

MUSCLE TONE/TENSION: INFLUENCING FACTORS

Psychological stress

- Chronic pain sufferers, (LBP, TMJ) experience increased muscle tension only in the painful muscles in response to personally stressful experience (not generalized to other muscle groups!).
- Also demonstrate increased guarding of the painful area in the presence of painful stimulus elsewhere (hand).

Lack of sleep

- Reduction in normal levels of growth hormone
- Responsible for failure of muscle to repair
- Resulting in observable muscle micro-damage, subsequent pain

Nutritional & Metabolic Factors

Deficiency

- Value outside the normal range
- Easily recognized
- Often associated with a clinical syndrome

Insufficiency

- Within the normal range
- Suboptimal for an individual
- Associated with symptoms but challenging to recognize

Adequate nutrition is a fundamental requirement for the maintenance of health and the treatment of disease. The human body needs at least minimum amounts of 40 essential nutrients to sustain life including water- and fat-soluble vitamins, minerals, essential amino acids, essential fatty acids, nitrogen, carbohydrates, fats, and protein.

The body operates as an integrated biochemical system in which there is simultaneous requirement for all the essential nutrients. Biochemical pathways consist of sequences of individual reactions where various nutrients are needed for specific reactions within a pathway.

If all the needed nutrients are available in adequate supply except one, the entire pathway function is blocked!

Hypothyroid

Thyroid Stimulating Hormone (TSH)

- Norm = 0.5-5.5 ISU
- Individual optimal range quite narrow
 - > 3.5 ISU associated with muscle pain
 - Also, coldness, dry skin/hair, fatigue, constipation
 - Medication that lowers to 2.25 leads in marked decrease in muscle pain, improved endurance

TSH

Essential role in regulation of Na⁺/K⁺-ATPase pumping, ion cycling

Chronic stress leads to hypo-activation of H-P-A axis leading to decreased levels of T3

Iron insufficiency

Common condition: occurs when muscle ferritin is depleted.

Symptoms: muscle aching, tiredness, unusual fatigue with exercise, sense of coldness

Seen in

- 9-16% females
- 19-22% Hispanic & African American females
- Vegans
- Chronic intake of NSAIDs

Initial stage of deficiency: 15ng/ml Anemia: 10ng/ml

Restless leg syndrome: <50ng/ml

Disturbed sleep AD/HD: <45ng/ml

Iron insufficiency: iron requiring enzymatic reactions are limited, leading to local energy crisis when muscles are exposed to excessive mechanical stress.

Upper limit in men & premenopausal women: 150ng/ml Postmenopausal women: 300ng/ml

Statin-class drugs

- Associated with myopathy in 2/3rd of subject group (n=<36,000)
- Impair mitochondria leading to mitochondrial calcium leak and an altered regulation of the sarcoplasmic reticulum

Vitamin d insufficiency

Commonly associated with chronic nonspecific musculoskeletal pain

- Muscle weakness
- Myofibrillar protein degradation
- Reduced muscle mass
- Osteoporosis Serum 25(OH)D levels
- > 25ng/ml = optimal
- 20-30ng/ml = insufficiency Study, n=150 patients
- 90% < 20ng/ml, 28% < 8ng/ml

Vitamin b12 insufficiency

Common, affecting 15-20% of individuals with chronic myofascial pain Norm = 200-1200 pg/ml

Symptoms can occur < 350 pg/ml

- Cognitive dysfunction
- Degeneration of spinal cord
- Peripheral neuropathy
- Widespread myalgia

Summarized from:

Dommerholt J, Gerwin R. Nutritional and Metabolic Perpetuating Factors in Myofascial Pain. In: *Myofascial Trigger Points*, Dommerholt J, Huijbregts P, eds. Jones and Bartlett Publishers; Sudberry, Massachusetts. 2011; 25-29.

Gut and Membrane Health

Probably the most important thing butter can do for us health-wise is that it protects the mucosal linings of the lungs, sinuses, intestinal tract, and other areas of the body better than other oils. The mucosal lining is essential for keeping us healthy. It provides a barrier in the body to keep organisms like *e. coli* (naturally found in the intestinal tract, and unnaturally in contaminated foods) from entering and being absorbed where they do not belong. Mucosa also manufactures immunoglobulin A (IgA), which binds heavy metals we come in contact with (and there are a lot, but that's another topic!), and also supports our entire immune system. A deficiency of IgA will leave us vulnerable to infections.

If the mucosal lining is damaged or destroyed in our bodies, we can develop sinus infections, bladder infections, irritable bowel syndrome, Crohn's disease or even more commonly yeast infections. Margarine will not help with this because it has the wrong types of fats to rebuild mucosal lining.

Mucosa Rebuilder

YOU'LL NEED:

- Mixer/Blender if no mixer
- 1 stick of fresh butter, softened. Do not use margarine or butter blends
- 1/2 cup extra virgin olive oil
- 10 capsules of Pro-Biotic (acidopholus, "friendly" bacteria), 10 capsules Colostrum, 6 capsules
- Glutamine & 4 capsules Zinc Carnosine (Pepzin GI)
- 1 Tbsp. raw/unfiltered honey

PROTOCOL:

- Mix ingredients together
- Store mixture in the refrigerator
- **For the first 2 days eat 2 tablespoons per day. Then eat 1Tbsp per day for 4 days, then maintain at 1 heaping tsp per day**
- May eat straight from spoon or put-on food, but don't heat the mucosa rebuilder

RATIONALE:

Friendly bacteria normally reside in the fatty layer of the intestinal mucosa. When these layers and the friendly bacteria become depleted, the body's immune function deteriorates. This protocol helps restore the intestinal mucosa.

Your body uses friendly bacteria, glutamine, zinc carnosine and oils to rebuild the mucosal lining of your bowel. The colostrum binds free iron, so it isn't available to bacteria. A healthy mucosa is critical for a strong immune system.

This protocol is particularly important after one has taken antibiotics.

Provided with gratitude to The Institute for Health Realities

More information and supplements can be obtained at <https://www.Designed2Win.com/>

OPTIMIZING SLEEP

Many people have experienced the fatigue, bad mood or lack of focus associated with loss of sleep. Studies have shown that not getting enough sleep can be even more hazardous to health than simply having an off day. Not getting enough sleep on a regular basis is associated with medical conditions such as obesity, diabetes, high blood pressure, and heart disease. Sleep issues have also been linked to mood disorders such as depression, anxiety, and mental distress. Not getting enough sleep slows recovery from injury and at the same time it increases the experience of pain.

Achieving regular good sleep improves overall health and optimizes recovery from injury or surgery. The following are recommendations for optimizing your sleep.

During the day:

- Exercise regularly; 30 minutes of mild to moderate aerobic exercise requires healthy energy and leads to stress reduction. Avoid intense exercise just before bed as it can have energizing effects.
- Best to avoid caffeine after 12 noon. Caffeine, as well as nicotine and alcohol, are stimulants that can keep you from getting restful sleep. While alcohol may initially help you fall asleep, too much can disrupt your sleep quality later in night and can make you wide awake at 1 or 2 in the morning.
- Plan to go to bed and wake up at the same time every day- including the weekends & holidays. This maintains your body's natural circadian rhythm, or your sleep-wake cycles.

Before bed:

- Avoid stressful media, including the news, 30 minutes prior to bed and do not fall asleep in front of the TV.
- Limit fluid intake before going to sleep to prevent awakening to urinate.
- Make your sleeping environment comfortable – dark, quiet, and cool. Eye shades or ear plugs can be beneficial.
- Develop a routine that helps you relax before bed: read, dim lights, meditate, listen to quiet music, drink a bedtime tea (1/4 cup steeped for 5 minutes) and/or take a warm bath.



- Aroma therapy can be helpful; sleep balms, pillow sprays, and flower essences enhance relaxation.
- Bedtime supplements, taken one hour before going to sleep, can be helpful. Consider melatonin or other supplements that have multiple ingredients to include chamomile, melatonin, tryptophan, valerian and passionflower. The multiple ingredient supplements help with relaxation and staying asleep.
- Practice diaphragmatic breathing: inhale to the count of 4 and exhale to the count of 4 for 5 repetitions.

THE HEALING PROCESS

In today's world of Instant Messaging, and next day deliveries, individuals occasionally have similar expectations of the body's healing process. "Mind over Matter" outlook typically allows about a 2-week time-frame, after which one thinks they should be better and ready to go after an injury or even after surgery.

Particularly related to musculoskeletal conditions, healing from an injury or a surgery follows a timeline that is determined by nature. By nature, certain structures heal at specific rates. Age, sleep, exercise, and nutrition further influence the healing process. Age cannot be changed, and therefore must be taken into consideration when viewing healing rates; for each decade after 30 years of age, one to two weeks should be added to the healing process.

As one heals, attending to Matter (being the body) over Mind is of utmost importance. It is normal to be fatigued during the healing process; an individual has a finite amount of energy to expend each day. If that energy is going toward a healing process, there will be less for other "normal" daily activities. Furthermore, the effects of general anesthesia can have general fatiguing and brain-fog consequences for months after a surgery; if multiple surgeries have been undergone within a short time frame, these effects are even more pronounced. The following is of utmost importance in the healing process:

1. **Get 7 to 9 hours of sleep per night.** During the 24-hour day, there is normally a balance between degradation and renewal; the activities of wakefulness enhance degradation, while sleep shifts the balance to renewal. Deep sleep stimulates the release of most of our growth hormone, essential to enhance formation of red blood cells and bone. Cell division and protein synthesis reaches maximal levels during the sleeping hours. When tissues have been damaged, the rate of healing is greater during sleep.
2. **Hydration: drink 10 8-oz glasses of water per day.** Nearly two thirds of the human body is made up of water and fluid. This includes 90 percent of blood, 80 percent of the brain, 73 percent of muscle, 60 percent of skin, and 22 percent of bone. When you go for as little as a few hours without replenishing the water in your body, it impacts all your body's processes, even causing dehydration, characterized by headaches, fatigue, the feeling of extreme hunger, and foggy memory. Water cleanses your system, detoxifies your cells, and acts as a giant cooling system to regulate your body temperature and carry oxygen and nutrients to all the thirsty cells. Keep fresh lemon slices in the refrigerator to use for added flavor in your water. (Bonus: lemon has proven antiviral and antibacterial properties.) In one hour, have another glass of water. Now you've had two glasses of water, and you are well on your way to healing your dehydrated body. If you are reading this in the middle of the day, have 16 ounces (two cups) right now. Aim for eight ounces (one cup) every hour until bedtime. Keep drinking until your urine is clear.

3. **Nutrition:** The impact of diet and nutrition on human health is not new. Eating right healing (nutrient-rich) foods in a right way can virtually help is every medical condition. Nutrition-healing is simply giving yourself the best possible intake of nutrients to allow your body to be as healthy as possible and to work as well as it can. Avoid fast foods.

Here are some simple considerations:

Anti-inflammatory foods help the body get rid of inflammation not only at the site of injury but throughout the entire system as well. Inflammation is what makes the injury sore and can be responsible for those general aches and pains felt on a daily basis. Anti-inflammatory foods can help your entire body feel better. Consider adding more of the following to your daily intake:

- Fruits like blueberries and any dark berries like strawberries, raspberries, or blackberries; cherries; grapes
- Nuts
- Olive oil, avocados, and tomatoes
- Vegetables like broccoli, cauliflower, mushrooms, as well as bell and chili peppers
- Salmon and other fatty fish like sardines and anchovies
- Green tea, about two cups per day are recommended
- Spices like turmeric and curcumin

There are also foods that provide necessary **building blocks for healing and restoring connective tissue.**

- Bone broth; this can be used for any liquid in cooking such as when cooking rice or making a soup or stew. It is beneficial drinking in a cup by itself throughout the day.
- Protein, the highest amounts which are found in animal meat and eggs, seafood, and nuts
- Now, in order to break down these proteins, add one or more of the following fruits to your meal or snack: pineapple, kiwi, mango, or papaya. If these fruits don't appeal to you, consider taking a vitamin B12 supplement.

4. Gentle Aerobic Exercise: 15 minutes daily.

Aerobic Exercise is a form of natural health and healing therapy that aims to promote natural health- it is considered an alternative and natural treatment used to enhance a happy and healthy lifestyle. Aerobic exercise is longer duration activity than Anaerobic requiring higher levels of stamina but not necessarily great physical strength. The word Aerobic means at it's simplest 'with Oxygen' reflecting the intention of a practitioner to increase the ability of the cardiovascular system to extract and deliver oxygen to the needed muscle groups. Aerobic exercise burns calories very effectively without dramatically increasing muscle growth. Aerobic exercise concentrates on building stamina and endurance by improving the cardiovascular system and avoids the oversteering of any parts of the body. The heart, lungs and veins are the target of aerobic exercise; these are responsible for ensuring that sufficient oxygen reaches the muscles enabling us to perform physical tasks over extended periods time.

NOTES:

MUSCULOSKELETAL CONSIDERATIONS

Various structures of the body heal at different rates. When recovering from injury or surgery, understanding and respecting the rate of recovery of each structure provides reassurance in terms of what is being experienced. An injured structure and a structure recovering from injury often provoke similar types of pain or discomfort.

Healing times:

1. **Bone:** 8 to 10 weeks for fracture, up to 3 years to achieve normal density (this explains why a fractured ankle can be painful after prolonged walking/running up to several years later)
2. **Ligaments:** when torn or surgically cut: 6 weeks for “weak” healing, another 6 weeks for that structural healing to be strong. When a ligament is not injured, turn over time is 300 to 500 days (important to know when wearing a brace to correct a hypermobile/lax joint)
3. **Muscle:** 6 weeks for initial healing, another 12 weeks to reach maximal strength
4. **Nerve:** 2 to 4 years. In the initial months healing nerves can be very painful. Often the nerve pain manifests as muscle spasm, either in the form of a constant contraction, or via a sudden “Charlie horse” type spasm that is momentarily debilitating.
5. **Cartilage:** 5 years, and the new structure is fibrous rather than hyaline, which makes it more susceptible to load.
6. **Intervertebral discs:** 6 months, depending on the level of degenerative changes. In the presence of a herniate disc in the neck with arm pain, it takes 4 months for the arm symptoms to resolve. For the lumbar spine, it takes 6 to 10 months for leg symptoms to resolve. In instances of a clinical hypermobility, it takes 2 years to stabilize.
7. **Immobilization of any joint:** Note that if the joint undergoes a period of immobilization of even a minimum of one week, it will be one year before the joint is completely normal again on a cellular level. Because most joints are immobilized after surgery, expect to feel “completely normal” at 1 to 2 years after surgery.

PHARMACEUTICAL CONSIDERATIONS

Antibiotics

Side effects of antibiotics include stress of the immune system. In addition, they affect the renal system's ability to remove waste and push fluid through the body. When on antibiotics, understand that your body is not only healing, but also fighting infection. Thus, the healing process will be slowed even more as energy is required to fight the bacterial infection. Furthermore, a course of treatment involving antibiotics can lower resistance to other infections of a communicable nature. So, it might be advisable to avoid gyms etc.

Because of the compromise to the renal system, lowering of the intensity of exercise to a point where heavy hydration isn't required would be a good idea.

Finally, changing or raising your metabolic rate through exercise can influence the effectiveness of some antibiotics. When you exercise you raise your metabolic rate, and this affects the way the drug is metabolized too. The effectiveness of many drugs is directly a result of how your body metabolizes them. Ask your physician or pharmacist about exercising while on antibiotics.

Gentle aerobic exercise, without creating fatigue, is most advisable.

Anti-inflammatories

The jury is still out on the beneficial effects of anti-inflammatory medications and the healing process. Studies have shown that anti-inflammatories inhibit bone and cartilage growth. On the other hand, a joint that has sustained a trauma and is diagnosed with a synovitis, or a joint with an old history of cartilage degeneration would generally benefit from anti-inflammatories as a hot and swollen joint will soften and further compromise the joint cartilage.

Inflammation is an important part of the initiation and facilitation of the healing process. In the first 10 to 14 days after an acute muscle or ligament tear, anti-inflammatories should be avoided.

Corticosteroid can be very beneficial to an irritated nerve and can actually help to reverse the damage. Very often, however, the nerve is more painful for 10 to 14 days after being bathed with the corticosteroid fluid.

OTHER CONSIDERATIONS

Time Frames after Surgery/Injury. Given the considerations listed above, healing after surgery will occur at a steady rate. It can be enhanced by getting appropriate sleep, nutrition, and water intake, but it cannot be accelerated. When recovering from surgery, respect the healing process and follow the “Matter (Body) over Mind” principle: listen to your body and let it guide your activity level.

First two weeks after surgery/injury: Most important during this time is to control swelling. At all costs, keep swelling to a minimum. This is best achieved by:

1. Elevating the extremity
2. Cool pack application: 10 minutes per hour, of cool – not ice – application. Temperatures below 65° F stop lymphatic flow, and lymphatic flow is needed for good healing.
3. Wear pressure garment/wrap, if possible
4. Gentle massage, preferably manual lymphatic drainage. Make sure the strokes move up the limb toward the trunk.

Weeks 3 to 6 after surgery/injury: Remember, this is a time of initial and weak healing of the structures. Control swelling as noted above, but gradually reducing to a frequency of once to twice per day (by week 6). This may be the time to regain range of motion, gently, if indicated. Because the healing is weak, aphysiological cross links in the connective tissue (adhesions or scar tissue) can be easily stretched. Healing optimally is the goal of this phase.

2nd 6 weeks: during this time frame, the weakly healed tissues gain strength – not to be confused with muscle strength. Rather, the tissues themselves become stronger, such as the ligaments and bone structures. This is the time frame within which range of motion must be restored; after this time frame, increasing range of motion will be possible but increasingly difficult. Goals during this period are to control swelling and gain full range of motion. Returning to normal daily activities is the goal of this phase.

3rd 6 weeks. Now the healing process itself is strong, and increased loads can be applied. This is where strengthening can progress, and exercises can become more vigorous, focusing on bulking muscle and increasing agility. Gradual return to recreational and medium to heavy work/house/yard activities is the goal of this phase and should take up to 6 months.

RETURN TO ACTIVITIES AND/OR EXERCISE FRAMEWORK

During this period, all healed and weakened structures will go through a period of fatigue as they strengthen. Fatigue is good, but overload and reinjury is not good. Unfortunately, the initial sensation is nearly the same. Ligaments speak the same language whether they are injured or just tired. The same is true for almost all other structures. As a result, it is the duration of discomfort after an activity that will allow for designation of fatigue versus overload, and for subsequent progression or modification of the exercise/return to activity program.

- Note that fatigue pain generally lasts about 48 hours, and injury pain generally lasts over 4 days (if the structure has been overloaded, and has undergone microtrauma as a result, symptoms will last longer than 4 days).

In general, start with a level of 25% (duration and load OR weight and reps) of 1) your last work-out/activity prior to your injury/surgery OR 2) your work-out/activity goal.

First day: Perform the exercise/activity (remember maximum 25% of original intensity).

Second day pain is worse scenario: If symptoms are increased, do not exercise or repeat that activity. Take a day of rest.

Second day no change in symptoms scenario: If symptoms remain the same as day 1 prior to exercise/activity, you can do it again on this day and even increase your intensity level by 10%.

Third day: If symptoms are back to the original level, repeat the same level exercise/activity as day 1. Continue with the program of day of exercise, and then day of rest if symptoms increase for 24 to 48 hours. Do not increase the level of exercise until there is no change in symptoms the next day.

Third day: If symptoms are still increased from the first day, do not exercise. Wait until the symptoms return to the initial starting level. If it takes longer than 2 days to recover, reduce the intensity of exercise/activity by 50% once symptoms are back to their initial level. Follow the guidelines above.

Repeat the above cycle of assessing symptom level and progression. Essentially,

- 1) If there is no change in symptoms, progress at your next exercise/activity session by 10%.
- 2) If there is an increase in symptoms that lasts 48 hours or less, stay at the same level of exercise/activity. Rest for 1 to 2 days between each session.
- 3) If there is an increase in symptoms of 3 days or more, wait until symptoms return to baseline, then return to activity with DECREASED intensity level by 50%.

Jet Lag Protocol -- Do this 3 consecutive days every week

You'll Need:

- An alarm clock
- Flashlight
- Newspaper with sunrise times
- Melatonin in 3mg capsules - if recommended by your health practitioner
- On three consecutive mornings, set the alarm clock for dawn. See your newspaper to know when the sun rises.
- When the alarm wakes you, get up and sit at bedside. Shine the flashlight in your face, looking directly into the light with a blank stare for 30 seconds.
- Get up and start your day. Do not go back to sleep!
- At noon, go for a walk for twenty minutes. Don't wear sunglasses or a hat.
- Go to bed no later than 11:00 p.m.

Rationale:

Many factors come into play that may cause the day/night chemistry to get confused. When this occurs, such as when we fly to the opposite coast, we call it jet lag.

The same set of circumstances can occur through engaging in shift work or if you are experiencing pain at night that is keeping you awake.

Surgery, stress, fatigue, poor diet, travel or hormone imbalances can cause day/night body chemistry to become confused.

This protocol stimulates the brain in a way that resets day/night chemistry. Resetting the body clock is important towards making repairs and allowing pain to subside. This protocol is designed to speed along this circadian correction.

The body is designed to break itself down during the daytime and to repair at night while you sleep. To accomplish this feat the body chemistry must be decidedly different during the night than it is during the day.

Cortisol, for instance, rises during the day to raise blood pressure, promote energy and to serve as a natural anti-inflammatory (holding off repair until night).

OPTIMIZING SLEEP

Along with prescription sleep aides, the following natural aides can be helpful. These are suggestions only and can be used solely or in combination. Trying different products will help determine what is just right for you.

Night time tea:

- While it is suggested to limit fluid intake prior to going to sleep, a relaxing tea at night can be made into an 'elixir' by putting the bag in ¼ cup hot water and letting it steep 5 minutes. Teas on the market include:
 - Traditional Medicines: Nighty Night Extra (organic)
 - Celestial Seasonings: Sleepytime
 - Yogi: Bedtime (organic)
 - Harney and Sons: Herbal Peppermint, also helps with indigestion.
 - Taylor's: Chamomile (organic)<https://www.prevention.com/health/sleep-energy/g29322910/best-tea-for-sleep/>

Sleep Supplements

- Melatonin is commonly used to aide in sleep. There are many supplements with a number of helpful ingredients that work together to enhance mood, relax, ease stress, help fall asleep and help stay asleep. Beneficial ingredients include: Valerian, L-Theanine, GABA, Chamomile, 5-HTP, Lemon Balm, Lavender, Magnesium, Melatonin. Some examples are:
 - SNAP: Sleep Complex
 - PrimalHarvest: Primal Sleep
 - Hyland's: Calms Forté
 - Vital Nutrients: Sleep Aide
 - Jarrow: Sleep Optimizer
 - <https://www.webmd.com/sleep-disorders/ss/slideshow-natural-sleep-remedies>
- Stress Supplement that Aides in relaxation and restful sleep, and helps stabilize the stress hormone cortisol to support a healthy stress response:
 - Integrative Therapeutics Cortisol Manager
 - <https://www.integrativepro.com/products/cortisol-manager>

Aromatherapy

- Aromas are helpful with relaxation and when applied at night can be a great adjunct to other sleep helpers. Balms are rubbed on chest, neck and/or pulse points. Some sleep balms include:
 - Badger Lavender and Bergamont Sleep Balm
 - Mountain Rose Herbs Dream Balm
 - Little Moon Essentials: Sleep Comes Easy<https://www.healthline.com/health/what-is-aromatherapy>
<https://www.webmd.com/balance/stress-management/aromatherapy-overview#1>

Bach flower remedies:

- Dr. Edward Bach created a product of essences from flowers that can help lift mood and ease stress. Related to sleep, there is the:
 - Rescue sleep, that helps stop repetitive thoughts and fall asleep naturally.<http://www.bachflower.com/>