

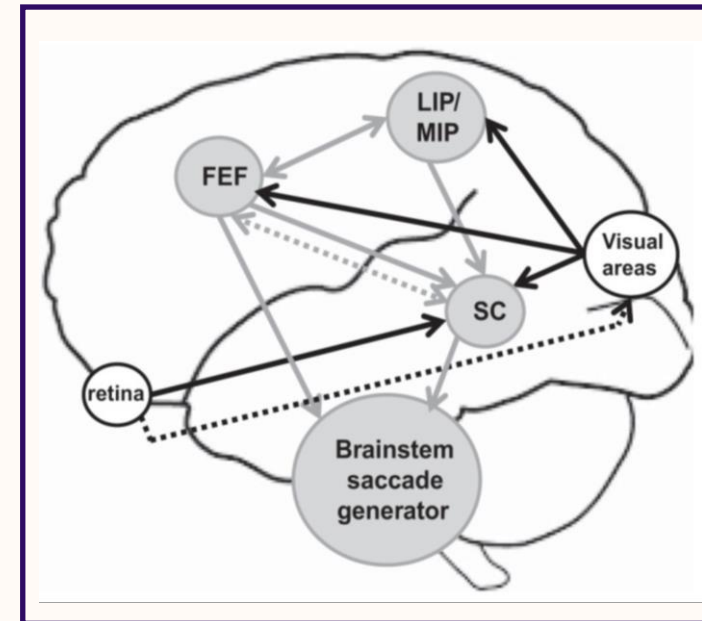
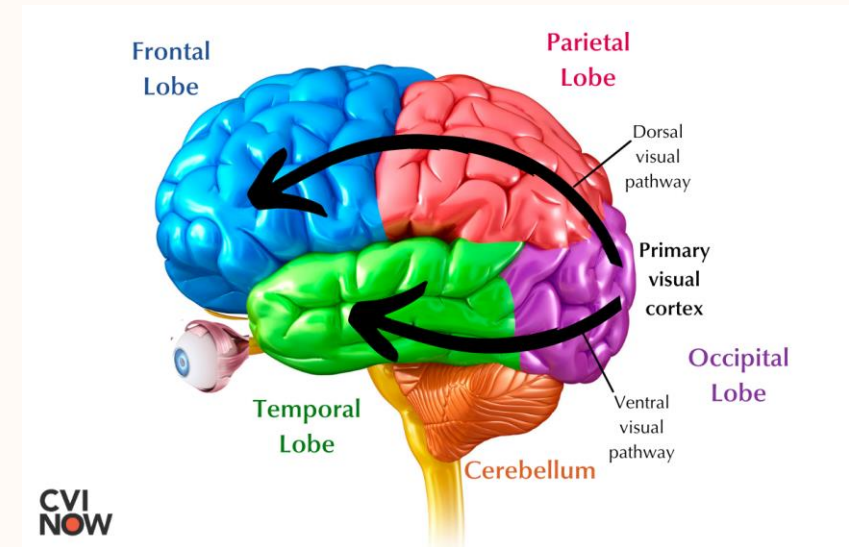
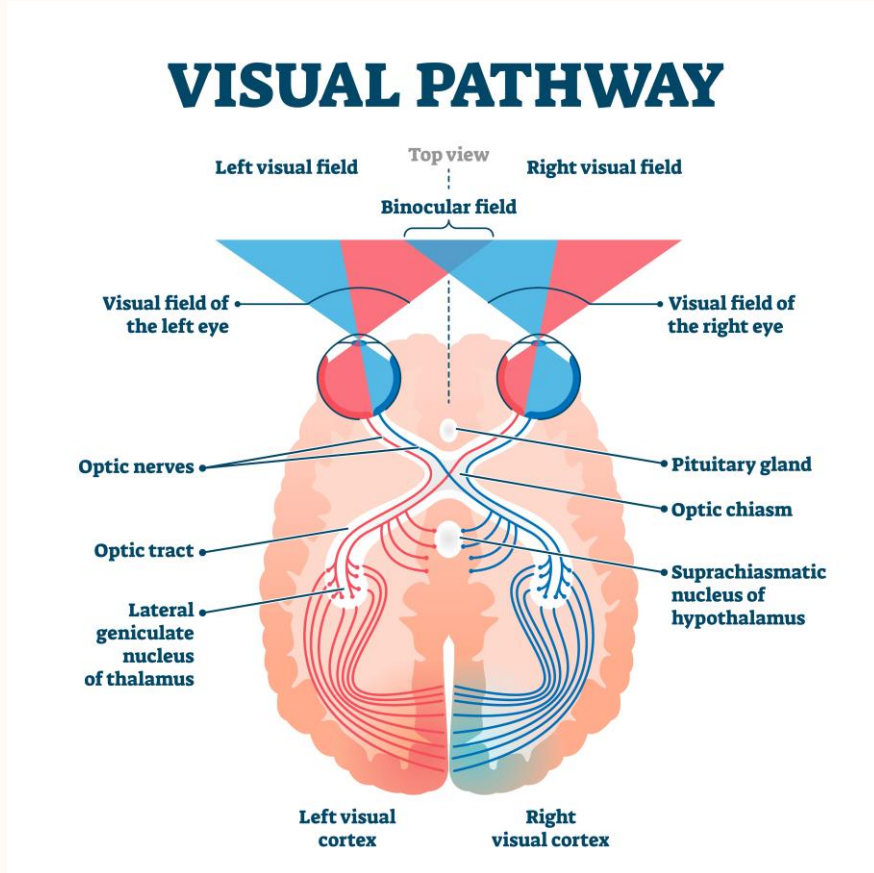
Visual problems after stroke

Associate professor Torgeir Solberg Mathisen

National Centre for Optics, Vision and Eye Care, Coordinator Norwegian Vision in Stroke (NorVIS) network

Professor Helle K. Falkenberg, National Centre for Optics, Vision and Eye Care

We see with our brain



FEF – frontal eye field
LIP/MIP - lateral and medial intraparietal cortex
SC – superior colliculus.
Caruso et al., 2018

RESEARCH ARTICLE

High incidence and prevalence of visual problems after acute stroke: An epidemiology study with implications for service delivery

Fiona J. Rowe^{1*}, Lauren R. Hepworth¹, Claire Howard¹, Kerry L. Hanna¹, Christopher P. Cheyne², Jim Currie³

¹ Department of Health Services Research, University of Liverpool, Liverpool, United Kingdom, ² Department of Biostatistics, University of Liverpool, Liverpool, United Kingdom, ³ Vision and Stroke Patient and Public Group (VISable), University of Liverpool, Liverpool, United Kingdom

* rowef@liverpool.ac.uk

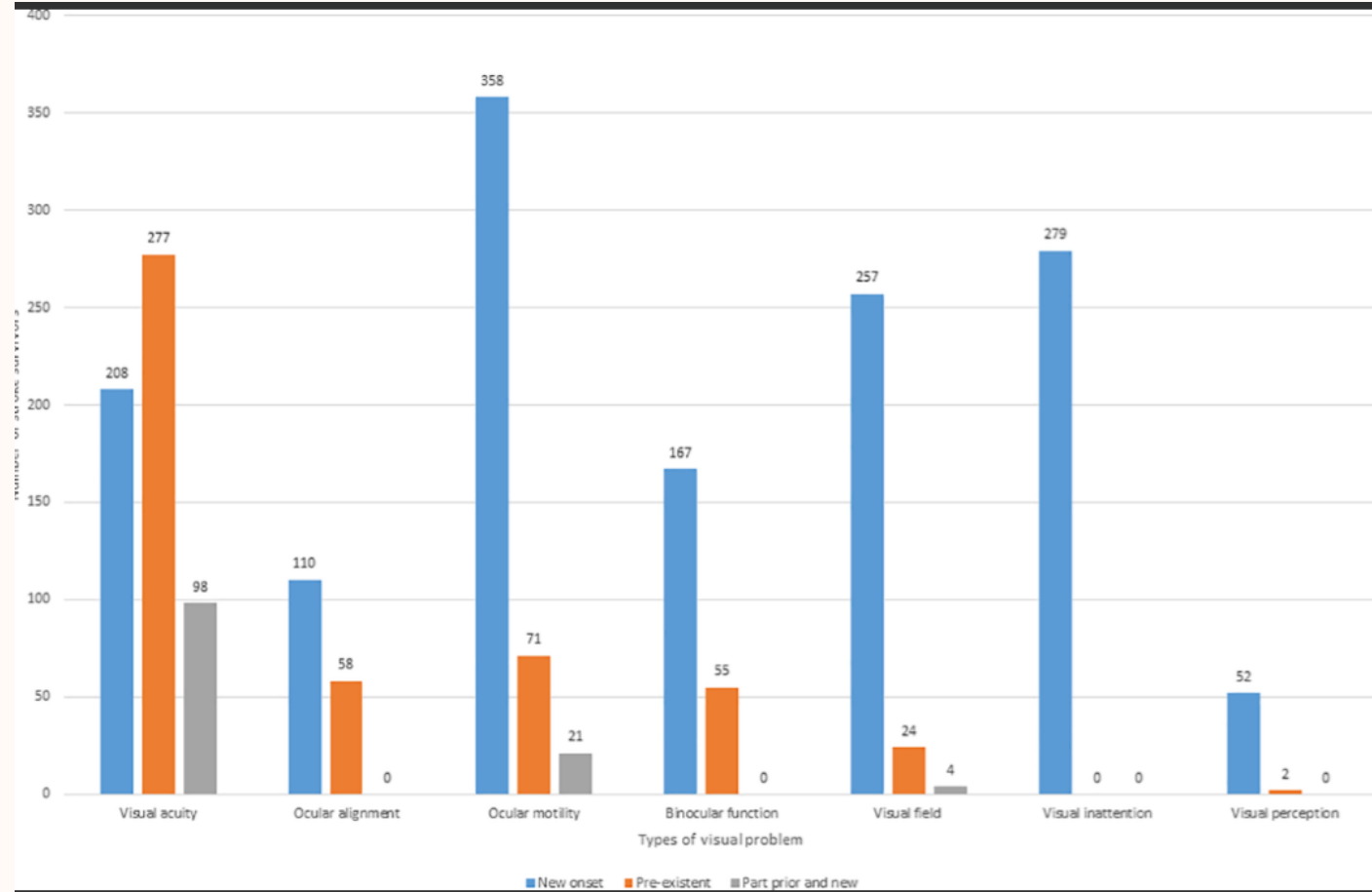
Abstract

Background

Visual problems are an under-reported sequela following stroke. The aim of this study is to report annual incidence and point prevalence of visual problems in an acute adult stroke population and to explore feasibility of early timing of visual assessment.

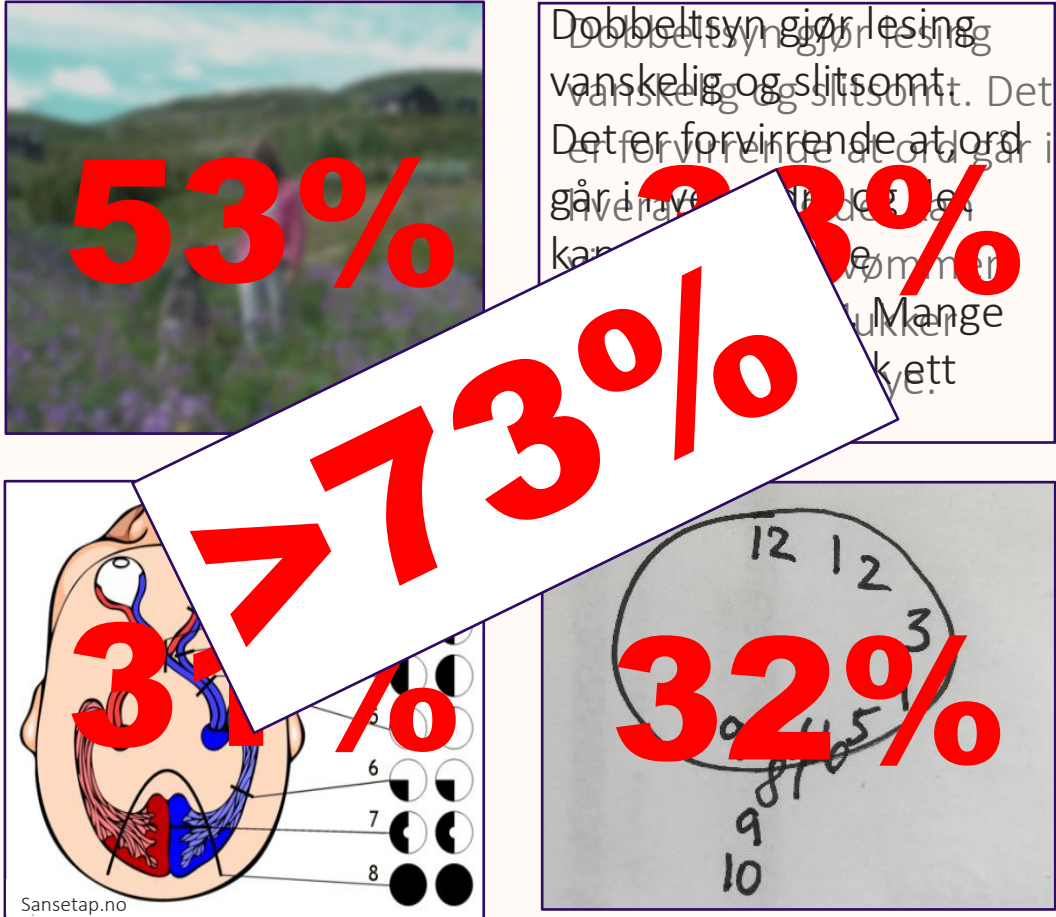
Methods and findings


Multi-centre acute stroke unit, prospective, epidemiology study (1st July 2014 to 30th June 2015). Orthoptists reviewed all patients with assessment of visual acuity, visual fields, ocular alignment, ocular motility, visual inattention and visual perception. 1033 patients underwent visual screening at a median of 2 days (IQR 2) and full visual assessment at a median of 4



Vision problems are common after stroke

- Norway 12 000 stroke cases per year (36/day)
- 7 000 persons per year (20/day) experience vision problems



A photograph of an elderly woman with short, wavy grey hair, looking out a window. She is wearing a blue patterned top and has a small hoop earring. Her hand is resting on the window frame. The window has multiple panes and is slightly fogged or dirty. The lighting is soft and natural, coming from the window.

***“Sometimes when things
turn bad, I really just want to
take a pill and be done with
it. Not having to struggle
with everything... for
example, paying the bills.
It feels hopeless.
I have tried for a long period,
but I can’t get the numbers
right....***

Falkenberg, Mathisen, Ormstad & Eilertsen, 2020

Post stroke vision problems are underreported by patients

Received: 17 February 2020 | Revised: 21 October 2020 | Accepted: 28 October 2020

DOI: 10.1002/brb3.1958

ORIGINAL RESEARCH

Brain and Behavior  WILEY

How to assess visual function in acquired brain injury—Asking is not enough

Märta Berthold-Lindstedt¹  | Jan Johansson² | Jan Ygge² | Kristian Borg¹

¹Division of Rehabilitation Medicine, Department of Clinical Science, Karolinska Institute, Danderyd University Hospital, Stockholm, Sweden

²Eye and Vision, Department of Clinical Neuroscience, Karolinska Institute, Stockholm, Sweden

Correspondence

Märta Berthold-Lindstedt, Division of Rehabilitation Medicine, Department of Clinical Science, Karolinska Institute, Danderyd University Hospital, SE 182 57 Danderyd, Sweden.
Email: marta.berthold-lindstedt@ki.se

Funding information



The County Council of Stockholm; The

Abstract

Background: Acquired brain injury affects many brain areas and causes a range of dysfunctions including vision-related issues. These issues can have negative impacts on rehabilitation progress and activities of daily life but may easily be overlooked. There is no common recommendation about how to assess visual impairments after ABI. The purpose of this study was to estimate the frequency of objectively measures oculomotor dysfunctions, and also how these findings are related to two inventories intended to support detection of visual impairment.

Methods: The study was cross-sectional and included 73 outpatients. In addition to the standard evaluation program, the patients went through a comprehensive optometric examination. The inventories used were the Vision Interview (VI) and the Convergence Insufficiency Symptom Survey (CISS).

“Eye” Don't See: An Analysis of Visual Symptom Reporting by Stroke Survivors from a Large Epidemiology Study

Lauren R Hepworth, PhD • Claire Howard, PhD • Kerry L Hanna, PhD • Jim Currie • Fiona J Rowe, PhD  

Published: April 01, 2021 • DOI: <https://doi.org/10.1016/j.jstrokecerebrovasdis.2021.105759>

Abstract

Aim

The purpose was to explore the reported symptoms of post-stroke visual impairment in a large epidemiology study.

Methods

Visual assessment, including a case history, visual acuity, ocular alignment



2 FOR 40 KR 2 FOR 40 KR 2 FOR 40 KR



2 FOR 40 KR 2 FOR 40 KR 2 FOR 40 KR 2 FOR 40 KR



2 FOR 40 KR 2 FOR 40 KR Gjetto ikke 2 for 40r 2 FOR 40 KR





40 KR 2 FOR 40 KR



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Gjelder ikke
2 for 40r

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Gjelder ikke
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2 FOR 40 KR

Vision needs to be assessed

“Yeah, they—maybe they primarily do not have it in their checklist. Because it should be just as important to check your vision as it is to check if your arm works or not! But if your eyes work? Not at all! It is not even on their list!”

RESEARCH ARTICLE

Open Access

“Invisible” visual impairments. A qualitative study of stroke survivors` experience of vision symptoms, health services and impact of visual impairments



Helle K. Falkenberg^{1,2*}, Torgeir S. Mathisen^{1,2}, Heidi Ormstad³ and Grethe Eilertsen^{2,3}

Abstract

Background: Visual impairments (VIs) have a negative impact on life and affect up to 60% of stroke survivors. Despite this, VIs are often overlooked. This paper explores how persons with VIs experience vision care within stroke health services and how VIs impact everyday life the first 3 months post stroke.

Methods: Individual semi-structured interviews were conducted with 10 stroke survivors 3 months post stroke, and analyzed using qualitative content analysis.

Results: The main theme, “Invisible” visual impairments, represents how participants experience VIs as an unknown and difficult symptom of stroke and that the lack of attention and appropriate visual care leads to uncertainty about the future. VIs were highlighted as a main factor hindering the participants living life as before. The lack of acknowledgement, information, and systematic vision rehabilitation leads to feelings of being unsupported in the process of coping with VIs.

Conclusion: VIs are unknown symptoms pre stroke and sequelae after stroke that significantly affect everyday life. VIs and vision rehabilitation needs more attention through all phases of stroke health services. We request a greater awareness of VIs as a presenting symptom of stroke, and that visual symptoms should be included in stroke awareness campaigns. Further, we suggest increased competence and standardized evidence-based clinical pathways for VIs to advance all stroke health services including rehabilitation in order to improve outcomes and adaptation to future life for stroke survivors with VIs.

Keywords: Rehabilitation, Qualitative research, Municipal- and specialist health care services, Health care professionals, Vision

ASSESSMENT OF VISUAL PROBLEMS AFTER ACQUIRED BRAIN INJURY: A SURVEY OF CURRENT PRACTICE IN DANISH HOSPITALS

Trine SCHOW, PhD^{1,2}, Eike Ines WEHLING, PhD^{3,4}, Helle K. FALKENBERG, PhD⁵, Anne NORUP, PhD^{1,6}, and Karin Spangsberg KRISTENSEN, MPH¹

From the ¹Neurorehabilitation Research and Knowledge Centre, Rigshospitalet, Copenhagen, Denmark, ²Neurorehabilitation-Cph, Copenhagen, Denmark, ³Department of Biological and Medical Psychology, University of Bergen, Bergen, Norway, ⁴Department of Physical Medicine and Rehabilitation, Haukeland University Hospital, Bergen, Norway, ⁵Department of Optometry, Radiography and Lighting Design, University of South-Eastern Norway, Notodden, Norway, and ⁶Department of Neuroscience, University of Copenhagen, Copenhagen, Denmark

Objectives: To explore current hospital practice in relation to the assessment of vision problems in patients with acquired brain injury.

Design: A survey study.

Subjects: A total of 143 respondents from hospital settings, with background in occupational therapy and physical therapy, participated in the survey.

Methods: The survey questionnaire, developed collaboratively by Danish and Norwegian research groups, encompassed 22 items categorically covering "Background information", "Clinical experience and current practice", "Vision assessment tools and protocols", and "Assessment barriers". It was sent out online, to 29 different hospital departments and 18 separate units for occupational therapists and physiotherapists treating patients with acquired brain injury.

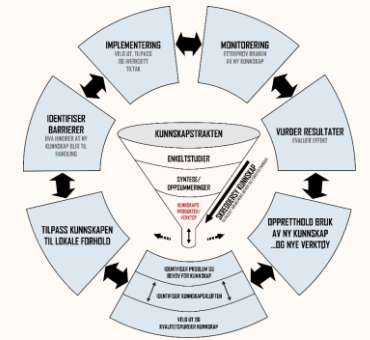
Results: Most respondents worked in acute or sub-acute hospital settings. Few departments had an interdisciplinary vision team, and very few therapists had formal education in visual problems after acquired brain injury. Visual assessment practices varied, and there was limited use of standardized tests. Barriers to identifying visual problems included patient-related challenges, knowledge gaps, and resource limitations.

LAY ABSTRACT

Vision problems are common after acquired brain injury, but no clear national guideline in Denmark exists in relation to assessing vision problems. This study looked at how therapists identify vision problems in patients who have acquired a brain injury. We surveyed 143 therapists working in hospitals. Interestingly, only a few had a practical guideline for how to do the assessment. Moreover, very few worked in teams, and therapists did not have much formal training on these problems. Therapists had different ways of assessing patients' vision, and some faced challenges like not having enough knowledge or resources. The study suggests that better interdisciplinary teamwork is needed, more education, and common ways of checking vision problems after a brain injury to improve how we treat patients with vision problems in Denmark.

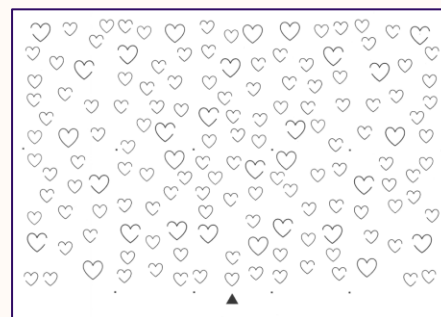
(2), healthcare professionals, and society (3–6). Various aspects of visual processing lead to a wide range of visual impairments (7), including reduced visual acuity, visual field defects, oculomotor dysfunction, binocular vision abnormalities, and higher-level visual

The KROSS KTA project



ISN Universitetet i Sørøst-Norge			
Bakgrunnsinformasjon			
Navn:	Dato for testing:	Tid siden hjerneslaget:	
Fødselsdato:	Diagnose (hvis kjent):		
Opplysninger om syn og symptomer			
1. Tidligere kjent med synsproblemer	a. På størrelse med b. Synsinnmerke c. F. E. G. H. I. J. K. L. M. N. O. P. Q. R. S. T. U. V. W. X. Y. Z. AA. AB. AC. AD. AE. AF. AG. AH. AI. AJ. AK. AL. AM. AN. AO. AP. AQ. AR. AS. AT. AU. AV. AW. AX. AY. AZ. BA. BB. BC. BD. BE. BF. BG. BH. BI. BJ. BK. BL. BM. BN. BO. BP. BQ. BR. BS. BT. BU. BV. BW. BX. BY. BZ. CA. CB. CC. CD. CE. CF. CG. CH. CI. CJ. CK. CL. CM. CN. CO. CP. CQ. CR. CS. CT. CU. CV. CW. CX. CY. CZ. DA. DB. DC. DD. DE. DF. DG. DH. DI. DJ. DK. DL. DM. DN. DO. DP. DQ. DR. DS. DT. DU. DV. DW. DX. DY. DZ. EA. EB. EC. ED. EE. EF. EG. EH. EI. EJ. EK. EL. EM. EN. EO. EP. EQ. ER. ES. ET. EU. EV. EW. EX. EY. EZ. FA. FB. FC. FD. FE. FF. FG. FH. FI. FJ. FK. FL. FM. FN. FO. FP. FQ. FR. FS. FT. FU. FV. FW. FX. FY. FZ. GA. GB. GC. GD. GE. GF. GG. GH. GI. GJ. GK. GL. GM. GN. GO. GP. GQ. GR. GS. GT. GU. GV. GW. GX. GY. GZ. HA. HB. HC. HD. HE. HF. HG. HH. HI. HJ. HK. HL. HM. HN. HO. HP. HQ. HR. HS. HT. HU. HV. HW. HX. HY. HZ. IA. IB. IC. ID. IE. IF. IG. IH. II. IJ. IK. IL. IM. IN. IO. IP. IQ. IR. IS. IT. IU. IV. IW. IX. IY. IZ. JA. JB. JC. JD. JE. JF. JG. JH. JI. JJ. JK. JL. JM. JN. JO. JP. JQ. JR. JS. JT. JU. JV. JW. JX. JY. JZ. KA. KB. KC. KD. KE. KF. KG. KH. KI. KJ. KK. KL. KM. KN. KO. KP. KQ. KR. KS. KT. KU. KV. KW. KX. KY. KZ. LA. LB. LC. LD. LE. LF. LG. LH. LI. LJ. LK. LL. LM. LN. LO. LP. LQ. LR. LS. LT. LU. LV. LW. LX. LY. LZ. MA. MB. MC. MD. ME. MF. MG. MH. MI. MJ. MK. ML. MM. MN. MO. MP. MQ. MR. MS. MT. MU. MV. MW. MX. MY. MZ. NA. NB. NC. ND. NE. NF. NG. NH. NI. NJ. NK. NL. NM. NO. NP. NQ. NR. NS. NT. NU. NV. NW. NX. NY. NZ. OA. OB. OC. OD. OE. OF. OG. OH. OI. OJ. OK. OL. OM. ON. OO. OP. OQ. OR. OS. OT. OU. OV. OW. OX. OY. OZ. PA. PB. PC. PD. PE. PF. PG. PH. PI. PJ. PK. PL. PM. PN. PO. PP. PQ. PR. PS. PT. PU. PV. PW. PX. PY. PZ. QA. QB. QC. QD. QE. QF. QG. QH. QI. QJ. QK. QL. QM. QN. QO. QP. QQ. QR. QS. QT. QU. QV. QW. QX. QY. QZ. RA. RB. RC. RD. RE. RF. RG. RH. RI. RJ. RK. RL. RM. RN. RO. RP. RQ. RR. RS. RT. RU. RV. RW. RX. RY. RZ. SA. SB. SC. SD. SE. SF. SG. SH. SI. SJ. SK. SL. SM. SN. SO. SP. SQ. SR. SS. ST. SU. SV. SW. SX. SY. SZ. TA. TB. TC. TD. TE. TF. TG. TH. TI. TJ. TK. TL. TM. TN. TO. TP. TQ. TR. TS. TT. TU. TV. TW. TX. TY. TZ. UA. UB. UC. UD. UE. UF. UG. UH. UI. UJ. UK. UL. UM. UN. UO. UP. UQ. UR. US. UT. UY. UZ. VA. VB. VC. VD. VE. VF. VG. VH. VI. VJ. VK. VL. VM. VN. VO. VP. VQ. VR. VS. VT. VU. VV. VW. VX. VY. VZ. WA. WB. WC. WD. WE. WF. WG. WH. WI. WJ. WK. WL. WM. WN. WO. WP. WQ. WR. WS. WT. WY. WZ. XA. XB. XC. XD. XE. XF. XG. XH. XI. XJ. XK. XL. XM. XN. XO. XP. XQ. XR. XS. XT. XU. XV. XW. XX. XY. XZ. YA. YB. YC. YD. YE. YF. YG. YH. YI. YJ. YK. YL. YM. YN. YO. YP. YQ. YR. YS. YT. YU. YV. YW. YX. YY. YZ. ZA. ZB. ZC. ZD. ZE. ZF. ZG. ZH. ZI. ZJ. ZK. ZL. ZM. ZN. ZO. ZP. ZQ. ZR. ZS. ZT. ZU. ZV. ZW. ZX. ZY. ZZ.		

KROSS



ISN Universitetet i Sørøst-Norge

Bakgrunnsinformasjon		Dato for testing:	Tid siden hjerneslaget:
Navn:			
Fødselsdato:		Diagnose (hvis kjent):	

Opplysninger om syn og synssymptom (marker)		JA	NEI
1. Tidligere kjente øyesykdommer	a. Grå stær/katarakt b. Grønn stær/glaukom c. Forkalkning/AMD d. Annet		
2. Bruker personen briller	a. Avstands-/tv-/kjørebrille b. Lesebrille c. Flerstykke/progressiv d. Egen <u>brille</u> er ikke tilgjengelig e. Kontaktlinser f. Lupebrille		
3. Opplever selv endring i synet etter hjerneslaget?	Hvis ja, spesifiser:		
4. Har familie/ fagpersoner rapportert endring i synet etter hjerneslaget?	Hvis ja, spesifiser:		

Skarpsyn/ Visus/ Sentralsyn (marker)		JA	NEI
5. Ser selv uklart/tåketete etter slaget	På nært (lesing)/ på avstand (tv)		
6. Synskarphet på avstand (3 m)	Utført med / uten brille Test ett øye om gangen med tv/avstandsbrille om personen bruker dette.	Høyre Venstre	
7. Kan lese avistekt	Utført med / uten lesebrille (begge øyne)	Høyre Venstre	

Synsfelt (marker)		JA	NEI
8. Opplever selv mangler i synsfeltet ei	Hvis ja, spesifiser:		
9. Observasjon av orienteringsvansker	Hvis ja, spesifiser:		
10. Synsfelt yttergrenser	Er det utfall i deler av synsfeltet? Test ett øye om gangen uten brille .	VØ HØ	
11. Sentralt synsfelt	Er det utfall i sentralsynet? a. ansiktsansler (ett øye om gangen) b. fingertelling (begge øyne)	VØ HØ	

Skjema er utviklet i prosjektet «Et slag for syn» i Kongsberg kommune, og må tilpasses lokale forhold. Informasjon til bruker: Du har fått en enkel kartlegging og informasjon av synet ditt. Du bør ta med en kopi som informasjon i eventuell videre rehabilitering. Kartleggingen erstatter ikke en full synsundersøkelse, og garanterer ikke at alle typer synsproblem avdekkes. Merker du endringer i synet, kontakt din lokale optiker eller øylege. V3.0 2023

ISN Universitetet i Sørøst-Norge

Samsyn og øyebevegelse (marker)		JA	NEI
12. Opplever selv dobbeltsyn	Hvis ja, spesifiser:		
13. Opplever problemer med dybdesynet	Hvis ja, spesifiser:		
14. Skjeler på ett øye	Spesifiser øye og retning	Høyre øye Venstre øye	Ut til siden Oppover Nedover
15. Unormale øyebevegelser	Spesifiser hvor det er problemer med å følge blikket fullt og jevnt til sin høyre eller venstre side, opp eller ned	Mot høyre Oppover	Mot venstre Nedover

Redusert oppmerksomhet (neglekt) (marker)		JA	NEI
16. Mistanke om redusert oppmerksomhet	Antall hele hjertes <u>avkrysset</u> /50 Hjertetesten: færre enn 42 av 50 avkrysset Annent test er brukt	Tid (min): (Maks 3 min)	
17. Det er identifisert et synsproblem	Hvis ja, <u>spesifiser</u> :	Synskarphet Redusert oppmerksomhet Synsfelt Samsynsproblem	JA NEI
18. Det er behov for videre utredning/oppløsing/synsrehabilitering/synsundersøkelse	Hvis ja, spesifiser:		JA NEI

Kryss nei, om synsproblemet er kjent fra tidligere og kvartett.

Informasjon (marker)		JA	NEI
Personen har fått informasjon om førerkort og bilkjøring			
Personen er informert om resultatet av KROSS kartleggingen			
Pårørende er informert om resultatet av KROSS kartleggingen			
Personen er informert om å kontakte optiker/fastlege/øylege hvis de senere opplever synsproblemer (f.eks. lese/tv/mobilisering)			

Andre kommentarer:

Skjema er utviklet i prosjektet «Et slag for syn» i Kongsberg kommune, og må tilpasses lokale forhold. Informasjon til bruker: Du har fått en enkel kartlegging og informasjon av synet ditt. Du bør ta med en kopi som informasjon i eventuell videre rehabilitering. Kartleggingen erstatter ikke en full synsundersøkelse, og garanterer ikke at alle typer synsproblem avdekkes. Merker du endringer i synet, kontakt din lokale optiker eller øylege. V3.0 2023



Veileder KROSS Kartleggingsskjema for syn



Tolkning av skjema: JA svar er som oftest relatert til redusert synsfunksjon med behov for videre oppfølging bortsett fra testing av synskarphet (visus). Dersom noen punkter ikke undersøkes, bør årsaken spesifiseres.

Bakgrunnsinformasjon

Angi dato og personens fødselsår. Ring rundt det som beskriver personen, kjønn, diagnose og NIHSS resultat (vis tilgjengelig). KROSS bruker «person» for å beskrive den som testes (pasient/bruker) i helse-, omsorg- eller opplæringsstjeneste.

Opplysninger om syn og synssymptom

1. Tidligere kjente øyesykdommer

Utførelse: Spør personen/pårørende om tidligere kjente øyesykdommer.
«Har du fått beskjed om at du har en øyesykdom som f.eks. grå stær (katarakt), grønn stær (glaukom) eller forkalkning (aldersrelatert makuladegenerering, AMD)? Får du behandling med øyedråper av noe slag?»
Dokumentasjon: Ring rundt ett / flere alternativer. Ved annet, skriv diagnose om den er kjent (f.eks. tørre øyne, diabetes retinopati, øyeoperasjon, øyeskade eller liknende).

2. Bruker person briller



Assessing barriers

Mathisen et al. *BMC Health Services Research* (2021) 21:497
<https://doi.org/10.1186/s12913-021-06467-4>

BMC Health Services Research

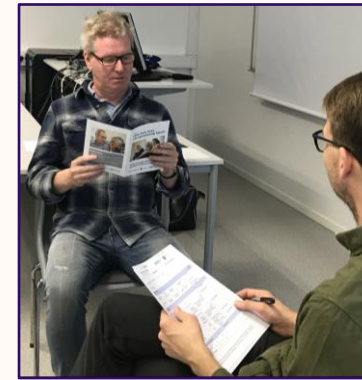
RESEARCH ARTICLE

Open Access

Barriers and facilitators to the implementation of a structured visual assessment after stroke in municipal health care services



Torgeir S. Mathisen^{1,2*}, Grethe Eilertsen^{2,3}, Heidi Ormstad⁴ and Helle K. Falkenberg^{1,2}



“We got a note from the ophthalmologist, but I did not understand a thing. And I dont think its just me. Its all Greak to me, reading such (vision) reports. Just numbers and letters and some crazy words.»

What we learned so far

“Before the KROSS workshop, I did not know anything about VIs after a stroke. I knew it existed, but in my education, we did not learn anything about it.”

Mathisen et al. BMC Health Services Research (2022) 22:351
https://doi.org/10.1186/s12913-022-07732-w

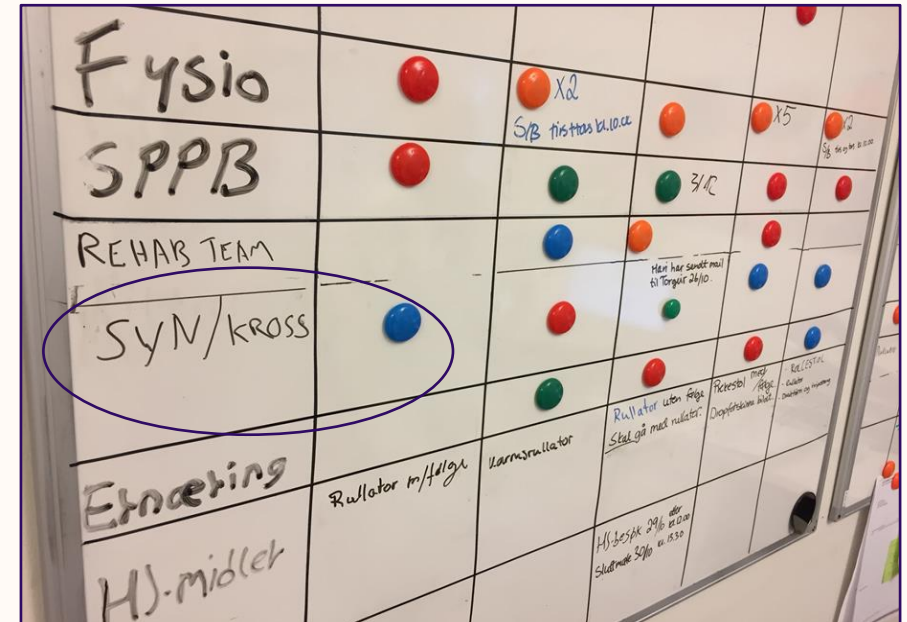
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RESEARCH Open Access

Check for updates

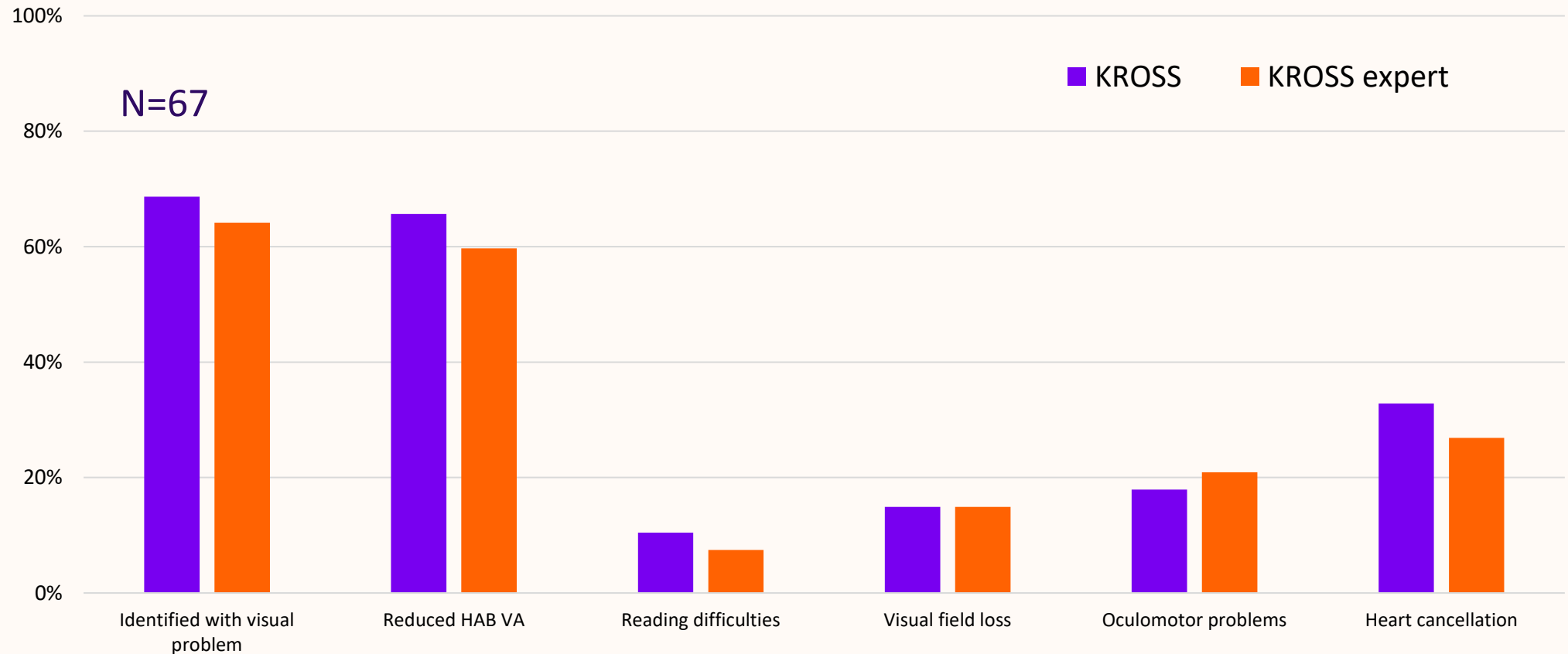
‘If we don’t assess the patient’s vision, we risk starting at the wrong end’: a qualitative evaluation of a stroke service knowledge translation project

Torgeir S. Mathisen^{1,2*}, Grethe Eilertsen^{2,3}, Heidi Ormstad³ and Helle K. Falkenberg^{1,2}



Falkenberg, Mathisen, Ormstad & Eilertsen, 2020

KROSS can identify visual problems

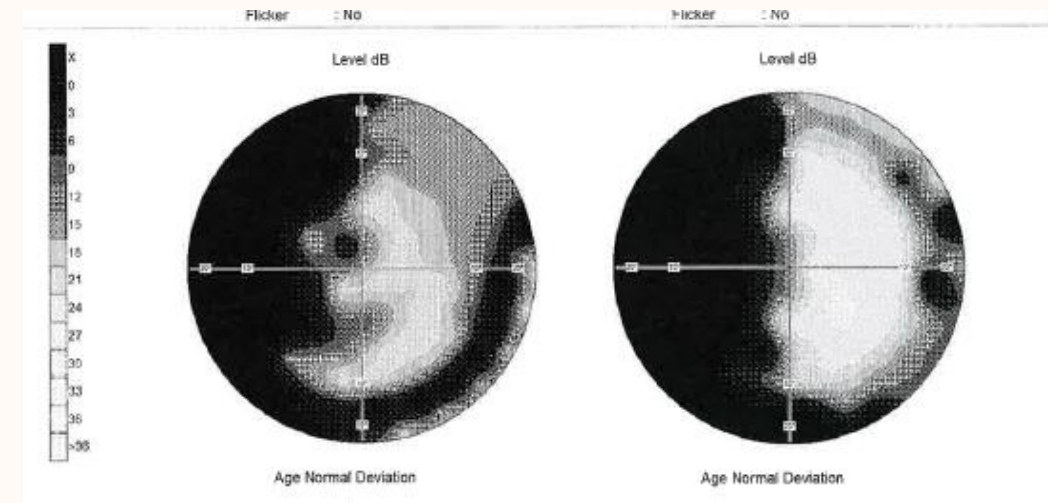


Visual rehabilitation

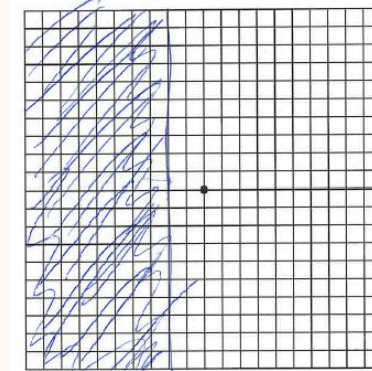
- Restitution
- Compensation
- Substitution
- Coping in a new situation

Venstre øye

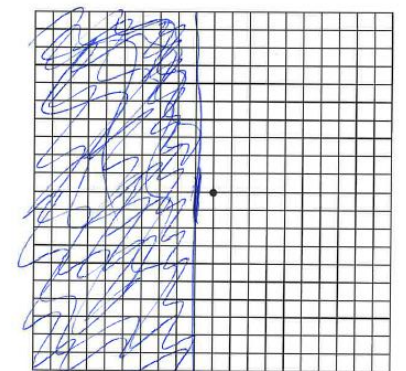
Høyre øye



AMSLER RECORDING CHART
A replica of Chart No. 1, printed in black
on white for convenience of recording

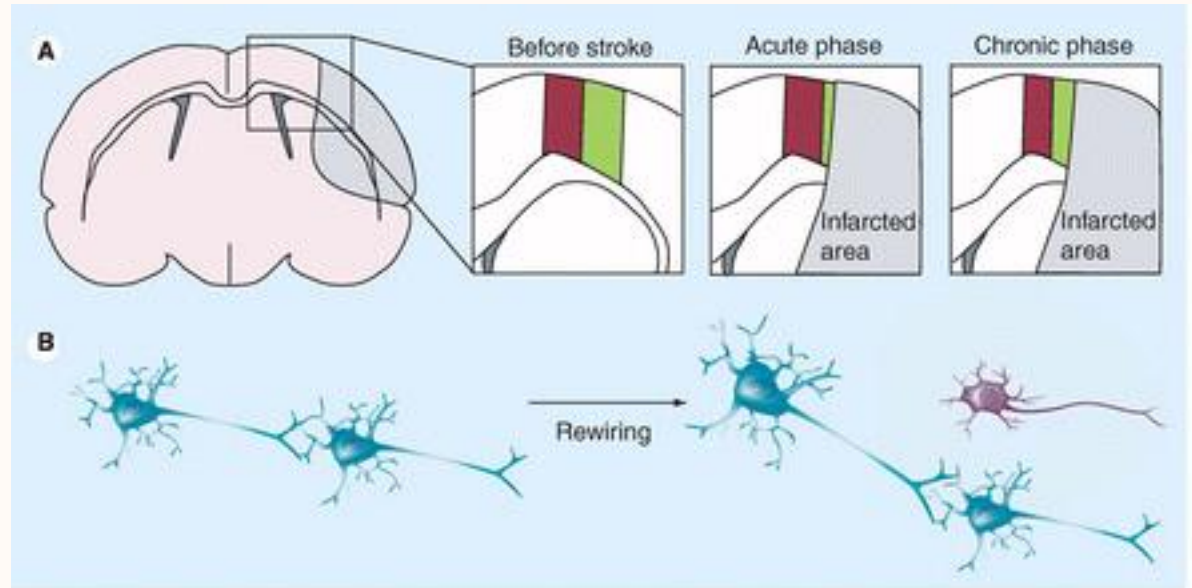


OD AMSLER RECORDING CHART
A replica of Chart No. 1, printed in black
on white for convenience of recording



Restitution

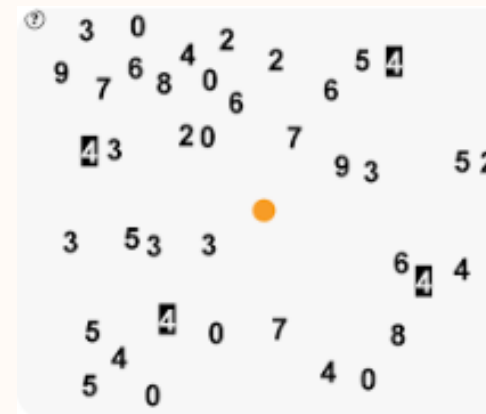
- Builds on the principles of the plasticity of the brain
- Eye movements
- Visual field
- Spontaneous restitution



(Smedslund and Myrhaug 2017, Pollock, Hazelton et al. 2019, Taraldsen 2023)

Compensation

- Optimize the visual function
- Improve search strategies in small and large visual field
- Prisms



(Zihl 2011, Pollock, Hazelton et al. 2019)

Synsrehabilitering på Vikersund Bad Rehabiliteringssenter

Av Torgeir Mathisen | Siste nytt | May 10, 2022 | 0



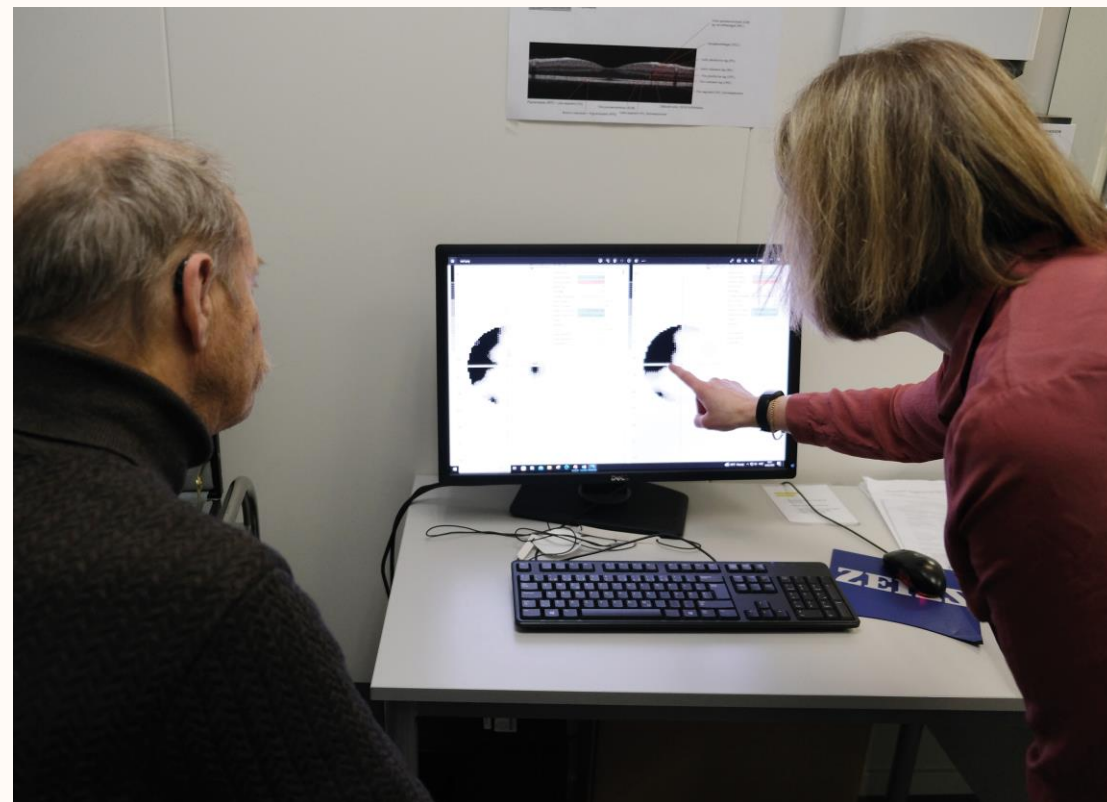
Substitution

- Optics for visually impaired
- Magnifying
- Lighting



Coping with a new way of seeing

- Understanding the visual problem
 - Patient
 - Caregivers
 - Health care personell
- Consequenses of impaired vision
 - Promote activity and participation
 - Coping



StrokeVIS



"Øyet I Slaget"



TenCRAOS

"Slag I Øyet"



- 🧠 Anne-Hege Aamodt
- 👁️ Fiona Rowe
- 👁️ Morten Carstens Moe
- 👁️ Øystein Kalnes Jørstad
- 🧠 Mona Skjelland
- 👁️ Anna-Katharina Lizten Jørstad
- 🧠 Ansar Roy
- ... og mange flere!



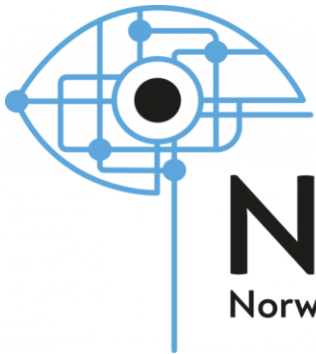
Norges Blindeforbund
Synshemmedes organisasjon

HELSE SØR-ØST

Oslo University Hospital

KLINBEFORSK





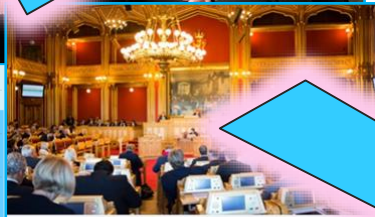
NorVIS
Norwegian Vision in Stroke



Plutselig problem med å

**PRATE
SMILE
LØFTE
SE**

må du ringe 113!



STORTINGET.NO
Representantforslag om en enklere hverdag for synshemmede



JOHANNES LÆRINGSSENTER

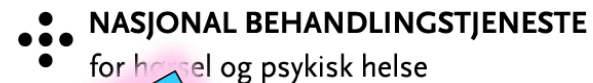


Oslo

TRONDHEIM
KOMMUNE



HELSE FØRDE



Linnéuniversitetet



**Takk
for
deltagelse
og
gjennomføring
av
konferansen
2023!**

