

Optometric neuro rehabilitation after concussion - why is this relevant for you?

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Tag der Optometrie

SICHT.KONTAKTE 2023

Offenlegung der finanziellen Interessen

- No conflicts of interest to declare

Ich versichere, die Darstellung meiner Beiträge produkt- und firmenneutral zu halten.

Optician school


Optometry school

MPhil & PhD
Clinical practice
Research
Teaching

MSc
Policy
(optometry
and health care
governance)


Neuro-optometry

Background



When you mainly look 'inside the box', can you still think outside the box?

Background



- Headaches
- Neck pain
- Problems with changing focal distance
- Light sensitive
- Overwhelmed in traffic cycling back from work

- Posture
- Triangle: visual – neck – vestibular
- Autonomic nervous system

Why is this relevant for you?

- Headaches
- Neck pain
- Problems with changing focal distance
- Light sensitive
- Overwhelmed in traffic cycling back from work

You probably see many of such patients

Similar complaints and treatment:

- Visual burnout
- Post concussion visual syndrome
- Visual problem with Long-Covid

Balance

- 65% post concussion visual syndrome
- 15% Long-Covid visual problems

Network

- Occupational therapists – ergotherapeut
- Osteopaths
- Chiropractors
- Rehabilitation centres
- Occupational doctors – Gesundheits- und Sicherheitsbeauftragter

Case: E.B. 27 years old female

• **Complaints:**

- Problems reading and computer work
- Dizzy
- Tinnitus after computer work
- Problems changing focal distance
- Headaches
- Neck pain
- Problems with driving a car and with buzzy environments
- Light sensitive

• **History:**

- Skiing accident
- Spectacles prescribed after accident, but never wears them
- No medication
- Has been in rehabilitation centre and seen by occupational therapist and physiotherapist
- Profession: data analyst
- Prior to accident: stressful time at work and father passed away



Case: E.B. 27 years old female

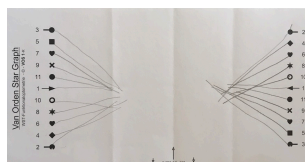
• **Measurements**

- VA sc: OD 1,2+ OS 1,2+ ODS 1,2++ VA cc: OD 1,5 OS 1,5 ODS 1,5
- Retinoscopy = subjective refraction: OD S +0,50 C -0,75 x 60 OS S +0,25 C -0,50 x 100
- Phorias distance: 2 XF Phorias near: 8 XF and 1 hyper (sitting); 0,5 hyper (standing)
- NPC: 20 cm, double and OS turns out
- Stereo distance: 2' (slow); near: 60" (slow)
- Ocular motility: full, but saccadic movement, overshoot in vertical direction. Patient becomes dizzy and nauseous
- Accommodation flipper: -2,00 slow, +2,00 can't clear
- Amplitude of Accommodation: -2,75
- Alpha-omega pupil: grade 3 ODS
- Visual midline: slight ambient and focal shift left




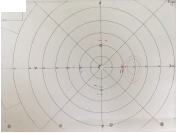
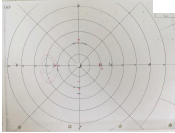
Case: E.B. 27 years old female


• **Van Orden Star**



Case: E.B. 27 years old female


- Functional fields



Important to keep in mind

- Autonomic nervous system
- Ambient and focal vision
- Vision – neck – vestibular system

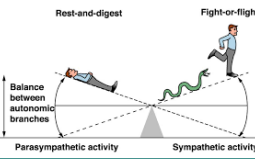



Important to keep in mind

- **Autonomic nervous system**
- Ambient and focal vision
- Vision – neck – vestibular system

Sympathetic response:


- Divergence
- Less accommodation
- Enlargement of the pupil
- Closes down the periphery






Autonomic Nervous System


FIGHT

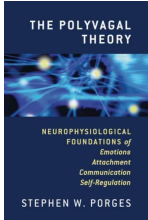



FLIGHT ohhala!



FREEZE

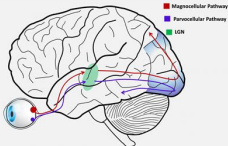






Important to keep in mind

- Autonomic nervous system
- **Ambient and focal vision**
- Vision – neck – vestibular system



Dorsal or "where" stream


Spatial processing

location movement spatial transformations spatial relations



Ventral or "what" stream


Object processing

color texture pictorial detail shape size



Ambient and focal vision

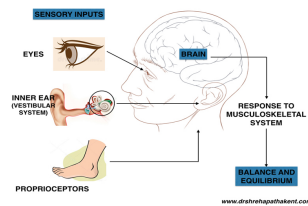
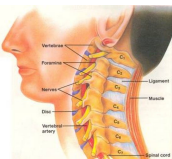


Ambient and focal vision



Important to keep in mind

- Autonomic nervous system
- Ambient and focal vision
- Visual – neck – vestibular system



Imbalance in Autonomic Nervous System

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Ambient and focal vision

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Visual – neck – vestibular system

• Measurements

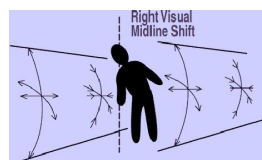
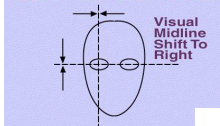
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Visual midline shift

Padula

VISUAL MIDLINE SHIFT TEST



Treatment program

- Intake
- Further examination
- 8-10 training sessions
- Evaluation at session 5 and at the end
- Repeat exercises less time a week
- Stop with exercises
- Check up



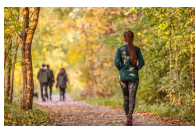
Treatment

1. Advice on lifestyle and how to use the visual system
2. Relax the system
3. Realign the system
4. Improve the system



Treatment

1. Advice on lifestyle and how to use the visual system
2. Relax the system
3. Realign the system
4. Improve the system






- Movement → proprioception
- Light – as little sunglasses as possible
- Nature → green and patterns
- Broad viewing → don't block the periphery!
- Breath
- Drink water
- Be in the now

Treatment

1. Lifestyle advice
- 2. Relax the system**
3. Realign the system
4. Improve the system

- Syntonics – photo modulation therapy
- Tinted lenses







Treatment

1. Lifestyle advice
2. Relax the system
- 3. Realign the system**
4. Improve the system

- Balance in focal and ambient vision
 - Refraction
 - Lens design: e.g. multifocal
- Visual midline
 - Nasal occlusion
 - Yoked prisms




Treatment

1. Lifestyle advice
2. Relax the system
3. Realign the system
- 4. Improve the system**

KEY!!!

- Make it dynamic
- Add cognition
- Don't overstep frustration level



- Vision therapy
 - 3 pillars:
 - Ocular motility
 - Convergence-divergence
 - Accommodation
 - Eye-body coordination
 - Include rhythm (timing), hearing, balance, etc.



Case: E.B. 27 years old female

Treatment

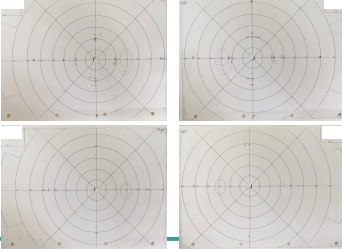
- First sessions
 - Nasal occlusion
 - Syntonics combined with
 - Ocular motility
 - Physiological diplopia for hyper/hypo
 - Convergence for exo and accommodation

Case: E.B. 27 years old female

Outcome after first few sessions

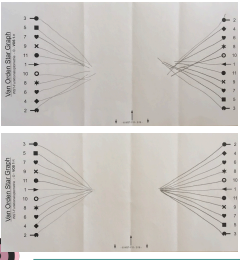

- Midline → no midline shift
- VF → enlarged
- Hyper/hypo → no hyper



Case: E.B. 27 years old female

Outcome after first few sessions


- Midline → no midline shift
- VF → enlarged
- Hyper/hypo → no hyper

Case: E.B. 27 years old female

Treatment

- Vision therapy
 - **Motility**
 - Convergence-divergence
 - Accommodation
 - Eye-body coordination



Case: E.B. 27 years old female

Treatment

- Vision therapy
 - Motility
 - **Convergence-divergence**
 - Accommodation
 - Eye-body coordination



Case: E.B. 27 years old female

Treatment

- Vision therapy
 - Motility
 - Convergence-divergence
 - **Accommodation**
 - Eye-body coordination



Case: E.B. 27 years old female**Treatment**• **Vision therapy**

- Motility
- Convergence-divergence
- Accommodation
- **Eye-body coordination**

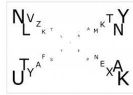


Figure 3. Balance

Case: E.B. 27 years old female**Treatment**• **VT in every day life**

- Eye movements
- Physiological diplopia
- Broad view
- Palming and wiggling fingers
- Change focal distance regularly
- Movement important – computer work: alternate standing and sitting

**Case: E.B. 27 years old female**• **Measurements at end of therapy**

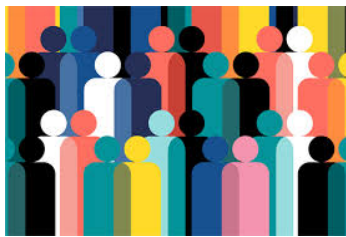
- VA sc: OD 1,2+ OS 1,2+ ODS 1,2++
- Phorias distance: 1 XF Phorias near: 4 XF
- NPC: 3 cm
- Stereo distance: 1' (little slow); near: 40"
- Ocular motility: full, only with circular movement slightly saccadic
- Accommodation flipper: -2,00 quick, +2,00 quick
- Amplitude of Accommodation: -8,00
- Alpha-omega pupil: grade 1 ODS
- Visual midline: no shift



Case: E.B. 27 years old female

- Subjective changes at end of therapy
 - Overall less tired and can do more social things
 - Is building up work and is now at 80%
 - Needs more breaks when doing computer work than before accident, but does not feel restricted by it anymore
 - No longer problems with movement in visual field
 - Less light sensitive
 - No longer dizzy
 - When stressed more complaints, but she recovers more quickly than before





What can you do in your practice

1. Advice on lifestyle and how to use the visual system
2. Relax the system
3. Realign the system
4. Improve the system



Overall easy to apply



Apply full scheme or don't do it at all
You won't be successful with a few exercises

Lens prescription and lens design important!



??? Fragen ???



Vielen Dank für Ihre Aufmerksamkeit!