

# FRIENDS OF NVT

OFFICIAL NEWSLETTER OF INNEURACTIVE



## INTRODUCTION

### WHAT'S IN OUR LATEST ISSUE:

Happy Holidays and welcome back to Issue 8 Volume 7 of the Friends of NVT Newsletter! In the main portion of today's newsletter, author Esha Reddy reviews an article regarding Near Point of Convergence scores.

In our "How To" this week, Dr. Joseph Clark provides methods for performing a Near Point of Convergence test.

Thank you for your support throughout this year! We look forward to creating more NVT centric content for you in the upcoming year! We encourage you all to leave questions and/or comments below.

If you missed an issue, please visit <https://inneuractive.com> where all issues are available for free. Please tweet and share with your friends as we plan to release more great content. @FriendsofNVT.

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## Article Summary – Examination of Near-Point Convergence Scores in High School Athletes- Implications for Identifying Binocular Vision Dysfunction After Concussion Injury

Following a TBI, it is fairly common for individuals to have a change in or lose some amount of their binocularity. This can lead to convergence insufficiency, learning difficulties and a host of visual and cognitive difficulties. Convergence refers to an individual's ability to shift their eyes inwards to view a near object clearly. When an individual cannot properly align their eyes, they may have convergence insufficiency. Given the prevalence of oculomotor impairment following a sports-related concussion or mTBI, convergence is included in protocols for screening patients, including the vestibular/ocular motor screening test (VOMS), for deficits following TBI.

The near point of convergence test (NPC) is commonly used when diagnosing convergence insufficiency. Further outlined in our "How To" below, NPC is evaluated using an object, such as a pen, and measuring the distance between the bridge of their nose up until the point at which the individual sees double. The simple and quick nature of the NPC test makes it a popular tool for diagnosing convergence insufficiency. However, there are inconsistencies found between the normative values of the general population as compared to the VOMS value. The latter has a clinical cutoff distance of greater than 5 cm whereas the mean distance from the general public ranges between 2.3 - 13.1 cm (Del Rossi 2022). There are also age-related changes in NPC as this value increases with age.

In order to investigate how healthy athletes perform on the NPC test as compared to the current clinical cutoff values, Dr. Gianluca Del Rossi collected and examined NPC scores from healthy, high-school-aged student-athletes to determine what percentage of individuals presented NPC scores outside the current clinical cutoff (Del Rossi 2022). The student-athletes came from a variety of sports and completed the NPC test before their season. He found that NPC data ranged from 1 - 22 cm, with a mean of  $3.58 \pm 2.72$  cm across three trials (Del Rossi 2022).

From their data, about 20% of the athletes scored above the 5 cm clinical cutoff. Additionally, other studies estimate that 11% or more of healthy individuals score above the cutoff as well. Given the fact that convergence insufficiency is generally reported as affecting 5% of people, Dr. Del Rossi discusses the possibility that the 5cm cutoff could be leading to "false positives" for convergence insufficiency. He suggests the idea of re-establishing the cutoff values to better correlate with the mean NPC scores of the general public. Dr. Del Rossi's idea that the current critical cutoff value is too low is shared by other experts – including the Convergence Insufficiency and Reading Study and Convergence Insufficiency Treatment Trial Groups (Del Rossi 2022). Both of the aforementioned groups use cutoff values greater than 5 cm when diagnosing convergence insufficiency. Furthermore, 10 cm has been historically used by optometric practitioners as a cutoff mark for diagnosis (Del Rossi 2022). It may be that a more inclusive strategy will be to have and use age-adjusted target ranges, with 95% confidence intervals. Several individual practitioners have already adopted that strategy (Clark personal communication).

Another factor impacting NPC scores lies in the methodology for performing an NPC test. In this particular study, an Astron International Accommodative Rule with a movable column was used to collect NPC values. A pen light, stylus, and pencil tip are other commonly used accommodative targets. Additionally, some practitioners begin NPC measurements at the bridge of the nose while others begin at the tip of the nose or the front plane of the eye. These inconsistencies in the accommodative targets and the measurement start point can certainly result in variable data ranges.

In conclusion, the widespread usage of NPC in diagnosing convergence insufficiency may become more clinically useful with a re-evaluation of the standard cutoff values and methodology.

### References:

Del Rossi, Gianluca PhD. Examination of Near Point of Convergence Scores in High-School Athletes: Implications for Identifying Binocular Vision Dysfunction After Concussion Injury. *Clinical Journal of Sport Medicine*: September 2022 - Volume 32 - Issue 5 - p e451-e456  
doi: 10.1097/JSM.0000000000000995

# “How To” – Near Point of Convergence

The near point of convergence (NPC) is a great NVT testing tool that is quick and easy to use. It should be done on every mild Traumatic Brain Injury (TBI) patient and sports related concussion patient.

To do the NPC, I like to have the person standing, although sitting is acceptable. Have a pen, pencil or stylus and ask the person to look at, and focus on, the tip of the pen. Note, this is because if you have the person track your finger, there is too much area to look at and the person may not converge adequately. A small, finite, point is preferable. Have the tip of the pen about 2 feet from the person, ortho to the two eyes.

I tell the person what I'm going to do, which is I will bring the tip of the pen to the bridge of their nose without touching them. I tell them to track the pen all-the-way to the bridge of their nose, as best they can. I'm also watching their eyes very closely. I also ask them to tell me if the image changes, they see double, it is painful or hard to do. I also note sway or lean hence the preference to have them standing.

I bring the pen in straight to the bridge of the nose, slowly, taking about 4 seconds to complete the two feet. Watching their eyes I note abduction, adduction, symmetry, smooth adduction and any convergence deficiency. If a person says they see double, I note when that occurs. I note when anything is observed or reported and record that in inches from the bridge of the nose.

NPC can change with age. Young adults can have an NPC of 2 inches to the bridge of their nose. Older adults (>50 years old) may be more like 4 to 6 inches.

Note, acuity can impact NPC as well.

One eye going exo or arresting the adduction is a common occurrence in post TBI patients and that is recorded as well. This might be consistent with a convergence insufficiency.

I will often repeat the NPC 3 times to get an average number and to also see if an initial observation is repeated. A three times exo – eye is of concern and requires attention.

Some people see double when they are unable to converge anymore. Some people may stop converging and suppress one eye or the other. This person might have an eye go exo or stop adducting. They won't see double even with the gaze is somewhat deconjugate because one eye is suppressing. In such a case consider doing a suppression assessment (see I6V7 on the suppression panel).

An observation that occurs with post TBI patients and the NPC is withdraw away from the fixation target. A person will pull away as you bring the tip of the pen closer. Record when this starts as the NPC. In a case of withdraw, I'll still repeat the test 2 or 3 times to ensure that the withdraw is consistent. Each run I try very hard to use the same speed approaching the bridge of the nose and record when the withdraw starts.

What I'll do next is I'll ask the person to take the pen and to do the test to themselves. With their hand they hold the pen and bring it to the bridge of their nose and they track the tip of the pen as they do this.

This is because I want to see if they can control the adduction and successfully adduct to near the bridge of the nose OR if they withdraw, nonetheless.

Withdrawing when they do the NPC is more consistent with an adduction deficiency. Whereas often a patient will be able to complete the task without withdraw suggesting that the deficiency may be more consistent with a deficiency of the control of adduction. In either case we are able to get information concerning the putative pathology the person is experiencing.

With NPC being objective and quantitative it is a great tool for diagnosing, monitoring, managing, and treating TBI.

## Announcements

Happy Holidays and Happy New Year! We look forward to returning next year!

The International Sports Vision Association 2023 Conference features sessions ranging from optometric concussion management to the role of the neck in visual function and concussion rehab. If you are interested, please look into attending this conference, <https://www.sportsvision.pro/professionals/2023-annual-conference/>

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](http://www.inneuractive.com).

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