

**The Stress Mess;  
How Stress Impacts Health**

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**Presenter Disclosures for Betsy Reynolds, RDH, MS**

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**Agenda**

- Introduction
- Modern Day Stressors
- Physiology of Stress
- Stress and Disease
- Stress and Dental Disorders
- Stress and Nutrition
- Stress and Gender
- Stress Busters

**What is STRESS???**

Stress is the way we react physically, mentally, and emotionally to various conditions, changes, and demands in our lives

- Our minds react with concern, worry, or fear
- Our bodies react by secreting stress chemicals and hormones

The physiological stress circuit existed in primitive humans as a mechanism to ensure the survival of our species

**Headliners:** Brain is equipped to register fear and worry more sensitively than any other emotion

- Nature does not consider happiness essential for survival
- Only attached intense pleasure to procreation and eating because they are necessary for survival

Normal reaction to life for ALL people of ALL ages

In this current world, stress from relationships, financial problems, the evening news, our daily commute, or from our work seems to increase and decrease but rarely ceases

When stressors are relatively acute but infrequent, our bodies have an opportunity to clear the stress hormones and return to more baseline or 'normal' conditions

Positive stress (eustress) can challenge us to act in creative and resourceful ways—in fact, too little stress can be bad for us, since stress can motivate us to do our best

Since concentration is more focused, actors, musicians and others find that their performances are often enhanced by this stress-induced effect

However, when stressors are as frequent and as pervasive as they seem to be in our modern world, our bodies do not have enough time to reverse the harmful physiological effects

Often, we cannot fight nor can we flee—we feel trapped and helpless

Changes in our world—technological advances, 'multi-tasking', breakdown of the extended family—has shifted the nature and pattern of stress-inducing events

**TIDBITS**

In 1969, scientists at the University of California (Los Angeles) transmitted a couple of bits of data between two computers and the Internet was born

Half a billion new users got connected to the web in 2014, an increase of 20% bringing the total number of web surfers to 3 billion worldwide—at the start of 2014, just 35% of the world had access to the internet but increased to 42% in January 2015

Going into 2015, more people were spending time on the web—in 2010, the average user of the Internet spent less than 2 hours every day online, but today that stands at almost 4.5 hours every day

Statistics show that 87% of adults and 95% of teens in America use the Internet—when does a little web browsing turn into a problem?

### **Internet Use Disorder (IUD)**

- The effect Internet addiction has on the brain is remarkably similar to the effect drug addiction has—while gaming online, dopamine levels in the user’s brain double and several small areas of the brain begin to shrink (by as much as 20%!)
- Although the Internet may seem harmless when it comes to long-term health, there are a number of mental and physical side effects of IUD
- Research has shown that people with internet addiction have demonstrable changes in their brains—both in the connections between cells and in the brain areas that control attention, executive control, and emotion processing
- Decreased white matter density in the brain caused by IUD has been linked to a severe decline in cognitive function—including reduced cognitive control, impaired inhibition, and short-term memory damage—teens who are addicted to the Internet have been shown to be at risk for depression, poor school performance, anxiety, and are two times more likely to self-injure
- The Internet Addiction Risk Checklist (IARC) is a 100- item risk assessment designed to investigate if an Information and Communications Technology (ICT) user is engaging in pathological use of the internet and ICT—the checklist statements have been categorized into cognitive, affective, behavioral and perceptual sections all themed surrounding the compulsive dependent use of digital devices  
<https://www.ipredator.co/internet-addiction-checklist/>

### **The Healing Power of Nature**

Recent investigations by Japanese researchers set out to study the effects of ‘shinrin-yoku’ (literally, ‘forest bathing’) on stress reduction

Study results:

People who spent 40 minutes walking in a cedar forest had lower levels of stress-related cortisol than their cohorts who spent 40 minutes walking in a lab--Source: Yoshifumi Miyazaki; forest-therapy expert and researcher; Chiba University (Japan); results appearing in TIME; 25 JUL 2016

Researchers found that trees and plants emit aromatic compounds called phytoncides—when inhaled, these products can spur healthy biological changes similar to aromatherapy--Source: Dr. Qing Li; professor; Nippon School (Tokyo)

### **Benefits of Shinrin-yoku:**

#### **Lowers Blood Pressure**

- A large June 2016 study found that ~10% of people with hypertension could get their high blood pressure under control if they spent just 30 minutes or more in a park each week—phytoncides lower BP by inhibiting the sympathetic ‘fight or flight’ response

#### **Inspires Awe:**

- In a 2015 study, researchers discovered that people who spent 60 seconds looking up at towering trees were more likely to report feeling awe—after which they were more likely to help a stranger than people that who looked at an equally tall building
- ‘Experiences of awe attune people to things larger than themselves. They cause individuals to feel less entitled, less selfish, and to behave in more generous and helping ways.’--Source: Paul Piff; study investigator; University of California (Irvine)

### **Promotes Cancer-Fighting Cells**

- In a 2010 study, researchers found that people who took two long walks through forests on consecutive days increased their Natural Killer ('NK') cell count 50% and NK activity was increased 56% (cellular activity remained 23% higher for the month following the walks!)

As human beings, our only real method of connection is through **authentic communication**

Studies show that only 7% of communication is based on the written or verbal word—a whopping 93% is based on non-verbal body language!--Source: Susan Tardanico, contributor for Forbes; Is Social Media Sabotaging Real Communication?; posted 30 Apr 2012; accessed 21 July 2016 at:

<http://www.forbes.com/sites/susantardanico/2012/04/30/is-social-media-sabotaging-real-communication/#536875194fd8>

With 93% of our communication context stripped away, we are now attempting to forge relationships and make decisions based on phrases, abbreviations, snippets, and emoticons—which may or may not be accurate representations of the truth

Because most personal as well as business communication is done without body language via e-mails, texts, instant messaging, tweets, blogs, Facebook and other tech-enabled media, the potential for misinterpretation is enormous!

Rushed and stressed, people often do not take time to consider the nuances of their writing—conclusions are drawn on frighteningly little information

### **The Human Moment**

Defined as 'an authentic psychological encounter that can happen only when two people share the same physical space'--Source: Edward Hallowell, MD; psychiatrist; 'The Human Moment at Work'; appearing in the Harvard Business Review; January-February 1999 issue; accessed on 21 July 2016 at: <https://hbr.org/1999/01/the-human-moment-at-work>

The human moment has two prerequisites: physical presence and emotional and intellectual attention

E-mail, texting, voicemail, and social media are one-way and electronic—allowing us to communicate with people when WE want to and from any location

Human moments are disappearing as the tide of electronic hyperconnection rises—technological changes have made many face-to-face interaction unnecessary

The BIG 'However': People need human contact in order to survive

The decade-long MacArthur Foundation study on aging in the United States showed that the top two predictors of well-being as people age are frequency of visits with friends and frequency of attendance at meetings of organizations

Not only do we need to see people to understand them most effectively, but, according to some neurologists, people learn to interact with the world by mirroring others

Our brain learns how to move limbs and make sense of the world by mirroring the actions of others—there are even 'mirror neurons' in our brain that fire only in response to mirroring the actions of others and they are intimately connected with the parts of our brain that allow us to move and understand the world

The part of our brain that controls grasping motions shows heightened levels of neural activity when we see someone else pick up an instrument—as if we are doing it ourselves

Historically, research has shown that a deficit of the human moment damages a person's emotional health

Scientists do not know the whole story yet, but they do know that positive human-to-human contact reduces the blood levels of the stress hormones epinephrine, norepinephrine, and cortisol

### **Additional Hormonal Considerations:**

'The neuropeptides oxytocin (OXT) and arginine vasopressin (AVP) are evolutionarily highly conserved mediators in the regulation of complex social cognition and behaviour. Recent studies have investigated the effects of OXT and AVP on human social interaction, the genetic mechanisms of inter-individual variation in social neuropeptide signalling and the actions of OXT and AVP in the human brain as revealed by neuroimaging. These data have advanced our understanding of the mechanisms by which these neuropeptides contribute to human social behaviour.'--Source: Meyer-Lindenberg, A et al: Oxytocin and vasopressin in the human brain: social neuropeptides for translational medicine. Nature Reviews Neuroscience 12, 524-538 (September 2011); accessed 21 Jul 2016 at: <http://www.nature.com/nrn/journal/v12/n9/full/nrn3044.html>

Oxytocin and vasopressin are hormones that are always present to some degree in all of us—they have been shown to increase when we feel empathy for another person (particularly, when we are meeting with someone face-to-face)

It has been shown that these bonding hormones are at suppressed levels when people are physically separate—which is one of the reasons that it is easier to deal harshly with someone via e-mail than in person

Furthermore, scientists hypothesize that in-person contact stimulates two important neurotransmitters: dopamine, which enhances attention and pleasure, and serotonin, which reduces fear and worry\*\*\*

This could partially explain why ‘worry’ often replaces the human moment—electronic communications remove many of the cues (body language, tone of voice, facial expression) that typically mitigate worry

### **Toxic Worry**

Toxic worry is anxiety that has no basis in reality—it tends to immobilize the sufferer and lead to indecision or destructive action

Toxic worry is among the most debilitating consequences of vanishing human moments—but little misunderstandings are more common and can lead to negative outcomes as well

As the number of human moments decreases, the number of ‘little misunderstandings’ often increases—compounding one another until there is nothing little about them anymore

The relationship between nonverbal behaviors and patient perceptions of clinicians has been underexplored—an investigation was undertaken to better understand the relationship between nonverbal communication behaviors (eye contact and social touch) to patient assessments of the treating clinician (empathy, connectedness, and liking) Researchers found that the length of an office visit and eye contact between clinician and patient were positively related to the patient’s assessment of the clinician’s empathy

The research team concluded that: ‘Clinical environments designed for patient and clinician interaction should be designed to facilitate positive nonverbal interactions such as eye contact and social touch. Specifically, health information technology should not restrict clinicians’ ability to make eye contact with their patients.’

**The upshot of all of this:** Most of us spend less face-to-face with other human beings and more time before a machine

When deprived of tangible physical contact and facial expressions that accompany human interaction, a part of humanity is lost

The difference between a smiley face and an actual smile is too large to calculate—‘lol’ can NEVER quite convey the sound of a friend’s laughter

The Good News?

- As oral healthcare providers, we touch, talk and listen in real time with our patients—what a gift to this world we are!

### **Symptoms of Stress**

According to the Harvard Medical School Family Health Guide, symptoms of chronic stress can affect us physically, behaviorally, emotionally, and cognitively

**Physical symptoms of stress include:**

- Headache\*\*\*
- Backache
- Indigestion
- Tight neck and shoulders\*\*\*
- Racing heart
- Tremors/Nervous tics
- Xerostomia\*\*\*
- Lethargy/Fatigue
- Bruxism

- Skin disorders
- Susceptibility to illness\*\*\*
- Heartburn/GI upset

**Behavioral symptoms include:**

- Increased smoking, alcohol or drug intake
- Compulsive eating
- Inability to get things done
- Reappearance or aggravation of phobias
- Avoidance of people or places
- Relationship problems
- Increased caffeine intake
- Impulsivity
- Overeating
- Bossiness

**Emotional symptoms include:**

- Crying
- Nervousness
- Edginess
- Loneliness
- Sense of powerlessness
- Low self-esteem
- Anger
- Guilt
- Suspicion
- Fear of failure
- Feelings of impending doom

**Cognitive symptoms include:**

- Trouble thinking clearly
- Forgetfulness
- Inability to make decisions
- Thoughts of escape
- Easily distracted
- Low threshold of frustration
- Anxiety and fears
- Lack of creativity
- Incessant worrying

According to the National Mental Health Association, 75 to 90% of all doctor's appointments are related to stress. Because most physicians do not have the time or resources to help discover and eliminate the sources of stress, they often prescribe medication—which can be addicting.

Stress is being linked to heart disease, immune deficiency, memory loss, diabetes, periodontal diseases, pre-term/low-weight births, AND MORE!

**Common sources of Stress:**

- Environment
- Social stressors
- Physiological source
- Thoughts
- Belief System
- Infection\*\*\*\*

## **The Tyranny of Choice**

Logic suggests that having options allows people to select precisely what makes them happy

But, as studies show, abundant choice often makes for misery

**Headliners: I Can't Think!; Sharon Begley; reporting for Newsweek; 3/7/11**

By utilizing a fMRI to measure brain activity, researchers demonstrated that as information load increased, so did activity in the dorsolateral prefrontal cortex—a region behind the forehead that is responsible for decision making and control of emotions--Dr. Angelika Dimoka; lead researcher; Director; Center for Neural Decision Making; Temple University

As more and more information was given to test subjects to 'help' them make a decision, activity in the dorsolateral PFC suddenly fell off—as if a circuit breaker had popped

Because the brain region associated with smart decision making is incapacitated, the brain's emotional regions—previously held in check by the dorsolateral PFC—are allowed to run amok

The booming science of decision making has shown that more information can lead to objectively poorer choices—and to choices people come to regret

It has been further demonstrated that decisions requiring creativity benefit from letting the problem incubate below the level of awareness—something that becomes more difficult when information never stops arriving

Not too long ago, the due diligence needed to make an informed decision meant simply looking something up in a reference book

As scientists have studied how the flow of information affects decision making, they have spotted several patterns

### **Many diminishing returns**

- Researchers found that the more information we try to assimilate, the more we tend to regret the many forgone options
- A key reason for information's diminishing returns is the limited capacity of the brain's working memory—it can hold roughly seven items at a time (the reason why seven digit phone numbers 'were' a great idea)
- Anything more than seven considerations must be processed into long-term memory—a task the brain struggles with as it tries to determine what to keep and what to disregard
- 'We're being trained to prefer an immediate decision even if it's bad to a later decision that's better. In business, we're seeing a preference for the quick over the right, in large part because so many decisions have to be made. The notion that the quick decision is better is becoming normative.'--Clifford Nass; psychologist; Stanford University

### **'Recency' trumps Quality**

- The brain is wired to notice change over stasis—an arriving email that pops up on a computer, an incoming text on a Smartphone or a new Facebook post 'alerts' the brain
- 'There is a powerful 'recency' effect in decision making. We pay a lot of attention to the most recent information, discounting what came earlier.'--George Loewenstein; behavioral economist; Carnegie Mellon University
- Getting 30 texts per hour up to the moment a decision is made means that most of the texts make all the impression of a feather on a brick wall—whereas, text numbers 29 and 30 assume outsized importance REGARDLESS OF THEIR VALIDITY
- Part of the problem is that the brain is really bad at giving only a little weight to a piece of information

### **The importance of science in Decision Making:**

When making patient treatment and home care recommendations, we depend on scientific investigation

All scientific endeavors depend on the TRUTH of investigative research

Amid recent examples of dishonesty within the business sectors, is truth an endangered virtue???

For the me's, you's and the public: Use of substantial, evidenced-based research in making recommendations for home care strategies and treatment protocols for patient care

Helping our patients make informed choices and decisions about aspects of their oral as well as their overall health is inherent in the dental profession

## Words of Wisdom

- 'Let us begin by committing ourselves to the truth—to see it as it is, and tell it like it is—to find the truth, to speak the truth, and to live the truth.'
- Those words were spoken by Richard Nixon as he accepted the Republican nomination for president in 1968

## History of STRESS

Since the beginning of time, many humans have identified stress in their lives on a personal, non-scientific manner. In the 4th century B.C., Plato conjectured that "all diseases of the body proceed from the mind or soul". Early societies consciously explored the phenomena of stress as a result of demonic possession of the body. In 1831, Dr. James Johnson developed a precise description of the physical reaction to stress:

- "A sudden gust of passion, a transient sense of fear, an expected piece of intelligence—in short, any strong emotion of mind, will cause the heart to palpitate, the muscles to tremble, the digestive organs to suspend their functions, and the blood to rush in vague and irregular currents through the living machine"

Modern day concept of stress was formulated by pioneering physiologist Walter Cannon in the 1920's!!!!

Cannon established the basis for the "fight or flight" description of stress

He established that "a complex animal body exhibits a single fundamental pattern of response to any challenge to its equilibrium"

Cannon coined the term "homeostasis"—a term vital to understanding the physiological aspect of balance despite external change

In 1936, Hans Selye began to investigate the 'syndrome of just being sick'

### A word or two about Dr. Hans Selye:

Hans Selye (1907 - 1982), a Hungarian-Canadian endocrinologist, may be considered the first to understand, evaluate, and promote the meaning of stress—he even coined the term stress

Selye had begun, as early as his second year in medical school to wonder about internal and external forces on the body—for example, simply flexing a muscle as well as feeling anxious can be considered stress because both exert forces

Selye experimented on mice with various toxins and noticed that even though they developed different diseases they seemed to share some fundamental symptoms

Selye noticed people who 'felt and looked ill, had a coated tongue, complained of more or less diffuse aches and pains in the joints, and of intestinal disturbances with loss of appetite...[and also] had fever, enlarged spleen or liver, inflamed tonsils, a skin rash' were demonstrating the symptoms of stress—or **the General Adaptive Syndrome ('GAS')**

### Syndrome ('GAS')

Three Stages of GAS:

- Fight or flight response (instantaneous)
- Resistance (extension of fight or flight)
- Exhaustion

Selye also observed that some general medical care seemed to help everyone: easily digestible foods, keeping the room at a comfortable temperature, relaxation etc.

Through experiments, Selye also discovered that changes in the state of human organs were the same despite the source of stress induced on the human body

Notable Quotes by Selye:

- 'Stress is the spice of life'
- 'Adopting the right attitude can convert a negative stress into a positive one'
- 'Man should not try to avoid stress any more than he would shun food, love or exercise'
- 'Every stress leaves an indelible scar, and the organism pays for its survival after a stressful situation by becoming a little older'
- 'It's not stress that kills us, it is our reaction to it'

## Physiology of Stress

The Fight or Flight response is controlled (as are the other two phases) by the sympathetic and parasympathetic nervous systems

The sympathetic nervous system prepares the body for action and makes energy resources available

The sympathetic nervous system is activated to full force when we are focusing on external challenges (exciting OR burdensome)

The parasympathetic nervous system attempts to neutralize the effects of the sympathetic nervous system by restoring homeostasis

Both the sympathetic and parasympathetic nervous systems are controlled by the hypothalamus, a small section of the brain near the pituitary gland

When “danger” is imminent, signals are sent to the adrenal glands (located on top of the kidneys) via the sympathetic nervous system

Certain neurotransmitters (“chemical messengers”) called catecholamines are released into the system

Catecholamines activate the amygdala inside the brain which triggers an emotional response to the stressful event

The hippocampus is also signaled to store the emotionally loaded experience in long-term memory

During a stressful event, catecholamines also suppress activity in areas at the front of the brain concerned with short-term memory, concentration, inhibition, and rational thought

This sequence of mental events allows a person to react quickly in emergency situations but hinders a person’s ability to handle complex social or intellectual tasks and behaviors

If the “threat” lasts longer than a few seconds, a complicated series of hormones are released

During the resistance phase, the hypothalamus releases “corticotropin releasing hormone” (CRH) which triggers the secretion of “adrenocorticotrophic hormone” (ACTH) from the pituitary gland

ACTH incites the production of **cortisol** from the adrenal glands

- Cortisol’s main job is to increase energy supplied to vital systems such as the heart and brain
- Cortisol does this by bettering the availability of blood glucose and by converting fat into energy
- When cortisol is secreted, it causes a breakdown of muscle protein
- Leads to release of amino acids (the “building blocks” of protein) into the bloodstream
- These amino acids are then used by the liver to synthesize glucose for energy
- Process raises the blood sugar level so the brain will have more glucose for energy
- At the same time other tissues in the body decrease their use of glucose as fuel
- Cortisol also leads to the release of fatty acids (from fat cells) for use by the muscle
- One of the most important tasks of cortisol is to keep its own production under control by regulating CRH production (“feedback loop”)
- Normal cortisol levels range from 6-23 mcg/dl (micrograms per deciliter)
  - Saliva sampling can be used as an index of blood cortisol levels (GCF holds promise)
- Higher levels are likely associated with the increased physical and psychological stresses associated with certain conditions

## Stress Can Make You Sick!

In the late 1980s, two professors (Drs. Sterling and Eyer) at the University of Pennsylvania coined the term “allostasis” (the ability to achieve stability through change)

“Allostatic load” is the price our bodies pay for the ability to adapt to stress

Allostatic systems respond to stress by initiating the adaptive response, sustaining it until the stress ceases, and then shutting it off (recovery)—the responses are initiated by an increase in circulating catecholamines from the autonomic nervous system and glucocorticoids from the adrenal cortex

Higher levels of allostatic load can lead to all sorts of physiological breakdowns

### Psychological Effects

- Stress diminishes the quality of life by reducing feelings of pleasure and accomplishment
- Relationships may become threatened
- Chronic stress might develop into more serious problems (anxiety disorder, depression)

## Heart Disease

- Mental stress is as important a trigger for angina as physical stress and may even pose a HIGHER risk for serious cardiac events
- Incidents of acute stress often precede sudden heart-related deaths
- Because stress causes the release of fat into the bloodstream, blood-cholesterol levels rise
- Sudden stress increases heart rate and causes arteries to CONstrict
- Stress causes blood to become “stickier” (possibly to prepare for potential injury) which increases the incidence of blood clot formation

Headliners: In a massive, long-term study of 17,000 civil servants in Whitehall, Great Britain an almost unbelievable conclusion emerged:

The status of a person’s job was more able to predict their likelihood of a heart attack than:

- Obesity
- Smoking
- HBP

Someone in a low-grade job such as a janitor was nearly FOUR TIMES as likely to have a heart attack as a permanent secretary at the top of the heap

Indeed, even if the secretary was obese, hypertensive, or a smoker at a given age than a thin, non-smoking, low-blood- pressure janitor the secretary was STILL less likely to suffer a heart attack

Exactly the same result emerged from a similar study of a million employees of the Bell Telephone Company in the 1960s

## Stroke

Prolonged or frequent mental stress can cause an exaggerated increase in blood pressure—in time, this can lead to thickening of the carotid arteries (blockage of these arteries are the primary causes of stroke)

In a University of Texas Medical Branch at Galveston study, 2,478 elderly men and women were analyzed

The happiest 25% had HALF the number of strokes as their unhappy counterparts

## Susceptibility to Diseases

Over 60 years ago the first evidence of stress-induced immunosuppression was discovered

Scientists have discovered that a period of stress will disrupt a wide variety of immune functions such as:

- Formation of new lymphocytes and their release into the circulation
- The time preexisting lymphocytes stay in the circulation
- The manufacture of antibodies in response to an infectious agent
- Communication among lymphocytes (“cytokines”)

## Digestive Problems

Long-term stress can disrupt the GI system causing:

- Diarrhea
- Constipation
- Cramping
- Bloating
- Irritable bowel syndrome

## Musculoskeletal Functions

Muscles that would be used to “fight or flee” often become very tight until released by relaxation, massage, stretching, or exercise

One of the most common responses to stress and has led to expressions like “uptight” and “pain the neck” (and other places)

Symptoms associated with this stress response might include:

- Tension headaches
- TMJ disturbances
- Neck/shoulder pain or tension
- Insomnia
- Fatigue
- Loss of concentration
- Poor communication

**Headliners: Stressful Times Have people Grinding Their Teeth; As reported by Camille Sweeney; New York Times News Service; appearing in the Idaho Statesman; 10/12/09**

'We're finding in a lot of double-income families, we have the people who have lost jobs and are worried, and then we have the spouse, who still has the job, with the added pressure and uncertainty. This can cause some real grinding at night.'--Dr. Gerald McCracken; San Diego dentist

Some grinders will brux up to 40 minutes of every hour during sleep—which can quickly erode enamel, fracture teeth, affect bite, damage the temporomandibular joint, and cause pain in the jaw, face, and ears

With or without economic hardship, 10% to 15% of adult Americans moderately to severely grind their teeth—and, along with genetics, stress has been recognized as a source for nocturnal bruxing

Source: Dr. Matthew Messina; dentist; consumer adviser for the American Dental Association

**KEY:** Because the body reacts to stress with a spurt of energy that enables a person to run or fight, people who are under stress burn that excess energy off somewhere—some do it at night by clenching or grinding their teeth--

Source: Messina

Efforts to control stress can have a positive impact on the development and duration of TMDs

**Meet Dr. Susan Maples, DDS and her co-workers:**

Some of the complimentary services they offer:

- Cervical neck pillow
- Heated aromatherapy neck pillow
- Heated blanket
- Personal aromatherapy (essential oils are placed on the patient bib)
- Massaging dental chair pad
- Lavender scented hand warming mittens
- Foot and hand massages
- Paraffin hand treatment and jewelry cleaning
- Personal CD player with choice of music from their CD library including relaxation and nature music
- Aromatherapy with massage
- Relaxation in a Chiropractic massage chair
- Upper body massage with massage therapist 10-20 minutes
- Facial massage
- To finish the visit, a warm face towel is provided

Services offered for a fee:

- Target massage 30 minutes
- Full body massage 60 minutes
- Hot stone massage 60 minutes
- Rejuvenating facial treatment 30 minutes

**Memory, Concentration and Learning**

The hippocampus, which is where memory cells in the brain are produced and stored, is highly activated during the fight or flight response

Prolonged exposure to cortisol is now believed to actually damage brain cells in the hippocampus

Although some memory loss occurs with age, stress may play an even more important role than simple aging

**Headliners: Daily Stress and Dementia Risk; Laura Fratiglione; study author; Karolinska Institute; Stockholm, Switzerland; study results appearing in Neurology; 1/20/09; as reported in Science News; 2/14/09**

A recent study concluded that people who typically do not get distressed by routine events that unnerve others tend to have a lower risk of dementia in old age

The findings also suggest that a socially active lifestyle may provide a buffer against the risk of being easily distressed

**Circulatory Changes**

Blood is directed away from the surface of the skin in the hands and feet (decreases chance that one would bleed to death when running away or fighting an attacker)

Blood is directed away from the GI and reproductive systems because of the low priority these systems have during a threat

Blood is directed toward the brain and major muscles to ensure survival

Symptoms associated with these stress-induced changes in the circulatory system include:

- Hypertension
- Cold hands and feet
- Stomach upset
- Migraine headaches
- Pre-ulcerous / ulcerous conditions
- Colitis
- Sexual dysfunction (70% in both men and women)

### **Pregnancy**

- Pregnancy-related discomforts (such as nausea, fatigue, frequent urination, swelling, and backache) can be stressful--especially if the pregnant woman attempts to accomplish everything she did prior to pregnancy

### **Weight Problems**

Since the 1980's, a large body of medical literature has linked chronic stress and its consequences (anger, depression, binge-eating, etc.) to high levels of upper body fat

Eating often is "comforting" in times of stress

Provides "fuel" for fight or flight response

Visceral fat cells are very metabolically active and promote increases in BP, triglycerides, and blood glucose by rapidly dumping excessive fatty acids directly into the liver

Any fatty acids that the liver doesn't use return to the central fat cells, plumping them up even more

As central fat increases, it starts dumping fatty acids into the bloodstream ALL the time (not just during stress)

"The constant presence of fatty acids in the bloodstream is what puts people at risk for diabetes and heart disease."--Raymond S. Niaura; Brown University

Other types of fat--particularly those deposits in the thighs and derriere--may actually PROTECT your heart

"Overweight women who carry most of their extra fat in their hips rather than their bellies...should not be at greater risk. If they have a smaller waist...[the fat] stays securely in the peripheral fat cells."--Elissa Epel;

Researcher in Psychology; University of California at San Francisco

Eating less and exercising more can help but sitting still and relaxing may be just as important for controlling your weight

### **Stress and Nutrition**

If chronic stress is decreasing the supply of serotonin, it's important to eat at least 2 oz of protein at every meal to ensure a steady supply of tryptophan in the bloodstream

To move tryptophan into the brain, it must be paired with a carb

### **Stress and Dental Health**

Studies are increasingly demonstrating a link between stress and periodontal diseases

**Headliners: Take It Easy & Reduce Tooth Loss!; Jeffrey Gross, DDS; associate clinical professor; Case School of Dental Medicine; as reported in Woman's World; 6/23/08**

As many as 57% of recent studies link stress to periodontal diseases—the leading cause of tooth loss

'A constant onslaught of cortisol depresses your body's ability to kill off damaging bacteria in the mouth, plus it dampens your immune system's ability to heal and repair tissue damage, allowing small gum problems to mushroom into bigger ones.'--Gross, J

**Direct Effects of Glucocorticoids on Bone = Increased bone resorption + Decreased bone formation**

Most experts believe that psychosocial factors—stress, moods, and anxiety—play an important role in the development of temporomandibular joint disorders

## Stress and Gender

We are learning that men and women process stress differently and that childhood stress can lead to adult health problems

**Headliners: A landmark UCLA study suggests that women respond to stress with a cascade of brain chemicals that cause them to make and maintain friendships with other women**

According to Laura Cousino Klein, PhD: “Until this study was published, scientists generally believed that when people experience stress, they trigger a hormonal cascade that revs the body to either stand and fight or flee as fast as possible.”

It is now believed that women have a larger behavioral repertoire than just “fight or flight”

In fact, when the hormone oxytocin is released as part of the stress response in women, it buffers the fight or flight response and encourages her to tend to her children and gather with other women instead

When she engages in this “tending and befriending” behavior, MORE oxytocin is released further countering stress and increasing the initial calming effect

While ESTROGEN enhances the effect of oxytocin, TESTOSTERONE reduces the effects of oxytocin

Study after study has found that social ties reduce the risk of disease by lowering blood pressure, heart rate, and cholesterol

“Every time [women] get overly busy with work and family, the first thing [they] do is let go of friendships with other women...That’s really a mistake.”--Ruthellen Josselson, PhD

**Headliners: Men versus Women Brain Study: Active Part of Brain during Stress; As reported by Tamara Hardison; Associated Content; 11/21/09; accessed 2/25/09 at: <http://www.associatedcontent.com>**

During and after performing stressful mathematics tasks, researchers at the University of Pennsylvania School of Medicine measured study participants’:

- Heart rates
- Cortisol levels
- Expressed stress levels
- Regional cerebral blood flow (‘CBF’)

The researchers found when men are under stress, CBF is increased in the right prefrontal cortex and decreased in the left orbitofrontal cortex

In contrast, women were found to have a more active limbic system—that part of the brain that processes data concerning emotions

The activated areas of the brain in BOTH men and women remained active well after the stressful task had been completed—however, WOMEN had a much stronger response

It has been shown for some time that women have higher rates of depression and anxiety disorders than men.

This study helps to explain why the rates...are higher among women. The study demonstrated that women respond to stressors with emotional responses PLUS their responses last a whole lot longer than men’s responses.

Source: J.J. Wang, PhD; lead researcher for the study; assistant professor; departments of radiology and neurology; University of Pennsylvania School of Medicine

**Headliners: The Physical Side of Stress; Paul J. Rosch; clinical professor of medicine and psychiatry at New York Medical College and honorary vice president of the International Stress Management Association; appearing online for Women’s Health; As reported by Clare Kittredge; 1/23/15; accessed on 7/23/15 at: <http://www.everydayhealth.com/womens-health/physical-side-of-stress.aspx>**

Although researchers have demonstrated that nurturing activities boost oxytocin levels in women—the catch-22 is that women apparently NEED more oxytocin than men to maintain their emotional health

This helps to explain why women are more negatively affected when they are not touched, and also feel more stress than men in relationships--Rosch

Women are more prone to specific stress effects such as:

- Eating disorders
- Stomach ailments
- Skin reactions
- Emotional conditions (including postpartum depression)
- Sleep problems
- Concentration difficulty

- Heart disease
- Lowered immune response
- Cancer (studies have suggested a link between stress and the development of breast and ovarian cancer)

**Headliners: According to Wm. Frey II, Ph.D., operator of the Dry Eye and Tear Research Center at Region's Hospital in St. Paul, Minnesota, CRYING is a natural stress reducer**

Dr. Frey describes crying as a '...purging of sorts, an excretive response similar to sweating or urinating.'

Crying would have stopped thousands of years ago if it had no biological purpose

Emotional tears contain the hormone PROLACTIN which is released from the pituitary gland in response to stress

Though tears triggered by an irritant also contain prolactin, the fact that emotional tears differ in protein composition from irritant tears is interesting

The expression 'for crying out loud' could well mean that the body is ridding itself of prolactin and its potential for peril

Although both men and women admit that crying is an emotional release, men are not as able to cry as women due to a variety of societal pressures

**Stressbusters**

According to Stanford psychiatrist David Spiegel: "Living a stress-free life is not a reasonable goal. The goal is to deal with it actively and effectively."

Though that's easier for some people than others, studies suggest that anyone can learn to cope better

Some folks weather devastating experiences--captivity, torture, illness, loss--with uncanny serenity

By studying these serene people, researchers have found that they share distinctive habits of mind

- They tend to focus on immediate issues rather than global ones
- They find ways to rationalize (many view their ordeal as a special assignment from God)
- They tend to have an optimistic "explanatory style"
- Assume their troubles are temporary versus permanent
- Problems are specific versus universal
- Credit themselves when things go right while externalizing their failures

Even pessimists can learn to modulate the stress response with meditation, massage, exercise and social support

**Headliners: Nocebo versus Placebo????**

The nocebo effect has been identified as how negative beliefs or conditioned responses can have a profoundly negative impact on health

Opposite of the placebo effect in which a patient tends to see his/her condition improve even when given an inactive treatment

Joshua L. Straus, M.D., an assistant professor at Northwestern University Medical School in Chicago believes many adverse reactions to certain medications can be exacerbated by the nocebo effect

**Meditation**

Breathing techniques coupled with relaxing one muscle at a time ("scanning") has been shown to lower cortisol levels and decrease blood pressure and heart rate

Your Turn

- Take several slow deep breaths and exhale completely
- Scan
- Repeat a self-affirmation phase

**Massage**

Over the past 25 years, researchers have shown that massage therapy can hasten weight gain in premature infants, improve lung function in asthmatics, and bolster immune function in HIV patients

Premature infants, massaged regularly for 10 days, gained 47% more weight than other preemies--and left the hospital 6 days earlier!

Your Homework

- Seek out weekly massages--10 minutes to one hour--to lower stress and muscle tension
- Consider massage therapy in the dental setting

### **Social Support**

Having a friend's supportive presence in a stressful situation helps reduce anxiety by working with "anti-stress hormones" in the body

Your Turn

- Seek support from friends and family when needed
- Do NOT take on the stressors of the world at the expense of your own health and well-being!
- Establish a supportive patient rapport to decrease anxiety in the dental setting

### **Exercise: #1 Stressbuster!**

Exercise releases accumulated cortisol and stabilizes insulin levels

Combats low mood--a major side effect of stress

Promotes better sleep

Prevents weight gain (deep apple)

Exercise is known to increase the body's production of endorphins, improve oxygen supply to the brain and release tension from muscles

Your Turn

- Take the stairs
- Brisk 10 minute walks are very beneficial
- Turn off the television
- Play

Getting in touch with your system's rhythms will allow you to enter a trancelike state that can relax your mind and body as effectively as meditation

Your Turn

- Place one hand on your heart
- Feel for your heartbeat
- With the other hand, tap along with the beat
- The longer you tap, the more you'll find your body relaxing

### **Turn off the TV**

Watching too much TV can TRIPLE our hunger for more possessions while reducing our personal contentment by about 5% for every hour a day we watch

45% of words consumed come from television—the next biggest contributors are computers (26%), radio (11%), print media (9%) and phone conversations (5%)--Discover; 4/10

**Headliners: Study Explains Why TV is Bad for Kids; Iowa State University; study results published in Science Daily; 10/10; as reported by Maureen Dempsey; MacClatchy Newspapers; appearing in the Idaho Statesman; 10/5/10**

An investigation into the effects of hours of TV viewing and video game playing has on children's attention spans revealed that the rapid pace of imagery involved in both technologies increases difficulty for children to focus on non-video life

'Brain science demonstrates that the brain becomes what the brain does. If we train the brain to require constant stimulation and constant flickering lights, changes in sound and camera angle, or immediate feedback, such as video games can provide, then when the child lands in the classroom where the teacher doesn't have a million-dollar-per-episode budget, it may be hard to get children to sustain their attention.'--Researchers comment This Iowa State University study recommended limiting children's video intake to two hours per day—much less than the University of Michigan's studies that reported children aged 2-5 spent 32 hours per week in from of a TV and children aged 6-11 spent ~28 hours

Two other studies demonstrated that turning off the TV burns extra calories—up to 840 calories a week without doing more exercise!--As reported by Mehmet Oz and Mike Roizen ('The You Docs'); appearing in the Idaho Statesman; 2/8/10

On average, Americans and Canadians watch 5 hours of TV a day—when asked to cut viewing in half, study participants burned an average of 120 calories a day REGARDLESS of how they used their non-TV time

**Headliners: Fake Electrocutation Game Jolts France; Jamey Keaton; reporting for the Associated Press; appearing in the Idaho Statesman; 3/18/10**

A French TV channel stirred controversy with a documentary about a fake game show in which participants obeyed orders to deliver increasingly powerful electric shocks to a man until he appears to die

The producers of 'The Game of Death' wanted to examine both what they called TV's 'mind-numbing power to suspend morality, and the striking human willingness to obey orders'

'Television is a power. We know it, but it's theoretical. I wondered: Is it so important that it can turn us into potential executioners?'--Producer Christophe Nick

Recruiters found 80 contestants who were told they would take part in a real TV show called Zone Xtreme

Each was presented to a man said to be another contestant—in reality an actor—whose job was to answer a series of questions while strapped into an electrifiable chair in an isolated booth

Participants were instructed to administer electric jolts of increasing intensity when the actor answered incorrectly As wrong answers piled up, and the voltage increased, the actor pleaded: 'Get me out of here, please! I don't want to play anymore!'

The actor finally stopped answering the questions being posed and fell silent despite the electric jolts

In the final tally, 81% of the contestants turned up the juice to the maximum—said to be potentially deadly

### **Believe in Yourself**

- Across all ages and all groups, a solid belief in one's own abilities increases life satisfaction by about 40% and makes us happier in our home and work lives

### **Enjoy What You Have**

- People who have the most are only as likely to be happy as those who have the least
- People who like what they have, however, are TWICE as likely to be happy as those who actually have the most

### **Have Fun!**

- Having fun is one of the five central factors in leading a satisfied life
- Fun types are 20% more likely to feel happy on a daily basis and 36% more likely to feel comfortable with their age and stage in life
- According to a recent study published in Psychological Science, seeing positive words activates the smile muscles in your face and may even boost your mood
- Researchers found that verbs that spell happiness—such as 'grin' and 'smile'—activated the facial muscles corresponding to those actions; negative words had the opposite effect

### **Keyboards Stop Stress**

Playing a keyboard is so relaxing, its effects can be seen at the most basic cellular level

'Stress can activate the DNA markers linked to everything from cancer to ulcers, and playing the keyboard is THREE times more effective at shutting off stress than passively watching TV or reading.'--Dr. Bickman; as reported in Woman's World; 6/23/08

According to a recent State University of New York (Buffalo) study, **cuddling with your pet zaps stress!**

The reason???

- Our pets love us unconditionally—putting us much more at ease and less guarded when we are with them
- The study demonstrated that when our pets are around, we perform better on complicated tasks like solving math equations
- Another bonus: Living with a cat lowers the risk of heart attack by 40%!!!!

'(S)He who laughs, lasts.'--Mary Pettibone Poole

The power of a smile is priceless—it transcends race, age and gender to connect all living things

It is an indisputable fact that you can trigger activity in the “happiness centers” (limbic lobe) of your brain with a deliberate smile as surely as you can trigger a smile with happy thoughts

**Sometimes the best approach is to just let go**

Think of someone who cannot swim and finds themselves in water—the natural inclination is to panic

But the solution is to relax and float

**What works????**

The key, experts agree, is to combat feelings of helplessness

Anything that fosters a sense of control lets you stop feeling like a victim

And when that happens, your body stops treating itself like one

Your Turn

- List five things that you are happy about
- Share your list
- Make a difference

**THANK YOU!**