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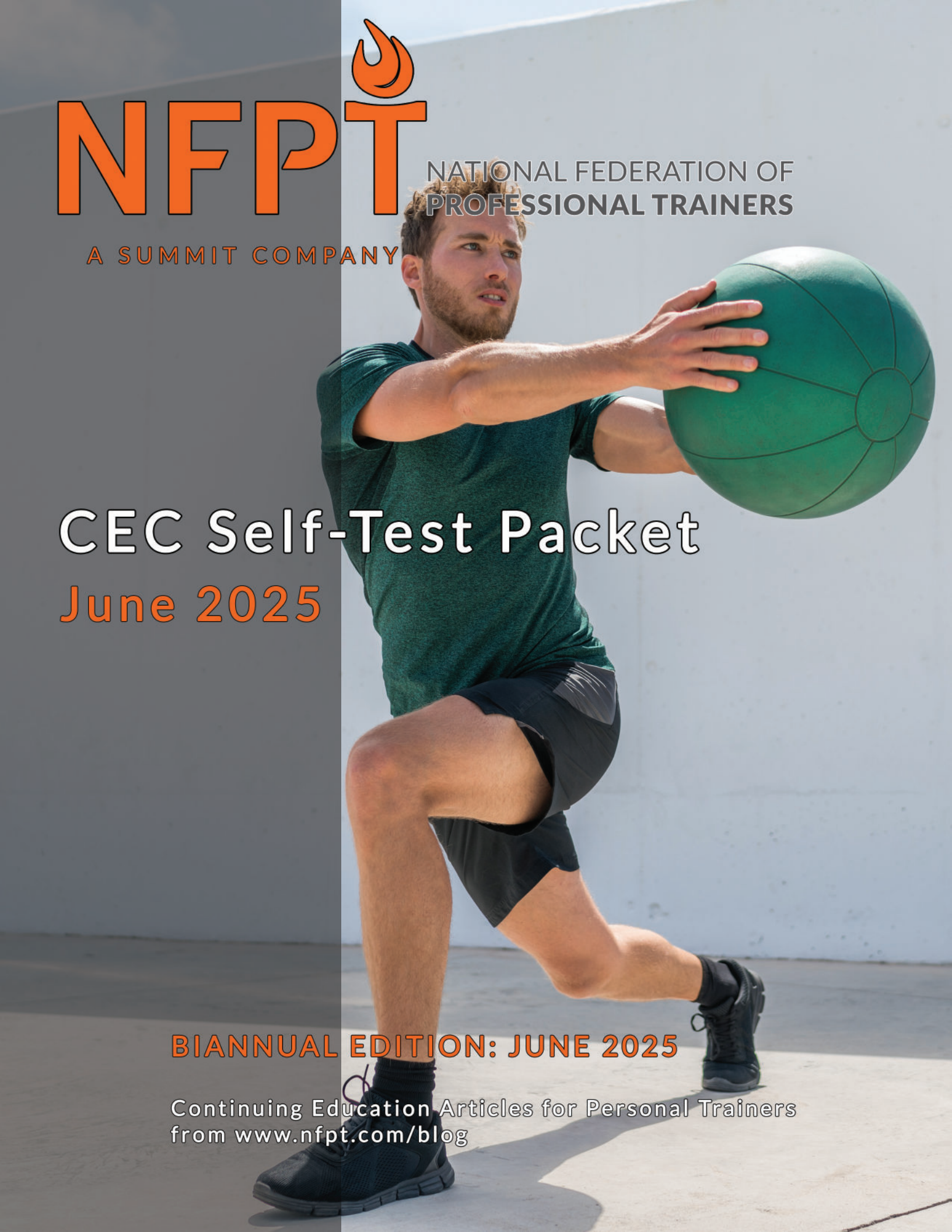

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Biohacking Offers a Pathway to Achieving Personal Goals

Biohacking, an emerging term and trend these days, refers to incremental shifts we can make in order to "hit the reset button" on both body and lifestyle. Biohacking involves making small, strategic changes to current habits and behaviors, while also encompassing alterations to our biology and/or environment. Such behavior likewise can have a positive effect on cognitive function, weight management, and physical/mental /emotional performance. Successful biohacking involves gaining a deeper understanding of how the body works at a molecular level; from there, adding in tools, data, and strategies help to optimize the body's functionality. Read on to learn about this unique way of approaching desired changes for the year ahead.

Body Biohacking

Biohacking involves using science, technology, and a daily process of trial-and-error to enhance both body and mind. This endeavor works, for a client striving for peak physical performance, a professional looking to boost productivity, or a healthy senior focused on longevity.

"Biohacking seems to be a new word for lifestyle modification, which is something primary care physicians always talk to our patients about — changing their lifestyle to improve their health," says Lorien Ahn, MD, a physician of Internal Medicine at Scripps Clinic Rancho Bernardo.

"For example, I tell my patients not to use coffee to wake them up," Dr. Ahn says. "You need to allow your body to wake up naturally. Your first cup of coffee shouldn't be until at least a few hours after you wake up."

The Difference Between Biohacking and Biotechnology

Biotechnology, a largely regulated industry, encompasses any type of science that boasts the goal of pairing biology with new technology. Biohacking, considered the quieter relative, makes frequent use of biotechnology, but does not require it in order to facilitate changes to one's lifestyle or mindset.

When first embarking upon a body-based biohacking journey, many individuals choose to look first at their typical diet, exercise and mindfulness habits, things that they can easily alter. Data-based tracking wearables, including the FitBit or Apple Watch, often figure prominently here, coupled with an optimal nutrition plan and perhaps introducing the concept of music in everyday life. Once an individual masters these, and has a firm grip of all aspects involved in his daily lifestyle, the next steps in body-based biohacking take many folks into uncharted territory.

A Brave New World

Popular motivational speaker Tony Robbins often delivers talks on this topic, revealing his 3 favorite biohacking methods: cryotherapy, red light therapy and dynamic sequential compression. Blending these methods provides him with great personal insight, which he often shares: "It's invigorating, strengthening and allows me to recover so much faster and perform at a higher level."

If this seems like a foreign concept, we must acknowledge the ever-evolving nature of body biohacking. A strategy of changing one's chemistry and physiology through science and self-experimentation, with a goal of increasing energy and vitality, may come across as daunting. Consider the concept of genetic engineering, with which we have some level of familiarity from the media. A technology known as *CRISPR* (clustered regularly interspaced short palindromic repeats) actually allows individuals to edit their own genetics. As we might gather, this highly controversial process remains completely unregulated, existing only on the fringes of the biohacking realm. However, it does merit consideration!

With endless possibilities, dare we allow ourselves to get fully immersed in the idea that we can change our bodies and our brains, ultimately evolving into smarter, faster and better human beings?

What To Expect in the Future

While personal trainers may still adhere mostly to traditional methods of helping clients gain strength, power, and overall healthier bodies, many atypical means of restorative therapy exist, offering interesting and varied methods of body biohacking.

1. Cryotherapy
This fairly new science, involving exposure of one's entire body to extremely low temperatures, seeks to elicit severe vasoconstriction. Upon returning to a normal temperature, a rush of blood re-enters the tissues, delivering an abundance of nutrients and minerals as well as a highly desired endorphin rush.

In our busy and often overly structured lives, the fact that cryotherapy can confer significant bodily improvements in about 3 minutes accounts for its rise in popularity. This small investment in time pays off with an invigorating, restorative experience.
Popular power athletes such as runner Usain Bolt and boxer Floyd Meriweather employ cryotherapy as part of their sports recovery program, enabling them to perform at their best. For the past four years, the use of cryotherapy in this country's technique has consistently doubled in growth.

2. Red light therapy
Too much time spent indoors, whether working in an office or training in the gym, may not pave the way for optimal health/performance success. The human body as a whole, and the brain in particular, require light to function at their best. Exposure to the sun serves to provide an important dose of vitamin D, but it boasts positive benefits in a variety of physiological and emotional ways.

Scientists currently focus their research on light wavelengths between 600 and 900 nanometers (red to near-infrared wavelengths) and their benefits to the body. How does this unique range of light waves impact us and, furthermore, can we manipulate its use to "biohack" the body?

As the body absorbs these waves of light through the skin, to a depth of about 8 to 10 millimeters, a plethora of mitochondrial chromophores absorb the photons. This in turn activates a number of nervous system and metabolic processes: electron transport, adenosine triphosphate (ATP) nitric oxide release, blood flow, and diverse signaling pathways. Activation of stem cells allows increased tissue repair/healing. All of these factors have led to the increase in red light therapy as a means of body biohacking, finding use as a treatment for pain relief, a reduction of the inflammatory response, and the restoration of certain bodily functions.

While not readily accessible, more and more locations seem have started to offer infrared light therapy services. Rheumatologists and dermatologists offer such services to select patients; gyms and fitness centers now offer treatments; medical-type spas likewise offer infrared treatments.

3. Compression therapy
The lymphatic system, often referred to as "the sewage system of the body", facilitates the elimination of waste and lactic acid that builds up from exercise and natural bodily processes. Compression therapy increases blood flow to certain parts of the body, helping to flush out toxins and expedite healing.

4. OsteoStrong
A decrease in bone health creeps up on us right along with the aging process. This includes bone density and overall bone loss. Until we reach the age of 30, both males and females build more bone at a faster rate than bone loss, reflecting how healthy bodies consistently strengthen bones and strive to maintain bone density. However, after passing that third decade of life, women typically lose about 2% of their bone density each year, a process that continues unfolding even a few years after the onset of menopause. This leaves women vulnerable to a higher incidence of fractures and osteoporosis.

Men lose bone density at a much slower rate, but the process continues up until the age of 65. Despite the fact that males enjoy adequate bone mass for a longer period of time, they do in fact succumb to an increased risk of fractures as well as osteoporosis. The body biohack known by the trademark name *OsteoStrong* **utilizes a series of robotic musculoskeletal treatment devices. A** stimulus to the central nervous system triggers osteogenesis, or new bone growth. **In this manner, *Osteostrong* delivers an equivalent emulation of high-impact stress to the body**, enabling individuals (largely an older demographic) to derive all the benefits of impact without the associated risks.

5. Functional music
The human brain boasts over 100 billion neurons that constantly use electricity to communicate with one another. In this regard, we can easily liken the brain to Grand Central Station. If you have ever experienced standing in a crowded room where everyone tries to speak simultaneously and over everyone else at an elevated decibel level, you understand the challenges it can provoke. Indeed, the brain sometimes finds it difficult to concentrate on the more important tasks at hand amid all of this "chatter". This describes an ideal scenario for introducing music biohacking.

Scientists measure brain activity as a wave-like pattern, the specifics of which determine if we feel alert, sleepy, relaxed or stressed. Many external forces can affect the brainwaves, including the activity in which one currently engages, whether adequate/restorative rest was achieved the night prior, or even what one just consumed an hour ago.

We can predictably and reliably alter our brainwaves through exposure to a consistent sound wave. "Audio entrainment", a form of music biohacking, uses beats and tones to synchronize with brain waves and induce a meditative, relaxed state. Through the use of specific apps such as *Brain.fm*, one can actually customize programs for his individual brain and the activities he wishes to accomplish. If this seems a bit too far-fetched for comfort just yet, we can still change both mood and mindset by listening to a favorite playlist while exercising, cooking a holiday meal or commuting to work.

6. Gratitude
Do you envision yourself as a "glass half-full" or a "glass half-empty" individual? One's view on life in general can largely influence his moods, how he treats others and his overall perception of fulfillment. When we exhibit a mindset of abundance and gratitude, the brain can remain consistently grateful for everything that comes our way. In this manner, we find ourselves always focused on the positive.

Many individuals, indeed a significant portion of today's population, struggle with adopting this type of perspective. Changing a mindset requires discipline and practice. It forces us out of a comfort zone, challenging us to consistently refocus the brain to find and embrace the positive in every situation. The following biohacking techniques can help facilitate this process.

- **Keep a gratitude journal:** write three to five things you're grateful for every day. This helps reframe and allows you to focus on the positive and reflect on all the good things that have occurred since waking.
- **Take a gratitude walk:** get out in nature and give thanks by sending positive energy vibes to every living thing you see.
- **Write a weekly letter of gratitude:** select a recipient someone who played a meaningful role in your life at some point in the past or on a daily basis.
- **Start each day with a ritual:** consider meditating upon rising, setting an intention for gratitude in everything you encounter.

7. Supplements
Every day personal trainers, life coaches and dietitians extoll the virtues of exercising, eating prudently and cultivating a positive mindset. Upon completing this groundwork, we can take biohacking a step further by considering the addition of supplements. In past articles, we have explored the vast and varied world of supplements, many of which promise to improve focus, increase energy and help the body derive the most bioavailable forms of nutrients. Careful consideration and research can pave the way for some of the healthier options on today's specialty store shelves.

Biohacking For Athletes

Biohacking originated in the competitive and professional athlete arena. For quite some time, scientists and coaches alike found ways to collect accurate data from the bodies of professional athletes in an effort to maximize performance. While these athletes typically enjoy the support of teams of nutritionists, psychological coaches and other experts, the majority of regular amateur gym afficionados must rely on other means. We can draw upon some of the key biohacks utilized in the competitive sports arena and share them with our clients. Consider the following.

- **Visualization:** picturing an event, competition, or even a tough day of training can increase the athlete's chances of success.
- **Cold training:** cold showers and/or ice baths foster muscle recovery and can reduce inflammation.
- **Altitude training:** given the lower content of oxygen at high altitudes, training in such an atmosphere may improve oxygen uptake as well as its effective utilization in the body.
- **Food supplements:** branched-chain amino acids (leucine, isoleucine and valine) can support muscle building and recovery.

Is Biohacking Safe?

As with any journey of self-improvement, safety ideally should remain a top priority. The same holds true for the world of body biohacking. Some hacks may appear straightforward and simple but can still pose risks if not approached with care. Specifically, ice baths may not serve as an ideal option for individuals with any underlying heart conditions. In a similar vein, the FDA advises against "young blood" transfusions, where older people receive transfusions of plasma from younger individuals. The FDA warns that claims of this treatment reversing aging and memory loss remain unproven and could potentially cause harm.

Carefully consider all of the options for body biohacking, researching as thoroughly as possible prior to engaging. The theories seem enticing, though, and the future may hold great potential for restorative health right along with strength training, aerobic exercise and healthy diets.

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The Psychology of Worthiness: Part 1 – The Science of Helping Clients Commit to Long-Term Muscle Health

Muscle health is integral to Dr. Gabrielle Lyon's Muscle-Centric Medicine (MCM) approach, which links physical well-being to an individual's self-worth and the psychological factors that promote sustainable behavior change. In this series, we have examined the nutritional and physiological aspects of muscle health, while critically assessing this emerging paradigm of health and human performance. In this edition, we focus on the crucial role of behavioral science and the psychology of worthiness in cultivating lasting health habits. By delving into the theories and evidence-based practices that underpin the behavioral analysis components of MCM, fitness professionals can address the mental and emotional elements that impact client engagement. This, in turn, can inspire not only physical transformations but also a significant shift in individuals' perceptions of themselves and their boundless potential.

Behavioral Change Frameworks: Building a Foundation for Commitment

Several well-established behavior change theories offer insights into how individuals adopt and sustain new health behaviors, particularly those tied to muscle health, such as resistance training and optimal nutrition. These frameworks provide a roadmap for understanding client behavior and crafting strategies to help them embrace a health-focused lifestyle.

The Transtheoretical Model of Behavior Change

The Transtheoretical Model (TTM) identifies five stages of behavior change: precontemplation, contemplation, preparation, action, and maintenance (Marshall & Biddle, 2001). Understanding where a client is in this continuum allows trainers to tailor interventions. For example, clients in the precontemplation stage may require education about the importance of muscle health, while those in the preparation stage benefit from specific, actionable strategies for incorporating resistance training into their routines (Hajivandi et al., 2021).

The Theory of Planned Behavior

The Theory of Planned Behavior (TPB) emphasizes the role of intention in predicting behavior. Intention itself is shaped by attitudes, subjective norms, and perceived behavioral control (Ajzen, 2020). In practice, this means helping clients develop positive attitudes toward resistance training by demonstrating its benefits—such as improved metabolic health and enhanced quality of life (Chilón-Troncos, 2024). Encouraging supportive social networks and addressing perceived barriers can further strengthen clients' intentions and likelihood of sustaining health behaviors (Newsome et al., 2023).

Self-Determination Theory

Self-Determination Theory (SDT) highlights the importance of intrinsic motivation, driven by autonomy, competence, and relatedness, in sustaining behavior change. Fitness professionals can nurture intrinsic motivation by aligning health goals with clients' personal values and fostering a sense of mastery through incremental progress (Taghipour et al., 2016). For example, a client who sees resistance training as a way to increase energy levels and enjoy activities with their family is more likely to commit to the behavior long-term (Vrinten et al., 2023).

Self-Efficacy and Its Impact on Adherence

Self-efficacy, or the belief in one's ability to succeed, is a critical determinant of behavior change. Clients with high self-efficacy are more likely to persist in the face of challenges and setbacks (Kim & Park, 2020). Strategies to build self-efficacy include setting realistic, achievable goals and celebrating small successes, such as completing a week of planned workouts (Stacey et al., 2014). This reinforces a client's confidence in their ability to maintain healthy habits.

The Role of Worthiness in Muscle Health

Beyond the structured theories of behavior lies the crucial concept of worthiness—a psychological state in which individuals believe they are deserving of health, vitality, and longevity. Many clients struggle with feelings of inadequacy or self-doubt, which can hinder their commitment to adopting healthy behaviors. It is vital to address these emotional barriers to facilitate meaningful and lasting change.

In exploring the holistic principles of MCM as outlined by Lyon (2023) in her seminal book *Forever Strong,* her approach inherently acknowledges the necessity for clients to feel worthy. By reframing muscle health as a pathway to empowerment rather than merely a superficial objective, clients can transform their mindset regarding fitness. For example, a middle-aged individual who perceives resistance training as a means to set a positive example for their children, instead of simply a strategy for weight loss, may uncover a deeper sense of purpose and commitment in their journey.

Practical Applications for Fitness Professionals

Personal trainers are uniquely positioned to bridge the gap between theory and practice. By integrating behavioral change models and the psychology of worthiness into their coaching, they can create transformative client experiences.

1. **Stage-Based Coaching**: Use the Transtheoretical Model (TTM) as a valuable tool to assess each client's readiness for change. For those in the action stage, provide them with comprehensive and personalized resistance training plans catering to their needs. For clients still in earlier stages, focus on education and fostering a trusting relationship. Embrace the wisdom of renowned strength and conditioning coach Mike Boyle, who reminds us that clients "will not care how much you know until they know how much you care." By demonstrating empathy and meeting clients where they are, you can build a strong foundation of rapport and trust, ultimately facilitating their progression through the various stages of the TTM. This constructive approach empowers clients and enhances their motivation and commitment to change.

2. **Positive Reinforcement**: Embrace the principles of the Theory of Planned Behavior (TPB) by showcasing encouraging success stories and testimonials highlighting muscle health benefits. Focus on the social advantages of group training and the importance of finding a "workout buddy" to strengthen perceived norms within the community. Training alongside a partner fosters a supportive environment and encourages individuals to challenge and motivate each other, enhancing accountability and commitment to their fitness journeys.

3. **Empowering Clients:** To nurture autonomy and competence—vital components of Self-Determination Theory (SDT)—it's beneficial to engage clients in the goal-setting process and encourage them to make their own decisions. This collaborative approach can significantly enhance their intrinsic motivation. One constructive strategy is to have clients create a list of healthy habits they aspire to adopt, utilizing a "no more than, no less than" guideline. For instance, beginners can set targets to work out "no less than twice a week and no more than five times a week." This method supports clients in establishing clear boundaries and "non-negotiables," facilitating the formation of new habits while reducing the likelihood of reverting to less favorable behaviors. Maintaining a "minimum threshold" for sustainable success empowers clients to stay committed rather than giving up entirely. These SDT elements can help clients remain focused and motivated, even amidst life's challenges when combined with other supportive strategies in this list. For more valuable insights into helping clients cultivate new habits and release old ones, be sure to explore Part 2 of this article.

4. **Build Self-Efficacy:** it's important to set achievable milestones that boost clients' confidence. For instance, gradually increasing weights or fine-tuning their form can highlight real progress, reinforcing their belief in their abilities. Another effective strategy is to encourage clients to buy a pair of pants or jeans one or two sizes smaller than what they currently wear, with a set date to fit into them. This serves as a motivating reward and creates a sense of intrinsic accountability, especially if they know they will be trying on the jeans in front of others.

5. **Creating a Supportive Environment:** Establishing a culture of support and camaraderie during training sessions can significantly enhance the overall experience for clients and trainees alike. When individuals encourage each other and work towards shared goals, they are more likely to remain committed to their fitness journeys. Recognizing personal achievements and sharing progress can build a strong sense of community, vital for fostering lasting behavioral change and nurturing a growth mindset. A practical way to implement this is by introducing friendly challenges between the morning and afternoon sessions of the same fitness class. Even without direct interactions, these groups can drive one another to excel while enjoying playful exchanges outside of training. This approach helps create a vibrant atmosphere rich in fun, motivation, and a sense of gamification.

Integrating psychological frameworks with Muscle-Centric Medicine creates a holistic approach to client care. By understanding and applying TTM, TPB, SDT, and self-efficacy theories, fitness professionals can address the underlying beliefs and emotions that influence behavior. Moreover, fostering a sense of worthiness empowers clients to commit to long-term muscle health, transforming their lives beyond the gym. As Dr. Lyon's work continues to inspire, the role of trainers as advocates for both physical and psychological well-being becomes ever more critical. Together, we can help clients see themselves not just as individuals striving for change but as deserving of health, strength, and vitality.

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Psychosocial and Physical Adaptations for Beginner Clients

When we speak of designing safe and effective workouts for a client who has never set foot in a fitness center, we face many more challenges than simply the choice of exercises. Embarking on a fitness journey can, for those new to a gym, represent an empowering decision that sets the stage for a healthier life. The key to a successful workout plan lies not just in getting the client started, but also in sustaining a plan that aligns with his lifestyle. That means tailoring a workout to match a client's goals as well as his fitness level, preferences and schedule so that he remains motivated, consistent, and always progressing. Here we discuss both the physical and the psychological processes involved in those very important first 3 months of training.

Moving Past the "Contemplation Phase"

When a trainer meets with a new gym member/client for the initial assessment, the potential exists to set the stage for a lifelong habit. Therefore, it behooves any fitness professional to remember that in our industry *we train the whole person.* Think of the body as an integrated entity, not merely body parts. By addressing the psychosocial aspect of what makes someone tick, right along with the muscles and tendons, trainers can forge a much stronger connection. This goes a long way toward developing a mutual trust.

The client's journey begins with some key questions from the trainer. The answers help the trainer understand what the gym experience represents to the client, and therefore how best to guide him on his path to wellness. Consider asking clients the following questions:

1. **What are your goals?** Learn whether a client seeks weight loss, toning, flexibility, stress release, strength, or a combination of any of these. His goals will dictate your personal training roadmap.

2. **What activities do you enjoy doing?** If cardio/endurance figures into a client's overall goals, remind him that he can accomplish this goal in other ways than spending hours on a treadmill or elliptical machine. Trainers can take a client's activity preferences and build them into his workout program. This will increase his likelihood of committing to and staying with the plan.

3. **Are your goals realistic?** While trainers will always jump at the chance to train a highly motivated and eager newcomer, we also have an obligation to set him up with the best chance of success. Help the client set achievable, manageable and reasonable goals rather than leaping into giant milestones.

4. **Can you commit to a schedule?** The key to a client's success lies in his ability to remain consistent with his time and workouts. Encourage the client to think of his gym time as a priority, a non-negotiable appointment. Positive self-care works wonders toward establishing good habits.

Assessing a Client's Level of Fitness

Prior to designing any beginner workout protocol, a trainer can spend some time during the initial assessment learning about a client's fitness level. To accurately measure a client's aerobic and muscular fitness, flexibility, and body composition, consider addressing the following parameters:

- Pulse rate before and immediately after a 1-mile walk
- How long it takes to walk 1 mile, or how long it takes to run 1.5 miles
- How many standard or modified pushups he can do at a time
- How well he moves through the full range of motion in hips, knees, ankles, shoulders and elbow
- Body mass index (BMI)

Armed with this knowledge, a personal trainer can begin to compile a safe and effective workout, while keeping the following points in mind:

- **Make a balanced routine:** Include at least 150 minutes of moderate aerobic activity a week, or 75 minutes of vigorous aerobic activity a week. For even more health benefits, such as weight loss, strive for 300 minutes a week of moderate aerobic activity. Engage in strength training exercises for all major muscle groups at least two times a week. One set of each exercise may suffice for true beginners. Start with a weight or resistance level heavy enough to tire muscles after about 12 to 15 repetitions.

- **Start slow and go forward slowly:** Slowly build up to a moderate or vigorous intensity level. Aim to increase activity level by no more than 10% a week. If client mentions an injury or a medical condition, get clearance from his health care professional or physical therapist.

- **Plan to include different activities:** Cross training, or engaging in a variety of different activities, can help alleviate boredom with an exercise routine. Cross-training using low-impact forms of activity also lowers the chances of injuring or overusing one specific muscle or joint.

- **Allow time for recovery:** Many people try to jump-start their fitness programs with amped-up energy. However, if clients work out too long or too hard, they may tend to give up when muscles and joints aches appear. Plan time between sessions for the body to rest and recover.

Getting Started

As the trainer readies the new client to begin his fitness program, he may wish to periodically remind the client of the importance of the following basic tenets of exercise:

- **Start slowly and build up gradually:** Warm up with a combination of easy walking or gentle stretching.
- **Break things up:** Discuss ways to integrate activity into an average day. Shorter bouts of exercise throughout one's day may fit better into an already packed schedule than a single 1-hour session. The client can still derive aerobic benefits from 3 or 4 brief bursts of energy expenditure.
- **Listen to body cues:** In the presence of pain, shortness of breath, dizziness, or nausea, take a break. If a client truly does not feel well, the flexibility of the workout should allow for a day or two off from the gym.

Putting It Together

For the remaining bulk of this article, we will highlight several different beginner workouts, each one cultivated for a client's specific goals and abilities. Choose a carefully structured program designed to ease the client into fitness. Gradually increasing the intensity/complexity of exercises can help the body adapt to new movement patterns. A well-rounded beginner workout plan should include a variety of exercises that target all the major muscle groups. This protocol allows the new athlete to build strength, endurance, and flexibility.

Tips for each workout:

- Go slow – focus on technique
- Rest for 60-90 seconds between each set
- Keep moving while actively resting – a gentle walk around the gym floor will keep muscles warm and heart rate elevated appropriately
- Ideally perform the workout in the order listed, but if another athlete occupies the equipment, simply switch the order for convenience.

In this first workout, circuit training offers a perfect opportunity for new clients who may not have a huge block of time to dedicate to exercise.

Beginner circuit workout

Following a short dynamic warm-up, the client can complete three mini circuits, each with three exercises. Complete each circuit three times before moving on to the next one. (Three circuits, three moves, three sets = 3-3-3.)

Circuit 1 — repeat 3 times

- Squats — 20 reps
- Reverse lunge with knee drives — 8 reps on each side
- Jump twist and squats — 8 reps

Circuit 2 — repeat 3 times

- Push-ups — 12 reps
- Three-legged dog twists — 8 reps on each side
- Single-leg crunches — 8 reps on each side

Circuit 3 — repeat 3 times

- Side lunges with hands raised — 8 reps on each side
- Butterfly dips — 8 reps
- Reverse crunch rolls — 8 reps

Beginner gym workout for females

This workout aims to tone the entire body, placing a slight emphasis on the legs and glutes.

- Seated leg press (10 reps x 3 sets)
- Seated shoulder press (10 reps x 3 sets)
- Close grip lat pulldown (10 reps x 3 sets)
- Bodyweight lunges (10 reps x 3 sets)
- Plank (30 secs x 3)
- Leg raises (10 reps x 3 sets)

Beginner gym workout for males
This workout helps men gain strength and lean mass. While still serving as a full body beginner workout, it adds an extra focus on the arms and core.

- Seated chest press (10 reps x 4 sets)
- Seated rows (10 reps x 4 sets)
- Wide grip lat pulldown (10 reps x 4 sets)
- Seated leg press (10 reps x 4 sets)
- Dumbbell seated shoulder press (10 reps x 4 sets)
- Dumbbell bicep curls (10 reps x 4 sets)
- Close grip tricep press (10 reps x 4 sets)
- Cable rotations/twists (10 reps x 4 sets)
- Reverse crunches (10 reps x 4 sets)

Beginner gym workout for strength
The desired repetition range for strength training lies somewhere between 4–6 reps; using this protocol requires the client to exert more energy for less reps (which will mean lifting heavier). For novice strength-training clients, use a manageable weight for the first few weeks and gradually increase the load 1 week at a time. Upon lifting comfortably for 8–10 reps using the same weight, consider increasing the weight.

- Barbell push press (6 reps x 4 sets)
- Goblet squat (6 reps x 4 sets)
- Dumbbell single arm row (6 reps x 4 sets)
- Shoulder lateral raise (6 reps x 4 sets)
- Bench press (6 reps x 4 sets)
- Pull ups/assisted pull ups (6 reps x 4 sets)
- Barbell bicep curls (8 reps x 4 sets)
- Cable overhead tricep extensions (8 reps x 4 sets)
- Rotating plank (30 secs x 4)

Beginner gym workout for fat loss

Any fat loss program strives to elevate heart rate. By pushing cardiovascular fitness, the higher heart rate leads to a greater caloric burn; in fact, upon completion of the exercises, excess calories continue to burn as the body tries to recover and ultimately return to homeostasis.

- Mountain climbers (20 reps x 3 sets)
- Box jumps (10 reps x 3 sets)
- Walk outs (10 reps x 3 sets)
- Renegade rows (full plank/kneeling) (10 each side x 3 sets)
- Press ups (full plank/kneeling) (15 reps x 3 sets)
- Treadmill 10 min run/steep incline brisk walk (no hands)
- Supermans (full plank/kneeling) (10 reps x 3 sets)
- Crunches (10 reps x 3 sets)

Beginner Strategy Beyond Weights

If a client wishes to embark on his new fitness journey without serious strength-training, introduce him to cardio, flexibility, stretching and mobility moves. Once he gains confidence in these areas, he may choose to begin incorporating resistance training. Offer the new client some of these techniques:

Cardio: improves cardiovascular health. Some good cardio exercises for beginners include:

- Walking
- Jogging
- Running
- Biking
- Swimming
- Jumping rope
- Hiking

Stretching & Mobility: these exercises help to improve flexibility and range of motion, while also mitigating the risk of serious injury. Some good stretching and mobility exercises for beginners include:

- Dynamic stretches
- Static stretches
- Foam rolling

Progress Updates

Assess a client's fitness abilities approximately six weeks after beginning the program. Repeat this process every few months. If the client's motivation falls off, together you can come up with new goals. Celebrate the small victories along the way. Whether it's an increase in stamina, weight loss, or improved flexibility, acknowledging and honoring a client's progress helps both of you stay positive and confident in achieving goals.

With careful planning and pacing, trainers can help clients begin a healthy habit that will ideally last a lifetime. If during an initial assessment, a client still seems hesitant to begin, trainers can point out the following benefits to a well-rounded activity plan:

- **Solid Core Foundation ~**a well-structured plan strengthens core muscles, setting the stage for overall strength and stability.
- **Elevated Energy Levels ~** regular physical activity infuses each day with renewed vitality and vigor, transforming daily life into a dynamic adventure.
- **Enhanced Flexibility and Mobility ~** helps ease the challenge of navigating daily tasks while minimizing the risk of injuries.
- **Better Posture ~** By targeting core and back muscles, a beginner workout plan promotes improved posture – a significant asset for both the gym and everyday life.

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How Attentional Focus Impacts Motor Learning and Performance: A Guide for Personal Trainers

Attentional focus—whether internal or external—is crucial in movement execution and skill acquisition. For personal trainers, understanding the impact of cueing strategies on client performance is essential for optimizing motor learning. While research has traditionally favored external focus (EF) over internal focus (IF), emerging studies suggest that the efficacy of cueing depends on individual differences, task complexity, and skill level. This article critically examines the nuances of attentional focus and provides practical insights for personal trainers.

What's the Difference Between External and Internal Cueing?

External and internal cueing stem from attentional focus, a phenomenon in which shifting the focus of attention affects performance. In short, external cueing draws focus outside the body during the exercise, whereas internal cueing draws focus to or inside the body.

External Cueing

EF refers to attention directed toward the external environment or reference, such as a box, bench, other fitness equipment, the floor, or even a body part (such as directing a dumbbell to touch the chest in a chest press), rather than internal body mechanics. EF primarily relies upon visual input (Sakurada, 2022).

Here are four examples of externally focused cues that a personal trainer could use when coaching an exercise.

- **Squat**: "Imagine you're pushing the ground away with your feet as you stand up."
- **Deadlift**: "Drag the bar up your legs like you're zipping up a jacket."
- **Bench Press**: "Push the bar away like you're trying to punch the ceiling."
- **Lunges**: "Step forward as if you're reaching for a target in front of you."

Internal Cueing

IF directs the learner or person's focus to inside the body, such as a muscle, limb, or area of a limb. It is called "internal" because the learner must consciously focus on their own muscle or limb positioning to perform the exercise. IF focuses on internal body information, such as **tactile or somatosensory inpu**t (Sakaruda et al., 2022). As the name suggests, IF indeed draws the focus inwards rather than outwards, as EF does.

Here are four examples of internally focused cues that a personal trainer could use when coaching an exercise.

- **Squat**: "Keep your chest up and engage your core as you lower down."
- **Deadlift**: "Squeeze your glutes as you stand up tall."
- **Bench Press**: "Tuck your elbows slightly and engage your lats as you press."
- **Lunge**: "Keep your front knee aligned over your foot and engage your quads as you push up."

Are All Cues Using a Body Part Internal?

No, not all cues using a body part are internal focused. In some cases, cueing a body part can still be external if used as an external reference point, such as "bring the dumbbell to your outer chest" on the eccentric portion of the chest press. Here we aren't drawing focus for the outer chest to move a certain way, but using it as a reference point.

A body-part-based cue can be more external if it references an outcome rather than bodily awareness. For instance, "Touch your chest to the bar" during a pull-up is more external than "Engage your lats."

Here are four examples of externally focused cues that a personal trainer could use when coaching an exercise.

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External vs. Internal Cueing: The Research Landscape

Evidence Supporting External Focus

Chiviacowsky et al. found that participants focusing on external cues—such as keeping markers on a platform horizontal—performed better than those concentrating on their body movements, particularly in skill retention (2010). EF has been linked to more automatic and fluid movements, reduced muscular co-contraction, and enhanced motor efficiency.

Chen et al. conducted a systematic review of attentional focus in older adults and found that over 60% of studies reported superior effects of EF on motor performance (2021). The constrained-action hypothesis (Wulf et al., 2001) suggests that EF controls movements more automatically, whereas IF can disrupt performance by inducing conscious control.

A study by Pelleck et al. examined how different types of focus (cueing) affected how well novice golfers performed a putting motion (2017). They used three types of focus:

1. **Proximal Internal Cueing (Internal-Movement Focus)** – Thinking about body movements close to the action, like your hands and elbows.
2. **Distal Internal Cueing (Internal-Stance Focus)** – Thinking about body positions slightly farther from the movement, like your feet and weight distribution.
3. **External Cueing** – Focusing on something outside your body, like the target (the hole).

What Happened:

When novices focused on their hands and elbows (proximal internal cueing), they moved more slowly. Their backswing took longer, and they adjusted their movements more before finishing the putt.

Accuracy was affected when they focused on their stance (distal internal cueing). But the study wasn't sure why accuracy wasn't affected when concentrating on hands and elbows.

Their performance wasn't negatively affected when they focused on the target (external cueing). This supports research showing that external focus helps movements become more automatic and fluid.

Why It Matters:

Novices who focus too much on their body movements tend to overthink and make slow, less efficient movements. They need more time to adjust because they haven't developed automatic motor patterns yet.

Focusing on the target (external cueing) helps performance by reducing unnecessary adjustments and promoting smoother, more natural movement.
Skilled golfers were unaffected primarily by different types of focus, meaning they have ingrained motor skills and can perform well regardless of cueing type.

In short, **novices tend to overanalyze when focusing on their body, while focusing on the target helps them move more naturally.**

Situations Where External Focus May Not Be Superior

However, not all research supports the blanket superiority of EF. Sawai et al. found no significant performance differences between IF and EF in younger and older adults, suggesting that EF does not always enhance motor outcomes (2024). Additionally, their research highlighted individual differences, noting that some people perform better under IF depending on their sensory processing characteristics.

Sakurada et al. further supported this notion by demonstrating that the optimal attentional strategy varies by individual (2022). Some individuals are IF-dominant, meaning they achieve better results when focusing on body movements, while others perform better with EF due to their dominance of visual or sensory modality. This indicates that a one-size-fits-all approach may not be ideal.

Although extensive literature supports external focus (EF) over internal focus (IF) cues, many expert performers and coaches still prefer to utilize internal cues (Herrebrøden, 2023). While there are fewer studies of internal focus (IF) than external focus (EF), numerous tasks, exercises, and sports may benefit more from internal focus (Herrebrøden, 2023).

McKay et al. **discovered conflicting evidence regarding the consensus** that an external focus is universally more effective than an internal focus. They observed that the focus of attention can have different impacts that cannot be fully explained, with overall effects being minimal to none.

Body form and proprioceptive feedback are crucial for achieving success in many tasks. However, sports such as dance, gymnastics, ski jumping, diving, and figure skating are not well-researched regarding focus of attention (Herrebrøden, 2023).

External Focus in Older Adults and Experts

A systematic review by Chen found that over 60% of included studies reported superior motor performance under EF conditions in older adults (2021). However, EF may be less effective for expert performers. Wulf observed that highly skilled athletes naturally mobilize automatic control systems, rendering explicit EF instructions redundant. Similarly, a study on juggling novices found that EF might provide unnecessary information for specific motor tasks, particularly in open-skill scenarios (Bull et al., 2023).

Findings from Bull's research on skilled cricket batters further challenge the EF superiority narrative. The study revealed that while a distal EF improved technique and performance, providing skilled batters with no instructions yielded similar benefits. Additionally, internally focusing on movement mechanics had varying effects depending on the strategic intention of the shot.

McKay's meta-analysis of 73 studies suggests that EF may have little to no effect on motor learning on average. While EF often leads to better performance, results vary due to unknown factors and potential publication bias. This finding underscores the need for a more nuanced approach to attentional focus strategies.

Adopting a Flexible Approach to Cueing

While EF has demonstrated advantages across various populations, attentional focus is not a one-size-fits-all strategy. Aiken's research suggests that an internal focus during preparation, followed by an external focus during execution, may facilitate learning (2023). This hybrid approach leverages the benefits of both cueing strategies without disrupting motor automaticity.

Additionally, Herrebroden emphasizes the importance of *task-relevant information*. Rather than rigidly adhering to EF or IF, personal trainers should prioritize cues that enhance movement efficiency based on the task and individual needs.

*Task-relevant informatio*n refers to data or stimuli that are important for completing a specific task, as opposed to distractions or irrelevant details (Biehl et al., 2013). For example, cueing "knees out" or "engage your core" may be more distracting and irrelevant for the client to process than cueing a specific task related to the exercise.

This type of information is crucial for effective decision-making and performance in various cognitive tasks.

Practical Applications for Personal Trainers

Personal trainers should individualize their cueing strategies. Given the mixed findings on attentional focus, they should tailor their cueing strategies to individual clients. **Through observation and experimentation, they should identify whether a client responds better to IF or EF.** Clients may respond differently to exercise.

New personal trainers often overcue, so, they should provide clients with only one or two cues per set, allowing them to process the information. Few people can catch more than that while trying a new exercise. Sometimes, giving no cues in the first set is acceptable, as the client is still learning from the movement experience and may often see improvements on their own in the second set.

Skill level, sensory processing preferences, and task complexity should guide coaching approaches. EF is often advantageous for simple, closed-skill tasks. However, open-skill or strategic tasks may require a more nuanced approach.

1. **For Novices**: When teaching beginners, emphasize external cues to promote automaticity and reduce conscious interference. EF cues encourage smoother, more automatic movement patterns. For example, instruct a client to "push the floor away" during a squat rather than focusing on knee positioning. Novices who focus too much on their body movements tend to overthink and make slow, less efficient movements. They need more time to adjust because they haven't developed automatic motor patterns yet.
2. **For Skilled Clients**: Allow flexibility in focus. Skilled athletes may benefit from switching between IF and EF depending on task demands. They also have automatic motor skills and can perform well regardless of cueing type.
3. **For Older Adults**: Since EF generally enhances motor performance in older populations, trainers should prioritize outcome-based cues such as "step toward the target" instead of emphasizing foot placement.

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Tracking and Measuring Success in Muscle-Centric Training

Throughout this series exploring the empirical evidence surrounding Dr. Gabrielle Lyon's (2022) Muscle-Centric Medicine (MCM) paradigm, we've explored the profound role of skeletal muscle in metabolic regulation, disease prevention, and longevity. However, the question remains: how do we track success in a training program rooted in MCM? Traditional fitness metrics have long prioritized weight loss and BMI, but these numbers fail to tell the whole story. For personal trainers integrating MCM into their practice, success must be measured through objective and subjective markers that reflect true physiological adaptation, functional capability, and long-term adherence.

This final installment in our series explores scientifically validated methods for tracking muscle-centric training progress, reinforcing the need for a shift away from outdated models toward a more comprehensive assessment framework.

Muscle as a Marker of Health and Longevity

A growing body of research highlights the vital connection between skeletal muscle health and longevity. Studies consistently show that muscle mass and strength serve as significant predictors of long-term health outcomes, with greater levels of lean mass linked to enhanced insulin sensitivity, reduced systemic inflammation, and a lower risk of chronic diseases (Hoffmann & Weigert, 2017; Kalyani et al., 2014; Sheffield-Moore & Urban, 2004). Additionally, grip strength—a seemingly straightforward measure—has proven to be an exceptionally accurate indicator of cardiovascular

health, metabolic resilience, and even the decline associated with neurodegenerative diseases (American College of Sports Medicine, 2021; Gerodimos, 2012) (Nicola et al., 2024). Therefore, as a personal trainer, assessing a client's grip strength can offer substantial benefits!

As mentioned in previous installments, sarcopenia—the progressive decline of skeletal muscle mass and function—is now recognized as a major contributor to frailty, disability, and increased mortality risk (Argilés et al., 2016; Kalyani et al., 2014). While traditional healthcare models have largely neglected skeletal muscle as a vital organ of longevity, MCM challenges this outdated perspective by placing muscle health at the forefront of disease prevention and metabolic optimization. If muscle is indeed the key to aging well, then tracking changes in muscle mass, strength, and function must become central to how we measure progress in resistance training.

Objective Measures of Success in Resistance Training

Tracking objective, quantifiable data is the foundation of progressive overload and long-term muscle adaptation strategies. While clients may initially focus on external changes—muscle definition, body composition, or weight—the fundamental indicators of success lie in how well their bodies are responding physiologically to training stimuli.

In this regard, Body Composition Analysis provides a far more accurate assessment of progress than scale weight. Traditional weight tracking fails to differentiate between muscle mass, fat mass, and hydration levels, making it unreliable in muscle-centric training. Instead, methods such as Dual-Energy X-ray Absorptiometry (DEXA) (Angin & Erden, 2009; Nagelkirk et al., 2010), bioelectrical impedance analysis (BIA) (McLester et al., 2020), and skinfold calipers offer more precise insights into changes in lean tissue and fat distribution (Pastuszak et al., 2019). Additionally, the D3 creatine dilution test has emerged as a potentially new gold standard for directly measuring skeletal muscle mass, surpassing traditional assessments in accuracy and reliability (Evans et al., 2019).

In contrast, strength and functional movement assessments stand out as two of the most practical and meaningful ways to monitor client progress. Unlike body composition, which can vary due to factors such as hydration levels and glycogen storage, strength adaptations offer direct evidence of neuromuscular improvements. Alongside grip strength measurements, five-rep max (5RM) (Haff & Triplett, 2015; Haugen et al., 2023) testing and functional movement screens (FMS) provide valuable insights into muscular function, movement efficiency, and movement asymmetries (Karuc et al., 2021; Parchmann & McBride, 2011). Moreover, the timed sit-to-stand test has emerged as an effective measure of lower body strength and endurance, particularly among aging populations (American College of Sports Medicine, 2021). Collectively, these methods equip personal trainers with a more comprehensive "assessment toolbox" to enhance client tracking.

For a more clinical approach, tracking metabolic biomarkers provides deeper insights into systemic adaptations. Since muscle plays a key role in glucose regulation, lipid metabolism, and inflammation, relevant blood markers such as fasting glucose, insulin sensitivity, testosterone levels, and C-reactive protein (CRP) can help quantify the impact of resistance training at a cellular level (Paine et al., 2015).

Subjective and Psychological Metrics in Strength Training

While objective data provides a measurable framework for progress, subjective perception plays an equally important role in training adherence and overall well-being. To illustrate, research highlights the significance of perceived progress, self-efficacy, and psychological resilience in sustaining long-term commitment to resistance training (Guerrero, 2023; Shaw et al., 2015).

Monitoring self-reported energy levels, recovery times, and mental clarity offers trainers a comprehensive view of how clients are responding to their training programs. Drawing from the author's personal experiences as a trainer and certified strength and conditioning specialist, many individuals involved in muscle-focused training have reported improvements in energy levels, sleep

quality, and stress management—factors that significantly enhance motivation and commitment. Regular check-ins and the use of training journals provide a means to document these qualitative improvements, emphasizing progress that extends beyond mere numerical data.

Best Practices for Tracking Client Progress in Muscle-Centric Training

For MCM to be **fully optimized**, tracking methods must extend **beyond weight and body fat percentages**. Implementing **structured tracking strategies** enhances **accountability, motivation, and long-term commitment**.

Training logs and digital tracking applications provide clients with concrete data on their progress over time. By logging sets, repetitions, weights, and rest periods, clients can identify clear patterns of improvement, while wearable technology facilitates real-time monitoring of heart rate variability, recovery, and energy expenditure (Patel et al., 2021). Additionally, gamification strategies—such as leaderboards, community-based challenges, and milestone rewards—help create a supportive training environment. Research indicates that social reinforcement significantly enhances adherence, particularly among older adults and novice trainees (Patel et al., 2021).

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Reframing Energy Management: Strength Training as the Foundation of Professional Performance

In today's hyper-connected and cognitively demanding world, the ability to manage one's energy—not just one's time—is emerging as the ultimate performance advantage. Nowhere is this truer than in high-pressure professions like academia and corporate leadership, where long hours, sedentary routines, and chronic stress have become the norm. Yet, despite the growing popularity of mindfulness apps and standing desks, many workplace wellness programs continue to overlook one of the most powerful tools for energy optimization: resistance training.

This article builds on the argument presented in Part 1 of this series, which framed skeletal muscle as the missing link in traditional wellness strategies. Here in Part 2, we take that a step further by suggesting that strength training is more than just a fitness protocol—it's the physiological foundation of cognitive stamina, mental clarity, and professional performance.

Energy Management: From Time Control to Bioenergetic Mastery

According to Energy Management Theory (Das et al., 2019, 2020), human productivity is not limited by time alone but by the quality of energy available to meet cognitive, emotional, and physical demands. This shift in perspective has profound implications for knowledge workers and educators alike. When we treat energy—not time—as our most valuable asset, we must ask ourselves: how do we cultivate, store, and deploy that energy efficiently?

This is where muscle comes into play. The body's largest endocrine organ, skeletal muscle, plays a vital role in modulating blood glucose, regulating inflammation, and releasing myokines that support

mood, motivation, and neuroplasticity. In short, muscle doesn't just move us—it sustains the biochemical conditions that allow us to focus, think critically, and recover from stress.

Resistance Training as a Cognitive Catalyst

Although often pigeonholed as a means to sculpt aesthetics or build brute strength, resistance training is now being recognized as a cognitive enhancer. A systematic review by Esmaeilzadeh et al. (2022) explored the dual impact of "strength exergaming"—programs that combine cognitive tasks with strength-based movement—and found measurable gains in both physical and psychological domains. Specifically, participants demonstrated improvements in executive function, mental energy, and task-switching capabilities. These findings are significant not just for older adults but for any professional whose performance hinges on cognitive endurance and focus.

Further reinforcing this connection, Smolarek et al. (2016) conducted a randomized controlled trial with elderly women and found that resistance training led to notable improvements in various cognitive domains, particularly executive functioning. While the study sample focused on older populations, the neurobiological mechanisms at play—such as increased expression of brain-derived neurotrophic factor (BDNF)—are not age-restricted. These changes promote enhanced synaptic plasticity and neural efficiency, suggesting that faculty members and professionals of all ages can benefit from the mental fortitude cultivated through regular strength training.

Muscle as the Metabolic Engine of Focus

Resistance training doesn't just preserve lean tissue—it optimizes the metabolic environment in which cognition occurs. As discussed in earlier installments of this series, skeletal muscle acts as a metabolic sink, clearing glucose from the bloodstream and mitigating insulin resistance. But its contributions don't stop there. Muscle is also an active communicator, releasing myokines like irisin and IL-6 that influence neurogenesis, mood regulation, and inflammation (Esmaeilzadeh et al., 2022). When you improve muscle function, you simultaneously enhance the biochemical infrastructure that supports mental stamina and emotional resilience—two cornerstones of professional productivity.

Kirk-Sanchez and McGough emphasize that these cognitive and emotional benefits of resistance training are likely driven by improved cerebral blood flow, cardiovascular efficiency, and enhanced neuroplasticity. In this light, strength training becomes a neuroprotective strategy with wide-ranging implications, especially for professionals facing burnout, digital fatigue, and cognitive overload.

Implications for Personal Trainers and Health Coaches

For fitness professionals seeking to differentiate themselves in a competitive market, this body of research presents an exciting opportunity. By framing strength training as a tool for workplace vitality—not just body composition—trainers can better engage with corporate clients and university faculty who may not resonate with traditional gym marketing. The key is to meet these professionals where they are: in pursuit of sustained cognitive energy, stress resilience, and high-level performance.

Trainers who can articulate the link between skeletal muscle and mental energy will be well-positioned to partner with corporate wellness programs and university HR departments. And by integrating resistance training into these environments, they're not just offering exercise—they're offering a neurobiological upgrade.

While much of the research to date has focused on older populations, the underlying physiological mechanisms are universal. The challenge now lies in translating this science into practical, scalable interventions for knowledge workers, educators, and executives. Future workplace wellness programs must evolve to include resistance training, not as an optional add-on but as a foundational pillar of energy management.

Because when it comes to peak performance in the workplace, strength isn't just about how much you can lift—it's about how long you can last, how clearly you can think, and how well you can recover. And for that, skeletal muscle is not optional—it's essential.

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Benefits of Low-Impact Exercise

Low-impact exercises are physical activities that minimize stress on the joints while still providing cardiovascular, strength, and flexibility benefits (Tse et al., 2015).

What is Low-Impact Exercise?

Low-impact exercise is any physical activity that puts minimal stress on your joints. It's gentler on the body compared to high-impact exercises (like running or jumping), making it ideal for:

- Beginners
- Injury Recovery
- Adults Advanced in Age
- Anyone who wants a sustainable fitness routine

What Makes it Low-Impact?

- At least one foot stays on the ground at all times (in most cases).
- No jarring or pounding motions on your joints.
- Movements are usually controlled and smooth.

What Low-Impact Isn't

Low impact does NOT mean low intensity. You can still work up a sweat, build strength, and improve fitness.

Common Low-Impact Exercises

Chances are that you're already incorporating these exercises in your programming. If you aren't, you can always start, especially with clients who need to get their heart rate up and aren't able to do movements like plyometric hops or wind sprints. You can also use these for active recovery days for your clients who are used to doing exercises like High-Intensity Interval Training (HIIT).

- **Walking:** Simple, effective, and easy to do almost anywhere.
- **Cycling:** Great cardio with little to no joint pressure.
- **Swimming:** Full-body workout, joint-friendly thanks to water support.
- **Elliptical Machine:** Smooth motion mimics running without impact.
- **Yoga:** Improves flexibility, balance, and mindfulness.
- **Pilates:** Builds core strength, posture, and mobility.
- **Tai Chi:** Enhances balance and consists of flowing movements.
- **Water Aerobics:** Excellent resistance training with little impact.
- **Low-Impact Dance:** Gentle Dance adds an element of fun and variation.
- **Strength Training:** Builds muscle and improves bone strength. Low-impact options include using dumbbells, resistance bands, or weight machines.
- **Rowing:** Rowing is a low-impact cardio workout that also targets major muscle groups like the shoulders, arms, and back.

Research and Low-Impact Exercise

Research shows that low-impact exercise benefits adults in the aged population, women with osteoporosis, and balance in Type II Diabetes Mellitus Patients (Hardjanti et al., 2013; Hardjanti et al.; 2013; Tse et al., 2015).

Anita et al. (2017), conducted an experimental study where 40 subjects with osteoporosis in the age group between 50-60 years were randomly assigned into group A and group B. Group A was instructed in low-impact exercises that utilized body weight, such as squats, toe stands, step aerobics, and walking. These exercises were performed 3 to 5 days per week, for 20 to 30 minutes per session, with a 30-second rest between each exercise. In contrast, Group B engaged in high-impact exercises, including running, stair climbing, jumping rope, and high-impact aerobics such as step-up exercises with 2 kg dumbbells. They followed the same frequency and duration as Group A, also incorporating 30-second rest intervals between exercises.

The results showed that people with existing osteoporosis can benefit from regular exercise, since a sedentary lifestyle contributes to accelerated bone loss. Engaging in consistent physical activity can help slow this process. While this former fact is accepted by fit pro's and science, this study also demonstrated that low-impact exercises are effective in improving functional ability among women with osteoporosis. The researchers found that both groups (low-impact and high-impact exercises) benefited from exercise. However, the low-impact exercises were simple and since the participants did not need to do them within a specific setting, it increased compliance (Anita et al., 2017). Therefore, the study concluded that regular exercise can slow the rate of bone loss and demonstrated that low-impact exercises can enhance functional ability in women with osteoporosis (Anitha et al., 2017).

Tse et al., 2015 conducted a meta-analysis of 15 studies to systematically review the effectiveness of low-intensity exercise interventions on the physical and cognitive health of older adults. Of those reviewed, 11 reported improvements in flexibility, balance, lower limb muscle strength, or reductions in depressive symptoms as a result of low-intensity exercises (Tse et al., 2015).

Yet another research study showed that low-impact aerobic exercise may help improve functional balance in patients with type II diabetes mellitus (Hardjanti et al., 2013). The researchers recruited men and women from an outpatient (OP) Diabetes Clinic in Dr. Soetomo General Hospital between the ages of 30-70. All participants were diagnosed with type II diabetes mellitus, among other specific inclusion criteria (Hardjanti, 2013). Participants were randomized into 2 groups, with the exercise group having 38 participants and the control group (no exercise) having 37 participants. The exercise group did 25-30 minutes of low-impact aerobic exercise 3 times per week for 3 months while the control group did not participate in any.

Hardjanti et al. (2013) used the Berg Balance Scale (BBS) and the Sickness Impact Profile (SIP) questionnaire to assess the participants' balance and quality of life before and after exercise. The

researchers concluded that exercise in individuals with diabetes can improve A1c levels, functional balance, and various quality of life parameters like sleep and rest (SR), work performance (W), body care and movement (BCM), and ambulation (A).

These are just three studies on three specific populations that benefited from low-impact exercise. However, its benefits don't stop there and aren't necessarily limited to these populations.

Benefits of Low-Impact Exercise

1. Joint-Friendly
Low-impact movements (like walking, swimming, or cycling) reduce the stress on your client's knees, hips, and ankles.

2. Good for Heart Health
Low-impact exercises get clients cardiovascular benefits by getting their heart rate up into the fat-burning, aerobic fitness zone.

3. Mindset Boost
Low-impact activity helps release endorphins, lowers anxiety and depression, and can improve focus and sleep.

4. Increases Flexibility & Mobility
Exercises like yoga, Pilates, and stretching improve range of motion and strengthen muscles that support your joints.

5. Ideal for All Ages & Fitness Levels
You can adjust exercise programming for your clients regardless of their age or experience level. Do this by scaling intensity while maintaining safety.

6. Promotes Long-Term Consistency
I've had clients tell me that they love low-impact movement because they feel like they had an intense workout and were able to preserve their joints (if that was their issue) or just be able to move their bodies after working all day.

7. Helps with Weight Management
Low-impact doesn't mean low results. With consistency, it can burn calories, boost metabolism, and support weight loss goals.

Low-impact exercises are gentle forms of physical activity that minimize joint stress while improving fitness, strength, and overall health. They include activities like strength training with specific low-impact implements, walking, swimming, cycling, yoga, Pilates, Tai Chi, and elliptical training. These exercises are ideal for clients of all ages and fitness levels, especially those with joint issues, injuries, or beginners looking for a safe way to stay active.

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Training Through Transition: Understanding and Supporting Clients During Menopause

As personal trainers, supporting clients through life stages is essential to delivering meaningful, effective programming. Menopause—a natural, biological transition—marks a significant phase for women, often accompanied by changes in body composition, metabolism, mental health, and exercise capacity. Understanding the underlying physiology and evidence-based exercise strategies can empower trainers to tailor programs that address the unique needs of women in this stage.

Menopause – Etiology, Epidemiology, Physiology & Pathophysiology

Etiology and Definition

Menopause is defined as the complete cessation of ovarian function, resulting in the end of menstruation. It can occur naturally or as a result of medical interventions (e.g., chemotherapy, surgery), termed "iatrogenic" or "secondary menopause" (Davis & Baber, 2022).

"It is termed 'early' if it occurs before age 45 and 'premature' if it happens before age 40. The global mean age for natural menopause is 48.8 years, showing slight geographic variation" (Davis & Baber, 2022).

Epidemiology

All women past midlife experience menopause. Symptoms affect a majority, with studies showing:

"Symptoms include hot flushes, night sweats, or general warmth. About 75% of women experience VMS, while 28% of postmenopausal women under 55 report moderately to severely bothersome symptoms" (Davis & Baber, 2022).
"Over 50% of perimenopausal and postmenopausal women report sleep disturbances, regardless of vasomotor symptoms" (Hulteen et al., 2023).

- **Physiology and Pathophysiology:** Declining levels of estrogen (primarily estradiol or E2) drive most of the physiological changes associated with menopause. This hormonal shift influences:
- **Glucose metabolism**: "Estrogen insufficiency leads to decreased glucose disposal in muscle, increased food intake, and reduced physical activity, predisposing women to insulin resistance and type 2 diabetes mellitus (T2DM)" (Davis & Baber, 2022).
- **Body fat distribution**: "The decline in estrogen levels leads to central adipose tissue accumulation, causing a shift from gynoid to android fat distribution and an increase in total body fat" (Davis & Baber, 2022).
- **Bone turnover**: "Menopause accelerates bone resorption, exceeding formation via direct activation of osteoclasts and indirect effects through osteoblasts and T cells" (Davis & Baber, 2022). Bone mineral density (BMD) declines by 6.4% at the lumbar spine and 5% at the femoral neck during this transition.

The Role of Physical Activity During Menopause

Why Exercise Matters

Exercise has broad-reaching effects for women during menopause, from preserving lean mass to improving metabolic and mental health outcomes. According to Hulteen et al. (2023):

"Detrimental body composition changes (i.e., increased fat mass, decreased fat-free mass, and bone density) exacerbate cardiometabolic risk and coincide with declines in physical activity during menopause."

"Postmenopausal women who exercised regularly had higher insulin sensitivity than those who were sedentary, regardless of hormone therapy status."

Types of Exercise and Their Effects

Aerobic Exercise

Aerobic activity improves cardiovascular fitness and helps reduce fat mass:

"A 6-month study showed that perimenopausal and postmenopausal women with overweight and obesity improved insulin sensitivity with combined aerobic and resistance or aerobic exercise alone, but not with resistance exercise alone" (Hulteen et al., 2023).
Gonzalo-Encabo et al. found that increasing aerobic exercise volume from 150 to 300 minutes per week led to greater reductions in intra-abdominal fat, BMI, and total body fat in postmenopausal women (Marsh et al., 2023).

Resistance Training

Resistance training combats sarcopenia and improves BMD:

- "Resistance training was successful in preventing weight gain and adverse changes in body composition" (Marsh et al., 2023).
- "Intense exercises (70% to 90% of one's maximum repetition) performed two to four times a week effectively improve muscle strength, bone density, and physical function" (Capel-Alcaraz et al., 2023).
- "Strength exercises decrease heart rate and hot flashes" and improve levels of estradiol, growth hormone, and IGF-1 (Capel-Alcaraz et al., 2023).

HIIT (High-Intensity Interval Training)

HIIT is a promising method for vascular and metabolic improvements. "These results allowed the authors to classify HIIT as a feasible training protocol for improving endothelial function among postmenopausal women" (Marsh et al., 2023).

Mind-Body Exercise (Yoga, Tai Chi, Qigong, MBSR)

Mind-body practices help alleviate psychological and physical symptoms:

"Findings show that mind-body exercise is a safe, effective way to reduce bone loss, enhance sleep quality, alleviate anxiety and depression, and relieve fatigue in perimenopausal and postmenopausal women" (Xu et al., 2024).
Yoga interventions showed improvements in "physical, urogenital, and total symptoms" (Money et al., 2024).

Sleep and Exercise

Exercise improves sleep quality, which in turn supports exercise adherence:

"The sleep and PA link is bidirectional: poor sleep reduces PA, while increased relative PA is linked to better sleep quality" (Hulteen et al., 2023).

Exercise Recommendations for Menopausal Clients

General Guidelines

Type of Exercise	Recommendation	Benefits
Aerobic Exercise	150–300 minutes/week	Reduces visceral fat, improves cardiovascular health
Resistance Training	2–3x/week (progressive)	Improves strength, BMD, hormonal profile
HIIT	1–2x/week (moderate to vigorous)	Improves endothelial function and fat loss
Mind-Body Exercise	2–3x/week	Enhances sleep, mood, and emotional well-being

Key Programming Considerations

- Prioritize **multimodal training** (aerobic + resistance).
- Include **balance and mobility work** to reduce fall risk.
- Address **individual symptoms** (e.g., fatigue, sleep disruption, mood).
- Emphasize **long-term consistency**: "Exercise must be maintained for life" (Capel-Alcaraz et al., 2023).
- Provide **supportive environments** and track progress for motivation.

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Uncovering the Wellness Potential of New Zealand Black Currant

Throughout history, black currant has figured prominently as a potent botanical for treating a variety of ailments. Its abundance of vitamins and minerals makes it an ideal adjunct to natural remedies for colds and flu. Similarly, its anti-inflammatory propensity has proved useful in the treatment of arthritis and joint pain. Read on to learn more about the history of this botanical as well as ways to incorporate it into any homeopathic regimen.

Centuries of Success

The use of black currant in "traditional remedies" originated in England and parts of northern Asia as far back as the 16th century. At that time, it gained popularity as a means of treating a plethora of health conditions, including maladies plaguing the digestive system, skin conditions, and respiratory problems. Early folklore believed that black currents could bring about a boost in energy levels, making it a popular choice for individuals suffering from listlessness.

While these blackish-purple berries once grew in the United States, they suffered a setback when scientists discovered that they played host to a unique form of fungus known to kill off forests of white pine trees. Rendered illegal and banned throughout the United States in the early 1900s, black currents have only recently enjoyed a boost in popularity.

The black current's intense, tart and bold flavor seems to mellow into sweetness upon ripening. This may explain why the individuals of early England experimented with black currant extracts to prepare teas and flavored syrups. Blending these extracts with herbs and spices further enhanced their medicinal properties as well as making for delicious foods and beverages.

Modern Applications

Today black currant continues to hold a place of prominence in many natural health and wellness products. Supplement manufacturers capitalize on the plant's abundance of potassium, vitamin C and anthocyanins, compounds known to protect the body from the damage incurred by free radicals. We will address this in more detail as the article unfolds.

Rich in an omega-6 fatty acid known as *gamma-linoleic acid*, preparations containing black current can help reduce inflammation as well as improve symptoms of inflammatory conditions like rheumatoid arthritis.

Eyes on the Prize

The anthocyanins present in black currents have shown promise in the treatment of glaucoma, a leading cause of blindness. These compounds can foster improved blood flow in the eyes, thereby slowing progression of the disease. Linoleic acid, which we find in abundance in many Vitamin C-rich berries, may also help improve dry eye syndrome as well as other symptoms/causes of eye strain and fatigue.

A Menu of Multiple Benefits

A single serving of this colorful berry provides close to 56% of one's daily recommended dose of vitamin C, the virtues of which we extolled above. Additionally, black currents contain the following healthy vitamins and trace minerals ~

- Iron
- Calcium

- Phosphorous
- Magnesium
- Manganese
- Vitamins B1, B2, B3, B5 and B6 (thiamine, riboflavin, niacin, pantothenic acid, and pyridoxine)
- Vitamin A
- Folic Acid
- Zinc

Potential Contraindications

Despite their cornucopia of benefits, black currents do hold the possibility of slowing the blood clotting process in some individuals. Prudent advice recommends speaking with a medical professional if currently on prescription blood thinners or living with a bleeding disorder.

Black currants may also have a tendency to lower blood pressure in sensitive individuals. While physicians generally concur that keeping a vigilant eye on lowering blood pressure usually improves one's overall health, it can cause and/or exacerbate problems for those with inherent low blood pressure or taking blood pressure medications. Signs of dangerously low blood pressure may include dizziness, fainting and blurred vision.

The Role of Black Currents in Sports and Physical Activity

Depending upon the intensity and duration of an exercise session, the human body can either achieve beneficial adaptive changes or suffer underlying tissue damage. The latter may impact subsequent workouts as well as long-range wellness. Functional superfoods offer the potential to support the body by way of managing the harmful aspects of exercise.

Black currants have gained recognition as a "superfood" in the fitness world due to their high polyphenol content, more than any other berry. Owing in large part to their high content of the aforementioned antioxidants and anti-inflammatory compounds, athletic subjects reported that consumption of black currant not only accelerated their post-exercise recovery time but also tended to lessen muscle soreness.

In 2018, the International Olympic Committee (IOC) released a statement clarifying the efficacy of dietary supplements for athletes, in which they noted that polyphenols in general (and anthocyanins in particular) showed promise in increasing mitochondrial biogenesis and fostering improved endurance performance.

Blood Flow Benefits for Athletes

The abundance of anthocyanins present in New Zealand black currants may also exert a powerful effect upon the vasoactive properties of a body *during athletic exertion*. These benefits can include increasing vasodilation as well as decreasing mean arterial blood pressure. However, the effects of anthocyanins on an athlete's exercise performance without having first engaged in a muscle-damaging/metabolically demanding bout of exercise do not seem quite as clear. The mechanisms by which anthocyanin intake can enhance exercise performance may include effects on blood flow, metabolic pathways, peripheral muscle fatigue, or a combination of all three.

One research study sought to evaluate the potential of black currant supplementation when taken by athletes, focusing specifically on oxidative markers, cognition, and general side effects. Data did indicate a reduction in oxidative stress under the conditions of exercise. However, the researchers did not deem the results highly significant; while the magnitude of change in the statistical mean ranged from moderate to large, the overall change among the test subjects did not vary greatly from the control group.

Why New Zealand?

Black currants cultivated in New Zealand boast a higher concentration of anthocyanins and other phytochemicals than those grown in other countries, most likely due to a growing environment filled with long, sunny days and higher-level ultraviolet rays. The anthocyanin content of juice produced from these berries lies in the range of 336 and 850 mg/100 mL, in comparison to non-New Zealand black currants, with an anthocyanin content ranging from 170 to 310 mg/100 mL of juice.

Perhaps this may explain, in part, why New Zealand -grown black currants, when compared to other black currant varieties grown in other countries, seem able to foster a small yet significant improvement on athletic performance. This result appeared particularly when subjects took black currant powder for 7 days, at a dose containing 105–210 mg anthocyanins, with a final ingestion occurring 1–2 hours prior to engaging in exercise. While the data clearly revealed evidence of a direct effect on sports performance, the mechanism by which this occurs still remains largely speculative.

Regulating the Anti-Oxidative Response

Science highlights yet another quality that renders New Zealand black currants unique: the anthocyanin ratio of two specific elements, *cyanidins* and *delphinidins*. Together these compounds possess the capacity to switch on the body's *master antioxidant regulator Nrf2*. This provides multiple performance and recovery benefits, all from just a single mechanism.

The human body's modulation of its immune response rests on its ability to tightly control regulation of the inflammation process. The transcription factor known as *nuclear factor erythroid 2-like 2 (Nrf2)* bears the responsibility of mediating inflammation. Once Nrf2 gets stabilized following oxidative stress, it forces the expression of both antioxidants and "cytoprotective genes", which in turn bring about the anti-inflammatory response crucial for igniting the healing process. Given this key role, scientists feel that preventing Nrf2 dysregulation may lead to new approaches and therapeutic applications for a variety of chronic inflammation-related conditions.

Protection Against Superabundant Oxygen

Several everyday processes in nature – ultraviolet (UV) rays from the sun, a lightning strike, photosynthesis in plants – foster the creation of *ozone*, also referred to as *active oxygen*. Once released into the air, this compound morphs into a purely organic cleansing agent or disinfectant. The high oxygen molecular structure of ozone (O3) enables it to purify its surroundings. On an internal level, the human body relies on active oxygen to protect us and defend against invaders like bacteria. However, the presence of superabundant active oxygen can begin to harm the body.

The body counts on the activity of antioxidants to eliminate toxins and free radicals. Some scientists feel that diseases such as cancers and arteriosclerosis evolve as a result of superabundant active oxygen. This hypothesis led to embracing the need for including antioxidant-rich foods in the modern diet, a simple and positive step towards preventing oxidative toxicity. Oxygen radical absorbance capacity (ORAC) describes one method of assessing antioxidant capacity.

While many dark berries and their derivatives may boast high levels of valuable antioxidants, black currants in particular have an *ORAC value* (Oxygen Radical Absorbance Capacity) of more than double that which we find in red wine, and more than 10 times higher than blueberries. When we consider just how much "cleansing power" we can harness from this, we begin to see the health/wellness value of the dark-colored New Zealand black currant.

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June 2025 Self-Test

June 2025 Self-test

1. **What is the primary goal of biohacking as discussed in the article?**
    a. To replace traditional medical treatments
    b. To make incremental changes for optimizing body and mind
    c. To develop new pharmaceutical drugs
    d. To eliminate the need for exercise and die
2. **According to Dr. Lorien Ahn, what is a recommended practice regarding coffee consumption?**
    a. Drink coffee immediately upon waking
    b. Avoid coffee entirely
    c. Delay the first cup of coffee until a few hours after waking
    d. Replace coffee with energy drinks
3. **Which of the following is NOT listed as one of Tony Robbins' favorite biohacking methods?**
    a. Cryotherapy
    b. Red light therapy
    c. Dynamic sequential compression
    d. Intermittent fasting
4. **What is the purpose of red-light therapy in biohacking?**
    a. To cool the body rapidly
    b. To stimulate mitochondrial activity and promote healing
    c. To increase melatonin production
    d. To enhance vitamin C absorption
5. **How can practicing gratitude contribute to biohacking efforts?**
    a. By increasing physical strength
    b. By improving digestion
    c. By fostering a positive mindset and emotional well-being
    d. By enhancing visual acuity
6. **According to the article, what is the primary focus of Dr. Gabrielle Lyon's Muscle-Centric Medicine (MCM) approach?**
    a. Emphasizing cardiovascular health over muscle development
    b. Linking physical well-being to self-worth and psychological factors
    c. Promoting high-intensity interval training exclusively
    d. Focusing solely on dietary supplements for muscle growth
7. **The Transtheoretical Model (TTM) identifies how many stages of behavior change?**
    a. Three
    b. Four
    c. Five
    d. Six
8. **In the Theory of Planned Behavior (TPB), which factor is NOT mentioned as influencing intention?**
    a. Attitudes

b. Subjective norms
c. Perceived behavioral control
d. Genetic predisposition

9. **Self-Determination Theory (SDT) emphasizes the importance of which three elements in sustaining behavior change?**
    a. Autonomy, competence, and relatedness
    b. Discipline, routine, and endurance
    c. Motivation, ambition, and competition
    d. Knowledge, skill, and ability
10. **How does the article describe the concept of 'worthiness' in relation to muscle health?**
    a. As an innate trait that cannot be influenced
    b. As a psychological state where individuals believe they deserve health and vitality
    c. As a measure of one's physical strength
    d. As a goal achieved through competitive sports
11. **What is the primary focus when designing workouts for beginner clients, according to the article?**
    a. Maximizing calorie burn in each session
    b. Emphasizing high-intensity interval training
    c. Tailoring workouts to align with the client's goals, fitness level, preferences, and schedule
    d. Implementing a standardized workout routine for all beginners
12. **During the initial assessment, which question is NOT recommended to ask a new client?**
    a. What are your goals?
    b. What activities do you enjoy?
    c. Are your goals realistic?
    d. What is your maximum bench press?
13. **According to the article, why is it important to address the psychosocial aspects of a client during training?**
    a. To diagnose psychological disorders
    b. To develop a mutual trust and stronger connection with the client
    c. To replace physical assessments
    d. To focus solely on mental health counseling
14. **What is one of the key components to assess a client's level of fitness?**
    a. Their ability to perform a maximum deadlift
    b. Their knowledge of nutrition
    c. Pulse rate before and after a 1-mile walk
    d. Their preferred workout attire
15. **How does the article suggest ensuring a beginner client's success in their fitness journey?**
    a. By encouraging them to work out sporadically
    b. By setting unachievable goals to motivate them
    c. By helping them view gym time as a non-negotiable appointment
    d. By focusing solely on weight loss
16. **What is the primary focus of nutritional immunology as discussed in the article**

a. Developing new vaccines for infectious diseases
b. Studying the impact of exercise on muscle growth
c. Exploring the relationship between nutrition and the immune system across the lifespan
d. Analyzing genetic factors influencing immunity

17. **According to the article, how does poor dietary habits rank among risk factors for mortality and disability-adjusted life-years (DALYs) worldwide?**
    a. First
    b. Second
    c. Third
    d. Fourth
18. **What historical discovery in the early 1900s contributed to the understanding of nutrition's role in immunity?**
    a. The identification of white blood cells
    b. The discovery of antibiotics
    c. The discovery of vitamins
    d. The development of the microscope
19. **How does the article describe the impact of diet on the immune system throughout the human lifespan?**
    a. Diet has minimal impact on immunity
    b. Diet only affects immunity during childhood
    c. Diet serves as a major modifiable target for interventions to improve immunological responses
    d. Dietary influences on immunity are only significant in old age
20. **What is the significance of inflammation in the context of nutritional immunology as mentioned in the article?**
    a. Inflammation is unrelated to nutrition
    b. Inflammation is solely caused by infections
    c. Inflammation is a common condition linked to the immune system and influenced by diet
    d. Inflammation only occurs in response to physical injury
21. **What is the primary distinction between external and internal cueing in attentional focus?**
    a. External cueing focuses on the body's internal sensations, while internal cueing focuses on the environment.
    b. External cueing directs attention to the environment or movement outcome, whereas internal cueing focuses on body movements or mechanics.
    c. External cueing is only used in advanced training, while internal cueing is for beginners.
    d. There is no significant difference between external and internal cueing.
22. **Which of the following is an example of an external cue provided in the article?**
    a. "Engage your core muscles tightly."
    b. "Focus on your breathing rhythm."
    c. "Push the bar away like you're trying to punch the ceiling."
    d. "Feel the contraction in your biceps."

23. **According to the article, what has traditional research suggested about external focus (EF) compared to internal focus (IF)?**
    a. EF is less effective than IF in skill acquisition.
    b. EF and IF are equally effective in all scenarios.
    c. EF is generally more effective than IF in enhancing motor learning and performance.
    d. IF is preferred for advanced athletes, while EF is for beginners.
24. **What does the article suggest about the effectiveness of cueing strategies?**
    a. The same cueing strategy works equally well for all individuals and tasks.
    b. The effectiveness of cueing depends on individual differences, task complexity, and skill level.
    c. Internal cueing is always superior, regardless of context.
    d. Cueing strategies have minimal impact on motor learning.
25. **Why is understanding attentional focus important for personal trainers, according to the article?**
    a. It helps in selecting appropriate workout attire for clients.
    b. It allows trainers to diagnose medical conditions.
    c. It aids in optimizing motor learning and performance through effective cueing strategies.
    d. It enables trainers to create meal plans.
26. **According to the article, why are traditional metrics like weight loss and BMI insufficient for tracking success in muscle-centric training?**
    a. They are outdated and no longer used in fitness assessments.
    b. They fail to capture true physiological adaptations and functional capabilities.
    c. They are too complex for clients to understand.
    d. They are only relevant for cardiovascular training programs.
27. **Which of the following is highlighted as a simple yet effective measure of overall health and longevity?**
    a. Resting heart rate
    b. Grip strength
    c. Body Mass Index (BMI)
    d. Waist-to-hip ratio
28. **What is sarcopenia, and why is it significant in the context of muscle-centric training?**
    a. A condition characterized by excessive muscle growth, leading to metabolic issues.
    b. A type of cardiovascular disease affecting muscle tissue.
    c. The age-related loss of muscle mass and function, contributing to frailty and increased mortality risk.
    d. An autoimmune disorder that enhances muscle strength.
29. **Which assessment method is NOT mentioned in the article as a way to measure body composition?**
    a. Dual-Energy X-ray Absorptiometry (DEXA)
    b. Bioelectrical Impedance Analysis (BIA)
    c. Skinfold calipers
    d. Magnetic Resonance Imaging (MRI)
30. **What does the article suggest about incorporating subjective assessments in tracking progress?**
    a. Subjective assessments are unreliable and should be avoided.

b. They are less important than objective measures like weight and BMI.
c. Subjective assessments, such as energy levels and confidence, are essential for a holistic understanding of client progress.
d. Only medical professionals should conduct subjective assessments.

31. **According to the article, why is skeletal muscle considered the body's largest endocrine organ?**
a. Because it stores the most energy in the body
b. Due to its role in producing hormones that influence mood, motivation, and neuroplasticity
c. Because it is responsible for all voluntary movements
d. Due to its ability to absorb nutrients directly from the bloodstream

32. **What cognitive benefits are associated with resistance training, as highlighted in the article?**
a. Improved memory recall and reduced need for sleep
b. Enhanced executive function, mental energy, and task-switching capabilities
c. Increased IQ scores and faster reading speeds
d. Better language acquisition and musical abilities

33. **How does resistance training contribute to energy management in high-pressure professions?**
a. By increasing the number of hours available in a day
b. By reducing the need for breaks during work
c. By optimizing the metabolic environment for better cognitive function and stress resilience
d. By eliminating the need for other wellness practices

34. **What role do myokines play in the relationship between muscle activity and brain health?**
a. They act as neurotransmitters that directly control muscle contractions
b. They are enzymes that digest proteins in the muscle
c. They are signaling molecules released by muscles that influence neurogenesis and mood regulation
d. They are hormones produced by the brain to stimulate muscle growth

35. **Why might personal trainers consider framing strength training as essential for workplace vitality?**
a. To appeal to clients interested in bodybuilding competitions
b. To align with corporate wellness programs focusing on cognitive energy and stress resilience
c. To replace the need for traditional cardiovascular exercises
d. To discourage the use of mindfulness apps and standing desks

36. **Which of the following is a key characteristic of low-impact exercises?**
a. They involve high-intensity, explosive movements.
b. They place significant stress on joints.
c. They are gentle on the joints and involve controlled, smooth movements.
d. They require specialized equipment and facilities.

37. **According to the article, which of the following is NOT a common low-impact exercise?**
a. Swimming
b. Cycling
c. Plyometric jumping
d. Yoga

38. **What mental health benefits are associated with low-impact exercise, as mentioned in the article?**

a. Increased anxiety and decreased focus.
b. Release of endorphins, reduced anxiety and depression, improved focus and sleep.
c. No significant impact on mental health.
d. Only beneficial for individuals with existing mental health conditions.

39. **How does low-impact exercise benefit individuals with joint issues or those recovering from injuries?**
    a. It exacerbates joint pain due to repetitive movements.
    b. It is too gentle to provide any real benefits.
    c. It allows for physical activity without placing excessive stress on joints.
    d. It should be avoided until full recovery is achieved.
40. **What is a common misconception about low-impact exercises addressed in the article?**
    a. They are only suitable for young athletes.
    b. They cannot contribute to weight management.
    c. They are ineffective for improving cardiovascular health.
    d. They are low-intensity and do not provide significant fitness benefits.
41. **What is the primary physiological change that defines menopause?**
    a. A significant increase in progesterone levels
    b. The complete cessation of ovarian function leading to the end of menstruation
    c. An increase in estrogen production
    d. The onset of irregular menstrual cycles
42. **According to the article, what percentage of women experience vasomotor symptoms (VMS) during menopause?**
    a. 25%
    b. 50%
    c. 75%
    d. 90%
43. **What are some of the physiological changes associated with menopause mentioned in the article?**
    a. Increased bone density and muscle mass
    b. Decreased fat mass and improved insulin sensitivity
    c. Increased fat mass, decreased fat-free mass, and bone density
    d. Enhanced cardiovascular endurance and flexibility
44. **Which type of exercise was found to improve insulin sensitivity in perimenopausal and postmenopausal women with overweight and obesity?**
    a. Resistance exercise alone
    b. Aerobic exercise alone
    c. Combined aerobic and resistance exercise
    d. Both B and C
45. **What is the significance of aerobic exercise volume in postmenopausal women, as highlighted in the article?**
    a. Increasing aerobic exercise from 150 to 300 minutes per week leads to greater reductions in intra-abdominal fat, BMI, and total body fat.
    b. Reducing aerobic exercise to less than 150 minutes per week improves bone density.

c. Aerobic exercise has no significant impact on body composition.
d. Only resistance training affects intra-abdominal fat in postmenopausal women.

46. **What traditional uses of black currant are highlighted in the article?**
    a. Treating digestive issues, skin conditions, and respiratory problems
    b. Curing common colds and flu
    c. Enhancing energy levels
    d. All of the above

47. **Why were black currants banned in the United States in the early 1900s?**
    a. They were considered an invasive species.
    b. They hosted a fungus harmful to white pine trees.
    c. They were toxic to humans.
    d. They had no nutritional value.

48. **According to the article, what are some of the health benefits of black currants?**
    a. Anti-inflammatory properties useful for arthritis and joint pain
    b. Rich in vitamins and minerals
    c. Boosting energy levels
    d. All of the above

49. **In which regions did the use of black currant in traditional remedies originate?**
    a. South America and Africa
    b. England and parts of northern Asia
    c. Australia and New Zealand
    d. Southern Europe and the Middle East

50. **How was black currant commonly consumed in early England to enhance its medicinal properties?**
    a. Eaten raw as a fruit
    b. Used in salads
    c. Prepared as teas and flavored syrups blended with herbs and spices
    d. Fermented into alcoholic beverages

Paper Pencil Answer Sheet

First & Last Name:	NFPT ID:	Date

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