

Course Title: Nutrition and Joint Health for the 21<sup>st</sup> Century

Instructors: Dr. Michael Robertson, D.C. and Dr. Jeremy Webster, D.C.

Total Hours: 16 hours

Summary:

In this course you will learn the latest nutritional and lifestyle interventions which are supported by the current scientific literature with an emphasis on factors affecting joint health. You will review the underlying mechanisms of joint integrity, inflammation and obesity which may signal the need for nutritional therapy as an adjunct to your chiropractic and rehab protocols. You will learn appropriate examination procedures and history taking to identify possible nutritional needs as well as metabolic conditions that require referral to other medical professionals. Dr. Webster will review samples of clinical protocols using lab analysis and nutritional and lifestyle modifications which could be utilized to positively affect the outcomes of your chiropractic patients.

Learning Outcomes:

By the end of the seminar, participants will be better able to:

- Relate physiological factors affecting joint health to the specific needs and conditions of their patient
- Explain the impact of nutrition, diet and lifestyle as they relate to pain, inflammation and physical function.
- Read and monitor lab markers and physical symptoms that indicate the patient's improvement thorough nutritional care.
- Create individualized treatment plans that help improve function and well-being of the chiropractic patients and are within the scope of practice for their state.
- Accurately code for the services that were performed

Teaching Methods:

Lecture, slides, Q & A, Sample Cases/Case Studies

Course Outline:

<i>Hour</i>	<i>Content</i>	<i>Format</i>	<i>Topic</i>
<i>Saturday 9:00am- 9:50am Hour #1</i>	<ul style="list-style-type: none"><li>• E/M Coding Selection Changes Effective Jan 1, 2021<ul style="list-style-type: none"><li>○ History of why these changes are being made<ul style="list-style-type: none"><li>▪ Review 2019 proposals to change by CMS and negotiations/feedback from AMA</li></ul></li><li>○ Summary of Changes<ul style="list-style-type: none"><li>▪ E/M Scoring changed to Time or MDM</li><li>▪ Deletion of 99201</li><li>▪ Retention of individual code levels<ul style="list-style-type: none"><li>• Review new compensation schedule</li></ul></li><li>▪ Addition of new prolonged services code</li></ul></li></ul></li></ul>	<i>Lecture, Slides</i>	<i>Documentat ion/Record Keeping</i>

- Review of NEW CPT code Descriptions
  - Current code descriptions for 99202-99215, & 99417
- E/M Scoring changes – New ways to select your code level
  - Compare and contrast new vs old methods
    - MDM vs 3 key components
    - Total time vs old Time method
- E/M Coding according to Time
  - Elements addressed in new time code selection
  - Differences between new E/M timed code selection and all other CPT code time selection processes
  - Specific criteria for time code selection
  - Face-to-Face and Non-face-to-face
  - Date of Service only
  - Pre/Post/Intra-service definitions changed
  - Portions of clinical encounter that can be counted toward time
  - No double dipping & exclusion of separate CPT services
  - Review correct coding for every probable time frame for E/M codes
  - The new Prolonged services code and how to implement Compare new prolonged code to existing prolonged codes and differentiate appropriate usage of said codes
- E/M coding in 2021 according to Medical Decision Making
  - Compare/Contrast MDM vs 3 Key Components
  - Highlight documentation requirement of only the history and examination they deem necessary for the encounter and maintenance of standards of Problem Oriented Medical Record as per NCQA Guidelines for Record Keeping
  - 3 categories of MDM
    - Number and complexity of problems addressed
    - Amount and/or complexity of data to be reviewed and analyzed
    - Risk of complications and/or morbidity or mortality of patient management
- Determining level of service
  - Selection of code level with respect to Number and complexity of Problems addressed
  - Selection of code level with respect to Amount and/or complexity of data to be reviewed and analyzed
  - Selection of code level with respect to Risk of complications and/or morbidity or mortality of patient management
  - Coding based on level of medical decision making
    - Clinical scenarios outlined by the AMA and CMS that qualify for 99203
    - Scenarios that qualify for 99204
- Review of probable code selection pathways for chiropractors given the new coding rules
  - Code Selection tips for:
    - 99202/99212
    - 99203/99213
    - 99204/99214
    - 99205/99215

Saturday  
9:50am-  
10:40am  
Hour #2

Lecture,  
Slides

Documentat  
ion

Final Review of code changes and expectations  
for Payer policy updates

<p><i>Saturday</i> <i>10:40am</i> - <i>11:30am</i> <i>Hour #3</i></p>	<ul style="list-style-type: none"> <li>• Discussion of ethical pitfalls and board complaints <ul style="list-style-type: none"> <li>○ Review of previous board actions for past year</li> </ul> </li> <li>• Introduction to medical ethics <ul style="list-style-type: none"> <li>○ Defining medical ethics <ul style="list-style-type: none"> <li>▪ Medical ethics vs common ethics</li> <li>▪ The 6 primary tenets of medical ethics</li> </ul> </li> <li>○ Looking at common medical ethical issues <ul style="list-style-type: none"> <li>▪ Privacy and confidentiality</li> <li>▪ End-of-life issues</li> <li>▪ Access to care</li> </ul> </li> </ul> </li> <li>• Ethical considerations of the provider-patient relationship <ul style="list-style-type: none"> <li>○ Fiduciary duty</li> <li>○ Protecting patient privacy</li> <li>○ Clear and ethical communication</li> <li>○ Understanding full disclosure</li> <li>○ Understanding appropriate referrals <ul style="list-style-type: none"> <li>▪ Considering second opinions</li> <li>▪ Specialist referrals <ul style="list-style-type: none"> <li>• Stark Regulations and anti-kickback regulations</li> </ul> </li> </ul> </li> </ul> </li> <li>• Running an ethical practice <ul style="list-style-type: none"> <li>○ Propriety in medical records</li> <li>○ Modern managed care &amp; today's office practice</li> </ul> </li> <li>• Ethical challenges in delivering basic healthcare <ul style="list-style-type: none"> <li>○ Ethics of healthcare distribution</li> <li>○ Exploring concepts in health care rationing</li> <li>○ Looking at healthcare delivery strategies in the US <ul style="list-style-type: none"> <li>▪ HIPAA and the adolescent patient</li> </ul> </li> </ul> </li> </ul>	<p><i>Lecture,</i> <i>Slides</i>      <i>Ethics</i></p>
<p><i>Saturday</i> <i>11:30am</i> - <i>12:20pm</i> <i>Hour #4</i></p>	<ul style="list-style-type: none"> <li>• Stroke <ul style="list-style-type: none"> <li>○ Review of evidence between chiropractic and stroke</li> <li>○ Utilizing Informed Consent</li> <li>○ Public Perception of chiropractic and stroke risk <ul style="list-style-type: none"> <li>▪ Topics and research to discuss with patients</li> </ul> </li> </ul> </li> <li>• Risk Management Tips <ul style="list-style-type: none"> <li>○ Screening patients for health risk and readiness for rehab <ul style="list-style-type: none"> <li>▪ PAR-Q</li> <li>▪ Red Flags from history</li> </ul> </li> <li>○ Handling the upset patient</li> <li>○ Insurance records requests</li> <li>○ Community outreach</li> <li>○ Patient reactions</li> <li>○ Balancing philosophy</li> <li>○ Updating patient records</li> </ul> </li> <li>• Risk Management and Social Media <ul style="list-style-type: none"> <li>○ Is it appropriate to text my patients?</li> <li>○ The risks of expanding your practice's social media presence</li> </ul> </li> </ul>	<p><i>Lecture,</i> <i>Slides,</i> <i>Case</i> <i>Study</i>      <i>Risk</i> <i>Managemen</i> <i>t</i></p>

- Avoiding potential pitfalls of social media
  - Concerns with responding to a bad online review
    - Handling a negative social media comment
- Informed consent
  - Components
  - Examples-Case Study

*Saturday  
12:50pm  
-1:40pm  
Hour #5*

- Anatomy of joints and joint damage
  - Anatomy of joint tissue
    - 10% chondrocyte (cartilage cells that secrete collagen matrix)
    - extracellular space contains 60-80% fluids (water, dissolved gasses, metabolites).....
    - and 20-40% collagen fibers, GAG's, and other non-collagenous proteins.
    - The extracellular matrix is responsible for the properties of the joint tissue
    - The chondrocyte is responsible for the existence and maintenance of the matrix.
    - Buckwalter J, Hunziker E, Rosenberg L, Coutts R, Adams M, Eyre D. Articular cartilage: composition and structure. In: Woo SLY, Buckwalter JA, editors. Injury and Repair of the Musculoskeletal Soft Tissues. Park Ridge, IL: American Academy of Orthopaedic Surgeons; 1988. pp.
  - Properties of joint tissue
    - Almost frictionless
    - Load bearing
    - Resists wear and tear
  - Joints under load
    - joint deforms at point of load
    - matrix fluid pushed from tissue
    - when load is removed, GAG's pull fluid back into the joint tissue
  - Types of GAG's in joints
    - chondroitin sulfate
    - hyaluronic acid
    - heparan sulfate
    - keratan sulfate
  - Joint damage-two types
    - 1) Loss of matrix molecules (GAG's, etc.) without damage to chondrocytes or collagen fibers
    - 2) Damage to chondrocytes and/or collagen
    - type 1 damage can lead to type 2 damage
    - type 1 damage caused by immobilization, joint fixation, abnormal stress
    - type 1 damage can be reversed if addressed soon enough but can become permanent.
    - type 2 damage is caused by blunt or penetrating traumas

*Lecture,  
Slides*

*Clinical  
Sciences;  
coding;  
documentat  
ion*

- type 2 damage may or may not be reversible depending on the individual and severity of trauma
- a return to normal, pain-free motion asap is a must
- conservative treatments include passive motion, cold laser and GAG/Collagen supplementation.

Saturday  
1:40pm-  
2:30pm  
Hour #6

- Physiological factors influencing joint health
  - Discuss the anatomy of joints and joint damage
  - Glucosamine, chondroitin, HA
    - HA and chondroitin sulfate are themselves GAG's
    - Glucosamine sulfate supports production of Keratan GAG's
  - MSM, NAC
    - provide sulfur and reduce oxidative stress
    - NAC vs HA in osteoarthritis- both are effective
    - <https://www.ncbi.nlm.nih.gov/pubmed/28934876>
  - Collagen
    - Oral supplementation of hydrolyzed collagen peptides
    - reduction in WOMAC, VAS and QOL scores vs placebo
    - <https://www.ncbi.nlm.nih.gov/pubmed/24852756>
  - Liver support and joint health
    - Liver dysfunction/disease seems to lead to joint dysfunction/symptoms
    - <https://ard.bmj.com/content/annrheumdis/41/3/295.full.pdf>
  - Many nutrients required for optimal liver function also contribute to joint health
    - NAC
    - <https://www.ncbi.nlm.nih.gov/pubmed/29521247>
    - Milk Thistle
    - <https://www.ncbi.nlm.nih.gov/pubmed/19139781>
    - Lipoic Acid
    - <https://www.ncbi.nlm.nih.gov/pubmed/27055478>
  - Reduction in oxidative stress is commonly referenced as the mechanism of action
    - Could these nutrients also prevent the liver from robbing joints of sulfur based compounds?
    - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC155438/>

Lecture,  
Slides,  
Case  
study  
  
Clinical  
Sciences

Saturday  
2:30pm-  
3:20pm  
Hour #7

- Joint Pain vs Inflammation
  - pain is a perceived sensation
    - brain decides when and where there is pain
    - the brain can't be wrong- if it hurts, there is pain
    - pain doesn't always indicate tissue damage or inflammation or even nociception
  - Inflammation is a part of innate immunity
    - general, non-specific immunity
    - unlike learned immunity as in certain infections or vaccinations
  - Inflammation is a response to irritation, infection or injury
  - Symptoms of acute inflammation
  - Acute inflammation is a sign that the body is trying to correct or remove something
  - this is often a good thing
  - suppression can reduce the ability to deal with the irritant (cause)
  - Chronic inflammation
    - can contribute to diseases such as cancer, heart disease and autoimmunity
    - symptoms include fatigue, fever, rash, sores as well as many types of pain
  - Causes of chronic inflammation
    - Diet- sugar, wheat, corn, dairy, trans-fat, oxidative stress due to insufficient anti-oxidant intake, insufficient Omega-3's
    - Poor sleep
    - Sedentary lifestyle
    - Toxicity
    - Smoking
    - Auto-immune disease
    - Allergies
    - Infection
    - Other inflammatory diseases
- Neurology of pain and nociception
  - Nociception: the pathways to pain
    - Not all nociception leads to pain. It must reach higher centers to cause pain
    - Nociceptors are stimulated by potentially harmful levels of pressure, temperature and chemicals
    - Signals travel along c-fibers and A-fibers and synapse in the dorsal root ganglion in the spinal cord or trigeminal ganglion
    - Travels to the sensory cortex for pain location, quality and severity
    - And travels to the anterior cingulate cortex and then the limbic system for emotional processing of pain

Lecture, Slides  
Clinical Sciences

- Glutamate is the primary excitatory neurotransmitter released by nociceptors
- Discuss MSG, aspartame and other glutamate/aspartate flavor enhancers
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2964977/>
- continued nociception leads to windup and eventually central sensitization of pain pathways
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4009371/>
- In some cases of chronic pain, there is little nociception involved

*Saturday*  
*3:20pm-*  
*4:10pm*  
*Hour #8*

- Chiropractic's influence on pain
  - Discuss pain gate theory
    - Large fiber activity inhibits small fiber transmission
    - lack of motion amplifies nociception
    - Discuss subluxation, casting across joints and other causes of reduced large fiber activity
    - How does the chiropractic adjustment impact the pain gate theory
    - Clarify the "segmental" nature of the pain gate theory.
    - Discuss rehab and exercise with regards to the pain gate
  - Discuss descending inhibition of pain
    - Adjustments heighten central function which can fire down to modulate nociception
    - Stress the global vs segmental affect that descending inhibition has on pain
    - Discuss other therapies are also helpful

*Lecture,*  
*Slides*      *Clinical*  
                          *Sciences*

*Sunday*  
*9:00am-*  
*9:50am*  
*Hour #9*

- Physiology of inflammation
  - NF-kB is the molecule that triggers the nucleus to release inflammatory chemicals in each cell.
  - NF-kB is stimulated by
    - oxidative stress
    - bacteria
    - ionizing radiation
    - toxic metals
    - trauma, etc.
  - NF-kB triggers the release of
    - NO
    - cytokines
    - chemokines
    - COX
    - adhesion molecules
    - immune response

*Lecture,*  
*Slides*      *Clinical*  
                          *Sciences*

- NO and Bradykinins
  - redness
  - heat
  - swelling
  - loss of function (neurological reflex due to inflammation)
- Cytokines (IL-1B, IL-6, TNF-a), chemokines (IL-8), eicosanoids (PGE2, leukotrienes), COX-2
  - increase pain
- Neutrophils
  - attack microbes
- Macrophages
  - remove debris
- Complement
  - stimulated by bacteria
  - helps kill and clear bacteria
- Coagulation systems
  - stimulated by traumas
- NF-kB is the key to inflammation
  - NF-kB is normally bound by IκB in cellular cytoplasm
  - When bound, NF-kB cannot signal the nucleus
  - Trauma triggers TNFα and IL-1 or RANKL to bind to RANK receptor and release IKK
  - OPG can also bind to RANK and thus inhibit activity of RANKL
  - Pathogens activate Toll-like receptors (TLR) to trigger IKK
  - IKK (IκB Kinase) separates NF-kB and IκB
  - NF-kB triggers nuclear transcription
  - Cytokines and other inflammatory chemicals are produced
  - Arachidonic Acid (AA) converted into inflammatory prostaglandins
- IKK and NF-kB are classes of chemicals
  - The type of receptor (RANK or TLR) determines the type of IKK released
  - The type of IKK dictates the type of NF-kB that is released
  - The type of NF-kB released determines the exact combination of inflammatory chemicals released and the specific type of inflammatory response
- Why is this pathway important to the Chiropractor clinically?
  - We now know precisely where certain nutrients affect the NF-kB pathway and can use this knowledge to help our patients with targeted anti-inflammatory nutrient protocols.



Sunday  
9:50am-  
10:40am  
Hour  
#10

- Nutrition that targets inflammatory pathways
  - Plant polyphenols
    - curcumin- blocks IKK activation
    - resveratrol- blocks IKK
    - quercetin- blocks IKK
    - cinnamaldehyde- inhibits DNA binding of NF-kB
    - silymarin- inhibits DNA binding of NF-kB
    - EGCG- inhibits NF-kB activity
    - Capsaicin- blocks IKK
    - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4468843/>
    - Boswellia- inhibits NFkB gene activity and IKK
    - <https://www.ncbi.nlm.nih.gov/pubmed/16493072>
    - Bromelain- inhibits IKK, reduces COX-2
    - <https://onlinelibrary.wiley.com/doi/abs/10.1002/mc.20769>
    - Ginger- inhibits IKK
    - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3448918/>
  - Omega 3's
    - decreased gene expression of NFkB gene associated with inflammation
    - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4820929/>
- Laboratory markers for inflammation
- Discuss the importance of measuring and monitoring inflammation (and other markers of health)
  - CRP
    - acute phase protein
    - common lab marker for acute inflammation
  - (Sed rate)
    - not as reliable as CRP
    - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4653962/>
  - Ferritin
    - iron storage protein
    - indirect marker of inflammation
    - over 250 could indicate inflammation, liver disease, chronic infection, autoimmunity, cancer
    - verify by comparing it to serum iron
  - RDW
    - red blood cell distribution width
    - Indirect inflammatory marker
    - large numbers could indicate inflammation or oxidative stress.
  - Insulin and HbA1C
    - Indirect indicators that inflammation is probably present
  - Picolinate, Quinolate
    - organic acids (urine)
- Natural treatment for pain
  - Chiropractic, exercise, physiotherapy
    - pain-gate

Lecture,  
Slides      Clinical  
Sciences

- descending inhibition
  - restore healthy bio-mechanics and joint tissue
- Reduction of chronic inflammation
  - eliminate inflammatory foods- trans-fat, sugar, additives, gluten
  - include anti-inflammatory nutrients- plant phenols, enzymes and omega-3's

Sunday  
10:40am

### Impact of Obesity on Joint Health

Lecture,  
Slides

Clinical  
Sciences

-  
11:30am  
Hour  
#11

- Obesity Statistics – An Ever-Growing America
  - CDC obesity maps 1985-2010
    - Note southern states obesity rates compared to NE or West Coast
    - Mississippi consistently has among the highest obesity rates
    - Colorado tends to have the lowest obesity rates
    - Observe the trends in all states over this 25-year study period
    - In 1990, Mississippi (and all other states) <15% obesity
    - By 2002, Colorado (and all other states) >15% obesity
    - By 2010 ALL states >20% obesity (12 states >30%!)
      - Obesity is NOT a southern problem. It is an American problem
  - New data type 2011-2016
    - Changes in obesity data collection occurred in 2011
    - Direct comparisons to data before 2011 is not accurate
    - Trends can still be observed both before and after the 2011 change
  - Ethnicity and Obesity stats 2015-2017
    - White- only DC and HI <20%, entire MW>30%, WV>35%
    - Black- ND<20%, dozens>35%
    - Hispanic- DC<20%, 8 states>35%
    - It's also NOT a Black/White/Hispanic issue
- The impact of obesity on joint longevity and subluxation
  - The alteration in biomechanics of joints due to obesity
    - BMI has been linked to back, knee and hip pain
    - Each extra pound places 4 lbs. of extra force on your patient's knees
    - BMI>35 equates to 48%-233% greater chance of back pain
    - Osteoarthritis in the hip has been linked to obesity - (Arthritis Rheumatol. Author manuscript; available in PMC 2017 Feb 1.)

- The link between obesity and subluxation
  - Excess abdominal fat produces an increase in lumbar lordosis
  - Postural instability due to poor integration of plantar somatosensory input - (Osong Public Health Res Perspect. 2016 Dec; 7(6): 378–381.)
- Adipose tissue and inflammation
  - The role of adipose tissue in storing inflammatory chemicals
    - Sequestration of toxins into fat decreases blood concentration of toxins
    - Bio-accumulation of many toxins leads to increased body burden
    - Increased body burden leads to inflammation, oxidative stress, joint destruction and pain
- Adipose tissue can stimulate the production of inflammation - (Arch Med Sci. 2017 Jun; 13(4): 851–863)
  - Stimulates TNF-alpha, IL-6 and decreases Adiponectin
  - Increased production of CRP
  - Increased joint pain and destruction

*Sunday*  
*11:30am*  
 -  
*12:20pm*  
*Hour*  
 #12

Dietary trends and contributions to obesity

*Lecture,*  
*Slides*      *Clinical*  
                          *Sciences*

- Macro-nutrient consumption
  - US Calories consumed daily per capita
    - 1970 caloric consumption compared to 2010 - ([http://www.pewresearch.org/fact-tank/2016/12/13/whats-on-your-table-how-americas-diet-has-changed-over-the-decades/ft\\_16-12-09\\_food\\_grains\\_fat/](http://www.pewresearch.org/fact-tank/2016/12/13/whats-on-your-table-how-americas-diet-has-changed-over-the-decades/ft_16-12-09_food_grains_fat/))
  - US Sugar consumption trends
    - Fairly steady from 1925-1975 (110-120lbs annually/person)
    - By 2000, that number had increased to over 150lbs/year
    - A Large portion of that is HFCS
    - Gallop poll 2013- those earning <\$30k/year more than twice as likely to drink regular sodas than those earning >\$70k
  - US Wheat consumption trends
    - 1960-1981 between 16M-23M metric tons per year
    - by 1984 we consumed 31M metric tons (26M-37M ever since)
    - 1960-2012 consumption increased 136% vs 74% population growth
  - US Corn consumption trends
    - First exceeded 100MMT in 1968
    - Exceeded 150MMT in 1987

- Exceeded 200MMT in 2001
  - Exceeded 300MT in 2014
  - 1960-2018 growth rate of 266% vs 81% population growth
- US Soy Oil consumption trends
  - Review data on increase in soy oil consumption from 1964-2018
  - 466% increase in soy oil consumption vs only 71% population growth during this timeframe
- US Beef consumption
  - 7MMT in 1960
  - 12MMT in 2018
  - 65% consumption growth vs 81% population growth
  - We eat LESS beef now per person - (<https://www.indexmundi.com/agriculture/?country=us&commodity=corn&graph=domestic-consumption>)
- Micro-nutrient consumption
  - With a more refined diet, micro-nutrient content has rapidly declined
    - Review how the refining process strips vitamins and minerals from whole grains
    - Trends reveal that consumption of more grains and cooking oils results in fewer fruits and vegetables consumed
- Research has demonstrated that soil nutrients have become less dense
  - Review changes in magnesium and iron levels in farmed soil
- Links between low Micro-nutrient Status and Obesity
  - Building blocks of hormones and neurotransmitters
  - Cofactors for enzymes that drive Krebs cycle

*Sunday  
12:50pm  
-1:40pm  
Hour  
#13*

#### Traditional Dietary Modifications to Improve Musculoskeletal Health via Reducing the Effects of Obesity

- Caloric Reduction Strategies
  - Eat less calories than you burn- it works!
  - Common "diet" companies use this approach.
  - Problems with low calorie diets
    - Eating less of the same food is often difficult
    - Poor long term complains
    - Loss of lean tissue
    - Haven't solved the "cause" of the overeating/obesity
    - Patients expect better from their doctor
- Fat Reduction Strategies

- Correlation between fat consumption and body fat percentage
- Impacts of fat consumption on arterial health and heart disease
- Public health impacts of fat reduction strategy in the US
- The challenges with a low-fat approach
  - Too much sugar consumed
  - Miss out on important nutrients
- Strategies Involving Alterations in Meal Frequency, Timing, and Portion Size
  - The effects of high frequency meal consumption on metabolism
    - Times when 5-6 meals can be helpful
  - Common beliefs around breakfast timing compared to current data on the impact of this trend on weight loss
- Veganism Strategies
  - Define Vegan
  - Reasons for being vegan
    - Ethical/moral
    - Religious
    - Health
  - Positives of a vegan diet
    - Nutrient rich fruits and veggies
    - Avoid low quality meat products that include preservatives and flavor enhancers
  - Negatives of Veganism
    - Insufficient intake of certain nutrients that require supplementation
    - Many unhealthy foods are still vegan- give examples
  - Sample of a full day on a vegan diet with proper supplementation

*Sunday  
1:40pm-  
2:30pm  
Hour  
#14*

Dietary Modifications to Improve Musculoskeletal Health via Reducing the Effects of Obesity that have gained popularity in the early 21<sup>st</sup> Century

- Paleo and “High Protein” Strategies
  - Review the history of the Paleo diet trend
  - What foods are included in a Paleo Diet and what foods are excluded
  - Theory behind Paleo Diet Strategies
  - Studies that compare outcomes of Paleo diet vs AHA diet
  - Criticisms of Paleo Diets
    - Kidney issues
    - Cardiovascular Issues
    - Lack of calcium from no dairy
    - Lack of fiber from no grains of legumes
  - Sample day of a proper Paleo diet
- Ketogenic Diet Strategies

- History of Keto diets with epilepsy and other conditions from early 1900's.
- What foods are included in a Keto Diet and what foods are excluded
- “Clean” vs “Dirty” Keto
  - Samples of each
- Theory behind Ketogenic Diet
- Benefits of Keto Diet
  - Fat loss
  - Muscle sparing
  - Improved metabolic markers
  - Reduced hunger
  - Autophagy
- What to expect when initiating a Keto Diet
  - Discuss exogenous ketones for first week on keto diet
  - Discuss becoming keto or fat adapted
  - Discuss keto cycling
- Common criticisms of Keto Diets
  - Cardiovascular risks
  - Low antioxidants due to little/no fruit
  - Low fiber due to no grains/beans
  - Ketoacidosis
- Intermittent fasting Strategies
  - Benefits according to research
  - Time restricted feeding
    - 24 hr. cycle
  - Circadian feeding
    - Subset of TRF
  - 5:2 caloric cycling
    - One week cycle
  - Periodic fasting
    - One month cycle
  - Compare strengths and weaknesses of each
  - Common challenges faced by patients who are pursuing intermittent fasting strategies
    - Difficult for some
    - Dizziness/lightheaded

*Sunday  
2:30pm-  
3:20pm  
Hour  
#15*

#### Exercise and its effects on Obesity and Joint Health

- Exercise, Activity and Movement
  - Movement is a broad term that includes both Activity and Exercise
  - Activity levels have declined tremendously
    - By 2020, Americans will average 190 METs (metabolic equivalents of task)
    - For perspective, sleeping all day is 151METs, a desk job with 30 min vigorous activity per day is 240METs.

- <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1467-789X.2011.00982.x>
  - Activity is different than exercise
  - Exercise is more intentional
- Intensity levels of physical movement
  - Low Intensity- can perform for hrs. without stopping
  - Moderate Intensity- can perform for 2-60minutes before needing to rest
  - High Intensity- can perform 15-60 seconds before rest is required
  - Extreme Intensity- can perform for 1-12 seconds before rest is required
- Benefits and drawbacks of each intensity level
  - Low Intensity Benefits
  - Low Intensity Drawbacks
  - Moderate Intensity Benefits
  - Moderate Intensity Drawbacks
  - High Intensity Benefits
  - High Intensity Drawbacks
  - Extreme Intensity Benefits
  - Extreme Intensity Drawbacks

*Sunday*  
*3:20pm-*  
*4:10pm*  
*Hour*  
*#16*

- Goal-specific movement plans targeting the individuals needs
  - Fat Loss
    - HI training
    - Increased activity
    - Sample workout
  - Joint/spine health
    - Passive motion first, then switch to active ASAP within tolerance
    - Isometrics and then Eccentrics for tendonitis
    - Core stabilization- McGill Big Three
  - Balance/coordination
    - Core- Big Three
    - Challenge the area the individual where they are struggling
    - Constant progression- seated, seated on ball, standing, one leg, foam, wobble board
    - Eye movements
  - Endurance/Stamina
    - Long duration cardio
    - Specific to the individuals sport
    - Add HIIT for improved times
  - Increased Strength
    - Combine concentric and Isometric lifting
    - 1-5 reps per set
    - Isometric at full effort for 1-1.5 minutes per set
    - Keep volume low and effort high for best muscle stimulation and recovery
    - Sample workout week

- Increased Muscle Mass
  - 6-12 reps per set.
  - Slow, grinding reps
  - Negatives (eccentric reps) with partner assist
  - Each muscle must be trained every second or third day
  - Compound movements work more muscle and stimulate more growth
  - Sample workout week
- Athletic Performance
  - Build explosive strength without slowing the athlete down
  - Explosive concentric movements with little or no eccentric loading
  - Changing direction rapidly should be emphasized
  - Core strength- McGill big three with dynamic movements added

### **Recommended/Background Readings**

- Laboratory Evaluations for Integrative and Functional Medicine 2nd Edition: Richard S., Ed. Lord
- Functional Medicine Clinical Protocols for Inflammatory Disorders: Functional Inflammation, Volume 2 (Functional Inflammation & Inflammation Mastery): Alex Vasquez
- A Review of Articular Cartilage Pathology and the use of Glucosamine Sulfate. Journal of Athletic Training 2001 Oct-Dec.;36(4) 413-419: James and Uh
- NF-kB Signaling in Inflammation; Signal Transduction and Targeted Therapy July 14, 2017: Liu, Zhang, Joo, Sun
- Metabolic effects of HIIT. IDEA Fitness Journal, 2014 Vol. 11, No. 5, 16-18: Kravitz, L.