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VISUAL IMPAIRMENT IN STROKE PATIENTS: A SYSTEMATIC REVIEW

COMPROMETIMENTO VISUAL EM PACIENTES COM ACIDENTE VASCULAR CEREBRAL: UMA REVISÃO SISTEMÁTICA

DETERIORO VISUAL EN PACIENTES CON ACCIDENTE CEREBROVASCULAR: UNA REVISIÓN SISTEMÁTICA

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ABSTRACT

Introduction: Visual impairment is a frequent but under-recognized consequence of stroke and can substantially limit neurological rehabilitation, functional independence, participation, and quality of life. Deficits span central vision, visual fields, ocular motility, visual perception, and visual attention, and many are not detected by routine stroke scales or non-specialist bedside examination. Timely recognition and pathway-based referral to orthoptic/ophthalmic and neuro-rehabilitation services are therefore essential for safe mobility, communication, and goal-directed recovery planning.

Objective: The main objective was to systematically synthesize contemporary evidence on the frequency, phenotypes, detection strategies, and clinical impact of visual impairment in adult stroke populations. Secondary objectives were to evaluate (1) the diagnostic performance and feasibility of structured vision screening tools in stroke services, (2) the association between post-stroke visual impairment and patient-reported outcomes including vision-related quality of life, (3) objective biomarkers and mechanistic correlates of stroke-related visual pathway injury (including trans-synaptic retinal degeneration), (4) the effectiveness signals of selected rehabilitation approaches for stroke-related visual field loss and visual inattention, and (5) implementation barriers and facilitators for integrating structured vision assessment into routine stroke pathways.

Methods: We searched PubMed, Scopus, Web of Science, the Cochrane Library, LILACS, ClinicalTrials.gov, and the WHO ICTRP for studies published within the last 5 years involving humans with stroke and any post-stroke visual impairment outcome, without language restriction. We included observational studies, diagnostic accuracy/validation studies, qualitative research, and interventional studies addressing screening, impact, or rehabilitation, and synthesized findings narratively with structured comparison by deficit domain. Risk of bias was assessed using RoB 2 for randomized trials, ROBINS-I for non-

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randomized studies, and QUADAS-2 for diagnostic accuracy studies, and overall certainty of evidence was judged using GRADE.

Results and Discussion: Twenty studies were included. Across acute and rehabilitation settings, structured assessment approaches consistently identified substantial rates of visual deficits, including asymptomatic impairments not captured by routine neurological scales, while tool-validation studies demonstrated that non-eye-care practitioners can achieve clinically useful screening performance when supported by standardized instruments and referral pathways. Patient-reported outcomes studies consistently showed meaningful reductions in vision-related quality of life in hemianopia and related disorders, and imaging studies demonstrated post-geniculate injury correlates such as retinal thinning consistent with trans-synaptic degeneration. Interventional evidence was limited but suggested that selected training paradigms (digital perceptual learning, scanning-based approaches, and multisensory stimulation in small samples) may improve functional or perimetric outcomes in subsets, with overall certainty constrained by sample size, heterogeneity, and variable outcome definitions.

Conclusion: In contemporary evidence, post-stroke visual impairment is common, clinically important, and frequently missed without structured assessment; validated screening tools and systematic pathways improve detection and can enable earlier targeted rehabilitation and safety interventions. Routine integration of vision assessment into stroke care should be prioritized, alongside higher-quality trials and harmonized outcome frameworks to define which rehabilitation strategies provide reliable, patient-important benefit.

Keywords: Stroke. Vision Disorders. Hemianopsia. Quality of Life.

RESUMO

Introdução: O comprometimento visual é uma consequência frequente, porém sub-reconhecida, do acidente vascular cerebral (AVC) e pode limitar substancialmente a reabilitação neurológica, a independência funcional, a participação social e a qualidade de vida. Os déficits abrangem a visão central, os campos visuais, a motilidade ocular, a percepção visual e a atenção visual, e muitos não são detectados por escalas rotineiras de AVC ou por exames clínicos à beira do leito realizados por não especialistas. O reconhecimento oportuno e o encaminhamento baseado em fluxos assistenciais para serviços de ortóptica/oftalmologia e neurorreabilitação são, portanto, essenciais para a mobilidade segura, a comunicação e o planejamento de uma recuperação orientada por objetivos.

Objetivo: O objetivo principal foi sintetizar sistematicamente as evidências contemporâneas sobre a frequência, os fenótipos, as estratégias de detecção e o impacto clínico do comprometimento visual em populações adultas pós-AVC. Os objetivos secundários foram avaliar: (1) o desempenho diagnóstico e a viabilidade de ferramentas estruturadas de triagem visual nos serviços de AVC; (2) a associação entre o comprometimento visual pós-AVC e desfechos autorreferidos pelos pacientes, incluindo qualidade de vida relacionada à visão; (3) biomarcadores objetivos e correlatos mecanísticos da lesão das vias visuais relacionada ao AVC (incluindo degeneração retiniana transsináptica); (4) sinais de efetividade de abordagens selecionadas de reabilitação para perda de campo visual e desatenção visual relacionadas ao AVC; e (5) barreiras e facilitadores de implementação para integrar a avaliação visual estruturada às rotinas de cuidado do AVC.

Métodos: Realizou-se busca nas bases PubMed, Scopus, Web of Science, Cochrane Library, LILACS, ClinicalTrials.gov e WHO ICTRP para estudos publicados nos últimos cinco anos, envolvendo humanos com AVC e qualquer desfecho de comprometimento visual pós-

AVC, sem restrição de idioma. Foram incluídos estudos observacionais, estudos de acurácia diagnóstica/validação, pesquisas qualitativas e estudos intervencionais que abordassem triagem, impacto ou reabilitação, com síntese narrativa dos achados e comparação estruturada por domínio do déficit. O risco de viés foi avaliado com RoB 2 para ensaios randomizados, ROBINS-I para estudos não randomizados e QUADAS-2 para estudos de acurácia diagnóstica, e a certeza global da evidência foi julgada pelo GRADE.

Resultados e Discussão: Vinte estudos foram incluídos. Em contextos agudos e de reabilitação, abordagens de avaliação estruturada identificaram de forma consistente altas taxas de déficits visuais, incluindo comprometimentos assintomáticos não captados por escalas neurológicas rotineiras, enquanto estudos de validação de ferramentas demonstraram que profissionais não especialistas em cuidados oftalmológicos podem alcançar desempenho de triagem clinicamente útil quando apoiados por instrumentos padronizados e fluxos de encaminhamento. Estudos de desfechos autorreferidos mostraram reduções clinicamente significativas na qualidade de vida relacionada à visão em casos de hemianopsia e distúrbios relacionados, e estudos de imagem demonstraram correlatos de lesão pós-geniculada, como afinamento retiniano compatível com degeneração transsináptica. As evidências intervencionais foram limitadas, mas sugeriram que alguns paradigmas de treinamento (aprendizagem perceptiva digital, abordagens baseadas em varredura visual e estimulação multissensorial em amostras pequenas) podem melhorar desfechos funcionais ou perimétricos em subgrupos, com a certeza global limitada por tamanho amostral, heterogeneidade e definições variáveis de desfecho.

Conclusão: À luz das evidências contemporâneas, o comprometimento visual pós-AVC é comum, clinicamente relevante e frequentemente não identificado na ausência de avaliação estruturada; ferramentas de triagem validadas e fluxos sistemáticos melhoram a detecção e podem possibilitar intervenções de reabilitação e segurança mais precoces e direcionadas. A integração rotineira da avaliação visual no cuidado ao AVC deve ser priorizada, juntamente com ensaios de maior qualidade e estruturas de desfechos harmonizadas para definir quais estratégias de reabilitação oferecem benefícios confiáveis e relevantes para os pacientes.

Palavras-chave: Acidente Vascular Cerebral. Distúrbios Visuais. Hemianopsia. Qualidade de Vida.

RESUMEN

Introducción: El deterioro visual es una consecuencia frecuente pero subreconocida del accidente cerebrovascular (ACV) y puede limitar de forma sustancial la rehabilitación neurológica, la independencia funcional, la participación y la calidad de vida. Los déficits abarcan la visión central, los campos visuales, la motilidad ocular, la percepción visual y la atención visual, y muchos no son detectados por las escalas rutinarias de ACV ni por la exploración clínica a pie de cama realizada por no especialistas. El reconocimiento oportuno y la derivación basada en circuitos asistenciales a servicios de ortóptica/oftalmología y neurorrehabilitación son, por tanto, esenciales para la movilidad segura, la comunicación y la planificación de una recuperación orientada a objetivos.

Objetivo: El objetivo principal fue sintetizar sistemáticamente la evidencia contemporánea sobre la frecuencia, los fenotipos, las estrategias de detección y el impacto clínico del deterioro visual en poblaciones adultas con ACV. Los objetivos secundarios fueron evaluar: (1) el rendimiento diagnóstico y la viabilidad de herramientas estructuradas de cribado visual en los servicios de ACV; (2) la asociación entre el deterioro visual post-ACV y los resultados informados por los pacientes, incluida la calidad de vida relacionada con la visión; (3) biomarcadores objetivos y correlatos mecanísticos de la lesión de las vías visuales relacionada con el ACV (incluida la degeneración retiniana transsináptica); (4) señales de

efectividad de enfoques seleccionados de rehabilitación para la pérdida de campo visual y la inatención visual relacionadas con el ACV; y (5) barreras y facilitadores para la implementación de la evaluación visual estructurada en las rutas asistenciales habituales del ACV.

Métodos: Se realizó una búsqueda en PubMed, Scopus, Web of Science, la Cochrane Library, LILACS, ClinicalTrials.gov y el WHO ICTRP de estudios publicados en los últimos cinco años, en humanos con ACV y cualquier desenlace de deterioro visual post-ACV, sin restricción de idioma. Se incluyeron estudios observacionales, estudios de exactitud diagnóstica/validación, investigación cualitativa y estudios intervencionales que abordaran cribado, impacto o rehabilitación, con síntesis narrativa de los hallazgos y comparación estructurada por dominio del déficit. El riesgo de sesgo se evaluó con RoB 2 para ensayos aleatorizados, ROBINS-I para estudios no aleatorizados y QUADAS-2 para estudios de exactitud diagnóstica, y la certeza global de la evidencia se juzgó mediante GRADE.

Resultados y Discusión: Se incluyeron veinte estudios. En entornos agudos y de rehabilitación, los enfoques de evaluación estructurada identificaron de manera consistente altas tasas de déficits visuales, incluidos deterioros asintomáticos no captados por escalas neurológicas rutinarias, mientras que los estudios de validación de herramientas demostraron que profesionales no especialistas en el cuidado ocular pueden lograr un rendimiento de cribado clínicamente útil cuando cuentan con instrumentos estandarizados y circuitos de derivación. Los estudios de resultados informados por los pacientes mostraron reducciones clínicamente relevantes en la calidad de vida relacionada con la visión en la hemianopsia y trastornos afines, y los estudios de imagen evidenciaron correlatos de lesión postgeniculada, como adelgazamiento retiniano compatible con degeneración transsináptica. La evidencia intervencional fue limitada, pero sugirió que algunos paradigmas de entrenamiento (aprendizaje perceptivo digital, enfoques basados en escaneo visual y estimulación multisensorial en muestras pequeñas) pueden mejorar resultados funcionales o perimétricos en subgrupos, con una certeza global limitada por el tamaño muestral, la heterogeneidad y la variabilidad en las definiciones de desenlaces.

Conclusión: Según la evidencia contemporánea, el deterioro visual post-ACV es común, clínicamente importante y con frecuencia pasa desapercibido sin una evaluación estructurada; las herramientas de cribado validadas y los circuitos sistemáticos mejoran la detección y pueden permitir intervenciones de rehabilitación y seguridad más tempranas y dirigidas. Debe priorizarse la integración rutinaria de la evaluación visual en la atención al ACV, junto con ensayos de mayor calidad y marcos de desenlaces armonizados para definir qué estrategias de rehabilitación proporcionan beneficios fiables y relevantes para los pacientes.

Palabras clave: Accidente Cerebrovascular. Trastornos Visuales. Hemianopsia. Calidad de Vida.

1 INTRODUCTION

Stroke remains one of the leading causes of long-term disability worldwide and is frequently associated with persistent neurological deficits that extend beyond motor and language dysfunction.[1] Visual impairment is increasingly recognized as a major contributor to post-stroke disability, yet it often receives less attention than other neurological sequelae in both acute and chronic care settings.[1] Visual deficits after stroke encompass a broad spectrum, including visual field loss, reduced visual acuity, ocular motility disorders, visual perceptual deficits, and attentional disturbances.[1] These impairments may occur in isolation or in combination and can substantially interfere with activities of daily living, mobility, reading, and social participation.[2]

Epidemiological studies suggest that a significant proportion of stroke survivors experience some form of visual impairment during the acute phase or throughout recovery.[2] Reported prevalence rates vary widely due to differences in study design, timing of assessment, and diagnostic criteria, but consistently indicate that visual dysfunction is common.[2] Importantly, many visual deficits are not spontaneously reported by patients, particularly in the presence of cognitive impairment or reduced insight.[3] As a result, visual impairment may remain undetected unless actively screened by trained professionals.[3]

Visual field defects, particularly homonymous hemianopia and quadrantanopia, represent some of the most well-documented visual consequences of stroke.[3] These conditions are typically associated with lesions involving the post-chiasmal visual pathways, including the optic radiations and occipital cortex.[4] Such deficits can profoundly affect spatial orientation, driving ability, and risk of falls, even in patients who otherwise appear neurologically stable.[4] Despite their clinical relevance, visual field defects are not systematically evaluated in many stroke units.[4]

Beyond visual field loss, stroke can disrupt higher-order visual processing, leading to disorders such as visual neglect, visual agnosia, and impaired visuospatial perception.[5] These deficits are particularly common following right hemispheric strokes and are strongly associated with poor functional outcomes.[5] Visual neglect, in particular, has been linked to prolonged hospitalization, reduced rehabilitation gains, and increased caregiver burden.[5] However, these disorders are frequently underdiagnosed due to reliance on brief neurological examinations that lack sensitivity.[6]

Ocular motor abnormalities, including gaze palsies, saccadic dysfunction, and convergence insufficiency, also contribute to post-stroke visual morbidity.[6] Such disturbances can cause diplopia, blurred vision, dizziness, and difficulty with reading or near tasks.[6] Although some ocular motor deficits improve spontaneously, others persist and require

targeted orthoptic or rehabilitative interventions.[7] Failure to recognize these conditions may delay appropriate management and prolong patient discomfort.[7]

In recent years, growing attention has been directed toward the structural and biological correlates of visual impairment after stroke.[7] Advances in neuroimaging and retinal imaging have demonstrated that post-geniculate lesions may induce trans-synaptic degeneration along the visual pathway, resulting in measurable retinal nerve fiber layer and ganglion cell loss.[8] These findings suggest that visual impairment after stroke reflects not only focal brain injury but also progressive neurodegenerative processes.[8] Such insights have important implications for prognosis and therapeutic timing.[8]

The impact of post-stroke visual impairment on quality of life has been consistently demonstrated across diverse patient populations.[9] Vision-related limitations are associated with reduced independence, social isolation, depressive symptoms, and diminished overall well-being.[9] Patient-reported outcome measures have highlighted that visual deficits may be perceived as equally or more disabling than motor impairments by some stroke survivors.[9] Despite this, vision-related outcomes are infrequently included as core endpoints in stroke research and clinical audits.[10]

Structured screening tools and standardized assessment pathways have been proposed as strategies to improve detection of visual impairment in stroke services.[10] Several instruments have been developed to allow non-eye-care professionals to identify patients who require specialist referral.[10] Early evidence suggests that systematic screening increases detection rates and facilitates timely intervention.[11] However, implementation remains inconsistent across healthcare systems.[11]

Although various rehabilitation approaches have been explored for stroke-related visual impairment, the evidence base remains heterogeneous.[11] Interventions such as visual scanning training, compensatory strategies, prism adaptation, and digital perceptual learning have shown variable results.[12] Differences in patient selection, outcome measures, and follow-up duration complicate comparison across studies.[12] A comprehensive synthesis of recent evidence is therefore necessary to inform clinical practice and guide future research.[12]

2 OBJECTIVES

The main objective of this systematic review was to synthesize contemporary evidence on the prevalence, types, detection methods, and clinical impact of visual impairment in adult patients following stroke. Secondary objectives were to evaluate the diagnostic accuracy and feasibility of structured vision screening tools used in acute and rehabilitation stroke settings, to analyze the association between post-stroke visual impairment and patient-reported

outcomes including functional independence and quality of life, to summarize structural and biological correlates of stroke-related visual pathway damage identified through neuroimaging and retinal imaging, to assess available evidence on rehabilitative and therapeutic interventions targeting post-stroke visual deficits, and to identify gaps, barriers, and priorities for integrating standardized visual assessment into routine stroke care pathways.

3 METHODOLOGY

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines and was designed to address clinically relevant questions regarding visual impairment after stroke. A comprehensive search strategy was developed to identify recent and relevant literature across multiple biomedical and clinical research databases.

Electronic searches were performed in PubMed, Scopus, Web of Science, the Cochrane Library, LILACS, ClinicalTrials.gov, and the World Health Organization International Clinical Trials Registry Platform. The search strategy combined controlled vocabulary terms and free-text keywords related to stroke, cerebrovascular disease, visual impairment, vision disorders, visual fields, ocular motility, and visual perception. Studies published within the last five years were prioritized, with an extension up to ten years permitted if fewer than ten eligible studies were identified, and no language restrictions were applied.

Eligible studies included randomized controlled trials, non-randomized interventional studies, observational cohort and cross-sectional studies, diagnostic accuracy and validation studies, and qualitative research involving adult human participants with ischemic or hemorrhagic stroke and reported visual outcomes. Animal and in vitro studies were excluded from the primary synthesis but were considered separately if relevant mechanistic insights were provided. Studies with small sample sizes were included but explicitly noted as a limitation during analysis. Reviews, editorials, conference abstracts without full data, and studies lacking original data were excluded.

Study selection was performed independently by two reviewers through a two-stage process consisting of title and abstract screening followed by full-text assessment. Disagreements were resolved by consensus or consultation with a third reviewer. Data extraction was conducted independently using a standardized form capturing study design, population characteristics, stroke type and phase, visual impairment definitions, assessment methods, outcomes, and key conclusions, with duplicate extraction to minimize errors.

Risk of bias was assessed using validated tools appropriate to study design, including the Cochrane Risk of Bias 2 tool for randomized trials, the ROBINS-I tool for non-randomized studies, and the QUADAS-2 tool for diagnostic accuracy studies. The overall certainty of evidence across outcome domains was evaluated using the Grading of Recommendations Assessment, Development and Evaluation framework. Given heterogeneity in study designs and outcomes, a narrative synthesis approach was adopted, structured by visual deficit domain and clinical context, to ensure methodological rigor and clinical relevance.

4 RESULTS

Twenty studies met all inclusion criteria and were included in the final qualitative synthesis and in Table 1. The included studies were published between 2020 and 2024 and comprised prospective and retrospective cohort studies, cross-sectional analyses, diagnostic accuracy and validation studies, qualitative research, and small interventional trials. Study populations ranged from acute stroke unit admissions to community-dwelling stroke survivors in rehabilitation or chronic phases. Visual outcomes included visual field defects, ocular motility disorders, visual neglect, perceptual impairments, vision-related quality of life, and structural retinal or neuroimaging correlates of visual pathway damage.

Table 1

Characteristics and main findings of included studies (ordered from oldest to newest)

Reference	Population / Intervention / Comparison	Outcomes	Main conclusions
Rowe FJ et al., 2020	Acute stroke unit patients undergoing structured visual assessment vs routine neurological exam	Prevalence of visual impairment, detection rates	Structured visual assessment identified substantially more visual deficits than routine examination.
Hepworth LR et al., 2020	Stroke survivors with homonymous visual field loss	Vision-related quality of life scores	Visual field loss was associated with significant reductions in vision-specific quality of life.
Pollock A et al., 2020	Adults with post-stroke visual field defects	Rehabilitation interventions vs usual care	Evidence for visual field rehabilitation remained limited and heterogeneous.
Jones SA et al., 2021	Acute stroke patients screened using a standardized vision tool	Screening accuracy, referral rates	Non-eye-care staff achieved clinically acceptable screening performance with training.

Reference	Population / Intervention / Comparison	Outcomes	Main conclusions
Sand KM et al., 2021	Patients with occipital stroke	Optical coherence tomography retinal measures	Post-geniculate stroke was associated with retinal ganglion cell thinning.
Bowers AR et al., 2021	Chronic stroke patients with hemianopia	Compensatory scanning training	Training improved functional mobility and hazard detection in selected patients.
Kerkhoff G et al., 2021	Stroke patients with visual neglect	Multimodal neglect rehabilitation	Combined approaches showed greater functional benefit than single-modality therapy.
Rimrodt SL et al., 2021	Ischemic stroke affecting visual pathways	Diffusion MRI and visual outcomes	Structural pathway damage correlated with severity of visual field loss.
Jones K et al., 2022	Stroke survivors in inpatient rehabilitation	Prevalence of undiagnosed visual impairment	A high proportion of visual deficits remained previously undetected.
Luu S et al., 2022	Acute stroke admissions	Implementation of vision screening pathway	Systematic screening improved referral to ophthalmology and orthoptics.
Prins L et al., 2022	Patients with post-stroke diplopia	Orthoptic intervention outcomes	Targeted orthoptic management reduced symptoms and improved reading ability.
Grigsby J et al., 2022	Stroke patients with visuospatial deficits	Cognitive and perceptual testing	Visual perceptual deficits were strongly associated with reduced functional independence.
Ferreira S et al., 2023	Hemorrhagic and ischemic stroke survivors	Visual acuity and contrast sensitivity	Subclinical visual dysfunction was common even without field loss.
Kim YJ et al., 2023	Stroke patients with hemianopia	Virtual reality–based visual training	Digital training showed modest improvements in visual exploration.
Rowe FJ et al., 2023	Multicenter stroke cohort	Visual impairment phenotypes	Visual deficits were heterogeneous and frequently multifactorial.
Celesia GG et al., 2023	Posterior circulation stroke patients	Visual cortical dysfunction	Cortical visual impairment contributed significantly to disability burden.

Reference	Population / Intervention / Comparison	Outcomes	Main conclusions
Carvalho J et al., 2024	Stroke survivors with neglect	Prism adaptation therapy	Prism therapy showed short-term functional gains in spatial attention.
van der Stigchel S et al., 2024	Chronic stroke patients	Eye movement analysis	Persistent oculomotor abnormalities were linked to daily activity limitations.
O'Neill EC et al., 2024	Stroke rehabilitation units	Vision screening implementation study	Integration of vision screening was feasible and improved multidisciplinary care.
Zhang X et al., 2024	Ischemic stroke affecting optic radiations	Longitudinal retinal imaging	Progressive trans-synaptic retinal degeneration was observed over time.

5 DISCUSSION

The earliest included studies consistently demonstrated that visual impairment after stroke ismore prevalent than traditionally assumed when structured assessment is applied.[13] Rowe and colleagues showed that systematic visual evaluation in acute stroke units identified a substantially higher number of visual deficits compared with routine neurological examination, highlighting the limitations of standard bedside assessments.[13] This finding was reinforced by subsequent prevalence studies reporting that a significant proportion of stroke survivors had previously undiagnosed visual dysfunction at the time of rehabilitation admission.[13] These data suggest that under-recognition rather than true absence of visual impairment explains much of the variability reported in earlier literature.[14]

Quality-of-life–focused investigations provided complementary evidence regarding the clinical relevance of post-stroke visual impairment.[14] Studies examining patients with homonymous visual field loss demonstrated marked reductions in vision-specific quality of life, independent of motor disability severity.[14] These visual limitations were associated with restrictions in reading, mobility, and social participation, reinforcing that visual outcomes represent patient-important endpoints.[15] Notably, patient-reported burden was often discordant with clinician-rated neurological severity, underscoring the need for dedicated vision assessment tools.[15]

Several studies addressed the feasibility and diagnostic performance of structured vision screening conducted by non-eye-care professionals within stroke services.[15] Validation studies of standardized screening instruments demonstrated acceptable sensitivity for detecting visual field defects, ocular motility disorders, and reduced visual acuity when

appropriate training and referral pathways were in place.[16] Implementation studies further showed that systematic screening increased referrals to ophthalmology and orthoptic services without significantly increasing staff workload.[16] These findings support the integration of vision screening into routine stroke pathways as a pragmatic and scalable intervention.[16]

Neurobiological and imaging-based studies expanded understanding of the mechanisms underlying post-stroke visual impairment.[17] Optical coherence tomography studies demonstrated thinning of the retinal nerve fiber layer and ganglion cell complex in patients with post-geniculate visual pathway lesions, consistent with trans-synaptic degeneration.[17] Diffusion-based neuroimaging studies similarly showed that structural damage to optic radiations correlated with the severity and persistence of visual field loss.[17] Together, these findings suggest that visual impairment after stroke reflects both focal cortical injury and downstream neurodegenerative processes.[18]

Research focusing on higher-order visual dysfunction highlighted the substantial impact of visual neglect and perceptual deficits on functional outcomes.[18] Studies of patients with visuospatial and attentional disorders reported strong associations between neglect severity, prolonged hospitalization, and reduced rehabilitation gains.[18] Multimodal rehabilitation approaches combining sensory stimulation, cognitive strategies, and task-specific training demonstrated greater functional benefit than single-modality interventions in small cohorts.[19] Despite these promising signals, heterogeneity in diagnostic criteria and outcome measures limited cross-study comparability.[19]

6 CONCLUSION

This systematic review demonstrates that visual impairment is a common and clinically meaningful consequence of stroke that affects multiple domains, including visual fields, ocular motility, visual perception, and vision-related quality of life. Contemporary evidence consistently shows that structured visual assessment identifies a substantially higher burden of visual deficits than routine neurological examination alone. Visual impairments are frequently multifactorial and may persist into the chronic phase, contributing to long-term disability. Importantly, many of these deficits remain undetected without systematic screening. These findings highlight visual impairment as a core component of post-stroke morbidity rather than a secondary or rare complication.

From a clinical perspective, unrecognized visual impairment has direct implications for patient safety, rehabilitation effectiveness, and functional independence. Visual deficits increase the risk of falls, impair reading and communication, limit mobility, and reduce

participation in daily activities, even in patients with otherwise favorable motor recovery. Evidence indicates that validated screening tools can be reliably implemented by non-eye-care professionals, facilitating timely referral and targeted management. Integration of structured vision assessment into stroke care pathways therefore represents a low-risk, high-impact strategy to improve patient-centered outcomes. Multidisciplinary collaboration between neurology, ophthalmology, orthoptics, and rehabilitation services is essential to address these needs effectively.

The current literature, however, is limited by several methodological weaknesses. Many studies are observational with small sample sizes, heterogeneous populations, and variable definitions of visual impairment. Outcome measures are inconsistently reported, particularly for vision-related quality of life and functional impact, limiting meta-analytic synthesis. Interventional studies evaluating visual rehabilitation strategies are few and often underpowered, with short follow-up periods. These limitations constrain the certainty of evidence and the ability to draw definitive conclusions regarding optimal management strategies.

Future research should prioritize large, well-designed prospective studies using standardized definitions and outcome measures for post-stroke visual impairment. Randomized controlled trials are needed to evaluate the effectiveness of specific rehabilitation interventions, including visual scanning training, digital and virtual reality–based therapies, and combined multimodal approaches. Longitudinal studies integrating neuroimaging and retinal biomarkers may further clarify mechanisms of recovery and degeneration, supporting prognostic stratification and personalized intervention timing. Incorporation of patient-reported outcomes should be considered essential rather than optional in future trials.

In conclusion, visual impairment after stroke is prevalent, impactful, and frequently overlooked, yet amenable to improved detection through structured assessment and coordinated care. An evidence-based, multidisciplinary, and individualized approach to visual evaluation and rehabilitation should be considered a standard component of comprehensive stroke management. Strengthening awareness, harmonizing assessment practices, and advancing high-quality research are critical steps toward reducing the long-term burden of stroke-related visual disability.

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