



BOSU® BALANCE TRAINER COMPLETE WORKOUT SYSTEM

UNDERSTANDING AND DEFINING FUNCTIONAL TRAINING

The BOSU® Balance Trainer is a piece of fitness equipment that facilitates functional balance training. Thus, it is important to understand what functional training is and how it fits into a total fitness program.

functional training defined

Functional training is purpose driven or intentional training. One can begin to think of functional training (FT) or functional fitness as a methodology and form of movement that is used to expose an individual to integrated movement patterns. These patterns prepare the person for many types of general movement requirements or activity. FT is goal, performance and results oriented training.

Functional training is not necessarily sport-specific and it is generally not the goal of functional training sessions to mimic movement requirements of sport, such as throwing a baseball, swinging a golf club or shooting a basketball. Instead, the focus is to train general movement patterns that have “purpose” as they relate to a variety of movement challenges a person will encounter in sport or life. FT methodology analyzes commonalities of movement, considers energy system requirements for a given activity at more sophisticated levels of training, and trains these general movement patterns using activity that reinforces the brain/muscle/energy system interaction that takes place when the body is in motion.

Functional training encompasses an evolved performance approach that involves the whole body. FT moves away from isolation or single joint training, to whole body, integrated, multi-joint movement that requires muscle groups to work together. Functional training is a process that intentionally introduces balance challenges, controlled instability in measurable doses, and proprioceptive or body awareness training into the three-key components of fitness. Functional training programs that introduce these aspects of training ultimately teach a participant how to manage his/her own body weight and to re-establish center of gravity, balance or stability when optimal alignment or positioning is lost. This result is critical when highly skilled, efficient and safe movement is a desired training outcome.



mind working with body to create effective movement

Essentially, functional training represents the ability of the body and mind to work together to link motion at joints with simultaneous stabilization in other joints. The end result of this synergistic and integrated effort is skilled, safe, and efficient movement. If one thinks about it, all advanced movement requires some degree of motion and stabilization. To this end, the movement patterns, skills and drills that have been developed for the BOSU Complete program represent this concept of training. Functional training is all about preparing the body with training that relates to the way people move. Linking motion with stabilization, results in training benefits that are useable or have great carry over to daily performance necessities.

training for enhanced balance and stability

Functional training requires a participant to provide stability by using muscles and body awareness or proprioception, both of which are very trainable through proprioceptive training. FT also focuses on center of gravity (COG) training. This type of training teaches a person how to re-establish or maintain overall body stability, body alignment and center of gravity. A goal of functional training is to teach individuals to move and control their bodies in a variety of environments that can be impacted by visibility, contact points, external stimuli and various movement requirements done in a multitude of planes, in addition to “performing” on a variety of surfaces including those that are not consistently stable or perfectly level. See Chapter 3, Balance Challenge Variables.

It's easy to understand why training on the BOSU Balance Trainer is categorized as functional training. This type of training is transferable to daily functional requirements because people move in a 3-D, dynamic world that plays itself out in an unpredictable manner. A body that is strong and flexible and can move in an integrated, coordinated fashion can successfully accomplish daily tasks that include catching one's balance after stumbling, reaching, bending, twisting, tracking an object or diverting one's gaze while moving, as well as maintaining an ability to react to movement challenges in a variety of physical environments.

body control and functional training

Training functionally on the BOSU Balance Trainer improves body control. Body control is a skill that must be developed in a variety of situations. This learning process includes using skill progressions that introduce instability in controlled training environments, which translate to a variety of training surfaces and movement challenges. Many real life examples support an approach that trains muscles for movement, which translates to a training methodology that attempts to develop body control. Body control could be thought of as the culmination of an effective functional training program, and stands side-by-side with a goal of training muscles in the same way they are used in life and sport.

prepare individuals for movement

The ultimate goal of functional training is to prepare people for movement, activity and sport. Many different functional training activities and drills that have real-life application exist and justification of the methodology depends largely on the training goal. The message here is that functional training application will continue to be refined and expanded, and should not be narrowly viewed.

understanding closed and open chain exercise

Closed and open chain exercise define whether a movement is integrated or isolated. To best understand whether a movement pattern is a closed chain exercise (CCE) or open chain exercise (OCE), it is useful to view the body as a length of chain. Envision the arms and legs as opposite ends of the chain.

Open chain exercise occurs when an end segment of the chain (arms or legs) is not fixed and does not support the weight of the body. An example of OCE is a seated knee extension or an arm curl.

Closed chain exercise occurs if either set of limbs (hands or feet) is involved in supporting the weight of the body. A squat or lunge movement is a good illustration of CCE. The legs and feet bear the weight of the body. CCE requires a dynamic response from the whole body to perform the movement correctly, safely and most efficiently.



Though not classically defined as CCE, any exercise that partially supports the body weight and requires an integrated response from the body's musculature can be characterized as CCE. A push-up position that is held with the feet placed on the dome of the Balance Trainer is a good example. The arms and hands partially bear the weight of the body and an end segment of the chain (the hands) is "closed," "fixed" or weight bearing.

OCE is best characterized by isolation, whereas CCE is best referred to as dynamic, functional, and working in concert with the body as a whole, integrated unit. Both types of training, depending on application and participant needs, are considered excellent ways to condition the body. The best results will be realized when one uses both approaches.

ten characteristics of functional training

The following characteristics of functional training help to define what a functional activity is comprised of, as well as providing a framework from which to teach in a safe, logical manner (adapted from Brooks and Brooks 2002, BOSU Integrated Balance Training Manual).

For activity or training to be considered functional and related to daily or sport movement requirements it should:

- 1. Focus on integrated movement, not isolated action at a joint.** Though it is important to strengthen specific muscles in isolation, functional training focuses on practicing parts of a movement, combining the parts into movement patterns, and practicing the whole skill in an integrated fashion. This rehearsal continues with the introduction of instability as is appropriate to the skill progression and goal of training. This type of movement practice is not necessarily sport specific, but recognizes that many of the movement patterns and specific energy system usage are common to many sports. Functional movement integrates multiple joint movements – linking movement together in the kinetic chain – and moves away from muscle isolation. Also, when movement is linked via joint action in the kinetic chain, note that during dynamic movement, simultaneous stabilization is occurring in some joints of the body.
- 2. Present an unpredictable movement challenge.** Sport participation, by its nature represents, 1) imbalance or an effort to maintain balance, and 2) an uncontrolled, dynamic environment. All movement exhibits a degree of randomness and chaos, but it is from a position of optimal alignment and balance that peak performance expression is developed. A common expression describes sport as "organized chaos." On the other hand, some elements of "play" are fixed. For example, a diver or gymnast contends with fixed challenges that are presented by height of a diving board, spring of a vaulting board or the challenge of quieting the movement of still rings. A tennis player or downhill ski racer interact with fixed elements that include using a familiar racquet with a specific string tension, or skiing a familiar race course on a favorite pair of well-tuned skis. But, athletes also contend with changing elements that can include wind, snow conditions, terrain uncertainties or in the case of a tennis player, an opponent who counters with unpredictable strategies, of which all can impact performance. Functional movement is dynamic and requires the participant to speed up, slow down, stop, change directions, move in a variety of planes, react to ground forces, contend with gravitational forces, alter the amount of force production, stabilize, change body angles, modify line of sight and constantly adjust and react.
- 3. Introduce multi-joint movement that occurs in multiple planes.** The body, which is the organic representation of the kinetic chain principle, moves in multi-planar fashion whether performing a sport at a world-class level or lifting a bag of groceries. Functional movement occurs in a three-dimensional environment at any level of physical movement and involves moving in multiple planes. To challenge movement functionally, exercise must be provided that occurs in the sagittal plane (divides the body into right and left halves as it passes front-to-back), frontal plane (divides the body into front and back halves as it passes side-to-side) and transverse plane (divides the body into top and bottom halves). Within these basic planes of movement are infinite movement variation possibilities. In other words, the body must be trained to bend, reach, stretch and simultaneously maintain balance while moving at a variety of speeds. This represents applied-power or the ability to use reactionary strength quickly, precisely and as needed. Linked force production via the kinetic chain provides movement that is useful.
- 4. Build complexity in a progressive manner.** Foundational fitness (primary components of fitness) must be established and basic movement skills learned before advanced training and balance skills are attempted, especially when introducing instability. Once these



elements are established, stability is trained before mobility. Stability training can progress from static to controlled-dynamic. A progression like this prepares the participant for advanced neuromuscular (motor learning) skill development that focuses on improvement of many of the secondary components of fitness and will ensure success, safety and skill advancement that builds on a logical foundation of movement ability.

5. Build intensity in a progressive manner.

As was true for the previous characteristic, baseline cardiorespiratory, strength and muscular endurance fitness, along with adequate stability and mobility must first be established. Initial loading during functional training should be accomplished by using body weight only. If appropriate, consider using external resistance (i.e., elastic resistance, weighted ball) as training progresses and specificity of training dictates. However, many people hurt themselves or their performance in the name of “specificity.” For example, it is arguable that excessively “loading” a golf swing or baseball pitcher’s arm motion while the skill is performed at full speed is dangerous, not specific and could negatively affect the complex neuromuscular patterns that make up many sport skills. (Refer to number 8 for additional information.)

6. Develop the body’s ability to stabilize and generate power from the core or trunk “power center.”

A variety of movements and types of training must be used to ensure a balanced approach to core training, as well as total development of the trunk region. Core movements should be trained in isolation (mover-type activity that includes spinal flexion, extension, lateral flexion and rotation), as well as using functional exercises that require the trunk muscles to synchronize their activation, resulting in a stabilized pelvic and spinal position. Stabilization training of the abdominal region represents a synergistic response that demands an integrated, interdependent action of the trunk musculature – which means muscles working together to stabilize spinal position. Functional training of the abdominal and back muscles involves training them in a manner in which they are required to work on a daily basis. The key function of the abdominal and back musculature is not to create movement at the spine, but to exert isometric or stabilizing muscular force production in order to maintain spinal and pelvic position. (Note: These comments are not intended to infer that mover-type or isolation trunk exercises are poor choices. The intention is to recognize that

stabilization training is different than active-isolation exercise, which utilizes movement at the spine, and that both should be used to optimally develop and challenge the trunk.) This ability to generate power from the core can be trained using static and dynamic exercises. See the previous chapter, Neutral Spinal Posture and Core Stabilization.

7. Challenge joint motions in a manner that acknowledges the degree to which sport and daily life movements are similar.

Developing general movement capabilities that have a high transfer and relevance to sport and daily life provides a clue that functional training approaches are generally not trying to create sport specific movement. This generalist approach views most activities as more similar than different and focuses on commonalities of daily activity and sport. The adage, “Train and practice like you play!” is a testament to quality of training in kinetic chain or functional training, as well as to the importance of specificity and sport skill practice. Transitioning from muscle isolation, to high-transfer functional activity, to skill practice and participation in the activity or sport brings the training paradigm full circle if improved performance is the ultimate goal.

8. “Drill” or practice in a manner that identifies and trains general skills that are integral to the performance of an activity or sport.

Basic motor skills – linear movement, lateral movement, diagonal movement, jumping, hopping, leaping, skipping, overhead throwing skills, striking, bending, reaching, rotating, weight shifts, single leg balance, and core bracing to name a few – are common to many sports and activities. Using drills for the sake of having a lot of drills is unintentional training and moves away from purpose driven functional training. Analyze activity and incorporate movement and balance challenges that mirror the activity or activities, and remember, focus on what sports have in common with each other. For example, rotary power training for the torso has a common link to baseball, softball, golf, tennis and hockey based on the swinging or striking motion used to propel a ball or puck. With this knowledge, an instructor can create workouts that emphasize a number of common skills, as well as simultaneously develop secondary fitness components that can result in training that improves coordination, proprioception and body control. Rather than indicating a drill is sport specific, understand the movement commonality factor and its application to other sports.



- 9. **Have a specific application in mind for accomplishing training goals.** Activity for the sake of activity is a dead end approach that goes nowhere. Without specific training goals, participants will drop out, become discouraged or get less than optimal training/performance result. Training must make sense (functional training makes sense to athletes!) and have application toward accomplishing the training goal of being able to move more effectively in a 3-D, dynamic world. This is called useable or functional training.
- 10. **Be fun.** Functional training, by its very nature can be fun. Though it is challenging, it is also rewarding and synchs-up with improved performance. It trains a person to move naturally. Since this type of training feels natural and is challenging, yet has direct links to personal success and every day movement applications, “fun” takes care of itself in the form of diversity, results and exercise compliance.

fitness and performance training hierarchy

Many instructors and trainers ask, “Where does functional fitness training fit in relationship to what I’m already doing?” or “Where does functional fitness fall in relation to the classic training hierarchy of cardio, strength and flexibility training?” The importance of developing a foundation of fitness components as they relate to health and performance has been expressed in a number of ways and by revisiting both primary and secondary components of fitness the answers to the above questions becomes quite clear.

A triangle-hierarchy of importance generally places primary components of fitness near the base of the triangle (most important initially or critical to a base of fitness), followed by secondary components of fitness, which then leads to the top of the tier which represents a desired outcome as it relates to integrated movement capability and accomplishment of training goals. In this case, the top of the triangle is “performance.”

primary fitness components

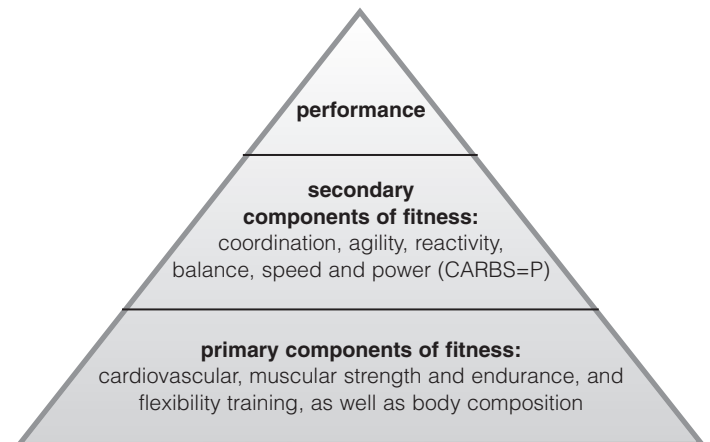
As the Fitness and Performance Training Hierarchy diagram shows, primary components of fitness include cardiovascular fitness, muscular endurance and strength, and flexibility fitness, as well as teaching a participant the basics of how to attain a healthful body composition ratio of fat to lean mass. This basic foundation highlights the importance of overall fitness and proper nutrition.

Though there is some functional transfer of this basic foundation training to real-life movement and sports participation, the development of secondary fitness traits distinctly marks where the training outcome shifts to training for function and has a high-transfer to performance. This step moves training from less useful to more integrated and useful as it relates to fitness and movement. To reiterate, one type of training is not necessarily better, or worse, when compared to another. They are simply different.

secondary fitness components

Secondary fitness traits can be represented by the acronym CARBS = P. With a base of cardiovascular, strength and flexibility fitness established, an important training goal becomes one of transitioning this less functional health/fitness/aesthetically oriented fitness foundation into integrated movement ability. It must be noted that some secondary fitness traits can be trained simultaneously with primary components, but regardless, it is important to “change-up” your program at some point using a planned and periodized approach that emphasizes this type of training on a regular basis. This planned variety should specifically include training that develops a host of desirable athletic traits that include the following secondary fitness components: **C**oordination, **A**gility, **R**eactivity, **B**alance, **S**peed and **P**ower.

CARBS = Power represents an expression of movement, when developed, that defines applied-power and is important to every individual. Power is simply a combination of strength and speed capability expressed over time. CARBS=P essentially represents a power-formula for developing athleticism, which leads to power-movement capability that is appropriate for any of life's physical requirements or challenges.



FITNESS AND PERFORMANCE TRAINING HIERARCHY



performance continuum

Proper development of primary and secondary components of fitness ultimately results in improved physical activity skills and leads a trainee to a properly evolved top-tier of the triangle that is characterized by better performance. Performance, like functional training, should not be narrowly defined.

performance

Improved performance can lead to an enhanced ability to handle the requirements of daily life, occupation, recreation/leisure, athletics and sport, as well as prevent or minimize the potential for injury. Performance improvement in individuals is not limited to high-level athletes.

performance continuum and athleticism

Athleticism and performance improvements are important to everyone! Having stated this fact, most would agree that professional or world class athletes should develop power and athleticism. But, does a seventy year old woman need power and athleticism or need to maintain or improve “performance?” The answer is an emphatic, “Yes!” If, for example, an older person was to stumble, then correct his or her loss of balance and remain standing, professionals in-the-know would rate that feat as a gold medal performance. Why? The consequence of a fall that results in a fractured hip in a seventy year or older adult can be lethal. The risk of dying because of related complications can run at eighty percent or greater. Avoiding a fall is quite a “performance.”

It is important to broadly define performance and see “it” for what it means at a personal level. If an average individual was asked to associate a word or phrase with “performance,” most responses uttered would include “athlete” or “world class” or “professional level competition.” Few would connect “performance” with a seventy year old adult. This is a mistake. All humans have “performance goals” that range from sustaining normal day-to-day function, avoiding injury and living fully, to performing at a world class level. The ability to perform functionally on a broad “performance continuum” runs the gamut from being the best in the world, to performing life skills more efficiently and safely, to preserving physical independence and even life! Avoiding a fall is comprised of an ability to act “right now” and is an expression of applied-power and athleticism (CARBS=P), where applied-power equates to an ability to use the right amount of force, or strength, quickly. The same holds true for high-level athletic performance, though the activity being performed is different.

“Performance goals” can be created for anyone so that they match current movement capacity, fitness/health needs and functional movement requirements. All individuals have important “performance” goals and “perform” on a daily basis, which makes functional training important and useful to everyone.

identifying different types of functional training applications

Even within the realm of professionals who support and believe in the concept of functional training, some confusion exists with regard to what constitutes functional exercise.

To be able to see the different possibilities that exist, remember that functional training prepares people to move. It's that simple. But, it is a moving target depending on the goal, stage of training, physical imbalances and injury status. That's why a black and white definition doesn't suffice. Instead, an understanding is required if one is going to be able to wrap his/her brain around this concept. Seeming contradictions are everywhere with regard to functional exercise, which can add to the confusion surrounding this form of training.

functional training paradoxes

Function varies from joint to joint for any given movement, and can change during movement! Though it holds true that functional movement is generally represented by upright, weight bearing and multi-joint movement that requires simultaneous motion and stabilization, the physical demands can change moment-to-moment and situation-to-situation.

For example, the lumbar spine might be required to flex or extend one second, and stabilize the next. Or, one instant the ankle can be commanded to hold a static position, and in the next moment help propel the body from a surface with a strong plantar flexion movement. Motion and stabilizing actions are constant and ever-changing in dynamic movement environments. Some exercises require functional stabilization at certain joints, others movement, and still others mobility to improve performance. All could be classified as functional.



Generally, for example, one would train scapular stabilization or fixation in isolation to teach the skill and develop this skill foundation to precede isolated rotator cuff training or diagonal pulls (wood chop motion). Outside observers would see the scapular retraction and isolated rotator cuff exercises as isolation exercises that are less functional, and would classify the trunk-rotating, high to low diagonal pulls using a functional load (elastic resistance) as integrated functional training. A straight arm plank (sustained push-up position) performed with a neutral or partial scapular retraction could be seen as functional with regard to the held scapular position, and the rotator cuff muscles of the shoulder could be seen as being trained functionally because of the static stabilizing force produced in these muscles while this position is held.

With regard to each situation above, it is easy to see the justification and importance of such a progression, and why someone who supports functional training would still use isolation exercises for some aspects of the training program to optimize the training result and minimize injury risk. At the same time, one can see why these types of scenarios can create confusion. Training choices do not have to revolve around an all-or-none philosophy. Ultimately, a professional will move from preparatory or necessary isolated movement to more integrated, coordinated and multi-joint movement as conditioning progression allows. This understanding gives professionals the choice to use both types of training.

Range of motion might intentionally be limited in a particular area of the body if stability is being trained, or during rehabilitation when motion at a joint, or joints, causes pain. Some would call this rehab, but it's also another form of functional training where the goal and circumstance is matched appropriately with a type of training. Other times it is necessary to "isolate" stabilization or movement at a single joint, before progressing to more integrated, head-to-toe movement. Rather than being confused, choose to see functional training and its appropriateness as a moving target!

functional training continuum

Keep this continuum in mind. Useful training moves from isolated on the far left of the continuum, to functional or movement that has a high transfer to real-life and sport at the middle of the continuum, to playing the sport or participating in skill rehearsal or practice on the far right.

Functional training prepares one to move well. It has been stated that moving well includes having the ability to express varying degrees of motion, stability and mobility.

The key is to understand and see the variety of functional training applications that adjust with individual need, goals and changing physical state. Ultimately the goal is to progress less useable, isolated fitness gains, into more useable fitness. Training functionally, or preparing the body to move and teaching muscle groups to work together from head to toe and in a coordinated fashion, is the ultimate goal. Now it is obvious why a black and white definition of functional training does not exist. Instead, exercise choice and progression relates more to a degree of appropriateness or properly matching the exercise to the current situation.

That's why functional training can be characterized as a fluid-concept. It has many applications and functional or integrated training may not be the best choice for some training or rehabilitation settings! One has to keep a keen eye focused on how and why people move for a given training situation. The ultimate training outcome is not stand alone strength, cardiovascular or flexibility fitness. Instead, the goal is to improve movement ability and performance, and not, for example, create strength for the sake of strength. Development of secondary fitness traits moves beyond this level of training.

Asking two questions will help professionals discern functional training. First, "What does this activity have to do with muscles working together to improve performance?" Before you ask the second question to help differentiate this form of training, realize it is okay and necessary to use traditional forms of training. It is also encouraged that one prepares the ground work for integrated functional movement by using isolated movement, if necessary, to accomplish that foundation. Finally ask, "Are muscles being trained to prepare individuals for movement in a manner that reflects the way they are used in sport and daily life?"



understanding where and why functional training fits in a training program

Controversy or at least confusion exists with regard to functional and traditional (i.e., strength training, weight lifting, sprints, plyometrics, training on stable surfaces, etc.) approaches to training. Often, extremists from both camps pit one versus the other. This is not necessary. More important, is to understand what each type of training can, and cannot, accomplish. Simply, they are different. Applied movement should focus on a “new” view of muscle function as it relates to the kinetic chain and muscles working together to perform movements (Boyle, 2004).

Functional training should be integrated, or become part of a program or class design scheme, not take it over. Functional training only programs cannot stand alone as an exclusionary approach to training. Too much of a “good thing” is not always better, and conversely, absolute rejection of a well-founded concept by those who stand by the use of traditional training practices only, is equally off track. If a professional chooses one type of training over another to the exclusion of other science-based approaches, at the least, training is not being accomplished in a complete manner. For those who state there is not enough science to support functional training as a science-based approach, equally true is the fact that there is no science that unequivocally disproves this approach. Obviously, more research is needed to clarify its effectiveness and use in training. However, it is clear that functional training will always have a place in a periodized and progressive program that meets all of the needs of trainees because it works and makes sense!

Material in this chapter adapted from Douglas S. Brooks' live workshop presentations and The Complete Book of Balance Training (in press), by Gregory Anderson, Douglas Brooks and Peter Twist.