

MODULE 6

THE FUNCTIONAL AGING TRAINING™ MODEL

Objectives

1. Describe the characteristics of functional task training.
2. Recall the 4 Cornerstones of the Functional Aging Training model
3. Describe the 2 Pillars (specificity and progressive overload) of the Functional Aging Training model
4. List and explain the 7 Key Principles of the Functional Aging Training model

Introduction

Almost any type and amount of exercise is good for older adults compared to doing nothing. Just meeting the minimum guidelines for cardiovascular, resistance and flexibility exercise can improve their health, fitness and functional abilities while helping to protect against chronic diseases and functional decline. Organizations, like the American College of Sports Medicine, have provided excellent recommendations regarding exercise types, intensities and quantities based on solid research for adults of all ages. However, the difficulty in creating “universal” guidelines and recommendations for older adults is that this population is extremely diverse and the recommendations focus more on health-related outcomes rather than functional abilities. From a functional perspective, the diversity within the older adult population dictates that an individually-tailored approach is most appropriate.

Recently, novel methods of training have been developed and evaluated for their ability to improve functional outcomes in older populations since this is often the ultimate result that is being sought

(as opposed to strength or aesthetics). Often referred to as multicomponent or functional task training, these programs are based on the concept of specificity and typically focus more on the replication of daily tasks (or similar movements) with a much greater emphasis on addressing a broad range of functional components. Special attention is often given to challenging motor control and coordination. There is a recognition that, as one researcher stated, there is a “complex interplay of cognitive, perceptual and motor functions that are involved in the performance of daily tasks”. Functional task challenges are accomplished by using whole-body movements, often with environmental manipulations, and few, if any, traditional isolation-type exercises. While there is still a lot of investigation to do in this area the initial research appears very promising with several studies concluding that functional task training is more effective than traditional resistance exercise training for improving function. Given the wide variety of training protocols and outcome measures that have been used it is difficult to determine an optimal exercise prescription for maximizing functional outcomes. However, these types of studies demonstrate the power of a more “functional” approach to training for older adults.

As mentioned previously, since individuals also vary widely in their needs and abilities, an individualized approach is warranted. The Functional Aging Training™ Model (FATM) has been developed based on the current research to help fitness professionals adopt a more functionally effective approach with their mature clients. For some trainers these concepts and the overall approach in the FATM may be new and innovative. For other trainers the FATM may reinforce and provide more structure to the approach they have already been using.

The FATM system is a dynamic process that includes the following steps:

- 1) Perform an in-depth health history interview to glean all pertinent medical information including the client's exercise experience and functional goals;
- 2) Administer the appropriate screening and fitness assessments to determine the client's functional level (according to the Hierarchy of Functional Aging) and to identify deficits across the 6 functional domains (and their subdomains);
- 3) Create a training program that prioritizes their specific deficits while simultaneously addressing as many of the other domains and subdomains as possible and considers their health conditions;
- 4) Perform ongoing qualitative assessment to determine what tweaks or changes (including progressions and regressions) need to be made to their program in order to keep them moving successfully towards their functional goals;
- 5) Perform follow-up assessments on a periodic basis as needed in order to gauge progress and update their program appropriately.

It is important to note that function is prioritized over any specific disease condition. The reason for this is very simple – everyone needs to enhance or retain their functional abilities no matter what disease condition they may have. As we briefly explored in the Nagi Disablement Model, exercise can directly affect and be affected by a disease process but can also directly affect impairments even in the absence of disease. Exercise is recommended to prevent and treat almost every major chronic condition although the specific guidelines on what to do, how much to do, how often to do it, how hard to do it, etc. may vary. Since every older adult needs to be able to function well and exercise is good for these chronic conditions then the conditions themselves become a secondary factor in the programming model.

Consider two individuals that are both 75 years old that have poor lower body strength and power and are struggling to get out of a chair and climb stairs. The first person has no specific conditions while person two has significant osteoarthritis of the knees. They both need to get stronger and more powerful in order to make these functional tasks easier and the presence of osteoarthritis doesn't change that. The programming would likely still include leg press, leg curl, leg extension,

calf raises, sit-to-stand, squat, deadlift, step-ups, etc. What would change are the programming variables such as load, sets, reps and maybe some of the corrective exercises. For example, the person with osteoarthritis may perform more reps at lower loads and with a smaller range of motion in order to decrease their symptoms of pain and stiffness in their knees. However, as their symptoms decrease over time with regular exercise participation then some of these restrictions can be lifted. Guidelines for specific conditions will be presented later on so that you can make these adjustments appropriately.

Critical FATM Concepts

The Trajectory of Functional Aging; the Hierarchy of Functional Aging; and the 6 Domain Model of Physical Function have already been described. These are critical concepts that need to be considered key components to the FATM. In this next section we will build on these concepts by describing the 4 Cornerstones; the 2 Pillars; and the 7 Key Principles which complete the core aspects of the model.

The 4 Cornerstones

Any credible system must have a strong foundation. The FATM has four cornerstones that together form an incredibly stable foundation for the rest of the program. Each of these alone is good but when joined together they create an incredible synergy that magnifies their impact.

Briefly they are:

1. An in-depth UNDERSTANDING of the aging process and its implications for exercise.
We've already discussed many of the changes that are associated with getting older AND how lifestyle impacts these changes. We've also seen the huge variability in how

these changes affect older adults. Older adults typically have unique needs and considerations but making assumptions based on age leads to inaccuracy.

2. A RECOGNITION of the desires, goals and aspirations that accompany the later stages of life. They may be old but they're not dead! Many older adults still have a zest for living their lives and want to be or remain as functionally capable and healthy as they can for as long as possible. This will enable them to do all of the things that bring them joy and happiness such as working, playing, travelling, spending time with family, and much more.
3. A strong BELIEF that people can be fit, healthy, vibrant and functional at any age. Exercise is powerful and especially so for older adults who have been inactive. While it is always best to begin exercising early in life the research is very clear that exercise begun in late life can yield significant benefits for a person's health, physical abilities, mood, mental status and more. To believe otherwise promotes ageist myths and misconceptions that perpetuates stereotypes about growing older. Older adults often harbor the same negative beliefs about aging which hold them back from living a meaningful and active life.
4. An APPROACH to exercise that is grounded in evidence and honed with experience. It is critical that what we do with older adults is backed by research rather than the newest fad or latest piece of equipment or even ageist traditions. The scientific evidence speaks very clearly in some areas; not so clearly in others; and is rather silent in others. This is why experience also matters. Research has its limitations so we must continue to forge ahead by building on top of the evidence with our own (and even

other's) experiences as to what techniques, strategies and programming works best for different types of clients.

The 2 Pillars

The foundation supports two key pillars that form the core of the FATM system and which many programs miss entirely. These pillars are the concepts of functional specificity and progressive overload. A good understanding of these concepts as they apply to training older adults will enable you to get the most out of the program.

The ***Pillar of Functional Specificity*** states that how a person trains determines the type of gains they make. This can also be stated as, “How you train is how you gain”. In other words, the kinds of exercises that a person performs, and how they perform them will determine the type and magnitude of results that the person sees. This principle is obvious when we consider someone who starts a walking program because they want to improve the strength of their arms. Even to the untrained eye this doesn't make sense. Walking may be a good choice for improving cardiovascular endurance and decreasing health risk but it has virtually no impact at all on arm strength. It is the wrong type of program for the desired results.

Most mature adults would say that one of the most important results that they would like to get from exercise is increased physical function so they can move better and easier with less discomfort and pain. This may mean playing golf or tennis, traveling, enjoying hobbies, playing with grandchildren, performing yard work, or whatever it is that is important and enjoyable to

them. The FATM is focused very specifically on using strategies that will increase physical function for your older clients so knowing their functional goals is an important step.

For example, one older client who was rehabilitating from a total knee replacement had a strong desire to return to downhill skiing. His family owned two ski-out condos at two different ski resorts and they spent lots of time there every winter. It was an activity he had enjoyed for a long time and created opportunities for him to spend quality time with his loved ones. Unfortunately, his orthopedic surgeon told him that he should give up skiing so he was feeling very discouraged. During his client intake evaluation, it was determined that his primary goal was to get back to skiing if he could. Skiing is a dynamic, high-intensity activity that requires strong, powerful legs, hip mobility, dynamic balance, quick reaction times, and lots of lateral agility. Training for this functional activity is obviously very different from training for activities of daily living or other less dynamic tasks. Therefore, he performed exercises, tasks and movement strategies that most other clients did not so that he could achieve his personal functional goal.

The ***Pillar of Progressive Overload*** states that the body must continually be challenged with more difficult tasks or exercises in order for it to continue to adapt and grow. The body will adapt only to the level of challenge that you give it and will not improve any more until it is given a greater challenge. There are lots of ways to progressively overload the body such as lifting heavier weights, completing more repetitions, performing the exercise for a longer period of time (e.g. jogging for 30 minutes instead of 20), increasing the intensity, or making a movement more complex. This program uses a myriad of methods, many of which you will rarely see used by even

“expert” trainers, to continually overload the body’s systems so that you continue to make improvements.

There seem to be many older individuals who have missed this principle completely in their own exercise routines. They either think that what they are doing is “good enough” for a person their age or believe that working out harder will be dangerous for them. It is likely common to follow up with a client or member that has been working out for several months only to find out that they haven’t changed their program at all since day one. Their program was kind of tough the first couple weeks and then it became pretty easy after that because their body adapted. Sometimes this can go on for years or even decades.

Trainers also need to understand progression. The vast majority of fitness professionals know how to appropriately progress a resistance training program in order to increase muscle strength. But how many could do the same for increasing proprioception, gait, mobility, muscle power or executive function? These are not areas that are typically addressed in most college degree programs or fitness certifications but there are many ways to progress these functional domains that will be addressed in this course. It is also important to consider the importance of regression in order to achieve proper progression. Someone who is overloaded too much and too soon can experience negative outcomes such as injury or it could stall their progress. Regression is especially important for older adults because their physical status varies more widely from day to day and month to month than other populations.

Strategies for scaling exercises (i.e. for progression and regression) will be discussed later on. With older adults it is important to be able to make smaller, rather than larger, changes to their program and from client to client. Doing this effectively is just as much art as it is science but there are numerous options available for scaling exercises that many trainers are not proficient with using.

A Solid Structure: The Seven Key Principles

The final components of the Functional Aging Training model are the 7 key principles. These principles are “big picture” recommendations that have been distilled from hundreds of research studies as well as years of experience training thousands of clients of all ages and abilities. They can, and should, be used with all older clients regardless of ability, health condition or age whenever possible.

The 7 Key Principles

1. Assess, prioritize and train ALL components of function
2. Make purposeful decisions for every aspect of training
3. Integrate movement patterns (train in all 3 planes) to prepare for functional demands
4. Include isolation-type exercise movements as supplementary and complementary rather than the primary component of the routine
5. Perform exercise movements in a seated position only when absolutely necessary or when it serves a specific purpose
6. Order the session according to energy level with more complicated, multi-component movements occurring earlier and less complicated, isolation-type movements occurring later
7. Maximize client safety and success by taking a holistic approach to training

Let's take a closer look at each one of these important principles.

Principle #1: Assess, prioritize and train all components of function

Since older adults vary widely in their physical abilities their exercise needs will also vary widely from person to person. As discussed earlier, the best way to determine an individual's needs is to perform a broad range of functional assessments. The areas of need (i.e. impairments) that are identified in the assessment process must become the highest priorities to address first since these are the “weak links” in their capabilities. When at all possible it is helpful to continue to include the other areas in their program so that they are at least maintaining, if not improving, in all areas. This may not be possible if there are limitations such as time and energy. For example, an older client may only be willing to exercise three times per week for 30 minutes each session. If they have large deficits in several domains then there may only be time to address these specific areas given the limited amount of time available. In some cases, the older adult has more time to give but their level of conditioning and energy is so low that they move slowly from one exercise to another and need lots of rest breaks.

Don't fall into the trap of believing that your goal is to develop a “well-rounded” exercise routine for your clients meaning that you have to focus equally on all domains. Well-rounded routines are effective for many populations including older adults because movement and exercise are powerful stimuli to the body. Even just getting sedentary older adults to walk every day is beneficial for them but it will not **maximize** their function and this is especially true for those that have already lost a significant amount of function. Older adults benefit the most from a focused and prioritized routine.

There is a story that is a good analogy for this type of prioritized approach. The story goes that there was a business professor who wanted to make an impression to his graduating class of students. He placed a large empty mason jar on the table in front of the class and proceeded to fill it with baseball sized rocks. He took several minutes maneuvering the rocks into the jar in just the right way so that no more rocks could fit. He then held up the jar and asked the students if the jar was full. The students replied “yes” wholeheartedly. The professor pulled out another box of smaller pebbles and slowly poured them into the jar. The pebbles slowly filled in the empty spaces in between the larger rocks. Again, he took several minutes to pour, shake and maneuver the pebbles into no more could fit. He again held up the jar and asked if the jar was full. The students hesitantly replied “yes?” The professor then pulled out a pitcher of water and slowly poured the water into the jar. The water slowly filled in all of the small spaces in between the pebbles. When the water reached the top of the jar he put the pitcher down and asked the class “What was the point of this demonstration?” Being eager business students ready to make their fortunes in the world many replied with comments such as: “No matter how full the jar is you can always fit more into it” and “However productive you might be you can always be more productive”. “No”, said the professor, “the point is to always put the big rocks in first”. His point is not only great advice for life but exemplifies an effective approach to exercise program design for mature adults.

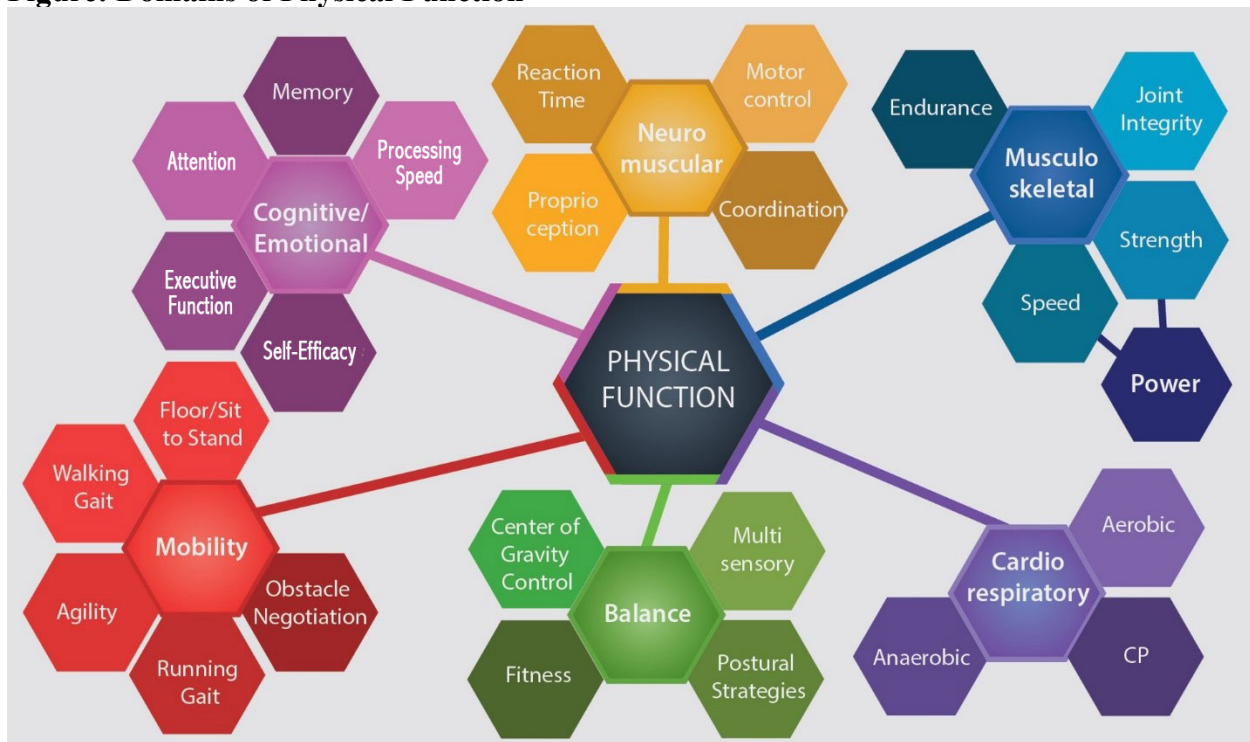
It is appropriate and effective to focus exclusively on strength and power training (Musculoskeletal Domain) IF that is the area that is most impaired. Improving this single domain could have a significant impact on their functional ability. Once the impairment is improved there may be other domains that now become the priority of the program (while still maintaining the improvements in the Musculoskeletal Domain). Of course, the TYPE of strength and power exercises they

perform is dependent on the other domains. A person who is sarcopenic (severe loss of muscle mass, strength and power), has poor balance and low cardiorespiratory function may need to perform their strength and power training on machines (most likely) at first. As their strength, power and balance improve then they may be able to transition to standing free-weight or band exercises which will put them in more functional positions. Do not ASSUME that a person cannot perform a standing free-weight exercise. Even frail older adults can often perform stable standing exercises such as kettle bell deadlifts.

The rule of specificity also applies here. While there is definitely an overlap between the six functional domains (see figure below) there is also a significant degree of separation and the overlap between them varies considerably. For example, training the cardiovascular domain can have a significant impact on the cognitive domain but has very little impact on any of the others. Strength training has a lesser impact on the cognitive domain but there is some overlap with the mobility domain since it can improve all movements that are strength-dependent. Contrary to popular belief, strength training has very little impact on the balance domain and its relationship to physical function overall is complicated (to be discussed in greater detail later on).

A deficit in any of the six domains can have a significant impact on functional ability. However, as discussed in the section on the physiology of aging, most adults have some degree of impairment in multiple domains. Even adults with similar levels of functional ability may differ in which domain or subdomain is impaired the most and needs to be prioritized in the training program.

Figure: Domains of Physical Function



Principle #2: Make purposeful decisions for every aspect of training

Fitness professionals today have more training options than ever before and therefore they must be prudent in selecting training methods, techniques, specific exercises, progressions, equipment and environment for their clients. If a proper and thorough assessment has been conducted then this task becomes significantly easier. As mentioned in Principle #1, the myth of the well-rounded routine is entrenched in our minds. It creates feelings akin to guilt if we don't include exercises for "every major muscle group" or we include exercises for a muscle without also including exercises for its corresponding antagonist (e.g. bicep and triceps).

Consider a chest press exercise. This movement is almost always included in a traditional strength training program for older adults. Does having stronger chest muscles equate to better functional ability somehow? One researcher stated that unless an older adult gets up in the middle of the night and the refrigerator falls on them they probably don't need to be able to chest press a lot of weight. There is a limited amount of time that the client is going to commit to exercising. Why waste it by including exercise movements that do not serve a specific purpose according to the individual's needs and goals?

The choices you make for your client determine (to a large extent) the potential results that they will realize. If someone were to observe you training a client would you be able to tell them the exact reasons why you are including that particular exercise in that particular manner (equipment, sets, reps, resistance level, speed, body position, etc.) for that particular client in that particular phase of their training program? Basically, could you defend the choices you make with either evidence or sound clinical/professional reasoning and how they are going to take the client from point A to point B?

Unfortunately, many trainers cannot adequately communicate their rationale for their approach. There are many factors that influence training choices and can get in the way of making purposeful decisions. For example, the use of unstable surfaces such as foam pads, balance cushions, wobble boards and BOSU to make exercises "more functional" has become ubiquitous. Although these devices have become very popular there is little empirical evidence to show they confer any additional advantages with most populations and have several disadvantages to using them have been identified (Anderson and Brehm 2005; Anderson and Brehm 2006; Schilling et al 2009).

They do have their place in fitness and therapy and can be very beneficial when used to address specific issues and conditions but it seems that most trainers use them purposelessly.

Variation can be a valid reason for using a new tool with a client even if it is not the most effective from a physiological or functional perspective. Keep clients interested, motivated and engaged in the training session is important and “mixing it up” with fun tools, games and movements can do that. Variation can serve an important function of improving retention and providing progressions. However, variety must be balanced with consistency. Using too much variety can hamper results.

Principle #3: Integrate movement patterns (train in all 3 planes) to prepare for functional demands

Life is three-dimensional. People reach, bend, lean, turn, twist, stoop and change directions constantly throughout their day. In essence, they continually face challenges in the frontal, sagittal and transverse planes. Why then do most exercise routines for older adults appear to be so one-dimensional? There are several reasons that may have contributed to this: 1) The fitness industry has been, and continues to be, heavily influenced by its body-building roots. While functional training methods and tools are becoming more popular the majority of the industry still focuses on the aesthetic goals of younger members and clients. This means using machines or free weights to isolate individual muscle groups for maximum hypertrophy. 2) Sarcopenia (age-related loss of muscle mass) is still regarded by many as the primary enemy of function with advancing age. Therefore, if muscle loss is the enemy then the cure must be to maximize muscle mass gains through heavy resistance training using the aforementioned body-building methods and equipment. 3) Trainers that work with older clients may not have specialized training for this population and therefore simply transfer what they know about training younger clients to their

older clients with some “common sense” modifications. Take, for example, a slightly overweight but healthy woman in her early 60’s, who trained with a former bodybuilder. The trainer had given her a modified bodybuilding routine for her that had little to do with her individual needs or goals. The modifications including “common sense” strategies such as doing bicep curls seated instead of standing (and with very light weights); performing crunches on an incline bench set at about 45 degrees (so that it assisted her); and incline chest press using very light dumbbells. It was obvious that this trainer had little to no knowledge, skill or experience working with older adults and therefore simply adopted what he did know (bodybuilding) to serve his client. This type of approach is all too common in the fitness industry and does little to improve the functional abilities of older adults.

In his book, *Bending the Aging Curve* (2011), Dr. Joseph Signorile explains the importance of using multi-planar exercises and describes an interventional approach for turning fitness gains into functional gains. He describes the use of a periodized model in which a physiological training cycle is followed by a translational motor learning cycle. The physiological training cycle is focused on improving the primary components of fitness such as strength, flexibility and aerobic capacity using traditional methods. The translational training cycle is focused on increasing functional capacity through multi-dimensional, motor control tasks of increasing complexity. Strategies for increasing task complexity include using multiple joints; shifting to dynamic tasks; altering base of support; adding object manipulation; using multiple directions; and multitasking. The basic stationary lunge can be used as an example.

During the physiological training cycle the lunge can be performed in a typical manner using dumbbells for extra resistance as needed because the focus is on simply building strength in the lower extremities. During the translational motor learning cycle the stationary lunge would need to become more complex because now the goal is to improve motor control/coordination and “teach” the client how to use their new-found strength to successfully complete functional tasks. This could be accomplished by making the lunge multi-directional; picking up and putting down an object with each lunge (such as a telephone book); or responding to changing verbal demands.

The multi-dimensional training approach falls in line with the advice of other experts in the field such as Gary Gray, PT, Gray Cook, PT, Juan Carlos Santana and Stuart McGill, PhD (2007, 2009) who advocate for a lesser focus on traditional strength training methodologies and a greater focus on multi-planar movements that challenge the body in ways that are more beneficial to functional task performance. The application to older adults is significant since multi-planar challenges and multi-directional movements often become more difficult for them due to deficits in many domains and subdomains.

Principle #4: Include isolation-type exercise movements as supplementary and complementary rather than the primary component of the routine.

Are seated bicep curls functional? Before reading any further think about it and make your decision. If you decided they aren’t functional then bicep curls should not be a part of the training routines you develop for your mature clients. If you answered that they are functional then you should include them for all of your clients. But, some of you likely answered “maybe” or “they could be” and this was the prudent choice. It is tempting to consider exercises in a dichotomous way: either/or, yes/no, good/bad but this is almost never the case. Are bicep curls functional? To

answer the question, we need to determine whether or not the bicep muscle is important in functional tasks.

It would certainly be difficult to pull a lawnmower handle or open a door without bicep strength. Lifting a jug of milk, carrying luggage (or virtually anything for that matter), vacuuming, or even pulling on a pair of pants would become much more difficult to even impossible without an adequate amount of bicep strength. Therefore, if someone lacks adequate bicep strength to perform these or other functional tasks then yes bicep curls are functional for that person. But what about someone who already has adequate bicep muscle strength? Will building even larger, stronger biceps going to improve their function? Probably not that much if at all.

Now what about using leg extensions to improve quadriceps strength? Or shoulder presses for deltoid strength? Using isolated strength techniques for individual muscle groups offers some benefits for combatting sarcopenia, building strength and, to a lesser degree, for improving function. So, it is difficult to conclude that these exercises are not functional. Rather it is better to view them along a functional continuum with some exercises having a more distant relationship to functional performance (e.g. less functional) and others having a closer relationship to functional performance (e.g. more functional).

While individual needs must always be considered the evidence points to the use of multi-component exercises as the primary focus of an exercise routine for mature clients. Isolation-type movements are best at improving the strength of the targeted muscle group yet strength is only one component of function that needs to be addressed and significant improvements in muscle strength do not necessarily equate to similar improvements in functional performance (Latham et al 2004).

Therefore, it is advisable to use isolation-type movements only when indicated with a client. For example, a client that significantly struggles (or is unable) to rise from a chair independently is likely suffering from a lower-extremity strength deficit. In this case it would be advisable to perform some isolation-type exercise movements to build strength in the quadriceps, glutes, hamstrings and calves (although improving muscle power would be more appropriate) for a short period of time. However, as soon as possible this individual needs to engage in exercises that develop proprioception, balance, center of gravity control, postural stability and visual and somatosensory feedback which are also likely limiting factors in performing the task of rising from a chair.

Another appropriate use of isolated strength movements is to correct a deficit in a specific muscle group or to activate a muscle group. The terms “mush butt”, “gluteal amnesia” and “dormant butt syndrome” refer to the situation in which older adults do not actively engage or use their gluteal muscles appropriately during hip-dominant movements such as squatting. The gluteal muscles are the most powerful of the hip extensors so it is vital that older adults use them effectively. In this situation it is often difficult to get these clients to perform proper hip-dominant patterns because they have learned improper muscle activation patterns that need to be corrected. Isolated movements for the gluteal muscles, such as side leg raises, clam-shells, hip dips (in single leg stance), lying hip bridges and donkey kicks, can help activate and strengthen them so that they can be used more effectively.

Principle #5: Perform exercise movements in the seated position only when absolutely necessary or when it serves a specific purpose.

It is all too common for older adults to walk into an exercise class for “seniors” only to perform 30 min of “gentle” exercises while seated in a chair. These programs are typically built on the stereotype that older adults are frail and lower functioning. From a functional perspective, seated exercise interventions have been shown to be inferior to standing (weight-bearing) exercise interventions in several areas including balance and mobility (Vogler et al 2009). Mobility is a critical component for the continued health and longevity of mature adults. Loss of mobility usually means loss of independence and increased risk of falling and can lead to a downward “death spiral” of declining health and activity levels. Falls are a significant threat to the mature population often leading to hospitalization, the need for long-term care or death.

There are many advantages that standing exercises offer over seated exercises. Standing utilizes many more muscle groups than sitting and is a more complex neuromuscular challenge that requires greater degrees of strength, proprioception, center of gravity control and postural stability. A recent literature review on effective balance training protocols (Sherrington et al 2011) recommended as best practice: 1) training and challenging base of support (e.g. narrow stance, tandem stance, one-foot); 2) training center of gravity control; and 3) modifying or reducing the use of the upper body (such as hands). Of these three, training center of gravity control is the only one that can be addressed in a seated position although only at a much lower level of challenge. This isn't to say that seated exercise doesn't have its place. Like any other tool it needs to be used judiciously to address the individual's needs.

Seated exercise may be purposeful when:

- a. The client is becoming fatigued
- b. The client is not yet ready for higher-level progressions involving standing postural positions or they cannot adequately control center of gravity
- c. The movement involves sit-to-stand transitions
- d. You want to remove postural or other variables for teaching/instructional purposes or to maximize force production (e.g. strength and power gains)
- e. The client is frail and/or at the lowest end of the functional spectrum (e.g. rehabilitation, nursing homes) (Baum et al 2003)
- f. The trainer/instructor cannot adequately monitor an individual with mobility impairments (such as in a group exercise setting)
- g. The client has a lower-extremity impairment precluding them from performing exercises in a standing position

Seated exercises are more appropriate for very low functioning individuals such as the dependent, frail and pre-frail. Higher functioning individuals will likely not be adequately challenged by most seated exercises with the exception of using seated strength machines to challenge individual muscle groups. Consider again Principle #2 which stresses the importance of having a purpose for everything. If you choose to include seated exercises for your older clients be sure that you are using them purposefully.

Principle # 6: Order the session according to energy level with more complicated, multi-component movements occurring earlier and less complicated, isolation-type movements occurring later.

During the course of an exercise training session it is typical for energy and focus to wane as both muscle and mental fatigue set in. For mature clients this loss of energy and focus can interact with poor functional capabilities to create potentially dangerous scenarios and increase risk of injury (discussed further in Principle #7). The longer and more intense the session the more likely attention and performance deficits will occur. Much of the personal training industry has moved to shorter 30 and 45-minute sessions instead of the traditional 60 min session. This approach

appears to work well with mature clients for whom 60 min may be too long for their level of conditioning and/or their health situation.

Recognizing the decline in energy and focus it is prudent to perform more complicated tasks that require a higher degree of coordination and motor control earlier in the session while the person is still fresh physically and mentally. This would include more complicated movements in the Neuromuscular, Mobility and Balance domains specifically but could also include plyometrics. These exercises typically increase fall risk. The latter parts of the session would be more appropriate for strength training, seated movements and floor work. Consider an agility ladder pattern that is to be performed as fast as possible. If a client performed this at the end of the session and after performing lower body strength training their performance will likely decline. It will also increase their potential for stumbling and falling during the exercise due to both muscle and potentially mental fatigue. Therefore, it is better to perform this movement towards the beginning of the session where they can give you their best effort and do it more safely.

Do not confuse complexity with intensity. An isolated strength movement is not complex but it can be very intense depending upon the resistance challenge that is used. Just because a movement is performed closer to the end of the session does not mean that it is less intense than ones that occurred earlier. Likewise, complex movements can be performed with a variety of intensities depending on the movement and its variables such as speed and loading.

Principle #7: Maximize client safety and success by taking a holistic approach to training

Client safety should always be our top priority especially when working with older adults. For many older adults any type of injury can significantly impair their progress and even set them back considerably. Accidents, such as falling, can create distrust for the facility and trainer even when an injury is not sustained. Safety begins with knowing your client's needs and goals (via the assessment process) and carries through to program design, facility characteristics, cleanliness, lighting, paying attention, teaching methods and how you monitor clients during the exercise program.

Exercise always involves a certain degree of risk and it is the trainer's duty to take the appropriate measures to ensure safety while maximizing the degree of success their clients achieve. As discussed in Principle #1 always begin with an appropriate pre-exercise evaluation that includes a thorough health history and functional assessments. Just the knowledge that Jane has had a hip replacement; George has peripheral neuropathy from diabetes; William is unstable during lateral movements; and Susan has poor vestibular input increases our chances of keeping our clients injury-free. Therefore, we already know which movements and situations may be more problematic and pose a higher risk.

A good trainer for this population is one who is always watchful and ever diligent about monitoring for the potential of falling. Taking attention off of the client to chat with someone else or watch TV even for a moment during an exercise can lead to disastrous results. Following this the trainer should always be close enough to provide aid if needed and in the proper position/direction in which the person is most likely to fall.

For example, if a client is doing a stationary lunge with their right foot forward then the trainer needs to stand to the right side of the client because that is the direction in which they have the least resources for recovery. If they fall to the left it is easier for them to use both hands to stop their fall and they might be able to step forward with their left leg. Other physical environmental factors that are paramount include having enough space to perform the movement (including enough “stumble room” as a buffer so that they can recover from a loss of balance without tripping on something else); having adequate lighting; reducing audio and visual distractions; and not allowing other exercisers to interfere.

While it is always the goal to challenge the client, risk can be minimized by using solid teaching and motor-learning strategies in order to maximize the likelihood that they can complete the activity successfully. One method is to break down a more complicated movement into pieces and teach those pieces to the client individually. If they are successful with the pieces then they can be put together into bigger pieces until finally the complete movement pattern is accomplished. In the experience of the authors it seems that some trainers are too eager to advance a movement without first requiring the client to master the more basic movement. Progressions that are implemented too quickly can lead to frustration, failure and, potentially, injury. Specifics on how to appropriately monitor and cue older clients safely and effectively will be addressed in more detail in a later section.

There are many other variables beyond the training program that can affect an individual's progress. These include sleep, nutrition (including alcohol use), hydration, medications, tobacco

use, stress, mood, social support and others. Caring for our older clients holistically means trying to educate and support them to be well individuals (refer back to the ICAA Dimensions of Wellness). Offering education (live and online), literature, programs and sometimes even referral to other specialists are great ways to support their efforts in these areas.

Putting It All Together

Together, the 6 Functional Domains, the Hierarchy of Functional Aging, the Trajectory of Functional Aging, the 4 Cornerstones, the 2 Pillars, and the 7 Key Principles comprise the core of the Functional Aging Training™ model. Each of these is important and must be considered when designing exercise programs for older adults that aim to improve functional ability. Keep in mind that these are not hard and fast “rules” that can never be broken. The specific needs and goals of the client must always come first. Experience will dictate when these recommendations need to be modified for a particular client. In order to be successful with clients you will need more than just an approach. You will need to know how to select and implement exercise movements and techniques that will be the most successful in propelling your client towards their functional goals. In the next section, we will present evidence-based and evidence-guided exercises and programming for each of the 6 functional domains.