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Personal Training Quarterly (PTQ) publishes basic educational information for Associate and Professional Members of the NSCA specifically focusing on personal trainers and training enthusiasts. As a quarterly publication, this journal's mission is to publish peer-reviewed articles that provide basic, practical information that is research-based and applicable to personal trainers.

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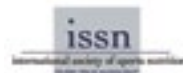
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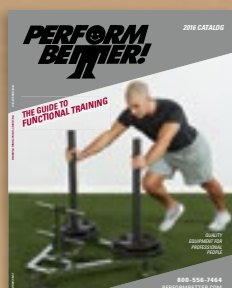


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STOP HIRING PERSONAL TRAINERS AND START BUILDING THEM—DEVELOPING AN INTERNSHIP PROGRAM AT A FITNESS FACILITY

ROBERT LINKUL, MS, CSCS,*D, NSCA-CPT,*D

One of the biggest challenges a fitness business owner faces is hiring and developing their team of personal trainers and facility staff. There are many factors that oftentimes come with hiring previously established and/or experienced professionals. These factors include pre-developed training philosophies, program design styles, coaching and cueing techniques, and business personality (e.g., selling techniques and strategies) that could clash with the business' mindset (1). Finding a well-educated and open-minded employee is, in most cases, simply luck of the draw. Instead of hoping for the perfect new hire to come walking through the door, a business owner could try a different technique in which they shed their business owner mindset and transition into a mentorship role. Using an internship program, the mentor can ideally build themselves the near-perfect employee (2).

Many fitness facilities across the country have started offering an internship program to local colleges and universities. These internships typically provide the intern elective credits in exchange for their time and commitment to a fitness facility. For the student, these internships can be useful opportunities to be mentored and to gain exposure to training styles and business techniques that they will need later in their careers. For the fitness business owner, the internship acts as a 12 – 16-week opportunity for the business owner to mentor and mold their next potential employee.

This is not an “observation-style” internship, where the intern simply watches the mentor coach clients and has to mop, fold towels, clean the equipment, etc. Instead, the mentor offers real “on-the-job” training in which the intern learns their business strategies, coaching philosophies, and teaching techniques (1). What an intern lacks in experience can quickly be replaced with learning the exact business and training techniques that the mentor desires. If either party is not enjoying the process or feels

that the fit is simply not right, the internship ends and nothing is lost other than the time invested.

The ideal ending to the internship would conclude with the mentor hiring the intern after they both invested their time and effort into training. In this scenario, the internship would act like typical on-the-job training that most new employees experience, except that the intern would not be compensated in the form of money. Instead, the intern earns school credit(s), gains experience within the industry, and earns the potential opportunity to start their career with a paying job in the field.

The following guidelines will walk the mentor through the steps of creating their own internship at their fitness facility. These steps can be daunting and require a large initial time investment to accomplish. However, the long-term positive effects and results that a well-designed, progressive internship program can have on a business can be well worth the effort. The following are five basic guidelines for how to create and establish an effective internship at a fitness facility:

1. CREATE AN INTERNSHIP SYLLABUS AND OUTLINE

The mentor (and/or their team of employees) will start this process by creating a syllabus and outline that spans the entire 12 – 16-week semester. This syllabus and outline should progress the intern through the basic components needed to be successful in the mentor's current business model. Each component should include details of implementation in regards to the specific application to the mentor's philosophy and strategies. Once the work has been completed and the internship materials are ready, they can simply be reapplied over and over again with each new intern. The only further required effort is a general maintenance, tune up, and upgrade of the syllabus and outline as needed. Some working components of the syllabus and outline can include, but are not limited to:

TABLE 1. SAMPLE INTERNSHIP SYLLABUS AND OUTLINE

Mobility, warm-up, and cool-down programming	Exercise program design	Coaching and cueing techniques and business
Marketing and social media	Referral and reward programming	Facility maintenance and standard operating procedures (SOPs)
Facility and equipment design	Implementation of specific training (e.g., sandbags, suspension training, battling ropes, etc.)	Consultation, initial interview, and assessment techniques

2. CREATE A WORK BINDER

With the syllabus created and outline topics designated, the next step is for the mentor to search for and select research articles that fit each component. The search for these articles can be made rather easy for any National Strength and Conditioning Association (NSCA) Member, as they have access to any NSCA publication. These publications include *Strength and Conditioning Journal* (SCJ), *The Journal of Strength and Conditioning of Research* (JSCR), *Personal Training Quarterly* (PTQ), *NSCA Coach*, and *TSAC Report*.

Printed copies of these articles can be added into the internship binder so that the intern has a hard copy of each article of their own, that way they can highlight and take notes (Table 2). An additional part of the requirements for the internship can be to request that the intern produces a write-up and review on each article. Other components of the binder can include SOPs of the facility, program design philosophy and guide, exercise libraries, coaching cues, progressions and regressions, mobility training, business strategies, and anything else the mentor deems prudent to the intern's learning experience (2).

3. MOCK PROGRAMMING

Another component of the intern's work binder is to create "mock" clients for them to engineer full program designs or specific individual workouts. The mentor should provide the intern with all the necessary details about the mock client (e.g., age, height, weight, physical limitations, goals, surgeries, etc.) and set them up for success, while allowing them to be creative and think for themselves (3). These mock-ups should get progressively more difficult as the weeks go on and as the intern learns more. Once completed, the mentor should review the mock-up with the intern to discuss the components in which they have created. An example mock-up is listed in Table 3 (3).

4. REQUIRE TIME AS BOTH TRAINER AND CLIENT (LOG HOURS)

A good amount of the intern's time should be focused on developing their knowledge base. With the development of their knowledge base comes the ability to apply it in a practical setting. The intern should log hours participating as both a client and as a trainer to gain experience in both roles. This experience provides the intern an opportunity to see things from the client's point

TABLE 2. SAMPLE ARTICLES

ARTICLE TITLE	AUTHOR	PUBLICATION	VOLUME AND ISSUE
Age Appropriate Fitness Considerations for the Older Fitness Clientele	Keith Chittenden	<i>Personal Training Quarterly</i>	Volume 1 Issue 2 (2014)
Sandbag Training: A Simple Four-Week Training Program	Katie Sell, Kurt Taveras, and Jamie Ghigiarelli	<i>Strength and Conditioning Journal</i>	Volume 33 Issue 4 (2011)
Effective Methods of Grip Strength Development	Jace Derwin	<i>NSCA Coach</i>	Volume 2 Issue 3 (2015)
Suggested Strategies for Developing and Retaining Fire Fitness Trainers	John Bennett	<i>TSAC Report</i>	Issue 40 (2016)

TABLE 3. SAMPLE CLIENT FOR MOCK PROGRAMMING

CLIENT NAME	GENDER	AGE, HEIGHT, AND WEIGHT	PHYSICAL LIMITATIONS	SURGERIES	MEDICATIONS	FITNESS GOALS
Nick Clayton	Male	43 years old, 6 foot 2 inches tall, and 244 lb	Right knee tightness	2004: right meniscus tear (repaired)	High blood pressure medication	Decrease body fat
			Lower back pain	2011: L5 – S1 herniation (repaired)		Increase right knee stability
			High blood pressure			Reduce lower back pain

The goal is for the intern to create the first three workouts for this client based on his physical limitations, health history, and fitness goals. The purpose of this exercise is to see how the intern processes the client's information and applies it to a program design.

STOP HIRING PERSONAL TRAINERS AND START BUILDING THEM— DEVELOPING AN INTERNSHIP PROGRAM AT A FITNESS FACILITY

of view. The intern gets to hear, feel, and participate in all the coaching cues, progressions, and program design components that the mentor has already created and mastered. This experience teaches the intern to be empathetic to the needs of their clients and helps them develop their ability to coach effectively. The more time the intern experiences observing and participating, the more likely they are to have success as they start their career.

5. FINISH THE INTERNSHIP WITH A REVIEW

At the conclusion of the planned 12 – 16-week internship, the intern and the mentor both should have their participation reviewed (2). The mentor should provide the intern with feedback as to how they performed during their internship. This review should cover all areas of their involvement including some areas of improvement, components in which they excelled, and suggestions on future goals and their career path in which the mentor feels the intern should pursue. In return, the intern should fill out a review for the mentor. This provides the mentor feedback on how effective their internship program is, what areas of weakness the program has, what areas of strength the program has, and any areas that the intern specifically enjoyed.

CONCLUSION

With the intern's "on-the-job training" experience complete, they have grown their knowledge base and enhanced their practical application abilities. The intern's experiences included work with mock programing, coaching ability, teaching of progressions, and the use of cues. The intern's experience working within the mentor's business can place them in the position of an ideal candidate for the mentor to hire. Ultimately, this makes the time invested by both parties very rewarding and well worth it. The mentor no longer needs to chance the "new hire" process as they have now learned how to build their ideal employee.

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Robert Linkul was the National Strength and Conditioning Association's (NSCA) Personal Trainer of the Year in 2012. He is currently a volunteer with the NSCA as the Southwest Regional Coordinator and Committee Chairman for the Personal Trainers Special Interest Group (SIG). Linkul is the Career Development columnist for the NSCA's Personal Training Quarterly (PTQ) publication and speaks internationally on career development techniques for personal trainers. Linkul mentors personal training students and rookie trainers entering the industry on business strategies, client retention, and professional longevity. Linkul has been in the industry since 1999, and owns and operates his own personal training studio in Sacramento, CA.

A man in a grey t-shirt and black shorts is performing a TRX suspension training exercise on a grass field. He is in a plank position, suspended by black straps with yellow buckles. A coach in a black t-shirt is lying on the grass next to him, observing his form. The background shows a stadium with bleachers and a clear blue sky. The image is overlaid with a large yellow diagonal graphic on the right side. In the top left corner, there is a yellow square with the TRX logo. The text 'MOVE BETTER TRAIN BETTER COACH BETTER' is written in large, bold, white capital letters across the top right.

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HEART RATE VARIABILITY FOR PERSONAL TRAINING—PART II: PRACTICAL APPLICATION

CARMINE GRIECO, PHD, CSCS, AND LACEY HOOK

This article is the last of a two-part series.

INTRODUCTION

The first article of this two-part series explored the physiological background of heart rate variability (HRV).

This article will focus on the practical application of HRV testing for strength and conditioning professionals. HRV has many clinical and diagnostic uses, but strength and conditioning professionals are most likely to benefit from HRV testing in one of two ways: to assess the acute effect of changes in training load or to assess the chronic effect of training (e.g., fitness).

ASSESS TRAINING LOAD

The most common way that HRV is used, and probably the first way in which most people are introduced to HRV testing, is to use it to guide daily workouts. In this regard, it is a simple, reliable, and useful tool. Reminiscent of flexible non-linear periodization (which uses a daily metric of performance, such as a single vertical jump, as an indicator of recovery), a morning HRV assessment can serve a similar function in determining readiness to train.

HRV provides a window into the autonomic nervous system (ANS). The ANS, a branch of the peripheral nervous system which is responsible for managing all physiological function that operates under the level of conscious awareness (e.g., blood pressure and glucose regulation), is exquisitely sensitive to even the smallest of physiological changes to the internal environment. In this manner, HRV can serve as a barometer, measuring the amount of “reserve” that is available on any given day. For example, if an individual had a particularly intense workout (or a series of intense workouts

over multiple days), their reserve might be depleted. Conversely, it would be expected that physiological reserve would be maximized following a period of recovery. In this way, a daily HRV reading can provide an objective measurement that is useful on a day-to-day basis and can provide an indication of physiological recovery, or “readiness to train.”

Several studies have validated the usefulness of HRV-guided exercise programs in athletes as well as recreational exercisers. For example, Kiviniemi et al. investigated the difference between a traditional pre-defined training regimen and one that relied upon a morning HRV reading, which would dictate daily workout intensity, among male recreational runners (7). The HRV group determined whether they were going to do a low-intensity run (65% of maximal heart rate), high-intensity run (85% of maximal heart rate), or rest day, based on morning HRV readings. If their morning assessment showed a lower than normal reading, based upon interpretation of a rolling 10-day average, they would take a rest or low-intensity day. In contrast, the traditional training group performed one day of low-intensity exercise, two consecutive days of high-intensity exercise, and one non-exercise recovery day, which was repeated to give six training days per week. This training regimen was maintained for the duration of the four-week investigation. Both groups accrued a similar number of rest, low-intensity training, and high-intensity training days. Maximal running velocity increased for both groups; however, the HRV group increased to a significantly greater extent. While there was no significant difference in $\text{VO}_{2\text{peak}}$ between the groups, only the HRV group improved $\text{VO}_{2\text{peak}}$ significantly (7). This led the

researchers to conclude that using HRV to guide daily workouts was an effective strategy to improve cardiorespiratory fitness.

A more recent investigation compared a traditional pre-defined training program versus HRV-guided training in both male and female recreational runners (16). The 12-week training study, which included a four-week preparatory period followed by eight weeks of intensive training, was largely running-based with cross-training and muscular endurance circuit training encouraged two days per week. Both groups performed weekly combinations of low-intensity, moderate-intensity, or high-intensity runs. Individuals in the HRV group performed daily assessments of HRV and used a rolling seven-day average to determine workout intensity. The results were noteworthy in that the HRV group significantly improved 3,000-m run-time, despite completing fewer moderate-intensity and high-intensity training sessions than the traditional group. Moreover, the individual differences in training adaptations were smaller in the HRV-guided group. This diminished variation potentially indicates a more accurate exercise prescription, suggesting that “the timing of moderate- and high-intensity sessions according to HRV is more optimal compared with the subjectively predefined training,” (16).

ASSESS FITNESS LEVEL

Aerobic fitness can be described as physiological efficiency. A “fit” body is a physiologically efficient body. Consequently, high levels of HRV serve as a biomarker of physiological efficiency. Chronically decreasing HRV is an indicator that the body is sliding toward physiological inefficiency. Many chronic lifestyle-related diseases are a manifestation of physiological inefficiency. Type 2 diabetes, which is characterized by a diminished ability to regulate blood sugar levels, is a prime example of physiological inefficiency. A loss of HRV is associated with type 2 diabetes as well as pre-diabetes and is inversely associated with plasma glucose levels (14).

While there currently exists no normative data that can be used to predict or quantify fitness level directly from HRV, research is trending in this direction. For example, a recent study by Kiviniemi et al. investigated the ability of resting HRV measures to predict change in aerobic fitness during a short-term (two weeks), high-intensity training program in middle-aged sedentary males (8). The authors demonstrated that baseline measures of HRV in previously sedentary individuals were predictive of improvement in aerobic capacity following a short-term, high-intensity exercise intervention.

Moreover, a recently published study by Mankowski et al. provided validation for an exciting new application for HRV (10). In the study, which manipulated oxygen to normoxic, hyperoxic, or hypoxic (i.e., normal oxygen consumption, excessive oxygen supply, and inadequate oxygen supply, respectively) levels during an incremental stress test, researchers demonstrated a strong linkage between markers of HRV and the second ventilatory threshold (10). The incorporation of this method of ventilatory threshold assessment into commercially available fitness equipment could pave the way for significant improvements in exercise prescription in the future.

The effect of significant aerobic exercise training has consistently demonstrated improvements in HRV, particularly in parasympathetic markers (e.g., root mean square of successive

differences [RMSSD] and high frequency power) of autonomic control (2). The literature, however, is somewhat equivocal in regards to the effect of resistance training on HRV. For example, Berkoff et al. found no significant mean differences in HRV between elite aerobic and power athletes, suggesting that both styles of training affect HRV in a similar fashion (1). Moreover, a recent review of the effect of resistance training on HRV found the majority of studies reporting no significant change (6). At first glance, these results may seem contradictory, but training adaptations are specific to the imposed demand of exercise. Since traditional resistance training does not place as great of a demand on cardiac function as aerobic training, and HRV is derived from cardiac dynamics, it follows that aerobic training should exert the greater effect on HRV.

Even though it is not yet possible to directly predict or quantify fitness level with HRV at the commercial level, regular HRV readings can serve the strength and conditioning professional as a biomarker of health, fitness, and readiness to train, while also providing important insight into specific populations, such as athletes and those with chronic health conditions. Many studies across a diversity of populations have demonstrated the efficacy of exercise training, particularly aerobic exercise training, in increasing HRV (3,8,13,17). Therefore, HRV can be used as a biomarker of change in aerobic fitness level. Furthermore, while reduced HRV is a predictor of carotid artery atherosclerosis, type 2 diabetes, and all-cause mortality, high HRV is associated with faster cognitive processing speed in older individuals and healthy longevity (5,9,14,15,18).

QUICK START GUIDE FOR HRV TESTING

There are dedicated HRV testing solutions on the market; however, this is a very expensive and inconvenient way to incorporate HRV into a health and fitness assessment. Moreover, technological advances are occurring at such a rapid pace that it is not advisable for the strength and conditioning professional to invest a large sum of money into a technology that may quickly become obsolete. It is recommended that strength and conditioning professionals consider these three basic rules:

1. **Pick the Device** – The simplest and most cost-effective way for the strength and conditioning professional to incorporate HRV testing is via a Bluetooth-enabled heart rate monitor (HRM). With Bluetooth capability, a chest strap HRM will be able to communicate directly with an application (app) on a smart phone or tablet. Plethysmography is another option for measuring changes in volume within an organ that result from changes in blood or oxygen. Devices for plethysmography vary and may be considerably more expensive than HRM options.
2. **Get the App** – A variety of apps are available for both iPhone and Android devices, and can be downloaded in seconds. It is recommended that the strength and conditioning professional invest some time in researching the capabilities of several apps, as each app has its own advantages and disadvantages. For a beginner to HRV testing, it is recommended to consider using a free app, such as Elite HRV or HRV +.
3. **Start Collecting Data** – Prior to beginning the first reading, it will be necessary to sync the Bluetooth HRM to the app (this can typically be done through the “settings” feature of the app).

HEART RATE VARIABILITY FOR PERSONAL TRAINING— PART II: PRACTICAL APPLICATION

TESTING ISSUES AND RECOMMENDATIONS

Because HRV is so exquisitely sensitive to a multitude of internal and external stimuli, it is imperative that testing parameters be as consistent as possible to obtain the most accurate measurements. For most health and fitness-related applications, the following guidelines are recommended:

- HRV testing should be done in a fasted state, immediately after waking in the morning, and while lying in bed.
- Morning recordings should be regular (i.e., daily).
- While research-based measurements range from five minutes to 24 hours, the recommended recording time for health and fitness purposes is one minute. One minute readings are typically standard on HRV apps and a resting one-minute reading has been validated in comparison to the research standard of five minutes (4).
- There are many meaningful measures of HRV; however, for health and fitness purposes, the primary metric is the RMSSD. Most apps will report either the raw or log-transformed RMSSD. Additionally, some apps (e.g., *ithlete*) will report a single transformed HRV “score.” This is typically the RMSSD, which has been log-transformed and multiplied by a value of 20 to yield a score which is conveniently represented on a 0 – 100 scale (very high readings may exceed 100).

INTERPRETATION OF HRV READINGS

As HRV is susceptible to many internal and external stimuli, the strength and conditioning professional should be cautious of altering an exercise prescription based solely on a single low reading. Individual HRV measurements should be interpreted in the context of each individual. For example, if an individual reports a single low reading, it would be best to consult with the client to determine if there is an alternate source of stress that is acutely depressing the HRV reading (e.g., recent significant bout of alcohol consumption, abnormally high life stress, acute sleep deprivation, etc.).

Normative data for many metrics of HRV do exist; however, caution is advised in regards to methodological differences, as well as inherent issues with HRV testing, as these differences may render the data ineffective for client comparison. As there can be a great amount of inter-individual differences in HRV readings, the best use for strength and conditioning professionals will be to use intra-individual comparisons over time. This will give the strength and conditioning professional a trend-line for each client, serving to inform exercise prescription, as well as tracking fitness levels. Nevertheless, as a point of reference, consider the following:

- In a study of track and field athletes, Berkoff et al. demonstrated mean RMSSD values of 75.6 and 69.4 in elite male and female runners, respectively (1). Values for male and female power athletes were similar (and not significantly statistically different), at 76.3 and 77.7, respectively (1).

- Melanson reported RMSSD values among males (25 – 49-years old.), stratified into three groups according to amount of weekly aerobic exercise, as 42.3, 92.7, and 87.3, for low (< 1,000 kcal·wk), moderate (1,000 – 2,000 kcal·wk), or high aerobic activity (> 2,000 kcal·wk), respectively (11).
- In a meta-analysis of HRV readings in healthy adults, Nunan et al. reported an overall RMSSD value of 42 (12).

CONCLUSION

The “bread and butter” of the personal training world is to deliver consistent positive change for clients. Technological advances over the last decade, combined with an explosion of HRV-related research, have opened up HRV testing to the average strength and conditioning professional. Continued advances in both technology and research promise to make the utility of HRV testing and assessment an indispensable tool for the strength and conditioning professional. Given the broad scope of related research and its association with so many facets of disease, health, and fitness, HRV will prove to be an invaluable biomarker for the strength and conditioning professional.

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LOW BACK PAIN—IS MOTOR CONTROL EXERCISE SUPERIOR TO GENERAL EXERCISE? A REVIEW OF THE RESEARCH

NICK TUMMINELLO, NSCA-CPT

Low back pain (LBP) is one of the major concerns of current healthcare. Motor control exercises, which are often referred to as “spinal stabilization” or “core stability” exercises, are often used by healthcare professionals worldwide as a common treatment for LBP.

Motor control exercises are designed for the individual to learn how to preferentially contract the local stabilizing muscles of the spine (e.g., multifidus, transversus abdominis, internal oblique) independently from the superficial trunk muscles (e.g., erector spinae rectus abdominis). Motor control exercises involve low-load activation of the local stabilizing muscles of the spine isometrically and in minimally loaded positions (e.g., four-point kneeling, supine lying, sitting, standing, etc.). A common example of a motor control exercise is the transversus abdominis draw-in. This exercise is often performed either lying supine or in four-point kneeling position and requires the individual to perform a slight drawing-in maneuver of the lower part of the anterior abdominal wall below the umbilical level (18).

Since research has shown altered recruitment patterns of deep trunk muscles, such as the transverse abdominis and lumbar multifidus in patients with LBP, these motor control exercises are often used in attempt to reestablish coordination of the deep trunk muscles in order to improve control of the spine (1,2,8,16,17).

Consequently, motor control exercises have also drawn tremendous attention from strength and conditioning professionals. Many strength and conditioning professionals often prescribe motor control exercises to their clients with current or previous LBP issues. The motor control exercises prescribed usually focus on activating the deep trunk muscles to restore control and coordination of these muscles. Many strength and conditioning professionals will often dedicate a great deal of their programming time, especially in the early stages of training, to using motor control exercises in order to first address what they believe to be the individual's “underlying dysfunctions.” This is because a key feature of the motor control exercise approach is the training of the deep trunk muscles in isolation before progressing to demanding tasks that train coordination of the deep and the superficial trunk muscles (18). Then they will often

focus the training program on the use of more general trunk training exercises, such as plank and side plank variations, which are often selected on the basis of maximizing the contraction benefit/spinal loading ratio, according to recommendations provided from recent experimental studies (15). These general trunk muscle specific-exercises will often be included into a comprehensive total-body strength and conditioning program, which often involves a variety of conventional resistance exercises such as loaded squat and deadlift variations that integrate the activation of deep and global trunk muscles along with other muscle groups (14).

Contrary to common belief, the current body of scientific evidence demonstrates that there is nothing special about using motor control exercises as a means to prevent or reduce back pain. This article provides an overview of the scientific evidence comparing specific motor control exercise intervention to using a more general exercise approach, and concludes by discussing the practical implications for strength and conditioning professionals from an exercise programming perspective.

OVERVIEW OF THE EVIDENCE

An early study randomized LBP patients into two groups: a conventional physiotherapy group consisting of only general activity exercises (aimed at improving the muscular strength of the lumbar and pelvic region and legs, such as the abdominals, erector spinae, gluteals, quadriceps, and hamstrings) and manual therapy, and a conventional physiotherapy plus specific spinal stabilization exercises group (3). This study found that patients with LBP showed improvements with both treatment packages to a similar degree. Therefore, the researchers concluded that “there was no additional benefit of adding specific spinal stabilization exercises to a conventional physiotherapy package for patients with recurrent LBP,” (3).

A randomized, controlled trial of patients with recurrent, non-specific back pain (NSLBP), compared two groups: a general exercise treatment group and a combination of general exercise and spinal stabilization exercise group. This study reported that a general exercise program reduced disability immediately after treatment to a greater extent than a stabilization-enhanced

exercise approach in patients with recurrent NSLBP. However, there were no between-group differences on self-reported disability at the three-month follow-up (9). Therefore, stabilization exercises do not appear to provide additional benefit to patients with subacute or chronic LBP who have no clinical signs suggesting the presence of spinal instability (9).

Another randomized, controlled trial compared the effects of general exercise, motor control exercise, and manipulative therapy on function and perceived effect of intervention in patients with chronic back pain (6). The researchers found that “motor control exercise and spinal manipulative therapy produce slightly better short-term function and perceptions of effect than general exercise, but not better medium or long-term effects, in patients with chronic non-specific back pain,” (6).

A recent systematic review found that “evidence of very low to moderate quality indicates that motor control exercise showed no benefit over spinal manipulative therapy, other forms of exercise, or medical treatment in decreasing pain and disability among patients with acute and subacute low back pain. Whether motor control exercise can prevent recurrences of low back pain remains uncertain,” (11). Additionally, another systematic review, this one about chronic NSLBP, concluded that “there is very low to moderate quality evidence that motor control exercise has a clinically important effect compared with a minimal intervention for chronic low back pain. There is moderate to high quality evidence that motor control exercise provides similar outcomes to manual therapies and low to moderate quality evidence that it provides similar outcomes to other forms of exercises,” (21). The authors went on to say that motor control exercises are not necessarily superior to other forms of exercise, and that the choice of exercises for chronic LBP should depend on individual preferences, therapist training, costs, and/or safety concerns (21).

EVIDENCE USING SUBGROUPS

Many healthcare providers state that low back pain is a multidimensional, socioeconomic public health problem with almost 85% of patients being diagnosed with NSLBP (4,7,10,12,13,22,23). They will also likely readily admit that treating chronic LBP is complicated because neither specific diagnostic nor treatment-based approaches have been shown to be absolutely effective. Many practitioners often prescribe motor control exercises almost universally to people with LBP issues. One of the common concerns many health rehabilitation specialists and strength and conditioning professionals who promote the use of specific motor control exercise interventions have with the research discussed above is that those studies did not involve patient subgroups. These professionals believe that patients with a motor control impairment can be diagnosed as a LBP subgroup who would benefit from specific motor control exercises. Therefore, they encourage studies in such patient subgroups with a common diagnosis or prognosis to examine outcomes from specific motor control exercise interventions.

To meet this concern, a recent study used a tailored exercise program versus general exercise for a subgroup of patients with LBP and movement control impairment. This study assessed the short-term effect of a specific exercise program targeting movement control impairment versus general exercise treatment on disability in patients with LBP and motor control impairment.

At the conclusion of this study, “no significant difference was found following the treatment period. Disability in LBP patients was reduced considerably by both interventions,” (20).

Another randomized controlled trial study that also involved subacute or chronic low-back pain patient subgroups found that motor control exercise and general exercise appear equally effective at reducing LBP in the patient subgroup included in this study (19). The researchers concluded that “the contrast between both types of intervention did not bring additional value to the shared effects,” (19). Additionally, strength and conditioning professionals should pay special attention to the following statements from the researchers of this study: “it is possible that the type of exercise treatment is less important than previously presumed; that the patient is guided to a consistent long-term exercise lifestyle is of most importance. The results of our study support previous findings that exercise in general, regardless of the type, is beneficial for patients with NSLBP,” (19).

CONCLUSION AND PRACTICAL TAKEAWAY

The overall takeaway of these studies is that exercise is a moderately effective treatment for chronic LBP. Although moderate evidence suggests that special motor control exercise interventions may prevent recurrences of LBP, no good evidence has been found for a difference in effect between types of exercise. In other words, although special motor control exercise interventions have been shown to improve low back outcomes, these exercises do not appear to be any more beneficial than general exercises, which also offer a wide range of well-established health, fitness, and physique benefits. Therefore, when it comes to clients with LBP, the strength and conditioning professional should not be hesitant to focus their programming on the use of general exercises that fit with the individual's ability, medical profile, and personal goals.

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DISRUPTING UNHEALTHY HABITS WITH ENVIRONMENTAL MODIFICATIONS

JUSTIN KOMPF, CSCS, NSCA-CPT

INTRODUCTION

Health and wellness professionals and personal trainers are often sought after by individuals who desire to live healthier lifestyles through nutrition and exercise interventions. The desire to change is reflected by good intentions to adopt new behaviors. However, unhealthy habits may easily override an individual's good intentions. Habitual behavior is distinct from non-habitual behavior in that little information is required to make decisions, intentions are insufficient to predict behavior, and behavior is activated by environmental cues (3,9,12). A habit is the inclination to repeat certain behaviors given a stable context. Habits are measured as the multiplicative function of contextual stability and behavioral frequency. Strong habits are performed frequently in the same context whereas weak habits are performed irregularly and in varying contexts (1). Furthermore, habits are characterized by the automaticity which occurs when a behavior is efficient. A habit can be viewed as a route by which a stimulus automatically creates an urge towards action that is based on learned stimulus-response relations (3).

Cognitive associations for strong habits are contextually linked and are likely goal-independent (3,7). A specific environment may prompt certain behaviors such as physical inactivity or unhealthy eating even in the face of intention to avoid these behaviors. As a habit becomes stronger, the influence of intention on actual behavior will decrease. For example, if an individual intends to eat healthy but has a strong habitual tendency to snack on unhealthy food, the intention they formed may have minimal influence on behavior (13). Since strong habits do not share a relationship

with behavioral intention, attempting to change intention alone may not be the most effective strategy to alter behavior. For individuals with good intentions but unhealthy habits, the environment may be the mediator to actual behavior. Because habits are contextually linked, it is reasonable to suggest that modifying the environment may disrupt the habit process and allow conscious intention to guide behavior. This article focuses on providing practical recommendations to aid individuals with intentions to exercise and eat healthy to reach their goals in the face of undesirable habits.

HABIT AND THE ENVIRONMENT

Only a small percentage of people recognize the impact that the environment has on food consumption (17). Furthermore, people often underestimate the number of food-related decisions they make on a daily basis. That is to say, most of these decisions happen automatically or without conscious intention (16). Components of the environment that might trigger the habit response consist of location, preceding actions in a sequence, particular people, or internal feelings or thoughts (8). For example, individuals who scored high for habitually smoking in bars were more likely to find themselves lighting up cigarettes in the bar even after a law was passed that made smoking in bars illegal (8). In this instance, the environment and possibly the sequence of actions played a role in unintended behavior. Another common example is popcorn consumption during movies where eating is automatically triggered by the context. Individuals who have a strong habit for popcorn consumption during movies will eat similar amounts regardless of the taste of the popcorn or how hungry they actually are (6).

However, this consumption pattern may be dependent upon context. For example, individuals with a strong habit to consume popcorn during a movie eat just as much as those with a low habit when the context is changed. People who have a strong habit for eating popcorn eat less by switching to eating with their non-dominant hand. These contextual changes presumably work by removing the automaticity of the task which generates some level of intentional control (7). This disruption in automaticity is also known to occur when individuals move to new locations (14,18). For example, Heatherton and Nichols report that 35% of individuals who made successful life changes reported that they had moved, whereas only 12% of unsuccessful changers moved (4). An environmental disruption such as a move can be taken advantage of by allowing behavior to come under goal-directed intention (14). Of course, it is usually not plausible to suggest that an individual move to a different neighborhood just to change their behavior. However, simple modifications to the home or kitchen environment based on habitual behavior may disrupt these unhealthy habits. This disruption can help intention and goal-guided behavior.

MODIFYING THE ENVIRONMENT
EXERCISE HABITS

It is far easier to engage in sedentary pursuits than physical activity. Furthermore, bad habits such as unhealthy eating provide instantaneous reinforcement while healthy eating and exercise requires a long-term commitment to realize benefits. The purpose of changing the environment is to make undesired habits less likely to happen. Modifying the environment to increase the convenience of physical activity while decreasing the convenience or appeal of sedentary behavior may help to disrupt habits. When physical activity alternatives are convenient compared to inconvenient sedentary activities, people spend increased time being physically active (10). For example, televisions should be placed in locations without comfortable furniture to decrease the appeal of sedentary behavior. Furthermore, televisions should not be in close proximity to food. An individual who watches television close to a kitchen or pantry area will likely eat more while watching television than the person watching in the basement further away from food. Increasing the convenience for exercise should also be a part of behavioral modification interventions.

TABLE 1. EXAMPLES OF HOW TO DISRUPT UNHEALTHY HABITS

HABIT	ENVIRONMENTAL DISRUPTION
Sedentary behavior	Place exercise clothing on the couch
	Put exercise equipment (e.g., stationary bicycle) where the client engages in sedentary behavior
	Join a gym that is located between work and home
Overconsumption of soda	Do not put more than one soda in the refrigerator at a time
	Store soda containers in inconvenient and less noticeable locations
	Buy single-serving cans rather than one-liter bottles
Overconsumption of alcohol	Store alcohol out of sight, such as in a garage refrigerator
	Reduce time spent with heavy drinkers
	Drink wine in tall skinny glasses to reduce consumption

Stationary bicycles or exercise equipment could be placed in bedrooms to serve as a convenient reminder to exercise.

To supplement increased convenience, keeping a consistent schedule and making exercise enjoyable may help to increase habit strength. Kaushal and Rhodes suggest that, along with keeping a consistent workout schedule, strength and conditioning professionals should focus on keeping workouts fun and skill appropriate to increase the likelihood that exercise will become a habit. The rationale is that this will decrease the cognitive demands for exercise and thus help exercise become more habitual (5).

FOOD HABITS

Unhealthy food can be made less convenient as well. For example, Wansink and colleagues observed that candy consumption among secretaries decreased as the ease of access to the candy decreased (15). When candy was located within hands reach and in a clear jar, participants ate more than if the candy was far away and in an opaque jar (15). In this instance, reaching for candy may have been habitual (learned through repetition and unchanging context). By making a small modification to the location of the candy, eating may have come under intentional goal-directed control.

Personal trainers should ask clients to identify the actions that commonly lead up to eating unhealthy food and then suggest ways to disrupt the habit process. For example, an individual may always walk through the kitchen door after work and open the pantry where at eye level lies a bag of chips. Every day they enact this behavior which is stimulated by several environmental cues. The personal trainer could encourage the client to walk through a door that does not lead into the kitchen or place the bag of chips in an inconvenient location. Additionally, instead of eating from a full bag of chips, the client could purchase single-serving packages or pre-serve the snack into a bowl to avoid excessive eating. Any change in action that precedes the behavior may disrupt the habit process. However, it is important to remember that prescribing nutrition plans or diet plans is beyond the scope of personal trainers. A list of suggestions for disrupting unhealthy habits can be found in Table 1.

DISRUPTING UNHEALTHY HABITS WITH ENVIRONMENTAL MODIFICATIONS

TABLE 1. EXAMPLES OF HOW TO DISRUPT UNHEALTHY HABITS (CONTINUED)

HABIT	ENVIRONMENTAL DISRUPTION
Snacking	Create a pantry that is not near the kitchen or television
	Place snacks in single-serving baggies
	Pick one single place to snack that is not in front of the pantry or television
	Make healthy snacks more noticeable than unhealthy snacks
Overeating meals	Leave serving bowls on the stovetop rather than on the dinner table
	Reduce the size of dinner plates and bowls

REPLACING BAD HABITS WITH HEALTHY HABITS—THE ROLE OF SELF-REGULATION

Personal trainers should not only help clients disrupt unhealthy behaviors but also replace these behaviors with healthy ones. For example, the goal of decreasing sedentary activity is tantamount to increasing physical activity. New exercisers may benefit from exercising regularly at the same time of the day (environmental time cueing) to form an exercise habit (11). For example, a person may plan to exercise every day after work at a nearby fitness center. This planning of the “when” and the “where” is an example of self-regulation. Self-regulation serves as the basis for purposeful action. Self-regulatory processes mediate the relationship between intention and actual behavior (2,8). This increased behavioral repetition in a consistent context may help to form new health habits.

CONCLUSION

The environment may be the deciding factor as to whether a habitual urge does or does not occur. The environment may also be a moderating factor as to whether a good intention to exercise or eat healthy will overcome sedentary and poor eating habits. Personal trainers should help clients think of creative ways to modify their environment to help disrupt unhealthy habits. These modifications may help prevent unwanted behaviors and encourage healthy ones.

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HOW TO LEVERAGE INDUSTRY LEADING MARKET RESEARCH FOR A FITNESS STUDIO

JOSH LEVE

One of the most important elements of running a fitness studio, no matter the discipline or the size, is understanding the competitive landscape. Gaining a key perspective on what is happening not only in the market, but also in the fitness industry as a whole, can provide owners and managers with the insight necessary to uncover the data and trends for their business to thrive. There are a variety of online outlets such as IBISWorld, but real analysis of this data is best found by belonging to a professional trade association for fitness studio owners. For example, health clubs have International Health, Racquet, and Sportsclub Association (IHRSA), and strength and conditioning professionals have IDEA Health and Fitness. The Association of Fitness Studios (AFS) is another resource that both fitness studio owners and strength and conditioning professionals may find useful.

There are a multitude of reasons why market research is necessary for any business at any level. The following is a list of basic guidelines that fitness studio owners can use to better their business:

1. **Make Better Business Decisions:** Using industry-leading research data, the fitness studio owner should be able to make informed decisions based on other businesses.
2. **Understand Performance:** Formulas such as net client capacity and revenue per square foot are “need-to-know” formulas for success.
3. **Reduce Complexity and Risk:** Adopting best practices from the other successful business models can dramatically increase the odds of success.
4. **Locate Strategies that Produce Results:** Get specific advice from those who have been there before that can easily be plugged into the business.
5. **Beat the Competitive Landscape:** Make practical decisions about pricing and promotions, weed out fads, and get ahead of trends.
6. **Find Insight into Target Market:** Understand the consumers and their behavior. Implement the most effective programming to position the studio for maximum success.

Many fitness studio owners, no matter where in their business lifecycle they may be, often encounter roadblocks that prevent them from attaining success, such as complacency. Progressing to the next level becomes more and more difficult and accomplishing long-term goals can quickly take a back seat to putting out the fires on a daily basis. But that does not have to be the case. While it may be difficult at first to see the return on investment, the benefits of being able to minimize mistakes and develop sound strategies specific for a business through market research, will ultimately provide fitness studio owners with a competitive advantage that cannot be found elsewhere.

Every good business owner knows that in order to take the next step, critical business decisions need to be made. When faced with these decisions, it is important to have the right information and a key understanding of both the competition and the industry, which will provide an opportunity to make an educated decision based off the data available.

REAL WORLD EXAMPLE

For instance, a fitness studio owner has been operating at roughly 400,000 dollars in total revenue. While ahead of industry averages, the fitness studio owner still wonders how to implement new ideas and add more revenue streams. What if someone were to ask them, how many total clients can the facility fit? There is a specific formula that every business owner can utilize to determine exactly how many clients their space can hold. It is called the client capacity formula, and it is determined by the square footage of a facility and the number of clients that can fit into that space. Therefore, it is important that studio operators understand the relationship between these two dynamics. The importance of knowing the studio's client capacity cannot be underestimated, as it will allow for calculations on the studio's potential for growth and, ultimately, the future of the business.

For the purpose of this example, it will be assumed that the average fitness studio provides nine square feet of space per client. Client capacity for this studio, therefore, is the simple calculation of dividing the facility's square footage by nine. For this example, if the studio is 9,000 square feet it would have the capacity for approximately 1,000 clients, while if it were only 3,000 square feet it would have a capacity for approximately 333 clients. Knowing how many clients the studio can handle is a fundamental means of assessing and projecting potential revenue. Using this formula, a studio owner can calculate if their studio's numbers are significantly above or below industry norms, and take appropriate action, if necessary.

Every studio owner should calculate projections, and measure and monitor their performance. The benchmark data provided by research can assist the studio owner with making accurate financial projections that can help them grow their business. A lack of information, specifically market research, can significantly hurt any business owner when making critical decisions. The fitness industry is a constantly expanding market, and if a studio owner is using old or expired data, they might be shooting themselves in the foot.

NEW BUSINESS OPPORTUNITIES

While the data above can assist in understanding specifics when it comes to knowing the capacity numbers, market research can lead to even more actionable items such as determining new revenue streams based off what others have implemented into their own businesses. Uncovering best practices and successful strategies used by others is one of the biggest takeaways studio owners can learn so they can apply them to their own businesses.

For instance, what if a studio owner is trying to decide how to price their small group training or is considering starting a nutrition and supplement program? Market research can provide the data that can be used to benchmark performance, determine new opportunities, and help them develop the systems to perform at a higher level. In addition to new revenue streams, market research can reveal ways for a business to pivot in the face of adversity. Pivoting can mean small changes or larger more dramatic changes such as new training styles, programs, or price increases or decreases. Market research can play a critical role in this process, which ultimately will determine entirely new business opportunities.

AVOIDING BUSINESS FAILURES

A common misconception about market research is that it implies being proactive, in that it plays a critical role in the creation or implementation of a new idea. But that is not always the case. As mentioned previously, minimizing business risk is a necessary element when deciding whether to move forward with any idea or not. One wrong decision can severely impact reputation, and ultimately lead to a loss in revenue that might not be easy to make up.

Analyzing industry performance data (e.g., client or member usage, client or member retention and attrition, financial metrics, compensation, employee metrics, etc.) will offer studio owners

key benchmarks to assess and improve their own performance. Additionally, research can offer insights into consumer attitudes and behaviors that can provide studio owners with information to help them market, sell, and program their businesses.

CONCLUSION

Fitness studios exist to provide their members with knowledge, resources, and a voice that will allow them to achieve their goals. It is important to stay abreast of the marketplace and never stop learning. Additionally, it is paramount to run the business skill set parallel to those of the training skill set. This way, the fitness studio owner can stay one step ahead of the competition in a very competitive landscape.

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As Co-Founder and President of the Association of Fitness Studios (AFS), Josh Leve is responsible for strategic business operations of AFS. Leve has over 10 years of sales, consulting, advertising, marketing, operations, and retail fitness experience. Prior to AFS, Leve successfully turned around the financial performance of three different big box facilities in Chicago, IL while providing consultative services for smaller fitness studios. Prior to his health club experience, Leve worked with Corbett Accel—the largest healthcare communications/advertising company in the United States—where he launched products for major pharmaceutical companies such as Merck, Bristol Myers Squibb, and Sanofi-Aventis. Leve holds a Bachelor of Arts degree in Journalism from the University of Kansas.



IMPROVING GAIT MECHANICS IN OLDER ADULTS USING HIGH-VELOCITY RESISTANCE TRAINING

TIM LESZCZAK, PHD, AND LISA HENNING, MS

CHANGES IN WALKING MECHANICS

Aging adults have noticeable changes in gait patterns. These changes can consist of a shorter stride length, decrease in step frequency, longer stance time, and a shorter swing time; all of which can change the way an older adult functions in their day-to-day lives. More specifically, their ability to perform activities of daily living (e.g., dressing and undressing, getting into and out of bed, ambulation, etc.) and moving quickly from one place to the next can be significantly affected.

One factor that contributes to this change in gait parameters is a decrease in muscular power. Research by Faulkner et al. indicates that the number of muscle fibers in an older adult will decrease by 50% between the ages of 50 – 80 (12). Metter et al. suggest that power and strength will be maintained up to the age of 40, and that power will start to decline at a rate that is 10% more than strength (23). Others suggest that total power will decrease 6 – 11% per decade from young adulthood to old age, which can affect physical performance and overall function during activities of daily living (5,8,13,15,21,22). Research by Izquierdo et al. suggests that explosive force decreases with age and recommends strengthening and explosive exercises (18). These studies suggest that a decrease in power may affect the way older adults walk, and that improving power may slow down or eliminate some of these adverse effects.

The decrease in power can have serious consequences on the gait cycle. Research by Beauchet et al. compared specific gait measures (e.g., stride time, stride length, stance time, swing time,

and stride width) between healthy young adults and healthy older adults (1). After an exercise intervention, their research showed that the only significant difference between the two groups was in the stride width variable (1). They also mentioned that stride length was different; however, this was due to a slower walking speed in the older adults (1). The authors concluded that decreased stride width is linked with increased falls in older adults (1). Similarly, research by Kerrigan et al. examined the contribution of hip extension mobility on stride length in older adults and found that hip extension mobility deficits were associated with an increased number of falls (19). The authors suggested flexibility interventions to increase range of motion at the hip joint. However, other research indicates that limited hip extension in walking is a dynamic, rather than postural, phenomenon (20).

Although research by Beauchet et al. indicated that stride width is different between younger and older adults, they did not test whether resistance training can affect walking ability in older adults (1). Research by Persch looked at whether resistance training can alter walking ability in older adults (26). After an exercise intervention, results showed that measures of gait speed, stride length, cadence, and toe clearance improved in the experimental group. The authors concluded that the muscles acting on the knee are strongly correlated to gait performance, and that an increase in knee flexor and extensor strength will greatly improve gait speed and stride length (26). In fact, the knee joint attributed to 44% of the improvement in gait speed as compared to 17% at the hip joint (26). However, hip extensors should not be ignored because results have also

shown that strengthening the hip extensors may improve stride characteristics, including walking velocity, stride length, and cadence, in elderly individuals (7).

One remedy to slowing the inevitable change in power output is through resistance training programs. Research has indicated that high-velocity resistance training (e.g., power training) can improve physical performance and functional measures in older adults (2, 3, 6, 9, 10, 11, 14, 16, 17, 24, 25, 28). Sayers et al. states that high-velocity training is a better form of exercise because it mimics the speed of activities of daily living (28). Based on the findings of a meta-analysis, a power-based training program appears to have a slight advantage over strength-based programs for improving overall function in older adults.

Therefore, it seems likely that a high-velocity resistance training program that emphasizes movements for the lower extremities would improve gait speed and stride width. The following will provide information about exercises that could be incorporated into a high-velocity resistance training program, as well as tests that can be used to help determine improvements at the conclusion of a training intervention.

EXERCISES

Some suggested exercises include hip flexion, hip hyperextension, calf raises, chair stands, medicine ball slams, medicine ball bounce passes with a partner, and sit-to-stand squat presses with a medicine ball. All of these exercises can be supplemented by some type of external resistance (e.g., wearing a weighted vest, using a medicine ball, or wearing ankle weights). The following are exercises with suggested protocols for implementation with an elderly population.

Medicine Ball Exercises: The medicine ball exercises can be performed with a 6-, 8-, or 10-lb medicine ball. As the weeks in the training program progress, repetitions can be increased in increments of two, starting at eight and ending at 20, for example. Three sets of every exercise can be performed during each training session with the prescribed high-velocity movement, which could consist of a concentric phase performed as fast as possible and the eccentric phase within 2 – 3 s.



FIGURE 1. MEDICINE BALL TOSS – START



FIGURE 2. MEDICINE BALL TOSS – FINISH

IMPROVING GAIT MECHANICS IN OLDER ADULTS USING HIGH-VELOCITY RESISTANCE TRAINING

Hip Flexion: Participants should stand next to a chair to aid in balance. An ankle weight (either two or four pounds) can be attached to their ankle as they perform hip flexion by kicking their leg forward (anteriorly) to the end of their range of motion (as fast as possible), and then slowly lower the leg back to standing position within 2 – 3 s.

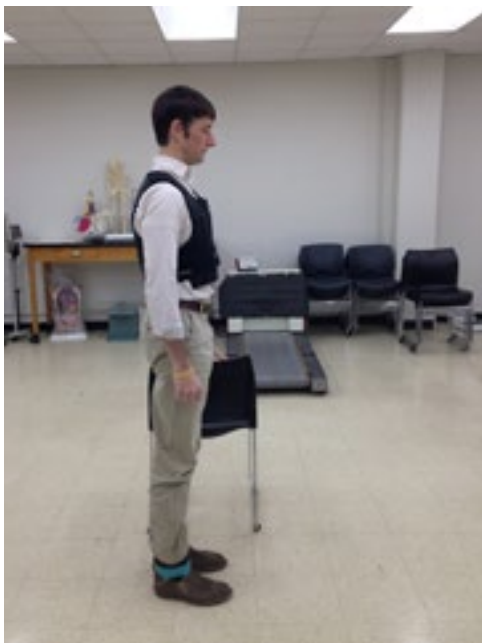


FIGURE 3. HIP FLEXION – START



FIGURE 4. HIP FLEXION – FINISH

Hip Hyperextension: The participants should perform the same procedure as hip flexion, except their leg should be kicked backward (posteriorly) instead of forward.



FIGURE 5. HIP HYPEREXTENSION – START



FIGURE 6. HIP HYPEREXTENSION – FINISH

Calf Raises: Participants should stand (wearing a weighted vest) behind a chair and perform standing calf raises. During the up phase (plantar flexion), they should move as fast as possible. During the down phase (dorsiflexion), they should move at a pace of 2 – 3 s.



FIGURE 7. CALF RAISE – START

Chair Stands: Participants should start in a seated position (wearing a weighted vest). They should stand up as fast as possible, and then slowly lower back to a sitting position within 2 – 3 s.



FIGURE 9. CHAIR STAND – START



FIGURE 8. CALF RAISE – FINISH

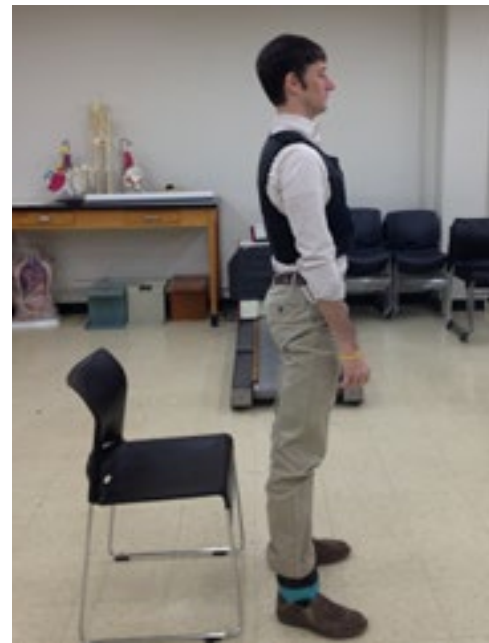


FIGURE 10. CHAIR STAND – FINISH

IMPROVING GAIT MECHANICS IN OLDER ADULTS USING HIGH-VELOCITY RESISTANCE TRAINING

Medicine Ball Slams: Participants should bounce the ball to themselves by slamming it onto the ground directly in front of them. When slamming the ball, they should raise the medicine ball up over their head and then throw it down as fast as possible. They should focus on catching the ball on its way back up.



FIGURE 11. MEDICINE BALL SLAM – START

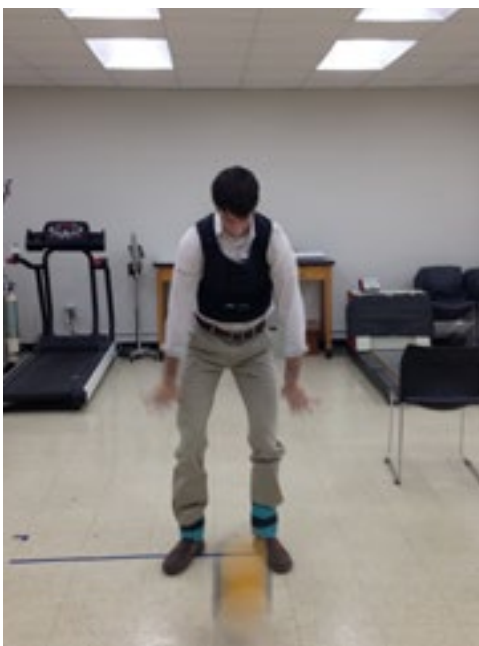


FIGURE 12. MEDICINE BALL SLAM – FINISH

Medicine Ball Bounce Passes with a Partner: The participants should bounce a medicine ball to a partner. They should stand about 10 – 15 ft apart and bounce the ball as fast as possible back and forth between each other.

Medicine Ball Sit to Stand Shoulder Presses: The participants should start in a seated position with the medicine ball at their feet. The movement is initiated by bending forward and picking up the medicine ball from the floor. Then they should stand up with the ball at shoulder level, and push it up over their head as fast as possible. The exercise ends with the participants lowering the ball back to shoulder height, returning to the seated position, and placing the ball back on the ground.



FIGURE 13. MEDICINE BALL SIT TO STAND SHOULDER PRESS – START

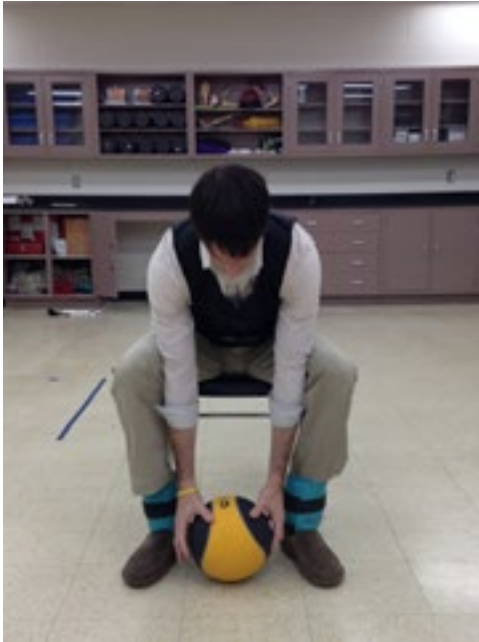


FIGURE 14. MEDICINE BALL SIT TO STAND SHOULDER PRESS – FORWARD REACH

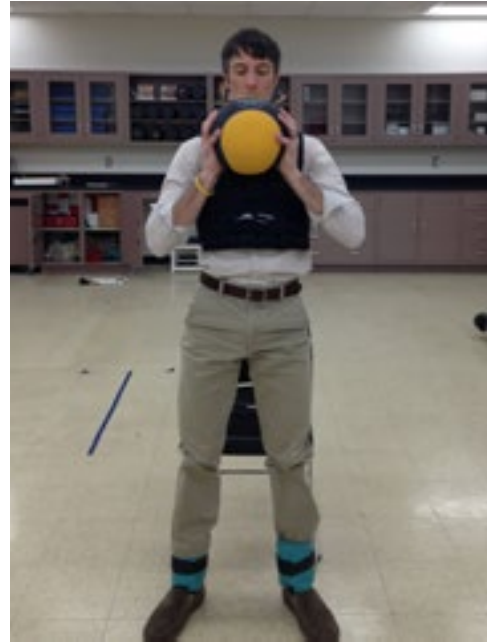


FIGURE 16. MEDICINE BALL SIT TO STAND SHOULDER PRESS – SHOULDER LEVEL



FIGURE 15. MEDICINE BALL SIT TO STAND SHOULDER PRESS – STAND

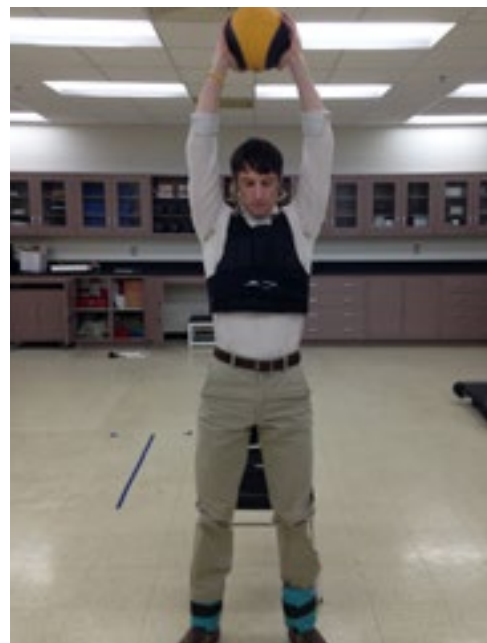


FIGURE 17. MEDICINE BALL SIT TO STAND SHOULDER PRESS – PRESS OVERHEAD

IMPROVING GAIT MECHANICS IN OLDER ADULTS USING HIGH-VELOCITY RESISTANCE TRAINING

TESTS TO MEASURE PERFORMANCE

In order to determine whether walking mechanics improve, the older adults can be tested on various measures of performance at the beginning and end of a training intervention. Specifically, they can be tested on gait velocity, stride length, chair stands, arm curls, and the eight-foot up-and-go (27). The procedures for the chair stand, arm curl, and the eight-foot up-and-go are previously published as part of the Rikli and Jones Senior Fitness Test Manual (27). The following are methods to test gait velocity and stride length.

Measuring Gait Velocity: The gait velocity test uses a multi-function timer to record how fast the participants walk a distance of 25 ft. To perform the test, participants should start five feet in front of the start line and walk as quickly as possible, without running, until the end of the 25-ft course (4).

Measuring Stride Length: To measure stride length, a reflective marker should be placed on the calcaneus of the participants prior to the gait velocity test. Using the reflective marker and a high-speed video camera, the participants' stride length can be analyzed as they perform the gait velocity test.

CONCLUSION

By using inexpensive and simple equipment, such as medicine balls, weighted vests, and ankle weights, older adults can improve measures of gait through high-velocity training. As compared to the high cost of pneumatic exercise equipment (or other machines commonly found in fitness facilities), this appears more practical for senior centers, independent or dependent living facilities, and nursing homes, as long as the high-velocity component is properly incorporated. Activity directors, personal trainers, and practitioners who work with older adults and do not have a significant amount of money to put into expensive exercise equipment can benefit from this type of training intervention. By using inexpensive equipment and functional movements, older adults can improve on measures of gait velocity, strength, and function through high-velocity training.

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VARYING TEMPO FOR HYPERTROPHY

LEE BOYCE

Many individuals embark upon a resistance training regimen in an effort to improve their muscularity and body composition. Along the way, they typically discover that resistance training also brings about improvements in health and daily function. Due to the principle of specificity, training should be tailored to the goal of the lifter in terms of the prioritization of strength, hypertrophy, health, and functional outcomes. However, even when training primarily for muscular hypertrophy and aesthetic purposes, the imposed adaptations will also improve long-term health and increase functional strength and athleticism. Therefore, training for hypertrophy in and of itself is a viable strategy to increase longevity, due to its favorable effects on the muscular, skeletal, nervous, respiratory, cardiovascular, and endocrine systems.

The personal training industry tends to be rife with blanket statements surrounding recommendations for training clients. It is often said that heavy weights are effective for building muscular strength and hypertrophy; whereas, light weights are good for building endurance and toning (but not strength and muscle). However, numerous studies currently exist showing evidence that hypertrophic gains are similar between high-load and low-load training when volume is equated (1,3,5,6,7,9,10). Moreover, some individuals are better off avoiding heavy loads due to prior injury, personal preference, genetic aspects of soft tissue strength, and other reasons. Therefore, individuals whose goals are primarily physique-based do not need to engage in heavy load training in order to maximize their hypertrophic results.

PUTTING THIS TO PRACTICE

If the goal is muscular hypertrophy, it may be beneficial to vary the repetition range. Since there is some evidence slightly favoring high-load training for muscular gains, some evidence slightly favoring using low loads for maximizing type I fiber hypertrophy, and some evidence slightly favoring varied loading instead of sticking to constant loading, it makes sense to utilize a variety of loads and loading strategies in the pursuit of maximizing hypertrophy (2,4,6,8,11). From an anecdotal perspective, it is apparent that speed skaters, skiers, cyclists, or any athletes that load the quads for minutes at a time often have some of the most developed quadriceps. This suggests that heavy-resistance training combined with high-duration loading provides a potent hypertrophic stimulus. There are numerous ways to carry out a set depending on the exercise tempo. The following are a few examples of ways to vary exercises beyond simple set and repetition schemes.

TEMPO REPETITIONS

For example, a one-minute set could involve the performance of 30 repetitions using a one-second rising phase and a one-second lowering phase, or it could involve the performance of 12 repetitions utilizing a one-second rising phase, one-second pause, and three-second lowering phase. Adding a pause or performing the exercise with slow, eccentric repetitions is one way to increase time under tension for any exercise. This will immediately make lighter weight feel heavier due to the element of control, and the amount of time it takes to complete a repetition. Momentum is largely taken out of the movement this way, and the lifter is forced

to focus on their muscles firing for 100% of the time. Focusing on a “4110 tempo” (four-second eccentric, one-second pause, one-second concentric, and no pause at the top) not only makes the lift more challenging, but also markedly increases the set time duration compared to traditional tempos.

LADDER SETS

Ladder sets require the lifter to load the implement to around a 10 – 12 repetition maximum (10 – 12RM), perform two repetitions, and then allow for 10 s of complete rest. Then the lifter performs three repetitions of the same movement, and rests for 10 more seconds. Next, the lifter performs five repetitions of the movement, and rests once again for 10 s. Finally, the lifter performs 10 repetitions and then allows for a full-length rest period. The brief 10-s breaks allow for partial restoration of adenosine triphosphate (ATP), enabling them to perform a greater amount of work. By the end of a set, a lifter will have completed 20 repetitions with their 12RM.

REST/PAUSE METHODS

Rest/pause sets involve performing a number of repetitions followed by resting for a prescribed period of time, then repeating for a predetermined amount of times. For example, a lifter could take 85% of his or her 1RM and perform one repetition every 30 s for eight rounds. Alternatively, a lifter could perform 10 repetitions using a 12RM, rest 30 s, perform four more repetitions, rest 30 s, and perform two additional repetitions.

BREATHING SETS

Breathing sets are mostly associated with back squats; however, they can be performed with other exercises as well. To perform breathing sets, the lifter typically takes his or her 10RM and performs 20 repetitions with the load by resting and “breathing” throughout the set. For example using the back squat exercise, the lifter could perform 10 repetitions of the 10RM set as traditionally performed, then rest without racking the barbell for five breathing cycles and perform three additional repetitions, then take 10 breathing cycles and perform two additional repetitions, then perform five additional rounds of 10 breathing cycles per single repetition. These sets can last 10 minutes in duration and often requires the lifter to buckle down and demonstrate mental toughness. Only one set is typically performed in this manner due to the grueling nature of the method.

A NOTE TO REMEMBER

Greater maximal strength is typically gained from training with a lower overall repetition range using heavier loads; whereas, hypertrophic gains can be achieved in any repetition range as long as effort is pushed to the point of technical failure. When effort is high and failure is reached, intense demands are placed on the nervous system. Because of this, it is important to monitor recovery and make adjustments in training loads and effort accordingly. In addition, proper nutrition and ample sleep are of the utmost importance on a daily basis to maximize recovery.

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