NEW AND UPDATED CHALLENGE PROCEDURES TO ASSESS AEROBIC, ANAEROBIC, AND CREATINE PHOSPHATE PATHWAYS

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ABSTRACT

Applied kinesiology testing methods of aerobic and anaerobic excess and deficiency have been utilized for decades to assess an individual's function of those pathways. Currently, the aerobic challenge test can be performed to assess if there is aerobic excess or deficiency and the anaerobic challenge test performed to assess an excess or deficiency of that system. This paper will update these challenge procedures to incorporate the neglected creatine phosphate (CP) system and redefine the parameters in which the anaerobic challenge must be performed. Additionally, new testing and treatment procedures will also be provided regarding the aerobic challenge test.

Key Words: aerobic, anaerobic, creatine phosphate, lactic acid, glycogen, glycolysis

INTRODUCTION

There are primarily three systems the body utilizes for energy. They are the creatine phosphate (CP), the lactic acid, and the oxygen system. The CP and lactic systems are commonly known as the anaerobic system, while the oxygen system is referred to as aerobic. Except for very short activities, such as a sprint or a jump, most activities employ both the aerobic and anaerobic (lactic) systems to various degrees depending on duration and intensity. [1]

Creatine phosphate is stored in very limited amounts in the muscle cells and is utilized after the few seconds of stored ATP are used up. CP only supplies energy for at most 10 seconds, with most experts citing its peak around 5-7 seconds,[2] and is fully metabolized and out of the system within 15-20 seconds. CP is used for explosive activities such as jumping, throwing, weightlifting and sprinting. No lactic acid is produced during this time; it is referred to as alactic.

The lactic acid system is used (by itself) during intense events up to 2 minutes after the CP system. It breaks down glycogen stored in the muscles and liver (glycolysis) thereby releasing energy. Eventually, the accumulation of lactic acid in the muscles will cause fatigue and be too much for the person to continue. This system relies on energy from carbohydrate metabolism and therefore post-workout restoration of glycogen is essential. This system, combined in part with aerobic metabolism, can provide energy for 90-120 minutes in elite athletes. A person of average fitness can rely on these systems for energy for a duration of approximately 30 minutes.

The aerobic system's energy source is primarily fat and pyruvate from glycolysis, but this time in the presence of oxygen, producing little or no lactic acid. The aerobic system is used during events up to 2-3 hours, beyond which the breakdown of fats as well as protein may occur to replenish ATP as glycogen is depleted.

Currently the anaerobic challenge technique employed during applied kinesiology manual muscle testing (MMT) procedures advises a challenge of 5-10 seconds,[3] (Philip Maffetone, written communication, July 2008). However, that time is much more associated with testing the CP (alactic) pathway of anaerobic energy and not the lactic acid system, which is the primary indicator of anaerobic metabolism and fitness.

DISCUSSION

The current anaerobic challenge procedure is performed by having the patient alternately flex and extend the forearms as rapidly as possible for up to 10 seconds, and often less. If the anaerobic system is functioning normally, then the test will neither strengthen any previously weak muscles nor weaken any previously strong muscles. However, if the person is in a state of anaerobic excess, then the strong muscles will weaken temporarily. The current thinking is that this is due to overtraining (too much anaerobic exercise) or from a nutritional deficiency, such as a B vitamin or a mineral needed to clear lactic acid. However, a test of such short duration is clearly focused on neurological MMT of the CP pathway, rather than the anaerobic lactic system. The short duration is alactic, not lactic. If the test is actually performed for the entire 10 seconds, then the CP pathway is beginning to phase-out and the true lactic anaerobic system is starting to take over. A test of very short duration (approximately 5 seconds), as is often performed, will test the CP pathway and only that pathway. During the course of testing this pathway repeatedly over the past two years, this author has found that for the anaerobic challenge to be effective in testing the lactic acid system, the patient must perform the test for at least 12 seconds. Any test performed for 3-4 seconds is going to test the CP pathway. Any test performed for 5-11 seconds is going to, at best, be an indistinguishable test of both anaerobic systems and often a true anaerobic problem will remain undiscovered.

The two separate and distinct anaerobic challenge procedures will correlate with their respective pathways during oral nutrient evaluation. If a patient weakens upon an anaerobic challenge of 3 seconds, they are in need of more support for the creatine phosphate system. He or she will often show a need for phosphorus and [rarely] creatine. If the patient weakens after performing the anaerobic challenge for 12 seconds (or more), then there may be a need for more aerobic activity or there may be a lack one of the citric acid cycle or glycolysis nutrients. It is also very important to note that the individual could be depleted in glycogen and is therefore failing the test due to low glycogen stores, thus requiring replenishment of those stores via carbohydrates.[4] The doctor can test the patient with either [homeopathic] glycogen or a carbohydrate food, (often sugar will do), and this will negate the anaerobic weakness. It can take a healthy individual up to 48 hours to fully replenish glycogen stores. Therefore, one can quickly deplete those levels and appear to be over-trained (anaerobic excess) from a few hard workouts and lack of dietary follow-thru to replenish the glycogen stores.[5] This will be completely missed by the doctor if the challenge test is either performed for less than 12 seconds or if the doctor does not test for carbohydrates or glycogen on those who fail a 12+ second test.

Sometimes an individual will strengthen with the [12 second] anaerobic challenge because they truly need more anaerobic activity or less aerobic activity. If the CP test of only 3 seconds is performed and a weak muscle strengthens, this often correlates more with an epinephrine

challenge procedure, as noted by Walter H. Schmitt, DC. Therefore, the adrenals and associated pathways should be investigated.

The aerobic challenge procedure is performed by having the patient raise and lower the legs alternately for 8-10 repetitions while supine.[3] A normal response is for the weak muscles to strengthen for a short period of time and the strong muscles should remain strong. A muscle that does not become strong after the aerobic challenge is often a result of a fatty acid or red blood cell nutrient deficiency, (most commonly iron), or from too much carbohydrate in the diet. Additionally, they may need more aerobic activity.

An additional test can be utilized by performing the aerobic challenge with simple sugar on the tongue. If there is too much carbohydrate in the diet, the individual will be primarily using sugar for energy rather than fats and that will shift their metabolism more towards anaerobic from aerobic. In this case, the sugar on the tongue while performing the aerobic challenge test will result in the weak muscles staying weak and the strong remaining strong.

Rarely does a patient actually fail the aerobic test to the point where the challenge will cause all strong muscles to weaken. The person must be severely over-trained or over-stressed for this to occur and endocrine system imbalances will be evident during the treatment. Anemia and/or fatty acid deficiencies are also a possibility. However, what does occur much more often than a weakening of all the muscles during an aerobic excess challenge is that only the thyroid related muscles (or acupressure alarm point) will show a sign of weakness, (Philip Maffetone, written communication, October 2008). It appears that the thyroid is the first of the endocrine organs to reveal itself during a failed challenge for aerobic excess.

PROCEDURE

1. Determine that the teres minor [thyroid] muscle is functioning correctly (is neither weak nor over-facilitated), as well as another muscle that will be used as an indicator. You can also test to make sure that the thyroid alarm point does not therapy localize (TL). Also determine at least one muscle that is weak and can be turned on by autogenic facilitation (stretching spindle cell = strong).

2. Perform the NEW AEROBIC CHALLENGE procedure by having the patient raise and lower the legs alternately for 8-10 repetitions while supine.
    a. Check the weak muscle(s) and the strong muscle(s). Normal is for the weak muscle(s) to turn on and all strong muscle(s) to stay strong.
        i. Weak >> weak, check the patient for fatty acids (omega 3 & 6) as well as RBC nutrients (Iron, B12, folate (including 5-MTHF), Mo, Cu (excess & deficiency), and evaluate sugar/carbohydrate intake *AEROBIC DEFICIENCY
        ii. Strong >> weak, evaluate for endocrine disorders, RBC nutrients, as well as injuries via IRT procedure;[6] consider anaerobic activity per challenge result (#4 below) *AEROBIC EXCESS

iii. Teres minor >> weak or thyroid alarm point positive TL, investigate thyroid support nutrients; consider anaerobic activity per challenge result (#4 below) *NEW AEROBIC EXCESS

b. If the above aerobic testing is normal, perform the 2.a.i. test again with sugar challenge (and treat accordingly if weak >> weak) *NEW AEROBIC DEFICIENCY

3. Perform the NEW CREATINE PHOSPHATE CHALLENGE procedure by having the patient alternately flex and extend the forearms as rapidly as possible for 3 seconds.
    a. Check the weak muscle(s) and the strong muscle(s). Normal is for the weak muscle(s) not to turn on and the strong muscle(s) not to turn off.
        i. Strong >>weak; this is a fault in the creatine phosphate pathway, check for phosphorus and creatine; Glycine (GLY) can also be tested as creatine is synthesized from GLY (and therefore requires B6 (P-5-P), B2, folate(s), and manganese) *Note that phosphorus is also needed for B6 conversion to P-5-P
        ii. Weak >> strong, check epinephrine via endocrine and neurological pathways

4. Perform the NEW ANAEROBIC CHALLENGE procedure by having the patient alternately flex and extend the forearms as rapidly as possible for at least 12 seconds.
    a. Check the weak muscle(s) and the strong muscle(s). Normal is for the weak muscle(s) not to turn on and the strong muscle(s) not to turn off.
        i. Strong >>weak; this is a fault in the anaerobic (lactic) pathway, check for glycolysis and citric acid nutrients, adrenal gland stress, and glycogen (or some form or carbohydrate) *NEW ANAEROBIC EXCESS
        ii. Weak >> strong, consider need for more anaerobic activity (or less aerobic) *NEW ANAEROBIC DEFICIENCY

CONCLUSION

The aerobic and anaerobic pathways are much more complex from a treatment perspective than were previously thought. Although the systems are almost always constantly working together, an imbalance in one system or the other can only be identified through specific testing. Prior to this paper, the anaerobic challenge procedures took into account both the lactic and alactic (CP) system as being one in the same. The current anaerobic challenge also appears to be too short as anything less than 12 seconds is not entirely lactic. This will often result in missing a fault that may be present, but not challenged appropriately. The aerobic system may also only reveal a problem if the thyroid related muscles/meridian is tested and/or if the general challenge is performed with sugar. Additionally, many athletes and non-athletes may appear to be over-trained but only appear so due to depleted glycogen levels - a dietary factor, not an exercise consideration. Performing these new and updated tests as described will result in a much more thorough understanding of the patient's aerobic, anaerobic (lactic), and creatine phosphate metabolism.

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