

Assess Before You Progress

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Assessment: (*uh-ses-muh nt*) the act of assessing; appraisal; evaluation.

Progression: (*pruh-gresh-uh n*) the act of progressing; forward or onward movement. A passing successively from one member of a series to the next; succession; sequence.

Where to begin? It is very difficult to know where you are going without a destination. It is also very difficult to get to that destination without a good road map containing specific directions on how to reach your destination. For example, imagine you are taking a road trip from Boston, Ma to Hillsview, South Dakota. The first step is to get an accurate map of where this town is (training goals). Now that you know your destination you need the quickest and safest route. A detailed roadmap (training template) will give you this information. Finally, before the trip you will need to perform a complete diagnostic assessment of your automobile (structural, functional, movement, athletic ability) to make sure it is running properly and can safely make the trip. For some reason, when it comes to our health we do not follow the example of road-trip planning.

You can read the newest cutting edge workout in a monthly fitness publication, but this does not mean that program is right for you. Many athletes and fitness enthusiasts alike follow a blind path when trying to increase performance and reach their personal fitness goals. What is good for the professional athlete or physique competitor may not be the best choice for the high school athlete or fitness enthusiast. It can clearly be seen that a one size fits all program/template of training cannot be the answer to achieving your goals. One's training roadmap must be individualized, as there are many paths to the same destination. To determine this path, one must assess before they can progress.

Dysfunction: (dis-fuhngk-shuh n) **Abnormal or impaired functioning, especially of a bodily system or social group. Any malfunctioning part or element:**

In order to achieve maximum results, priorities of training must be determined. Rehabilitation from injury or pain and correction of muscle imbalances and joint dysfunction should be priority number one in any training environment. It can be very difficult to make any gains if an injury or dysfunctions exist. As a protective mechanism the central nervous system will compensate for a movement in order to avoid pain. "If you're in pain, you can rest assured that the muscles crossing any joint in pain are being shut off, resulting in progressive instability of the joint(s) related to that muscle(1)." When this type of compensation occurs, there is a direct effect on many baseline characteristics of movement including muscle activation sequences, motor unit/muscle fiber recruitment, over activation of stabilizer/neutralizer muscles, decreases in rate of force development, and changes in length tension ratios. These dysfunctions can then lead to increased pain, degeneration of cartilage, and potential for injury as the body compensates for faulty movement and posture. "The stress can take many forms. It may cause unnecessary work or movement in another part of the body, placing greater stress on certain muscles and tendons (strains). It may create unnatural motion of the spine or limbs, placing greater stress on joints and ligaments (sprains) (2)." It becomes a cycle of injury where one dysfunction leads to another, which in turn leads to another and so on. With dysfunction, more pain and potential for injury appear, until either surgical removal or repair becomes the recommended solution. But, the underlying cause of the problem still exists. "Whether or not injury occurs depends of course on external factors such as duration, intensity or frequency of exposure to biomechanical stress, but it also depends on the ability of the body to resist and control such forces to maintain stability(3)." A proper structural balance or postural/range of motion assessment by a trained professional in this field will reveal these compensations/dysfunctions so the cause of the problem can be corrected before any invasive solutions become necessary.

Compensation: (kom-puh n-sey-shuh n) the act or state of compensating. The improvement of any defect by the excessive development or action of another structure or organ of the same structure.

Once dysfunction, posture, and rehabilitation guidelines are in place, the next step is to determine the activation patterns of the body through muscle function testing. Now that you know where the imbalances are, it is time to learn what is causing these dysfunctions. Typically overactive (tonic) muscles become tight and under-active (phasic) muscles become weak or stretched. Look at a telephone pole the next time you are driving. The wires on either side of the pole must possess equal tension keep the pole vertical. If there is more tension on one side, the pole will lean. The body works the same way with regard to length/tension ratios between agonist and antagonist muscle groups (muscle which oppose each other, for example biceps and triceps). The tonic (usually flexors) muscles typically become tight and the phasic (usually extensors) muscles typically become weak or stretched. “Certain muscles which relate to the fetal position, static work postures or slumping have a tendency to become overactive or even shorten, while other muscles which relate to the neurodevelopment of upright posture or dynamic joint stability tend to become inhibited or even weak(3).” With this change in length tension ratio, certain muscles become lazy and allow other muscles to do the work for them. This is where the compensations occur, and so begins the chronic injury cycle. There are many tests to determine the function of muscles including portable EMG, structural balance assessments, functional screening, muscle activation testing, strength tests, etc... Prior to beginning a rigorous exercise program, a thorough evaluation utilizing these methods can mean the difference between mediocre results and maximal gains.

Now that we have determined where the dysfunctions lie, what is causing these dysfunctions, it is time to assess how these dysfunctions are affecting ones movement. Compensations can rear their ugly head in many ways. They will typically restrict range of motion, thus causing altered mechanics of simple movements. From this it is necessary to assess ones primary movements including squatting, lunging, pressing, pulling, rotating, bending, and extending. If any of these movements occur without proper mechanics, results from training can be very hard to attain. Compensatory muscles will perform most of the work, rather than the prime movers targeted in these movements. Balance from left to right and front to back must also be taken into account with regards to human movement. If one side of the body is dysfunctional, this can lead to postural distortion patterns, which will eventually lead to compensation and chronic pain. The tests to focus on are ones that test each of those primary movement patterns.

Table I: Basic Tonic and Phasic Muscles, A Question of Balance (antagonistic muscles are across from each other in this chart)

TONIC MUSCULATURE	PHASIC MUSCULATURE
Prone to Shortening, Tightening, and Over-activity. Need to stretch	Prone to Lengthening, Weakening, and Under-activity. Need to activate/strengthen
Iliopsoas (hip flexors) Rectus Femoris (hip flexor and knee extensor) Hamstrings (hip extensor and knee flexor) Piriformis Tensor Fascia Latae	Glute Muscles (hip extensors) Vastus Medialis and Lateralis (knee extensors)
Pectoral Muscles Levator Scapulae and Upper Trapezius	Rhomboids Mid and Lower Trapezius
Quadratus Lumborum (Lumbar Extensor)	Rectus Abdominis (trunk flexor)
Biceps Brachii (elbow flexor)	Triceps Brachii (elbow extensor)
Subscapularis (internal rotator cuff)	Supraspinatus (external rotator cuff)
Gastroc and Soleus (Primary plantar flexors)	Anterior Tibialis (primary dorsiflexors)

At this point the roadmap is almost complete. The last step is to assess an athlete's athletic ability. After all this is where the compensations and dysfunction limit one's performance. Testing an athlete's jumping ability (vertical, horizontal, and reactive) can give great insight to the direction the athlete needs to direct his/her training program. Jump tests (vertical, reactive, horizontal) can determine if an athlete is lacking strength or Plyometric (reactive) ability. Characteristics of an athlete that can be tested are speed, agility, reaction time, muscle endurance, strength, balance, reactive ability, force absorption, and power output. Prior to performing testing, a needs analysis of the individual sport must be created. For instance, it may not be necessary to test the vertical jump of a marathon runner, because the results may steer the training toward absolute strength development, when this athlete should be more concerned with muscle endurance. The performance testing must reflect the needs of the sport.

The destination is set, the diagnostic testing is done, and the roadmap is in place. Now what? Now it is time to progress the athlete from point "A" to point "B" following the roadmap. As we discussed earlier, rehabilitation and correction must occur first in order to have a foundation to build upon. "If extreme tightness is present in a muscle group, strengthening in the antagonistic group is useless as the function of this group will continue to be neurologically inhibited by the tight group. Attention should first be directed to lengthening the tight muscles(4)." Once the injuries and imbalances have been corrected and pain subsides, it is time to go to progress. A logical next step is to activate and integrate primary movers and stabilizers. At this point you should work on strength and power development through increasing inter and intra-muscular coordination. Teaching your central nervous system to recruit higher threshold muscle fibers and activate motor units, while coordinating multiple muscles in sequence can lead to tremendous gains in strength, hypertrophy, and power. "Functional strength is the ability of the neuromuscular system to reduce force, produce force, and dynamically stabilize the kinetic chain during functional movements on demand in a smooth, coordinated fashion(5)." This in turn leads to increased performance both on and off the field. After all, isn't that the overall goal of any training method.

If you are currently training under the supervision of a certified professional or working out on your own, and have not assessed your structure, function, movement, or athletic ability, you may want to rethink the program/supervision you are currently utilizing. It may be nearly impossible to reach your destination without the proper vehicle and roadmap in place to get you there. “If you don’t know where you are going, any road will get you there. (Lewis Carroll)”

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