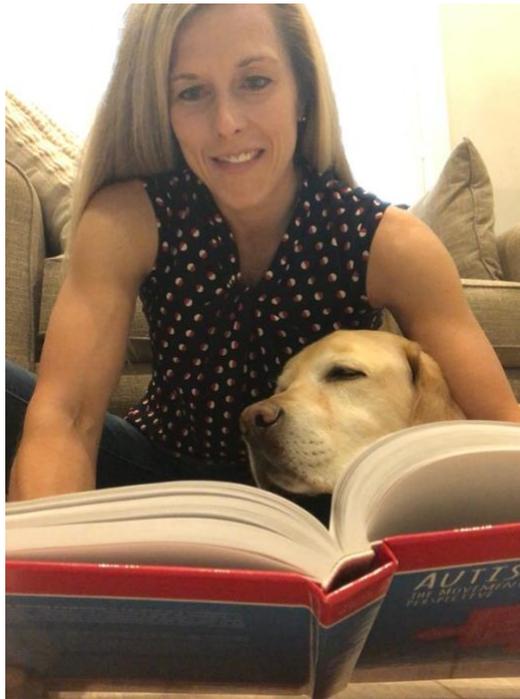




AND EYE QUOTE...READING REQUIRES OCULAR MOTOR SKILLS!

Ah summer reading. One of the things that I look forward to on my vacation during the dog days of summer - curl up in a HAMMOCK with a good book. When I was younger, I would always have a book going and sometimes even multiple books at a time. I LOVED to read! We are also in the middle of our I-ASC [Neurodiversity Summer Reading Challenge](#) so if you haven't chosen a book, take a look and get a few books in over the summer!



Dana Johnson & Pup Digging into Neuroliterature

NEUROTYPICAL people, don't often think about what goes into the ability to read. Yes, there is the cognitive part of DECODING the words and processing the information, however did you know that reading is a MOTOR skill as well? Let's look a little closer at how our eyes work to allow us to read.

SPELL VACATION SUMMER HAMMOCK

Reading requires both cognitive and what abilities? MOTOR

What season did the author say she looked forward to so she could read?

SUMMER

Name two more seasons WINTER, FALL, AUTUMN, SPRING

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The author likes to read in a hammock. Where do you like to read?



Our eyes rely on the small tiny MUSCLES to work together in order for our eyes to “team” or work together to track the words smoothly and efficiently. In fact, our eye muscles are one of the tiniest muscles in the human body making our eye movements one of the FINEST movements we make. They are controlled by 6 muscles for each eye. These include (refer to the diagram below and point to the muscles as you name them):

- MEDIAL RECTUS: causes the eye to look inward
- LATERAL rectus: causes the eye to look outward
- INFERIOR OBLIQUE: causes the eye to move on an angle
- SUPERIOR oblique: causes the eye to move on an angle
- Inferior rectus: causes the eye to look downwards
- Superior rectus: causes the eye to look upwards

It is important to note that these muscles all work TOGETHER when the eye moves. One or two may have a stronger contraction, however for smooth eye movements, more than one muscle may be activated.

SPELL

TRACK

MUSCLES

MOVEMENT

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When reading our eyes work together to track the words in what way?

SMOOTHLY AND EFFICIENTLY

What is a synonym for tiny? SMALL, MINUSCULE, PETITE, MINIATURE

Are eye muscle movements a gross motor or fine motor skill? FINE MOTOR SKILL

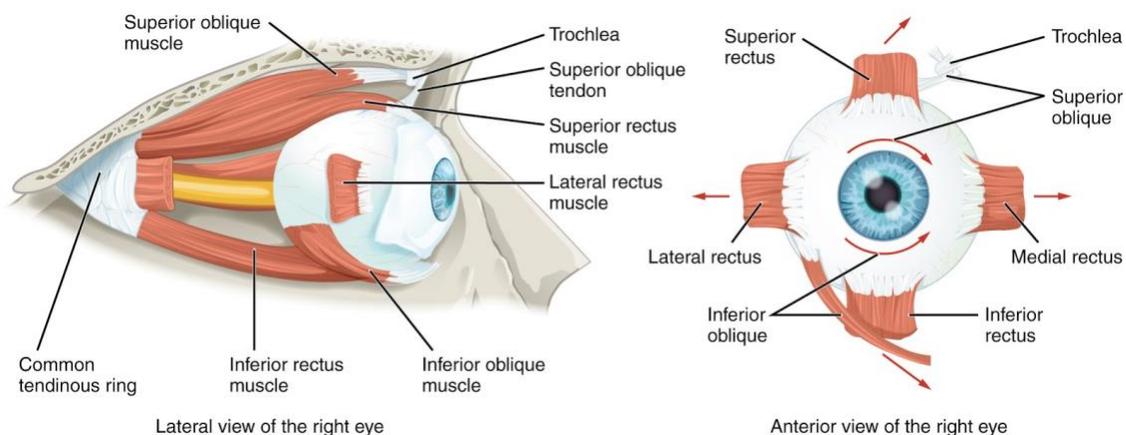
How many muscles control our eyes? 6

Which muscles cause the eye to look at the airplane in the sky? SUPERIOR RECTUS

Name one of the muscles that are involved in moving the eyes side to side?

MEDIAL RECTUS, LATERAL RECTUS

In what direction do the oblique muscles move the eyes? ON AN ANGLE



All of the muscles allow the eye to move in any direction. Additionally, our eyes are controlled by three CRANIAL NERVES which produce the eye movements. The other cranial nerve associated with the eyes is the OPTIC NERVE, but that is associated with vision and not eye movements. To put that into perspective, our ENTIRE body is controlled by 12 cranial nerves and four of those are specific to the eyes. Our eyes are obviously very important to our everyday tasks. So when we want to move the eyes to look out the window, to stare at the beautiful sunset, or to read our favorite book, our eyes will move exactly how we want them to. The active movement of our eyes working together to track is called SMOOTH PURSUITS. However, when you have APRAXIA or sensory motor differences, eye movements that are purposeful are very challenging and can make everyday purposeful motor movements, such as reading, very very difficult.

How many nerves control the eye muscles? 3

How many cranial nerves are there for the entire body? 12

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How many cranial nerves are NOT involved with the eyes? Let's show the whole equation. $12 - 4 = 8$

What is the one cranial nerve that is not related to the muscles? OPTIC NERVE

What do we call the active movement of our eyes, working together to track?

SMOOTH PURSUITS

OR **What is smooth pursuit?** ACTIVE MOVEMENTS OF THE EYES WORKING TOGETHER

Name another cranial nerve that is not related to the eye. OLFACTORY NERVE, TRIGEMINAL NERVE, FACIAL NERVE, VESTIBULOCOCHLEAR NERVE, GLOSSOPHARYNGEAL NERVE, VAGUS NERVE, ACCESSORY NERVE, HYPOGLOSSAL NERVE

What is something that you like to look at?

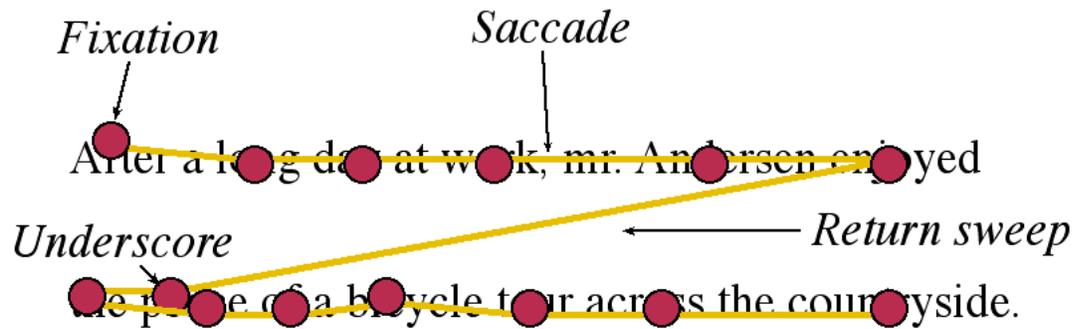
Can you name another motor challenge that someone with apraxia may have?

Point to the picture of the eye. Now point to one of the muscles of the eye.

I often have parents or caregivers ask me about reading and tell me that their speller has difficulty reading a book. What is confusing to them is that they know you can spell and we know that if you can spell, you can read - so why is it so difficult to read a book? The answer to that is that the act of reading a book is a motor skill! Reading is both a motor and a COGNITIVE (thinking) skill when it comes to neurotypical people. For you, the ocular motor demand of reading is the main reason why it's complicated to pick up a book or magazine and start to read. You may very well *want* to read, but it may be difficult to get your body to do it. Smooth pursuit movement is VOLUNTARY which means that you have to initiate, sustain and stop the movement of our eyes. Those with apraxia demonstrate motor differences with volitional movement or difficulties performing voluntary movements. We tend to associate this more with gross motor movements because we can see these difficulties much easier, however our eyes are controlled the same way as our quadricep muscle is controlled - via the NEURAL PATHWAYS from the brain to the muscle.

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Spell: NEUROTYPICAL MAGAZINE MOVEMENT

Smooth pursuit movement is _____? VOLUNTARY

What does cognitive mean? THINKING

Apraxia causes difficulty with what type of movements? VOLITIONAL, VOLUNTARY

What is one motor task you have to do when engaged in smooth pursuits?

INITIATE, SUSTAIN AND STOP THE MOVEMENT OF THE EYES

Tell me something other than a book that you can read. NEWSPAPER, MAGAZINE, COMICS, JOURNAL, etc.

Neural pathways travel from where? THE BRAIN TO THE MUSCLE

Name another muscle in the body.

What is something that you would like to do, but need body coaching/support to do?

So, how do we support you in your purposeful eye movements? First, we want to understand what *your* goals are. Is reading a goal that you have? You take in visual information in a very different way than neurotypical individuals. Spellers like you can often take a quick look at something and remember what they have seen but this can be EXHAUSTING and difficult to sustain. Reading books can be used as a tool to support your purposeful eye movements and ocular motor abilities, specifically tracking.

Here are some ideas that will help with smooth pursuits or tracking. It's important to note that some of these activities will require the Communication and Regulation Partner (CRP) to help prompt the eyes as you are working through the activities. CRPs can directly coach the motor with prompts such as "shift your

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eyes,” “look at it,” “follow the words,” “eyes on it,” “keep scanning,” to focus on the movement of the eyes.

1. **Throw a balloon or ball** -if tracking is tough for you, we can start with the balloon as it moves slower and then transition to the ball.
2. **Mazes** - to start your CRP can help you track a pencil as it moves through the maze. Gradually, your CRP can help coach you to complete the maze on your own.
3. **Puzzles** - these are great tracking practice as you have to move your eyes around the puzzle to figure out where the piece goes. Your CRP should use visual prompts to support tracking and moving eyes around the puzzle.
4. **Marble runs** - these are fun for all ages as they can be simple or complex.
5. **Laser pointer** - The CRP will need to help to prompt the eyes while you move the laser pointer in various patterns on the wall.
6. There are MANY other activities that can support tracking and smooth pursuits. Just remember that some spellers may need prompts to stay on track and keep their eyes on the moving target.

Spell: ACTIVITY REGULATION TRACKING

What was mentioned above that can be used to support tracking? READING

We said that eye tracking can be _____? EXHAUSTING

What was one of the eye prompts that was mentioned? SHIFT YOUR EYES, LOOK AT IT, FOLLOW THE WORDS, EYES ON IT, KEEP SCANNING

Name TWO of the activities listed above will help support ocular motor skills. THROW A BALLOON OR BALL, MAZES, PUZZLES, MARBLE RUNS, LASER POINTER

Which one of the activities above do you think sounds the most fun?

If it is hard to track a ball, what can you use at first? BALLOON

Why is a balloon suggested to use before a ball when working on ocular motor skills? THE BALLOON MOVES SLOWER

If reading is one of your goals, what would be the first book, magazine, or article that you would like to read?

Finally, as I mentioned above, the eye muscles are very tiny and can FATIGUE (tire) very quickly. It is important to remember that this may be a limiting factor in how long you can work on these activities. Start with 5 minutes and then move to increase the time from there. Here are some INDICATORS (signs) that your eyes are fatiguing.

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1. Blinking or squinting
2. Rubbing your eyes
3. Your eyes begin to water
4. Dysregulation
5. Eye shifting off of target more frequently as you increase the time

So when it comes to reading, you may want to read and improve their motor reading skills, however you or other spellers may not. Here are some ways you can enjoy and expand your reading skills:

1. Audiobooks and other technology can bring a book to life!
2. Having someone spend the time reading a book to you is also a great way to build a relationship and spend time with each other.
3. If you do want to work on ocular motor skills, start with very short sentences.
4. You may need the font to be larger than average.
5. Be sure to have good lighting. Give your CRP feedback to adjust lighting as needed.
6. The CRP can use their finger or a writing utensil to point to each word to help your eyes on the page and on each word.
7. Try using a ruler or cut out window (like [this](#) or [this](#)) to track one row at a time.
8. Finally, I highly recommend reaching out to an S2C Practitioner to discuss ocular motor practice and support in this area.

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What word did I use for tire? FATIGUE

What is one way you can consume books without reading? AUDIOBOOKS, TECHNOLOGY, READ OUTLOUD

Name one way your CRP can help you track? POINTING, FINGER, CUT OUT WINDOW, RULER

Name TWO of the signs or symptoms of eye fatigue. BLINKING, SQUINTING, RUBBING EYES, EYES BEGIN TO WATER, DYSREGULATION, EYE SHIFTING

We have listed a number of ways to enjoy and expand reading skills for nonspeakers. Is there another way or something else that needs to be included in the list as a way for CRP's to support spellers' reading skills?

Ultimately, getting into a good book is one of the best things that I remember as a child and even now as an adult. It lets us travel in our minds, meet some amazing individuals, and build our imaginations. Grab a book with your speller, start reading and dive in!

Creative Writing:

What is an audiobook or book that you have had read to you that you really enjoyed? What was it about that book that made you love it?

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Write a review or a summary of the best book that you have ever listened to, have had to you or have read yourself. If it happens to be one on Amazon, submit your review so that others can get your perspective as well!

Book clubs are a way to both enjoy reading and get involved in a more social environment. It also provides different perspectives on one book and the opportunity to learn and expand your thinking. If you have a couple of friends and have a book that you all want to read, why not get together a couple of times a month to discuss? What a fun and social event that can build community!!



Written by [Dana Johnson](#), PhD, MS, OTR/L

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