

Physical Literacy for the Older Adult

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ABSTRACT

THIS ARTICLE INTRODUCES THE CONSTRUCT OF PHYSICAL LITERACY PARTICULARLY AS IT RELATES TO THE OLDER ADULT. MOST ARTICLES PERTAINING TO PHYSICAL LITERACY IN THE SCIENTIFIC LITERATURE HAVE SHARED INFORMATION RELATIVE TO THE SECTORS OF YOUTH SPORTS AND CHILDHOOD EDUCATION. HOWEVER, THE DEFINITION OF PHYSICAL LITERACY HIGHLIGHTS THE IMPORTANCE OF TAKING RESPONSIBILITY FOR ENGAGEMENT IN PHYSICAL ACTIVITIES FOR THE FULL LIFE SPAN. THEREFORE, THE FOCUS OF THIS ARTICLE IS ON THE OLDER ADULT, AN OFTEN OVERLOOKED AUDIENCE, AND ADDRESSES SPECIFIC SAMPLE EXERCISES THAT CAN HELP START THAT AUDIENCE ON THE PATH OF PHYSICAL LITERACY. GUIDELINES FOR THE STRENGTH AND CONDITIONING PRACTITIONER ARE PROVIDED.

INTRODUCTION

The purpose of this article is 3-fold. First, because the concept of physical literacy is still relatively new in the United States and not yet widely accepted by the general public, a brief background of its merits will be provided. Although there have been several variations to the

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definition of physical literacy, the following definition has been endorsed by the International Physical Literacy Association and embraced by a growing number of countries worldwide: *Physical Literacy is the motivation, confidence, physical competence, knowledge, and understanding to value and take responsibility for engagement in physical activities for life* (31).

Because physical literacy is based on a lifelong journey of physical activity, we would like to introduce the second component of this article, which is a focus on the older adult (≥ 65 years). Several researchers have stated that physical literacy helps to develop the confidence, desire, and enjoyment for the lifelong pursuit of physical activity, a key component to successful aging and a healthy life (10,16,55,61). To date, articles directly addressing the topic of physical literacy have focused on the sectors of education and youth sports (5,11,22,28,40,51,56). In addition, articles related to the older adult have been limited as well, although physical activity is a widely applicable, low-cost strategy to reduce associated risks of immobility (specifically in older adults), cardiovascular disease, and even deaths (14,23,30,37,39,45,60). Recent articles have focused on the topic of prolonged sedentary time or “sitting disease,” which is most often associated with deleterious health outcomes regardless of physical activity (6,8,13,19,35,46,48,50).

Third, while introducing physical literacy as a theoretical construct for activating seniors, we also believe it is important to provide the strength and

conditioning practitioner with appropriate sample exercises to particularly address the nonactive (and moderately active) senior to physical activity. Including resistance training can benefit older adults addressing both functional limitations as well as longer and healthier life spans (29). The NSCA as an organization and its members as professional strength and conditioning experts are exceedingly qualified to address these issues and provide the older adult population with meaningful information, practical advice, and training methods. By embracing the principles of physical literacy, the strength and conditioning professional can teach and implement its core components (competence, confidence, motivation, and knowledge/understanding) and ecological elements to inspire success, promote self-efficacy, and allow for full participation and engagement for all. Professional organizations should consider indexing the term where appropriate.

UNDERSTANDING PHYSICAL LITERACY

Across the globe in recent decades, the construct of physical literacy has gained significant support, initiated by the work of Margaret Whitehead and successfully embraced in countries such as Canada, Great Britain, New Zealand, and Australia (10,15,21,41,57). The term physical literacy has been around for

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more than 80 years; however, Whitehead reintroduced the concept of physical literacy in the 1990s with a philosophical foundation and holistic approach of the mind and body connection (51,55,62,63). In recent years, there has also been increased activity in the United States to promote physical literacy, particularly in the education and youth sport sectors of society. As part of an Aspen Institute initiative termed Project Play, leaders from various organizations helped develop a model, strategic plan, and call to action for the concept of physical literacy (2,57). Although the Project Play report recognized that programs and venues should support opportunities for everyone to be active for life, the focus of this particular report was specifically on young people (ages 12-younger) with the goal of encouraging them to learn and embrace the ability, confidence, and desire to be physically active for life. Because, as mentioned earlier, most physical literacy research has been in the age spectrum related to physical education and youth sport settings, teachers and coaches play an important role training individuals in the concept of physical literacy (11,12,21,28,42,53,58). As Longmuir and Tremblay (41) stated, a physically literate child is one who is committed to healthy habitual movement behaviors, including recommended regular physical activity and limited sedentary behavior. In addition, several researchers have emphasized that providing students with the building blocks and guidance along their physical literacy journey will help each individual reach his or her maximum potential for success and prevent many physical problems as they grow older (9,12,54).

As the available research indicates, the concept of physical literacy is meant as a lifelong journey (9,16,34,41,52,61). In fact, the Project Play report recommends a future working group to address how to develop and maintain physical literacy in teens, adults, and seniors (2). However, thus far, physical literacy has not been extensively investigated among the adult population and particularly the older adult (≥ 65

years), although Whitehead in her philosophical approach indicated the importance of understanding that individuals who embrace and implement the construct of physical literacy participate more fully in their community and wider society. In addition, individuals take responsibility for maintaining, and helping others to maintain, purposeful physical activity pursuits throughout the course of a lifetime (61–63). Fortunately, a movement directed at promoting physical literacy specifically for older adults has also been recommended, which includes the recommendation to support successful aging by building on movement skills to improve self-confidence and create opportunities to access a greater diversity of physical activity choices, beyond simply walking (32). This recommendation is in line with other researchers who have evaluated perceptions of health and physical function in relation to quality of life and social engagement (7,27,59). Furthermore, an ecological physical literacy model for older adults was recently developed, which is promising. This model proposed that a physical literacy model be used for older adults to sustain lifelong physical activity participation and as a strategy for physical activity advocates, promoters, and facilitators to support physical activity guidelines. In addition, it is anticipated that the model could, in the future, increase awareness and provide education in the area of physical literacy and thereby become a meaningful resource for increasing physical activity to appropriate levels and reducing sedentary behaviors of older adults across the globe. The model is structured with the defining characteristics of commonly mentioned physical literacy competencies (individual/intrapersonal elements) at its core, with an additional 4 domains (interpersonal, organizational, community, and policy) that may influence both physical activity participation and the quality of the physical activity experience (33).

This model seems to be very much in concert with Whitehead's

philosophical approach of the overall construct of physical literacy where she highlighted the importance of understanding the interaction within a range of environments. Therefore, building on Whitehead's work as well as the ecological model developed by Jones et al. (33,62), we propose to introduce specific ecological action items to support physical literacy journey as a guide for practitioners in the various physical activity-related fields (Table 1).

Because physical literacy is considered a journey, different and unique for each person, it is important to consider the importance of all these components specific to the individual. This includes not just the typical core components of competence, confidence, motivation, and knowledge/understanding but also the complementary and supporting key ecologically based elements. As indicated in much of the existing physical literacy literature, social interaction, movement enjoyment, age adaptation, and influence on the environment are key elements that support sustained engagement of participation in physical activities (9,16,33,34,41,61). Although significant and appropriate for all ages, recognizing each of these elements is particularly pertinent to the older adult population. Based on the available research, we believe that if practitioners, in our case strength and conditioning professionals, can successfully address and implement these 4 additional elements, they will enhance the participants' confidence, motivation, physical competence as well as knowledge and understanding, which is critical for a lifelong journey of physical literacy. Providing age-appropriate experiences that include social interaction and movement enjoyment allows participants to appreciate a positive environment for themselves, which can lead them to positively influence others to participate in physical activities as well. Each of the elements is interrelated and should serve as the basis for the older adults' sustained engagement.

Table 1 Ecological action items to support physical literacy journey		
Level	Components	Actions by Physical Activity Professional
Intrapersonal	Participation motivation to perform activity; confidence, and knowledge	Educate regarding exercise; increase self-efficacy through persuasion and positive experiences with physical activity
Interpersonal	Social support; peer engagement; movement enjoyment	Include small group or pairs exercise; remain engaged during sessions
Organizational	Organization rules and culture; workplace environment	Provide resources for activity; promote culture and acceptance for older adult to develop new skills
Community	Neighborhood, physical, and social environment	Expand scope of program to promote community acceptance and support of physical activity for the older adult
Policy	Government and nongovernmental support	Advocate and provide support for initiatives to fund, incentivize, and create opportunities to develop physical activity for the older adult

The next step, particularly because it pertains to the strength and conditioning professional, is to provide some practical examples based on the components of these previous approaches. Therefore, as highlighted in Figure 1, we propose embracing each of the commonly mentioned elements of physical literacy as well as the following ecologically focused elements: social interaction, age adaptation, movement enjoyment, and influence

on environment. These last 4 elements cannot be overlooked because we believe that these elements are often interrelated and can serve as the basis for sustained engagement of physical literacy. Positive social interaction, appropriate age adaptation of activities, and enjoying movement skills can lead participants to positively influence others to participate in physical activities as well. Together, addressing and incorporating these elements into our

programs allow us to focus on the holistic, integrative nature of physical literacy as it was intended and provide the basis for a successful physical literacy journey.

Two additional models, specifically relevant to older adulthood and very much in line with physical literacy as well as the above-mentioned recommendations, are the following. The first is based on Pesce's research highlighting the benefits of a holistic

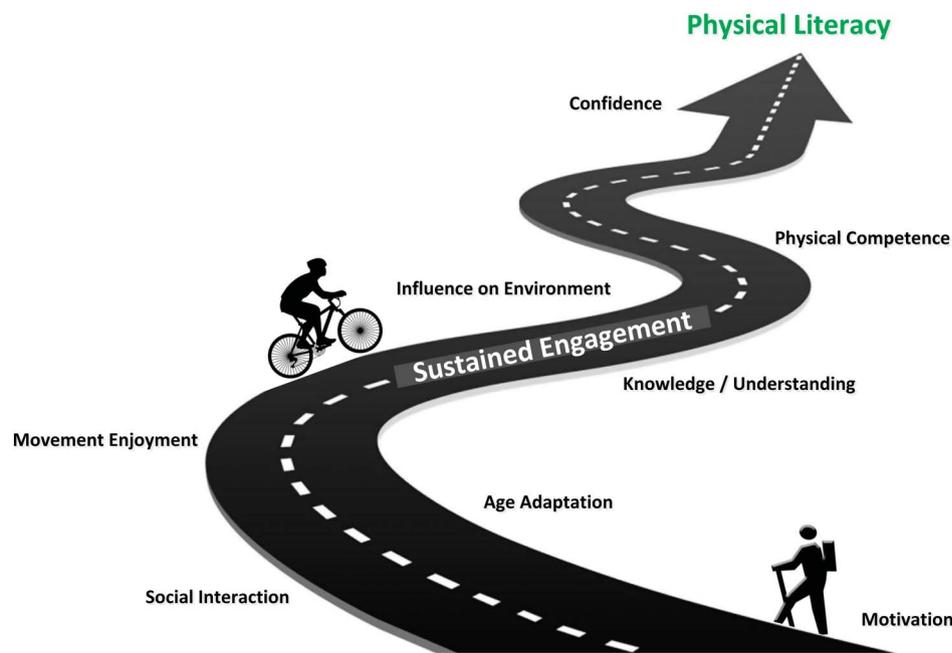


Figure 1. Physical literacy journey.

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perspective capitalizing on the cognitive benefits of participation in physically effortful and mentally engaging activities (49). Specifically, he points out that gross-motor cognitive training represents a potential means to capitalize on the cognitive benefits of participation in physically effortful and mentally engaging activities. An important point of his perspective is that we need to complement research on the moderating role of the quantitative characteristics of physical exercise with novel research investigating the role of its qualitative characteristics, such as coordinative complexity and cognitive demands. This includes identifying what “dose” of coordinative and cognitive demands of physical tasks is appropriate to reach the optimal challenge point and gain greatest cognitive benefits according to age and individual skill level. Each of these points clearly relate to several elements highlighted in our physical literacy journey diagram. The greatest cognitive benefits (knowledge and understanding) can be gained by physically effortful and mentally engaging activities (physical competence) reaching the optimal challenge point (confidence) according to age and individual skill level (age adaptation).

The second model relates to the concept of “successful aging,” which is based on the theory of Selection, Optimization, and Compensation (SOC) as proposed by Baltes and Baltes (3). SOC theory describes that individuals make choices and adapt throughout life to attain and maintain higher levels of functioning across all dimensions so that as one ages, SOC occurs with selection, meaning that there is a focus on fewer, more important goals. Optimization necessitates performing goal-directed actions and means whereby a successfully aging individual will use compensatory means to maintain a given level of function in the face of loss. SOC theory suggests that “successful agers” further their development by “maximizing gains and minimizing losses.” The multilevel approach presented by the ecological

approach provides a framework to address the available and lost resources of the older adult. From a physical literacy perspective, successful agers compensate and modify their activity (age adaptation and physical competence) by optimizing choices (motivation and movement enjoyment), thereby maximizing success (confidence) and maintaining higher levels of functioning across all dimensions. Combined, these elements lead to sustained physical activity engagement.

For the successful ager, as well as the strength and conditioning practitioner, this means “reading” the environment (16,61,62). Like reading the written word, whereby a literate individual is

able to integrate the meaning of words with existing knowledge, drawing on cognitive skills and enriching life experiences, physical literacy entails reading the environment by perceiving through various senses what is around them in shape, size, weight, movement of others, etc., and what physical barriers must be negotiated. For example, in the older population, adequate balance, strength, and stability play a crucial role in retaining an independent lifestyle and maintaining this ability to read and move within the environment, all components identified within the concept of physical literacy (9,10,16,61). Considering these relevant points regarding the relationship



Figure 2. Scapular retraction.

between successful aging and lifelong physical literacy, recommendations are warranted to include selected, specific exercises that can support the construct of physical literacy for the older adult. Unfortunately, specific programs and activities for older adults supporting the physical literacy construct have not been adequately addressed in the literature. With the understanding and application of the specific physical literacy elements provided, we believe that the idea of building on movement skills for older adults beyond just walking and specifically focused on resistance training can and should be addressed by the NSCA and its strength and conditioning practitioners. Therefore, considering the scope of this journal, we would like to introduce a basic, beginner resistance training program focused specifically on the inactive and moderately active older adult. The program addresses key posture, stability, balance, and strength exercises identified as being helpful in promoting activities for daily living.

RECOMMENDED FUNCTIONAL RESISTANCE EXERCISES

Clearly, walking is a great activity recommended for the older population because, among other benefits, participants need minimal equipment and facilities, improve aerobically and gain muscular strength, commune with nature, and enjoy social opportunities (1,14,43). However, as pointed out by Jones and Stathokostas (32), finding diverse activities beyond just walking is important for successful aging as well as the physical literacy components of desire, motivation, and confidence. In addition, adding the component of competence, older adults who are weak and frail may need to increase muscular strength before they are capable of aerobic training (1,44). With that in mind, after providing a medical examination, and not to minimize the importance of other beneficial activities such as swimming, tai chi, flexibility training, and meditative exercises, our focus in this article is to highlight 5 important

resistance, posture, and balance exercises. These are often successfully used by physical therapists for injury prevention and rehabilitation purposes with older adults (20,24,26,36,38,47). We have labeled these exercises as “functional resistance exercises” because they apply directly to activities of daily living such as improving posture, balance, and stability. Strength and conditioning practitioners are in a unique position to address this population and consider these, and similar, exercises to help the older generation in aging successfully. Providing success-oriented guidance, instruction, and training, participants will have the opportunity to obtain the confidence and desire to continue participating in an appropriate resistance training program.

The exercises are meant to provide a starting point for older adults not familiar with resistance training and were selected to show early success. They can be performed in private or as a group activity to promote social interaction, although performing them in a group format will enhance the social inclusion component of physical literacy as mentioned earlier (7,27,33,59). The frequency and intensity of the exercises as well as the specific number of sets and reps will depend on experience, age, and ability.

Typically, older adults should progress from one set to 3 sets of 8–12 repetitions. As recommended by organizations such as the NSCA and ACSM, participants should start with relatively low intensity, light loads, and easy neuromotor exercises and gradually progress based on competence and confidence to more difficult tasks (1,44). So, as the participant’s physical literacy increases, the challenges of the exercise program can increase as well. The importance of technique-driven progression and supervision is vitally important. Therefore, a well-qualified (certified) practitioner is recommended to lead the activities. We encourage incorporating the exercises with aerobic and flexibility activities because the variety can enhance the quality of life for older adults. Although the order of the exercises highlighted in this article can be modified and varied (alternating upper and lower body, training from the ground up, etc.), we have organized them from upper body to lower body to remember the exercises in a logical sequence. Together, we believe that these resistance training exercises along with the understanding and implementation of each of the other key components of physical literacy can form the basis for successfully aging in a healthier, safer, and more active manner.



Figure 3. Bridge.



Figure 4. Partial squat.

ACTIVITY #1: SCAPULAR RETRACTION

Completing simple scapular retraction exercises can strengthen muscles that support the body against the forces of gravity and thereby maintain and improve posture. The scapular retractor muscles are responsible for squeezing the shoulder blades together and pulling the shoulders back into upright positioning. Scapular retraction is an important but easy exercise that can be performed with or without resistance. This exercise is an integral

component of good trunk posture and provides additional benefits of promoting good balance, posture, stability, and an expanded chest cavity for easier breathing. Strong scapular retractors resist development of a hunched-forward posture and decreases strain on the thoracic spine.

- Major muscle groups involved: rhomboids and trapezius.
- Description: Pulling the shoulder blades down and back toward the spine. Imagine squeezing something between the shoulder blades (Figure 2).

- Difficulty:
 - Level 1: Sit on a chair and squeeze shoulder blades together.
 - Level 2: Stand up straight and raise your arms so that they are level with your shoulders. Bring arms back slightly so you feel a gentle contraction between your shoulder blades. Turn palms up and hold for 3–5 seconds. Slowly bring arms back to your side.
 - Level 3: Place elastic tubing around a solid post or doorknob of a closed door, holding each end of the tubing. Pull band at waist level with elbows at your side (and bent at 90°) and bring shoulder blades together. Return to starting position.

ACTIVITY #2: BRIDGE

The bridge exercise provides a number of significant benefits related to balance, posture, and particularly core strength. Although the exercise engages most of the core muscles, the main focus is on what is called the posterior chain (low back, hip extensors, gluteal muscles, and hamstrings). These muscle groups are often neglected in an exercise program. The major muscles involved provide the strength, support, and control to raise the hips from the floor (or bed/couch) from a supine position. Strengthening these muscles helps to maintain balance while standing and walking.

- Major muscle groups involved: gluteus maximus, rectus abdominis, erector spinae, hamstrings, and adductors.
- Description: Although this exercise can be performed on a relatively soft surface such as a bed or couch, greater support is provided by using a firmer surface such as an exercise mat or padded floor. From a supine position with knees bent, raise hips toward the ceiling and bring them in line with the knees and shoulders. Focus on pushing feet downward while raising the pelvis. Arms should be kept at the side with palms down to provide stability. Shoulders remain on the surface to protect the neck. After holding the position for 2–3 seconds, lower slowly to the starting position. Exhale during the



Figure 5. Carioca stepping.

upward movement phase and inhale during the downward movement phase (Figure 3).

- **Difficulty:**
 - Level 1: Lie down on your back with soles of the feet on the floor and knees bent at approximately 90° and raise your hips toward the ceiling. Press your feet against the floor while lifting pelvis to bring hips in alignment with knees and shoulders. Slowly lower to starting position. Repeat as recommended above.
 - Level 2: While in the “up” position, extend one leg at the knee to bring in alignment with the hips. Keep pelvis level, do not let one side “drop” or lower when extending the leg. Hold for 2–3 seconds.

ACTIVITY #3: PARTIAL SQUAT

Of all the lower-body strength exercises, this may be the most important and beneficial. Performing this exercise on a regular basis will enhance balance and posture while reducing the risk of falling, which in turn builds confidence while standing and walking. The partial squat improves the strength of the quadriceps and hip muscles in particular. This exercise complements the previous 2 exercises for a full body benefit.

- Major muscle groups involved: quadriceps and gluteals.
- Description: Stand with feet shoulder-width apart and back against a wall (place a small exercise ball against the lower back to keep

good posture). A chair can be placed in front if needed for balance. Bend knees and flex hips to descend slowly, keeping upright posture. Based on ability, bend 25–30° or 1/4 of the full way possible in a controlled manner. Pause for 2–3 seconds and return to starting position (Figure 4).

- **Difficulty:**
 - Level 1: Perform exercise as indicated above against a wall and focus on proper posture throughout the movement. If needed, a chair can be placed in front or behind in case of initial fatigue.
 - Level 2: The same exercise can be performed standing away from the wall to increase difficulty in maintaining balance and control.
 - Level 3: Holding weights (dumbbells) in each hand can further increase difficulty level.

ACTIVITY #4: GRAPEVINE OR CARIOCA STEPPING

This activity develops agility and stability. It involves a cross-over step to maintain coordination. This can be performed once a day back and forth 3–5 times. Because this exercise requires greater skill (strength and balance) than the others, we recommend this as a higher-level activity. Therefore, this exercise is most appropriate for older adults already moderately active and not inactive seniors with poor strength and balance. A proper base of strength and balance/stability should be developed first. In addition, we recommend close supervision/guidance while performing this activity.

- Major muscle groups involved: abductors of hip and hip flexors.
- Description: Stand facing forward and move the right leg forward and place it in front of the left foot and across the body on the floor. Take the left foot from behind and place it next to the right. Repeat, performing a weave to move 5 steps in one direction. Then do the same, taking the left foot forward and across the right leg on the floor. Move the right

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Figure 6. Heel raises.

leg out from behind and next to the left, weaving across the floor (Figure 5).

- Difficulty:
 - Level 1: Perform the exercise facing a counter with hands placed on the counter for support.
 - Level 2: Perform the exercise facing the counter, with hands above the counter but not touching the counter.
 - Level 3: Perform the exercise in an open space and to increase difficulty, speed can be increased.

ACTIVITY #5 HEEL RAISES

This activity promotes balance and lower-extremity/knee stability and can be performed as both a balance exercise or muscle strengthening activity.

- Major muscle groups: gastrocnemius and soleus.
- Description: Stand with feet flat on the floor. Raise heels to the maximum height possible. Be sure to lift heels off the floor for each repetition (Figure 6).

- Difficulty:
 - Level 1: Face a counter and place hands on the counter. Lift heels off the floor, hold 2–3 seconds, and return to flat foot.
 - Level 2: Hover hands over counter but do not touch counter.
 - Level 3: Lift one leg and perform heel raises on one leg, then the other.

FUTURE RECOMMENDATIONS

This article is meant as a first step toward operationalizing a physical literacy model for the older adult, specifically as it relates to strength and conditioning professionals. As indicated by Durden-Myers and Whitehead (17,60), there is a need for research to “unpack” the concept of across a number of areas in pursuit of operationalizing physical literacy in practice. This recommendation is in alignment with that of the study by Edwards et al. (18) who stated that research across all ages and different environments is required. However, several researchers have highlighted 2 key limitations in the available research. First, much of the physical literacy research thus far has been limited to children and youth, particularly in PE lesson settings and second, measurements/assessments have been lacking or inconsistent. In fact, Edwards et al. (18) indicated that most of the assessments do not relate to adults and the elderly. Furthermore, they state that current research adopts diverse and often incompatible methodologies in measuring/assessing physical literacy. These comments are in line with those of both Green et al. and Robinson et al., who both expressed concern regarding instruments differing in their ease of use and usefulness, some lacking with respect to trustworthiness and some failing to capture physical literacy as Whitehead intended it (25,51). There seems to be a consensus among these researchers that there remains a need to articulate appropriate means of assessment based on the holistic and integrated nature of physical literacy as it was intended, including the domains relevant to an individual’s capabilities,

their environment, and culture, not just on physical competencies.

From an ecological perspective, tracking sustained engagement of physical activity for the full life span will be critical for the success of the concept of physical literacy. Finally, specific to the strength and conditioning professional, further physical literacy research is needed beyond just resistance training. Areas such as aerobic and flexibility training as well as the development of periodized models (with strategies at every phase to enhance literacy) will be valuable for participants at all ages and levels.

SUMMARY COMMENTS

This article briefly introduces the construct of physical literacy and focuses specifically on functional resistance exercise examples, understanding and implementing a variety of appropriate age-specific skills and activities that will allow older adults to successfully start or continue the journey along the physical literacy path. The exercises were chosen to serve as key movement skills that will assist in the prevention of injuries and support participants to continue to be competent, confident, and motivated movers. In addition, we recommend that the exercises be performed in a group format, which supports social interaction and movement enjoyment.

As outlined by *Canadian Sport for Life* (10), becoming physically competent will not only provide the knowledge and understanding of the overall health benefits, but also allow people to participate in a wide range of activities and environments, which sets the stage for developing the confidence, desire, and enjoyment for a physically active life. It is important to understand that physical literacy is much more than just teaching fundamental movement skills. As identified by Dudley et al. (15,16), to achieve success, the development of basic movement competencies should be applied in different contexts and in various settings while enabling safe participation and motivating and inspiring people. This is where strength and conditioning

practitioners, as experts, can play a vital role by embracing the following principles of physical literacy (4,16,33). They can teach key age-adapted skills (physical competence, knowledge, and understanding), inspire success and promote self-efficacy (motivation and confidence), and allow for full participation in a group format (social interaction and movement enjoyment). In concert, these elements lead to sustained engagement in physical activities and provide participants the opportunity to be a positive influence on their environment.

Regardless of where people are on the continuum of aging, we should keep in mind that physical literacy is a personal lifelong journey. With the support and guidance of the strength and conditioning practitioner, each individual can learn to take responsibility for choosing to participate in regular physical activity as a significant and integral component of their lifestyle.

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