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# FRIENDS OF NVT

OFFICIAL NEWSLETTER OF INNEURACTIVE

## INTRODUCTION

Welcome to the first Issue of Volume 6 of our continuing Friends of NVT Newsletter! We are beyond grateful for all your support and viewership. At Inneuractive, we strive to provide you with the most up-to-date, actionable information regarding our neuro-visual training methods, exercises, philosophies, and new developments. Our goal is to develop this Friends of NVT Newsletter into the gold standard for all your neuro-visual training insights and information. With that said, we are thrilled for you to be joining us for Volume 6 and are appreciative for your continual support in our mission to provide a cutting-edge NVT newsletter throughout the year.

In this first Issue of Volume 6, we will start by drawing connections between the principles behind standard strength and conditioning exercise physiology and NVT exercises. This content will explore the relationship between strength and conditioning and NVT from the perspective of muscle physiology such as force-velocity curves, muscle memory, strength building, and endurance. There are important similarities between these two distinct training programs that provide insight into the importance of a combined approach for a more holistic performance enhancement training program.

In our How To this week we will be exploring the Amsler Grid. The Amsler Grid is a commonly used optometric assessment tool for the analysis of the central 10-20 degrees of the visual field in age-related macular degeneration. We will be expanding upon the utility of the Amsler Grid for assessing visual field functioning post-traumatic brain injury.

We encourage you all to leave questions and/or comments below. Thank you for the continued interest and enjoy!

### WHAT'S IN OUR LATEST ISSUE:



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# Exercise Physiology and Its Connection with NVT

Every athlete, fitness guru, and home workout warrior has at least a general understanding of strength and conditioning: energy expenditure equals calories burned. For the average exercise enthusiast, despite no formal academic training in exercise physiology, that is actually a great starting point for understanding the physics, muscles' actions, and metabolic changes that occur during strength and conditioning. In taking a deeper dive, energy is required for a muscle contraction to take place. Muscle contractions can be described based on length, tension, force, or velocity. An isometric muscle contraction describes a change in muscle tension while the muscle length stays the same. An example of an isometric exercise can be demonstrated by wall sits. In contrast, an isotonic muscle contraction describes changes in the muscle length under a constant tension, with shortening of the muscle being "concentric" and lengthening of the muscle being "eccentric". An example of an isotonic concentric exercise would be lifting a dumbbell towards the shoulder during a bicep curl, and an example of an isotonic eccentric exercise would be lowering the barbell toward your chest in a bench press. These examples demonstrate that exercises are multifaceted and depending on the workout program may comprise of concentric, eccentric, and/or even isometric muscle contractions.

These foundational exercise movements are also employed in certain neuro-visual training practices. For example, when doing our previously discussed Marsden balls drill or other pitch & catch workouts (FoNVT I7V5, I8V4, I7V3, I1V2, & I6V1), one can progress to more difficult variations by having the participant do these drills while on a half bosu ball. By being on a half bosu ball, the participant would ideally be engaging coordinated contractions to stay balanced and work on their proprioception.

On a separate note, our NVT methodologies generally rely on the principle of "thinking" while doing things or performing exercises. The purpose of "thinking" focuses the brain on a central cognitive task, while having to simultaneously process sensory information and then send efferent signals to the muscles during exercise. Training "thinking", while performing exercises, or during movements, or while things are coming at you, is inevitably crucial for peak athletic development. Just as it is important to equally perform concentric, eccentric, and isometric muscle contractions during strength and conditioning for optimal, well-rounded muscular development, it is as important to incorporate "thinking" during each of these muscle contractions to develop optimal, well-rounded neurosensory and neuromuscular processing within the brain.

Another principle of exercise physiology works to exploit antagonistic muscle pairs. An antagonistic muscle pair can be described as one muscle contracts, the other muscle lengthens. The muscle that is contracting is call the agonist, while the muscle that is lengthening is called the antagonist. For example, during a bicep curl, the biceps contract to produce the movement, making it the agonist, while the triceps lengthen, making it the antagonist. For another example, during a leg extension exercise, the quadriceps are contracting to move the weight, making them the agonist, while the hamstrings are lengthening, making them the antagonist. From the first paragraph, these antagonistic muscle pairs can also be thought of concentric/eccentric pairs.

Muscle conditioning often focuses on speed, strength, endurance, and muscle memory. The first two pillars of NVT encompass speed, endurance, and muscle memory. While increased strength of the six extra ocular muscles is difficult to accomplish with NVT the other three are easy to train. With reference to the biceps curl, if you increased the reps and the speed of the reps of a biceps curl without increasing the weight you would still see a degree of muscle training concerning endurance (increased reps), speed (faster sets) and muscle memory (proficiency of reps/sets). Unlike the curl when moving one set (biceps) the reset with arm extension has little conditioning of the triceps, whereas with the eyes the antagonistic muscle is equally conditioned when the eyes move in the other direction.

From the NVT perspective, the antagonistic muscle pair philosophy can be easily demonstrated with exercises that focus on the muscles that move the eyes, also known as oculomotor muscles. There are six muscles that surround the eyes and are responsible for all the eye movements: superior oblique, superior rectus, medial rectus, lateral rectus, inferior rectus, and the inferior oblique. During horizontal (left-to-right or right-to-left) saccadic eye movements and NVT exercises that feature these movements such as scanning saccades, the medial rectus and lateral rectus are stressed and are antagonistic pairs. When both eyes look to the right, the right eye's lateral rectus contracts, while the medial rectus lengthens, and the left eye's lateral rectus lengthens, while the medial rectus contracts. To include the "thinking" component of our NVT exercises, Word-Finding Scanning Saccades incorporate the medial rectus and lateral rectus antagonistic pairs as we just discussed, on top of focusing the brain on the primary cognitive task of processing the visual information to recognize hidden words within the alphanumeric of the Hart charts.

With NVT pillar three, brain training, we are often training the brain to think and recall faster. The constitutive exercises for the speed of brain training should include the speed of the extra ocular muscles with NVT. That way the brain and eyes will improve simultaneously without one hindering the conditioning of the other.

# "HOW TO" – Amsler Grid

The macula is a small area in the retina consisting of a dense array of rods and cones. It is responsible for our central vision, most of our color vision (due to the high proportion of cones in the center of the macula, known as the fovea), and to some degree our ability to capture fine details of what we see. The macula is a very important structure for not only our ability to see and visualize the world around us, but for our central nervous system to bring in and process visual information. Given its importance, it is crucial for practitioners to be able to detect if there are weaknesses of the macula, such as in macular degeneration, retinal ischemia (blood loss), and direct trauma. This calls to light the Amsler grid (Figure 1).

The first Amsler grid was developed in 1947 by a Swiss ophthalmologist, Marc Amsler, and is still routinely used throughout Optometric practices today in the assessment of macular disease. The Amsler grid is a paper-based test that can evaluate the development of scotomas (blind spots) and/or metamorphopsia (vision distortions) in patients with macular degeneration. Although the Amsler grid is primarily used in the evaluation of macular degeneration, it is well studied that traumatic brain injuries can also induce retinopathies that may also affect the macula and our visual perception. From this perspective, we use the Amsler grid to assess the function of the macula in traumatic brain injured patients with vision complaints. If the Amsler grid provides us with sufficient evidence to indicate macular pathology, we then refer the patient to a trained Optometrist for further testing and management.

With that said, the instructions for how to appropriately use the Amsler grid is as follows:

1. If you wear spectacles or contact lenses, use the grid with your eyewear in place.
2. Hold the chart at a comfortable reading distance (generally, about 12-14 inches away). Wear your reading glasses if you normally use them.
3. Cover one eye and focus on the black dot in the middle of the grid.
4. Cover the other eye and repeat the test. If the lines appear to be wavy, dim, irregular or fuzzy, schedule an eye exam immediately.
5. Check each eye separately and record your findings separately for each eye.

Of note, it is important to ask the patient or subject when dwelling on the center dot if they are aware of the grid around the dot. Ask if the grid stays as a grid, or if the grid becomes wavy, blurry, distorted in any way. Note the location of the distortion. A wavy grid or distorted grid can indicate retinal disorders such as retinal detachment and should be referred to an eye care professional immediately.

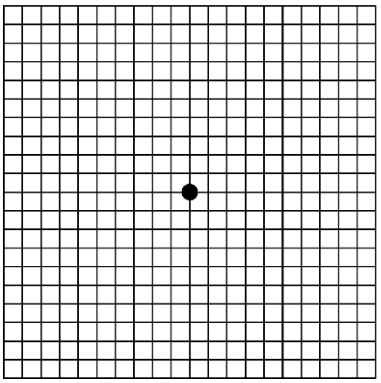

Figure 1: Amsler Grid Test

## Announcements

As always, if you're interested in learning more about Inneuractive, our mission, our products and service offerings, or just Neuro-Visual Training in general, please click the following link: www.inneuractive.com. If interested in learning more or purchasing Tricerapro, please visit www.tricerapro.com.

Have suggestions for a future issue? Please reach out to clarkjf@gmail.com or info@inneuractive.com and we will do our best to include your request in the future.