

PERSONAL TRAINING QUARTERLY

PTQ

VOLUME 2
ISSUE 3



ABOUT THIS PUBLICATION

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.

Copyright 2014 by the National Strength and Conditioning Association. All Rights Reserved.

Disclaimer: The statements and comments in PTQ are those of the individual authors and contributors and not of the National Strength and Conditioning Association. The appearance of advertising in this journal does not constitute an endorsement for the quality or value of the product or service advertised, or of the claims made for it by its manufacturer or provider.

NSCA MISSION

As the worldwide authority on strength and conditioning, we support and disseminate research-based knowledge and its practical application, to improve athletic performance and fitness.

TALK TO US...

Share your questions and comments. We want to hear from you. Write to *Personal Training Quarterly* (PTQ) at NSCA Publications, 1885 Bob Johnson Drive, Colorado Springs, CO 80906, or send an email to matthew.sandstead@nsca.com.

CONTACT

Personal Training Quarterly (PTQ)
1885 Bob Johnson Drive
Colorado Springs, CO 80906
phone: 800-815-6826
email: matthew.sandstead@nsca.com
nsca.com

Reproduction without permission is prohibited.

ISSN 2376-0850

PERSONAL TRAINING QUARTERLY

PTQ

VOLUME 2 ISSUE 3

EDITORIAL OFFICE

EDITOR:

Bret Contreras, MA, CSCS

ASSISTANT EDITOR:

Britt Chandler, MS, CSCS,*D, NSCA-CPT,*D

PUBLICATIONS DIRECTOR:

Keith Cinea, MA, CSCS,*D, NSCA-CPT,*D

MANAGING EDITOR:

Matthew Sandstead, NSCA-CPT,*D

PUBLICATIONS COORDINATOR:

Cody Urban

EDITORIAL REVIEW PANEL

Scott Cheatham, DPT, PT, OCS, ATC, CSCS

Mike Rickett, MS, CSCS

Andy Khamoui, MS, CSCS

Josh West, MA, CSCS

Scott Austin, MS, CSCS

Nate Mosher, DPT, PT, CSCS, NSCA-CPT

Laura Kobar, MS

Leonardo Vando, MD

Kelli Clark, DPT, MS

Daniel Fosselman

Liz Kampschroeder

Ron Snarr, MED, CSCS

Tony Poggiali, CSCS

Chris Kennedy, CSCS

John Mullen, DPT, CSCS

Teresa Merrick, PHD, CSCS, NSCA-CPT

Ramsey Nijem, MS, CSCS

Bojan Makivic, MSC

Justin Kompf, CSCS, NSCA-CPT

TABLE OF CONTENTS



- 04 **YOUTH PERFORMANCE AND FITNESS—STRENGTH AND CONDITIONING INFORMATION FOR PARENTS**
CHAT WILLIAMS, MS, CSCS,*D, CSPS,
NSCA-CPT,*D, FNSCA
- 08 **RESISTANCE EXERCISE PROGRAMMING—A MIXED-TRAINING APPROACH**
NICK TUMMINELLO
- 12 **POST-WORKOUT NUTRITION—NUTRIENT TIMING AND THE ANABOLIC WINDOW**
DYLAN KLEIN, PHD(C)
- 16 **NETWORKING RECOMMENDATIONS FOR PERSONAL TRAINERS TO IMPROVE PROFITABILITY**
JOSH LEVE
- 20 **ASSESSMENTS AND MEASURES—INTERVIEWS FROM EXPERTS IN PERSONAL TRAINING**
CARMINE GRIECO, PHD, CSCS
- 24 **SELECTING A SPECIALTY—WHAT WILL YOU BE KNOWN FOR?**
ROBERT LINKUL, MS, CSCS,*D, NSCA-CPT,*D
- 26 **TRAINING CONSIDERATIONS FOR PEOPLE WITH DISABILITIES**
NICK MARUCA
- 30 **FOAM ROLLING FOR PERFORMANCE AND RECOVERY**
SEAN KRATCHMAN AND BRIAN JONES, PHD, CSCS,
NSCA-CPT, TSAC-F, USAW



YOUTH PERFORMANCE AND FITNESS—STRENGTH AND CONDITIONING INFORMATION FOR PARENTS

CHAT WILLIAMS, MS, CSCS,*D, CSPS, NSCA-CPT,*D, FNSCA

The incorporation of resistance training to help youth athletes improve athletic performance has steadily become more popular over the past decade. After working with children for the past 12 years, several questions and concerns have been raised by parents regarding their child's participation in a strength and conditioning program. Common questions include "how safe is a resistance training program?" "Will resistance training stunt their growth?" "What age should they start?" "Will lifting weights help them get bigger, faster, and stronger?" and "Will strength training keep them from getting hurt while playing their sport?" These are just a few of the questions or type of questions that have been asked over the years.

The National Strength and Conditioning Association (NSCA) has provided a guideline called "Youth Resistance Training: Updated Position Statement Paper from the National Strength and Conditioning Association," (2). This position statement contains expert dialogue in a roundtable discussion on youth resistance training, several articles published about the Long-Term Athletic Development (LTAD) model, and the proper utilization of resistance training and fitness modalities for youth. It was authored by several leading experts, practitioners, and researchers in the field of strength and conditioning.

This article will provide insight on the current research and expert opinions of the leading sport coaches, strength coaches, and researchers involved in providing sound, well-developed strength and conditioning programs for youth.

The Youth Position Statement, published in 2009, is a 13-page document that includes 258 references and seven expert authors who provide seven recommendations on youth resistance training (2). These recommendations are that a properly designed and supervised resistance training program:

1. Is relatively safe for youth
2. Can increase the muscular strength and power of youth
3. Can improve the cardiovascular risk profile of youth

4. Can improve motor skill performance and may contribute to enhanced sports performance of youth
5. Can increase a young athlete's resistance to sports-related injuries
6. Can help improve psychosocial well-being of youth
7. Can help and promote exercise habits during childhood and adolescence

LONG-TERM ATHLETIC DEVELOPMENT MODEL

Strength and conditioning professionals that incorporate a properly designed and supervised training program can help their young athletes train, compete, and reduce the likelihood of injury. Most importantly, they can provide the young athlete with the tools necessary to maintain a healthy and active lifestyle into their adult years. The LTAD model is an excellent representation of developing and training youth from early childhood into adulthood. It is a seven-stage model that can help keep physical activity fun and prevent overtraining and burnout. It also provides useful information on how to design programs that have proper progressions for their age and skill level, as well as realistic progressions to maximize their performance level as they get older and more competitive (1,4).

Stage 1: Active Start (Males and Females 0 – 6 Years of Age)

- Keep active for 60 min a day, including physical activity with other youth
- Teach the proper movement skills; run, jump, and explore

Stage 2: Fundamentals (Males 6 – 9 and Females 6 – 8)

- Participate in less-structured activity with a focus on physical literacy
- Encourage physical activity classes in school

- Focus on multiple sports that include running, jumping, kicking, and other activities that challenge balance, coordination, and speed (gymnastics and swimming can be incorporated at this stage)

Stage 3: Learn to Train (Males 9 – 12 and Females 8 – 11)

- Low to moderate structure and focus on technical competency
- Maintain multiple sports (three or more) plus unstructured play
- Learn proper bodyweight training: push-ups, bodyweight squats, pull-ups, crunches, and external resistance with medicine balls and stability balls
- Balance practice time and actual game time: 2 – 3 practices per game

Stage 4: Train to Train (Males 12 – 16 and Females 11 – 15)

- Moderate structure with the main focus on technical skills and the secondary focus on performance outcomes
- Aerobic training becomes a little more important, but the focus is still on skill, speed, and strength
- Periodization can be incorporated slowly with multiple phases and foci
- Focus may shift to only two sports
- Competition time will increase compared to practice time and practice time will start to incorporate more real-life and game-like scenarios and situations

Stage 5: Train to Compete (Males 16 – 23 and Females 15 – 21)

- Participate in highly structured activities with the focus shifting to performance
- Start specializing in one sport
- Begin training year-round and at a high level of intensity with proper progressions and adequate rest
- Develop strengths and decrease weaknesses
- Develop high level competition by modeling high level practices
- Could be competing at the national and/or international level

Stage 6: Train to Win (Males 19 and Over and Females 18 and Over)

- Could be competing at the highest level of competition, professional, and/or international level
- Very skilled athletes and very high dedication
- These athletes are working with highly qualified coaches

- Training is highly specialized with periodization making sure the athlete is getting proper training, recovery, tapering, and peaking at perfect time

Stage 7: Active for Life (All Ages)

- Maintain lifelong physical activity participation
- Participate in familiar sports or activities
- Avoid going from an active childhood to a sedentary adult lifestyle
- Participate in less-intense recreational activities
- Pursue a career or volunteer coaching in fitness or sport-related activities

AGE TO BEGIN RESISTANCE TRAINING

In terms of what age a child should start a resistance training program, there is no specific age; however, it is generally recommended that they must be mature enough to accept and follow directions and possess an understanding of the risks and benefits associated with resistance training. It is common belief that if a child is participating in an organized sport then they are ready to begin lifting weights. Typically, this would occur approximately at the age of 6 – 8.

CONCERNS OF RESISTANCE TRAINING FOR YOUTH

A roundtable discussion including coaches, medical professionals, and researchers addressed several questions pertaining to training youth, including injury rates, efficacy, and safety (3). Related to the safety of a strength and conditioning program for youth, there is a common theme among the experts. When a program is well supervised, form and technique are properly instructed, and the program is administered by someone who holds an appropriate certification (e.g., Certified Strength and Conditioning Specialist® [CSCS®]) there should not be a concern for the child's safety. A large number of the reported injuries took place in a home or involved youth who were unsupervised. These injuries were generally mild and ranged from smashed fingers, dropping a weight on the foot, and minor muscle strains. In regards to minimizing risks in the weight room, many of the experts agreed that there should be an appropriate coach-to-athlete ratio of one coach per 10 youth athletes, proper education on resistance training, and proper progressions for their training age.

BENEFITS OF RESISTANCE TRAINING FOR YOUTH

Several studies have been published on the benefits of resistance training on muscular strength, overall fitness, injury reduction, sports performance, and confidence (2). Increased neural drive, increased synchronization of motor units, and hypertrophy are other factors that may be improved by incorporating resistance training (2). The experts also agree that there are many other health benefits associated with resistance training. Research suggests that resistance training in youth can result in increased bone density, healthier body composition, and enhanced performance with motor skills, which can lead to increased sprint speed and vertical jump performance. In several other studies, health risk factors improved including oxygen consumption, flexibility, and blood lipid profile (2). Finally, benefits from

YOUTH PERFORMANCE AND FITNESS—STRENGTH AND CONDITIONING

INFORMATION FOR PARENTS

participating in a resistance training program also include reduced chance of injury while playing their sport and increased self-esteem and confidence (2).

CONCLUSION

There are numerous benefits for youth to begin a strength and conditioning program. The program should be led by a qualified strength and conditioning professional and tailored to meet the needs of the specific ages, gender, and sport(s). The child should be willing and ready to take instruction to ensure safety, quality training, and to meet performance goals. By following the above recommendations, these individuals will be provided with strength and conditioning tools to last them a lifetime.

REFERENCES

1. Canadian Sport for Life. Long-term athlete development information for parents. Retrieved 2015 from <http://canadiansportforlife.ca/sites/default/files/resources/CAC%20LTAD%20for%20Parents.pdf>.
2. Faigenbaum, A, Kraemer, W, Cameron, J, Blimkie, R, Jeffreys, I, Micheli, L, et al. Youth Resistance Training: Updated Position Statement Paper from the National Strength and Conditioning Association. *The Journal of Strength and Conditioning Research* 23(suppl 5): S60-S79, 2009.
3. Haff, G. Roundtable discussion: Youth resistance training. *Strength and Conditioning Journal* 25(1): 49-64, 2003.
4. Lloyd, R, Oliver, J, Meyers, R, Moody, J, and Stone, M. Long-term athletic development and its application to youth weightlifting. *Strength and Conditioning Journal* 34(4): 55-66, 2012.

ABOUT THE AUTHOR

Chat Williams is the Supervisor for the Norman Regional Health Club. He has served as a Member of the National Strength and Conditioning Association (NSCA) Board of Directors, NSCA State Director Committee Chair, Midwest Regional Coordinator, and State Director of Oklahoma (including being named the 2004 State Director of the Year). He also served on the NSCA Personal Trainers Special Interest Group (SIG) Executive Council. He is the author of multiple training DVDs. Williams also runs his own company, Oklahoma Strength and Conditioning Productions, which offers personal training services, sports performance for youth, metabolic testing, and educational conferences and seminars for strength and conditioning professionals.

The TRX logo is displayed in a bold, black, sans-serif font on a bright yellow rectangular background.

The Pursuit
of Better



Expand your coaching toolbox with TRX Education. Our systematic coaching approach combines evidence based functional-movement training, with the world's most versatile gear. With ten years experience in professional, collegiate and high school sports, we will help you deliver the fitness, performance and durability results to transform your athletes.

Find out more at TRXtraining.com



RESISTANCE EXERCISE PROGRAMMING— A MIXED-TRAINING APPROACH

NICK TUMMINELLO

Resistance training exercises can be categorized into four types: explosive exercises, cross-body exercises, compound exercises, and isolation exercises. Correspondingly, when it comes to using resistance exercise, there are four primary foundational training approaches: Olympic-style lifting, functional training, powerlifting, and bodybuilding. Each of these approaches focus on a different type of resistance exercise. Explosive exercises (e.g., barbell clean) are often the training focus of those who follow an Olympic-style lifting approach. Cross-body exercises (e.g., standing single-arm cable press) are commonly associated with functional training. Compound exercises (e.g., barbell bench press) are often the training focus of those who follow a powerlifting-style approach. Lastly, isolation exercises (e.g., biceps curls with free weights or on a machine) are commonly used for bodybuilding.

This article seeks to demonstrate that for the purposes of improving general health, fitness, and functional capacity each of the four types of resistance exercise should not be looked at as mutually exclusive. Rather, they should be viewed as complimentary training components because each type of resistance exercise offers unique benefits the other types may lack.

EXPLOSIVE EXERCISES

Explosive exercises (e.g., Olympic-style lifting variations and medicine ball throwing variations) involve a coordinated effort of the entire body to summate force, which is the sum

of the total force of individual muscles added together, in an explosive manner. Explosive exercises are useful because athletic movements, from throwing a punch to sprinting and jumping, do not just come from power generated in one specific area of the body, but rather come from the combination of all the individual muscles producing power in a smooth, coordinated sequence. Explosive exercise applications are designed to use as many muscles in a sequential and explosive manner as possible to obtain maximal force.

A unique benefit of explosive exercise applications is that they closely match the force production patterns of fast, ballistic, sporting-type actions, which require a triphasic muscle firing pattern. The triphasic muscle firing pattern involves alternating bursts of activation in agonist (muscles responsible for bringing about movement) and antagonist (muscles responsible for stopping or slowing down a movement) muscles (4). It follows a sequence of activity that begins with an agonist burst, followed by a burst of the antagonist muscles, and followed again with another burst using the agonist muscles. Although slow movements produce a single continuous activation of only the agonist muscles, research has shown that a triphasic muscle firing pattern of burst-like muscle activation occurs when the same movements are performed at fast speeds (1,2,7).

The principle of specificity dictates that training methods should match the desired training effect (4). The triphasic muscle activation pattern has been shown to be present during fast,

ballistic movements. Incorporating fast, ballistic exercises into the training program is recommended in order to maximize the potential to safely and effectively perform a variety of explosive, athletic movements (4).

The programming implications of the above suggest that explosive exercise applications may enhance the ability to summate force, in an explosive manner. These exercises also potentially refine the triphasic muscle firing pattern involved in high-speed actions. Using a variety of these exercise applications and in various directions is advised since power is direction specific.

CROSS-BODY EXERCISES

The anatomical characteristics of the human body dictate that it commonly functions in a crisscross manner, with the arm and shoulder on one side linking diagonally through the torso to the hip and leg on the opposite side. Since these cross linkages are such a foundational aspect of human function, terms such as the serape effect and the posterior oblique sling have been used to describe some of the specific, key muscular relationships involved in performing cross-body actions (5,11). However, when the entirety of the muscular relationships responsible for the variety of cross-body actions the human body is capable of performing are taken into account, the interaction between these different anatomical relationships can collectively be called the body's "x-factor."

Cross-body exercises are exercise applications that are specifically focused on providing loading in which these x-factor linkages are used, therefore adding more specificity. These exercise applications utilize single-arm loading or off-set loading (e.g., two unevenly loaded dumbbells) movements from various stances.

Although traditional compound exercises, such as the barbell squat and the barbell bench press, can help strengthen the entire body, they are not ideally suited for improving the coordination of the body's x-factor linkages. This is because these linkages are usually used when standing, or in environments when the body is rotating, resisting rotation, or dealing with an unbalanced load.

This is highlighted in the research comparing the single-arm standing cable press (a cross-body exercise) with the traditional bench press (a compound exercise) (8). The results of this study showed that the single-arm standing cable press performance is limited by the activation and neuromuscular coordination of torso muscles, not maximal muscle activation of the chest and shoulder muscles (8). In other words, the limiting factor when pushing an off-set load from a standing position is the stiffness of the torso muscles and their ability to maintain body position and to coordinate the hips and shoulders while stabilizing the forces created by the extremities.

The unique benefit cross-body exercises offer is the consistency between these exercise applications and the force generation and neuromuscular coordination patterns that commonly occur when movement involves the body's x-factor linkages. It is worth noting that as powerlifters use "assistance exercises" to improve the target movements in the sport of powerlifting, cross-body exercise applications utilize this same wisdom to improve in the target movements of sports.

COMPOUND EXERCISES

Compound exercises are multi-joint movements that involve several muscle groups. These exercise applications primarily consist of conventional strength training lifts such as squats, deadlifts, bench presses, chin-ups, rows, etc. Unlike cross-body exercises, compound exercises do not necessarily reflect the force generation patterns of specific athletic movements. However, in comparison, compound exercises tend to create a more ideal environment for stimulating increases in general strength and recruitment of motor units, along with overall improvements in muscular hypertrophy, bone density, and connective tissue strength (2,7,8,12).

ISOLATION EXERCISES

Isolation exercises are single-joint movements that focus on individual muscle groups. These exercise applications primarily consist of classic bodybuilding exercises such as biceps curls, triceps extensions, shoulder raises, leg extensions, and leg curls. These exercises focus on developing improved control, strength, and hypertrophy, while also contributing to overall muscle balance, physique development, and connective tissue strength.

A benefit isolation exercises offer is highlighted by the research that supports the fact that hamstrings activity is low during compound exercises such as the squat and the leg press (3,10). This led the author of one study to conclude that "the squat is not an optimal exercise for training the hamstrings." This evidence is further validated by another study, which found significant increases in muscle hypertrophy of the quadriceps from squats, but found no changes in hamstrings muscle growth from baseline (12). This highlights the importance of including isolation exercises for overall development and strength in addition to the other types of exercise.

A MIXED APPROACH TO RESISTANCE EXERCISE PROGRAMMING

Additionally, when it comes to developing the hamstring musculature, a study compared the stiff-legged deadlift and the lying leg curl (where movement originates at the hip versus the knee) to investigate whether these exercises will result in differential activation of the hamstring muscle complex (9). The researchers used surface electromyography (EMG), which measures the electrical activity of muscles during exercise, to record muscle activity of the upper lateral hamstrings, lower lateral hamstrings, upper medial hamstrings, and lower medial hamstrings. The results showed that the lying leg curl elicited significantly greater activation of the lower lateral and lower medial hamstrings compared to the stiff-legged deadlift. This demonstrates that different regions of the hamstrings can be regionally targeted through exercise selection.

These results demonstrate that a comprehensive hamstring exercise program should incorporate at least one exercise where movement is focused at the hip joint (such as the deadlift or other compound exercises) and one exercise where movement is focused at the knee joint (such as the leg curl or other isolation exercises) as each offer unique but complimentary training benefits.

The research study discussed in the cross-body section, which compared the standing single-arm cable press and bench press, also showed that horizontal pushing forces when performing the standing single-arm cable press are limited to around 40.8% of one's bodyweight, rather than of one's bench press (8). In other words, the heavier the body is, the more horizontal and diagonal pushing force is possible from the standing position due to having more mass to push from. It is important to note that this is not to assert that getting a stronger bench press does not help standing pushing performance, because it can help. These results demonstrate that having more weight can help to improve performance by giving the individual a greater platform from which to push against the opposition as well as better stability to avoid getting knocked over or off-balance.

For example, putting on 20 lb of muscle mass for an athlete or client may allow more horizontal and diagonal pushing force from the standing position. This can be achieved for this individual by implementing a mixed training approach by incorporating compound exercises, like the bench press, along with isolation exercise applications, as both of these types of resistance exercise create a more ideal training environment for hypertrophy gains than explosive and cross-body exercises.

CONCLUSION

Improving general health, building muscle, and increasing functional capacity requires several different resistance exercise components because no single type of resistance exercise will ever be able to address such multifaceted demands fully. A mixed approach to resistance exercise programming that utilizes all four types of resistance exercise may provide superior training results when compared with exclusively using only one type of exercise. The amount of time spent on each type of resistance exercise per workout and throughout a training week should be manipulated in the program based on which physical qualities are most desired. This is done by designing the exercise program so the client or athlete is spending the most amount of their training time and energy performing the exercise type(s) that create the training environment that most closely reflects their training goals.

REFERENCES

1. Brown, JMM, and Gilleard, W. Transition from slow to ballistic movement: Development of triphasic electromyogram patterns. *European Journal of Applied Physiology and Occupational Physiology* 63(5): 381-386, 1991.
2. Brown, SH, and Cooke, JD. Movement-related phasic muscle activation. I. Relations with temporal profile of movement. *Journal of Neurophysiology* 63(3): 455-464, 1990.
3. Ebben, WP. Hamstring activation during lower body resistance training exercises. *International Journal of Sports Physiology and Performance*. 4(1): 84-96, 2009.
4. Harman, E. The biomechanics of resistance exercise. In: Baechle, ER, and Earle, RW (Eds.), *Essentials of Strength Training and Conditioning*. (3rd ed.) Champaign, IL: Human Kinetics; 65-90, 2008.
5. Logan, G, and McKinney, W. The serape effect. In: *Anatomical Kinesiology* (3rd ed.). Dubuque, IA: Brown; 287-302, 1970.
6. Meylan, C, McMaster, T, Cronin, J, Mohammad, NI, Rogers, C, and Deklerk, M. Single-leg lateral, horizontal, and vertical jump assessment: Reliability, interrelationships, and ability to predict sprint and change-of-direction performance. *The Journal of Strength and Conditioning Research* 23(4): 1140-1147, 2009.
7. Morrison, S, and Anson, JG. Natural goal-directed movements and the triphasic EMG. *Motor Control* 3(4): 346-371, 1999.
8. Santana, JC, Vera-Garcia, FJ, and McGill, SM. A kinetic and electromyographic comparison of the standing cable press and bench press. *The Journal of Strength and Conditioning Research* 21(4): 1271-1277, 2007.
9. Schoenfeld, BJ, Contreras, B, Tiryaki-Sonmez, G, Wilson, JM, Kolber, MJ, and Peterson, MD. Regional differences in muscle activation during hamstrings exercise. *The Journal of Strength and Conditioning Research* 29(1): 159-164, 2014.
10. Schoenfeld, BJ, Contreras, B, Willardson, JM, Fontana, F, and Tiryaki-Sonmez, G. Muscle activation during low- versus high-load resistance training in well-trained men. *European Journal of Applied Physiology* 114(12): 2491-2497, 2014.
11. Vleeming, A, Pool-Goudzwaard, AL, Stoeckart, R, van Wingerden, JP, and Snijders, CJ. The posterior layer of the thoracolumbar fascia - Its function in load transfer from spine to legs. *Spine* 20(7): 753-758, 1995.
12. Weiss, LW, Coney, HD, and Clark, FC. Gross measures of exercise-induced muscular hypertrophy. *Journal of Orthopaedic Sports Physical Therapy* 30(3): 143-148, 2000.

ABOUT THE AUTHOR

Nick Tumminello is the owner of Performance University, which provides practical fitness education for fitness professionals worldwide, and is the author of the book "Strength Training for Fat Loss." Tumminello has worked with a variety of clients from National Football League (NFL) athletes to professional bodybuilders and figure models to exercise enthusiasts. He also served as the conditioning coach for the Ground Control Mixed Martial Arts (MMA) Fight Team and is a fitness expert for Reebok. Tumminello has produced 15 DVDs, is a regular contributor to several major fitness magazines and websites, and writes a very popular blog at PerformanceU.net.

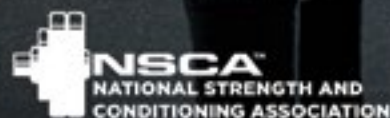
PARTNERING FOR GROWTH

**YOUR CLIENTS BUY THEIR
SUPPLEMENTS FROM US.
WANT A CUT?**

In 2014 Bodybuilding.com sold \$466 million in supplements to people trying to achieve their health and fitness goals. Learn how you can grow with us and tap into this valuable revenue stream.

LEARN MORE AT BODYBUILDING.COM/NSCA

BRANDON JOHNSON, NSCA-CPT
BODYSPEACE.COM/TRAINERB





POST-WORKOUT NUTRITION—NUTRIENT TIMING AND THE ANABOLIC WINDOW

DYLAN KLEIN, PHD(C)

The timing of nutrient ingestion surrounding an exercise bout has been the subject of much research and debate over the past few decades (1). While very few individuals would deny that pre- and post-workout nutrition is vitally important for the provision of substrates needed to fuel a workout, repair damaged tissues, and replenish energy stores following training, there is considerable debate surrounding the timing of ingesting nutrients and how to maximize the anabolic response to training, particularly when it comes to post-workout nutrition. This is commonly known as the “anabolic window.”

The aim of the post-workout meal is to provide the body with the substrates needed to replenish body energy stores (e.g., carbohydrates to replenish skeletal muscle glycogen and fat to replenish triglyceride stores in skeletal muscle and adipose tissue), as well as repair damaged tissues (e.g., skeletal muscle). In addition, adequate fluids and electrolytes should also be consumed following an intense training session in order to restore hydration status and replace ions (e.g., sodium and potassium) lost through sweating. The timing and importance of these aspects of sports nutrition, however, are beyond the scope of this article.

While the importance of consuming a meal post-workout with adequate protein and carbohydrates is not under debate, the timing with which these nutrients are consumed is a highly debated subject. So much so that some even consider the timing of nutrients to be a greater factor with regards to muscle protein anabolism and recovery than overall nutrient ingestion alone (2). Unfortunately, the current state of the scientific literature does not support a clear conclusion in either direction. Therefore, the aim of this article is to summarize the relevant literature regarding post-workout nutrient timing and its importance towards training adaptations, specifically increasing skeletal muscle hypertrophy and replenishing skeletal muscle glycogen stores. Indeed, these two factors may be the most important factors affecting training muscular adaptations and performance.

SKELETAL MUSCLE HYPERTROPHY

Skeletal muscle hypertrophy, or simply an increase in skeletal muscle mass, is dependent upon the balance between muscle protein synthesis (MPS) and muscle protein breakdown (MPB),

such that MPS is greater than MPB. Like protein, skeletal muscle is in a constant state of being produced and destroyed. For many individuals, increasing skeletal muscle mass is important for increased performance via increases in strength and power. Thus, increasing MPS and attenuating or preventing MPB following an intense training bout are of utmost importance. Without the proper ingestion of nutrients following training, a net decrease in skeletal muscle balance due to increases in MPB that outweigh MPS can occur (17). Without the inclusion of a post-workout meal, these increases in MPB can be seen even up to 24 hr after training and may lead to net decreases in muscle mass over time (12).

Inhibiting MPB and stimulating MPS can be achieved nutritionally through the ingestion of protein and carbohydrates, although an adequate amino acid or protein bolus alone may fulfill both nutrients' post-workout hypertrophic effects. In part, this process is nutritionally mediated through leucine (an amino acid found abundantly in proteins, especially whey), which stimulates an intracellular amino acid sensor called mammalian target of rapamycin (mTOR) (16). Through the activation of mTOR and its downstream effectors, the muscle cells increase the translation of proteins needed for skeletal muscle contraction, as well as numerous other proteins involved in the hypertrophic response (15). In addition, both protein and carbohydrates stimulate the production and release of insulin, which is needed for 1) the complete activation of mTOR and 2) the inhibition of MPB via insulin's signaling cascade involving protein kinase B and its activation and inactivation of various downstream targets involved in proteolysis (15,26). In the end, the proper ingestion of nutrients leads to increases in MPS, decreases in MPB, and an overall net accretion of lean tissue. The main question is whether or not the timing of these nutrients can beneficially effect the anabolic response and lead to greater increases in muscle mass?

To date, there are several relevant controlled studies that look at the effect of nutrient timing on long-term changes in skeletal muscle mass, specifically with regards to protein ingestion following a resistance training program lasting equal to or greater than 10 weeks in duration (3,4,5,8,9,23,24). However, significant limitations exist within and among these studies making any definitive conclusions about the “anabolic window” preliminary

at best. In fact, a majority of these studies recruited relatively untrained individuals (typically older males) (4,5,9,24,23). Additionally, some of the studies did not match total protein intakes over the course of the study period (4,9,23,24). Moreover, all of the studies utilized different resistance training protocols and varied in body composition assessment methods. Thus, any firm conclusions about post-workout nutrient timing are based purely on opinion or experience rather than a cohesive body of rigorous scientific evidence.

There were three studies that matched protein intakes between the intervention (immediate) and control (delayed) groups rather than giving them non-protein placebos (3,5,8). Two of the three studies saw significant increases in muscle cross-sectional area using different measurement methods. One of these studies measured increases through magnetic resonance imaging (MRI) in the immediate versus delayed protein and carbohydrate groups (3). The other study measured the increases through dual-energy x-ray absorptiometry (DXA) in the immediate versus delayed protein and carbohydrate groups (5). The third study saw no differences between immediate and delayed nutrient ingestion (8).

The evidence to date, therefore, does not support a clear benefit of immediate versus delayed nutrient ingestion. However, in a recent meta-analysis looking at post-workout protein ingestion on strength and hypertrophy in over 500 subjects spanning 23 studies, Schoenfeld et al. showed that overall protein intake rather than timing was the primary determinant for predicting strength and hypertrophic outcomes (19). Nevertheless, this does not mean that post-workout nutrition is not important. The benefits of consuming the proper nutrients following a workout are well documented and should be regularly practiced (21).

REPLENISHING SKELETAL MUSCLE GLYCOGEN

Another aspect of post-workout nutrition is replenishing depleted fuel stores to provide energy for the next training bout. One of the most important fuel depots is glycogen because it fuels the majority of high-intensity skeletal muscle contraction; it can be rapidly exhausted depending on the intensity and duration of the training bout, and its relative storage capacity (approximately 1,200 kcals) is nothing close to that of adipose tissue (upwards of 100,000 kcals depending on leanness) (13,18). Therefore, the repletion of lost skeletal muscle glycogen stores can be seen as an important post-workout nutritional concern.

It has been shown that carbohydrate and protein administration immediately following training has profound effects on glycogen resynthesis rates, with a 50% reduction in glycogen resynthesis rates seen with a delayed ingestion of carbohydrates two hours after training (10,22). While the reality of expeditious nutrient ingestion with regards to glycogen resynthesis is not under contention, the utility of such dietary timing strategies apply only to a subset of athletes who compete in multiple glycogen depleting events throughout the day (e.g., swimmers, wrestlers, runners, cyclists, etc.). Thus, it can be argued that immediate post-workout protein and carbohydrate ingestion for the purposes of increased rates of glycogen synthesis may be of low importance for the majority of athletes who do not undergo twice-daily training sessions or who do not have multiple events over the course of 24 hr.

PRACTICAL NUTRITIONAL RECOMMENDATIONS

Multiple studies have shown a maximal anabolic response of skeletal muscle to protein ingestion maxing out around 25 – 40 g of high-quality protein that contains high levels of leucine (14,25). Thus, any more than this amount can be seen as unnecessary for skeletal muscle protein synthesis. For example, this could be accomplished by consuming a meal that includes 4 – 7 oz of lean meat, poultry, or fish, or 1 – 2 scoops of protein powder (e.g., whey, casein, or soy).

With regards to carbohydrates, there is a dearth of research related to long-term increases in skeletal muscle mass from carbohydrate consumption (6). Moreover, it has been shown that the inclusion of post-workout carbohydrates (e.g., 30 g of sucrose or 50 g of maltodextrin) alongside an adequate protein bolus (e.g., 20 – 25 g of whey protein) does not lead to any further increases in MPS compared to just protein alone (7,11,20). Thus, as long as carbohydrate-rich meals are consumed at some point during and after the post-workout period, and that adequate protein is consumed, glycogen stores should be replenished before the next training session and maximal synthetic rates of skeletal muscle protein can be achieved. It may be best to let personal preference, dietary goals, and carbohydrate tolerance dictate the source and overall amounts consumed.

CONCLUSION

In the end, no firm conclusions can be made about providing nutrients during the supposed post-workout “anabolic window.” Rather, as long as adequate protein is consumed relatively shortly following training and daily macronutrient values are met, there is no reason to think that delaying a post-workout meal will have any measurable negative effects on skeletal muscle protein synthesis and increasing muscle mass.

REFERENCES

1. Aragon, AA, and Schoenfeld, BJ. Nutrient timing revisited: Is there a post-exercise anabolic window? *Journal of the International Society of Sports Nutrition* 10(5): 2013.
2. Candow, DG, and Chilibeck, PD. Timing of creatine or protein supplementation and resistance training in the elderly. *Applied Physiology, Nutrition, and Metabolism* 33(1): 184-190, 2008.
3. Cribb, PJ, and Hayes, A. Effects of supplement timing and resistance exercise on skeletal muscle hypertrophy. *Medicine and Science in Sports Exercise* 38(11): 1918-1925, 2006.
4. Erskine, RM, Fletcher, G, Hanson, B, and Folland, JP. Whey protein does not enhance the adaptations to elbow flexor resistance training. *Medicine and Science in Sports Exercise* 44(9): 1791-1800, 2012.
5. Esmarck, B, Andersen, JL, Olsen, S, Richter, EA, Mizuno, M, and Kjaer, M. Timing of post-exercise protein intake is important for muscle hypertrophy with resistance training in elderly humans. *Journal of Physiology* 535(1): 301-311, 2001.
6. Figueiredo, VC, and Cameron-Smith, D. Is carbohydrate needed to further stimulate muscle protein synthesis/hypertrophy following resistance exercise? *Journal of the International Society of Sports Nutrition* 10: 42, 2013.

POST-WORKOUT NUTRITION—NUTRIENT TIMING AND THE ANABOLIC WINDOW

7. Glynn, EL, Fry, CS, Timmerman, KL, Drummond, MJ, Volpi, E, and Rasmussen, BB. Addition of carbohydrate or alanine to an essential amino acid mixture does not enhance human skeletal muscle protein anabolism. *Journal of Nutrition* 143(3): 307-314, 2013.
8. Hoffman, JR, Ratamess, NA, Tranchina, CP, Rashti, SL, Kang, J, and Faigenbaum, AD. Effect of protein-supplement timing on strength, power, and body-composition changes in resistance-trained men. *International Journal Sport Nutrition Exercise Metabolism* 19(2): 172-185, 2009.
9. Hulmi, JJ, Kovanen, V, Selanne, H, Kraemer, WJ, Hakkinen, K, and Mero, AA. Acute and long-term effects of resistance exercise with or without protein ingestion on muscle hypertrophy and gene expression. *Amino Acids* 37(2): 297-308, 2009.
10. Ivy, JL. Glycogen resynthesis after exercise: Effect of carbohydrate intake. *International Journal of Sports Medicine* 19(Suppl 2): S142-S145, 1998.
11. Koopman, R, Beelen, M, Stellingwerff, T, Pennings, B, Saris, WH, Kies, AK, et al. Coingestion of carbohydrate with protein does not further augment postexercise muscle protein synthesis. *American Journal of Physiology Endocrinology and Metabolism* 293(3): E833-842, 2007.
12. Kumar, V, Atherton, P, Smith, K, and Rennie, MJ. Human muscle protein synthesis and breakdown during and after exercise. *Journal of Applied Physiology* 106(6): 2026-2039, 2009.
13. Lambert, CP, and Flynn, MG. Fatigue during high-intensity intermittent exercise: Application to bodybuilding. *Sports Medicine* 32(8): 511-522, 2002.
14. Moore, DR, Robinson, MJ, Fry, JL, Tang, JE, Glover, EI, Wilkinson, SB, et al. Ingested protein dose response of muscle and albumin protein synthesis after resistance exercise in young men. *American Journal of Clinical Nutrition* 89(1): 161-168, 2009.
15. Morita, M, Gravel, SP, Hulea, L, Larsson, O, Pollak, M, St-Pierre, J, and Topisirovic, I. mTOR coordinates protein synthesis, mitochondrial activity and proliferation. *Cell Cycle* 14(4): 473-480, 2015.
16. Norton, LE, and Layman, DK. Leucine regulates translation initiation of protein synthesis in skeletal muscle after exercise. *Journal of Nutrition* 136(2): 533S-537S, 2006.
17. Pitkanen, HT, Nykanen, T, Knuutinen, J, Lahti, K, Keinanen, O, Alen, M, et al. Free amino acid pool and muscle protein balance after resistance exercise. *Medicine and Science in Sports Exercise* 35(5): 784-792, 2003.
18. Robergs, RA, Pearson, DR, Costill, DL, Fink, WJ, Pascoe, DD, Benedict, MA, et al. Muscle glycogenolysis during differing intensities of weight-resistance exercise. *Journal of Applied Physiology* 70(4): 1700-1706, 1991.
19. Schoenfeld, BJ, Aragon, AA, and Krieger, JW. The effect of protein timing on muscle strength and hypertrophy: A meta-analysis. *Journal of the International Society of Sports Nutrition* 10: 53, 2013.
20. Staples, AW, Burd, NA, West, DW, Currie, KD, Atherton, PJ, Moore DR, et al. Carbohydrate does not augment exercise-induced protein accretion versus protein alone. *Medicine and Science in Sports Exercise* 43(7): 1154-1161, 2011.
21. Stark, M, Lukaszuk, J, Prawitz, A, and Salacinski, A. Protein timing and its effects on muscular hypertrophy and strength in individuals engaged in weight-training. *Journal of the International Society of Sports Nutrition* 9: 54, 2012.
22. van Loon, LJ, Saris, WH, Kruijschoop, M, and Wagenmakers, AJ. Maximizing postexercise muscle glycogen synthesis: Carbohydrate supplementation and the application of amino acid or protein hydrolysate mixtures. *American Journal of Clinical Nutrition* 72(1): 106-111, 2000.
23. Verdijk, LB, Jonkers, RA, Gleeson, BG, Beelen, M, Meijer, K, Savelberg, HH, et al. Protein supplementation before and after exercise does not further augment skeletal muscle hypertrophy after resistance training in elderly men. *American Journal of Clinical Nutrition* 89(2): 608-616, 2009.
24. Willoughby, DS, Stout, JR, and Wilborn, CD. Effects of resistance training and protein plus amino acid supplementation on muscle anabolism, mass, and strength. *Amino Acids* 32(4): 467-477, 2007.
25. Yang, Y, Breen, L, Burd, NA, Hector, AJ, Churchward-Venne, TA, Josse, AR, et al. Resistance exercise enhances myofibrillar protein synthesis with graded intakes of whey protein in older men. *British Journal of Nutrition* 108(10): 1780-1788, 2012.
26. Zhang, X, Tang, N, Hadden, TJ, and Rishi, AK. Akt, FoxO and regulation of apoptosis. *Biochimica et Biophysica Acta* 1813(11): 1978-1986, 2011.

ABOUT THE AUTHOR

Dylan Klein earned his Bachelor of Science degree in Nutritional Sciences, Dietetics from Rutgers University, where he is currently pursuing his Doctorate in Nutritional Biochemistry and Physiology. His research currently focuses on the molecular adaptations of skeletal muscle to exercise. In addition, Klein was also the Head Nutritionist for the Rutgers football team for the 2012 – 2013 season and the Assistant Nutritionist for the 2011 – 2012 season. In addition, Klein was the Head Nutritionist for the Rutgers' Army ROTC program from 2011 – 2013. Outside of his role as a nutritionist on campus, Klein also works with the lay public, both in person and via email/phone correspondence where he specializes in fat loss, muscle gain, and body recomposition. He also provides more information on a blog called "Calories in Context."



NSCA 2016

COACHES CONFERENCE

January 7 – 9, 2016 | San Antonio, TX | NSCA.com/Coaches2016

ACHIEVING GREATNESS



NETWORKING RECOMMENDATIONS FOR PERSONAL TRAINERS TO IMPROVE PROFITABILITY

JOSH LEVE

In this day and age, it is critical to stay in touch with clients and members. For business owners, networking and marketing should never stop. Webster's dictionary defines networking as "the exchange of information or services among individuals, groups, or institutions; specifically: the cultivation of productive relationships for employment or business," (3).

There are many ways to network in the field of personal training. But first, a personal trainer must clearly outline their goals. For instance, is the goal to gain insight into other similar businesses, learn about up and coming trends, or simply keep the audience engaged?

Here are some tried and true networking activities recommended for personal trainers:

Open House: There are many reasons to host an open house. In this context, the focus on networking should be clear. Personal trainers can invite prospective members and employees into their club by reaching out personally. Social media sites can be a great avenue for targeting specific groups and individuals. The personal trainer can make it an invitation-only event and as individuals and groups confirm their attendance, they can share this information so that others will know who will be there. When facilitating networking among others, it can also help in creating a community within the client base.

Welcome to the Neighborhood Event: This is a great way for personal trainers to introduce themselves to the neighborhood (especially if just opening a business), or just to invite businesses that are close in proximity. It may be useful to send out a short agenda beforehand with topics and ideas that will be shared. These could include up and coming events, changes to the neighborhood that could affect local businesses, or ideas of things that will help facilitate conversation and rapport amongst each other. This could also be a great setting to talk about joint business ventures.

Continuing Education: Hosting continuing education is another great way to network. For instance, a personal trainer could bring in an expert strength and conditioning professional for a workshop for free or at a low cost in exchange for marketing the event for them. Alternatively, the personal trainer or someone from their facility could host the event and use it to drive traffic for prospective clients. Creating a buzz with continuing education also gives networking opportunities for the whole business and all of its employees to help them learn and grow.

Online Sites: LinkedIn is one of the most popular professional networking services online. Personal trainers should not be afraid to actually reach out to others and set up meetings or phone calls. When doing so, it is important to be direct and upfront in the intentions of the conversation. Additionally,

personal trainers can learn a lot about other personal trainers or businesses from their websites or Facebook pages. According to eBiz, the top five in their list of the top 15 most popular social networking websites are Facebook, Twitter, LinkedIn, Pinterest, and Google+ (2).

Get Involved in the Community: Personal trainers should find out when the local chamber of commerce meetings are set to take place. This is a great way to network with local businesses, as well as to find out what is going on in the area, new businesses that are starting, changes that could affect local businesses, etc. For example, something as simple as road construction could force a personal trainer to alter their marketing strategy.

When it relates to networking, find out what works best and make sure to continue doing it. The contacts and relationships built through successful marketing should be managed in a way similar to managing clients.

Just meeting someone at a networking event does not mean that they will automatically become a client or business partner. They need to know that they are talking to the resident expert in the field. Relationships take time to blossom, so keeping the audience engaged is paramount. One way to enhance that engagement is through the use of a newsletter (electronic or printed). Here are some advantages to an effective newsletter:

- It can convey exciting opportunities for client participation in programs and events
- It can be useful in controlling the content to show credibility, including helpful workout and lifestyle recommendations
- It can be interactive and community-building
- It can be an inexpensive, yet effective marketing tool

Here are eight steps to turn a run-of-the-mill newsletter into a top notch newsletter (1):

1. **Make Some of the Content Educational:** It is one thing to promote how many great programs are available but it is also important to be seen as the strength and conditioning expert in the community. Content such as the value of stretching or exercises that can be done at home between training sessions can go a long way. To take it a step further, embedding a video into an electronic newsletter that demonstrates particular stretches or exercises can be very effective. Since the goal is to become the face of the business, what better way than a video.
2. **Introduce New Employees:** Newsletters provide the platform to introduce new trainers, employees, and front-line staff members. When doing so, it may be ideal to include pictures, their background, expertise, and some fun facts about them, such as what they like to do during their time off.

3. **Spotlight the Success Stories:** Never underestimate the power of change. Showcasing a client's success story coupled with before and after pictures can highlight how the business has positively impacted their life. This can be a huge motivating factor for anyone who looks at the newsletter. It portrays that if one client can achieve success, others can as well.
4. **Cross-Promote with Local Businesses:** While building a newsletter mailing list through social media ads, website lead capture fields, and walk-in traffic, the list inherently becomes more desirable to other local businesses. For instance, one studio owner I met was able to provide his local dry cleaner free advertising in his newsletter; in return, the dry cleaner hung cardboard pods around the necks of the hangers promoting his studio to all the dry cleaning customers.
5. **Ask for Feedback:** One of the best ways to find out what members think about the services of the business is to survey them. Online solutions, such as SurveyMonkey.com, offer easy tools to implement and can be linked directly to an electronic newsletter. When developing a survey, make sure to form any questions in a way that sells or promotes the business. Surveys may be particularly useful to implement on a quarterly schedule or around certain seasons. Example questions might include: "on a scale of 1 – 10 how likely are you to refer a friend?" or "how satisfied are you with the parking options?"
6. **Market New Programs:** No matter the time of year, it can be useful to always have a 12-month marketing calendar set before the start of the year. Understanding what programs to market at the right time could make all the difference in participation. For instance, if summer is just around the corner, it might be effective to market a 6 – 8 week beach body program.
7. **Showcase New Members:** Highlighting new members who have joined can be a great way to advertise a growing membership as well as make the new member feel like they are valued. Also, if someone referred the new member, they can be spotlighted too. People typically enjoy recognition, even if they do not admit to it.
8. **Spotlight Speaking Arrangements:** Conducting a seminar, workshop, or any type of public or private presentation is a great tool for advertising. Any opportunity to promote the brand of the business is an opportunity to utilize the newsletter for further exposure. The main goal is to get people engaged and talking. The feedback received, whether positive or negative, can be used to fuel success for the business.

NETWORKING RECOMMENDATIONS FOR PERSONAL TRAINERS TO IMPROVE PROFITABILITY

Certain websites such as Constant Contact, MailChimp, and iContact can provide cost effective platforms with easy templates to create newsletters. With each event or newsletter distribution, make sure to have a plan in place. Following these recommendations may help improve the reach and influence of a fitness business, which could ultimately lead to increased profits.

REFERENCES

1. Association of Fitness Studios. Leverage Your Newsletter to Increase Leads for Your Fitness Business. Retrieved August 2015 from <https://www.afsfitness.com/blog/417/leverage-your-newsletter-to-increase-leads-for-your-fitness-business.html>.
2. eBizMBA. Top 15 most popular social networking sites – August 2015. 2015. Retrieved 2015 from <http://www.ebizmba.com/articles/social-networking-websites>.
3. Merriam-Webster Dictionary. Networking. Retrieved 2015 from <http://www.merriam-webster.com/dictionary/networking>.

ABOUT THE AUTHOR

As Co-Founder and President of the Association of Fitness Studios (AFS), Josh Leve is responsible for strategic business operations of AFS. Leve brings more than 10 years of sales, consulting, advertising, marketing, operations, and retail fitness experience to AFS. Prior to AFS, Leve successfully turned around the financial performance of three different big box facilities in Chicago while providing consultative services for smaller fitness studios. His grandfather, Mort (a member of the Handball Hall of Fame) founded the National Court Clubs Association (NCCA), and was the Executive Director of the United States Handball Association (USHA). His father Chuck (a member of the Racquetball Hall of Fame) and 40-year industry veteran, was the Executive Director of the United States Racquetball Association; a founding employee of the International Health, Racquet, and Sportsclub Association (IHRSA); and developer of six fitness start-ups including IHRSA. 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 in Journalism from the University of Kansas.

2015

PERSONAL TRAINERS CONFERENCE

OCTOBER 10 – 12, 2015 | ANAHEIM, CA

NSCA.COM/PTCON2015



APPLICATION
IN
MOTION

SEPTEMBER 21 IS THE LAST CHANCE TO REGISTER ONLINE

ROUND IS OUT. THE SCOOP HOLDER IS IN.



Hate the old-fashioned protein tub? Everyone does. That's why we redesigned it. All of it. The result? The **EAS Building Block** with a built-in scoop holder and a pop-off lid. This is where we'd tell you about the uncompromising EAS 100% Whey protein inside, but let's be honest, we had you at "scoop holder," didn't we?

Eric Ebron
Tight End, Detroit

EAS
SPORTS NUTRITION

SAVE \$1 ON THE
EAS BUILDING BLOCK
AT [EAS.COM/SPECIALOFFERS](https://www.eas.com/specialoffers)



ASSESSMENTS AND MEASURES—INTERVIEWS FROM EXPERTS IN PERSONAL TRAINING

CARMINE GRIECO, PHD, CSCS

While a basic fitness assessment will always be a part of a comprehensive client assessment, the array of tests and measures that are available to the personal trainer today are substantially more sophisticated than when I first entered the profession in the mid-1990s. Tests that were once only conducted in human performance labs are now working their way into personal trainers' arsenals of health and fitness tests and measures. Performing glucose, cholesterol, or lactate testing, for example, is now simple, relatively low cost, and requires only a single drop of blood. Additionally, there are a lot of low-cost, field-based tests that can be incorporated into tests and measures. For example, tests such as the Balance Error Scoring System (BESS) or the Star Excursion Balance Test (SEBT) provide quick, simple, and reliable measures for assessing static and dynamic balance, respectively (2,3).

Another example to consider is heart rate variability (HRV) testing. My first introduction to HRV testing came in 2008 as I began my doctoral research at Old Dominion University. At this time, the standard equipment necessary to conduct this form of testing required an electrocardiogram cart, which carried an average price tag in excess of \$10,000. Even though HRV testing has a broad application in the fitness setting, the cost and technical difficulty of quantifying and analyzing HRV data was such that it was very impractical for any fitness professional to utilize. Today, a mere seven years later, fitness professionals can perform the same level of testing using a standard Bluetooth-enabled heart rate monitor and various smartphone apps that cost less than \$10 (1). In addition to being cost-effective, the apps radically simplify the often-confusing HRV parameters into something that is straightforward and easily comprehensible.

For this article, I interviewed four accomplished fitness professionals with diverse professional backgrounds. Each brings a unique perspective to our discussion of assessment tests and measures.

THE EXPERT PANEL INCLUDES:

Guy Hornsby (GH), PhD, CSCS, presently an Assistant Professor of Exercise Science at Glenville State College, is a former Strength and Conditioning Coach for the 160th Special Operations

Aviation Regiment (Airborne) in Ft. Campbell, KY. Hornsby also has extensive experience working with athletes, especially weightlifting athletes.

Rob Rabena (RR), MS, CSCS, is the Director of Sports Performance at the Maplezone Sports Institute in Garnet Valley, PA. Rabena specializes in training baseball athletes from children to the college level, including some professional baseball players.

Lauryn Meyer (LM), MS, CSCS, works as a Fitness Specialist for the credit card giant, Capitol One in Virginia Beach, VA. Meyer works in a corporate gym setting that serves the Capitol One campus and trains primarily sedentary office-bound workers.

Andrea Kozai (AK), MS, CSCS, is a freelance dance performer and personal trainer. Kozai specializes in small group and personal training of dancing athletes in Pittsburgh, PA.

HOW MUCH IMPORTANCE DO YOU PLACE ON ASSESSMENT TESTS AND MEASURES?

RR: "I think it is extremely important; we do all semi-private training, so I want to learn as much as I can about them [my athletes]. What are their goals, their background, etc.? That all starts with an evaluation. If you do not have any baseline numbers, where do you start? It is like throwing a dart at a dart board to determine where you are going to begin. I am not doing tests just to look fancy, I am doing tests to get data so I can effectively prescribe exercise."

LM: "I work mostly with the general population, but specifically office workers and 100% of them are seated 6 – 8 hr every day. If they want to use the personal training services that we offer, which is included in their memberships, the assessment is their first session. So if they want our services we always start with an assessment. They [Capitol One employees] get two personal training sessions of 30 min every week as part of their membership. So I am with my clients for an hour a week, at best.

The fitness assessment is standardized across our 12 sites [at Capitol One]. The one thing that is missing is that it does not guide or change with our client's goal(s). It is not always applicable with everybody. For example, among my clientele,

I have my special populations, my general population, and my 'athletes'—these are people that want to push hard."

GH: "In terms of monitoring preparedness, I am a big believer in the importance of force plate assessment, if you have the ability to do so. I really think isometric testing is a great way to look at a force-time curve, and know that the athletes are responding the way you think. Are they getting stronger and developing as you want them to? What makes that testing so helpful, especially the rate of force development (RFD), is because it is more central nervous system and more central to fatigue, so we can look at how they are handling the training stress. The RFD, especially from isometric testing, can be so telling because it is so sensitive to fatigue. And force plates are becoming much cheaper than they used to be. I know several colleagues that have purchased small portable force plates for under a thousand dollars."

AK: "Wherever possible, I include assessments as part of my practice. I encourage my clients to adopt a goal-oriented approach to their training, and this requires assessments to determine progress. As a researcher at heart, I am also very data-driven in my approach, so I love using assessments to get an objective picture."

If I suspect any disordered eating, I may have the client complete the Eating Attitudes Test (EAT-26) to determine if I need to refer out to a psychologist. There are also some dancer-validated screening questionnaires that I may employ if I see a need, including the Perfectionism Inventory, Motivational Climate screening, and Achievement Goal Orientation Inventory. These help me understand the psychological context in which the dancer is working."

WHAT TYPES OF FITNESS ASSESSMENTS DO YOU USE WITH YOUR CLIENTELE?

RR: "I go through three primary areas of testing: general movement, joint position, and posture. If you are not testing those three areas, then you are going to miss something. I learned from a lot of good people and I took what I thought was important from those organizations. I was fortunate enough to learn some orthopedic tests, shoulder range of motion, etc. Some people may say 'you are a strength and conditioning coach, you should not be doing those,' but I think it is helpful just to get some more information about this client. I think I am staying in my scope of practice by doing assessments that give me important information that enables me to write an effective program."

Also, I have them do exercises that they will do in training, just to try to get an idea of where to start them. People are here to exercise, so I want to see how they exercise. It is also helpful in determining cueing (e.g., do they pick this up quickly, how is their body awareness, if they cannot squat but they move well on the field, if I tell them not to round their back and they do not know what that means). I will have interns come in and they have no idea of what I am talking about. Most of this I did not learn in school.

For posture analysis, I am also a big fan of the Postural Restoration Institute (PRI). I incorporate some of their tests into my evaluation. They are great and they have a ton of courses. We also do some Functional Movement Screen (FMS) testing.

Specifically, I do the standing broad jump test, 5-10-5 agility test, 10-yard sprint test, and 20-yard sprint test (that is all the space I have). I will do a maximum repetition chin-up test (or an isometric hold if they cannot do one chin-up). And then I just go through general exercises. That way I know where to start them. For example, I will go through the front squat to see how that feel and how that looks. Even though I am doing that with only bodyweight, I want to see how the body handles that just to get an idea of how they handle movement patterns. I do not do a ton of traditional strength testing like one-repetition maximums. I know people are going to get stronger; that is my strength test, looking at their progression over the course of each four-week block. If someone cannot squat properly I am not going to load them up and see how much they can do. Athletes who do not move well have no business touching heavy weight yet, as there is most likely a weak link in their chain. I do not want people getting hurt on their first day doing a maximal movement.

Sometimes I will also look at resting heart rate (RHR). For example, I trained a lacrosse player and he said he was having trouble making it through workouts and games, so I looked to RHR as an indicator of overtraining. Sometimes I will also look into caffeine or sleeping, but if that is not brought up, I probably will not pursue it. Sometimes just coaching people through exercise is an assessment in itself. I am always doing an assessment; when you are coaching people, you are always assessing."

LM: "We do the usual: weight, blood pressure, hip and waist, body mass index, and body fat using bioelectrical impedance. We are very aware of our space constraints, so I rarely do skinfold due to privacy issues, although we have calipers. We have to get very creative in that gym due to very limited space. We also do the three-minute step test, sit-and-reach, push-up test, postural assessment grid, and overhead squat; and I cram all that into 30 min. I do not have time for anything too invasive or creative, 30 min goes by very fast."

My two favorite things are the FMS and my first workout with a client. I am very comfortable with the FMS, but the issue I have is time constraints. Since sessions are only 30 min, it is difficult to squeeze that in and most people do not get it [the concept of FMS]. I wish we did FMS with our population, but we just do not have the time. That is something that would take some corporate support. That is something I have not done except with my athletes. I have some outliers that are very fit.

The thing I have found most beneficial, is using a posture grid. Because I am in an office setting, I see a lot of postural abnormalities. That one [assessment] is great for me. Also, the overhead squat; lets me look at you from the front, back, and side.

The other one I do is the first workout with someone. So, when I have new clients, I want to see if they are coachable and I want them to be comfortable. My first session with a client I always start with the TRX. A lot of my clients are women and the TRX is easily adjustable to all strength levels. Also, it is easy and exciting for them because it is new, but it is also a confidence builder. I always start with TRX rows. We are not really dealing with ability yet and it is easy to accommodate a variety of different fitness levels. I think people enjoy that because it is different for them, they are excited to do that, and it gives me a chance to tell if they are

ASSESSMENTS AND MEASURES—INTERVIEWS FROM EXPERTS IN PERSONAL TRAINING

more a visual learner or verbal learner. It tells me a lot about their “coachability.” I am learning about them in that first exercise.

My whole session is one big conversation. I always start by asking ‘any aches, pains, or issues?’ Occasionally someone will tell me something I need to know. Conversation works best for me because that is my strong point. My clients are not always coming to me because they really want to. I want to be the vital part of their day. We have 10 different departments at my site. People come in in different moods depending on what department they are in, sometimes it is even seasonal.”

GH: “The Special Operations Command (SOCOM) has a pretty standard battery of testing. We used very basic, easily implemented tests to evaluate the commonly accepted components of fitness (e.g., body composition, total body flexibility, agility, strength, lower body power, and anaerobic endurance).

With my athletes, I use a free web-based monitoring system called Sportably. In the software program, you can set up teams (e.g., weightlifters) and then as the coach, I could have access to that information. I really like it for two reasons. Firstly, after collecting data for a while, you can set parameters, (e.g., the upper and lower limits) so if your numbers stray out of range, then it can alert you to a problem. For example, it can alert you if body mass is consistently increasing or decreasing. Secondly, most of the questions that they answer on Sportably are hard data that is mostly straightforward, which is easier to handle. This is information that you do not have time to ask every single athlete every time. They can do it on their smartphone.

I prefer to do isometric testing via a clean grip mid-thigh pull; I do not think there is a substitute for that because of how well it assesses preparedness. Certainly a lot of weight rooms are not going to have the equipment to do that. I think the next best thing is weighted and unweighted static and countermovement vertical jumps. You can do those on a switch mat, but that is not going to be as sensitive as a force plate. The loaded part is important for better trained athletes.

The overhead squat assessment is useful when you are just starting with someone or when the athlete is new to training. Even before some movement assessment, good coaches will assess the athlete’s ability to squat. In my experience, as an athlete gets stronger, those movement issues usually go away. When working with a seasoned athlete, I do not think you gain much from doing that. Also, there has been such growth in monitoring technology (e.g., Global Positioning Systems [GPS], heart rate monitors, etc.) that it has created this very reactive style of coaching. That is not a process of raising preparedness, there is no substitute for a really good training prescription. We should take advantage of technology, but it should not take the place of our coaching. It should assist us, but that is it. That is kind of a pet peeve of mine as it is not good coaching. When you constantly change the plan based on the measurements, then you do not have a plan.”

AK: “With my dancers I am very interested in their cardiorespiratory fitness and their muscular fitness (specifically their agonist and antagonist balance.) I have had a hard time finding an aerobic fitness assessment that works well for dancers. Most dancers hate running (and have terrible running economy), and it is not uncommon to be limited by what I can do in the dance studio. If I have time, there are a couple of dance-specific aerobic fitness tests (one using ballet choreography and one using contemporary choreography) but they take 20 min plus to teach the choreography. So this has been a struggle.

For muscle testing, I frequently rely on manual muscle break tests. I focus on the hip abductors and adductors, hip flexors, knee flexors, and ankle plantar flexors and dorsi flexors. I am always looking for obvious imbalances between agonist and antagonist groups or lateral imbalances. You would be amazed by how many dancers cannot pass a hip abductor break test. This has obvious implications for their stability and resistance to fatigue throughout the day. I will also use some muscle endurance tests for the plantar flexors, test how long they can hold a plank and side plank, see how many push-ups they can do and perform a Romberg eyes-closed balance assessment. I do not generally emphasize flexibility testing for dancers unless there is an obvious need. Most flexibility tests are not sensitive enough for dancers (who usually stretch far more than they need to).

I also love Precision Nutrition’s assessment tools to understand a client’s current nutritional approach and their need and willingness to make adjustments. As I am not a nutritionist or dietician, I do not prescribe diets, but I do emphasize education about macronutrients in particular. I have found that dancers (especially young dancers) are particularly prone to diet fads and nutritional misinformation.

I think most of my assessment tools are rather unusual from a traditional fitness perspective. What is unusual for me is to use more traditional screenings, but it has a lot to do with location. If I can get a dancer to agree, I would love to find out how much she can deadlift and get an estimate of her VO_2max . Unfortunately, these are the exception instead of the norm.”

HOW FREQUENTLY DO YOU PERFORM ASSESSMENTS?

RR: “I will do my assessment on day one and then usually every four weeks I reevaluate.”

LM: “We do assessments at 8 – 12-week intervals, except if there is an incentive program running. For example, we ran a “Biggest Loser” program and then we did assessments at four-week intervals.”

GH: “For the weightlifters it really ends up being every mesocycle, so then we can determine if the goals of the mesocycle were accomplished. For military, the testing was very field-based and it would usually be every few months. Every few months we would do some basic testing so we could adjust the training (sets, times,

etc.). One of the things with military athletes is that their schedule is so unpredictable. They might be away [on deployment] for months.”

AK: “Anytime I start with a new client, the first session is a free assessment. We use this time to get to know each other, identify strengths, and pinpoint areas for improvement. After that, the frequency of reassessments depends entirely on the individual program and client. I keep detailed records of each session so it is usually possible to see where progress is being made or plateaus are being hit just from this, but if the client has time-sensitive goals (which I encourage), I will break down the time we have until the goal needs to be met and periodically assess as we approach the deadline. So for instance, if I have two months to get a dancer in shape for a performance, we will assess once at the start, once with a month to go, and once with two weeks to go. I will try to keep them to the absolute minimum necessary, as dancers in particular tend to be very unperiodized in their dance training, so I want to avoid piling too much stimulus on, especially close to performance time when their dance volume tends to increase.”

REFERENCES

1. Flatt, AA, and Esco, MR. Validity of the ithlete™ smart phone application for determining ultra-short-term heart rate variability. *Journal of Human Kinetics* 39: 85-92, 2013.
2. Hunt, TN, Ferrara, MS, Bornstein, RA, and Baumgartner, TA. The reliability of the modified Balance Error Scoring System. *Clinical Journal of Sports Medicine* 19(6): 471-475, 2009.
3. Kinzey, SJ, and Armstrong, CW. The reliability of the Star-Excursion Test in assessing dynamic balance. *Journal of Orthopaedic and Sports Physical Therapy* 27(5): 356-360, 1998.

ABOUT THE AUTHOR

A personal trainer with over 15 years of experience, Carmine Grieco recently made the transition from personal trainer to college professor. Recently hired as an Assistant Professor of Exercise Science at Glenville State College, Grieco received his Doctorate degree in Human Movement Sciences from Old Dominion University in 2012. Grieco recently accepted a position at Colorado Mesa University. He is the National Strength and Conditioning Association (NSCA) West Virginia State Director and is passionate about the profession of fitness. Grieco is now focusing his time and energy on training the next generation of fitness professionals.



everyone stronger
NSCA.com

NSCA BOARD AND COMMITTEE OPENINGS

APPLY NOW >>

TAKE THE NSCA FURTHER

The NSCA is shaped by its members and now is your chance to make your mark. Take the NSCA to the next level by serving on the Board of Directors or other general committees.

Open Elected Positions – Applications Due December 1, 2015

Board Member – 2 positions open
Nomination Committee – 2 positions open

Open General Committee Positions – Applications Due December 1, 2015

Conference Committee – 2 positions open
Membership Committee – 3 positions open
Research and Education Committee – 3 positions open
Women's Committee – 2 positions open

CLICK HERE to apply.

Any questions? Contact the Membership Department at volunteer@nsca.com



SELECTING A SPECIALTY—WHAT WILL YOU BE KNOWN FOR?

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

There are two business approaches for personal trainers to pursue in today's fitness industry. These two business strategies have been molded and framed over time as the field of personal training has evolved and grown. In the 1960s and 1970s, personal trainers were known as one-trick ponies or gym rats who were only hired by bodybuilders to help them build muscle as they prepared for a show. However, in the 1980s, with the fitness revolution in full swing, the demand for a one-on-one personal trainer increased and a new career path was born. These two business approaches were developed as a product of the increased demand for personal trainers. The first approach focuses on knowing a moderate amount of information about many different areas of fitness thus, making the personal trainer the local "one-stop shop" for any client. The second approach involves the personal trainer selecting a specialty in which they obtain a vast amount of knowledge in one or two specific areas of fitness, making them the local fitness expert on the topic. This article examines potential reasons why the "specialist" personal trainer may strive over the one-stop shop personal trainer.

One-Stop Shop: Due to the large amounts of certification and certificates obtained, the one-stop shop personal trainer may look great on paper. These personal trainers stay up-to-date on new trends in the fitness industry and usually earn a very basic level of education and experience that covers a wide spectrum. The potential problem with this approach is that their education level stops there. The box has been checked and they are on to the next attraction. This lack of education and experience could potentially lead to a disgruntled client who does not reach the goal in which they hired their "One-Stop Shop" trainer to help them achieve.

Specialist: The specialist personal trainer can be a great option due to the large amount of education and certifications they have achieved specifically geared toward certain client's specific needs (4). Typically, a specialist can successfully grow their business by having a great reputation for being the personal trainer that is exceptional at training clients for one or two specific goals. The specialist personal trainer is known for one or two specialties and clients may come to work with that personal trainer based on the demand of their stellar reputation (2). One negative is that

if the client is not looking for that specific goal, they may not be interested in training with the specialist personal trainer and may want to seek out someone else (1). Specialist personal trainers market themselves as experts in their specific area(s) in order to create a brand for themselves. In turn, this brand may attract potential clients. If the marketing campaign and branding is done appropriately, the community should be able to relate that specific area with that personal trainer. The specialist personal trainer should pursue a marketing campaign that makes potential clients think of them when they want to reach a specific goal.

It should be noted that both business models can work and provide a personal trainer with consistent financial income. However, when looking at growing a career as a personal trainer, there may be potential benefits to obtaining a specialty and growing a business around that specific area of focus.

SPEED DATING FOR SELECTING A SPECIALTY

Many personal trainers struggle to select their specific area of expertise. Table 1 provides a list of some example options that a personal trainer can select as a specialty. This specialty should be something that the trainer is extremely passionate about and looks forward to on a daily basis (2).

One suggested technique for selecting a specialty is a format similar to speed dating. When a personal trainer is just beginning in the industry, they should sample all of the areas that sound even remotely interesting. By going to a clinic, taking a class, attending a private training session, or watching a webinar, a personal trainer can gain some experience and insight on the topic and may be able to see if it sparks an interest.

If interested, the personal trainer should pursue the next level by learning as much as possible on the topic, such as earning a certificate or certification, finding a mentor, and reading books or manuals. If there is no interest in a particular subject, then the personal trainer should move on to the next topic as soon as they decide it is not for them. While it may seem like a waste of time, the personal trainer is able to gain some education on that topic, and perhaps more importantly, learn that they are not interested in a certain area, which can help via the process of elimination (3).

CONCLUSION

With a specialty selected and the pursuit of education and experience in progress, the specialty personal trainer can kick-start their campaign to build a reputation as the resident expert in their respective area. This can provide the groundwork and opportunity for a long lasting career that is both financially stable and successful. It is up to the personal trainer to stay up-to-date on the most relevant and appropriate research on training practices and to implement those practices with their clients. By doing this, the personal trainer will be able to stay on the cutting edge of their specialty and at the forefront of their clients' radar—which can ultimately help to build a successful and long-lasting career in the personal training industry.

REFERENCES

1. Bouw, K, and Goodman, J. Your niche will set you free. Personal Trainer Development Center (PTDC). Retrieved 2015 from <http://www.theptdc.com/2013/10/your-niche-will-set-you-free/>.

2. Bratcher, M. Choosing a specialty. *IDEA Fitness Magazine* 2008.

3. Crawford, N. What's your specialty – How not to find a niche in the fitness industry. Retrieved 2015 from <http://breaking-muscle.com/coaching/whats-your-specialty-how-not-to-find-a-niche-in-the-fitness-industry.html>.

4. Legal issues and responsibilities. *ACSM's Resources for the Personal Trainer*. (3rd ed.) Philadelphia, PA: Lippincott Williams and Wilkins; 479-491, 2010.

ABOUT THE AUTHOR

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 their 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.

TABLE 1. SAMPLE SPECIALTY OPTIONS BY CATEGORY

POPULATIONS	IMPLEMENTS	PERFORMANCE
Youth	Kettlebells	Olympic-style lifting
Older adults	Sandbags	Bodybuilding
Pre- and post-pregnancy	Suspension devices	Powerlifting
Physical limitations/disease	Battling ropes	High-intensity interval training
Tactical athletes	Indian clubs	Long-term athletic development
Fat loss/nutrition	Vipers	Strongman



TRAINING CONSIDERATIONS FOR PEOPLE WITH DISABILITIES

NICK MARUCA

As the fitness industry continues to evolve, strength and conditioning professionals are constantly faced with new challenges that they need to learn about in order to adapt accordingly. As the population gradually becomes more health-conscious, there are a variety of different groups that participate in exercise—but for some, there is greater difficulty than others. People with disabilities make up one of the largest groups, or populations, in the United States with over 50 million people reporting some form of disability (3).

WHAT COACHES AND TRAINERS NEED TO KNOW—WHAT IS A DISABILITY?

Contrary to common belief, the term “disability” reaches far beyond the realm of just physical disability. A disability is defined by any physical or mental impairment that substantially limits one or more major life activities, such as speaking, walking, caring for oneself, hearing, learning, concentrating, as well as limitations in the function of the respiratory, endocrine, immune, or reproductive systems (1). Disabilities can occur in a number of different forms, including amputations, spinal cord lesions and injuries (e.g., spina bifida), traumatic brain injuries (e.g., stroke), neuromuscular limitations (e.g., Parkinson’s disease), cognitive (e.g., Down syndrome), musculoskeletal (e.g., arthritis), sensory (e.g., vision limitations), medical (e.g., cancer), cardiac (e.g., cardiovascular disease), and pulmonary (e.g., chronic obstructive pulmonary disease) disorders. Each of these categories has many different conditions that affect millions of Americans every day.

EXERCISE CONSIDERATIONS FOR PEOPLE WITH DISABILITIES

People with disabilities often do not have the resources available to participate in physical activity, let alone a structured exercise program; therefore, they are at an even greater risk than people without disabilities for developing secondary conditions (e.g., heart disease, obesity, hypertension, etc.) resulting in a decline in overall function (4,5,6). General considerations for many of these secondary complications include lower maximum heart rates, early fatigue, balance and coordination issues, muscular imbalances, temperature regulation issues, concentration and memory impairments, difficulty communicating, tight or loose muscles, loss of control of bowels or urinary excretion, increased risk of falling, and development of osteoporosis (7). Every disability comes with its own signs and symptoms, considerations, and proper exercise testing methods and prescriptions. People with disabilities often deal with some of these secondary conditions; therefore, it is of utmost importance for strength and conditioning professionals to find ways to increase physical activity for people with disabilities in a safe manner.

These secondary complications are only further exacerbated when age is taken into consideration. The world is going to keep getting older, and more people are beginning to engage in exercise programs. It is estimated that by the year 2030, the population in the United States will be the oldest it has ever been, with 20% of the people being over the age of 65, and an estimated 20% of them will have at least one chronic/secondary condition (3). This makes it imperative that strength and conditioning professionals

are able to develop programs to aid this growing population as well as all individuals with any adaptive needs (2).

The common strength and conditioning professional is oftentimes not equipped to understand the needs of a person with a disability fully—they may not know the limitations of the individual, or be able to adapt an exercise program for their level of ability. For many people with disabilities, the most important goal will be providing them a program to either maintain or improve muscular strength, flexibility, and endurance in order to remain as independent as possible. The strength and conditioning professional should perform a number of assessments in order to gain information on the type of disability the individual suffers from, their limitations, any secondary conditions that may be occurring, and of course their level of strength, flexibility, and endurance. People with disabilities may feel afraid to exercise and may believe that the traditional fitness center is not a place where they feel welcomed. In addition, there are potential barriers such as a lack of information on adaptive programs or services that are offered, lack of accessible equipment, high costs, and transportation difficulties that could prevent them from going to a fitness center regularly. Presumably, if a fitness center were able to provide the necessary equipment and have knowledgeable coaches and trainers on hand, there could be a significant increase in the amount of people with disabilities that attend to engage in exercise (7).

While it might be uncommon to see a person with an amputation or someone who uses a wheelchair in a gym, it may be common for a person to be exercising who has a condition such as multiple sclerosis or a history of concussions, as there are not any visible signs of their disability. Those people still need specific programming for their conditions, even though they may not even be aware of it. If a person with a disability presents that information to a strength and conditioning professional, the strength and conditioning professional must be able to understand how to adapt the program to the individual's specific needs.

EVERYONE IS DIFFERENT—SCALING AND ADAPTING FOR PEOPLE WITH DISABILITIES

Everyone is going to respond to exercise differently and there should never be a “one size fits all” approach to training. Strength and conditioning professionals should show every person that comes to them for training that they truly care about them. One of the markers of being a good coach or trainer is the ability to adapt to everyone. When a strength and conditioning professional takes the time to get to know who they are working with, and is able to adapt to their needs, that is when real trust can be built. Far too often, unfortunately, strength and conditioning professionals do not take the individual needs of their clients or athletes into consideration. Clients should never be given a workout that is far beyond their level of ability. The strength and conditioning professional needs to always have an alternative plan in mind that is different from what was originally programmed, just in case. They need to be able to adapt on the fly. No matter if it is a person with or without a disability, knowledge of progressions and regressions of exercises can be crucial to the development and overall success of a training program.

The strength and conditioning professional's job is to help people become the greatest versions of themselves that they can be. Therefore, it is very important to create an environment in which people can thrive. People with disabilities have the desire to be fit and strong, and are capable of more than they tend to believe. There will be certain people who can be pushed more than others, as gains vary on a case by case basis. However, there still needs to be a level of challenge for the individual and any amount of progress, no matter how small, should be recognized by the strength and conditioning professional. When dealing with people with disabilities, the strength and conditioning professional should expect a lot of trial and error. Not everything is going to work out the way it is intended, or at all in some cases. There needs to be an open communication between the client and the strength and conditioning professional in order to establish what the client is comfortable with and what can be achieved.

Being a strength and conditioning coach myself, as well as a person with cerebral palsy, I have experienced this struggle myself for many years. For example, due to balance and coordination issues, as well as tightness in my hips and hamstrings, I am not able to perform traditional barbell back squats. However, there are many ways to achieve the same movement with the same desired outcome. For instance, if I want to perform a back squat, I find something to lightly grasp in front of me for balance and squat with a weighted backpack or vest. Also, I can do front squats with a log or sandbag, kettlebell goblet squats, band resisted squats, and bodyweight squats. When I first began training, my coach and I learned together. He learned how to adapt to what I needed, and I learned about my body and what worked for me.

SAMPLE ASSESSMENT AND EXERCISE SELECTION FOR PEOPLE WITH SPINAL CORD INJURIES

As an example, someone comes into the gym with a spinal cord injury at their thoracic vertebrae (T3). The injury is incomplete, meaning that there is still some function below the injury site. The client requires the use of a wheelchair and has difficulty transferring out of the chair as well as a fear of falling. However, the person does have full use of their arms, hands, and trunk. When designing an exercise program for this client, some considerations would include:

1. Strengthening functional/intact muscles
2. Improving strength in weakened muscles
3. Improving range of motion in shortened muscles
4. Focusing on posterior development due to overuse of anterior muscles from pushing the wheelchair
5. Improving ability to transfer to and from the wheelchair
6. Improving ability to recover from a fall
7. Improving trunk strength
8. Focusing on stretching and mobility for the upper extremities and trunk

TRAINING CONSIDERATIONS FOR PEOPLE WITH DISABILITIES

All those considerations are areas a person with a spinal cord injury should focus on in their training. The strength of the posterior chain is often much weaker, if not totally neglected due to the constant pushing motion. The trunk is essential to maintain posture; the muscles surrounding the injury typically become tight, so stretching is important. The ability to transfer to and from the chair is paramount for when having to use certain exercise equipment as well as simply performing activities of daily living. Building the strength to transfer can also provide the client an increased level of confidence that if a fall does occur, they will be able to get themselves back up into a stable position. Increasing strength and flexibility of all intact muscle groups should also be a goal of their training. Some sample exercises that can be performed from the wheelchair include:

1. Overhead presses
2. Cable row exercises
3. Band rows
4. Band trunk flexion/extension and lateral flexion
5. Pulldowns
6. Kettlebell cleans
7. Dips from a bench or box
8. Medicine ball throws/passes
9. Sled pushes/pulls with rope

CHANGING THE PERCEPTION OF DISABILITY

When someone is physically different in some way from the human perception of “normal,” they are typically ostracized to the ends of the social spectrum. Most people do not know how to respond to seeing someone with one arm or one leg, and they stare or feel sorry for those people. Because most people do not know how to deal with being confronted by something different, a person with a disability may feel like they are not included in the community and cannot participate in the same capacity as everyone else. Someone may offer help to a person with a disability because they feel bad, even if help is not needed. For example, they may see someone with an amputation performing an everyday task and say something like “wow that is so inspirational,” when to that person it is just the way they live their life. Many people with disabilities do not wish to be given any special treatment, and often feel that when it is given, or when praise is given for minimal tasks or achievements, it is demeaning. People with disabilities have a desire to want to be treated as normal individuals, because they are. It is the job of strength and conditioning professionals to help others see that just because someone may have some form of disability, it does not mean they should be shunned away. The door needs to be open to people of all walks of life and the more people become exposed to the diverse population of people with disabilities, there will be less fear or uneasiness when the situation arises.

It is the job of the strength and conditioning professional to create a positive atmosphere for people with disabilities. For instance, if someone with a disability is in a group exercise class, they should not be neglected and left to do their own workout. They should be involved just like everyone else and should be allowed to perform the same exercises even if it has to be scaled down to their ability level. The goal for many people with disabilities is to become independent in life and included in the community. It is important that they are independent enough to be able to maneuver around a fitness center and learn the skills so that they can hopefully work up to being able to exercise on their own. Safe, fun, and effective programming that allows for maximal physical and mental engagement can have tremendous physical and psychological benefit for people with disabilities (7).

CONCLUSION

There are few people in this world who go through life without suffering some degree of injury, illness, or disease. Everyone will eventually need to learn how to adapt their life to whatever gets thrown at them. Right now, there is a need for more strength and conditioning professionals who are able to develop effective exercise programs for people with disabilities. As veterans come back from war and the population continues to age, there is a growing need for strength and conditioning professionals who can provide exercise that is specific to their unique needs. Everyone deserves to feel like they are welcome at gyms or fitness centers. Certifications such as the Certified Special Populations Specialist® (CSPS®) through the National Strength and Conditioning Association (NSCA) or Certified Inclusive Fitness Trainer (CIFT) through the American College of Sports Medicine (ACSM) are great options for those looking into this area as well as seminars such as Crossroads Adaptive Athletic Alliance.

REFERENCES

1. Brennan, J. The ADA National Network Disability Law Handbook. *The ADA National Network*. Houston TX: Southwest ADA Center; 2013.
2. Center for Disease Control and Prevention. Prevalence of disabilities and associated health conditions among adults—United States, 1999. *Morbidity and Mortality Weekly Report* 50(7): 120-125, 2001.
3. Center for Disease Control and Prevention. The state of aging and health in America 2007. The Merck Company Foundation. Retrieved 2015 from http://www.cdc.gov/aging/pdf/saha_2007.pdf.
4. Rimmer, JH, Riley, B, Wang, E, Rauworth, A, and Jurkowski, J. Physical activity participation among persons with disabilities: Barriers and factors. *American Journal of Preventive Medicine* 26(5): 419-425, 2004.
5. Rimmer, JH. Promoting inclusive physical activity communities for people with disabilities. *President's Council on Physical Fitness and Sports Research Digest* 9(2): 1-8, 2008.
6. Rimmer, JH. The conspicuous absence of people with disabilities in public fitness and recreation facilities: Lack of interest or lack of access? *American Journal of Health Promotion* 19(5): 327-329, 2005.
7. Wing, C. Resources for the Inclusive Fitness Trainer. *American College of Sports Medicine*: 2013.

ABOUT THE AUTHOR

Nick Maruca is a graduate of Temple University with a degree in Kinesiology. He began his training journey at the age of 13, and has worked as a strength and conditioning coach and personal trainer since high school. He has extensive knowledge in bodyweight and alternative methods of training such as kettlebells, tires, ropes, stones, etc. He has worked for some of the best minds in the industry, including John McKenna and Zach Even-Esh. Maruca currently works for Special Olympics New Jersey and has spoken about the importance of strength training to families at the Dupont Hospital for Children in Delaware. He is an Underground Strength Coach, holds certifications in alternative training, kettlebells, adaptive training, and is certified as an American College of Sports Medicine Certified Inclusive Fitness Trainer (ACSM-CIFT).

A Sports & Health Sciences Education For Those Who Expect More.

American Public University can help you prepare for success in the multi-billion dollar sports industry. Learn from experienced faculty, many of whom are leaders within the fitness world. APU offers 190+ career-relevant online degree and certificate programs including:

- B.S., Sports & Health Sciences
Concentrations in Coaching Studies, Exercise Science, and Fitness & Wellness
- M.S., Sports & Health Sciences
Concentrations in Exercise Science & Human Performance and Health & Wellness Management

Get started today at StudyatAPU.com/nsca

We want you to make an informed decision about the university that's right for you. For more about our graduation rates, the median debt of students who completed each program, and other important information, visit www.apu.edu/disclosure.





FOAM ROLLING FOR PERFORMANCE AND RECOVERY

SEAN KRATCHMAN AND BRIAN JONES, PHD, CSCS, NSCA-CPT, TSAC-F, USAW

Foam rollers and massage sticks have increased in popularity in the fitness industry and are often recommended by strength and conditioning professionals (5,6,10). There is evidence that shows positive effects of foam rolling on range of motion (ROM), recovery, and performance (8,9,10,14). Despite its effectiveness, the mechanisms as to how foam rolling works are not fully understood. However, it is likely that acute responses in foam rolling are similar to those elicited by manual therapy, which are thought to be neurophysiological in origin (24).

Many different health professionals including physical therapists, athletic trainers, and massage therapists use foam rolling clinically. However, foam rollers and massage sticks allow individuals to apply manual therapy on themselves, making them portable and affordable forms of therapy.

SELF-MYOFASCIAL RELEASE (SMR) FOR WARM-UP

It is well documented that pre-exercise static stretching can have a negative effect on strength and power but foam rolling has been shown to increase ROM without decreasing muscular performance (11). SMR may be a substitute for static stretching before workouts, especially if combined with dynamic warm-up exercises (8,9,11,16). In fact, two recent systematic review papers on foam rolling have concluded that foam rolling acutely increases joint ROM and decreases muscle soreness without negatively impacting performance (2,15). However, it should be noted that dynamic stretching and foam rolling elicit similar increases in hip flexion range of motion (3).

FOAM ROLLING FOR RECOVERY

SMR through the use of foam rolling may also be beneficial for post- and between-workout recovery. Foam rolling has been shown to decrease delayed onset muscle soreness (DOMS) when performed following exercise (9,13). One study examined the effect of post-exercise foam rolling on muscle soreness and performance. The subjects completed 10 sets of 10 repetitions (German volume training protocol) of the back squat at 60% of one repetition maximum (1RM). Subjects who performed a 20-min foam rolling session immediately 24 hr and 48 hr after exercise had significantly lower quadriceps DOMS than those who did not (13). Additionally, the foam rolling recovery work caused faster recovery of muscular function as measured by sprint time, power output, and dynamic strength-endurance (13). Foam rolling has also been shown to speed heart rate and blood pressure recovery following high-intensity exercise as compared to placebo treatment (1).

FOAM ROLLER DENSITY AND OTHER TOOLS

The increased popularity of SMR and foam rolling has led to the development of many different types of foam rollers, such as softer, less dense, harder, and more rigid rollers. There are also multilevel rigid rollers, which have ridges of isolated contact area as opposed to the standard foam roller. Research suggests that the significantly higher pressure and isolated contact area of the multilevel rigid roller can have a potentially greater benefit (7). Although high-density rollers may be more therapeutic, they can

cause significant discomfort during use. Many people begin with a softer roller and progress to a firmer one as their pain tolerance increases.

However, foam rollers are not the only SMR tools available; massager sticks and massage balls, including tennis and lacrosse balls, are also used for this type of therapy. These tools are smaller and more portable than foam rollers and can be good alternatives to the standard foam roller. Massage sticks have been shown to increase range of motion while not decreasing muscle strength (17).

OPTIMAL PROTOCOL FOR FOAM ROLLING

Foam rolling has been shown to cause significant ROM increases when paired with a static stretching routine. A recent study found that this combination significantly increased passive hip-flexion ROM compared to foam rolling or static stretching alone (12).

One protocol that has shown to be effective in the literature involves rolling the length of the muscle 3 – 4 times over the course of 1 min, followed by 30 s of rest, followed by another bout of foam rolling for 1 min (10). Tables 1 and 2 provide a sample program for SMR through the use of a foam roller and massage stick.

CONCLUSION

SMR through the use of foam rolling or other implements is a time and cost-efficient method of increasing performance and recovery. One of the most common mistakes when using foam rollers or other SMR tools is going too fast. Some discomfort or slight pain is normal when working on sensitive areas, and moving too quickly over them can take away the full benefit of the therapy. Although SMR may be effective, it is always advisable to consult a physician or other healthcare professional before beginning any type of self-treatment.

REFERENCES

1. Arroyo-Morales, M, Olea, N, Martinez, M, Moreno-Lorenzo, C, Díaz-Rodríguez, L, and Hidalgo-Lazano, A. Effects of myofascial release after high-intensity exercise: A randomized clinical trial. *Journal of Manipulative and Physiological Therapeutics* 31(3): 217-223, 2008.
2. Beardsley, C, and Skarabot, J. Effects of self-myofascial release: A systematic review. Published ahead of print. *Journal of Bodywork and Movement Therapies*, 2015.
3. Behara, B, and Jacobson, BH. The acute effects of deep tissue foam rolling and dynamic stretching on muscular strength, power, and flexibility in division I linemen. Published ahead of print. *Journal of Orthopaedic Trauma*, 2015.
4. Bialosky, JE, Bishop, MD, Price, DD, Robinson, ME, and George, SZ. The mechanisms of manual therapy in the treatment of musculoskeletal pain: A comprehensive model. *Manual Therapy* 14(5): 531-538, 2009.
5. Button, DC, and Behm, DG. Foam rolling: Early study findings suggest benefits. *Lower Extremity Review*. 2014. Retrieved February 21, 2015 from <http://lermagazine.com/article/foam-rolling-early-study-findings-suggest-benefits>.
6. Cressey, E, and Robertson, M. Feel better for 10 bucks. *T-Nation*. 2014. Retrieved February 21, 2015 from <http://www.t-nation.com/training/feel-better-for-10-bucks>.
7. Curran, PF, Fiore, RD, and Crisco, JJ. Comparison of the pressure exerted on soft tissue by 2 myofascial rollers. *Journal of Sport Rehabilitation* 17(4): 432-442, 2008.
8. Ganfield, L. Myofascial therapy for the treatment of acute and chronic pain. *Spine-health*. 2007. Retrieved February 21, 2015 from <http://www.spine-health.com/treatment/physical-therapy/myofascial-therapy-treatment-acute-and-chronic-pain>.
9. Macdonald, GZ, Button, DC, Drinkwater, EJ, and Behm, DG. Foam rolling as a recovery tool after an intense bout of physical activity. *Medicine and Science in Sports Exercise* 46(1): 131-42, 2014.
10. Macdonald, GZ, Penney, MD, Mullaley, ME, Cuconato, AL, Drake, CD, Behm, DG, and Button, DC. An acute bout of self-myofascial release increases range of motion without a subsequent decrease in muscle activation or force. *The Journal of Strength Conditioning Research* 27(3): 812-821, 2013.
11. McMillian, DJ, Moore, JH, Hatler, BS, and Taylor, DC. Dynamic vs. static-stretching warm-up: The effect on power and agility performance. *The Journal of Strength Conditioning Research* 20(3): 492-499, 2006.
12. Mohr, A, Long, B, and Goad, C. Effect of foam rolling and static stretching on passive hip-flexion range of motion. *Journal of Sport Rehabilitation* 23(4): 296-299, 2014.
13. Pearcey, GE, Bradbury-Squires, DJ, Kawamoto, JE, Drinkwater, EJ, Behm, DG, and Button, DC. Foam rolling for delayed-onset muscle soreness and recovery of dynamic performance measures. *Journal of Athletic Training* 50(1): 5-13, 2015.
14. Pohl, H. *Fascia Research: Basic Science and Implications for Conventional and Complementary Health Care*. Lancaster, PA: Urban & Fischer; 245-246, 2007.
15. Schroeder, AN, and Best, TM. Is self myofascial release and effective preexercise and recovery strategy? A literature review. *Current Sports Medicine Reports* 14(3): 200-208, 2015.
16. Simic, L, Sarabon, N, and Markovic, G. Does pre-exercise static stretching inhibit maximal muscular performance? A meta-analytical review. *Scandinavian Journal of Medicine and Science in Sports* 23(2): 131-148, 2013.
17. Sullivan, KM, Silvey, DB, Button, DC, and Behm, DG. Roller-massager application to the hamstrings increases sit-and-reach range of motion within five to ten seconds without performance impairments. *International Journal of Sports Physical Therapy* 8(3): 228-236, 2013.

ABOUT THE AUTHOR

Sean Kratchman is currently in his senior year of undergraduate studies at Georgetown College, where he is pursuing an exercise science degree. He played football at Georgetown College for four years and was a 2014 National Association of Intercollegiate Athletics (NAIA) Champion of Character. Upon graduation, Kratchman plans to attend Eastern Kentucky University for his Master of Arts degree in Occupational Therapy.

Brian Jones is an Assistant Professor of Exercise Science in the department of Kinesiology and Health Studies at Georgetown College in Kentucky. He has worked as a strength coach for several different Division I athletic teams at the University of Kentucky and has strength coaching experience with high school and professional athletes. Jones has authored three books, two book chapters, and numerous articles on strength training, supplementation, and other exercise science topics. Jones has served as the National Strength and Conditioning Association (NSCA) State Director for Kentucky and currently sits on the Advisory Board for Kentucky and the Great Lakes Region. He has a 2nd degree black belt in Brazilian jiu-jitsu and is the owner and head coach of Valhalla Academy, a jiu-jitsu school in Frankfort, KY.



FIGURE 1. FOAM ROLLER – UPPER BACK



FIGURE 2. FOAM ROLLER – LOWER BACK



FIGURE 3. FOAM ROLLER – HAMSTRINGS



FIGURE 4. FOAM ROLLER – HIP ADDUCTORS



FIGURE 5. FOAM ROLLER – ILIOTIBIAL BAND

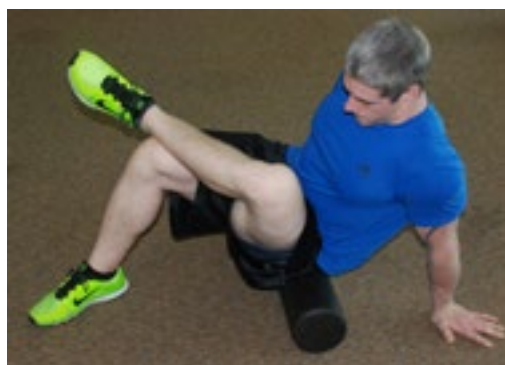


FIGURE 6. FOAM ROLLER – GLUTEALS



FIGURE 7. FOAM ROLLER – ACHILLES TENDON



FIGURE 8. FOAM ROLLER – LATS AND TERES MINOR



FIGURE 9. FOAM ROLLER – TRICEPS



FIGURE 10. MESSAGE STICK – QUADRICEPS



FIGURE 11. MESSAGE STICK – CALF



FIGURE 12. MESSAGE STICK – HAMSTRINGS



FIGURE 13. MESSAGE STICK – LOWER BACK

FOAM ROLLING FOR PERFORMANCE AND RECOVERY

TABLE 1. SAMPLE FOAM ROLLING ROUTINE

Calves: Pass along the entire muscle pointing toes in and out to get the entire muscle.	Hamstrings: Pass along the entire muscle pointing toes in and out to get the entire muscle.	Glutes: Cross one leg over the other knee and roll.	Iliotibial (IT) Band: Roll the length of the IT band from hip to the lower leg. This area may need extra work.	Adductors: Pass along the entire muscle, spending extra time on the upper half of the muscle.
Middle Back: Pass along the left, middle, and right sides of the back with both hands behind the head. Repeat while hugging the body with both arms.	Upper Back: Pass along the left, middle, and right sides of the back with both hands behind your head. Repeat while hugging the body with both arms. Pay special attention to the trapezius.	Lats: Roll along the entire length of the muscle.	Shoulders: Put the hands together as if sleeping on one side, then pass along entire shoulder.	Triceps: Pass along the triceps, spending extra attention near the elbow. Flex and extend the elbow while rolling.

TABLE 2. SAMPLE MESSAGE ROLLER STICK ROUTINE

Quadriceps: Roll along all parts of the quadriceps muscle.	Hamstrings: Flex the knee and roll along the hamstrings.	Calves: Pass along the entire muscle, hitting the inside and outside of the calves.	Gluteals: Stand up and roll along all the gluteal muscles.	Lower Back: While standing, roll up and down the lower back.
---	---	--	---	---

NOW AVAILABLE IN
6 DELICIOUS FLAVORS

#FUELINGSPORT

MULTI-LAYERED PROTEIN BAR



COVIBAT
20g **GLUTEN** **CRUNCH**
PROTEIN **FREE**

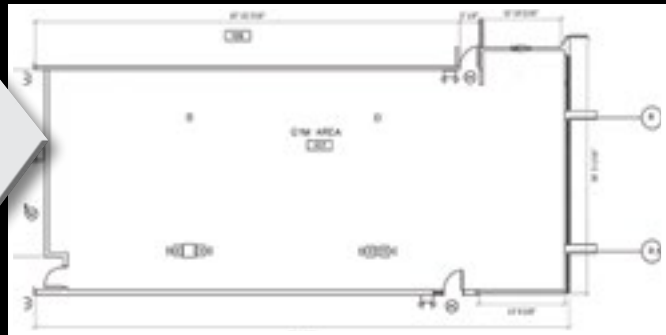
- ✓ PACKED WITH 20G OF PROTEIN FOR MUSCLE SUPPORT + LOW IN SUGAR AND NET CARBS
- ✓ CLEAN, GLUTEN-FREE FORMULA WITH ONLY 210 CALORIES
- ✓ UNIQUE, TRIPLE-LAYER TECHNOLOGY DELIVERS DELICIOUS TASTE

PERFORM BETTER![®]

Let us help you design your facility.
It's as easy as 1, 2, 3.

1

You provide us with the dimensions of the room and your equipment needs.



2

Our design team will present you with a three dimensional rendering, a price quote and, if needed, financing options.

3

Followed by the finished product.



800-556-7464 • PERFORMBETTER.com