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A current view of the issue of rehabilitation of patients with ocular pathology

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This paper considers general rehabilitation. In addition, attention is given to prospects for advancement in rehabilitation in the field of ophthalmology. The following major aspects of further development of the vision rehabilitation system in Ukraine were determined: 1) organization of up-to-date process of rehabilitation in the field of healthcare requires forming specialty rehabilitation units for persons with visual impairments (PVAs); 2) a comprehensive and continuous process of rehabilitation for PVAs should be achieved through established relationships among the parties involved; 3) rehabilitation is not only for people whose visual impairment is permanent and irremediable, but is primarily for those whose visual impairment is potentially remediable; 4) increasing awareness of vision rehabilitation issues among ophthalmologists and rehabilitation specialists should be a strategic objective of the healthcare system; 5) rehabilitation of vision should not only involve measures for adaptation of low-vision patients to new life conditions, but also should consider a range of measures aimed at optimizing visual function, including postoperative rehabilitation, posttherapeutic rehabilitation, surgical rehabilitation, esthetic rehabilitation (including prosthetics), etc, and 6) developing specialty rehabilitation care for PVIs and moving forward from empirical approaches to an era of evidence-based practice requires further research on the efficacy of measures of medical vision rehabilitation.

Key words:

rehabilitation, ophthalmology, eye, vision impairment, vision rehabilitation

Introduction

Rehabilitation needs are on the rise due to increased prevalence of non-infectious diseases and population aging, posing a challenge to the global healthcare system. According to the World Health Organization (WHO), the increasing need for rehabilitation is going largely unmet because rehabilitation services are unavailable to most people who need them, although people are living longer and more people are living with chronic diseases [1]. According to the global estimates of the need for rehabilitation based on the Global Burden of Disease study 2019, the number of individuals with conditions that would benefit from rehabilitation services had increased from 1.48 billion in 1994 to 2.41 billion in 2019 [2]. It has been proposed that rehabilitation is the key health strategy for the 21st century [3].

Today there is no doubt that rehabilitation is of utmost importance in the healthcare system of Ukraine. There is, however, some uncertainty with regard to whether the general rehabilitation guidelines developed are acceptable and effective in such special area as rehabilitation for persons with visual impairments (PVIs).

The purpose of this paper is twofold: (1) to review the propositions available in the world with regard to rehabilitation for PVIs and (2) to further develop theoretical and conceptual basics of specialty rehabilitation for patients with eye diseases causing a considerable number of cases of prolonged incapacity to work and/or disability.

General rehabilitation issues

Historically, the word "rehabilitation" originates from the Latin "re", which means "again", and "habitare", which means "make fit" [4].

There is a range of definitions of rehabilitation [5]. The WHO defines rehabilitation as "a set of interventions designed to optimize functioning and reduce disability in individuals with health conditions in interaction with their environment" [6, 7]. The WHO's (2001) International Classification of Functioning, Disability and Health (ICF) aims at describing an individual's functioning and disabilities and provides the structural basis for system-

atizing this information [8]. In Ukraine, the national classifier 030:2022 "Classifier of Functioning, Disability and Health" was adopted for use based on this classification, particularly when providing rehabilitation services in healthcare [9].

The Law of Ukraine defines rehabilitation in the field of healthcare as "a system of measures performed by rehabilitation specialists who work at a rehabilitation facility/unit/ward, at the level of territorial communities, as members of a multidisciplinary rehabilitation team (MRT) or independently, to provide assistance to a person limited in their activities of daily living (ADLs), with the aim to optimize functioning and quality of life of the person in their environment" [10].

That is, rehabilitation is not only for people with disabilities or long-term or physical impairments. Rather, rehabilitation is an essential health service for anyone with an acute or chronic health condition, impairment or injury that limits functioning [8].

The state acknowledges the right of every citizen to receive rehabilitation care while being provided with medical care [11]. The Ukrainian legislation defines healthcare system as "a system of activities aimed at preservation and restoration of physiological and psychological functions, optimal working capacity and social activity of a person with the maximum biologically possible individual life expectancy" [11]. However, in considering the issue of rehabilitation, attention should be also given to the quality of life that is defined by the WHO as "an individual's perception of their position in life in the context of the culture and value systems in which they live" [12].

Rehabilitation is required at all levels, for identification of needs and for an effective continuum of care throughout a person's recovery [13]. Consequently, rehabilitation should be seen as a social-and-medical system involving the following components:

1) medical (a set of interventions allowing to compensate for or regain body functions lost due to injury, surgery or disease, and aiming to prevent complications and recurrences);

2) physical (physical exercise training and application of natural factors to restore or compensate for impaired or lost body functions);

3) psychological (restoration or correction of impaired psychological functions and creating favorable conditions for the development and strengthening of personality);

4) social (creating favorable conditions for bringing an individual back into active participation in life and restoring his/her social status and capacity for independent public activities);

5) vocational (preparing the individual to occupational functioning, restoring or building the capacity for employment).

Medical rehabilitation provides the basis for rehabilitation interventions that collectively make up a special field of medicine, rehabilitation medicine [4]. Some authors see medical rehabilitation as a set of measures including the techniques for speeding recovery, stimulating reparative- and regenerative processes, identifying and strengthening compensatory mechanisms, and improving total body resistance and immunity. In addition, medical rehabilitation interventions that enable regaining body functions lost due to injury, surgery or disease include medication therapy, physical therapy, physiotherapy, restorative and cosmetic surgery, psychotherapy, diet therapy, prosthetics, sanatorium therapy, etc. [3, 4, 14].

The basic principles underlying rehabilitation are common for all patients that need it irrespective of the nosological status. The basic principles of rehabilitation include:

1) patient-centeredness (rehabilitation must be planned and performed taking into account the needs, potential and wishes of the rehabilitant or his/her family, and with their involvement in the development and implementation of the individual's rehabilitation program (IRP);

2) purposefulness (rehabilitation process must be designed to achieve short-term and long-term purposes);

3) timeliness (rehabilitation must be initiated during the acute phase or immediately after the rehabilitant's chronic condition has been stabilized);

4) consistency (each subsequent stage of rehabilitation process must be linked to previous stage);

5) continuity (rehabilitation process must take place continuously during all stages of rehabilitation);

6) functional orientation (rehabilitation must be designed to optimize functioning and quality of life in rehabilitants in interaction with their environment) [10].

The following principles can be added to those mentioned above:

7) multidisciplinarity (the involvement of professionals from different fields into the rehabilitation process);

8) comprehensiveness (relationships should be established among all parties involved in the rehabilitation system (ministries, territorial communities, public and charitable organizations, facilities providing rehabilitation services, etc.) to ensure a comprehensive and continuous rehabilitation process);

9) monitoring of rehabilitation progression.

Rehabilitation care should be provided in dedicated facilities/units/wards that have been authorized for providing rehabilitation care in the field of healthcare. These facilities include:

1) rehabilitation hospitals and rehabilitation centers that provide post-acute and long-term rehabilitation care;

2) outpatient rehabilitation facilities;

3) centers for psychological rehabilitation and/or trauma therapy;

4) prosthetic and orthopedic manufacturing facilities;

5) comprehensive rehabilitation facilities including medical-and-psychological rehabilitation facilities.

Rehabilitation units/wards include:

1) acute rehabilitation wards in various specialty hospitals and general intensive care hospitals of the healthcare system;

2) inpatient and outpatient units for post-acute and long-term rehabilitation care in various specialty hospitals of the healthcare system;

3) inpatient units for post-acute and long-term rehabilitation care in sanatorium-and-spa facilities [10].

A multidisciplinary approach to the rehabilitation for a rehabilitant is required. The approach must involve developing an IRP, determining rehabilitation potential, suggesting a prognosis for rehabilitation, and monitoring rehabilitation progress [14]. Seven overarching principles can be applied to any rehabilitation program: avoiding aggravation, timing, compliance, individualization, specific sequencing, intensity, and consideration of the total patient [15].

Rehabilitation process is conducted by rehabilitation specialists including:

1) physical medicine and rehabilitation physicians (physiatrists);

2) physical therapists;

3) ergotherapists;

4) speech and language therapists;

5) prosthetists/orthotists;

6) psychologists and psychotherapists;

7) rehabilitation nurses;

8) physical therapist's assistants and ergotherapist's assistants.

Rehabilitation specialists may work as members of an MRT or independently, and provide rehabilitation care according to the IRP [10, 16].

Rehabilitation for patients with ocular pathology

Eye health and function have a great impact on various aspects of life, health, sustainable development and economy. Access to quality eye care is, however, often unavailable or limited to many individuals, families and population groups, resulting in high rates of visual impairment and blindness [17].

In 2020, 1.1 billion people get distance visual impairment or uncorrected presbyopia worldwide, of whom 43 million were blind. By 2050, an estimated 1.8 billion people will suffer from vision loss due to refraction disorders, including 61 million people living with blindness. The most common causes of vision impairment in adults are uncorrected refractive error, cataract, glaucoma, age-related macular degeneration, diabetic retinopathy, corneal scarring, and trachoma [17, 18]. Traumatic eye injury is another common cause of blindness. Eye injuries constitute 10–15% of all ophthalmic diseases with a worldwide incidence of more than 55 million/year [19]. It was estimated that globally, a total of 1.6 million cases of blindness and 2.3 million cases of low vision and 19 million cases of monocular blindness per year can be attributed to eye injuries. In recent decades, there has been an increase in the incidence of eye injuries; this presents a challenge resulting in a significant burden for healthcare systems worldwide [20, 21]. Combat blast-induced injury to the eye is a common cause of irreversible visual loss, visual disability and blindness in military personnel and civil population [22].

Vision impairment reduces mobility, affects mental wellbeing, exacerbates risk of dementia, increases likelihood of falls and road traffic crashes, increases the need for social care, and ultimately leads to higher mortality rates. Conservative assessments based on the prevalence figures for 2020 suggest that annual global productivity loss from vision impairment is approximately US$410.7 billion purchasing power parity [17].

Object of vision rehabilitation

Rehabilitation has traditionally been a separate, second-stage process, carried out after medical treatment has no more to offer yet recovery remains incomplete. The stereotype of disability is a severe medical condition with objective evidence of disease and permanent physical or mental impairment (e.g. blindness, severe or progressive neurological disease, or amputation). The goal of the above approach to rehabilitation was to overcome, adapt or compensate for irremediable, permanent impairment [5]. However, rehabilitation of an individual with a profound of complete visual loss has a limited potential for recovery, and is aimed primarily at psychological counseling, orientation and mobility training, training in the use of special aids for orientation, communication and exchange of information for visually impaired people, learning Braille and evaluation and adaptation of the home and working environment.

Given that people get over 80 percent of information from their own eye and bionic eye technologies are at an early stage, an individual with a profound of complete visual loss becomes fully dependent from the assistance of others and society in general. Even early or moderate vision loss causes disability and can generate great anxiety and impact ADLs, safety and quality of life [23].

The major drawback of the view that rehabilitation is primarily for individuals with permanent and irremediable visual impairment or blindness is as follows: this view does not take into account a large category of patients whose visual function can be restored or improved (that is, those who primarily require rehabilitation). The WHO emphasize in their studies and initiatives that rehabilitation is not only for people with permanent physical or mental impairment, but should be used for those with an acute or chronic health condition, impairment or injury that limits functioning in order to prevent permanent disability [24]. This approach argues that, in fact, most sickness absence, long-term incapacity for work and premature retirement on medical grounds are now caused by "common health problems" that often consist primarily of symptoms with limited evidence of objective disease or impairment. Importantly, many of them are potentially remediable and long-term incapacity is not inevitable [5]. We believe this approach is comprehensive and relevant particularly to rehabilitation in the field of ophthalmology.

Therefore, the major objective should be to prevent loss of visual function through early and effective prophylactic, treatment and rehabilitation measures at all stages of eye care for a an individual with impaired vision.

A model of visual rehabilitation in the healthcare system

According to the preferred practice pattern of the American Academy of Ophthalmology, vision rehabilitation is part of the continuum of eye care that extends from promotion and prevention to diagnosis, treatment, and rehabilitation [23]. Rehabilitation services should be integrated into and between primary, secondary and tertiary levels of health systems [13]. The Lancet Global Health Commission believes that, to deliver comprehensive services including promotion, prevention, treatment, and rehabilitation, eye care needs to be included in national strategic health programs and development policies, health financing structures, and health workforce planning [17].

The work with an individual that needs vision rehabilitation begins with his/her admission to the hospital. Therapy and some form of rehabilitation ideally occur simultaneously. Traditional eye care treats the eye's anatomic abnormalities; low-vision rehabilitation addresses the consequences [25]. Rehabilitation process should be aimed primarily at utilizing the remaining vision to its fullest potential, and the involvement of other specialties will depend on the degree of actual improvement [25]. In 2022, the "International Vision Rehabilitation Standards" were adopted for three levels of the health care system with the involvement of specialists from other sectors, in the development of which the WHO team and the Italian National Centre of Services and Research for the Prevention of Blindness and Vision Rehabilitation of participated. A list of narrow specialists participating in the provision of rehabilitation services for visual impairments has been defined: ophthalmologists, optometrists, vision rehabilitation therapists, PVI rehabilitation specialists, orientation and mobility specialists, specialists in the formation of daily life skills, psychologists, other specialists are also involved depending on PVI age and functional condition (teachers, professional consultants, social workers) [24, 26, 27].

Depending on the rehabilitation needs, a patient with visual impairment may require either inpatient or outpatient rehabilitation. Rehabilitation units must be formed in hospitals to provide specialty rehabilitation care to PVIs [13, 28]. Rehabilitation services provided in such units must be aimed primarily at optimizing visual function and include the opportunity for the rehabilitant to improve his/her psychological and social functions. Multidisciplinary programs for rehabilitation for ophthalmological patients in in-patient units must be recommended during acute and post-acute phases and in the most severe cases. Outpatient rehabilitation care is to allow discharged patients with an incomplete recovery of vision to continue their rehabilitation.

Rehabilitation programs should not be limited in time, but the duration of rehabilitation treatment should be based on treatment response and the possibilities for further improvement, according to the best available evidence and the opinion of the rehabilitation team. At discharge, patients should be offered long-term follow-up services to ensure that the benefits achieved are maintained, to detect possible complications, and to assess possible changes in functional status that may lead the patient to need other treatment programmes [29].

A three-level model of vision rehabilitation has been proposed by the Vision Rehabilitation Committee of the American Academy of Ophthalmology. Level 1 is provided by all ophthalmologists; they recognize patients with impaired visual function and advice them that vision rehabilitation is an option for improving their capacity to continue performing their ADLs. Level 2 of vision rehabilitation service is provided by clinicians with interest and expertise in vision rehabilitation who provide assessment of low vision, recommendations for interventions, and referral to other services as indicated. Level 3 services are typically provided by a multidisciplinary team that may include a clinician (either an ophthalmologist or optometrist), an occupational therapist or other rehabilitation professionals, psychological support staff (e.g., social workers or psychologists), and specialists (e.g., orientation and mobility trainers) [23].

International vision rehabilitation standards also envisage a three-level structure for the vision rehabilitation system, with the provision of primary-, secondary- and tertiary-level services based on the individual needs of the reabilitant [26].

Ophthalmologist's role in vision rehabilitation

Because a comprehensive evaluation of the eye and vision is a major component of rehabilitation for PVIs [27], the ophthalmologist should be the initiator for the entire process and remain available for advice and leadership [30]. Given the specificity of the eye and visual functions and that today's rehabilitation specialists are not skilled in ophthalmology (and vice versa, ophthalmologists are not skilled in medical rehabilitation), it would be reasonable to increase the awareness of vision rehabilitation issues among ophthalmologists and rehabilitation specialists. As long as ophthalmological rehabilitation specialists are unavailable, the ophthalmologist- rehabilitationist tandem should take the responsibility for specialty rehabilitation care arrangements, with the ophthalmologist being the leader of the tandem.

Because patients vary in the rehabilitation needs, vision rehabilitation process should be individualized to meet each patient's specific needs, limitations and established goals. A problem that PVIs face while being treated at a medical facility and for some time thereafter is the lack of information about rehabilitation services available for them [28]. The leading role of the ophthalmologist in

vision rehabilitation process consists in (a) recognizing patients whose visual function has a potential for restoration/improvement and (b) responding by referring them for vision rehabilitation. Initial evaluation by the vision rehabilitation specialist is to be helpful for determining the level of care required and possible interventions depending not only on the patient's visual acuity, but also on his/her goals, visual function, psychosocial status and personal traits [23].

Rehabilitation for ophthalmological patients should be primarily aimed at assisting them in utilizing the remaining vision to its fullest potential. Other specialists (ergotherapists, orientation and mobility specialists, professional consultants, social workers, etc) should be involved in rehabilitation if this approach failed to enable patients to reclaim their ADLs and thereby their independence and optimized quality of life.

Low-vision rehabilitation specialists use the methods enabling the patient to adapt to new circumstances and develop a safe environment through the use of low-vision devices (LVD). They should aim to optimize patients' reading, ADLs, safety, participation in their community, and psychosocial well-being despite vision loss. Reading rehabilitation approaches include training patients to use LVD, training visual function and substitution with either audio or Braille reading. Keys to successful vision rehabilitation are the ability to empathize, communicate with sensitivity, and convey hope to patients with vision loss [23].

Problems related to a shortage of trained and capable vision rehabilitation workforce have been reviewed in the publication entitled "Rehabilitation of people with visual impairments: analysis of the situation" which was prepared within the project implemented by the United Nations Development Programme in Ukraine [24].

Postoperative rehabilitation of ophthalmological patients

Rehabilitation of patients after surgery for eye injury, eye tumor, retinal detachment, glaucoma, or corneal transplantation, should be an integral part of the surgical process for some groups of patients and in the focus of attention of ophthalmologists. Postoperative rehabilitation for ophthalmological patients aims to prevent complications and optimize functional capacity of the patient.

Given (1) the anatomical, physiological, and embryological similarities between the retina and the brain, in terms of cell types, vasculature, and immune responses, (2) features of visual system structure and (3) visual system involvement in brain lesions, it seems reasonable to consider the rehabilitation of visual function on the basis of current advances in neurorehabilitation. Thus, neurorehabilitation is part and parcel of neurological surgery, and is initially aimed at avoiding damage to or improving the status of the central nervous system and preventing secondary complications through adequate therapeutic measures [31]. Early postoperative rehabilitation is performed by an MRT that assists the patient in returning to normal activities. The rehabilitation procedures are started as soon as possible because the length of hospital stay is short and time to achieve the goal is limited. The content, intensity and frequency of the rehabilitation program are tailored to the individual patient's clinical needs. Patient and his relatives are also included in the rehabilitation team [32].

It seems reasonable to apply the major principles of neurorehabilitation to ophthalmological patients in the postoperative period. Rehabilitation may benefit some categories of patients not only after surgery, but even after therapeutic treatment, if visual function has not improved sufficiently with treatment. Special attention is required for patients with a single eye treated. Finally, the multidisciplinary principle encourages strengthening collaborations across different disciplines, including rehabilitation medicine, bioengineering, neuroscience, sports science, materials science, computer technology, artificial intelligence, and psychology [33].

Surgical rehabilitation for ophthalmological patients

The State Model Rehabilitation Program for Individuals Limited in Their Daily Living Activities has been approved by the Cabinet of Ministers of Ukraine. This document includes a core set of rehabilitation measures in the field of healthcare and should be utilized by the MRT when developing the IRP [34].

The issues and methods of rehabilitation care for ophthalmological patients, as well as the issue of prosthetics for this category of patients, have not been included or specified in the core set of rehabilitation measures in the field of healthcare. This make it possible to consider the issues of surgical methods for the restoration of vision as a component of medical ophthalmological rehabilitation before a core set of vision rehabilitation measures appears.

It is well known that eye injuries, eye burns and eye tumors are often accompanied by severe damage to the eye and it is not uncommon that visual function of the eye cannot be restored in these cases. This makes preprosthetic surgery and prosthetics especially important. Rehabilitating such patients requires a multidisciplinary approach involving the combined and timely efforts of an ophthalmologist, psychologist, a skilled maxillofacial prosthodontist and ocular prosthetist. Ocular prosthesis fitted over the phthisical globe and customized according to the patient's socket tissue bed and individualized aesthetic requirements is a highly positive, logical, noninvasive, and beneficial approach to improve the cosmetic appearance and psychological well-being of a patient with an eye injury [35].

Recently, there have been major breakthroughs in retinal prosthesis technology, with the creation of numerous types of implants, including epiretinal, subretinal, and suprachoroidal sensors. These devices can be implanted to partially restore vision, but their application requires surgical approaches. Therefore, in the near future, with the approval for use of electronic prosthesis and with the emergence of opportunities for wide application of electronic

prostheses for partial restoration of vision, this technology has the potential to break new ground in surgical rehabilitation [36].

Potential options for the surgical restoration of visual function following a globe injury or ocular burn need to be taken into account when developing the IRP. Surgical rehabilitation is especially important in patients with chemical burns that can cause devastating injuries to the anterior segment [37]. These patients require surgical treatments directed at ocular surface reconstruction and restoration of vision. Keratoprosthesis is an only option for the most severely damaged eyes in this category of patients [38].

Several additional reconstructive operations after initial restoration may be required for rehabilitation for the open-globe injury (OGI) patient [39-41]. Surgical rehabilitative process provides a functionally meaningful visual benefit in patients with a recent OGI [42]. The possible interventions may include vitrectomy, penetrating keratoplasty, iris reconstruction, glaucoma surgery, cataract surgery, and intraocular lens placement.

Assessing the efficacy of vision rehabilitation measures

Major vision rehabilitation measures include prescription of optical correction devices and training in their use; orientation and mobility training; development of visual perception and compensatory means of perception; learning Braille; provision of telerehabilitation services; organization of self-aid groups; training in the use of technical means of rehabilitation (spectacles, optical and electronic magnifying devices, vision to audition substitution devices, low-vision illumination aids and alerting indicators, and optical character recognition devices); household management training; evaluation and adaptation of the home and working environment; training in the use of rehabilitation aids; provision of social and educational services; use of leisure programs and wellness programs; psychological counseling; professional counseling; monitoring the use of rehabilitation services [24, 26]. Most of these vision rehabilitation measures, however, are more likely to be classified as measures of social rehabilitation or habilitation for persons with visual impairments.

Some measures enabling restoration of visual function following ocular trauma, surgery or disease require further discussion and assessment of their efficacy as measures of medical rehabilitation (pharmacological, physiotherapeutic, surgical (including prosthetics), immunological, massage, sanatorium, etc.) based on the results of clinical studies.

A number of studies have assessed the efficacy of some vision rehabilitation measures. A retrospective analysis of visual rehabilitation for patients with uveitis (choroiditis, retinitis, retinochoroiditis, and chronic panuveitis sequelae) suffering from poor vision with LVDs [43] demonstrated rehabilitation of uveitic patients with low vision is challenging. LVD may be a beneficial tool in these patients to help them perform their ADLs independently [43]. A multicenter randomized clinical trial (Low Vision Intervention Trial (LOVIT)) included 126 patients with macular diseases and a visual acuity in the better-seeing eye worse than 20/100 and better than 20/500. Interventions included low-vision examination, counseling, and prescription and provision of LVDs and 6 weekly sessions provided by a low-vision therapist to teach use of assistive devices and adaptive strategies to perform ADLs independently. The treatment group demonstrated significant improvement in all aspects of visual function compared with the control group. It was concluded that the program effectively provided low-vision rehabilitation for patients with macular diseases [44]. A Low Vision Intervention Trial II (LOVIT II) included 323 veterans with macular diseases and a best-corrected distance visual acuity (BCDVAbetter-eye) of 20/50 to 20/200. Using an intention-to-treat design, participants were randomized to receive LVDs with no therapy or LVDs with a rehabilitation therapist providing instruction and homework on the use of LVDs, eccentric viewing, and environmental modification. Both basic LVD alone and combined with low-vision rehabilitation were effective [45]. A study by Stroupe and colleagues [46] concluded that patients receiving low-vision (LV) rehabilitation had greater improvements in overall visual ability, reading ability, visual information processing, and visual motor skill scores. The mean total direct health care costs per patient were similar between patients who were randomized to receive basic LV services or LV rehabilitation. However, basic LV services required less time and had lower transportation costs [46].

Therefore, developing specialty rehabilitation care for PVIs and moving forward from empirical approaches to an era of evidence-based practice requires further research on the efficacy of methods and measures of medical vision rehabilitation. Traditional rehabilitation methods may have limited efficacy in PVIs. Progress in neurorehabilitation has been impressive over the years, but mainly in the last two decades. It follows the progress of clinical neurosciences in general, which is accelerated by several factors, technology being a major factor. Virtual reality, brain-computer interfaces, robotics, non-invasive brain stimulation (transcranial magnetic stimulation and transcranial direct current stimulation), invasive brain stimulation (deep brain stimulation, vagus nerve stimulation, peripheral nerve stimulation, surgical electrotherapy), prism-adaptation training and photobiomodulation are believed to be promising approaches in the field of neurorehabilitation [33, 47, 48].

Conclusion

The current approaches to rehabilitation for PVAs need to be revised to respond to today's challenges.

Organization of up-to-date process of rehabilitation in the field of healthcare requires forming specialty rehabilitation units for PVAs.

A comprehensive and continuous process of rehabilitation for PVAs should be achieved through the development

of a rehabilitation care system involving ministries, territorial communities, public and charitable organizations, and facilities providing various rehabilitation services (medical, peyschological, sanatorium-and-spa, social, vocational rehabilitation, etc.).

Rehabilitation is not only for people whose visual impairment is permanent and irremediable, but is primarily for those whose visual impairment is potentially remediable and in whom prolonged incapacity to work or disability may be postponed or prevented.

Increasing awareness of vision rehabilitation issues among ophthalmologists and rehabilitation specialists should be a strategic objective of the public healthcare system.

As long as ophthalmological rehabilitation specialists are unavailable, the ophthalmologist should function as the leader of the multidisciplinary team of professionals involved in the process of rehabilitation of PVIs.

Medical rehabilitation of vision should involve a wide range of evidence-based effective measures, including postoperative rehabilitation, surgical rehabilitation, prosthetics, etc.

Developing specialty rehabilitation care for PVIs and moving forward from empirical approaches to an era of evidence-based practice requires further research on the efficacy of methods and measures of medical vision rehabilitation.

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