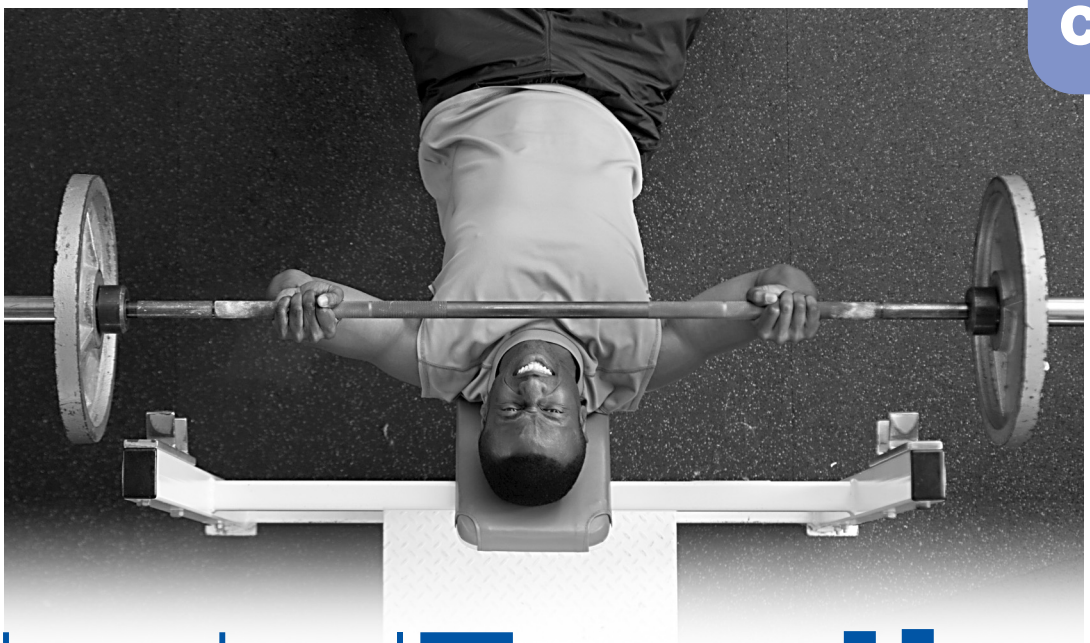
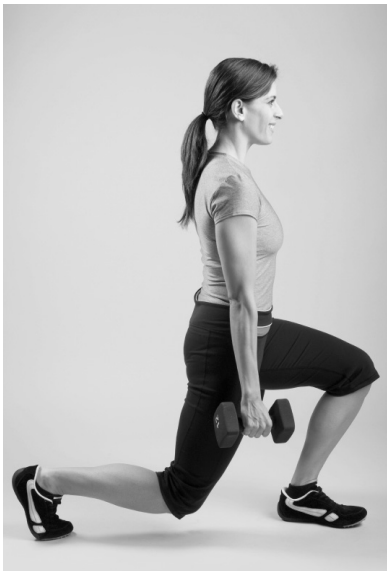


Physical Function

Physical function is a factor of efficient performance of tasks; where neural patterns cause harmoniously synchronized muscle contractions that transfer energy effectively to accomplish a desired action. Standing on a physioball is not functional – it is a circus act. Picking up a relatively heavy laundry basket of wet clothes and placing it on the dryer is functional. Functional training applications should emphasize improving components of the body that present limitations to the performance of activities the body is exposed to at some level of frequency. Attempting to stabilize an overhead squat on a foam roller certainly challenges stability, but is the action duplicable in life activities? When deciding on exercises and progressions into the more functional realm keep in mind the client, their actual needs, and the outcome of the stress. Just because someone did it in a video and it looked neat does not justify inclusion in a prudently mastered exercise prescription. Everyone needs efficient transfer of ground reaction force up the spine to exert (stable) peripheral force on objects or to control undesirable movements. This suggests that exercises used in training should reflect the genuine demands that a human experiences and the level of adaptation needed to efficiently overcome or manage those demands. Water skiing and snow skiing both require a strong kinetic chain for successful performance but the application of forces are different in the two activities. Snow shoveling and raking leaves both use extension devices but require different leverage systems. Lifting and carrying groceries has very different requirements than moving a couch. Therefore, the root of the challenge needs to be identified and the confounding agitators also need to be accounted for to maximize the human's performance in the activity.

Adding function to an exercise program does not mean preparing someone for the Cirque de Soleil. Many traditional exercises are very effective at adding to total body movement efficiency without having to use a physioball, dynadisc, or Bapse board. This does not suggest there is anything wrong with this list of typically used functional training tools, but total body challenges yield very positive results in several categories of fitness besides enhanced stability. To start off at teaching the foundations of function, try properly implementing the core lifts used in athletic based training. Core here is defined as "primary" not the transverse abdominis and its functional counterparts (collectively the inner unit). The core movements used in sports performance for strength include the Deadlift, Front squat, Back squat, Bent-over-row and Military press. The bench press is often included in this grouping, but as it relates to function has limited transfer because it is not a closed chain exercise and is stabilized by an external object. Power additions to the functional lifts include Floor pulls, Power cleans, Push press and Jerks, which are collectively referred to as Olympic assistive lifts. The power lifts certainly have their place in athletics and fitness training, but require additional training and instruction for proper performance and therefore will not be included at this time.

The factor that makes the core lifts also functional strength lifts is similar to the rationale behind many functional based modifications to exercise. Stability is almost always the limiting factor to force transfer. Prime movers rarely get to apply the majority of their total potential force because too much is lost in the weak stabilizers. When the muscle has nothing to push against, the forces are lost. Secondary to internal stabilizer strength are mechanical stability issues that further challenge these and additional muscle groups. The height of the center of gravity, the size of the base of support, the location of the center of gravity relative to the base of support, symmetry of the load, velocity of the change in the center of the mass, along with numerous other factors all add increasing demand to the movements' stability and consequentially the magnitude of the force needed to establish dynamic equilibrium and accomplish the task. The back squat is a well known exercise, and is probably more often done incorrectly than biomechanically correct. The reason the back squat is difficult and functional is the elevated center of gravity, the axial loaded condition, and the posterior migration of the center of mass. Although all the action should take place at the acetebulum of the hp (hip joint) many people use excessive anterior sagital movement, leading to tibial translation as the femur is pushed forward by the hip. Back squatting as with other ground based lifts requires limited dorsi flexion so the energy is driven through the heel of the foot, not the balls of the feet. A very common error occurs when weight plates or lifts are placed under the heels of new exercisers. This compounds the problem, forcing the load direction anteriorly and should always be avoided.



Exercises should be done with purpose for functional improvements not just because they were on a video.

The requirements to stabilize the trunk to maintain a neutral spine while exerting ground force against the bar means the distance of the kinetic chain between the resistive force and the base of support is extensive and the number of joints through which the energy is transferred opens up many areas for energy leakage. It is this cross joint application of force that causes efficiency among force couples. This is particularly true when the spine is the connecting segment between the base of support and the resistive load. Interestingly, this is further challenged when the resistance is moved anteriorly as seen in the front squat exercise. Between squat exercises the same dynamics exist as far as stability across multiple joints but the anterior load placement of the front squat influences the spine's natural tendency to flex. This makes the exercise harder on the trunk musculature and disadvantages the hip as the duration of hip flexion is prolonged in the front squat compared to the back squat. The longer duration of hip flexion during the movement increases knee extensor requirements making it an excellent quadriceps strengthening exercise along with its functional attributes. Tricep and latissimus dorsi flexibility are sometimes limiting factors in the front squat when the lift is done using traditional Olympic hand position. This is likely the reason many bodybuilders use a cross arm grip.

The military press shares a few characteristics with the squat exercises, as the resistance is elevated to the top of the axial skeleton. The military press further challenges the body due to the elevation of the resistance above the head during the concentric phase of the movement adding the shoulder, elbow, and wrist joints to the equation. The spinal segments and shoulders must all be properly stabilized to transfer the energy from the ground to the bar. When dumbbells are used or the resistance is asymmetrically loaded, the stability requirement is increased and therefore the resistance force must be decreased to account for the added stability requirements. This is why a person can military press more with a bar than the combined weight of the dumbbells during standing overhead pressing.

The deadlift exercise and bent-over-row present different challenges than the axial loaded exercises just discussed. When the resistance is low, the energy still comes from the ground and transfers up the tibia through the kinetic chain ending at the bar. The key point of stability is still the spine. Deadlifting may be one of the most functional exercises as every human picks up objects from the ground. Most parents, although not anatomists or kinesiologists, know to instruct their children to lift with their legs, not their back. This suggests the back must be firmly stabilized during the exercise for proper energy

transfer. A weak middle often means suffering the detriments of a loaded kyphotic spine. Energy is lost unless the integrity of the spinal system is maintained. Similar to the squat exercises the line of force application is heavily directed into the back end of the feet, not the front end, which means the hips must be pushed back to accommodate the femur's length at the lowest aspects of the lift.

The bent-over-row adds further challenge to the body as the hip/shoulder relationship must be kept aligned so the spine is parallel to the floor for proper bar movement against the perpendicular line of gravitational pull. The action occurs at the shoulder complex and the elbow, and therefore the rest of the body joint segments should remain isometrically positioned. Weakness in any area is often identified by changes in spine and hip positioning. The exercise increases in difficulty when asymmetrically loaded, such as what occurs with the single arm dumbbell bent over row. Bodybuilders often place a hand and knee on a bench during the dumbbell version of the bent-over-row to increase stability and isolate the resistance, but this actually changes the exercise dramatically as the stress on the other joint segments is significantly negated and the exercise is no longer closed chain and functional.

Regardless of the exercise, closed chain performance is the best way to add function. Moving from seated to standing dumbbell press, supine to standing forward press, supine to standing trunk rotation, and machine butt kicks to axial loaded lunges all add improvements toward functional efficiency. Even pull-ups and dips serve function better than lat pulls and the bench press. Exercises should be done with purpose for functional improvements not just because they were on a video. Although several functional devices can provide a benefit for improved performance, do not forget about the movements and loaded conditions that serve as the foundations. There is a reason athletic programs use these exercises and these same reasons may warrant inclusion in fitness based exercise programs for your clients.