Session 164: Brain Fitness – Building Mental Muscle

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NOTES

Does research demonstrate a causal (cause-effect) relationship between physical activity/exercise and cognitive function?

- Keyword searches of 5 databases (Pubmed, Scopus, Sports Discus, Web of Science, and The Cochrane Library).
- 13,166 published studies in academic publications – general consensus supports this causal relationship.
  - Research Example – Chapman, et al., (2013).
  - 37 cognitively healthy, sedentary adults (57–75 years old).
  - 60-min aerobic exercise; 3x/week – 12 weeks + mental exercises.
  - Measurements: Cognition, resting cerebral blood flow (CBF), aerobic fitness (VO2max).
  - Results: Increased regional CBF – anterior cingulate and hippocampus (cognition and memory).
  - Conclusion: Combo – physical & mental exercise = best cognitive solution.

Cognitive Decline Example:

- Dementia – broad category of brain diseases (e.g., Alzheimer's) – causes long term and gradual loss in processing and memory.
- Alzheimer's = 60 – 70% of all dementia cases.
- New case of dementia is diagnosed every 4 sec = 7.9 million cases / year.
- Increasing physical activity by 25% = 1 million < new cases annually (Ferri, et al., 2005; Barnes, et al., 2011).

Evolution of the Human Brain – Growth:

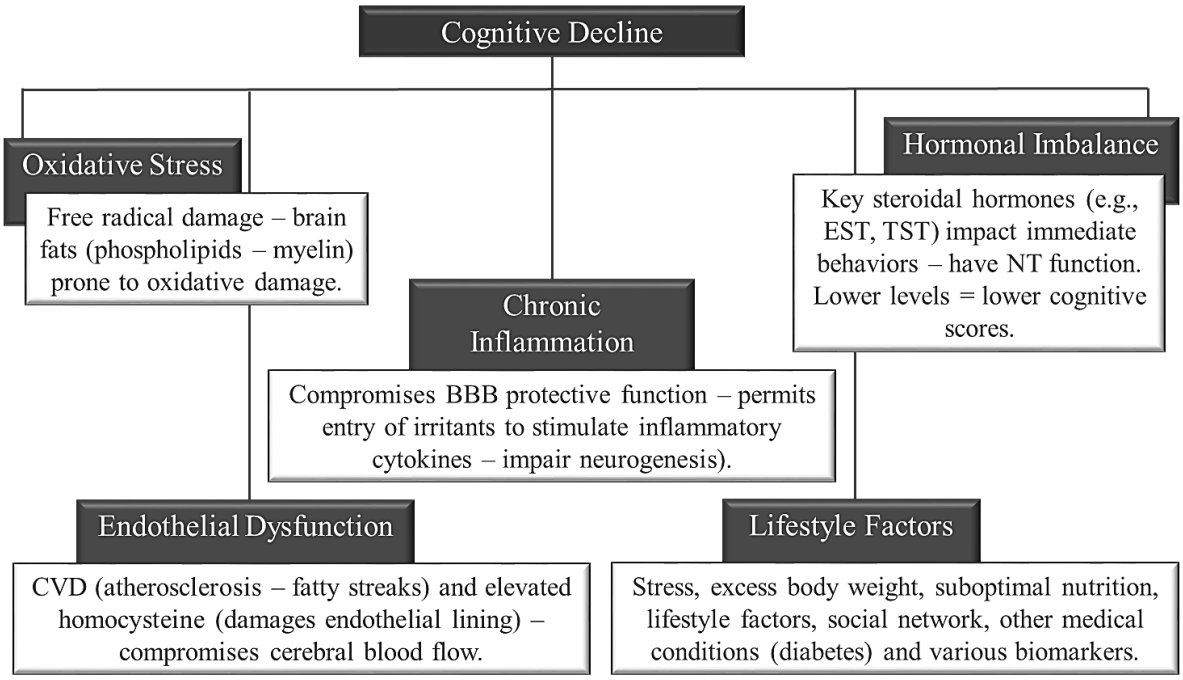
- Survival – muscle fiber differentiation = bipedal species:
- Longer limbs, shorter toes, less hair, thermoregulation, inner-ear balance (movement shaped body).
- Brain size increase – 3x larger relative to body size v. other mammals.
- Need for social interaction – planning/thinking complicated patterns like group hunts.
- This increased capacity – stimulated brain growth.

Just as our brain grew, so to can it shrink:

- Decreased mental efficiency and memory decline = #1 cognitive complaint in older adults:
- By mid-late 20's = 1% loss of hippocampus mass/year (learning, memory).
- 10 % of adults > age 65 have some form of cognitive impairment.
- 50 % of adults > age 80 have some form of cognitive impairment.

Generally attributed to:

- Physiological losses within cells, tissues, organs and systems.
- Disease (e.g., Alzheimer's).
- Lack of use (repetition or practice)
- Lack of physical activity.
- Depression and medications.



Cognitive Decline – Outcomes:

- Reduced brain volume (hippocampus).
- Loss of myelin integrity (covers neurons).
- Dendrite thinning and synaptic inefficiency.
- Impaired NT (serotonin, dopamine, norepinephrine) levels, receptor binding sites and signaling compounds.
- Accumulation of neurofibrillary (protein) tangles (tau) and clumps (beta-amyloids) on neurons.

Neuroplasticity:

- Capacity of brain (neural pathways and synapses) to modify structure and function due to changes in behavior, environment, neural processes, thinking, and emotions.
- 1970's – term replaced formerly-held notion of a static brain.
- Plasticity requires overload to trigger adaptation(s).
- Key influencers:
  - Learning
  - Exercise/Activity
  - Nutrition

Effects on Key Brain Regions:

- Corpus Callosum – connects L/R hemispheres.
  - Transfers information between sides.
  - Greater neural connectivity in females.
  - Activity strengthens connectivity.
  - Greater development with cross-lateral patterns.
  - High 5's/10's – contralateral arm/leg patterns.

Fitness Parameter	Information
Frequency:	• 2x/week to everyday. • Note: Some studies demonstrated that 2x/week does not yield same results as 4x/week.
Intensity:	• Moderate-to-vigorous intensity evoking sweat and labored-breathing (> 60% of MHR) – up to 70 – 80% of age-predicted MHR (?). • Moderate-intensity promotes greater antioxidant capacity in brain whereas anaerobic (higher-intensity) or aerobic-exhausted exercise (or combo), shows cognitive improvement, but with less antioxidant capacity.
Time (Session Duration)	• 8 – 12 minutes aerobic activity per day. • 40 – 60 minutes per cardio session (2 – 3x/week). • 60 minutes per resistance training session (3x/week).*
Program Duration	• 12 weeks to 12 months.
* Added benefit = cognitive challenge associated with emphasizing good technique.	

Hippocampus:

- Area associated with learning and memory – region most affected by activity.
- By mid-late 20's = begin a 1% loss of hippocampus mass / year.
- Studies demonstrate total 4 % hippocampus growth (up to 5.6% in left hippocampus) with activity (greater growth with aerobic exercise).
- Growth = improved capacity for learning and information retention

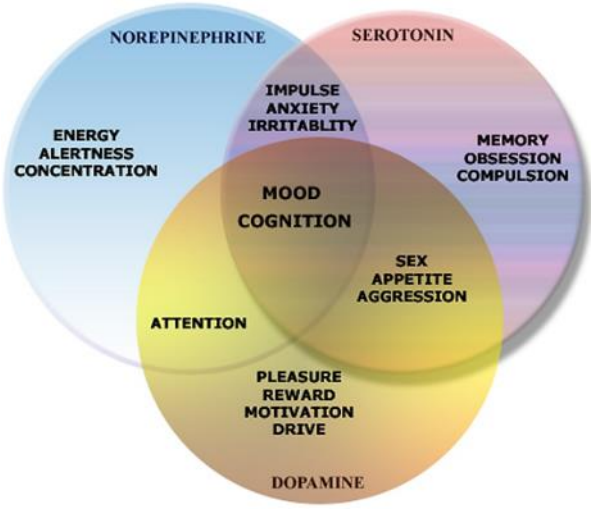
Neurogenesis / Neural Plasticity – the development of new neurons within specific brain regions (e.g., hippocampus) – changing neural landscape.

Compound	Benefit
Brain-derived Neurotropic Factor (BDNF)	• Neurotrophin that triggers neural growth within CNS (e.g., hippocampus, cortex) and PNS. • Physically grows neurons and dendrites (thin, less dense with age). • Builds (synaptogenesis), strengthens and cleans synapses (nerve junctions) – improves synaptic connectivity and efficiency.
Insulin-like Growth Factor-1 (IGF-1)	• Manufactured within muscles (exercise) = crosses into brain. • Increase glucose uptake into brain cells (fuel). • Complements some BDNF actions.
Vascular Endothelial Growth Factor (VEGF)	• Increased following exercise – promotes angiogenesis. • Builds new capillaries within brain – more O_2 and glucose.

Compound	Benefit
Fibroblast Growth Factor-2 (FGF-2)	• Neurotrophic – involved in neurogenesis. • Involved in maintaining synaptic plasticity. • More powerful than VEGF in angiogenesis.
Blood Brain Barrier (BBB) = brain filter	• Improves filtering efficiency to control amino acids entering brain (NT building blocks) – BCAA-tryptophan-tyrosine. • More balanced NT levels = improved cognition, moods, etc.
Neurotransmitters	• More balance NT levels + increase glutamate (stimulatory NT)

Regulatory Neurotransmitter Examples:

- Serotonin affects moods (relaxation), anger, impulsivity and aggressiveness.
- Norepinephrine (NE) affects attention, motivation and arousal.
- Dopamine affects rewards (satisfaction), pleasure and focus.



Learning:

- Cognitive learning or motor skill development – repetitive signaling strengthens neural and synaptic connections = greater efficiency and accuracy of signal transmission.
- Important difference:
  - Physical practice (novel) = task specific (e.g., tennis serve does not improve cycling)
  - Mental stimulation (novel) = domain-wide improvements/spillover (e.g., playing chess can improve driving skills).
  - Synaptogenesis builds more general neural pathways – bypass breakdowns in other pathways ('cognitive reserve').
  - Exercise and improvements (MRI) = weeks to months.
  - Cognition and improvements (MRI) = instantaneous (≥ 2 hours).

Mental Exercises:

- Participate in frequent digital or analog games, tasks and challenges to stimulate neurogenesis and synaptogenesis.
- New Experiences – tastes; smells; using non-dominant hand; new tasks/trips, etc.
- Building self-efficacy and self-control:
  - Spend 3-4 hours/day resisting desires – willpower depletes throughout day (easier to gain victories in am).
  - Aim initially for early victories (e.g., breakfast snack) – spillover effect.

Dietary Ideas:

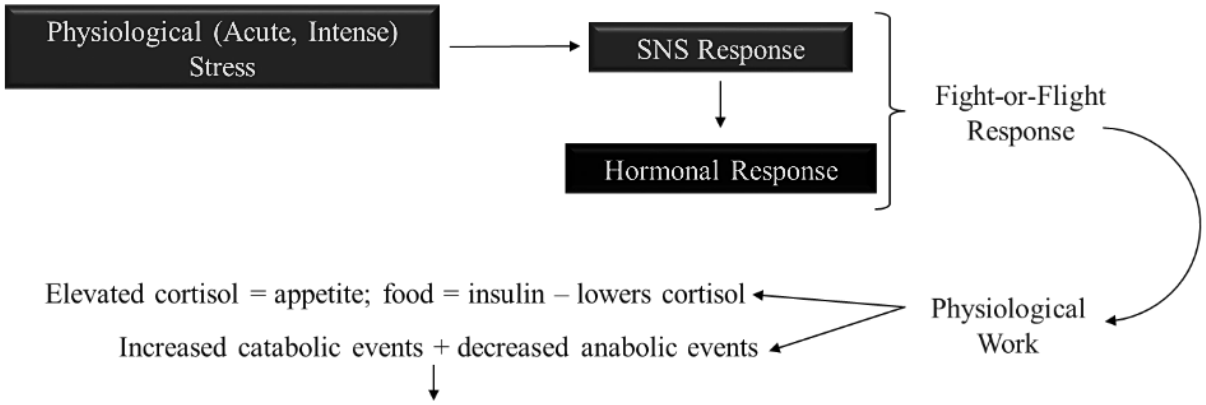
- Caloric Reduction:
  - Typically by 20 – 30% below normal.
  - Creates favorable changes in peripheral insulin sensitivity.
  - Boosts some neurotrophic factor levels (e.g., BDNF).
- Overall Fat Intake:
  - Aim for 30% range – average US diet 32 - 33%.
  - May reduce flow of oxygen-rich blood to brain; may slow glucose metabolism rates.
  - More healthier mono-/poly-unsaturated fats (less Ω-6) - Mediterranean diet.
- Omega-3 Fatty Acids:
  - 2 – 3 fish servings / week.
  - Framingham Heart Study – 1,200 mg EPA + 200 mg of DHA.
  - Slows yearly rate of cognitive decline by up to 10%.
  - Associated with a 50% decline in risk of developing dementia
  - Improves O2 circulation to brain; membrane integrity

Food Group	Brain Effect
Anthocyanins (A) Polyphenols (P). A = beets, pomegranate P = spinach, red wine	• Combat cell-damaging oxygen free radicals – high metabolism. • Blueberries (A) – stimulates neurogenesis (Hippocampus); inhibits acetylcholesterase – preserves learning/memory. • EGCG (Green tea) – also reduce damaging effects of amyloid-beta proteins (Alzheimer's). • Resveratrol – may increase IGF-1 and BDNF, suppressing inflammatory agents; reinforce BBB integrity.
Folate (800mg) Spinach, broccoli, beans, asparagus	• Homocysteine (inflammatory amino acid) – from methionine (increased with high animal protein diets + low fruits/leafy vegetables) – associated with Alzheimer's. • Folate helps regenerate methionine from homocysteine.
B-complex vitamins	• Same effect as folate.

Food Group	Brain Effect
Alcohol	• Binge drinking – rat studies – less hippocampus cell growth after binge + virtually none a month later. • Possible - large amounts of alcohol = damage + limit cell repair.
Caffeine	• May increase BDNF in hippocampus – improve memory retention?

BCAAs: _____.

Stress: Biological Design



Acute Events Activated	Acute Events Inhibited
Increased cardiopulmonary responses. Increased vasodilation. Increased mobilization of fuels. Increased blood clotting ability. Increased large intestinal contractility. Increased bladder contractility. Increased immune function. Increased sweat rates.	Decreased salivary and digestive enzyme secretion, and digestion. Decreased stomach/small intestinal contractility. Decreased pain perception (analgesia). Decreased growth, repair and maintenance. Decreased reproduction capacity.

However…….. Chronic Stress

- Chronic psychological stress and sustained high levels of cortisol

Stress	Effect
Elevated Cortisol	Impairs cells in the hippocampus involved with short-term memory, learning and memory.
Elevated Cortisol	Ultimately can damage hippocampus – becomes smaller due to free radical attacks (reduces long-term memory), destroys and shortens dendrites, decreases levels of BDNF, reduces neurogenesis, and increases neural atrophy
Elevated Cortisol	Amygdala (emotions) will control hippocampus = increased emotional stress – vicious cycle.
Elevated Cortisol	Cortisol also impedes transition to stage 4 sleep (delta or deep sleep) where short-term memory is converted to long-term memory.

Dinner – Carbohydrates

- Muscle and liver glycogen filled.
- Evening activities – bedtime.
- Overnight fast – bodily functions:
  - Muscle cannot release glucose to blood
  - Liver's role is to maintain blood glucose
- Results = increased cortisol (highest of the day).
- Eating Breakfast – effect on cognitive function = improved concentration/retention.

Can Stretching Improve Brain Plasticity?

- Stretching + Breathing - increases PNS dominance.
- Lower cortisol levels.
- Less impairment upon hippocampus – less damage to cells.
- Any stress-reducing mechanism may have similar effects (meditation, yoga, Tai-Chi, Qigong; Feldenkrais).

Restful Sleep:

- Sleep – 2 basic stages:
  - Rapid eye movement (REM) sleep (dreams)
  - Non-rapid eye movement (NREM) sleep (stages 1 – 4) with each stage lasting 5 – 15 minutes (quiet sleep).
- Sleep = cycles between non-REM and REM sleep
- Initiated with NREM stages, followed by short REM sleep, before repeating cycle between Stage 2 – 4 (NREM) and REM.

Stage 1	Stage 2	Stage 3 – 4
• Reduced wakefulness with closed eyes; easily awakened – not restful. • 5 – 10 minutes. (high-amplitude, low-frequency theta waves) Traits: • Sudden muscle contractions (myoclonic jerks). • Vivid sensations (hypnagogic hallucinations) – falling.	• Intermittent high/low periods of muscle tone mixed and muscle relaxation. • 20 minutes (bursts of rhythmic, small, fast [beta] waves – sleep spindles) • Core temperature and HR lower – prepares body for deep sleep – Important for Proper Recovery !!!	• Less responsive and noises and activity in the environment may fail to generate a response. If aroused during these stages – disoriented feeling. (slow-wave delta sleep; stage 4 = more intense). Stage 3 = transition into deep sleep (stage 4) • Body repairs/regenerates tissues; builds bone/muscle; strengthens immune system. • Hippocampus – imprints ST into LT memory (learning, information retention). • Stress and aging = less deep sleep.

REM
• 1st REM stage: ~ 90 minutes after sleep onset – lasts about 10 minutes, but each recurring REM stage lengthens with final REM stage = up to 60 minutes. • Paradox: Increased brainwave activity (similar to wakeful states) + accelerated and erratic heart/breath rates – muscles become more relaxed (appears protective to prevent harm associated with dreams – vivid and intense. • Why REM? • (1) Restful sleep, but be alert to defend ourselves. • (2) Turns off NTs (e.g., serotonin, norepinephrine) – replenish, reset receptors. • Aging declines REM sleep

Key Considerations:

- Exercise can release 'feel good' endorphins = relaxation – later in day may promote restful sleep – BUT not too late – lowering of core temperature.
- Stress or overtraining = elevated cortisol levels = poor quality of sleep = further elevated cortisol levels.

HIIT, HVIT and VIIT Training

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Trending: HIIT workouts – why? **NOTES**

- Weight loss – potentially increased caloric burn during session + EPOC (afterburn)?
- Time-efficiency – shorter workout sessions (as short as 3 x 20 sec)?
  - Up to 90 % less training volume (amount of work performed).
  - Up to 67 % lower training time.
- Improved performance – aerobic and anaerobic improvements?
- Improved health – blood glucose control?
- Increased metabolism – fat burning ability?

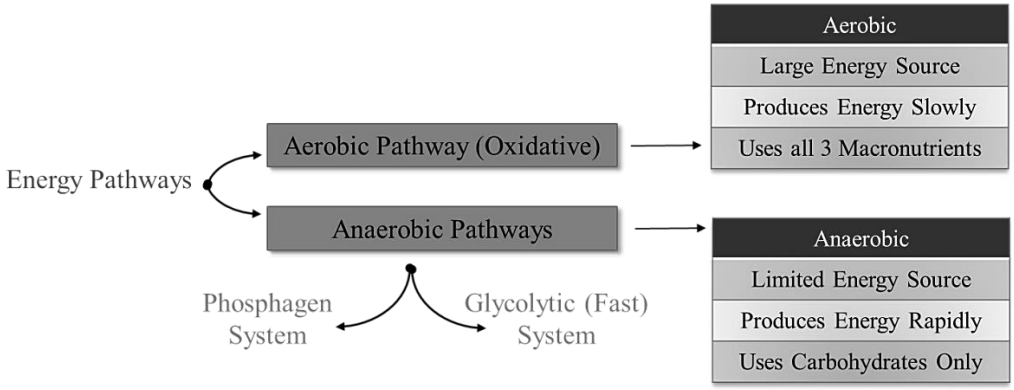
Big Question: Are you delivering HIIT programs or HVIT Programs?

- HIIT = High-intensity (Movement Quality – performance).
- HVIT = High-volume (Movement Quantity – calories?)
  - Work intervals > 3 – 4 minutes
  - Work intervals < 75 % of maximal performance (e.g., 1RM).
  - Body weight training is not HIIT

NEVER confuse maximal performance with maximal effort – very different !! **NEVER** confuse maximal performance with maximal effort – very different!

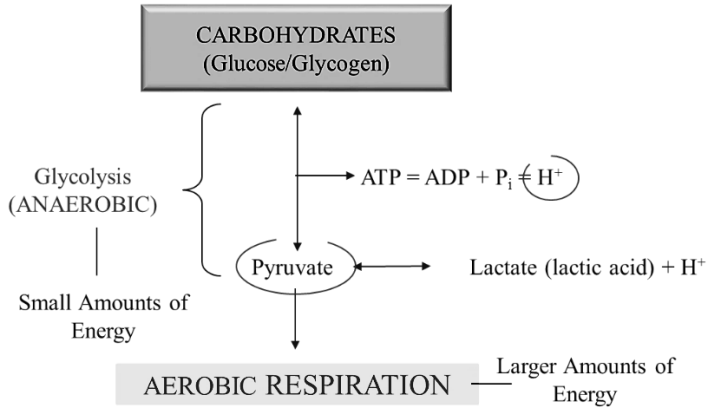
Maximal Performance	Maximal Effort
Example: best 40-m sprint time (e.g., 5 seconds).	Example: Pushing as hard as possible under fatigue, but completing same 40-m dash in 7-seconds.
Goal = improve performance	Goal = burn calories, but at what cost? As intensity drops, so does kcal burn rate.

Energy Systems:

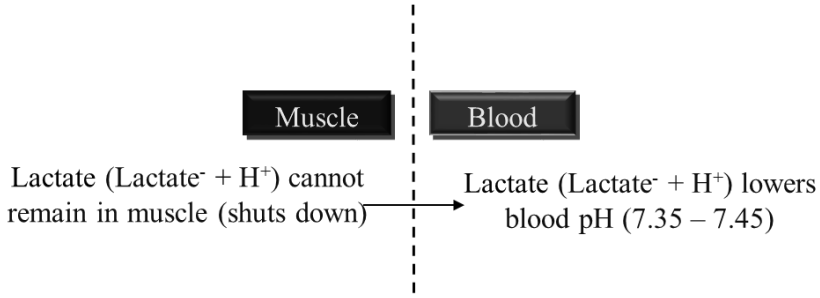


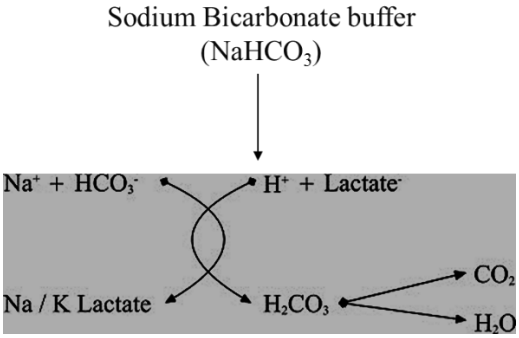
Duration of Event	Event Intensity	Primary Energy System
0 – 6 seconds	Extremely High	Phosphagen
6 – 30 seconds	Very High	Phosphagen and Fast Glycolytic
30 – 120 seconds	High	Fast Glycolytic
2 – 3 minutes	Moderate	Fast Glyolytic and Oxidative
> 3 minutes	Lower	Oxidative

NOTES

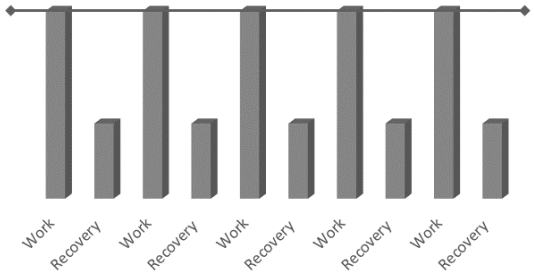


Recovery within Blood !!!





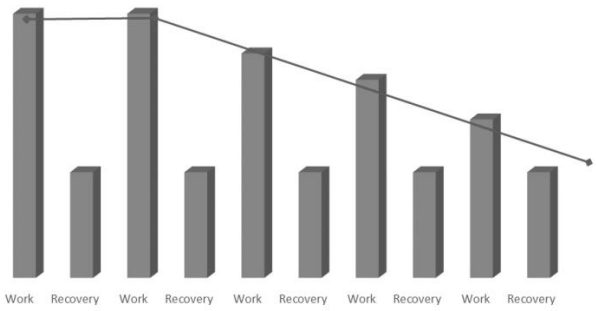
HIIT:



Appropriate recoveries =

- Consistent work performance.
- Consistent calorie burn in bout.
- Less kcal burn in recovery.
- *Example: 4-min x 5 sets (20 min):*
  - 60-sec HIIT = 20 kcal/min.
  - 180 kcal recovery = 5 kcal/min.
  - Interval = 35 kcal x 5.
  - Total workout = 175 kcal.

HVIT:



Inappropriate recoveries =

- Reduction in performance.
- Calorie burn decreases.
- More work bouts, but is it more kcal?
- *Example: 2-min x 10 sets (20 min):*
  - 60 sec HVIT #1 – 2 = 20 kcal/min.
  - 60 kcal recovery = 5 kcal/min.
  - 60 sec HVIT # 3 – 6 = 17 kcal/min.
  - 60 sec HVIT # 7 – 8 = 12 kcal/min.
  - 60 sec HVIT # 9 – 10 = 9 kcal/min.
  - Total workout = 200 kcal.

Does EPOC Contribute Significantly to Weight Loss?

- Research Studies:

NOTES

Study	Design	Results	EPOC	Weight Loss
Knab et al. (2011). *Medicine & Science in Sports and Exercise*	N= 10; cycling, 45–min @73% VO_2max (85% MHR)	519 kcal expended; 37 % more kcal burned with EPOC	EPOC was 190 kcal – 14 hours 13.5 kcal/hour.	3x/week = 8½ lbs. per year
Heden et al. (2011). *European Journal of Applied Physiology*	N= 8; resistance: 1 v. 3 sets of 10 reps (10 exercises)	Both groups showed increased EPOC regardless of volume	EPOC = 100 kcal. Exercise volume has small effect on EPOC	3x/week = 4½ lbs. per year
Scott et al. (2011). *Applied Physiology Nutrition and Metabolism.*	N= 10; 2 sets BP @ 70%, 80%, and 90% 1RM x reps to failure.	More kcal expended with 70% / 80% 1RM v. 90% (less reps)	EPOC was same although more work performed with LI sets. EPOC = 45 kcal	3x/week = 2 lbs. per year
Phelian, et al. (1997) *Journal of the American College of Nutrition*	N=8, 500 kcal session 50%VO_2max v. 70% VO_2max	EPOC elevated after 70% VO_2max session for 3-hours post-exercise	EPOC was 45 kcal v. 24 kcal	3x/week = 2 lbs. per year
Laforgia, et al. (1997). *Journal of Applied Physiology*	N=8; 30-min continuous run (70% VO_2max) v. 1-min intervals (105% VO_2max) + 2-min rest	EPOC elevated for 9-hours; 7.1% and 13.8% of kcal	EPOC was 32 kcal (tempo) v. 64 kcal (intervals)	3x/week = 2.8 lbs. per year
Thornton, et al. (2002). *Medicine & Science in Sports and Exercise*	N=14; 2x15 @ 45% 8RM v. 2x8@ 85% 8RM	EPOC larger with HI resistance workout	EPOC was 11 kcal (HI) v. 5 kcal (LI)	3x/week = ½ lb. per year

EPOC = influenced by 1st by intensity, then 2nd by duration.

- ~14 % of exercise energy (research don't account for EPOC between intervals).
- Consensus: 7 % of exercise energy up to 37 % (11 – 190 kcal).
  - EPOC for light-to-moderate activity = almost 0 kcal.
  - Which program contains greater intensities - HIIT v. HVIT?

True HIIT Training: Goal = performance:

Resistance Training		
System / Goal	Phosphagen (Maximal Power / Strength)	Fast Glycolytic (Strength / Hypertrophy
Load	90 – 100 % 1RM	75 – 90% 1 RM
Conditioning		
50 m (55 yards)	Phosphagen (~6 sec)	No < 1.5 sec slower than fastest pace
100 m (110 yards)	Phosphagen (~ 11 sec)	No < 3.0 sec slower than faster pace
200 m (220 yards)	Fast glycolytic ~ (23 sec)	No < 5.0 sec slower than faster pace
400 m (440 yards)	Fast glycolytic ~ (50 sec)	1-4 sec faster than average ¼ mile (1 mile)
> 400 m	Fast glycolytic / aerobic	Add 3 – 4 sec to average ¼ mile pace

Women – Physiological Differences:

- Women have smaller concentrations of type II (fast-glycolytic) fibers - 3.5 – 5.0 % less than men.
- Reduced Glycolytic Capacity:
- Reduced glycogen loading capacity = less glycogen.
- Reduced glycolytic enzymes.

- Reduced LDH (lactate dehydrogenase) activity

Men:

NOTES

Energy System	% of Maximal Power	Bout Duration	Work-to-Recovery Ratio	Type of Recovery	Recovery Time between Sessions
Fast Glycolytic	75 – 90 %	15/30 sec to 3 min	1:3 to 1:5	Active	48 hours minimum

Anaerobic Systems – Performance Training Principle:

- Specificity utilizes the following variables (FITR / FIVR):
  - Number of repetitions (F)
  - Intensity (I)
  - Interval duration (time – T / volume – V)
  - Recovery length (R)

Women: Generally cannot train as hard as men – bouts need to be shorter and less intense, but recoveries can be shorter (1:2 or less).

Energy System	% of Maximal Power	Bout Duration	Work-to-Recovery Ratio	Type of Recovery	Recovery Time between Sessions
Fast Glycolytic	< 75 – 90 %	15/30 sec to 2 min	1:1 to 1:3	Active	48 hours minimum

What are we supposed to do during recovery intervals?

- Transition from Type II fibers (anaerobic) to type I (aerobic)
  - How?
  - Need for movement – active recovery.
  - Stabilization exercises.
  - Balance and postural control.

HIIT Example: (> 75% of maximal performance (1RM test)

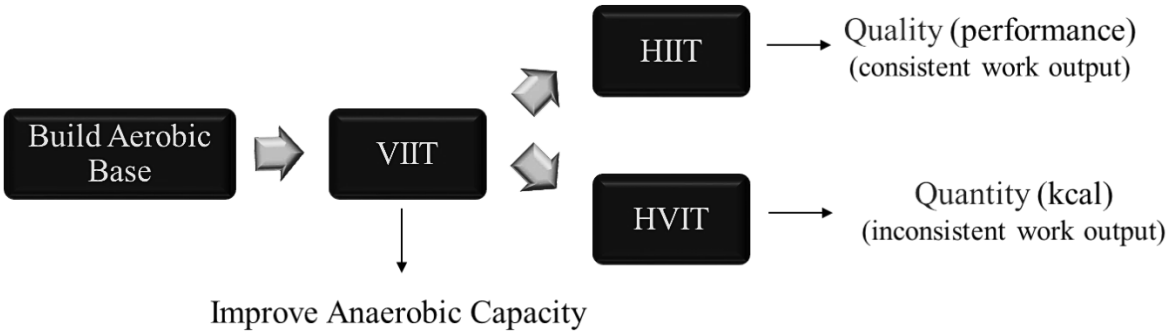
- **Goal**: Improve performance
- SS: Bb Clean and Press (45-sec) + Bb Side Lunges (30-sec each way)?
- ~ 105 seconds of work = 1:3 (315 sec recovery) - generalized recovery – lactate buffer
- Active Recovery:
  - Light Movement – walking (30-sec)
  - Plank walk-ups (40-sec) / Rotational Planks (40-sec) / transition.
  - Single-leg Leg Swings and Hip Drivers (3D) (40-sec per leg) / transition.
  - Turkish Get-up (40-sec each side) / transition
  - Light Movement – walking (20-sec)
- SS: Bb Deadlift (30-sec) + Standing Kb Rear Rotational Presses (30-sec / side)

HVIT Example: (< 75% of maximal performance)

- **Goal**: High work-rate – kcal burn?
- SS: Burpees with OH Wall Ball (45-sec) + Push-ups (45-sec)
- ~ 90 seconds of work = 3:2 (60-sec) - Generalized recovery – lactate buffer?
- Active Recovery:
  - Plank walk-ups (30-sec)
  - Rotational Planks (30-sec) / transition.
- SS: Box jumps (45-sec) + Pull-ups / Kips (45-sec)
- Technique and injury?

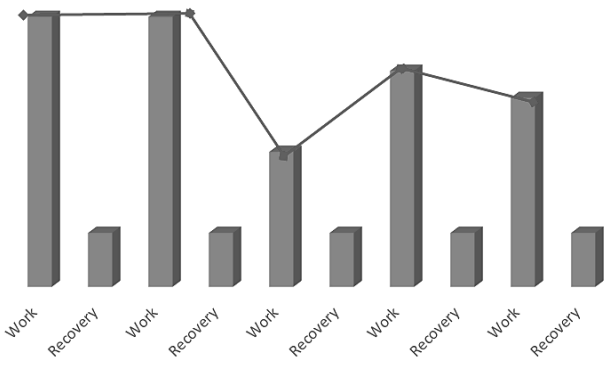
New Solution …… **NOTES**

- HIIT = High-intensity (Movement Quality – performance).
- VIIT = Variable-intensity – transitional between HIIT and HVIT
  - Aim is to pursue smaller improvement in performance, yet maintain higher work rates to burn kcal.
- HVIT = High-volume pursuing maximal efforts (Movement Quantity – calories).



VIIT….

- A hybrid between both styles:
  - VIIT – variable intensity interval training:
- Mixed pursuit of:
  - Performance
  - Calories (EPOC)
  - Sustained intensities = calories + EPOC
  - Reduced potential for injury



Coaching Client to Nutrition Success 2015 Evolution Fitness Conference

Mike Fantigrassi mfantigrassi@nasm.org

Scope of practice

- Never create nutrition plans for special populations-medical nutrition
  - Diabetes, pregnant, high blood pressure
  - For medical nutrition refer out
- Generally outside scope of practice to write out diets

For healthy populations you can:

- ❑ Advise on healthy snacks
- ❑ Discuss food preparation methods
- ❑ Educate about macro and micro nutrients
- ❑ Discuss hydration guidelines
- ❑ Review food logs
- ❑ Develop strategies for long term success

Why do Clients Struggle with Nutrition?

- Knowledge
  - Not knowing what to do
  - Unrealistic expectations
- Behaviors
  - Lacking skills
  - Lacking habits to be successful
- Environment
  - Grocery store, home, restaurants, office

Behavior Influences:
Thoughts, Emotions, Sensations, Social Influences
Habits triggered by a cue which start a routine and lead to a reward.
A large part of our behavior occurs automatically with conscious decisions being made.
Nutrition Coaching

- Is your client ready to change?
  - Stages of change model
    - Precontemplation
    - Contemplation
    - Preparation
    - Action
    - Maintenance
    - Termination
- What does your client struggle with?
  - Understand their unique issues

Goal Setting

- Outcome goals
- Performance goals
- Process goals
- Action items

Review goals on set schedule and provide feedback
Behavior Coaching

- Advantage response cards
- Implementation intentions
  - Specify where, when, and how to act to obtain a goal
- Though strategies
  - Positive coping statements
  - Though reframing
- Emotion strategies
  - Behaviors that stimulate positive emotions
  - Coping mechanisms
- Sensation strategies
  - Ways to limit hunger
- Social strategies
  - Communicating how important goal is to others
  - Positive influence
  - Social activities that support goal

Change Environment
Remove the cue or stimulus
Change the routine. Example meditation to relax vs. alcohol
Improve home environment and work by reducing, removing, or making stimulus harder to get.

Quick Fixes for Squats and Lunges

Rich Fahmy

Objectives

- Discuss and review ideal mechanics for squats and lunges
- Review common deviations to squat and lunge form
- Practice correcting these deviations

Overhead Squat Assessment

- A two-legged squat performed with:
  - the arms held overhead
- From a bilateral standing posture assesses:
  - total body structural alignment, dynamic flexibility, and neuromuscular control
- Squatting requires:
  - optimal motion in the ankles, knees, and hips.
- Having the arms elevated overhead:
  - stresses the musculature surrounding the shoulder complex
  - increases the demand placed upon the core stabilizing muscles

Front View: Feet Turn Out
Front View: Knees Move Inward
Side View: LPHC Excessive Forward Lean
Side View: LPHC Low Back Arch
Side View: Upper Body Arms Fall Forward
Asymmetrical Weight Shift

Cueing

- Auditory
- Visual
- Kinesthetic
- Show, tell, do

Lunges

- Squats with a "kickstand"
- Upright versus leaning forward

Squat correction - ankles

- Elevating the heels-temporary fix
- Using a stability ball
- Range of motion adjustments
- Flexibility intervention
  - Static stretch
  - Self myofascial release

Squat correction – the upright squatter

- Flexibility intervention
  - Static stretch
  - Self myofascial release
- Ways to push the hips back
  - Cues in front of the body
  - Cues behind the body

Squat correction – the "deadlifter"

- Flexibility intervention
  - Static stretch
  - Self myofascial release
- Practice cues in front of the body
- Practice cues behind the body

Lunge correction – the 90/90

- Flexibility intervention

        - Static stretch
        - Self myofascial release
    - Weight distribution across the feet
    - Cues in front of the body

Lunge correction – the huge step

- Flexibility intervention
    - Static stretch
    - Self myofascial release
- Adjusting stance and depth of drop

Training Considerations for Older Adults

Rich Fahmy

Goals

- Discuss different categories of age-related changes
  - Neurological
  - Cardiovascular
  - Respiratory
  - Psychosocial
- Discuss and apply different exercises to integrated training model
  - Flexibility
  - Core
  - Balance
  - Plyometric
  - Resistance Training

Neurological Considerations of Aging

- 10-15% decrease in brain matter
- Decrease in dendritic branching
- Response speed increased
- Ability to process info
- Ability to learn new motor skills impaired

Cardiovascular Considerations of Aging

- Enlargement of the heart
- Slowing of the heart's electrical activity
- Large arteries thicken, widen and stiffen-heart works harder to push blood
- Increase in risk of hypertension and heart rate abnormalities

Respiratory Considerations of Aging

- Lungs have reduced elasticity-airways remain open for shorter periods
- Stiffness in the chest wall-harder to expand lungs

The Good News

- Many structural changes can be halted or reversed with exercise

Psychosocial Considerations of Aging

- Quality of life directly related to physical health, independence and functional ability
- Exercise programs improve self-efficacy and self esteem
- Fear of injury and intolerance lead to discomfort in health clubs

Psychosocial Considerations of Aging-Programming

- Encourage daily activity
- Meet them where they are at
- Assessments based on the client, not "norms"
- Reward success
- Fight boredom

Program Design Principles

- Periodization – systematically changing the variables of a program to bring about specific responses (adaptations) in the body
- Based on SAID principle – what I repeatedly do, I get good at
- Progress and Regress based on client's ability to move free of pain and compensation through a full ROM

Program Design

- Discuss traditional versus integrated training
  - Flexibility
  - Core
  - Balance
  - Plyometrics
  - SAQ

        - Strength
    - OPT Model

Flexibility

- Self Myofascial Release
    - Considerations
    - Contraindications
    - Modifications

Flexibility

- Static Stretching
    - Considerations
    - Modifications
- Practice

Core Training

- Progression through the OPT model
- Modifications
- Practice

Balance Training

- Progression through the OPT model
- Modifications
- Practice

Plyometrics

- Applying plyometrics to the older adult population
- Rationale
- Modifications
- Practice

Resistance Training

- Progression through the OPT model
- Modifications
- “I just want to learn the machines.”
- Practice