

Functional Balance

By Gary Gray and Vern Gambetta

Michael Jordan has it. Emmitt Smith has it. Shannon Miller has it. What is it? It is balance. Balance is the single most important component of athletic ability because it underlies all movement. It is a relatively simple concept with many complex applications. Balance does not work in isolation therefore it should not be thought of as an isolated component. It is a component of all movement whether that movement is dominated by strength, speed, flexibility or stamina. Balance is closely related to coordination and agility because they are dependent on a well developed sense of balance. To understand the role of balance it is necessary to take another look at the activities that you use in training and rehab, more importantly take another look at the respective activity you are training from the perspective of the role of balance in those activities. By taking a divergent thinking approach you will quickly realize that there is more than one right answer to the question of the role of balance. Problems that you thought were strength, speed, flexibility or skill-related could in fact be directly balance related and are manifested as a lack of strength, speed, flexibility, skill etc. Poor balance leads to poor technical or skill development which often results in injury.

A relatively simple activity such as sprinting when seen from a balance perspective is a highly complex balance activity. At speeds in excess of 11m/sec the sprinter must alternate balancing on one leg and then the other in periods of time less than one tenth of a second. Try losing and regaining your balance in less than one tenth of a second and see how difficult a skill is required. Seated weight bearing sports such as kayak and cycling also demand a high degree of balance. The basic difference here is that balance is in a seated position.

Balance Concepts

Balance has an integral relationship with the concept of the Performance Paradigm. (T&C April 1995 vol. 5 # 2) It is impossible to appropriately reduce and subsequently produce force without balance. The ability to reduce force at the right time, at the right joint, in the right plane, in the right direction, for the right activities is highly balance dependent. The inability to do all of the above will result in movement that is awkward and it may not necessarily be in the direction that you want.

We tend to think of balance as a static position because of the traditional definition of balance as a set position that must be maintained for a period of time. In function, balance is dynamic because movement is dynamic. Balance is control of one's center of gravity, control of body angles and unstable equilibrium. Movement is a state of dynamic equilibrium consisting of a constant interplay of imbalance and balance with the body constantly trying to regain balance to perform efficient movement. Essentially balance is the body losing and regaining control of its center of gravity. Therefore gravity and its control will facilitate movement. There is a continual reaction to gravity and external forces such as the playing surface, opponents, etc. Maintaining this state of dynamic equilibrium requires total systemic involvement with feedback from the ocular, vestibular, kinesthetic and auditory senses. Our goal must be to develop good balance in

motion not in a still position. To do this we must train, test, and rehab balance in motion not in stillness.

From a growth and development perspective consider the toddler who must master balance in order to be able to proceed to more normal patterns of gait. As we grow and develop we should be constantly learning good balance. Unfortunately in today's society once we learn to walk we are not required to continue to learn a broader range of balance activities unless we are in special programs such as gymnastics or other movement exploration activities that will build a rich repertoire of motor skills. Riding in a car, playing Nintendo or watching television does not promote good balance. This, along with an early emphasis on specific sport skill development accentuates the problem. All of this underscores the point that without balance efficient movement is impossible. To train balance it must be trained as a component of fundamental movement skill. When it is trained there is a tendency to train it as an isolated component rather than a component of all fundamental movement skills.

Conceptually it may be helpful to think of balance as occurring in two zones: the Inner Zone and the Outer Zone. Inner Zone balance is balance where our body weight and center of gravity is balanced over the ground reaction force of our own center of gravity. It is the traditional static stand position. This is not highly functional. It will serve as a starting position for more complex and demanding drills. Outer Zone Balance is how far outside your inner zone can you reach or step and still regain balance. The Balance Threshold is closely related to the Outer Zone balance. It is the point at which you lose control of your balance for that particular activity. Losing balance is lost balance. Using energy to try to regain your balance is using energy incorrectly rather than for the right purpose. Since you didn't fall over was that good balance? Losing balance and using it is different than losing it and having it use you. Losing your balance is loss of balance. What we are seeking is a functional threshold which is the point at which motion is productive. It is not motion and movement patterns whose sole objective is just to maintain their balance. This threshold must be constantly stressed to improve balance.

"The Driver" is who or what is controlling your balance. Is it your opponent? Is it the effects of gravity? Is it the angle of the ground? Is it the surface? Is it the shoes? Is it the direction of movement? Is it the arms and the legs? It could be the wind. It could be a weight or a stretch cord. Essentially it is anything that manipulates the force that we have to balance against: gravity, ground reaction force or momentum. It is important to understand who the driver is in order to be able to effectively train balance.

Training Balance

Balance is improved through exposure to a variety of different sensory conditions in a safe controlled environment. To design a functional conditioning and rehab program we must incorporate balance in normal training activities primarily by increasing proprioceptive demand. In selecting balance exercises use the following criteria:

The exercise must be safe.

It must be challenging.

It must stress multiple planes of motion.

It must incorporate a multi-sensory approach.

Must be derived from a fundamental movement skill and apply directly to a sport skill.

Balance must be developed in a progressive manner. The goal is to continually increase the awareness of the importance of balance by constantly creating instability to further increase stability. The following progression is appropriate for both Inner Zone and Outer Zone balance activities.

Balance Progression

1. Bilateral Stance
2. Unilateral Stance
3. Arms or legs as a counterbalance
4. No arms
5. Eyes Closed
6. Varied Surface
7. Apparatus
8. Dynamic
9. Increase range of motion
10. Increase speed
11. Add Reaction
12. Add External Kinesthetic Stimulus

The volume of balance work should be low, but should be incorporated into the daily workout routine. For balance work to be most effective it demands the highest degree of intensity and the most efficient and beneficial place to train balance is as a part of the warm-up. It can also be placed between drills during practice. It definitely should be incorporated as a daily activity.

This is a selection exercises for use with various sports for training and rehabilitation. They are all simple activities that can be easily incorporated into the daily routine. Hopefully this will stimulate you to use your imagination and knowledge and invent your own balance exercises and activities.

- (1) Leaning Tower - sway anterior/ posterior and medial lateral.
- (2) Hurdle Walk - Step over hurdle and hold position for a count of one thousand one then step over the next hurdle and repeat with the opposite leg. To increase difficulty close the eye of the leg that is stepping over the hurdle.
- (3) Scramble Up - Start from a prone position and scramble up to a balance standing position as quickly as possible. To increase difficulty, perform the exercise with the eyes closed.
- (4) Ninety Degree Jumps - Jump and turn ninety degrees in the air. Land and jump and turn ninety degrees opposite back to the starting position. Jump and turn one eighty then two seventy and finally three sixty. Eyes open. Eyes close.
- (5) Red Light/Green Light - Stop on one leg each time and hold a balance position.

(6) Rhythmic Balance Exercises - Use a metronome or music to govern the rate of a particular balance activity.

Use an oscillating balance beam, a K-board, a BAPS Board™, mini tramp or a foam block to perform balance activities. Don't get too hung up on equipment, remember that the body is still the highest tech training equipment known ever invented, so use the body and all its senses wherever possible. The only limitation is your imagination and an understanding of the activity that you are preparing for.

Testing Balance

It is necessary to test balance in order to train balance. It is not necessary use \$40,000 machines that give artificial feedback. It is more important to use functional movements that provide real feedback that the body can immediately interpret and use. To test the effect of the various systems eliminate those systems when performing the test. For example, to test the effect of the ocular systems test with both the eyes open and closed. Testing will give an objective measure of improvement. The important aspect of testing, just as in training is that it must relate to the activity that you are preparing for.

It is important to test both Inner Zone Balance and Outer Zone Balance. Space does not permit an in-depth discussion of testing. For further information on testing we refer you to the: "Lower Extremity Functional Profile" by Gary Gray with Team Reaction.