo group, who received "laser" therapy in the form of a bright halogen light that was not a laser at all and had been determined to have no effect, good or bad, on the pain associated with bruxism and TMD. Each of the women being studied self-reported moderate to severe pain due to bruxism. Their results found that using LLL has a muscle relaxant did in fact significantly reduce the pain that the women in the study group experienced. Cavalcanti et al found that "pain began to decrease at the end of the first week for patients who received LLL" and "more gradually at the end of the second week" for those being treated with hot compresses and medications. As might be expected, those in the placebo group also reported a lessening of their pain, which Cavalcanti et al attributed to "anxiety and depression control" but also found that everyone in placebo group was still having pain at the end of the trial period, while the LLL and heat/medication groups experienced significant reduction in pain (Cavalcanti et al, 2016). They note that while LLL and the heat/medication protocol achieved similar results, LLL treatment is far less expensive and that with the introduction of small, portable home units these cost reductions could be even more dramatic.

"People say I look so happy - and I say, 'That's the Botox" -Dolly Parton

Botox and Bruxism

When one thinks of Botox, one often thinks of an aging movie star trying to cheat time or a "Real Housewife of New Jersey" hoping to fool people into thinking she's the same age as her teen-age daughter. However the mechanisms of Botox that work to remove laugh lines and wrinkles also have serious application in the fields of dentistry and medicine and that includes treating bruxism and other parafunctional habit that cause muscular problems and pain. Botox works by blocking nerve impulses and creating a form of paralysis in the area into which it is injected. Botox is a naturally occurring poison and its paralytic effects are powerful, but temporary, and those using it must receive ongoing injections. The article "An evidence-based review of botulinum toxin (Botox) applications in non-cosmetic head and neck conditions" by Persaud et al (2013) examines some of these uses and sheds light on how Botox can be used to treat bruxism and other causes of TMD pain.

According to Persaud et al, pain from clenching the jaws and teeth is

caused by “chronic nociceptive irritation of the tendons and fascias of the masseter, temporalis and medial pterygoid muscles” (Persaud et al, 2013). Botox, which paralyzed muscles, might well be able to relieve this sort of distress, a theory that Persaud et al sought to investigate. Indeed, they found that the use of Botox proved to very effective in by creating atrophy in certain chewing muscles, in the process relieving a patient’s tension and enabling “decompression of afferent nociceptive neurons through reduction of substance P-mediated neurogenic inflammation” (Persaud et al, 2016). They do warn that Botox must be injected by someone extremely familiar with its effects as it can lead to the unintended consequence of causing a “frozen smile” by paralyzing certain muscles. Persaud et al found that Botox is particularly effective in treating the tension and pain associated with bruxism and is highly effective in reducing “myofascial pain symptoms” in those with bruxism as compared to others in studies who received placebos in the form of saline water injections (Persaud et al, 2016). They conclude that Botox may well be a poison that actually heals rather than killing.

Psychology, Stress, Bruxism and Parafunctional Habits

Stress has been identified as a major factor in developing bruxism and other parafunctional habits. When discussing stress it is important to examine not only its sources but also the effectiveness with which people manage it. Two people can be stuck in maddening rush hour traffic and one can be yelling, screaming, and punching the steering wheel while the other can be completely calm and accepting of the situation as being out of his or her control. Given this it is more accurate to say that stress management plays a significant role in bruxism rather than placing the blame on external stress itself. Because people can build their stress-management skills and coping mechanisms it means they can also play an active role in lessening or even eliminating bruxism and other parafunctional habits that may well be damaging their oral health. A study conducted by Giraki et al (2010) found that those with the most severe cases of sleep bruxism were also those who tended to deal with stress is a non-productive or negative fashion.

As early as 1975 researchers began to notice a direct correlation between bruxism and “ the number of occupational health care and dental visits” and researchers found that “bruxism may reveal ongoing stress in normal work life” (Giraki et al). Interestingly, Giraki and colleagues found that more ambitious, hard-driving people were at higher risk of developing bruxism. Laboratory experiments have found that the “relationship between emotional stress and brux-like activity of...masseter muscles have also suggested a positive correlation” (Giraki et al). Those studied by Giracki et al reported that they were not good at managing stress, and described themselves as being reactive to situations as opposed to being in control. This information provides a great deal of insight into the development of bruxism in all age groups, particularly high school and college students who report that they find themselves under a great deal of stress. Bruxism might well be a product of the fact that although young people do experience stress, they may not have yet had the opportunity to develop the effective coping mechanisms that older, more experienced people have. Having said that, it is clear the people of all ages have varying degrees of stress-management skills, and no one age group is necessarily better or worse at handling the tension that everyone has to deal with in life.

Stress and the inability to effectively deal with it is a major problem among young people

today. According to the University of Minnesota, nearly two-thirds of students in a survey shared that they regularly feel depressed and overwhelmed by their problems, almost half stated they were either mildly or severely depressed, and six percent reported that they had attempted to kill themselves at least once (15minutes4me.com). An article in *Psychology Today* provides similarly sobering statistics. The magazine reports that the UC Berkeley Mental Health Task Force found that nearly half of the students they surveyed had been through a significant stress or emotionally related situation in the preceding year that they believe had negatively impacted their overall sense of well-being as well as their performance in the classroom (Henriques, 2014). A survey of college students in 2013 found that "57% of women and 40% of men reported experiencing episodes of 'overwhelming anxiety'" during the previous year and that "33% of women and 27% of men reported a period in the last year of feeling so depressed it was difficult to function" (Henriques, 2014). When a person is depressed or stressed, he or she sleeps less which, as noted above, directly increases the possibility that he or she will clench or grind his or her teeth at night, and the resulting fatigue might also cause them to unconsciously clench their jaws when they are awake.

Giraki et al set out to scientifically quantify the impact of stress and stress management on bruxism, specifically the hypothesis that the higher the stress and the poorer the coping mechanisms, the higher the rate of sleep bruxism would be. They measured healthy adults whose partners had reported that they grind their teeth while asleep and who had symptoms such as morning muscle pain or fatigue, "abnormal tooth wear or shiny spots on restorations and masseter hypertrophy upon digital palpation" (Giraki et al). They also conducted a psychological survey with the participants in the study which allowed the subjects to self-report the levels of stress they felt in their lives and to self-assess how well they believed they managed their stress. After doing the study, Giraki et al found that, indeed, the more stress that a person reported and the worse that he or she believed they dealt it with, the more severe their levels of sleep bruxism were. They found that those with the highest levels of bruxism also self-reported having the greatest amount of stress in their lives and that "frequent bruxism was both significantly positively associated with severe stress experience and with the number of occupational health care and dental visits" (Giraki et al). Interestingly Giraki and colleagues found that smoking tobacco tended to increase the incidence of bruxism as well as the pain associated with TMD. It is not unreasonable to conclude that although smoking might not directly lead to bruxism, that stressed individuals prone to bruxism might also be more likely to use tobacco as a way to relieve tension. It is clear that for many people, bruxism and other parafunctional habits must be treated from a holistic perspective. If stress is indeed a cause of these disorders, then helping people lead happier, more productive lives can not only improve their dental health but their overall sense of health and well-being.

"Optimal functioning of the immune system, it turns out, is dependent upon feeling good."
-Marcey Shapiro

Poetic Reflection on Bruxism

Like all health issues, bruxism and other parafunctional activities are also fascinating from a holistic perspective. Dental issues are not often viewed through the eyes of a poet,

however physical problems relate to a person's mental and spiritual health, and indeed many works of art have been created by artists dealing with pain and disease. Furthermore, art reflects on what it means to be a human and to consider the meaning that life has, if any, in the face of death. Teeth decay as just like bodies do, over time human being's spark get worn down through stress, tension, and the simple process of being alive. Given this, a selection from "The Uses of the Body" by Deborah Landau who is the Chair of NYU Creative Writing helps us look at bruxism from a broader perspective.

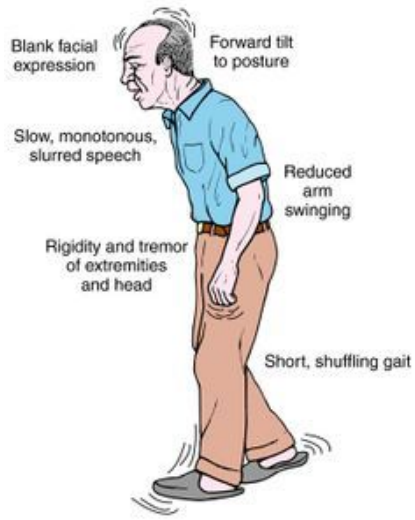
Landau writes of the cycle of life, and of the way that nothing is permanent. She shares that, "Before you have kids,/you get a dog./Then when you get a baby,/you wait for the dog to die./When the dog dies,/it's a relief" (Landau). Landau explores the human experience through relatable everyday occurrences. Just as humans have succedaneous teeth (baby teeth) that give way to their secondary or permanent teeth, they also must learn to shed off different chapters of their life as the flow of time moves unceasingly forward. Landau notes that as soon as person's babies grow up, they begin to long for a dog again. However, she then relates the aging experience directly to the decline of the body. She notes that in mid-life, death has already begun to take hold. Landau observes that "The organs growing older in their plush pockets/ticking toward the wearing out/We are here and soon won't be" (Landau). Succedaneous exist for a while and then they do not, even secondary teeth mistakenly referred to as "permanent" eventually wear down to nothing and cease to exist. Given Landau's insights, it seems that one's teeth are a valid metaphor for one's life: eventually we all wear down and even those things we think of as being permanent are in fact only temporary.

Why is this important in a research paper on bruxism? At its core, all of healthcare is dedicated to healing disease and preserving life. Many people are surprised to learn that certain dental issues can be fatal, from infections that get into the bloodstream to the presence of bacteria that can destroy cardiovascular health. As Li et al note in their paper "Systemic Diseases Caused by Oral Infection" research clearly shows that the "oral cavity can act as the site of origin for dissemination of pathogenic organisms to distant body sites" and that "often fatal systemic disease...has been associated with dental diseases and treatment" (Li et al). Given this, dentists are among those healthcare professionals who sometimes walk the boundary between life and death, and can help people control the rate at which they and their teeth decay. Given this, I believe it is very important to remember that dental care is about more than just flossing and eliminating decay, in a way, the dentist is helping the patient deal with the inevitable erosion that life brings. Furthermore, even though physicians and dentists are first and foremost scientists, it is important that they remain artists and philosophers as well. There is nothing more powerful than the human urge to survive, and in many ways those in the medical fields are like modern day shamans-- they control the magic powder and potions, the specialized tools, the rehearsed rituals that can fend off death and protect life.

I believe that considering poetry like that written by Landau is an important component of studying bruxism and other health concerns. While day to day maintenance is important people and their dentists are involved in a much larger, more consequential struggle: life vs. death. It is important for us to take this quest seriously and to spend time looking within ourselves, seeking out the wisdom of others, and turning to artists like Deborah Landau as part of this important process. At its best, science has a soul; the greatest scientific minds never lose a sense of wonder and awe at the world they are studying and know that as great as their knowledge may be, it is dwarfed by what they do not--and may never--know. It is through this

that dentistry intersects art and poetry. Poets embrace the mystery of life and human existence, and strive to communicate what they find on their intellectual adventures to others. Many people say they do not "understand" poetry or art. Although studying these forms is important, I have noticed that many musicians and other types of artists hesitate to share the "meaning" of their work, and instead ask the viewer, listener, or reader to consider the thoughts or emotions that the work stirs within them. I want to be a great dentist, one who thoroughly understands the technical and scientific aspects of the discipline, yet at the same time is a person who looks more deeply into what is happening and understands the importance of dealing with such mysteries as life, death, disease and health.

Bruxism in the Elderly



Although research supports the idea that bruxism decreases in frequency and intensity as people age, the fact is that bruxism and other parafunctional activities represent a significant problem for many senior citizens. In addition to the problems that people with bruxism of all ages face, seniors with bruxism must also often contend with loss of bone density, chipping of teeth, and overall physical deterioration that can amplify the negative effects of bruxism. When bruxism results in tooth chipping or loss, the effects on an aging person can be significant. Although repairing or replacing a damaged or missing tooth is a rather routine procedure, many seniors cannot afford the procedures or have other conditions that make such interventions difficult or even impossible. A missing tooth may be primarily a cosmetic concern with a younger person, however poor dental health can be devastating for seniors, affecting their ability to chew food, impacting their nutrition and therefore harming their overall health.

Of particular concern are those adults with bruxism who are also dealing with the many challenges of Alzheimer's disease and Parkinson's disease. In the journal article "Awake bruxism in a patient with Alzheimer's dementia" Lai (2013) examines the way that bruxism manifested itself in the life of an elderly person suffering from Alzheimer's.

Lai details the case of a 79-year old Italian man who had been experiencing twenty-four months of progressive memory loss that was clinically "consistent with moderate dementia of Alzheimer's type" and accompanied by "increasing apathy, new alcohol demand, visual hallucination of animals in the evening and a constant audible teeth grinding in the day, which distracted him from social interaction" (Lai, 2013). These symptoms of bruxism in Alzheimer's patients are relatively common. As is the case with many such patients, tomography using ultrasound to reveal the layers of his brain showed that he was experiencing cerebral atrophy that was consistent with both his age group as well as others with Alzheimer's. His manifestation of bruxism was causing problems that were made worse by the progression of his Alzheimer's. Lai shares that the man's symptoms lessened when he was eating and talking to others, however he was still experiencing a great deal of "phasic teeth grinding" and severe wearing of his teeth.

Furthermore, his increasing use of alcohol was also contributing to his bruxism. A further discussion of the use of alcohol and other substances will follow within this paper.

In addition to experiencing bruxism, the patient was also experiencing hallucinations associated with his Alzheimer's that was alleviated by him stopping drinking and taking a drug known as risperidone, a psychotropic medication (Lai, 2013). Another medication called Galantamine that is frequently prescribed for patients with dementia also significantly reduced the patient's bruxism, an occurrence that Lai notes might indicate a "dual benefit" for the drug, while also observing that "evidence of its direct effect on symptom relief is insufficient in the presence of alcohol use, which is a known risk factor for awake bruxism" (Lai, 2013). Lai notes that bruxism is the result of complex interactions of a diverse set of the body's neurotransmitters and that a "central role of the dopaminergic system in awake bruxism" came from observing patients suffering from Parkinson's disease and the favorable way that they responded to "dopaminergic medications" (Lai, 2013).

At this point you might be feeling like you're reading from a medical journal rather than learning from an informative essay aimed at lay people. You're not alone. When I started reading about "dopaminergic" systems and medications, I only had the most general sense of what Lai is referring to. Allow me to explain a little more clearly. The body's dopamine system is an organization of nerve cells that being in a person's midbrain. In essence there are three primary networks of the dopamine system. One extends to the frontal cortex of the brain where it oversees cognition, and both thinking and functioning memory (Cold Spring Harbor Laboratory, 2017). Another branch of this system, the one that is involved in Parkinson's disease, goes to the part of the brain that controls muscular movement. This system is disrupted in a person with Parkinson's, which is why their movements become shaky and uncontrolled. The third part of the dopaminergic system goes to the brain's limbic system which is in control of emotions. Because bruxism is, in part, the result of uncontrolled muscular impulses it is connected to these neurotransmitters, and therefore drugs that can help control muscular spasms and movements can also be beneficial in alleviating bruxism. For seniors who have conditions like Alzehimer's and Parkinson's these medications can provide some form of relief, even if that is not the initial intended use.

As noted above, bruxism and other dental problems are also frequently found in elderly patients with Parkinson's disease. Outside of the pain and tooth damage that bruxism can cause in people dealing with these types of serious condition, poor dental health can directly affect the amount and quality of the food the sick person consumes, weakening them, and increasing their vulnerability on a number of fronts. As Dr. James Noble, Assistant Professor of Neurology at Harlem Hospital Center and the Columbia University College of Physicians & Surgeons notes, maintaining good dental health often requires "muscle-eye-coordination, digital dexterity and tongue-cheek-lip control. Tremor and the associated loss and/or lessening of the above faculties mitigate against effective oral hygiene procedures" (Noble, 2017). People with neurological diseases like Parkinson's can find this particularly challenging. Furthermore, the compromised physical condition of Parkinson's patients can make it more difficult for a dentist to perform a thorough and effective examination. Bruxism can be a particularly challenging issue in elderly people with Parkinson's (and Parkinson's patients of all ages). People who have Parkinson's disease often receive medications like levodopa to treat their conditions. Although some

medications like risperidone and Galantamine can actually alleviate bruxism to varying degrees, levodopa and other drugs can results in patients developing "dyskinesias" or impaired voluntary movements that result in bruxism, creating further problems for the sufferer (Noble, 2017). If bruxism or other parafunctional activities result in excessive tooth wear to the point that tooth restoration or other oral surgery is required, Noble states that these remedial procedures should ideally take as soon as possible before the patient's dental, and overall, health declines to the point that such surgeries become more difficult or even impossible to perform.

Drug Addiction, Alcohol Use and Bruxism/Periodontal Health

The abuse of alcohol and other controlled substances is global health issue. Abuse and addiction wreak havoc on lives, run up health care costs, and negatively impact the health of individuals. The use of alcohol and controlled substances can directly affect an individual's oral health and play a significant role in parafunctional activities, tooth wear, and tooth decay. Use of heroin is often associated with tooth decay and missing teeth, marijuana use can result in acidic erosion of tooth enamel due to a condition known as "cannabinoid hyperemesis" in which the user experiences repeated vomiting that exposes the teeth to corrosive digestive juices and chemicals, and methamphetamine use often results in what is known as "Meth mouth" or "large carious lesions in buccal smooth surface areas and fractured teeth due to increased motor activity" (Saini and Prabhat, 2013).

In layman's terms, this means that meth users have often manic, frantic energy that can manifest itself in teeth grinding, aka bruxism, leading to an increase in all the negative aspects of this parafunctional activity. Many users of methamphetamines and other substances experience significant tooth wear and loss, directly due to substance-induced bruxism. This photo, from toothandteeth.com shows the extensive damage that can occur from meth-induced bruxism and tooth decay associated with abusing this substance and from neglecting to regularly brush the teeth and/or lack of regular dental care. This is one of the many devastating side-effects of drug and alcohol use, as I will continue to share.

One might ask how people addicted to methamphetamines and other drugs can withstand the pain associated with this kind of advanced tooth wear and decay. The answer lies in the nature of the drugs themselves. Drugs like opiates numb pain and therefore, the abuser can suffer extreme consequences from bruxism and decay without receiving the body's warning systems that something has gone seriously wrong (Saini and Prabhat, 2013). Furthermore, when one abuses alcohol and other substances, one often does not receive adequate nutrition, thereby further increasing the body's inability to repair or protect damaged teeth and other parts of the body. Research shows that 21% of alcoholics are malnourished and that even more of them have irregular eating patterns that are associated with dental disease (Saini and Prabhat, 2013) In

addition to these negative outcomes, research shows that bruxism is a very common side effect of drug and alcohol abuse and research shows that abusers have the "habit to grind or clench teeth together and felt pain or tenderness in the jaw muscles or joints", in other words, the classic symptoms and effects of bruxism (Saini and Prabhat, 2013).

One of the problems that dentists and other health-care professionals face when trying to treat bruxism and other parafunctional activities in alcoholics or substance abusers is their inability to show up for regular appointments and/or inability to pay for the medical and dental services that they receive. This means that for many substance abusers, conditions like bruxism and tooth decay are often undiagnosed and therefore completely untreated. Even when medical professionals can address these needs in substance abusers, they can face challenges that are different than those found in mainstream patients. Because abusers have frequently built up tolerance to drugs, the anesthesia or analgesics that dentists and others offer may be ineffective. Many substance abusers have damaged their livers by long-term use of alcohol or other drugs, a diseased liver "is unable to store adequate levels of vitamin K and the conversion of vitamin K to coagulation factors is reduced" (Saini and Prabhat, 2013).Therefore, many alcoholics and addicts are prone to excessive bleeding during dental procedures. In addition to increased prevalence of bruxism and rotting teeth, the use of substances like alcohol and tobacco are directly linked to higher incidence of oral cancer, which can further complicate treatment. Dentists must obtain a complete record of which drugs or substances a person has been abusing, to the extent it is possible, in order to be aware of problematic interactions between those drugs and medications that the medical professional might prescribe or utilize.

"It provokes the desire, but it takes away the performance/Therefore, much drink may be said to be an equivocator with lechery." Macbeth (II.iii.29-30)

This line from Shakespeare's "Macbeth" describes one of the many effects alcohol has on the human body. In this context, the Porter tells MacDuff that although alcohol can make a person desire sex it also limits a person's ability to perform in a way that matches his or her desire. In this sense, the Porter explains, alcohol is a double-edged sword; it can provide what appears to be benefits, but at the same time can cause unseen harm. This is true of many aspects of alcohol. It can a loosen a person's social inhibitions, but too much can lead to a person acting or saying things that are inappropriate, ultimately damaging those social relationships. People can use alcohol to reduce stress, but when a person drinks too much it only increases the stress that a person experiences. Some people drink in order to sleep better, but research shows that drinking actually reduces the quality and duration of sleep.

This contradictory aspect of alcohol has direct application to the topic of bruxism. Recently a research team investigated the possible associations between "sleep bruxism (SB) and alcohol, caffeine, tobacco, or drug abuse" (Obesity, Fitness & Wellness Week, 2017). Using a variety of diagnostic tools, scientists hoped to gain a greater understanding of the relationship between these substances and instances of bruxism. The study found that the odds for developing sleep bruxism doubled for those who used alcohol when compared to those who did not. However, the study also concluded that "there is still a need for stronger evidence based on studies with greater methodological rigor" (Obesity, Fitness & Wellness Week, 2017).

"It is not true that the wind's problems and mine are so different" Juan Carlos Galeano

Subjective Values Associated with the Treatment of Bruxism

When considering issues like bruxism and other parafunctional habits, it might seem incongruous to bring up the idea of values. The same is true of discussing counterclaims. Isn't treating bruxism a fairly black and white issue? How can there be dissenting or disagreeing voices when the subject at hand is the treatment of a medical/dental disorder? The truth is medicine and dentistry do not deal in absolutes, and both rely on bodies of knowledge that are changing and evolving. Furthermore, neither of these practices lies outside the realm of human perception, choice, and error. Doctors and dentists are human beings and as such apply conscious and unconscious values to their work, as do the patients who come to them seeking treatment. These values directly shape the experience and quality of health care, and also affect the outcomes of various types of treatment for conditions like bruxism.

In the past, people often viewed dentists and doctors as being infallible "superhumans" possessing a special realm of knowledge skills. In this way, they were almost like modern shamans or so-called witch doctors. Today, empowered by the internet, patients are often more familiar with their disease and treatment than they were in the past, however they still--often correctly assume the the health care practitioner is the ultimate authority. True, these professionals have a working knowledge of the latest treatments, breakthroughs, and can draw on their own experience to provide outstanding care in most instances. However, there is a subjective element at work in parafunctional activities that are linked to stress. Furthermore, what does the term "healthy" mean? For some it might mean a condition in which one is totally free of detectable disease, to others it might mean the ability to go about one's daily business regardless of what conditions might inhabit one's body. In order to provide the best possible care for patients, dentists and doctors must take time to reflect on their own definitions of such terms and understand that they are not universal in their application. For example, one patient might simply seek cessation of pain and consider himself or herself "cured" while another might want more active intervention to address the root causes of his or her condition. Health care providers must consider the totality of the person they are treating and the specific circumstances of his or her life and condition. Dentists and doctors must continue to act within the bounds of proven, scientific medical research and treatment, but still understand that their own perceptions and attitudes might bias their treatment for better or worse.

A closer examination of this reality helps illustrate the way that quality health care is both art and science. Clinically speaking, bruxism is a problem because it can lead to pain, attrition, and muscular imbalances (Chirillo, 2016). Other literature states that parafunctional habits are accurately described as being "habitual exercise of a body part in a way that is other than the most common use of that body part" (Orthodontists Associates of Western New York). This seems to be fairly straight-forward information that one would be hard pressed to dispute. However, that is not the case. What does it mean for a body part to have a "common use" and is anything outside that common use indicate a need for treatment or intervention? Ears are for hearing and yet people also use them to display jewelry that makes a statement about their

character and identity. The mouth is used for intake of food and respiration, but chewing tobacco does not fit into either of those categories. Although it is an unhealthful practice, does that mean that in and of itself it is not "natural" or "intended?" When considering gender these questions become even more pointed. What defines male or female? Genes? Culture? Societal traditions? The same willingness to accept flexibility and differing perceptions is important in treating patients with bruxism and other conditions.

How does this directly apply to bruxism and other parafunctional habits? That is an outstanding question, and one which is worthy of deeper consideration. The first step is to realize that conditions are personal and subject to degrees. Does a person with severe pain and attrition merit the same treatment as a person who only has mild bruxism to the point that he or she might not be aware of it at all? Can the person with mild bruxism even be said to have a condition if it's not harming him or her and is not affecting his or life or health in any way? In some cases, perhaps the best treatment is none at all, which often goes against the training that doctors and dentists receive. In medicine, there's a type of infection known as nosocomial. This is an infection that a person acquires while he or she is in the hospital. The irony of this is vivid and tragic; a person goes to the hospital to get well and ends up catching something that might be worse than what he or she was originally being treated for. A broader term for this type of infection is Hospital Acquired Infection or HAI. According to the Centers for Disease Control and Prevention, in 2011 there were 720,000 HAIs in American hospitals and "about 75,000 patients with HAIs died during their hospitalizations. More than half of all HAIs occurred outside of the intensive care unit" (Centers for Disease Control and Prevention, 2016). It is not an exaggeration to say that for 75,000 people the cure was worse than the disease.

This is not meant to place the blame on caregivers for these statistics. Accidents happen and medicine, although more advanced than ever, is still imperfect. Furthermore, there are simply factors outside a doctor or dentist's ability to control. An operation can be a success and that patient can still die. As Tennessee Williams said in his poem "To the Lake", "Death was in that poisonous wave, And in its gulf a fitting grave" (Williams). Poisonous waves can strike us anywhere at any time, even in a hospital or doctor's office. This is simply a sad fact of reality. Not all treatments gone wrong end with such tragic results. Despite this, doctors and dentists must examine their values and seek to apply the best possible treatment for conditions like bruxism. Sometimes the conventional wisdom doesn't apply to a specific patient or case, and sometimes the best treatment truly is none at all. This applies to bruxism and other parafunctional habits.

Consider the current standard of treatment for bruxism. As discussed earlier, the therapeutic tools that a dentist can employ include medication, physical therapy, psychotherapy, and mouthguards. One patient reports that her dentist prescribed a mouthguard for her bruxism which reduced attrition, but did nothing to stop the cause of her bruxism. One dentist shares that mouth guards can actually cause problems like open bite, and that even though they can prevent wear on teeth, they don't protect against jaw damage and pain, muscular ache; other sources indicate that bruxism might not even be a condition unto itself, that it might be a symptom of obstructive sleep apnea in many patients, as noted in this paper (Ask the Dentist). There is evidence that "stress" causes bruxism, but what is "stress"? The definition of stress varies greatly from person to person, and yet too often the medical community treats individuals as if they are all the same. Dentists must consider these counterclaims and also take a candid inventory of their own values. Giving a person with sleep apnea a mouthguard to prevent teeth grinding is no

treatment at all, and a person who is "stressed" might find better relief from taking up a hobby or changing jobs. Furthermore, sometimes treatments like mouthguards create more damage than they prevent, even though there are thousands who benefit from their use.

Dentists must do everything within their power to effectively treat patients, however that means both inner and outer reflection. They must understand their own values and biases, and treat people as the individuals they are. One size fits all might be true of socks, but it certainly no standard to use in healthcare when people's lives, happiness, and quality of existence are at stake.

Patients Dealing with Bruxism

"I lived in the present, which was that part of the future you could see. The past floated above my head, like the sun and moon, visible but never reachable" - Landscape by Louise Gluck

As is the case with anyone dealing with a medical issue or health concern, people with bruxism and other parafunctional habits live simultaneously in the past, the present, and the future. Louise Gluck's words remind us of this aspect of the human condition, one that seems more pronounced when one is in crisis. A person facing disease can't help but gaze into the past and wonder. Should I have seen this coming? Could I have altered my habits and either delayed or prevented the onset of this disease? Am I responsible for what has happened, or is my illness or condition a function of my genetics or normal wear and tear on the body? The person experiencing a health crisis also lives completely in the present; pain and discomfort have a way of commanding a person's attention and focusing it on the here and now. Often a patient's days are filled with trips to various specialists, researching his or her disorder looking for answers, adhering to medication schedules, and trying to find relief from his or her symptoms. A person with a health challenge cannot help but look to the future. Will I someday be healed or is this condition going to worsen? Is it something I will have to live with for the rest of my life? Are there new treatments or medications on the horizon? And perhaps the most consuming question of all: am I going to die from my disease or condition?

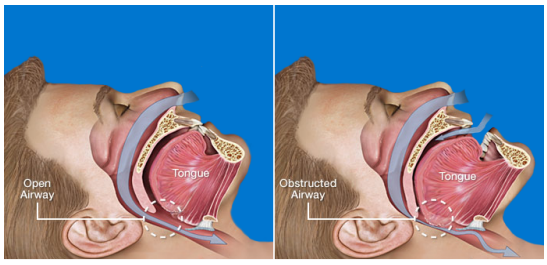
Fortunately for those who have it, bruxism is not a fatal condition so some of these fears of the future are easily set aside. However, patients cannot help but wonder if their bruxism and other parafunctional habits can be more successfully treated; in the present tense they seek relief and try to establish new habits that will make their future brighter. One of the most empowering things that a patient can achieve is a sense of self-control. When ill it is easy to feel like a victim, a passive person whose fate is completely in the hand of doctors and destiny. When people begin to understand that they can play an active role in improving and maintaining their own health, suddenly tomorrow seems a great deal brighter and the struggles of today begin to be viewed as temporary. In my goals as a dentist, it is important for me to establish a sense of a partnership with my patients. Yes, I am there to help address their dental needs and to repair damage where I can, but it is their responsibility to perform regular dental hygiene and to take responsibility for their dental and overall health. The truth is that most of the problems that dentists treat would simply not exist if a patient was vigilant about brushing and flossing. This, of course, does not

extend to issues like bruxism, but the underlying assumption is still valid. The more a person addresses their own health and takes proactive action to remain healthy, the better their prospects are for a better and happier life today and tomorrow. The future begins right now, and when people understand this they become active players in their own well-being.

I spoke with patients dealing with bruxism and other parafunctional activities, heard about their conditions, and discussed not only current treatments but also their role in maintaining their health. I found that the people I talked with had a very strong desire to act on their own behalf, to follow the dentist's instructions, and to do whatever was in their power to effectively manage their conditions. I found that several of them had already actively researched their condition on the internet, and were very familiar with the current treatments and protocols. This enabled us to move quickly through the "Bruxism 101" aspect of the conversation and instead begin dealing with the specifics of their conditions and how best to deal with them.

Bob- Bob is a middle-aged man, in very good overall health, who is energetic and optimistic. He is a very friendly, verbal person and getting him to talk about his dental issues was an easy task. Although Bob states that he has taken "relatively good care" of his teeth over the years, he has several fillings, and two crowns on his lower first and second molars. He shares that even though now he flosses and brushes regularly, as a younger man he was not so vigilant and believes that had he taken better care of his teeth in his youth, he wouldn't have needed crowns later in life. He had his wisdom teeth removed when he was a teenager, and had a root canal about seven years ago which he described as being "less of a pain" than he anticipated.

Recently, Bob has noticed a clicking sound in his temporomandibular joint (TMJ). He has never experienced this before, and first noticed it just several months ago. He has no pain associated with this, only a clicking sound that lessens or worsens as he repositions his jaw. He says that when he either thrusts his jaw forward, or retracts it, the clicking stops. He shares that 25 years ago a dentist commented that his jaw was slightly out of alignment, however Bob never did anything about it and has experienced no difficulties with it in the ensuing years. As is the case with many patients, Bob has researched his symptoms on the internet and believes that it is possible the issue will resolve itself over time without treatment. Even though I am still a dental hygiene student, I told Bob that I believe he might have TMD (Temporomandibular Joint Dysfunction) and that he should discuss with his dentist at his next regular appointment. Many people live in denial about medical and/or dental concerns and often delaying treatment or procrastinating about getting a professional opinion gives the condition a chance to deteriorate and forces the patient to go longer without receiving beneficial treatment.



Non-Obstructed Airway Obstructed Airway

Bob also shared that he has obstructive sleep apnea, and has been using CPAP for the past five years. He is not aware of nocturnal teeth grinding and claims that his wife has never noticed it, or mentioned it to him if she has. Even though Bob doesn't know if he has bruxism or not, the fact that he seems to be developing TMD is a strong indicator that he is clenching his jaw or grinding his teeth at night. In terms of other parafunctional activities, Bob shared with me that he bites his thumbnail when he is

thinking or stressed and that when he was a child he bit his nails quite severely, a habit that he was only able to overcome as a young adult. He also told me that he chews his tongue from time to time, and has been told several times over the years that he has a scalloped tongue. Although nail biting and tongue chewing, technically known as Oral Frictional Hyperkeratosis, are not indications of bruxism or TMD, it is related to emotional stress which can also contribute to bruxism. As one researcher notes, "Patients with persistent cheek and lip biting habits tend to have increased stress and psychologic disorders" (Tapia). Even though Bob is rationalizing that his TMD will hopefully go away on its own, from
talking to patients like Bob, I've learned that even patients who are self-informed about their symptoms would still receive enormous benefit from discussing possible treatment options with their dentist.

Marina- Marina is a twenty-four year old woman getting her master's degree in Psychology while working part-time as a kindergarten teacher. She is a thoughtful, introspective person, who is very intelligent and has a good sense of the way her mind works, not surprising for someone with plans to become a Marriage and Family Therapist. She has enjoyed good dental health throughout her life, has only has two cavities, and aside from having braces when she was an adolescent has had no dental issues to speak of. I met her socially and when she heard about this class and the paper I was writing, told me that she is concerned that she might have nocturnal bruxism. She reports that her roommate has not noticed anything unusual, but when she wakes up in the morning she has jaw pain and sometimes an accompanying headache. She sees the dentist regularly and he has never commented on tooth wear, but as I described the profile and symptoms of a person with bruxism, she said that she believes she possibly fits the criteria.

In addition to the jaw pain and headaches, she has noticed that she is experiencing difficulty eating certain types of foods such as apples, or large sandwiches that require her to fully extend her jaw. So far the pain has not been severe, but she has noticed that this is occurring more regularly in the past several months and has also noticed a sense of fatigue in her jaw muscles when chewing. She has a history of parafunctional habits such as biting her nails when she was a child, and reports that she currently catches herself chewing on her pen at work or in class when she is feeling anxious or stressed.

Based on my interview with Marina, I believe that she is not currently experiencing any problematic symptoms from bruxism, and told her that although she was right to be concerned, she shouldn't worry too much. However, I also stressed that it was important for her to keep paying attention to her symptoms and, in any event, to discuss what's been happening with her dentist the next time she has an appointment. I told her that there were a number of treatment options available, including coping mechanisms for stress. As a Psychology student, she really sparked to this idea and was encouraged to know that her bruxism, even if she does have it, might be managed simply by employing relaxation techniques and taking care to unwind before going to bed at night.

It was interesting interviewing both a younger and older person at different points in their lives and in their possible bruxism. As Gluck notes, we all go through different seasons and that

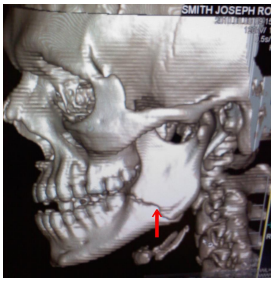
being aware of the passage of time and the relationship between the activities of today and the consequences of tomorrow can be very powerful in terms of staying happy and healthy.

Athletes, Broken Jaws, and Dental Issues

"The girls turning double-dutch bob & weave like boxers pulling punches, shadowing each other, sparring across the slack cord casting parabolas in the air." - Gregory Pardlo

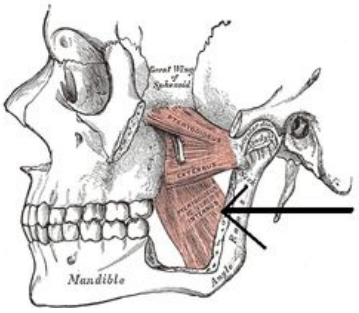
Jonathan is an athletic 22-year old who has participated in sports all his life. In high school, he was a starter on the varsity football team and also was a top-ranked wrestler. Although he was a talented athlete, he didn't have the skills or desire to play competitively in college, however he still works out regularly and stays in very good shape. As part of this, Jonathan began doing Tae Bo-style workouts that are based in part on boxing moves and exercises. Jonathan found that he enjoyed the sport and he began to taking boxing lessons. Although he didn't like getting hit, he did enjoy the strenuous exercise and says that he became as fit as he had ever been in his life. Then, one day while sparring with a fellow student, everything changed.

Despite the fact that he was wearing protective headgear and mouth guard, his opponent landed a punch on Jonathan's jaw that was so hard that immediately Jonathan knew that something was wrong. Jonathan remembers that it was just another ordinary day, and he was pleased with how well he was progressing in his training. For a moment it seemed he had the upper hand while sparring with his partner. Suddenly, that all changed when his sparring partner landed a devastating blow to Jonathan's mandible. Jonathan realizes that he had dropped his guard and wasn't completely focused on what he was doing. He said that after the blow landed he felt like one of his teeth had exploded in his mouth. When he realized he had blood in his mouth, the teacher quickly called an end to the session and inspected Jonathan's mouth. When he tried to open Jonathan's mouth, Jonathan experienced excruciating pain and they both began to suspect the worse. A trip to the emergency room confirmed their worst fears: Jonathan's jaw was fractured.

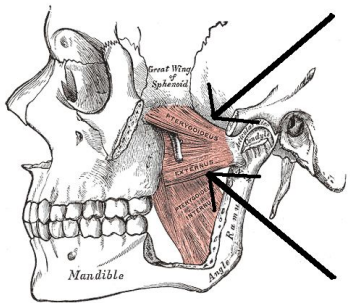


After setting the bone, the doctors wired Jonathan's jaw so that it could heal properly and prevent further damage from certain movements. For the next six weeks, Jonathan ate almost all of his meals through a straw, giving him a weight loss program that he wasn't expecting. Jonathan, who was already very fit, lost about twenty pounds during this time. One of the unexpected aspects of his recovery, Jonathan shares, is the feeling of claustrophobia he got from having his jaw wired. Sometimes he felts as if he was trapped, and would often wake up at night in a panic from having a dream that he was being suffocated and couldn't breathe. Being unable to work out and continue his daily activities, Jonathan also became somewhat depressed, something he says he had never experienced before in his life. Even communicating with people became a chore, especially because Jonathan says that almost everybody he would meet would ask him what happened to his mouth and would want to hear the entire story. Jonathan says at one point he almost considered printing up an explanation of his injury just so that he could hand them out to

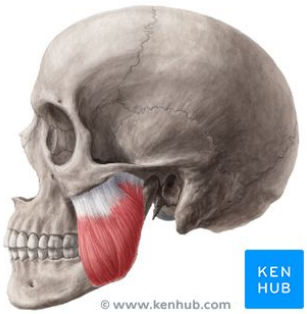
the curious people that he would meet. He also had to endure lectures from his parents about choosing his sports more wisely and promising them that he would no longer participate in any type of contact sports after his jaw had healed. After a while, Jonathan found he was able to lift his spirits by resuming his weight training and doing light running. This also helped him fall asleep at night despite the discomfort from his jaw.



Medial Pterygoid Muscle



Lateral Pterygoid Muscle



Masseter Muscle

When Jonathan's jaw was healed and the wiring removed, he found that he still had a period of recovery to live through. His masseter muscle, medial pterygoid muscle, and lateral pterygoid muscle had atrophied and he also experienced malocclusion (in layman's terms his teeth were out of line) because his jaw had healed in a slightly different position than it was prior to the injury. He also experienced a great deal of pain that he was not expecting. The dentist advised him to wait a few weeks to let the muscles readjust, however over the next month, Jonathan's pain continued and his malocclusion also did not get better. When Jonathan went back to see him, the dentist gave Jonathan some muscle-relaxing drugs which provided some relief. To treat Jonathan's malocclusion, the dentist recommended that he consider oral surgery, although he told Jonathan that he could possibly benefit from a prosthetic device. Jonathan didn't want to have surgery, however he did want relief from his nighttime pain and jaw clenching, problems that he had never experienced before his injury. After talking things over with his parents, Jonathan decided to try the prosthetic mouthpiece first and if that didn't work, then he would consider having surgery.

The mouthpiece that Jonathan used was similar in design to those that dentists prescribe for those suffering from bruxism. The prosthetic was made out of plastic that was specifically molded to Jonathan's mouth. The goal of the mouthguard was to protect Jonathan's teeth from the attrition associated with bruxism and to further relax his muscles of mastication that might allow his jaw to resume its former position and relieve his malocclusion. Jonathan wore the device every night, and after a week of adjustment in which he would want to take it out, he habituated to having it in his mouth. Jonathan's dentist also advised him to try to avoid other parafunctional activities such as biting his nails or chewing on a pencil as these would only hinder his recovery.

The dentist also gave Jonathan some exercises to do to continue strengthening them into proper alignment. Such exercises have been shown to have significant therapeutic benefits; as English and Olfert (2005) note, "exercise in combination with high-pull headgear produced significant reductions in the ANB and gonial angles and mandibular autorotation" (English and Olfert, 2005). For the layperson, this means that exercises work and, in many cases, help the jaw

to return to its optimal functioning position. Although Jonathan did not use headgear, he believes that these exercises helped him experience dramatic improvements in his malocclusion. This is consistent with the research findings which show, "Mastication exercises in conjunction with concentrated vertical control seemed to reduce aberrant vertical growth patterns in the patients" (English and Olfert, 2005). Jonathan's story is relevant to many people, particularly active ones because he was injured even though he had taken precautions such as wearing a mouthguard and participating in his sport under the proper supervision.

Fortunately, non-surgical interventions worked well for Jonathan and he no longer suffers from the pain, muscle tension, or nocturnal jaw-clenching that he was experiencing as a result from the trauma to his jaw. Gregory Pardlo's vivid description of young girls immersed in a playground game bubbles with energy and vitality. Pardlo describes them both in humanistic terms as "boxes pulling punches" and expressions of mathematics in nature as the girls shadow each other and cast parabolas. It is ironic for people like Jonathan that an activity that expresses physical strength and is supposed to provide benefits instead leads to significant health set-back. The dynamism of Pardlo's poem speaks to this and suggests that even in the face of risk, people must push themselves and dare to cross the boundaries that might otherwise be self-built fences. Jonathan was like these girls, full of life and energy, and even though this activity ended in a physical challenge which caused him to lose weight, strength, and emotional stability, I think he would say that he ultimately emerged from this situation as a stronger individual. He learned that he has the ability to overcome great adversity and even though he has decided not to engage in contact sports, he has developed a toughness that being punched by another person could never instill in him. With the help of dentists and other medical professionals, Jonathan had the opportunity to gain the benefits of this experience while experiencing only temporary pain and discomfort. Even if he had not fully recovered from this injury, it seems that he would have still discovered new aspects of his character and found an internal resilience that he might otherwise have never discovered. As an aspiring dentist, I want to be completely aware of these facets of health and recovery. I might be able to one day heal jaws and repair fractured teeth, but I also want to be a catalyst for internal growth in the people that I treat and help them recognize that no matter what might happen to them, they have the power to experience as a positive occurrence in their life, even if that life is totally different than it has ever been before.

Dental Care and Treating Bruxism Among the Needy

"At me, thy poor, earth-born companion An' fellow-mortal!" -Robert Burns

When the poet Burns wrote these lines in 1785, he was communicating an idea that it is as timeless today as it was when he put pen to paper. America is by and large an affluent country, and typically we take things that are considered luxuries in certain parts of the world for granted. We expect that by turning a faucet, we will receive affordable, clean, drinking water. When it is hot and humid outside, we step into an air-conditioned building for relief. Our odds of contracting food-borne or waterborne diseases is very small, and if we do we can almost always be treated quickly and effectively. Most of us have access to so much food that we need to regulate our intake, getting fresh fruits and vegetables and healthy meat rarely presents a challenge for most Americans. However, this is not the case for millions of people around the world and even in our own country. From our perspective of comfort and plenty, it is often too

easy for us to completely overlook the truth that thousands of people in our own city still suffer from not having enough money to cover life's necessities, let alone "luxuries" like quality healthcare. We walk down the streets, often oblivious to their needs-- if we see a homeless person we either move more quickly to get past him or her or even cross to the other side of the street.

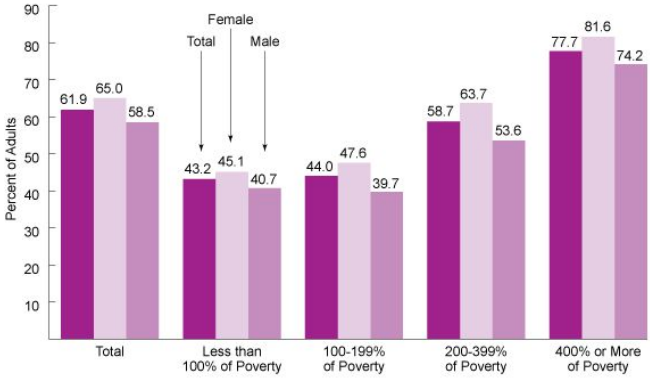
As Burns notes, when we behave this way we diminish our own humanity. Even those of us who believe we are leading secure lives are sometimes only a bad break or two from suddenly having to worry about where our next meal is coming from or finding ourselves unable to pay the rent. We are surrounded by "earth-born companions" of all races, genders, and socioeconomic levels and as Burns reminds us they are fully our "fellow mortals", nothing more, nothing less. As an aspiring healthcare professional, I take very seriously the responsibility to treat all people, regardless of their bank account. There are plenty of social programs and aid available to those in need, and these are very important. However, we can never pretend that this sort of welfare absolves us of our individual responsibility to be compassionate to the less-fortunate around us. Inspired by this idea, and the words of Robert Burns, I set out to research more about how the dental needs of lower income people are being met, and how a poor or homeless person dealing with bruxism and other parafunctional habits might find the same relief that wealthier people have access to.

I come from Los Angeles, California and one of our family friends, who I will call Dr. J (at his request) who lives there is a dentist and is one of my role models both professionally and personally. I know that he volunteers a great deal of his time to provide dental services to the those in need through both private and governmental organizations. In order to better understand the types of people in need that he serves, I asked him to share with me some stories about people he has met through his various outreaches. His answers were fascinating and truly put a human face on the poor and homeless people across our nation and around the world who too often have their dental needs unmet.

One of the first patients that Dr. J told me about was a homeless man, who I will call "Walt" that came into one of the clinics where Dr. J volunteers. Walt had recently completed a drug rehabilitation program and had suffered from severe dental issues that had gone unaddressed for many years. Walt was in the process of getting his life together, but found that his bad teeth were causing him a great deal of pain and, furthermore, were a significant hindrance in his search for employment. Other than manual labor, Walt found that his appearance made it hard for him to find a job. The first step, Dr. J shared, was to remove all the teeth that Walt had remaining in his mouth. This represented a rather drastic first step, but Dr. J knew that this was the only way that he could begin to repair the extensive damage that years of neglect and decay had caused. Dr. J next spent a great deal of time working on Walt's gums, as gums are a vital aspect of dental health; as Dr. J put it "gums are the soil in which the trees grow." Dr. J then began measuring and fitting Walt for dentures, an exacting process that would ensure the best fit and therefore the maximum utility and comfort for Walt. Dr. J says that the day Walt first saw his new set of teeth was one of the most gratifying of his life. Without the assistance of Dr. J, Walt would have yet another considerable obstacle to overcome in his life, but by Dr. J treating his "earth born companion" they both came away enriched by their interaction. The last that Dr. J heard from his patient, Walt had a job as busboy at a high-end restaurant and was well-liked by both the staff and customers. This is a job that Walt would never have been able to land with a mouth full of rotting teeth.

Poverty represents a significant hurdle for people in having regular access to quality dental health care. According to research, "Children living in poverty have about five times more untreated dental decay than children from higher income families" (Huff, 2015). Furthermore, people of all ages who live in poverty, tend to have diets higher in soda and other sugary foods, which only increases the likelihood of developing dental disease. As was the case with Walt, having poor dental health negatively affects many aspects of an individual's life. Studies show that poor children with dental health issues have more problems speaking, eating, and learning than do children from higher socioeconomic groups, further hindering their possibilities for higher education and lucrative professional careers, increasing the cycle of poverty in the process. Even though there are social programs to help people in need afford dental care, reality often makes this a challenge, and "factors such as provider office location and whether a practice accepts Medicaid insurance could impact utilization" (Huff, 2015). As noted above, this sobering truth often impacts children as much, if not more, than older poor people. Children in need often have more school absences than their more affluent peers due to "dental pain, infection risk, speech and eating difficulties" which can lead directly to an "increased risk of poor oral health in adulthood" (Huff, 2015). Data shows that despite widespread welfare and aid programs, as time progresses people from poor neighborhoods are receiving less dental care than ever before, highlighting the need that the poet Burns references to recognize our common humanity, a need that is exemplified by people like Dr. J who assume the responsibility for doing something about this growing problem in communities across America.

Adults Aged 18 and Older Who Had a Dental Visit in the Past Year, by Poverty Status* and Sex, 2007–2009



Poverty level, defined by the U.S. Census Bureau, was $21,954 for a family of four in 2009.

Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, 2007-2009. Analysis conducted by the Maternal and Child Health Information Resource Center.

The article "The Impact of Oral Disease in New York State" issued by the New York State Bureau of Dental Health (Green et al, 2006) illustrates the need for dental assistance to the poor of New York and identifies outreaches that are attempting to address this critical issue. The good news for residents of New York is that over the years, New York has seen "dramatic improvement in the oral health of its residents through the actions of individuals, professionals, policy makers, State and local governments, educational institutions and healthcare organizations" (Green et al, 2016). This effort is in perfect alignment with the sentiments that Robert Burns shares and shows that impactful change that can occur when people work together to help one another and particularly those in need. Despite the progress that is being made, children and others from lower socioeconomic groups remain at higher risk in New York than do more affluent New Yorkers. Green et al report that "Children from lower income groups in New York State (60%) and New York City (56%) experienced more caries than their higher income counterparts (48% and 48%, respectively)" and that "Racial/ethnic minorities, females, and individuals with less education were found to have more tooth loss" (Green et al, 2006).

In order to better serve this population, New York State has established regional Area Health Education Centers (AHEC), according to Green et al, which are strategically located in

communities that are medically and dentally underserved. Each center is located in a medically underserved community. Such governmental services are vitally important, but it is the actions of individuals taking responsibility for the needs of their "fellow mortals" that makes all the difference. One such person is Queens dentist Dr. Alexandra Khaimov who has taken it upon herself to treat those in need by opening up her office in Elmhurst every Monday to provide free treatments for people who can't afford treatment otherwise. As the child of Russian immigrants, I personally find it very inspiring that Khaimov also immigrated to the United States from Russia. Khaimov offers treatment for anyone who needs it and says "Every single patient I treat as my family" (Chinese, 2012). I further relate to Khaimov because she studied dentistry at NYU, where she had her first experience offering pro bono dental services. Khaimov offers a full range of dental care ranging from cleanings and fillings all the way up to "more complicated procedures like root canals — as long as the patient promises to come back to finish treatment" (Chinese, 2012). This treatment is vital. Khaimov notes that many people do not realize that poor "oral hygiene can lead to liver and heart disease and other potentially fatal problems" (Chinese, 2012).

Treating all people, regardless of their socioeconomic status, is important if we truly want to view ourselves as a compassionate, proactive community. Burns inspires us to recognize our "poor, earth-born companion[s]" as our "fellow-mortal[s]" and treating those with decay, gum disease, bruxism, and other parafunctional habits is of the highest priority, perhaps even more so when those people do not have the resources to pay.

Bruxism, Parafunctional Activities and Alternative Medicine

"I lived in the present, which was
that part of the future you could see.
The past floated above my head,
like the sun and moon, visible but never reachable." -Louise Gluck

Many people who face both medical and dental challenges such as bruxism find themselves in similar position to the speaker in Louise Gluck's "Landscape." They live in a visible present however find themselves tied to the past. Is their health today directly tied to their behaviors of the past? Did their parents implant something in their DNA that is a like a ticking time bomb just waiting for the right conditions in which to explode? Everyone is aware of their past and understands that while it impacts the present, it cannot be changed. What's done is done and even though in the present moment one can choose to interpret it in a different way or even to recontextualize it, the past is the roots of the tree that is the present moment. However, it is equally true that the present moment immediately becomes the past, we are constantly in the process of building the foundation for tomorrow even when we don't realize it.

The truth that Gluck embraces certainly applies to every aspect of life, and has direct application to our habits and our health. Although at the moment, we are fairly powerless over the genetic information that we have inherited (although scientists are working to address this) we have a much greater degree of control of the way that we live our lives in order to ensure a healthier future. We also have a large degree of power when choosing the treatments for whatever health issues we may face, regardless of their original cause. The choices we make today are important, as Gluck notes, because the shape the reality of tomorrow. As detailed in

this paper, traditional medicine/dentistry has a number of effective treatment protocols for bruxism and other parafunctional activities. What this paper has yet to delve into more deeply are the treatments that alternative medicine offers for bruxism, approaches to managing and even eliminating the condition that many people have found to be effective.

Traditional science has a bias against the "anecdotal evidence" that accompanies many alternative treatments, that does not mean that these approaches are ineffective, simply that they have not usually been vetted using the scientific medicine. Still, many people swear by alternative treatments for bruxism and, in the interest of providing a complete look at bruxism and the ways it can be managed, it is worthwhile to examine several of the more popular "alternative treatments" for the condition. When traditional treatments fail, are too expensive, or fail to live up to a patient's expectations trying a different method of dealing with bruxism might very well prove to be the answer, provided that the patient moves forward wisely and in an informed way that will not harm them, or make their bruxism worse.

One of the proven causes of bruxism is stress, and there is no shortage of alternative therapies to managing stress including meditation and massage. Many people have found that Omega 3 supplements with high levels of EPA (eicosapentaenoic acid) help regular moods, and substances like the natural green tea extract L-Theanine, a natural green tea extract, helps "relieve anxiety and aids in serotonin production. Diffusing lavender essential oil is calming and grounding" (Thinking Moms Revolution). However stress and other psychological reasons are not the only factors that can lead to bruxism. Many people who have lives filled with stress do not have bruxism, while young children who have no sources of stress can have the condition. One source reports that mineral deficiency, especially calcium, is directly associated with the grinding of teeth. A mother found that giving her child who suffered from bruxism "additional calcium citrate with meals" proved to be a significant help, but advises that if others attempt this approach to always take calcium supplements at mealtime in order to prevent the likelihood of kidney stones forming due to the additional mineral intake (Thinking Moms Revolution). Others state that increasing zinc and magnesium in the diet can also help alleviate bruxism. These sources cite research which shows that magnesium "helps with serotonin production, helps with calcium absorption and it relaxes tight muscles" (Thinking Moms Revolution). Supplementing these common minerals is only the beginning of the approach that many alternative healers take.

A substance called Himalayan Salt Sole is said to contain over eighty minerals, and when dissolved in water has helped to relieve bruxism in many individuals (Thinking Moms Revolution). Beneficial mineral intake can also be increased by cooking foods rich in minerals such as bone broth and ikan bilis which is an anchovy from Malaysia that has high levels of calcium and is the sources of this mineral for many Asian countries in which dairy products are not a significant portion of the diet. It is important to remember that taking supplements can lead

to problems however, and when people are ingesting extra minerals or vitamins it is very wise to consult with a licensed medical professional. Although calcium might help relieve bruxism in certain individuals this is far from an established medical fact. In fact, too much calcium in the bloodstream can lead to a condition called hypercalcemia which "can weaken your bones, create kidney stones, and interfere with the way your heart and brain works" (Mayo Clinic). One must remember that alternative medicine and traditional medicine can and should complement one another. Just as it would be short-sighted to completely dismiss alternative treatments, it would be equally foolish to disregard traditional medicine which is based on scholarly research and rigorous testing. Mineral supplements might be helpful; a patient would still be wise to monitor his or her blood levels whether on their own or in a licensed doctor's office.

Alternative medical practitioners also report that certain essential oils can increase relaxation and relieve bruxism. These sources believe that "valerian, lavender, Roman chamomile and oil blends" can effectively treat bruxism and that chamomile in particular is held in high regard by homeopathic doctors (Thinking Moms Revolution). Herbs like chamomile have not been approved by the Food and Drug Administration and therefore a person should do extensive research before ingesting them. Many people believe that because certain oils and herbs are "natural" they are harmlessly beneficial. While this can be true, it is not always the case. For example, certain herbs like "green tea extract and comfrey tea, can cause injury to your liver" (Everyday Health). However, the specific oils valerian, lavender, and chamomile are generally deemed safe by the FDA and have acknowledged calming properties, making them perhaps an effective treatment for stress-related bruxism.

Many people are drawn to alternative treatments because they are outside of the "mainstream medical establishment" and are therefore supposed to be more pure and are not simply the products of wealthy pharmaceutical companies exploiting the sick and injured. Certainly Big Pharma has its faults, however that does not necessarily logically lead to the conclusion that anything outside of its realm is inherently superior. For example, one alternative website puts forth the idea that bruxism can be the result of untreated intestinal parasites. This site asserts that these worms can lead to "anal itching, nightmares, mood swings, [and] behavioural issues" particularly during "full-moon periods" (Thinking Moms Revolution). At first an assertion like this might make the more scientific-minded reader roll his or her eyes and be the exact type of over-reach that gives alternative medicine a bad name in the minds of many people. Frankly, as a dental hygiene student, that was my first reaction when I found this in my research. How could worms possibly have any effect on bruxism? I took my own advice and rather than simply dismissing this idea, I did some research in peer-reviewed journals. To my surprise, medical science does back up this idea. In the article "The Correlation between Intestinal Parasitic Infections and Bruxism among 3-6 Year-Old Children" by Tehrani et al (2010) the research team did in fact find that "pathogenic parasites may serve as the cause of initiation of bruxism habits among children" (Tehrani et al, 2010).

In essence, Tehrani et al found that the parasites excrete substances that are toxic to humans and can lead to stress, sleep loss, and teeth grinding, especially in the presence of "*Enterobius vermicularis*, *Ascaris lumbricoides*, and other parasites" (Tehrani et al, 2010). The picture to the

right is of *Enterobius vermicularis,* taken from https://www.cdc.gov/dpdx/enterobiasis/images/2/evermicularis_adult2_norway.jpg. It is hard to find any support for the idea that the activities of these worms are any greater during period of full moons, however research shows that bruxism can have many causes, several of them quite unexpected. As a remedy for intestinal worms, one alternative healer suggests the use of the herbs artemesia wormwood, black walnut and clove (Thinking Moms Revolution). However this recommendation once again shows that the wise patient does not simply accept either traditional or alternative medicine as being completely correct with the other being false. Although the alternative healers notion that bruxism can be caused by worms is correct, its recommendation of using herbs like artemisia wormwood is misguided as there is no clinical data supporting the idea that this natural remedy has any effectiveness killing worms or any other intestinal parasite (Drugs.com). Alternative sites also suggest that homeopathic remedies, chiropractic measure to align cranial structure, and even smiling can reduce or eliminate the symptoms of bruxism.

Policy for Treatment of Bruxism

If I was governor of New York or president of the country seeking to enact meaningful public health policy when it comes to treating bruxism and other parafunctional activities, I would mandate twice a year dental checkups for all citizens under the age of 18. I would like to extend this policy to all adults, but I know the political opposition would be tremendous, and furthermore, adults can refuse to receive health care. There would be significant costs associated with this policy, but I believe that the rewards to society would worth it. I believe it is important to mandate this coverage for youth, as they are developing the habits that will last throughout their lives, and they are also not in the place where they can opt to receive regular dental care. As is the case with many medical conditions, an ounce of prevention is worth a pound of cure not only terms of individual well-being but economically as well. Looking at a subject like oral cancer, when this disease is diagnosed early, the effectiveness and relative economy of treatment are significant. However, when these cancers are not detected until they are well-advanced, the prognoses decline and the cost of treatment increases. The same paradigm can be applied to bruxism, parafunctional disorders, and the pain associated with them.

Screening children regularly and early will enable dentists to determine if there is a problem and to treat that problem before it turns into something chronic or more severe. The same holds true for adults, however implementing this policy would run into the problems I mentioned before. The Heritage Foundation argues against this sort of mandated public health policy, arguing that it is unconstitutional. The site notes that, "Nowhere in the Constitution is Congress given the power to mandate that an individual enter into a contract with a private party or purchase a good or service" (Gaziano et al, 2009). This same rationale would apply to similar mandates at the state level. Opponents of this type of policy maintain that, however well-intentioned, forcing people to receive and pay for any type of care runs against the Constitutional principles of the country. There would certainly be governmental costs associated with implementing my policy, but I argue that what better use of public funds is there than seeing to the health of individuals? Bruxism and parafunctional activities are not life-threatening, but they can wreak havoc on an individual's life and negatively impact his or her quality of life.

Coupled with ongoing educational efforts about the importance of dental health and the various conditions that can damage it, this type of public health positive would yield enormous benefits to those who suffer from bruxism and other dental conditions.

In Closing

As is the case with many medical and dental issues, bruxism is a complex parafunctional activity that is best understood and treated from a holistic perspective. Some people are still dubious about the connection between our physical bodies and our emotions and thoughts, and question the degree to which they affect one another--if they affect one another at all. Based on my extensive research and own education, I believe quite strongly that bruxism is not purely a physical condition and that its appearance and severity are directly related to other factors in a person's life whether it's stress, nutrition, toxins, and even parasites. Certain prophylactic measures are proven to be effective, but it seems that to truly effectively help someone dealing with bruxism it is imperative to treat the whole patient. I believe that all medical care is moving increasingly in this direction, particularly as we learn more about the intricate connections between the human mind, body, and spirit. As an aspiring healthcare professional, I will take the lessons I have learned and the truths I have uncovered in writing this paper with me, and look forward to not only addressing the symptoms of the disorders my patients are experiencing, but looking at the variety of root causes thereby not just offering management, but hopefully, a cure.

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