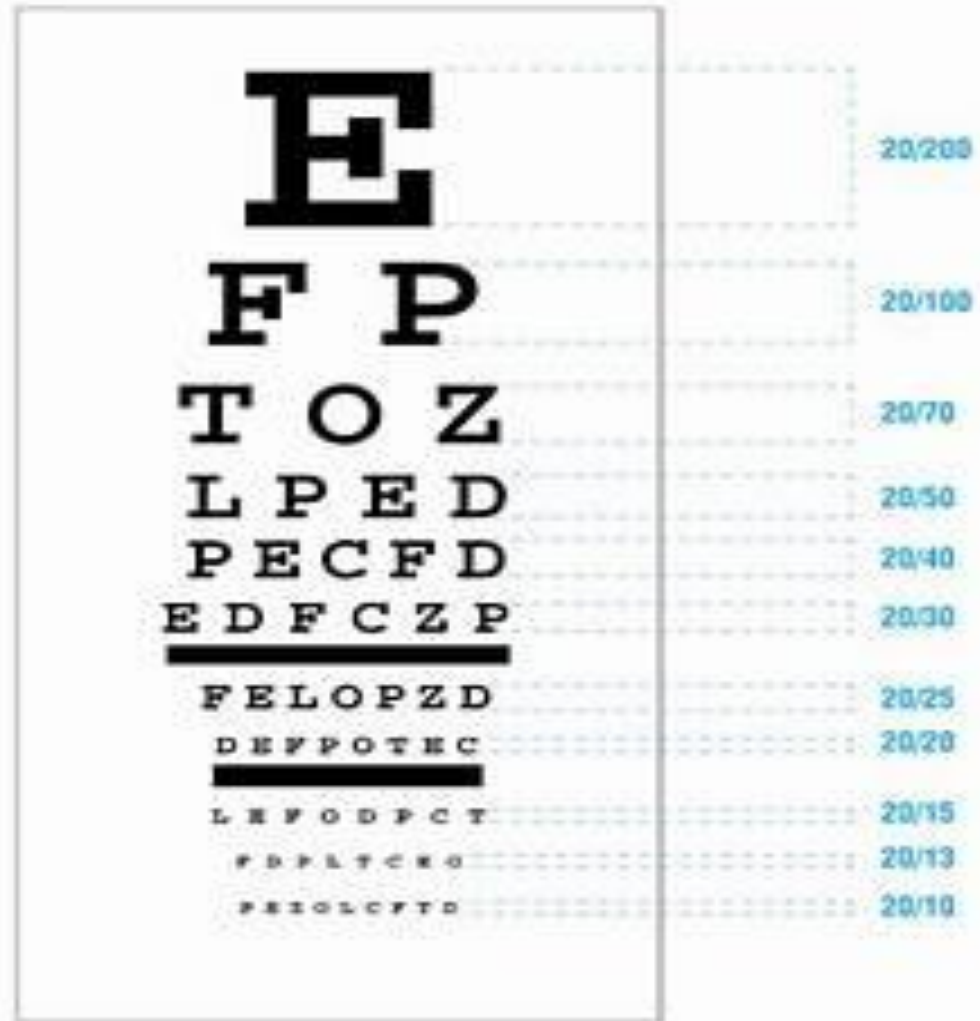




HOW DOES PARKINSON'S AFFECT VISION

Judith Riley, OD
drfoureyes@aol.com

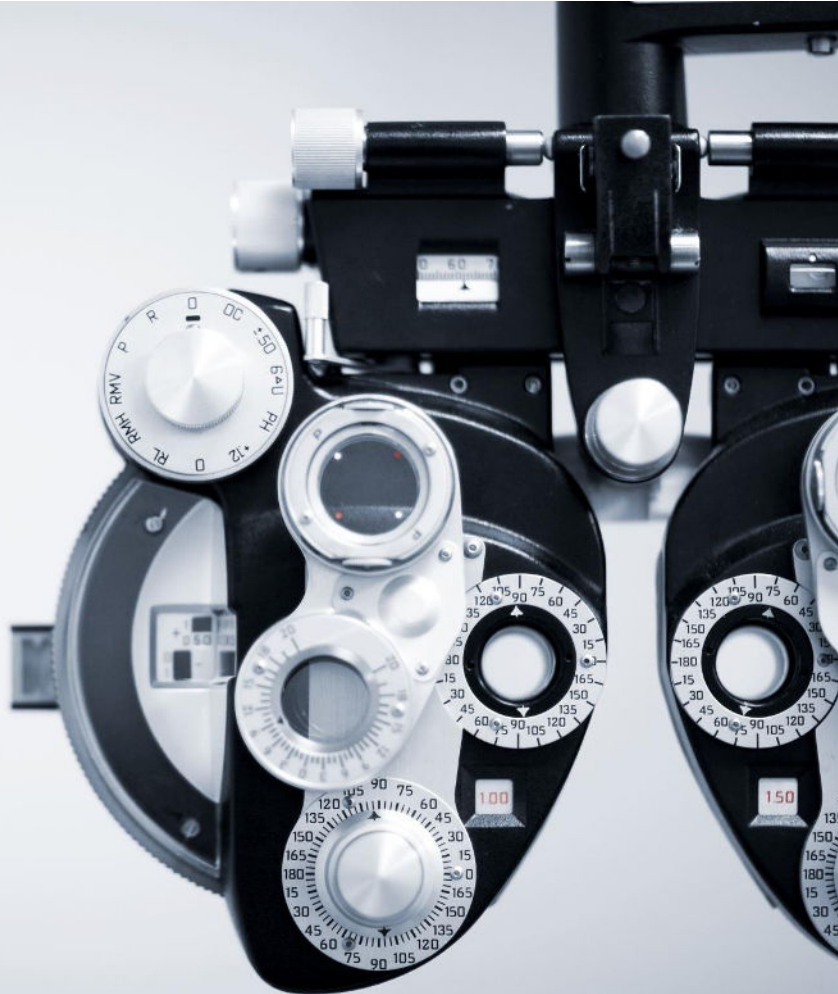
WHAT IS PERFECT VISION?



Is it 20/20?

The ability to see a
9 mm (3/8 inch)
letter on an eye
chart 20 feet away.

VISION IS MORE THAN 20/20



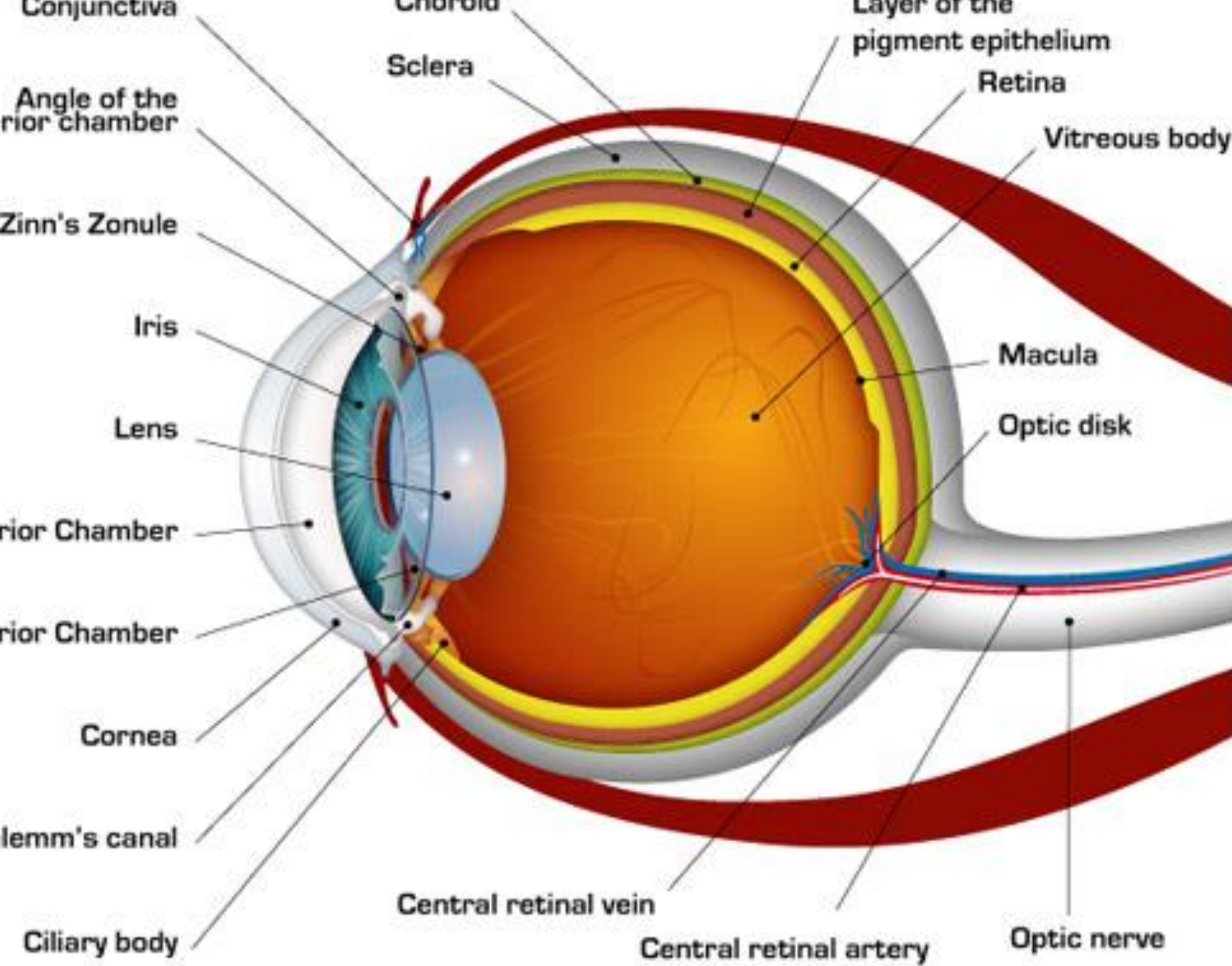
Vision is a sensory,
perceptual and motor
process that guides the
body and creates the
world we live in.

WHAT GOES WRONG WITH VISION IN PARKINSON'S



PROBLEMS WITH THE EYE

- **The role of the eye in vision, gather information from the world and send it to the brain to create vision.**
- **Parkinson's can interfere with this process by eyelid problems, dry eye, and retinal problems.**



ANATOMY OF THE EYE

Lid function problems

A close-up photograph of a human eye, heavily tinted with a blue color. The eye is looking slightly to the right. The eyelashes are visible, and the iris and pupil are partially obscured by the blue tint. The background is a soft, out-of-focus blue.

**DECREASED BLINK RATE, CAUSING DRY EYE,
APRAXIA OF LID OPENING,
BLEPHAROSPASM WITH TOUCH OF LIDS**

DRY EYE...60% OF PEOPLE WITH PARKINSON'S HAVE DRY EYE. COMFORT AND VISION ARE AFFECTED.

- **Cause:** decreased blink rate from decreased dopamine, tears are not replaced by lid movement and evaporate away.
- **Treatment:** increase lubrication through drops and ointments. Consider use of artificial tears with oil component to prevent evaporation. Ointment use at bedtime if hands are unsteady. Caution to blurred vision after drop or ointment use.

BLEPHAROSPASM, APRAXIA : EYELIDS MAY SQUEEZE AND HAVE SPASMS OR BE DIFFICULT TO OPEN.

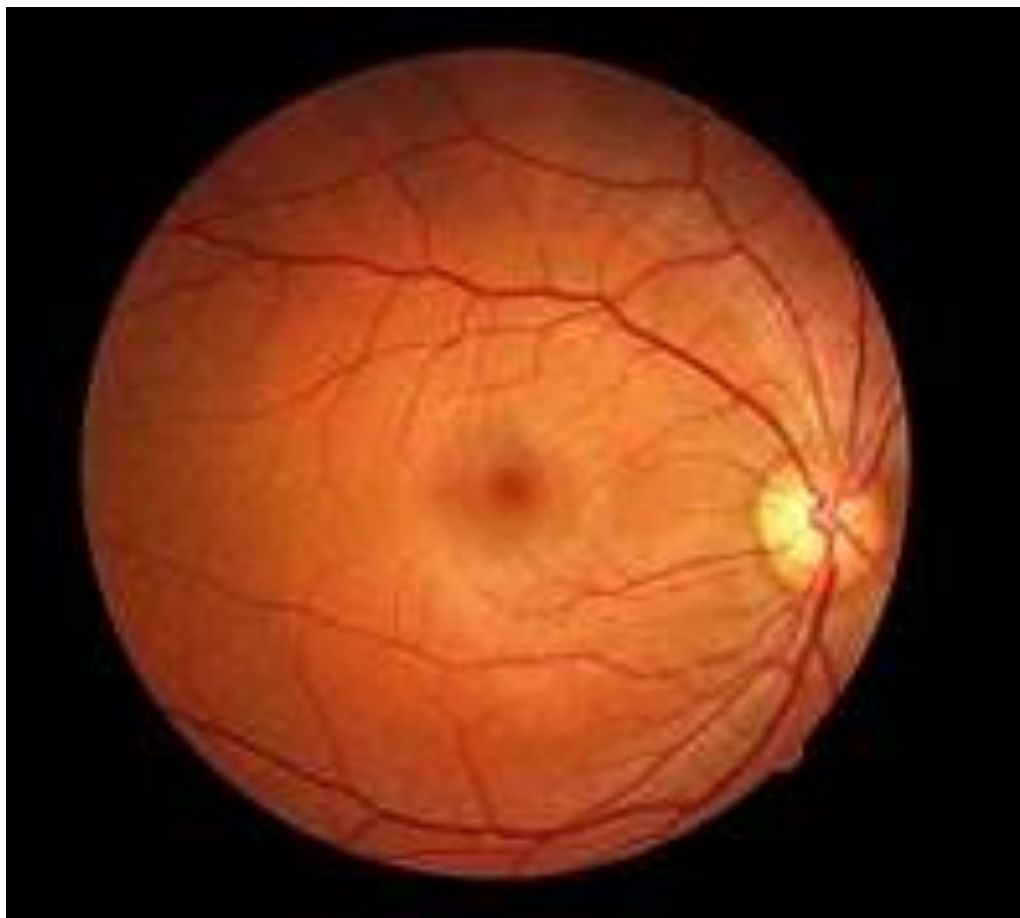


Treatment may be Botox injections or adjustment in medication.



DEFICIENCY OF DOPAMINE CAN LEAD TO MANY SENSORY PROBLEMS

**Visual loss, loss of smell, auditory
problems, restless legs syndrome**



**SENSORY INPUT
CHANGES FROM
DOPAMINE DEFICIENCY
IN THE RETINA**

DOPAMINE
WORKS TO
TRANSMIT
NEURO-SIGNALS
AND REGULATE
ACTIVITY
AMONG
DIFFERENT CELLS
IN THE RETINA
THAT INITIATE
VISION.

1. Decreased visual acuity

2. Decreased contrast sensitivity

3. Color Vision Changes

4. Visual Field defects

Decreased Visual Acuity



FUNCTION NOT JUST BEAUTY



THOUGHTS ON PRESCRIBING GLASSES FOR PARKINSON'S

- **1. May need more than one pair of glasses. Use of reading only glasses gives more room for inaccurate eye movements to work and can have different prism than bifocal or distance pair of glasses.**
- **2. Prism can help for double vision**



MORE PRESCRIBING THOUGHTS

- **3. Bifocal or reading power may be lower than others the same age to allow less need for convergence (hold book farther away from eyes.)**
- **4. Experiment with tint prior to buying glasses.**
- **5. Always wear impact resistance lenses**



Vision Rehabilitation

Decreased Contrast Sensitivity



Despite poor contrast sensitivity the patient can read small letters on a visual acuity chart on the left, but shows a loss of contrast sensitivity on the Pelli Robson chart on the right side.

**LOSS OF THE ABILITY TO SEE CONTRAST,
DECREASES VISION**



LOW CONTRAST



MEDIUM CONTRAST



HIGH CONTRAST

FILTERS AND LIGHTING



ELECTRONIC DEVICES FOR MAGNIFICATION AND INCREASED CONTRAST



COLOR VISION CHANGES

REDUCTION IN ALL COLORS EXCEPT YELLOW IS SUGGESTED. USE YELLOW AS A MARKER.

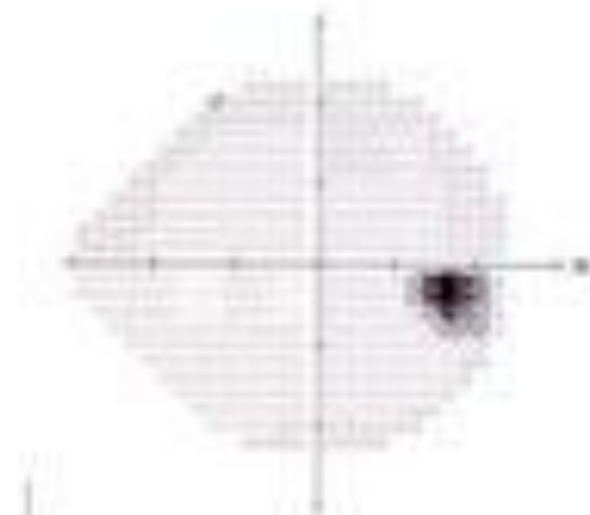


**Visual Field
Loss in
Parkinson's**

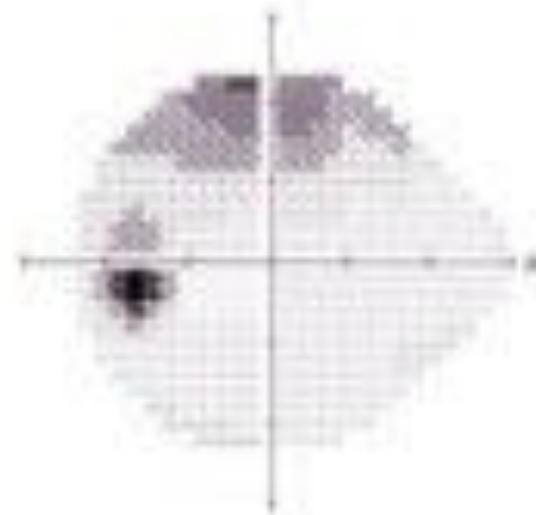
**DUE TO GANGLION
RETINAL CELL LOSS,
MUCH LIKE GLAUCOMA,
SIDE VISION IS LOST**

Humphrey visual fields

Normal visual field right eye



Superior arcuate field loss in the left eye due to glaucoma





FALLS FROM VISION LOSS

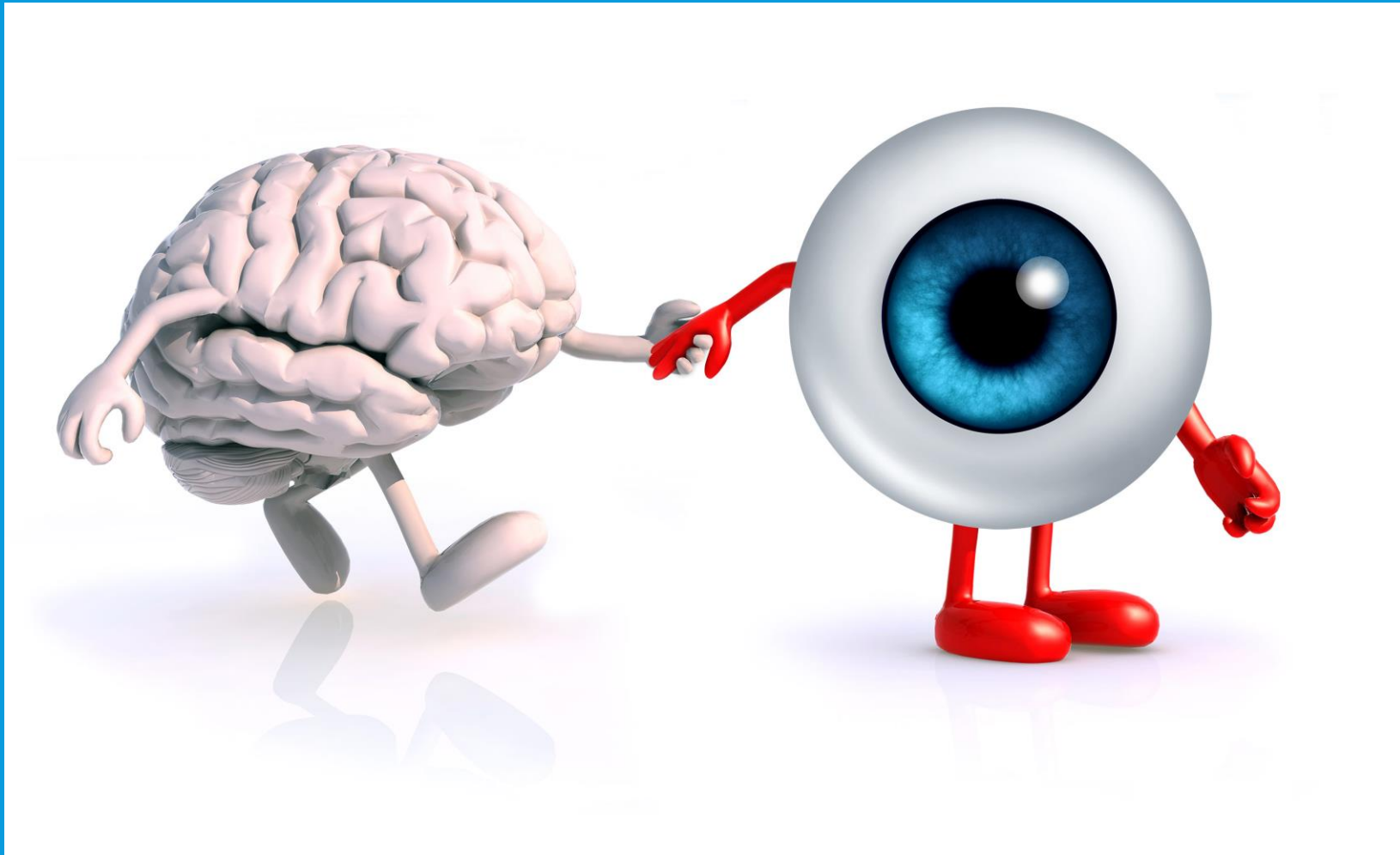




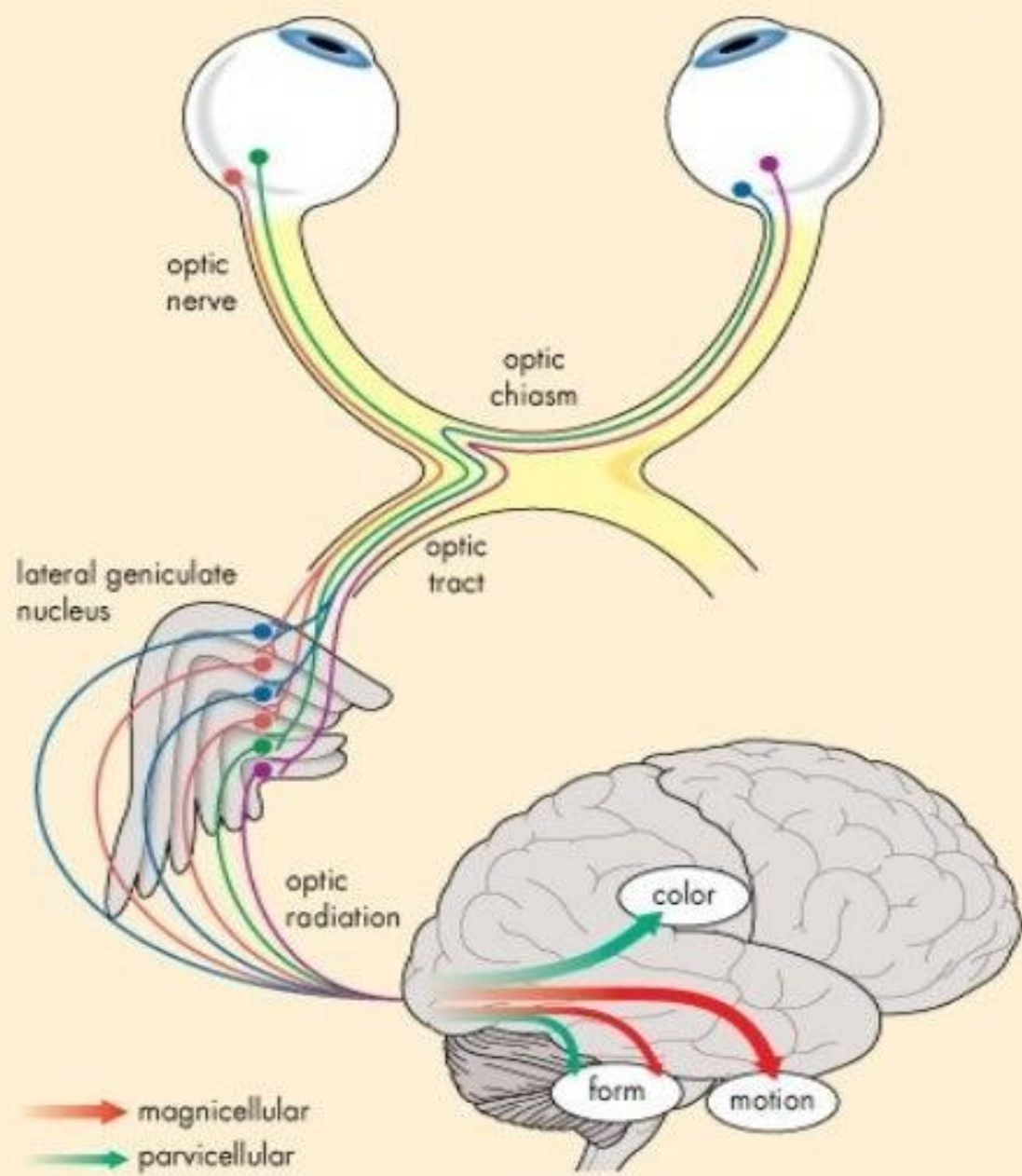
ORIENTATION

Mobility Training

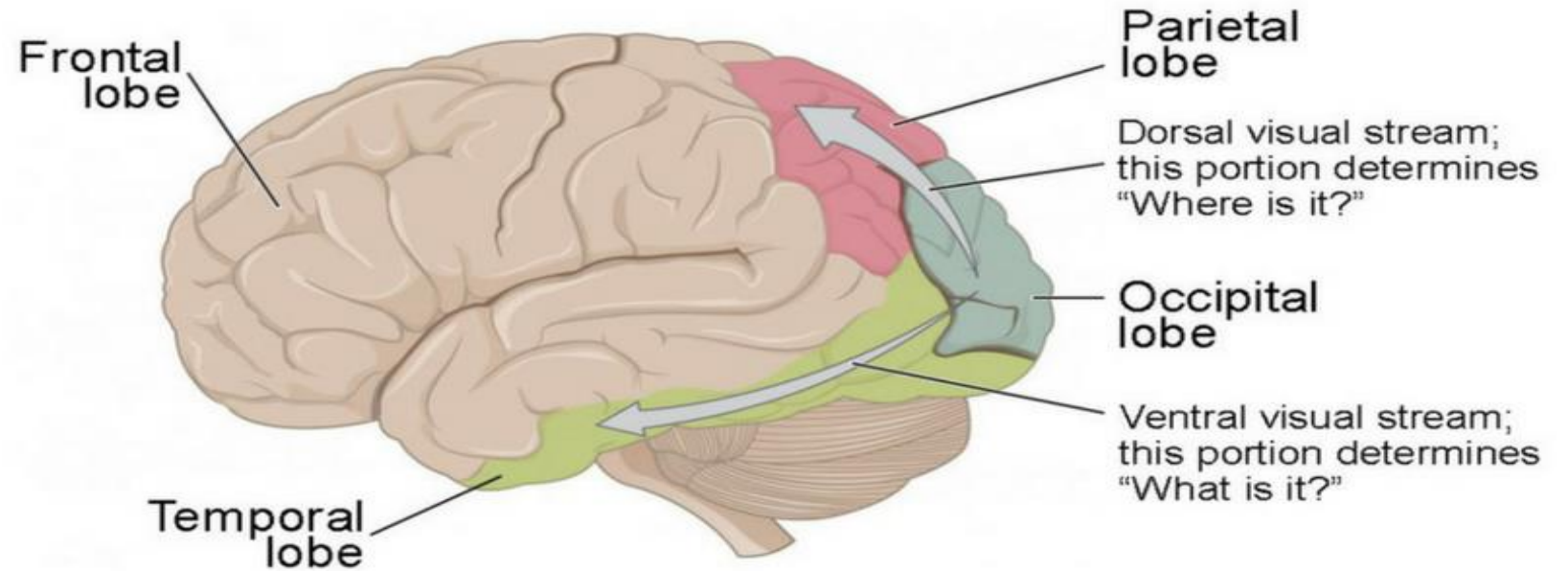
THE SENSE OF VISION IS MUCH MORE ABOUT THE BRAIN THAN THE EYE.



DISTRIBUTION OF HIGHER-ORDER VISUAL PROCESSING



**THE ROLE OF
THE BRAIN IN
VISION
50-70% OF THE
BRAIN IS
INVOLVED
WITH VISION**



VISUAL PROCESSING IN EARLY CORTICAL VISUAL AREAS

Line orientation

Pattern perception

**Figure ground
discrimination**

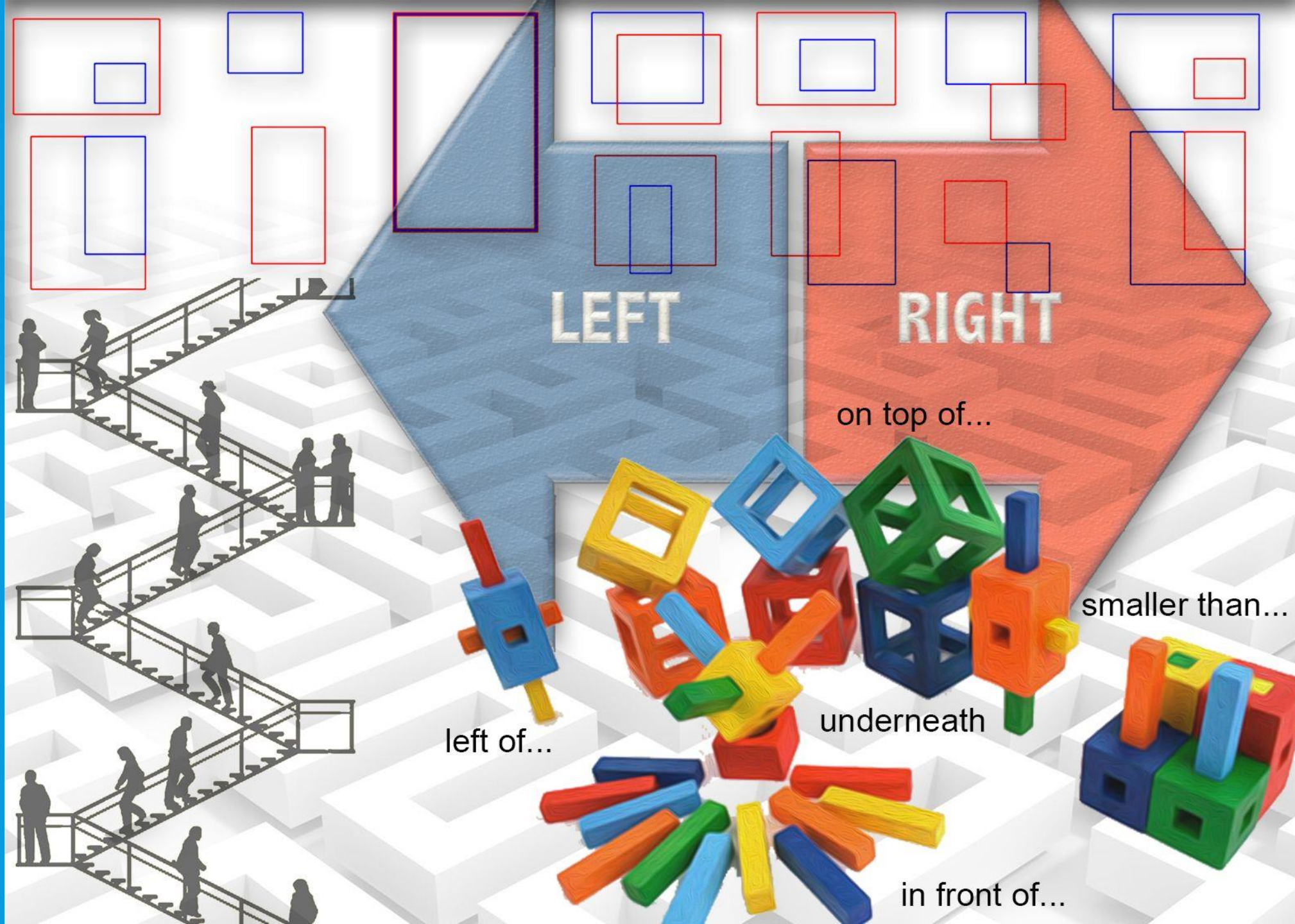
Depth perception

Difficulties in identifying overlapping objects

More errors when matching objects in 3D space

More errors when copying and recalling complex figures than healthy controls

Parkinson's disease impairs the perception of motion



LEFT

RIGHT

on top of...

smaller than...

left of...

underneath

in front of...

Spatial neglect

The ability to recognize faces is impaired

Difficulty in interpreting facial expressions

MOTOR OUTPUT CHANGES FROM DOPAMINE PATHWAYS IN THE BRAIN

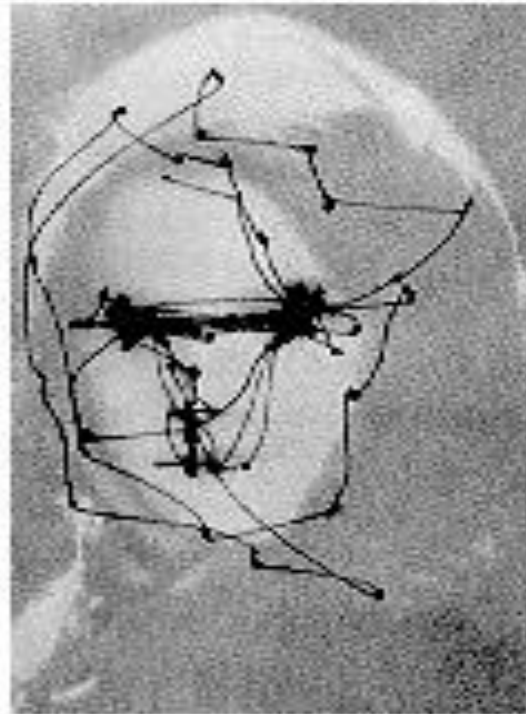
**MOTOR
CONTROL OF
THE EYES**

- **Binocular eye movements in same directions and in opposite directions both fast and slow.**
- **Change of focus**
- **Pupil size**
- **Reflex movement responses**
- **Planned movement response, ie reading**

EYE MOVEMENT DISORDERS

- **Saccades: fast movements to locate objects. Used in reading.**
- **Smooth pursuits: slow movements to track**
- **Fixation: micro movements to hold the eyes on a target**

SACCADES



Slow, smaller movements. Decrease in ability to remember where to look and to react to new targets.

These movement keep us safe by bringing in information quickly. They are used in all activities but are especially useful in tracking across a page when reading.

TREATMENT OF SACCADIC DISORDERS

- 1. Vision therapy to improve accuracy and speed of eye movements
- 2. Reading guides
- 3. Deep Brain Stimulus improves saccades
- 4. Mixed evidence on medication treatment helping saccadic function.

READING GUIDE



SANET VISUAL INTEGRATOR



Designed to improve saccadic dysfunction specific to Parkinson's.

Memory Saccades

Voluntary Saccades

Reflex Saccades

PURSUIT MOVEMENTS : SLOWER FOLLOWING MOVEMENTS



Vision Therapy
with low tech
or high tech
methods.

CONVERGENCE TRAINING FOR INABILITY TO CROSS EYES AND FIXATE ON CLOSE OBJECTS.

Convergence training

Prism in glasses

Low power reading or
bifocal glasses

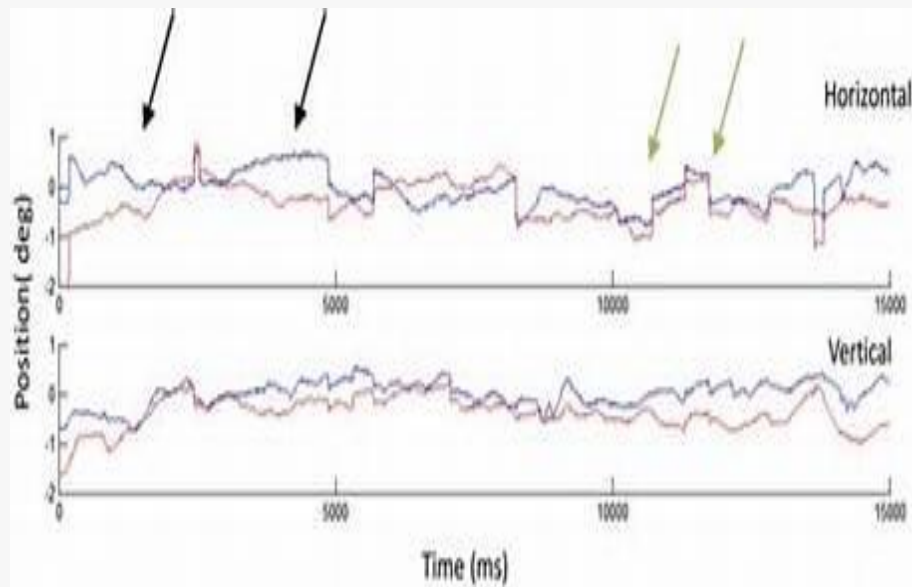


PRISM



Can help
convergence,
double vision,
and fatigue.

FIXATION MOVEMENTS: ABILITY TO HOLD EYES ON TARGET. MORE UNSTEADY IN PARKINSON'S.



Treatment
with
medication
for
Parkinson's

**MOVEMENT
CONTROL OF
THE BODY**

**Feed back and interaction
with vestibular, vision and
proprioception.
Coordinate vision with
input from other senses
and direct motor control.**

Pupil Disorders

**1.LARGER THAN
NORMAL**

2.UNEQUAL IN SIZE

**3.DELAYED RESPONSE
TO LIGHT**

PUPIL
DYSFUNCTION
RESULTS IN
GLARE AND
LIGHT
ADAPTATION
DELAY.

- **Treatment would be wearing of correct tint. Transitions may be useful.**

The background of the entire image is a vibrant, stylized pattern of tropical leaves. The leaves are rendered in various shades of green, from bright lime to deep forest green, and are scattered across the frame. Some leaves have distinct patterns like white spots or black dots. The overall style is flat and graphic, reminiscent of mid-century modern or bohemian decor.

VISUAL HALLUCINATIONS

VISUAL HALLUCINATIONS HAPPEN IN 40% OF PARKINSON'S PATIENTS

- Can be related to medication taken to treat Parkinson's, may need decrease in dopamine
- Theories of poor sensory input from retina as a cause
- Theories of brain creating images as it needs more stimulation
- Can cause fear and worries...what am I seeing!!!!
- Longer duration of disease, excessive daytime sleeping, and cognitive defects are associated with this.

HOW TO TREAT AND PREVENT HALLUCINATIONS



1. Keep Vision as good as possible!



2. Stimulate your brain with visual activities, reading, tv, crafts, and interaction with people.



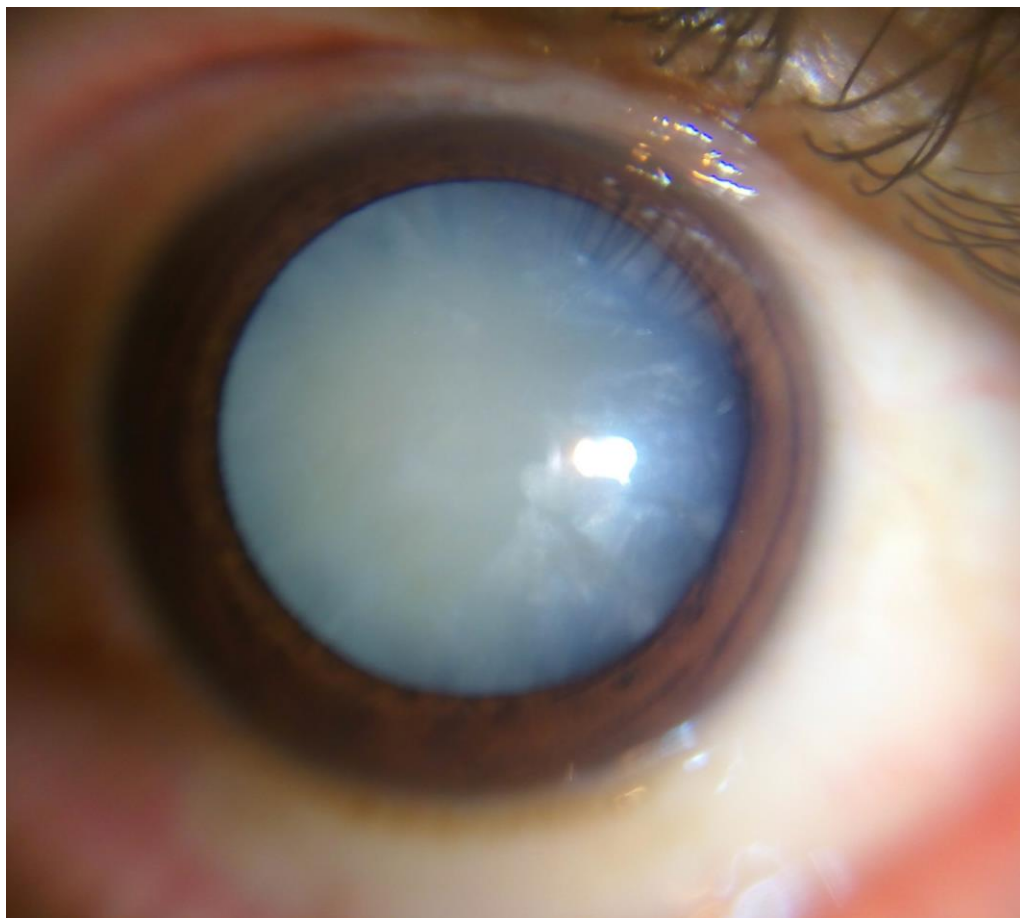
3. Discuss medication with your doctor, Nuplazid has been advertising on TV lately as a treatment for the visual hallucinations.



4. You are not alone!!!



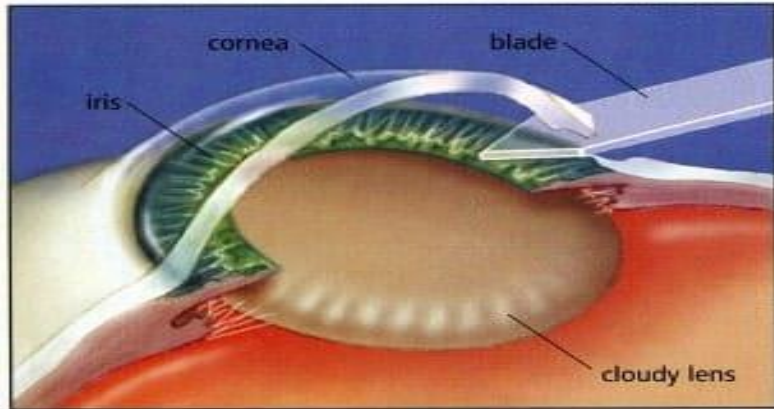
**AGING CHANGES IN VISION ALSO HAPPEN
IN PATIENTS WITH PARKINSON'S**



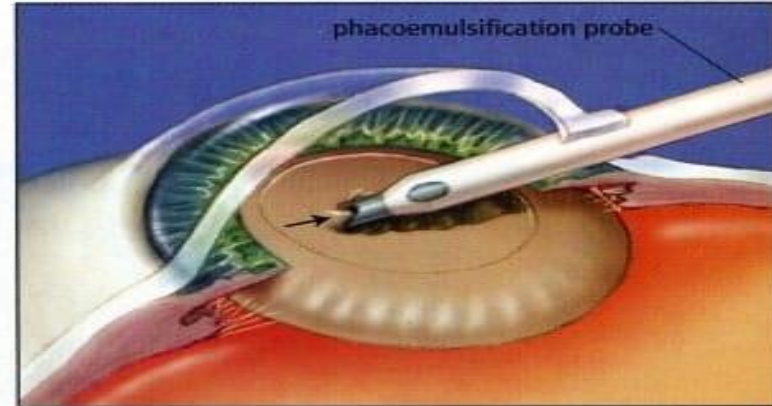
**CATARACTS LEAD TO
GLARE, VISION LOSS
AND CHANGES IN DEPTH
PERCEPTION**

TREATMENT OF CATARACTS: SURGICAL REMOVAL

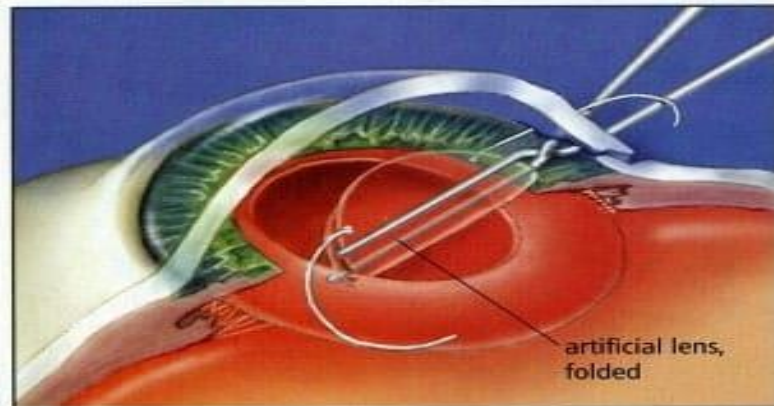
Cataract Surgery



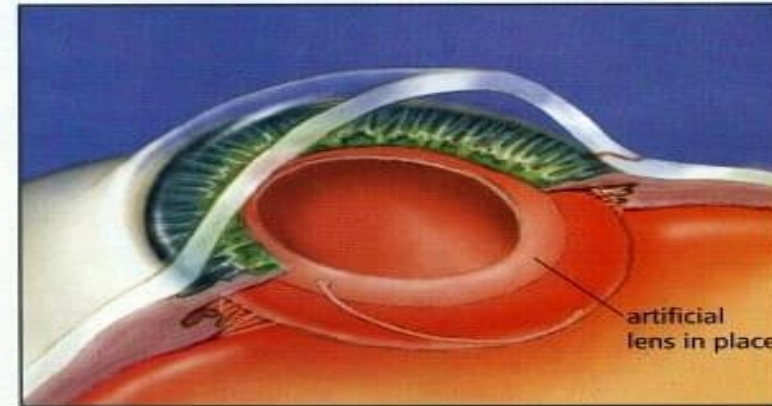
1. Incision: A small incision, approximately 3mm in width, is made at the corneal margin.



2. Emulsification: Phacoemulsification probe is inserted through corneal incision and ultrasound breaks cataract up into microscopic fragments, which can then be aspirated using the probe tip.



3. Intraocular Lens Implant: The artificial foldable



4. Result: The new lens is in place, the small incision

MACULAR DEGENERATION

Dry or wet both have injection treatments now

Prevention through diet, not smoking and UV protection still the best option

Genetics play a role







Referral to retinal specialist to evaluate for treatment, shots, laser or observation

GLAUCOMA





GLAUCOMA MEDICATION

- Besides medication laser treatment or surgical means to reduce pressure are available. In Parkinson's, neuroprotective glaucoma medications would most likely be the first choice.

THINGS TO REMEMBER



- **1. Keep using your eyes. Exercise them to keep movement going.**
- **2. Remember things are going to work slower, frustration and fatigue can happen. Walk away and then return.**



3. Lubricate

4. Ask your doctor how is my convergence and do I need some prism?

5. Other age-related problems still happen, keep up your regular eye exams at least annually.

David Free, OD

Tulsa

918 582 7346

Megan Ford, OD

South Tulsa Vision

Development Center

918 949 4002

**NewView
Oklahoma
Vision
Rehabilitation
Tulsa and OKC
Clinic
855 811 9699**

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