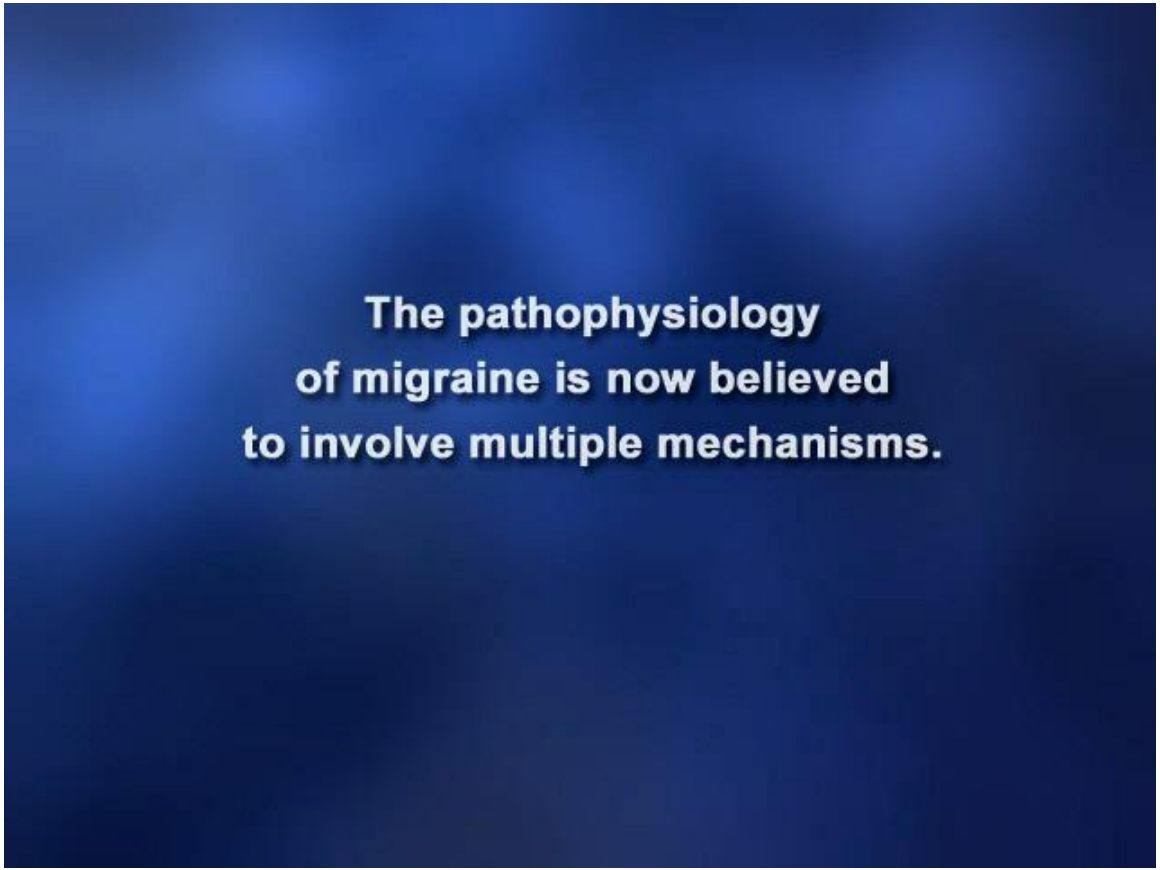
(Non-Surgical) Cutting Edge Treatment for Neck and Back Pain

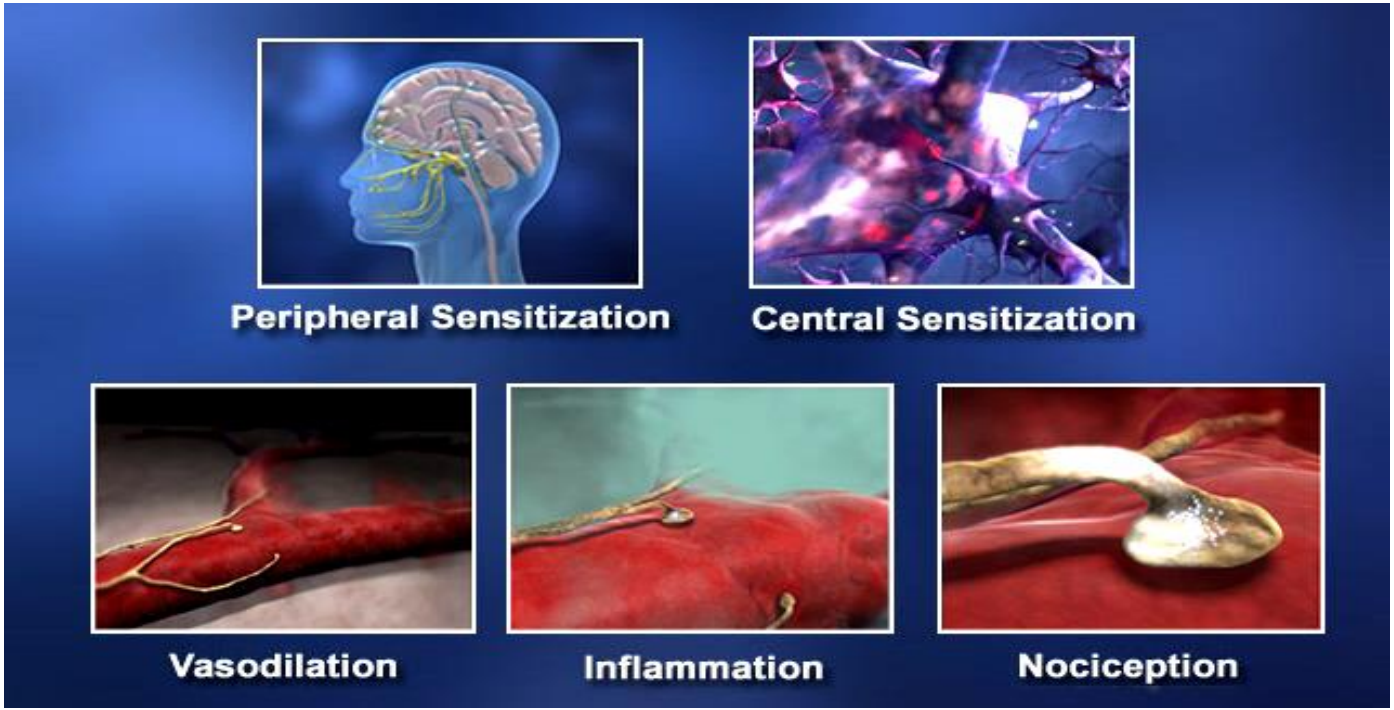
Anthony Pribila, PT, DSc, CMPT, CMP, CEAS

Therapeutic Rehab Specialists

What's new in Headache treatment?



Migraine



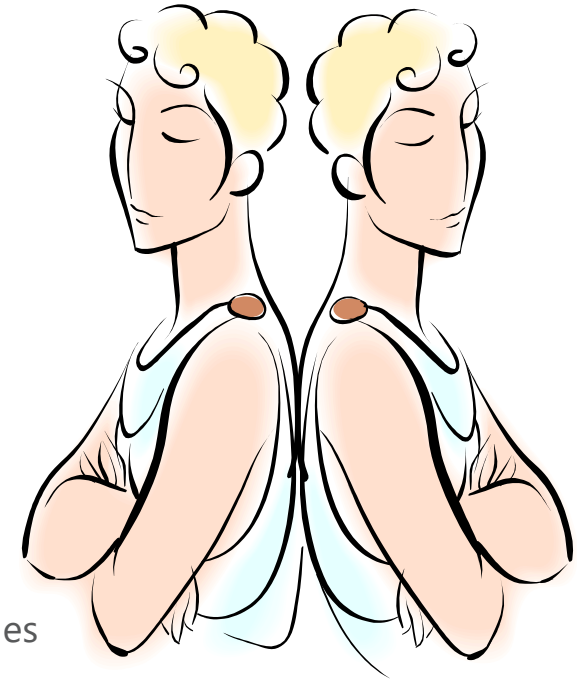
Theory of the Migraine HA process

- Prostaglandin causes platelet aggregation
- ↑release of the neurotransmitter serotonin; which signals vasoconstriction in blood vessels to the brain.
- Causes cerebral ischemia > ↑ acidosis which leads vasodilation.
- Vasodilatation of the innervated arteries results in HA, & inflammation in the meninges which prolongs the HA.
- Then a ↓ in platelet aggregation occurs and = lowered serotonin levels causing ↑ vasodilatation.
- This stimulates the brain's trigeminal nerve to trigger the release of calcitonin gene-related peptides to further inflame blood vessels & activate the meninges pain receptors. This leads to persistent migraine headache.

Differences in

Migraine

- Characterized by aura
- Nausea/vomiting
- Cold like symptoms
- Responds well to medication
- Pulsating
- More sensitive to light
- Hormonal connection
- Varied location
- Minimal loss of mobility
- Usually, no radiological changes

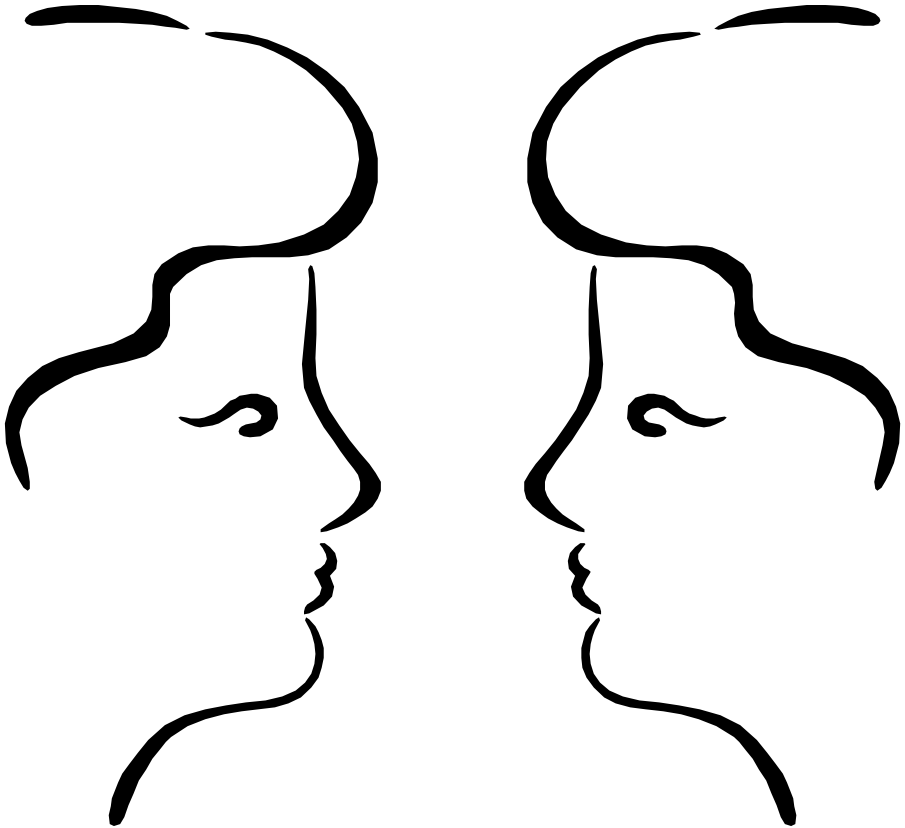


Cervicogenic

- Increased with positional special or rep. neck movements
- Tenderness in neck
- Sensitive to sound
- Pain with stretch or contracture
- Reduced neck mobility
- Usually unilateral and in same location
- May have radiological changes

Similarities in Migraine vs. Cervicogenic

- Head pain
- Genetic predisposition
- Can be a combination of the two
- Either can be unilateral or bilateral
- Often debilitating

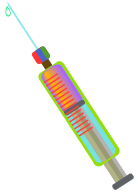


Migraine Headache Causes & Characteristics

- Occur most often in the 25 -55 y/o females
- Also triggered by a drop in pressure with rainy, snowy, or humid weather, or (-) ions.
- Food triggers such as alcohol, MSG's, milk, asparmatine, chocolate or caffeine.
- Some experts believe that migraine sufferers have a vulnerable nervous system which is acutely vulnerable to either external stimuli or internal (stress) stimuli.
- Carbon monoxide exposure is another sometimes missed cause of migraine

Migraine Headache Drugs

- Medications such as (Triptans): Imitrex, Zomig, Maxalt, Axert, Frova, and Relpax.
- Antiseizure medications are also helpful: Topamax. Midrin is acetaminophen plus a muscle relaxant and a drug to shrink swollen blood vessels.
- Antidepressants: Prozac and elavil are also often prescribed in addition to Beta Blockers such as Lopressor, Toprol-XL, Corgard, Inderal and Tenormin.
- Narcotics used for severe migraines are: Percocet, Oxycodone, Vicodin, Lortab, and Demorol. Migranal is inhailible and injectable and is as effective as Imitrex, but takes longer to act.(Caution with Imitrex in cardiac pt.)
- Botox injections can give up to 3 months of relief.



PT's Role in Migraine Treatment

- Relaxation therapy: yoga, meditation and biofeedback can help in those migraineurs affected by stress.
- In these individuals migraines often occur after the period of stress is over; people can learn how to decrease stress induced muscle tension through an electrical (biofeedback) device.
- Dr. Otto Warburg demonstrated that he was able to turn normal, healthy cells into malignant cells simply by lowering O2 levels.
- Deep Breathing tech. to cleanse your system. You should breathe in this ratio: inhale for a five sec, hold for 15 sec, and exhale 10 sec. Hold 3x as long as you inhale to fully oxygenate the blood and activate your lymphatic system. Exhale 2x as long to eliminate toxins via your lymphatic system. Less toxins may = less headaches.
- PT manual therapy treatment is not typically effective unless stress is the trigger.

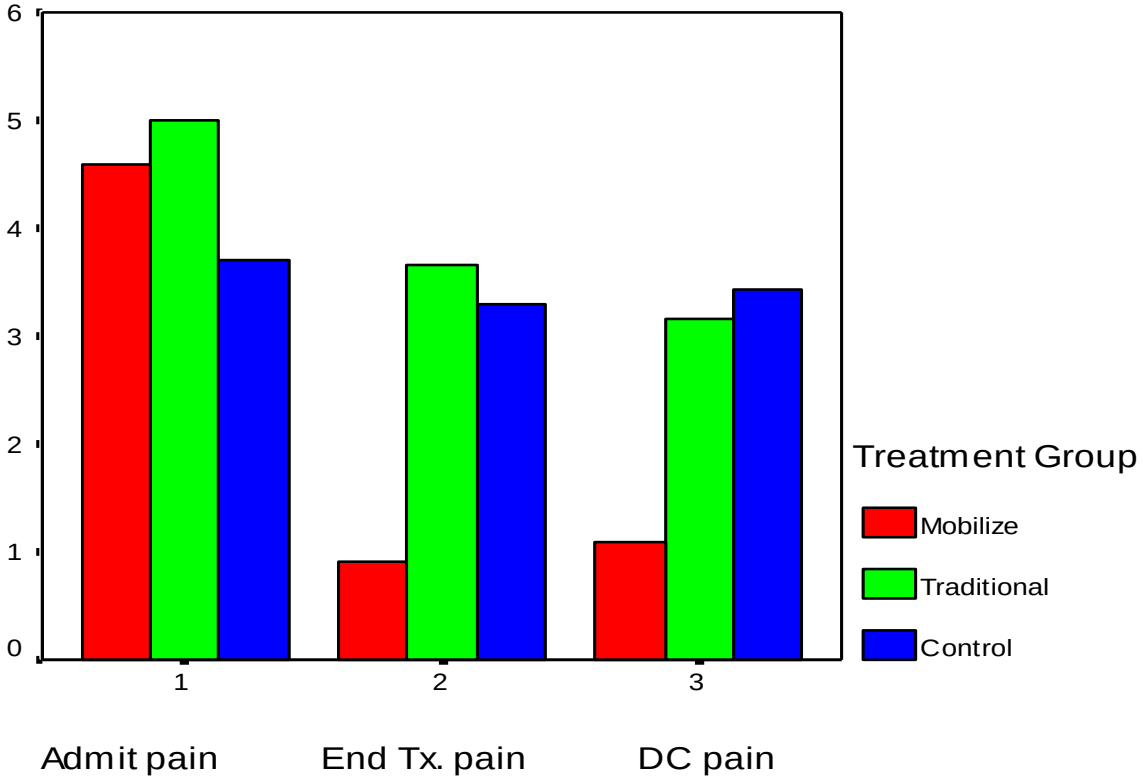
C. Ha. RESEARCH STUDY (Results)

- Of the 25 subjects with cervicogenic headaches 15 had (B) headaches.
- 18 of the 25 subjects tested showed the C ½ region as the main contributor of cervicogenic headaches.
- 58% of the mobilization group demonstrated less frequency of headaches or (< 50% of pre Rx. HA freq.)
- Increases in range of motion in both the traditional and mobilization group were found to be higher than in the control group. 96% of the mobilization group showed ↑range of motion. 67% of the Trad. Group showed an ↑, and 50% of the control group demo an ↑.

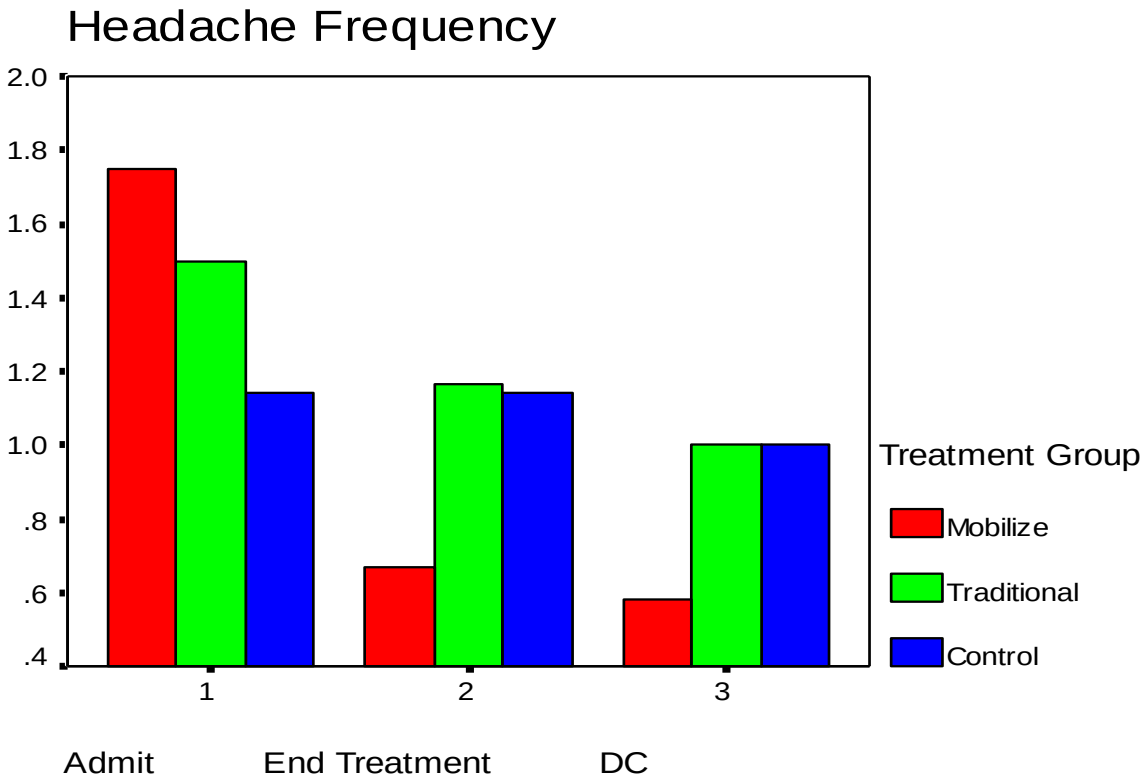
THE RESEARCH STUDY (Results)

- 83% of individuals in the mobilization group demo. At least a 50% reduction in pain with 58% reporting full relief.
- 33% of the traditional group demonstrated a 50% reduction in pain. 17% demo. full relief.
- 14% of the non-treatment or control group demonstrated a reduction of headaches, while 0% demo. a full relief of HA's. Of this amount 57% reported increased HA's or no relief.

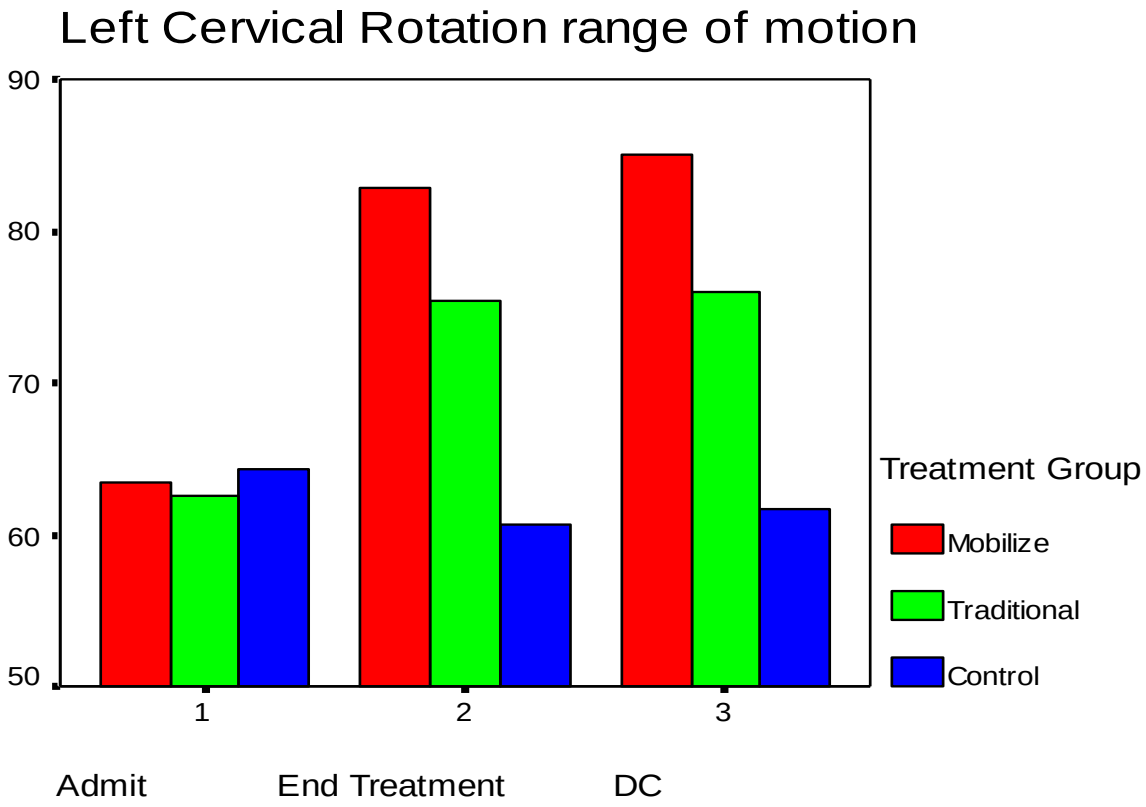
Subject pain levels from admit through end treatment to discharge.



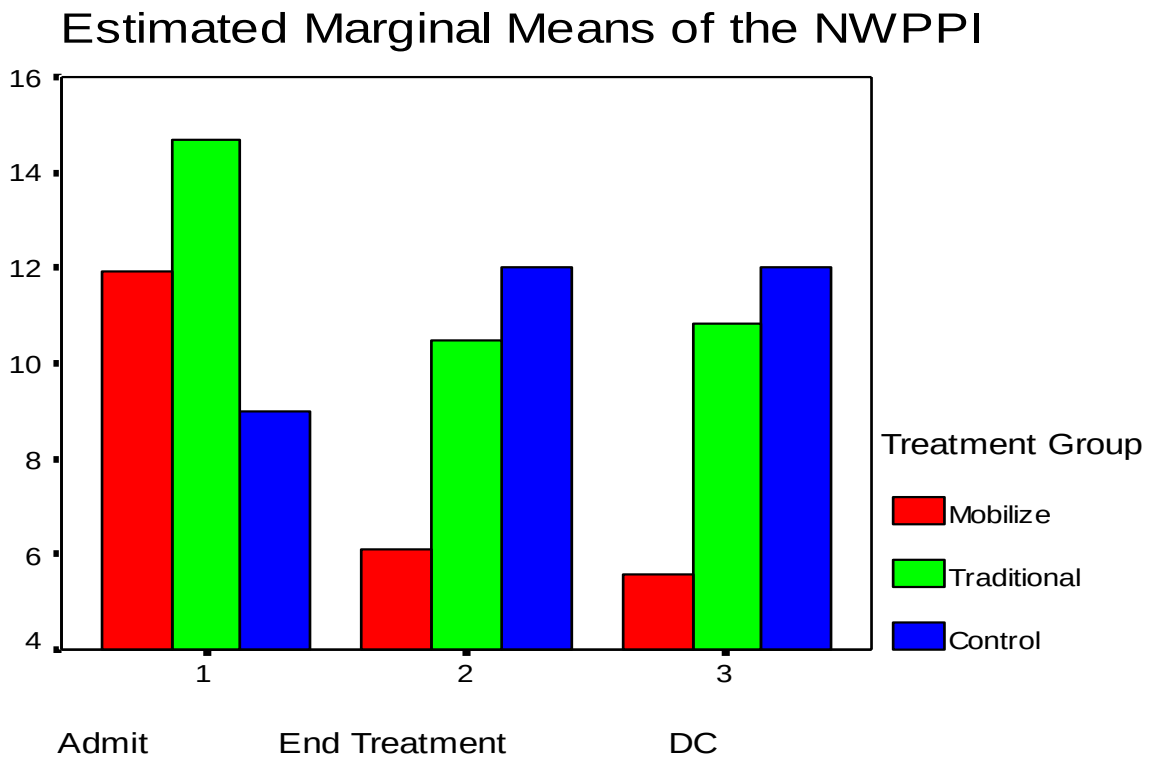
Estimated Marginal Means of Headache Frequency per day



Means Left Cervical Range of Motion from Admit to through Discharge.



Means for the Northwick Park Pain Index Admit through DC



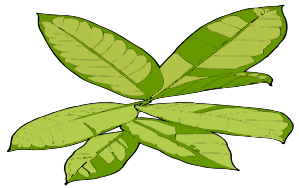
Poll Question #1

Which Types of Headaches Effectively Treated with Physical Therapy

1. Cervicogenic
2. Cervicogenic / Migraine with or w/o aura (combo)
3. Cervicogenic/tension (Combo)
4. Cervicogenic/cluster (Combo)
5. Tension
6. TMJ
7. All of the above

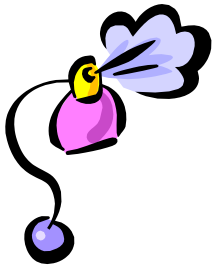
Migraine Headache Natural Remedies

- (200-300 mg) TID of magnesium orally has been found to ↓ intensity and duration of migraine headaches, but not occurrences. Cayenne pepper is a good source of magnesium. [Do not take magnesium supplements if you have kidney problems]
- Calcium has also been found beneficial in up to (2000 mg a day).
- For those migraineurs with depression and epilepsy some natural remedies often used in decreasing depression are: Tryptophan or 5-Hydroxytryptophan @ 50 mg BID (↑ serotonin production), and Tyrosine @ 500 mg BID. Zinc, B 12 and Omega 3 fatty acids are also often used.
- feverfew plant = 25% decrease in migraines & ↓ in symptoms. ↓ serotonin and prostaglandin production.

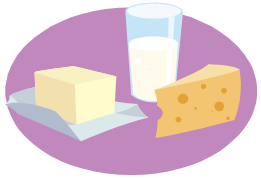


Lifestyle & Prevention

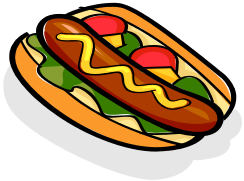
- Keeping a migraines log especially while on vacation can be important in determining environmental causes.
- Avoiding possible allergies to things such as cigarette smoke, strong odors, dust, cold air, mold, certain carpets, paint and perfume.
- Oversensitivity to plastic is an often-overlooked factor.
- Prepare for bad weather conditions by taking medication.
- If you're sensitive to light use sunglasses, and a hat.
- If you're sensitive to humidity purchase a dehumidifier.
- Irregular sleep and eating schedules can be a trigger migraine headaches.
- weather.com/activities/health/achesandpains/ and type in your zip code to find out if air pressure is changing for your area.



Foods to Avoid

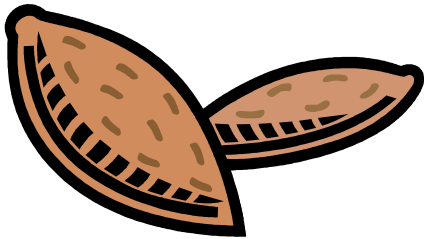


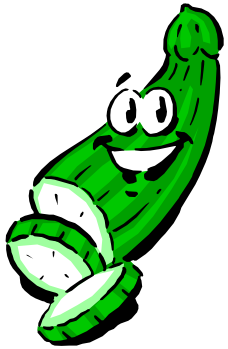
- Diet may need to be changed to organic fruits and vegetables if the person is sensitive to pesticides.
- Common food allergies: wheat (gluten intolerance) dairy, corn, soy, eggs, chocolate, sugars, citrus, and nightshades (eggplant, peppers, tomatoes, potatoes).
- Other foods can be aged cheese, salty foods, or foods that contain tannin; such as avocados, dark beer, red wine, and nuts.
- Foods with artificial sweeteners (aspartame), Sulfites (used on restaurant salad bars), Nitrates (hot dogs, ham, bologna) [capillary dilators] and MSG's (some oriental foods) may need to be avoided. High carb diets including bread, citrus foods, and spicy foods.
- Try Omitting foods containing the amino acid Tyramine including aged meats, avocados, bananas, beer, cabbage, canned fish, dairy products, eggplant, hard cheeses, potatoes, raspberries, red plums, tomatoes, wine and yeast.



Foods to Eat

- Foods found to be non-acidic and with a high electrical charge include Almonds, almond milk, watercress, parsley, cucumbers, fennel, garlic, cherries, blueberries, drinking purified water with lemon, wheatgrass, broccoli, asparagus, spinach, sprouts, salmon, halibut, beets, green tea, apples and green bell pepper. The goal is to alkalize and energize.
  http://www.thewolfeclinic.com/pdf/Alkaline_Food_Chart.pdf





Food Sensitivity Testing

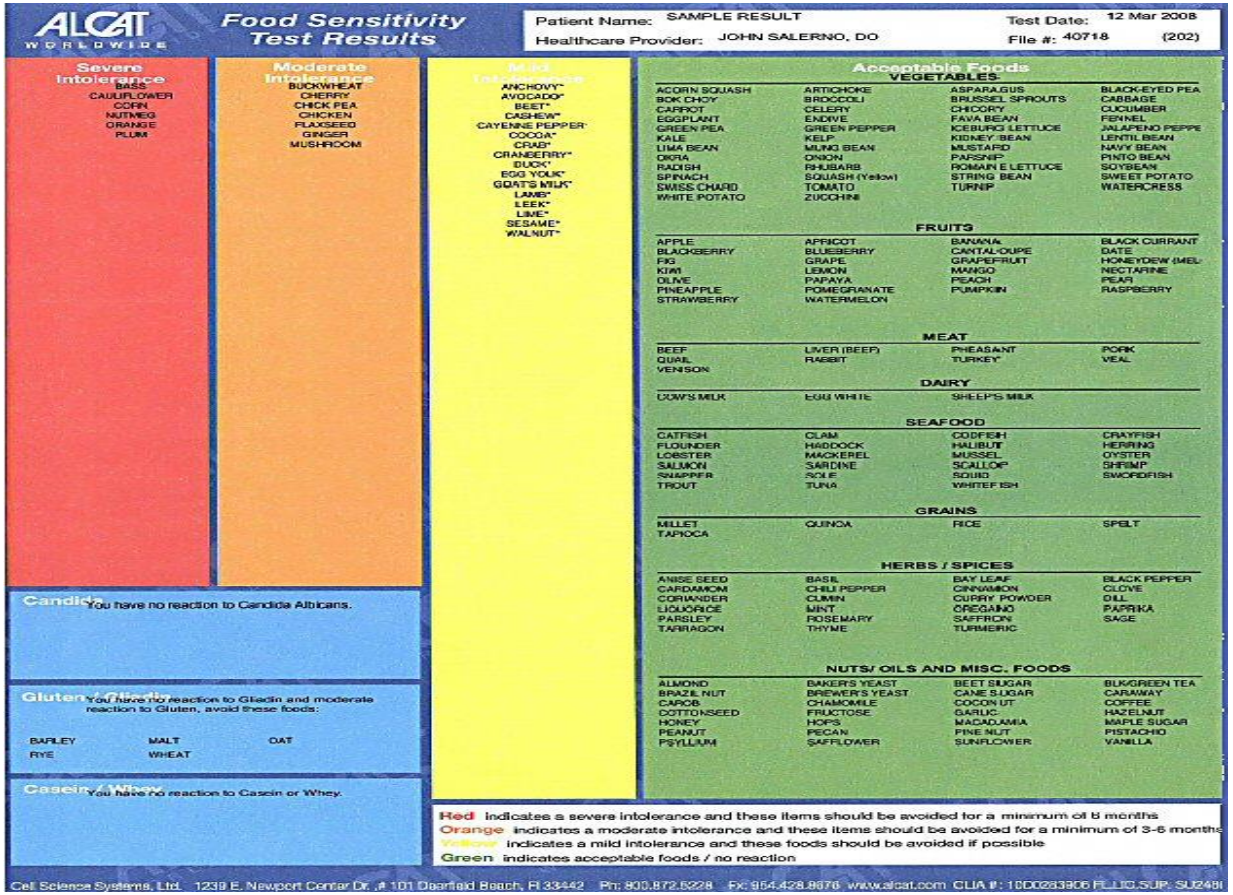
- Identifies foods & substances that provoke a negative cellular response.
- When a food or chemical triggers neutrophil activation in vitro (or not) suggests that in vivo it may be responsible for the release of mediators associated with inflammation.
- With repeated consumption, can develop into a chronic systematic inflammatory response and the constant activation of the immune system.
- Inflammation can create chronic conditions that can go undiagnosed and untreated for years: Weight issues, fatigue, migraines, headaches, IBS, depression, arthritis, skin disorders, acid reflux, sinus, asthma, and many more.

ALCAT BLOOD TEST

- Most accurate way to identify antigens that provoke a negative cellular response
- Direct link to systematic inflammation and constant activation of the immune system
- Test for reactions to over 400 antigens, including Foods, Environmental Chemicals, Food Additives & Colorings, Molds, Functional Foods and Medicinal Herbs, Pharmocoactive agents
- Proven results with patient compliance to rotation diet

ALCAT WORLDWIDE

Results



ALCAT WORLDWIDE

Food Sensitivity Test Results

Patient Name: SAMPLE RESULT
Test Date: 12 Mar 2008
Healthcare Provider: JOHN SALERNO, DO
File #: 40718 (202)

Severe Intolerance
BASS
CAULIFLOWER
CORN
NUTMEG
ORANGE
PLUM

Moderate Intolerance
BUCKWHEAT
CHERRY
CHICK PEA
CHICKEN
FLAXSEED
GINGER
MUSHROOM

Mild Intolerance
ANCHOVY*
AVOCADO*
BEET*
CASHEW*
CAYENNE PEPPER*
COCOA*
CRAB*
CRANBERRY*
DUCK*
EGG YOLK*
GOAT'S MILK*
LAMB*
LEEK*
LIME*
SESAME*
WALNUT*

Candida
You have no reaction to Candida Albicans.

Gluten / Gliadin
You have no reaction to Gliadin and moderate reaction to Gluten, avoid these foods:

BARLEY MALT OAT
RYE WHEAT

Casein / Whey
You have no reaction to Casein or Whey.

Acceptable Foods

VEGETABLES

ACORN SQUASH	ARTICHOKE	ASPARAGUS	BLACK-EYED PEA
BOK CHOY	BROCCOLI	BRUSSEL SPROUTS	CABBAGE
CARROT	CELERY	CHICORY	CUCUMBER
EGGPLANT	ENDIVE	FAVA BEAN	FENNEL
GREEN PEA	GREEN PEPPER	ICEBURG LETTUCE	JALAPENO PEPPE
KALE	KELP	KIDNEY BEAN	LENTIL BEAN
LIMA BEAN	MUNG BEAN	MUSTARD	NAVY BEAN
OKRA	ONION	PARSNIP	PINTO BEAN
RADISH	RHUBARB	ROMAINE LETTUCE	SOYBEAN
SPINACH	SQUASH (Yellow)	STRING BEAN	SWEET POTATO
SWISS CHARD	TOMATO	TURNIP	WATERCRESS
WHITE POTATO	ZUCCHINI		

FRUITS

APPLE	APRICOT	BANANA	BLACK CURRANT
BLACKBERRY	BLUEBERRY	CANTALOUPE	DATE
FIG	GRAPE	GRAPEFRUIT	HONEYDEW (MEL
KIWI	LEMON	MANGO	NECTARINE
OLIVE	PAPAYA	PEACH	PEAR
PINEAPPLE	POMEGRANATE	PUMPKIN	RASPBERRY
STRAWBERRY	WATERMELON		

MEAT

BEEF	LIVER (BEEF)	PHEASANT	PORK
QUAIL	RABBIT	TURKEY	VEAL
VENISON			

DAIRY

COW'S MILK	EGG WHITE	SHEEP'S MILK

SEAFOOD

CATFISH	CLAM	CODFISH	CRAYFISH
FLOUNDER	HADDOCK	HALIBUT	HERRING
LOBSTER	MACKEREL	MUSSEL	OYSTER
SALMON	SARDINE	SCALLOP	SHRIMP
SNAPPER	SOLE	SQUID	SWORDFISH
TROUT	TUNA	WHITEFISH	

GRAINS

MILLET	QUINOA	RICE	SPELT
TAPIOCA			

HERBS / SPICES

ANISE SEED	BASIL	BAY LEAF	BLACK PEPPER
CARDAMOM	CHILI PEPPER	CINNAMON	CLOVE
CORIANDER	CUMIN	CURRY POWDER	DILL
LICORICE	MINT	OREGANO	PAPRIKA
PARSLEY	ROSEMARY	SAFFRON	SAGE
TARRAGON	THYME	TURMERIC	

NUTS/ OILS AND MISC. FOODS

ALMOND	BAKER'S YEAST	BEET SUGAR	BLK/GREEN TEA
BRAZIL NUT	BREWER'S YEAST	CANE SUGAR	CARAWAY
CAROB	CHAMOMILE	COCONUT	COFFEE
COTTONSEED	FRUCTOSE	GARLIC	HAZELNUT
HONEY	HOPS	MACADAMIA	MAPLE SUGAR
PEANUT	PECAN	PINE NUT	PISTACHIO
PSYLLIUM	SAFFLOWER	SUNFLOWER	VANILLA

Red indicates a severe intolerance and these items should be avoided for a minimum of 6 months
Orange indicates a moderate intolerance and these items should be avoided for a minimum of 3-6 months
Yellow indicates a mild intolerance and these foods should be avoided if possible
Green indicates acceptable foods / no reaction

Cell Science Systems, Ltd. 1239 E. Newport Center Dr. # 101 Deerfield Beach, Fl 33442 Ph: 800.872.5228 Fx: 954.428.8676 www.alcat.com CLIA #: 10D0283906 FL LIC.SUP. SU2481

Food Sensitivity Reactions

- Dose dependent
- Delayed onset (4 -72 hours)
- Multiple foods can cause symptoms
- Single elimination trials are useless
- NO universal bad or good foods – very patient specific
- ALCAT Food Sensitivity Testing identifies those "triggers"

The Role of Breathing in Health

- Poor breathing has been shown to be related to asthma, insomnia, obesity, ED, anxiety, ADHD, digestive problems and HTN
- Inhalation is sympathetic ns. dominant
- Exhalation is parasympathetic ns. dominant
- Light, **diaphragmatic** nasal breathing with minimal sighing improves health and overall wellness.
- Goal is a B.O.L.T. Blood O2 level test score of 40 (sec)

The BOLT Score

- B.O.L.T. score is obtained upon a.m. waking and is how long you can hold a breath without straining after an exhalation.
- Take a normal breath through the nose
- Hold your nose shut
- Time the # of sec. until you have the desire to breathe again
- Release the nose and stop the timer

How to improve your BOLT score

- Diaphragmatically breathe through the nose and not mouth (pm mouth taping/guard)
- Stop sighing and yawning (swallow instead)
- Observe light breathing throughout the day (breathe light 2 breathe right)
- Nose unblocking exercise (5-6 reps of breath hold with gait then resume nasal breathing)
- Simulate High Altitude Training throughout the day and with walking w/ breath holds (20-100 paces) > 15 sec. of minimal breathing > NL breathing 30 sec. Repeat 8-10x

What's New in Stress Management and Sleep Therapy

- Chronic pain sufferers will almost always have sleep dysfunction and suffer from some form of anxiety.
- Stress alone is said to be the cause of 85% of disease (NEJM)
- 50-90% of chronic LBP sufferers have some form of depression.

What's New for Stress and Anxiety Management?

NuCalm®

How NuCalm Works

- NuCalm® is a safe, proven neuroscience technology that quickly relaxes you without using narcotics or controlled substances. NuCalm naturally brings your body to the pre-sleep states characterized by deep relaxation and idleness.
- NuCalm leverages biochemistry, neurophysiology, and physics to suspend the mind and body in parasympathetic nervous system dominance – the only state that allows your body to recover, heal, and rebuild.

4 components synergistically bring the body to a deep state of calm

- GABA topical cream dietary supplement relaxes by counteracting adrenaline.
- Microcurrent (C.E.S.) electrodes placed behind mastoid pr. to help facilitate neurotransmitter release for relaxation. (now w/ discs)
- Noise-dampening headphones w/ neuroacoustic software brings your brain wave pace from Beta (12-25 Hz) to the pre-sleep stages (12Hz -4Hz). (Alpha to Theta waves)
- Light-blocking eye masks negate visual stimuli to maintain the relaxation state.

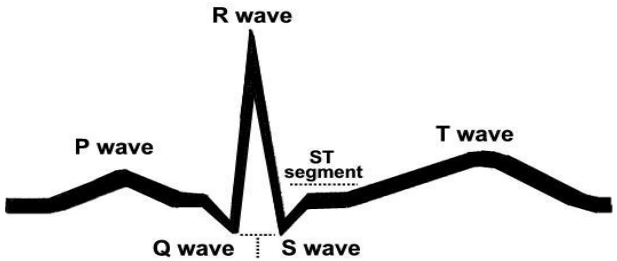
Brain wave EEG frequencies

- Gamma: (25-60 Hz) Conscious perception, present during decision making and memory
- Beta: (12-25 Hz) Dominate normal waking cognitive tasks, decisions and present with anxiety
- Alpha: (7-12 Hz) Present with dreaming, relaxed state of learning and creativity. Resonates at 7.83 Hz- same as the earth
- Theta: (4-7 Hz) Deep meditative state where stress is decreased, learning and intuition are enhanced.
- Delta: (0-4 Hz) Slowest but highest amplitude generated during the deepest dreamless sleep, and meditation. Essential for GH release, healing, inner peace and regeneration.

NuCalm takes you from Alpha to Theta in as little as 5 min.

How is it measured?

- Heart Rate Variability (HRV) and ECG scanning
- Heart rate is controlled by the vagal N. through SNS (w/ stress) / PNS (w/ rest)
- R/R intervals are measured of the QRST complex
- Overstrained and stressed individuals have ↓ R/R intervals with ↑ Hr. and higher LF (SNS) dominance to HF (PNS) (LF/HF) ratio's.



Health benefits of NuCalm:

- Stress reduction (reduced production of cortisol) ↓ SNS, and ↑ PNS activity
- Improved attention
- Better memory and creativity
- Increased immune system function
- Improved restorative sleep quality
- Balanced biological clocks and circadian rhythm
- Resolve neuromuscular tension
- Reconcile emotional stress

Post Concussion Treatment Advances

- Stage 1 is associated with metabolic and physiologic changes occurring in the post concussive individual such as ↑ heart rate with and without activity, ↑ sympathetic and ↓ PNS, ↓(HRV) which reflects the brain to heart sympathetic and parasympathetic nervous system balance.
- Nu-Calm, (HRV) testing (Stage 1-2 50-60% MHR → stage 5 90% MHR)
- Touch points- tactile vibration therapy
- Retraining of nasal diaphragmatic breathing with/without activity
- Balance, vestibular rehab and cognition training
- (HRV) assessed prior, during and post exercise.
- Nutrition- Fish oil, Zinc, Melatonin, Mg, Phosphatidyl Chol., D3, B-Complex, Vegan Protein, Curcumin
- Pulsing red LED light therapy
- Cranial cryotherapy
- Manual therapy- trigger point and joint mobilization

Myofascial Pain Syndrome

- Studies show ↑ed ms. ph similar to DOMS w/ ↑ed Ach. = muscle contraction.
- This ↑es (inflammation) w/ Substance P and CGRP
- The most prominent muscles leading to headaches: SCM, Traps, and Lev. Scap.
- The most prominent muscles leading to back pain: QL, Paraspinals, Multifidus and Piriformis
- Constricting clothing: tight bra, headband

Intramuscular Dry Needling's in Myofacial Pain Treatment

- Dry Needling is accepted internationally as a tool of physical therapy
- Dry Needling is a therapeutic treatment procedure that involves inserting a filament needle into the muscle that typically contains a 'Trigger Point'. A healthy muscle feels very little discomfort.
- An unhealthy muscle may feel a muscle cramp -- referred to as a 'twitch response'.

Intramuscular Dry Needling

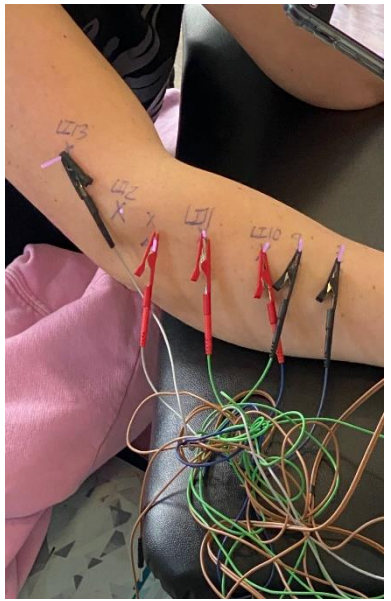
- The twitch response has a biochemical characteristic to it which likely affects the reaction of the muscle, symptoms, and response of the tissue.
- A reproduction of pain can be a helpful diagnostic indicator of the cause of the patient's symptoms.
- Deactivating the trigger point, reduces pain, restores normal length and function of the involved muscle. (E-stim calms tension >STM > Stretching > Ice to reduce inflammation)

Intramuscular Dry Needling

- Positive results are apparent in 2-4 sessions but can vary depending on severity and duration of S & S.
- Dry needling is an effective treatment for acute and chronic pain, rehabilitation from injury, and even pain and injury prevention, with very few side effects. This technique is unequaled in finding and eliminating neuromuscular dysfunction that leads to pain and functional deficits.

Dry Needling Research

- Dunning J, Butts R, Young I, Mourad F, Galante V, Bliton P, et al. Periosteal electrical dry needling as an adjunct to exercise and manual therapy for knee osteoarthritis: a multicenter randomized clinical trial. Clin J Pain 2018;34(12):1149–58.
- Christopher J. Standaert , MD , * Janna Friedly , MD , † Mark W. Erwin , DC, PhD , ‡ Michael J. Lee , MD , PhD Exercise Acupuncture, and Spinal Manipulation for LBP Spine 2011 ; 36 : S120 – S130
- Dunning J . DN-1: Dry Needling for Craniofacial, Cervicothoracic & Upper Extremity Conditions: an Evidence-Based Approach. Montgomery, AL: Dry Needling Institute of the American Academy of Manipulative Therapy; 2012:256.
- Dunning J, Butts R, Henry N, Mourad F, Brannon A, Rodriguez H, et al. (2018) Electrical dry needling as an adjunct to exercise, manual therapy and ultrasound for plantar fasciitis: A multi-center randomized clinical trial. PLoS ONE 13(10)
- JAMES DUNNING, DPT, PhD, FAAOMPT1,2 • RAYMOND BUTTS, DPT, PhD1,3 • CÉSAR FERNÁNDEZ-DE-LAS-PEÑAS, PT, PhD4,5 J. Orthop Sports Phys Ther 2021;51(2):72-81. Epub 28 Aug 2020. doi:10.2519/jospt.2021.9785



Intramuscular Dry Needling

- Functional Dry Needling/Trigger Point Dry Needling is pending or has currently been accepted in the scope of practice for physical therapists in ALL states except California, Nevada, Tennessee. Hawaii and Florida has received approval in 2020.

Other causes of Myofascial Pain

- Vitamin and nutritional inadequacies: C, D, B1, B6, B12, folic acid, iron (serum ferritin) found in liver, muscle and bone
- Hyperthyroidism, hyperuricemia, and hypoglycemia.

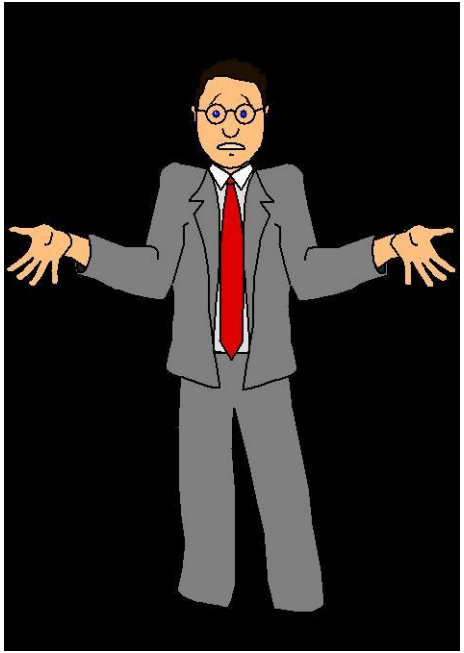
Drug Side Effects

- Hypercholesterolemia statins (lipitor crestor)
- Bisphosphonates- Boneva
- Antihyperglycemic drugs (metformin)

Identifying the perpetrators

What does this mean?

- Pain can arise from any of these structures and be referred to any of the segmentally associated tissues.
- The trigeminal-cervical nucleus connection can also refer pain and alter sensation in the face/head.

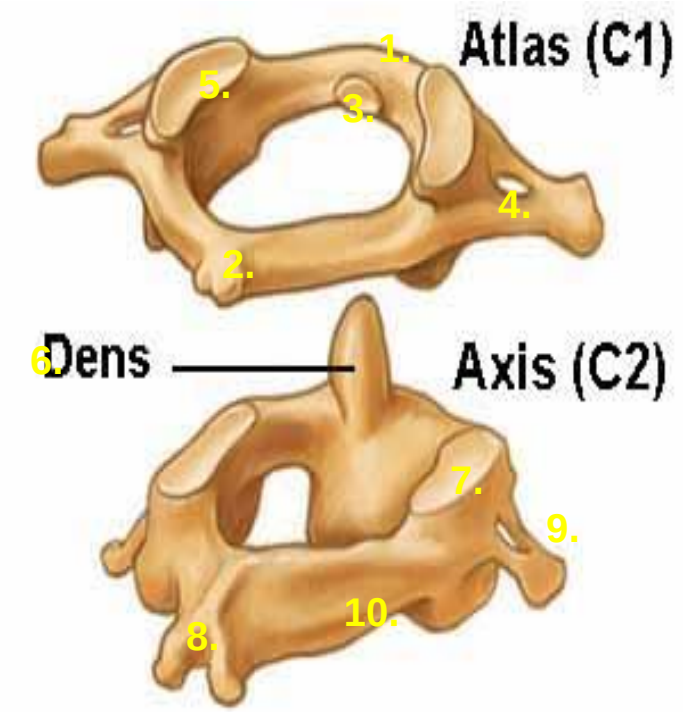


Combination (Cervicogenic) Headaches

- Can be a migraine or other headache with a cervicogenic headache at the same time.
- Could be one type at one time and another at another time.
- Are 71.2% Cervicogenic / Migraine with or w/o aura vs.. cervicogenic/tension: 17.3% and cervicogenic/cluster: 7%.

The upper cervical spine

- Anterior Tubercle
- Posterior Tubercle
- Facet for Dens
- Transverse Foramen
- Superior articular facet for occiput condyles
- Dens (Odontoid Process)
- Superior articular facet for atlas
- Spinous process
- Transverse foramen
- Lamina



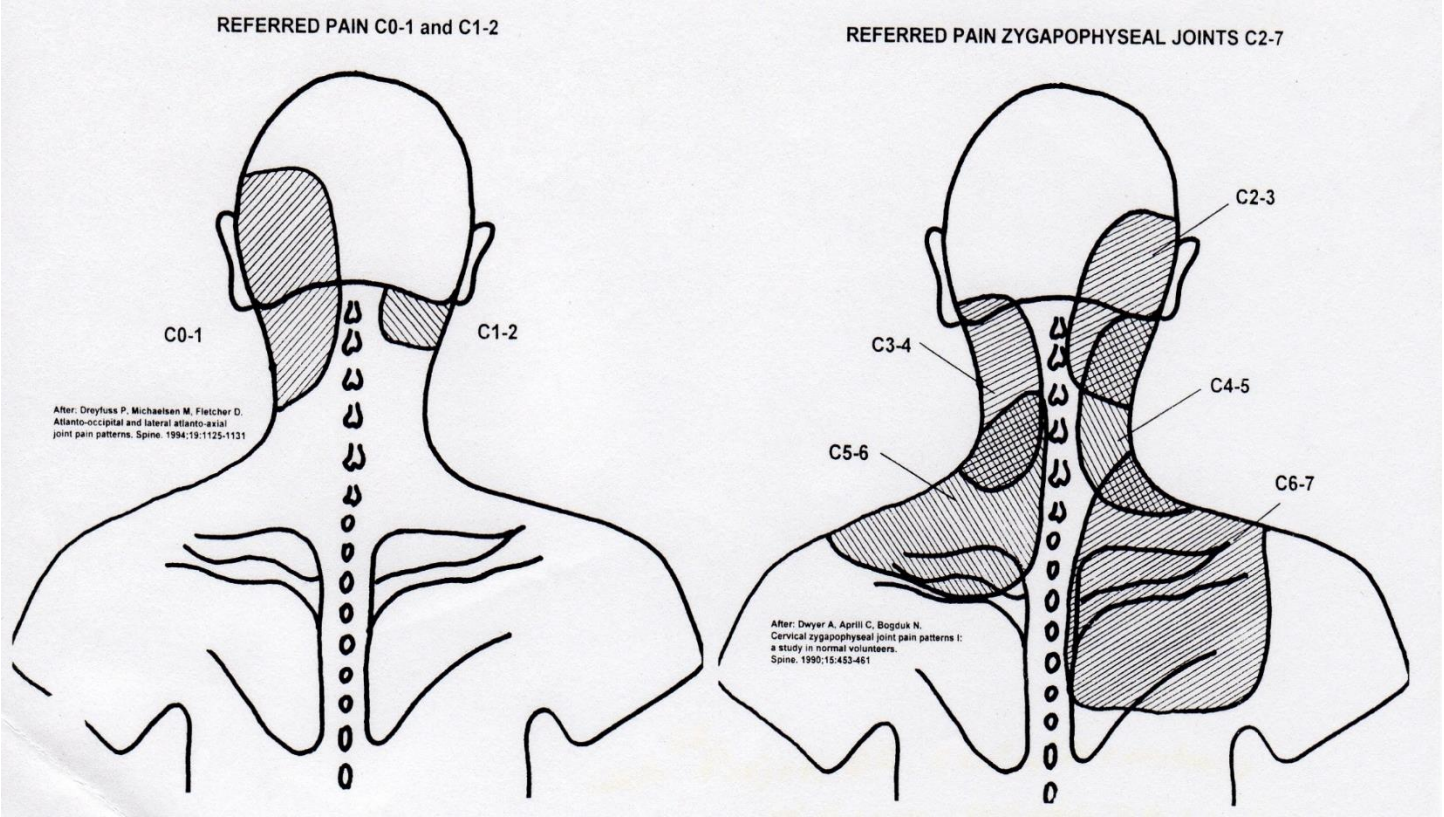
Most common intervertebral segments leading to cervicogenic headaches

- Headaches from (C0/1, C ½, and C 2/3) were nearly 3 times more likely from PA pressures over the joint than from the lower cervical segments.

Capsular /Joint dysfunction

- Past degeneration may be activated by stress or microtrauma.
- Lower cervical dysfunction often includes some form of hypomobility of the upper cervical segments.
- Stiff segments can be stretched.
- Loose segments cannot be tightened with PT. > (sx. or prolotherapy / PRP)

Referred Pain Patterns of the Zygapophyseal joints



Have you been listening?

Poll Question 2

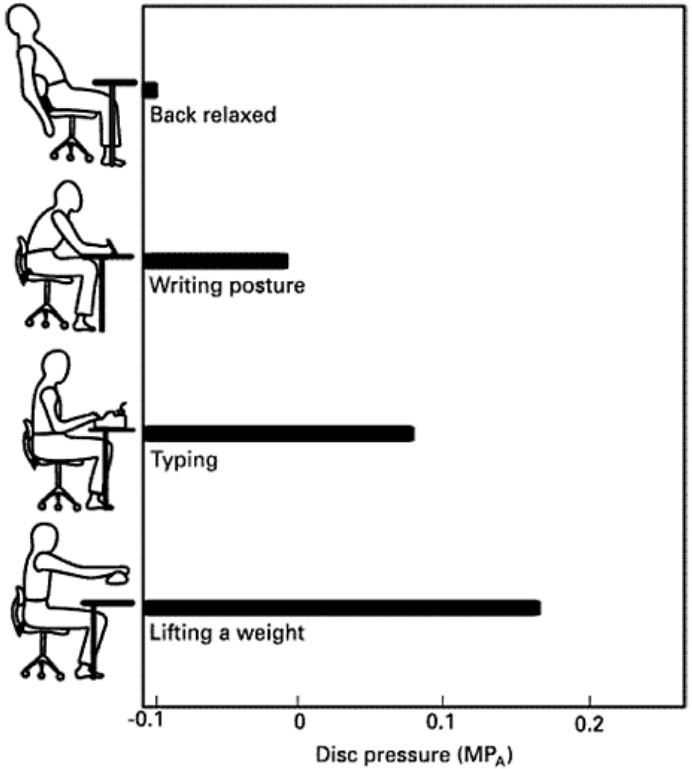
Using the information so far, which level of the cervical spine is most effectively treated with manual therapy for cervicogenic headache relief?

- C ½ region
- C 2/3 region
- C 3/4 region
- C 0/1 region

• The C ½ region

The effects of poor posture and an unbalanced spine

- It allows progressive stress and strain to body structures
- Impedes circulation
- Results in unnecessary muscle fatigue
- Leaves a person more vulnerable to unexpected influences and perturbations
- Studies show no correlation between excessive lumbar lordosis and LB pain



Percentage of lumbar spine flexion on various postures

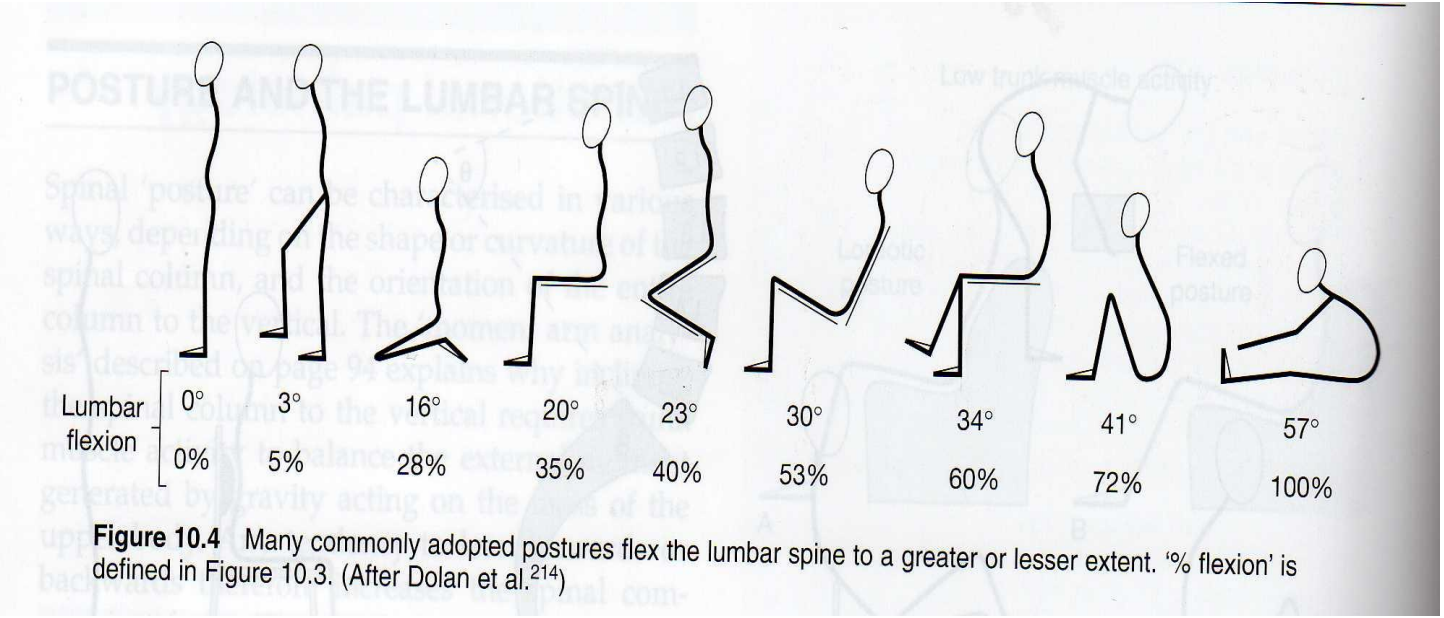


Figure 10.4 Many commonly adopted postures flex the lumbar spine to a greater or lesser extent. '% flexion' is defined in Figure 10.3. (After Dolan et al.[214])

Research on back pain Shows:

- 2/3 of c/o LB pain occur w/o incident
- LB pain is 2nd only to the flu/colds in primary care visits in the U.S.
- Chronic LB pn occurs more often in countries where psych stress is high and physical stress is low.
- Stress is the cause of 85% of disease (NEJM)
- 50-90% of chronic LBP sufferers have some form of depression.
- Those with religious convictions have an easier time getting over illness.

Risk factors for low back pain

- Occupation/Sports activities
- Genetic/body weight/height
- Age/Gender (>60+ = 2/3 of 20 y/o)
- Nutritional factors
- Smoking
- Depression/psychosocial
- Moderate decrease with age
- No evidence of back pain and (+) radiographic findings

Risk factors for low back pain

- Sitting jobs (↓ activity) >5 min in a flexed posture causes creep reducing the sp. Lig. Ability to protect the disc by 40%. Also reduces muscle activity: takes hrs. to recover
- Vigorous manual labor jobs
- Whole body vibration – driving
- 1st hr. of the day: increased water content in the disc= most vulnerable to injury ex: (rowers)

Cumulative Factors Resulting in Dysfunction

What factors predispose to LBP?

- Improper Body Mechanics
- Poor standing or sitting posture
- Prolonged Deconditioning
- Prolonged Physical Stress at Home or in the Workplace
- Past trauma
- Sporting activities

The FACILITATED SEGMENT

- An Osteopathic theory whereby chronic, repetitive and abnormal segmental input (from e.g., a segmental hypermobility) can create referred segmental pain and tenderness, hypertonicity of key muscles and even secondary tissue changes within the girdles and limbs.

- It is proposed that the constant afferent barrage ultimately leads to state of central segmental excitation which, in turn, lowers the synaptic resistance and facilitates neuronal transmission. This state produces and exaggerated response from the cognitive and efferent systems serviced by the segment in question.

The FACILITATED SEGMENT TREATMENT

- These cervical and lumbar stabilizer muscles are important in making the transition from hypermobility or instability to hyperstability.16
- The goal is to reeducate movement by make muscles stronger and more mobile.3
- Although there is a focus on isolating the cervical and lumbar stabilizer muscles, it is nearly impossible to achieve this isolative effect due to the contraction of cervical stabilizer and lumbar muscles along with large muscle groups.3

The FACILITATED SEGMENT TREATMENT

- Treatment of cervical dizziness is sometimes similar to cervicogenic headache treatment.15,17
- It is possible to improve a patient's muscle dysfunction without directly treating the articular component.16
- This was effectively done in a study in which a reduction of a cervical subluxation was achieved through a cervical stabilization program that excluded addressing the articular component.16
- It should be noted that this program lasted a duration of 6 weeks.16

The FACILITATED SEGMENT TREATMENT

- The key to a full resolution of symptoms is the re-integration of all cervical, visual, and vestibular input. 18
- After a correction of biomechanical deficits, a structured and progressive neuromuscular retraining program must be designed to address deficiencies.18

- 15. Mulligan B. Manual Therapy, “Nags”, “Snags”, Mwms” etc. 4th edition 1999; Wellington, New Zealand
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- 17. Reid S, Rivett D. Manual Therapy Treatment of Cervicogenic Dizziness: A Systematic Review. Manual Therapy 2004; 10: 4-7.
- 18. Oas JG, Gargano F. Cervicogenic Dizziness: Recognition and Treatment: International Mulligan Symposium. October 22, 2000 Course Lecture Notes

Lumbo-sacral hypermobility leading to L5 facilitation

- In runners a comm dx. is gluteal bursitis or tendinitus.
- The pt. may have had steroid injections into the gluteal tendons. Typically, the 1st. injection ↑ pt's symptoms at time of injection then ↓ the pain within 24 hours (central biasing mechanism). Then pn returns within days.
- On assessment the pt's pain ↑ when the gluteus minimus or medius tendons are palpated deeply. However, frustratingly the pain cannot be reproduced with isometric resistance of hip abduction.
- ROM of the hip joint = loss of ext. and IR or a (central facilitation of ilio-psoas – not segmental) and the inner quadrant is invariably painful but full (segmentally facilitated tenderness), signs of an early capsular pattern of restriction may be present.

Clinical decision making for:

Passive Inter-vertebral joint mobilization

- At this point the therapist must have determined:
  - a) Any HYPO-mobilities
  - b) Any clinically relevant HYPER-mobilities (painful)
  - c) Any INSTABILITIES

- The hypomobile segment is our target.

Three basic aims of physiotherapy mobilization of a ZAJ joint.

- 1) Distraction (gapping) of joint surfaces
- 2) Parallel gliding of joint surfaces into flexion
- 3) Parallel gliding of joint surfaces into extension

Treatment Goals

- Accurately localise the mobilization force,
- Minimise the force necessary for mobilization
- Protect sensitive joints (may be pain sensitive e.g, hypermobile, or structure sensitive e.g, degenerative spondylosis or instability.
- Minimise the risk of damage to vascular and neurological structures potentially threatened by the mobilization force through structurally unsound (excessively lax, unstable) joints.

Treatment Goals cont…

- Flexibility of technique allows the therapist to tackle many joint problems, amenable to mobilization, that might otherwise be troublesome or ill-advised.

- There are other treatment options……

It’s all about the options!

- Posture, breathing and biomechanics correction
- Heat / Ice
- Ultrasound
- Dry Needling
- Acupuncture
- Massage
- Myofascial Release
- Medication / Diet
- NuCalm

- Electric Stimulation
- (TENS) (Interferential)
- (Microcurrent)
- Manipulation
- Mobilization
- Exercise (stretching / strengthening / stabilizing)
- Nonspecific manual / mechanical traction

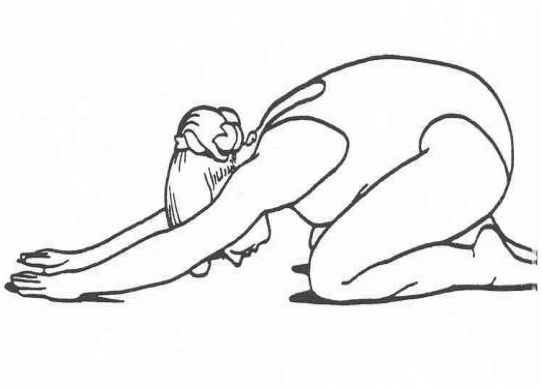
Other options…

- Telemedicine and self treatment techniques
- Exercises
- Some self treatment techniques such as self SNAGS, headache SNAGS and self lumbar mobilization techniques can be taught to patients through video conferencing and educational instructional videos.

Exercises

TNT
Total Neck Trainer®
MADE IN THE USA

Back Exercises



It’s all about the options!

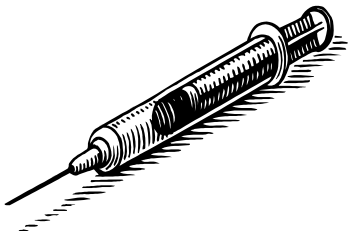
- Treatment approach is determined through a thorough examination
- Treatment can be in any combination best suited for the individual
- A collaboration of medical colleagues may prove beneficial
- The presence of hypermobility or instability may present challenges…

When Hypermobility or Instability lead to headaches

- PT can only improve active (neuromuscular) stability of an area
- When active stability has been optimized, hypomobile areas have been mobilized, but passive stability remains compromised
- *BALANCE HAS NOT BEEN ACHIEVED*
- Other interventions may be necessary…

The role of: PROLOTHERAPY and PRP

- Proliferation or hyperplasia of connective tissue through chemical or platelet rich plasma injection of a mild irritant or biologic healing properties at the site of pain or injury to stimulate healing.
- Connective tissue hypertrophy



What is it?

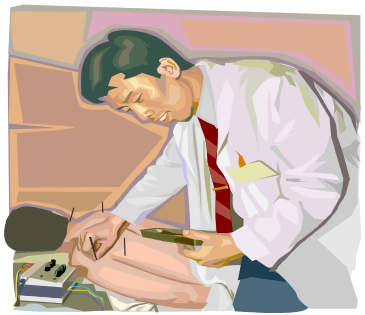
- A solution of 15% Dextrose and 0.5-1% Lidocaine is often used
- A combo of proliferant and mild anesthetic
- Dextrose is safe in diabetics, but for those with poor corn tolerance; other agents can be used
- Such as sodium morrhuate, PG2 Dextrose-phenol-Glucose solution, Sarapin, and preservative free Zinc sulfate
- PRP: 1000x the pt's own platelet rich plasma rich growth factors

What does it do?

- Performed on lax ligaments or tendons to improve passive stability of a joint
- This reduces painful muscle spasm (knots) which have developed from excessive muscular contraction in attempts to stabilize a loose joint

Where is it performed ?

- All accessible ligaments and capsule
- In cervical spine avoid injecting anterior to the lateral margins of the Z-joint
- Some of the deeper layers of posterior muscles and tendons



Criteria for recommending prolotherapy

- Patient must have a musculo-skeletal functional impairment (with or without pain)
- Objective (palpatory) evidence of segmental instability. Radiographic evidence is a plus!
- All hypomobilities within the immediate kinetic chain have been mobilized
- Patient has been on a stabilization program for a minimum of 3 months

Recommendation protocol for the patient

- The patient must clearly understand that the objective of the prolotherapy treatment is *functional improvement*
- Patient must agree to continue with therapist for hypomobile segmental mobilization/stabilization
- The patient is encouraged to read prolotherapy text and discuss proposed treatment with MD

Prolotherapy and manual therapy progression

- Patient injected every two to four weeks (may be more but not < 2weeks) (3-4 x)
- Patient should be seen by the therapist for mobilization of (fixated), or hypomobile joints if necessary
- Stabilization ex's reviewed
- Comparative functional motion/strength test
- Check *stability* of unstable segment

Have you been listening?

Poll Question 3

Using the information so far, what type of treatment may be performed on lax ligaments or tendons to improve passive stability of a joint?

- Stem Cells
- Ultrasound
- Prolotherapy
- Nu Calm

ADAS- Human Adipose Derived Adult Stem Cells
SVF- Stromal Vascular Fraction

- Our fat cells contain stem cells that typically live 7-10 years. Your abdomen hips thighs and buttocks are blessed with more fat cells thus more stem cells, consequently it takes more time to completely deplete these areas of cells.
- If you replace stem cells and tissue that was injected. You will eventually lose these fat and stem cells and it will need to be redone.
- Stem cells have a life expectancy window as we age. Eventually we will run out of cells to the point we just don't have enough to sustain life.

ADAS- Human Adipose Derived Adult Stem Cells
SVF- Stromal Vascular Fraction

- Scientists are experimenting with freezing fat cells and harvesting stem cells at a younger age to inject later in life through a mini lipo suction procedure.
- SVF is Stromal Vascular Fraction a technique where adults Mesenchymal stem cells are harvested.

SVF- Stromal Vascular Fraction

- The 1st property that must take place is anti-inflammatory which is effective within 24 to 48 hours after treatment for inflammatory diseases
- 2nd is regenerative where the cells promote healing by replacing damage cells that secrete (cgf) cytokine growth factors affecting repair using cell to cell signaling. This effect takes weeks to months
- The third is immuno-modularity which SVF mitigates autoimmune disease by rebooting the immune system

SVF- Stromal Vascular Fraction

- (Next) 2 events must take place on a cellular level
- 1st- stem cells must be attracted to the target tissue or cells that secrete signal molecules associate with damage, disease, inflammation or degenerative tissue
- 2nd- stem cells must be activated or turned on to affect healing by special trigger molecules that are associated with damage, disease, inflammation or degeneration

ADAS- Human Adipose Derived Adult Stem Cells and Prolotherapy

- Prolotherapists have begun to utilize the potential of autologous adipose (fat)-derived stem/stromal cells (AD-SC) within non-manipulated fat graft scaffolding, combined with high-density PRP concentrates (HD-PRP) to provide a potent biological therapeutic combination.

Embyonic stem cells are not used anymore for treatment of degenerative conditions due to their tumor forming abilities.

Avoid in case of infection and cancer, caution with blood thinners

What is the future of ADAS?

- Currently no adult stem cells can naturally regenerate multiple tissue types
- Australian scientists have figured out how to reprogram adult bone or fat cells to form stem cells that could potentially regenerate any damaged tissue in the body (lig. tendon. OA)
- This technique is a significant advance, as many current stem cell therapies have shown little objective evidence that they contribute directly to new tissue formation

What is the future of ADAS?

- For this new type of stem cell treatment, the researchers collect adult human bone and fat cells and treat them with two compounds: 5-Azacytidine (AZA); and platelet-derived growth factor-AB (PDGF-AB) for two days.
- Researchers are assessing whether these adult human fat cells reprogrammed into [induced multipotent stem cells (iMS cells)] can safely repair damaged tissue in mice. Human trials begin in late 2017."

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- Hsu WK1, Wang JC, Liu NQ, Krenek L, Zuk PA, Hedrick MH, Benhaim P, Lieberman JR. Stem cells from human fat as cellular delivery vehicles in an athymic rat posterolateral spine fusion model. J Bone Joint Surg Am. 2008 May;90(5):1043-52.

The future - Epigenetics

- New studies on aging tissues reversed with epigenetic reprograming of cells by using a virus to deliver youth restoring genes to return cells to the embryonic state to allow development into other regenerated cells without altering the genetic code itself.
- Vision loss from Glaucoma reversed with Epigenetics Nature. 2020 Dec;588(7836): 124-129.
- Potential implications for chronic pain, cancer, degeneration and spinal cord injuries.

Have you been listening?

Poll Question 4

Using the information so far, what types of conditions may be effectively treated through Stem cell therapy?

- Osteoarthritis
- Tendon injuries
- Ligament Injuries
- Degenerative disc disease
- All of the above

Conditions treated with Stem Cell Therapy

- Osteoarthritis
- Tendon injuries
- Ligament Injuries
- Degenerative disc disease

Clinic Locations

- 1129 Professional Park Drive
- **Brandon, FL 33511**
- Phone: (813) 876-8771
  Fax: (813) 333-5414

- 6231 66th Street North
- **Pinellas Park, FL 33781**
- Phone: (727) 470-6070
  Fax: (727) 498-8677

- 1826 N. Crystal Lake Drive
- **Lakeland, FL 33801**
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