

FRIENDS OF NVT

OFFICIAL NEWSLETTER OF INNEURACTIVE



WHAT'S IN OUR LATEST ISSUE:

INTRODUCTION

Welcome to Issue 7, Volume 8 of the Friends of NeuroVisual Training Newsletter! Our mission is to provide you with the latest insights and news regarding NVT and its benefits in preventing injuries, facilitating rehabilitation, and enhancing overall performance. We also aim to provide actionable instructions to incorporate into your training, practice, and daily routine at no cost.

In this issue, we will delve into the muscle physiology of the extraocular muscles and how lateral gaze and hold exercises can help "reset" these muscles towards an ortho position. With the rise of over-converging issues caused by prolonged screen time, the lateral gaze and hold exercise has become a crucial exercise in NVT to combat the chronic adduction of medial recti muscles that can lead to a strength and length imbalance. By performing tailored NVT exercises, we can lengthen medial recti and strengthen/shorten lateral recti muscles to enhance quality of life and daily activities.

Additionally, our How To section will provide instructions on conducting an optokinetic nystagmus (OKN) assessment to determine and reset gaze stabilization. OKN is an involuntary eye movement that plays a crucial role in maintaining visual acuity during sustained visual motion. By training eye discipline and maintaining gaze where intended, we can enhance visual skills and overall performance.

We hope you find this issue informative and continue to support our mission of promoting the benefits of NeuroVisual Training.

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- Muscle Physiology and NVT Exercises for Balanced Extraocular Muscles - Lateral Gaze and Hold Exercises - Dr. Joseph Clark, Ph.D.
- How To: Optokinetic Nystagmus to Determine Gaze Stabilization - Jon Vincent
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Muscle Physiology and NVT Exercises for Balanced Extraocular Muscles – Lateral Gaze and Hold Exercises

Extraocular muscles have some differences and similarities between them and skeletal muscles. Often skeletal muscle principles apply within the limits of the work the extraocular muscles must perform. In this article, we will address an NVT training modality for a specific extraocular muscle deficiency and relate the treatment to skeletal muscle physiology correlates.

It is becoming increasingly common for people to have over-converging issues in modern society. This over-converging issue is especially prevalent in people who use media, computers, phones, iPads, etc., a lot and at a close distance (say less than 18 inches). Chronic adduction of the medial recti muscles can lead to a strength and length imbalance of the medial recti and lateral recti.

Consider in this representative example that a person has an over-convergence issue that impacts the quality of life (QoL) and/or activities of daily living (ADL). This person tends towards eso because of spending a lot of time on his/her phone. Now depth perception is impaired, and he/she complains of chronic daily headaches when using media. You want to work with this person doing NVT. While there are several methods to consider with this person, we're here to discuss the physiology of the NVT exercises to help reset the extraocular muscles.

We want to lengthen the medial recti and strengthen/shorten the lateral recti. If we consider the left eye, that would be looking left and holding, or doing fine motor movement with the left eye abducted (see Figure 1). It's simple... Except not so simple because the right eye will be greatly adducted.

Now in Figure 2, regarding the right eye, you are making the situation worse, furthering this eye's over-convergence. So the question becomes, "How do we somewhat isolate the stretch of the medial rectus and strength of the lateral rectus, one eye at a time?". It is possible to do said exercises with a base-in prism, making the contralateral eye contract less. A complementary and more straightforward solution is to patch one eye. The patched eye will often not work as hard to maintain the lateral fixation.

The patching, in this case, would be to patch the right eye and do a left lateral gaze and hold exercise with the left eye (see Figures 2 and 3). The dose (angle) and duration are dependent upon what the client can tolerate.

As represented in Figure 3, the contralateral eye (right eye in this case) is not as adducted, and you are not making the medial to lateral rectus set point worse in the right eye. If you do this exercise alternating patching and alternating isometric with dynamic adduction exercises the muscles will set back to a more ortho position. If you have other modalities that we've discussed in Friends of NVT newsletter such as tranoglyphs, vectograms, phoropter (I1V5, I3V7), or yoked prisms (I1V5), you can use any combination or all of these to help treat your over-converging client.

You'll be using straightforward muscle physiology principles of; strengthening muscle groups, and stretching muscle groups with isometric, isotonic and dynamic activities. For the sake of coordinating muscle function to be able to fuse an image at various distances and various locations, you'll want to include eye teaming exercises along with one-eye exercises. If your client is experiencing a detriment in QoL and or ADLs, these exercises will help them.

Like skeletal muscle stretching, strengthening muscle pairs aid in the control and performance of paired muscle groups. The extraocular muscles of the medial and lateral rectus can be stretched and strengthened to aid in getting the client away from over-converging and more towards ortho. All this is accomplished using traditional muscle physiology principles.

Isometric Exercises for Eyes

- Mimics Low-Load stretching
- Strengthens weak side
- Stretches Strong side
- The vertical lines represent relative muscle length.

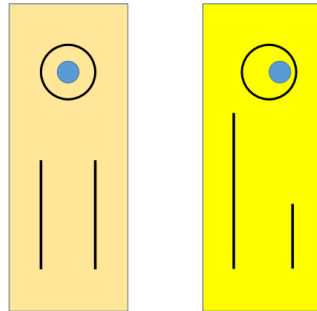


Figure 1. The two vertical lines below the representative eyeballs indicate the relative length of the two horizontal recti muscles. The shorter muscle is contracting pulling the eyeball to the right. In the right panel the longer line indicates that the other rectus is stretched. This strengthening and stretching principle is a component of the treatment we are striving for when, in this case, a client is over-converging.

Both Eyes Open (Right eye excess Abduction)

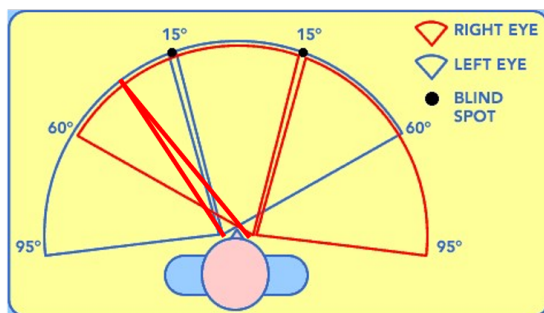


Figure 2. In this image the client has a fixed gaze to the left between 15° and 60°s. Represented herein we see that the right eye is adducted farther to the left (a more acute angle) to fuse the image with the left eye. This is making the right adductors shorter and stronger. Such an exercise runs the risk of not aiding the over-converging client.

Right eye patch (Less Right eye Abduction)

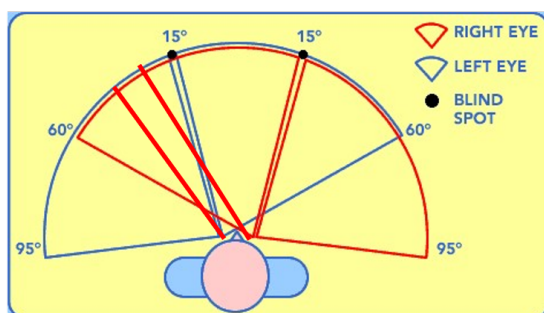


Figure 3. In this figure there is an eye patch (not shown) covering the right eye. The left eye is fixated on a target between 15° and 60° but the right eye does not need to adduct as much as the abducting left eye. Thus, there is less shortening of the medial rectus of the right eye. However, for the left eye the medial rectus is being stretched to reset its length towards ortho.

“How To” – Optokinetic Nystagmus to Determine Gaze Stabilization

Optokinetic Nystagmus (OKN) is an involuntary eye movement that occurs in response to a moving visual stimulus. It is a reflexive response of the eyes to visual motion, which is essential for maintaining visual acuity while moving through an environment. OKN helps stabilize images on the retina during sustained visual motion, which is important for gaze stabilization.

Gaze stabilization is the ability to keep the eyes steady on a stationary object while the head or body is moving. It is a critical visual function for maintaining balance, visual acuity, and overall visual performance. In many situations, such as driving or playing sports, an individual needs to maintain a steady gaze on a target while their head or body is in motion. If the eyes are not properly stabilized, the visual system can become overwhelmed, leading to motion sickness, decreased visual acuity, poor performance, and increased risk of injury.

Determining gaze stabilization is essential for diagnosing and treating vision-related issues. OKN is a powerful tool used by eye care professionals to determine gaze stabilization and is carried out using the tool shown in Figure 4. By measuring the eye's involuntary response to a moving visual stimulus, eye care professionals can assess the efficiency and effectiveness of the individual's visual system.

Here are the steps to perform our OKN assessment to determine and reset gaze stabilization:

1. Set up a computer or rotating drum with vertical or horizontal black and white bars scrolling across the screen. The bars should move horizontally (L to R, R to L) as well as vertically (D to U, U to D).
2. Instruct the person to track a bar across the screen with their eyes and repeat.
3. Then, ask the person to pick a spot in the center of the screen and hold their gaze on it.
4. Observe their eyes for smooth pursuits, symmetry, and physiological OKN.
5. Ask the person about difficulty with each task and relative differences between tasks.
6. The assessment can be done for one eye at a time (OS or OD) or both eyes (OU).
7. Compare the difficulty between eyes to determine if there is an imbalance in the visual system.

Of note, the OKN can be done with one eye at a time or both eyes simultaneously.

It can be done in different directions (up, down, left or right), with different colored bars, different rotation rates, or varying thicknesses of the bars presented in different visual fields. The assessment should be done in 1-minute blocks, up to 5 minutes per rehab session. If done on a computer, it can be done with or without a fixation point (see link for YouTube video of OKN drum:

<https://www.youtube.com/watch?v=8rCmti1bVzo>).

Overall, OKN is a powerful tool for determining and resetting gaze stabilization, which is crucial for maintaining visual acuity, balance, and overall visual performance. By incorporating OKN exercises into NVT training, individuals can improve their visual skills, enhance eye discipline, and prevent injuries. This can ultimately lead to a better quality of life, as individuals can perform daily tasks more effectively and with less discomfort.



Figure 4. Representation of a typical hand held optokinetic nystagmus drum. We also use hand held and computer based nystagmus training and utilize a Retilab™ system for measuring nystagmus.

Announcements

We are excited to welcome our newest addition to our editorial team, Robert Hasselfeld! Robert is a certified CL-1 trainer, performance coach, and NVT trainer. We look forward to creating more exciting NVT content!

Check out the Huberman Lab's discussion on neuroplasticity here! <https://hubermanlab.com/science-based-mental-training-and-visualization-for-improved-learning/>

Exercise is key for maintaining physical and mental health. Studies show that it positively affects health even if started later in life. Some suggest that exercise improves cognition! <https://flip.it/HWZKB7>

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.

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.

Disclaimer: Nothing in this communication should be construed as a practice of medicine, an endorsement, or political action. The opinions are the opinions of the authors.