

Newsletter

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TRAINING FOR PROPRIOCEPTION & FUNCTION

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Proprioceptive movements in your classes and training sessions can enhance your body's awareness and movement efficiency.

What is proprioception?

Proprioception is an automatic sensitivity mechanism in the body that sends messages through the central nervous system (CNS). The CNS then relays information to the rest of the body about how to react and with what amount of tension. Human beings "train" for proprioception in the quest for efficient everyday movements. Proprioception is unconscious initially, but can be enhanced with training, according to Greg Niederlander, an exercise physiologist. Specialized sensory receptors in the muscles, joints and connective tissues enable the body to process information from a variety of stimuli, and turn that information into action. "Through conscious appreciation and cognitive processing of the body's position in space, the central nervous system and sensory receptors can be conditioned to be more responsive to length and tension in the muscles and tendons," says Niederlander. Additionally, the skin, palms of the hands, soles of the feet and other senses collaborate to communicate with the brain about muscle tension, weight shifts, load and range of motion. "There is a fine line between proprioception and kinesthetic awareness," says Paul Chek, founder of the CHEK Institute in Encinitas, Calif. "Improving one often improves the other. For example, performing any functional exercise that requires you [to] maintain your center of gravity over your base of support will contribute to improvement of kinesthetic awareness (a sense of one's whole body), as well as proprioception." Chek uses an example of skiing at high speed, which requires reflexive movement intelligence: "When skiing down a mountain at high speed, all at once you must be able to sense the position of your limbs relative to the rest of your body, the position of your body relative to the earth and gravity, and interaction with the skis and terrain." Your body automatically coordinates with stimuli obtained from the immediate experience and turns them into physical action.

Movement intelligence & proprioceptive trace

The key to creating what Chek refers to as movement intelligence involves becoming consciously aware of your movements, and of the information your bodies are absorbing. To do this, stimuli is created to elicit a movement reaction through a variety of tasks or exercises. As skill improves, more stimuli are needed to continue improvement. This type of exercise planning involves integration of the mind and body, combining balance, strength and quickness. The result is a heightened ability to make spur-of-the-moment decisions about what your capabilities are in any given situation. A common example of loss of proprioception can be seen in any athlete who is required to use the arms and shoulders with precision, such as shooters, boxers, throwers (baseball), archers, and even people who throw darts in the bar or shoot pool, says Chek. For instance, he says, "After an injury to the shoulder joint, I have seen many people complain of a loss of accuracy and performance, which I have corrected using exercises to improve proprioception." Try this: With both arms, pick up a chair and feel its weight. Pick it up and set it down about 10 times. Then, pick up another chair that looks the same but is lighter. You'll immediately notice how the body's 'memory' for tension kicks in. The body expected to pick up the same weight, but didn't. Proprioceptive trace is an aftereffect of the immediate proprioceptive experience. In this situation, the body's memory kicks in to produce a certain predictable amount of force/effort and doesn't need it. For instance, if you've ever gone backpacking with 40 pounds of weight, then removed your pack, you'll remember feeling feather-light. For seasoned backpackers, the load does not impose much demand; therefore, they experience much less proprioceptive trace. Try this: Run or walk on a treadmill for a

lengthy period of time. Step off, and you'll experience a surreal floating sensation as they continue to walk.

Proprioceptive adaptation

Activities that require balance, coordination, agility and power, and movements that challenge normal range of motion, are great ways to cross-train for proprioceptive adaptation.

Balance: Balance is the body's ability to right itself. It is improved with proprioceptive feedback.

Strength: The core strength of the abdominal, back and gluteal muscles is the foundation from which all movement originates. Strength is the catalyst of postural endurance—the ability to maintain core stabilization, balance and control.

Quickness: If you have ever tripped and didn't recover balance, perhaps it was because you weren't physically quick enough to pull off a recovery. You can improve your proprioceptive abilities by challenging your body to be more reactive. The goal for training is to shorten the amount of time that it takes to mentally react and to physically move to accomplish the task. The ability to move more quickly and powerfully stimulates more accurate transmission of instructions from the nervous system to the working muscles, and recoveries can happen with less effort.

Challenge your body

Constantly repositioning the body keeps it naturally aware of its surroundings. The movements aren't necessarily planned, and success is based on stabilization, control and trials, not necessarily reps and sets. Keep in mind that some of the most effective training for body awareness takes place in more frequent, quicker exposures to challenging activities, rather than long durations of "practice." Create situations in which you can enhance your ability to sense body positions and speed of movement relative to a fixed point, such as a foot or hand. A good example is the classic drunk-driving test where you must touch your nose with your head tilted back and your eyes closed.

Try these:

- From a hands-and-knees or standing position, achieve a specific degree of anterior or posterior pelvic tilt, then return to a natural standing posture and close the eyes. From there, return to the target position.
- Niederlander suggests using a wobble board to challenge proprioception. Perform two-legged half squats. The body's reactions to recover balance will produce movement oscillation through the sagittal, frontal and transverse planes. Count the number of times the edges of the wobble board touch the floor while performing 10 repetitions. Fewer touches indicate improvement.
- Kneel on all fours to perform an opposite arm/leg raise with a round dowel running along the length of the spine. Count the number of times that the dowel comes off-center while performing five opposite arm/leg raises with each side of the body; perform 10 total exercise repetitions. Fewer off-center dowel movements indicate improvement.

Chek also suggests that, by reducing vision with any exercise and/or by using exercises that require increased positional sense, such as with balance boards or exercise balls, you can create nearly any type of proprioceptive training situation

Enhancing proprioceptive quality & adaptation

The following exercises and body systems have an effect on proprioceptive awareness:

- Movement for movement's sake in any variety of movement patterns and ranges of motion with different tensions/loads (i.e., dancing, tai chi, yoga).

- Traditional cardio, strength and flexibility conditioning.
- Balance conditioning, eyes open and closed.
- Rotational movements (not just linear and lateral).
- **Visual acuity:** Use vision to adjust movements when recovering balance. Instead of focusing downward, look ahead to realign the head and neck.
- **Auditory system:** The inner ear registers head and body movement like a built-in level. To function properly, the head and neck must be situated over a balanced spine.
- **Rhythm:** Heart beat, breathing patterns and even walking are rhythmic by nature. Strive to feel rhythm during sports and as they work out.
- **Stance:** Movements should be initiated from an "athletic stance" (ankles, knees and hips slightly flexed) and an upright posture. Stance is also referred to as the clients' "base of support," or the distance created between their feet.
- **Weight transfer:** Bodies are especially sensitive to weight changes that take place with stance or postural shifts. You will feel weight transfer from the feet upward.
- **Constant motion:** Get a feel for constant, dynamic movements (versus static positions) as you try the drills mentioned in this article.