

- **Muscle Relaxation**

Various types of muscle relaxation have been developed for total or differential relaxation of the muscles. Techniques should result in lengthening of the muscles and maximizing blood flow for metabolic transportation that can easily be established with EMG and temperature biofeedback. Commands to release muscle tension need to be given twice to reduce residual tension (Wilson & Cummings, 1985).

- **Imagery**

The use of relaxing imagery has been found effective in increasing blood flow as well as creating a peaceful mood state. Different types of imagery exercises exist but it is important to recall that while most people will benefit from imagery, specialized training will strengthen the effectiveness of the imagery upon the physiological systems. Some individuals are able to effect 'target locations' with the use of imagery. The same procedures used in target imagery for conditions such as cancer can be applied to athletes who are attempting to effect specific systems such as fatigued muscle groups. While the target technique does not work equally well for all athletes, the use of repetition, increasing intensity and clarity of the image and the creation of boundaries around the target area are examples that will enhance regeneration imagery.

- **Blood flow exercises**

Increased blood flow is essential in removal of waste products and delivery of nutrients to the various tissues of the body and brain. Schultz and Luthe (1959) provided evidence of the enhancement of psychological states, as well as an increase in blood flow using autogenic standard exercises. The exercises are to assist an athlete more quickly and completely return to the homeostatic levels in many systems through a series of repetitive self-statements. Autogenic exercises do not seem effective for some athletes who either don't have faith in the process or have poor attention spans.

A technique that we found effective that can be learned and performed in a few minutes and verified by an inexpensive thermometer placed on the finger is to merely have the athlete mentally open the arterioles. The script can be as simple as "imagine (see, feel or give permission to) the smaller arteries in the top of the arm opening, and the blood flowing more freely from the top of your arms, to the forearms, to the wrist, hand and fingers. The blood will automatically be returned." This script can be modified for the trunk and legs. With a temperature biofeedback, 15 of 20 athletes can learn to warm their hands in the first two or three sessions. After they become skilled they can direct blood flow to an injury site.

- **Total System Relaxation**

A good relaxation script or tape for regeneration of athletes should include:

- breathing
- muscle relaxation
- blood flow
- imagery for healing
- attention focusing
- parking of thoughts/feelings, and
- positive self-statements

An example of this type of tape/CD is Power Hour (to obtain: vwilson@yorku.ca). I, again, would recommend the use of biofeedback equipment to teach and reinforce the quantitative changes as the athlete learns to control and regenerate the systems of the body/brain.

Recovery & Regeneration Using Neurofeedback

Neurofeedback is the measurement and displaying of brain activity from various sections of the head so that the person can learn to change the level or type of activity. It has been used for decades in the treatment and control of epilepsy, attention and learning deficits as well as other medical-related disorders. Recently, it has been used for those with depression and disruptive mood states. Good results are being reported for athletes who need specialized attention or arousal states such

as golf, racecar drivers, shooters, etc. Because it requires a specialist and many training sessions, it is not readily available to the typical athlete.

Following are suggestions where Neuro-feedback can be used to enhance the regeneration of track and field athletes.

1. Sleep Disorders

When athlete's performance or recovery is reduced due to persistent sleep disruptions and normal sleep techniques are not working, it may be beneficial to try Neuro-therapy.

2. Post-Traumatic Stress Disorder (PTSD)

Post-Traumatic Stress Disorder is a syndrome that occurs following a significant stressor that involves psychological distress and accompanying psychophysiological disorders. PTSD may remain dormant for many years and then be triggered unexpectedly by an event or situation. When an athlete continues to make the same old error or script in their mind (SOS), and it is not skill based, it may be similar to PTSD. This most often occurs when the athlete has previously experienced loss or shame. If the future of the athlete is to continue at a very high level, Neurotherapy may be appropriate if traditional sport psychology or counseling techniques do not work.

3. Busy Brain

If athletes identify their inability to slow a busy brain, to get to sleep quickly, to forget disturbing thoughts or to 'let go and relax' as reasons why they don't totally recover, even when given appropriate time out to do so, they may benefit from Neuro-therapy. This is after behavioral techniques such as 'thought stopping', breathing to obtain the meditative state (six breaths/min), or 'cognitive restructuring' have been tried.

4. Elite Performers

If track and field athletes intend to pursue a career at the elite level, they should explore all options that strengthen their