

JUSTIFICATION INCLUSION OF PHYSIOTHERAPY AND SELF-REFLEXOTHERAPY PROGRAM PHYSICAL REHABILITATION OF ADOLESCENTS WITH SHORT-SIGHTEDNESS

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Annotation. *Purpose:* To substantiate the combined use of therapeutic exercises and Onnuri therapy to restore vision in teenagers with myopia. *Material:* analysis of more than 80 sources of literature on the subject to study the prevalence of myopia in adolescents and the impact of physical rehabilitation for restoration of view. *Results:* It was established that the increase in the prevalence of myopia in adolescents with greater visual load, requires the development of new approaches to rehabilitation. Data on the impact kinesotherapy and reflexology on the body. Presents the rationale of their use in rehabilitation, with the principles of conduct, with myopia. *Conclusions:* kinesis therapy, compliance with recommendations for the application of different directivity exercises limited power voltage, over- load of a physical and jumping, should be combined with the methods of self-reflection therapy (self-massage, application of seed, color effects) for more high effect of restoring vision.

Keywords: short-sightedness, myopia, rehabilitation, physical, exertion.

Introduction

In everyday life people fulfils numerous actions in educational, professional and social life and in leisure with the help of visual perception [44, 20]. Eyesight endures heavy loads, which were not envisaged by evolution, and modern level of educational loads does not correspond to functional abilities of child's organism [V.I. Serdiuchenko, 2002].

As per the data of World health protection organization, at present more than 160 million of people in the world have serious eyesight problems. Every forth of them lost eyesight in childhood [6; E.I. Saydasheva, 2010; 46].

But, unfortunately, restoration of eyesight is not always possible. That is why foundation of rehabilitation measures is an important element of eyesight problems' therapy.

In to-day's physical rehabilitation and ophthalmology the problem of eyesight restoration of teen ages, who have progressing myopia, is of great medical-biological, medical-social, psychological-pedagogic and social importance [8]. In this connection there appears a demand in conducting of further scientifically grounded works and rehabilitating measures with application of traditional and new rehabilitation means and methods [6; Ye.V. Shmaley, 2007]. For improvement of life quality, progress in education, prospects of career and social economic status it is necessary to rehabilitate weakened eyesight [25].

Purpose, tasks of the work, material and methods

The purpose of the work was foundation of therapeutic gymnastic and Onnury's therapy's combined application on the base of analysis of scientific-methodic and special literature for restoration of eyesight of teen-agers with myopia.

Material and methods of the research: theoretical analysis and generalization of more than 80 scientific-methodic and special literature sources, devoted to the studied problem.

Results of the research

Eye is the most developed and perfect organ of body. It has spherical shape. Not without reason it corresponds to the Sun. Two eyes, like two suns irradiate light of human soul. Eye balls have projections of all body and internal organs, including brains (the subject of iridology) and elements of human energy system [10].

Weakening of eyesight hinders cognition of world, restricts choice of profession and worsens life quality [13, 20; 26, 34].

Visual perception is negatively influenced by insufficiency of visual stimuli that can result in weakening of positive results of any everyday life actions. These actions include both skills of everyday behavior (for example: posture, gait [19], eating, bathing etc.) and skills in writing, reading at school [18], interaction with peers [41], as well as difficulties of communication and social functioning [24, 34, 35, 41].

Reina R et al., gave information that children with eyesight problems shall be paid more attention than healthy children, for creation of understanding and interaction with peers. After six - days' program children communicate more effectively than after one day program [41].

Not diagnosed worsening of eyesight can change motion and cognitive progressing of children with numerous health problems, limiting their access to information, to social interaction and visual control of limbs and body [42].

Development of skills with disorders of eyesight depends on children's age as well as on contribution of family and teachers in their development [20, 35].

Myopia is very rare in baby's age, but it constantly increases and covers approximately 20-25% of young full age people in Western countries and 80% of young full age people of South-Eastern Asia [28, 32, 37].

Significant part of school age children (50 %-60 %) suffer from low quick sightedness [36, 43], that results in reducing of activity of 9-16 years old teen-agers, both boys and girls [17, 38].

One of main reasons of eyesight worsening is myopia (form Greek *-Myo* – to peep and *-Opsi* – eyesight, vision). Myopia is a result of non-correspondence between axial length of eye and central part of its refracting elements, cornea and eye lens [32]. Progressing of myopia is connected not only with genetic bents but also with non-observance of hygienic regulations for works at close distance [V.I., Serdiuchenko, 2002].

Myopia is an important problem of public health protection for many industrial countries of the world. Abundance of myopia is increasing in the whole world. During recent three decades myopia level has increased by from 24% to 33% of total quantity of young people [O.B. Chendrova, 2007; 29] and up to 41% of total population [49]. Abundance of myopia of 19-years old men-recruits was 96.5% [47].

In other research it was noted that in the United States progressing of myopia was the quickest at 6-9 years old age. Myopia progressing of 6-11 years old girls is quicker than boys' [50]. Differences between indicators were partially related by the fact that girls spent more time for reading and work at close distance and relatively less time for being outdoors.

Myopia of school age children became more abundant in Asian countries, among populations of Japan, Hong Kong, Singapore and was from 71% to 96% of natural persons' quantity [O.B. Chentsova, 2007; 29]. According to recent reviews, continental China has one of the highest morbidity with myopia – 78.4% - of people of 5-15 years old age [22, 30]. By the data of other authors myopia of schoolchildren varies from 2,3% to 16,2 %, and more – up to до 31 %. This percentage is even higher among HEEs students [T.A. Zipunnikova, I.A. Biriukova, 2004; 6; 40].

The works of a number of authors witness that portion of children with myopia is increasing with level of their education [29, 39, 51].

There are works, which inform that progressing of myopia correlated with starting of puberty period (between 8.9 and 11.2 years old age) [23, 25, 27] and with age of peak growth of body, both of boys and girls [25].

Progressing of the disease happens when regulations of visual loads and hygienic conditions are not observed, when there are no therapeutic measures for myopia disorders. All these result in complications, in irreversible changes of visual analyzer and loss of eyesight, in decreasing of mental and physical workability, appearing of sense of inferiority as well as disablement [Ye.I. Saydasheva, 2010; 6; 28]. Many kinds of activity, including practicing of some kinds of sports, are restricted [48], because they can lead to traumatism [37], owing to insufficient accuracy of movements [48].

According to data of Brazil coaches of para-Olympic swimmers, having visual problems, during 5 competitions there were 1.5 traumas of every of swimmer [37].

In researches of H.et Myrowitz O.D. [25] it was elucidated that for 8-15 years old children reduction of myopia level for the period of research was connected with duration of period of their being outdoors. Much time, spent in the open air, is, partially, protective factor against myopia.

Analysis of scientific methodic literature, devoted to restoration of eyesight with myopia, showed that there exists quiet insufficient quantity of works about organization of assistance for children with myopia in the process of their education at comprehensive schools, during working day, when load on eyesight is the highest [O.B. Chentsova, 2005; 4, 16, 18]. In existing literature there was presented a system of schoolchildren's and organized groups' of children with poor eyesight physical education. Also there were given some ways of prophylaxis and correction of visual disorders under condition of observance of hygienic regulations. According to literature data the reasons of myopia have not been studied completely yet. Some risk factors of visual disorders have been studied more profoundly.

Hereditary factors cause weakening of sclera, number of defects in synthesis of collagen, dysplasia of connective tissue, deficit of microelements Zn, Mn, Cu, Cr and other, which are required for building of sclera [2, 4]. Deficit of blood circulation of eye's internal envelopes, insufficiency of central and orbital blood circulation, systemic hyper tension promote progressing of myopia [Ye. N. Iomdina, 2000; G.I. Dolzhych, 2008; A.V. Solodnikov, 2011].

Overstraining of eyes results from durable and intensive visual loads at close distance, poor illumination of working place, wrong posture when reading or writing, excessive work with computer, wrong correction, using of incorrectly chosen glasses of absence of correction with first signs of myopia [8; A.S. Skuratovich, 2009].

In case of stabilized myopia of moderate and low degree they carry out optimal correction for distant and close vision (glasses, contact lenses) and medical treatment, oriented on restoration of all structures of eye and muscles, with participate in fixation of image on retina.

Restoration measures for myopia envisage solution of the following tasks:

- Restoration of visual functions;
- Promotion of correct functioning of visual organs;
- Develop activity of children's eye muscles, mobility of eye ball;
- Perfection of visual analyzer; способствовать профилактике возможных осложнений;
- Formation of motion skills and abilities;
- Development of cognitive functions, correction of emotional states, control over negative emotions, stabilization of general and mental state of a teen ager;

- Qualitative improvement of children-parents interaction, increase parents' interest in system of children's physical education for formation of healthy life style [G.D. Zhaboyedov, 2002; V.G. Kovylyna, 2008; 2; 12; 13].

For creation of teen-agers' motivation for active participation in physical rehabilitation process, appropriate mood and conscious attitude to trainings, for observing of main didactic principles of physical education in practicing of therapeutic gymnastics it is necessary to conduct psycho-therapeutic talks [L.A. Yermakova, 2007; Ye.V. Bismak, 2007].

Leading place among means of teen-agers' with myopia physical rehabilitation, for training of adaptation reserves, is allotted to therapeutic gymnastics (TG), including general, special, breathing, yoga and other exercises [1, 2; 15, Gopinathan G., 2012]. For prevention from progressing of myopia, a number of orthopedic exercises was offered for improvement of ciliary muscle's functional state [15].

Muscular functioning stimulates metabolism oxidation-restoration and regenerative processes in organism [L.I. Ivanova, 2009]. Exercises for eyes are more effective than treatment with placebo. However, owing to absence of accessible scientific researches, which would determine quantity of eye exercises, their application still has been remaining arguable [33]. We also have not found researches, which would show that exercises of visual therapy could prevent from myopia progressing [Kazumi Kawahira et al., 2005; 33].

Restoration effect of physical exercises is reflected in stimulation of intensity of biological processes and organism's protective abilities, in activation of its functions, acceleration of development and perfection of compensation mechanisms, improvement of metabolism and regenerative processes, restoration of motion functions, including eye muscles' functioning, strengthening of sclera, reducing of after-effects of motion deficit, increasing of organism's workability and strength [2, 5, 6, 31]. In the process of movement special exercises facilitate generation of pro-prio-receptive impulses, which go to higher sectors of nervous system and vegetative centers, reconstructing their functional state, promoting of improvement of trophism of organs and tissues, connected with them by mechanism of motor visceral reflexes. Complexes of special exercises are oriented on normalization of adaptation, convergence and divergence reserves [I.A. Akhmadulina, 2009].

Special exercises can include exercises with rotational movements of eyes [10]. Such complex is called twist of therapy gymnastics. Eye balls can twist in eight directions with closed and open eyes. These eight directions make four axes. Twist with open eyes is combination of eyes' twist with their active visual function.

General approach, which is used in eyes treatment, includes main treatment methods: eye balls' twist, twist of eyelids, twist of eyebrows, twist of jaws and twist of neck.

Fulfillment of twisting causes of patient's state of emotional and physical comfort, helps to accept the offered medical effect with readiness, guarantees stability of results, fixes the achieved effect of treatment [N.V. Borisova, 2003; L.V. Gospodarova, 2003].

Eye balls' twisting promotes preservation of good eyesight, prevents from its weakening and from eye diseases. Eye twisting can cure some eye diseases [10].

Muscles' motion functioning renders decisive influence on formation of brains, psycho-physical, sensor and mental abilities of a child. Especially important role is played by development of fine motor system of a hand (finger gymnastics) because hand is to the highest extent represented in cortex and is in close connection and functional unity with speech, visual and coordination centers [M.M. Koltsova, 1973].

Alternation of different physical exercises facilitates restoration of normal mobility of nervous processes, involves in response all kinks of nervous system, causing neurohumoral character of functions' regulation in organism's responses that is very important with myopia.

Physical exercises can be used in independent morning exercises, in therapeutic gymnastics (eye gymnastics); physical culture's break in the process of work or learning; in self massage; in organism's hardening. [2; 6; T.A. Zippunnikova, I.A. Biriukova, 2004;]. Physical culture, outdoor games, sports shall take important place in prophylaxis measures, oriented on prevention from myopia and its progressing, because physical exercises facilitate both general strengthening of organism, activation of its functions and increasing of eye muscles' workability, strengthening of sclera [2, 6].

When fulfilling physical exercises, for children with myopia it is necessary to exclude heavy physical loads, sharp movements, jumps, lifting of weight [I.A. Akhmadulina, 2009].

In opinion of a number of authors application of physical exercises in complex physical rehabilitation can be successfully combined with medical therapy and different physical methods [M. Makhov, 2010; E.I. Saydasheva, 2010], massage, psycho-correction and other rehabilitating means and methods [Ye,V, Bismak, 2007; L.A. Yerakova, 2005; L.O. Tovchenko, 2007; U. Ostermayer-Sitkovsky, 2010; S.I. Statyev, 2010].

Degree of myopia manifests in presence of different by level disorders in connective, muscular and nervous tissues of eye and vessels. Disorders can be both functional and organic. For elimination of functional disorders reflex therapy methods can be included in physical rehabilitation program [14, 15]. Reflex therapy is a medical –prophylaxis system, based on evaluation of parameters of periphery reflexogenic zones and influencing on them for regulating of organism's functional systems [4]. Reflex therapy can include all kinds of reflexogenic actions: somatic-sensor, visual, hearing and other and, therefore, medical methods as well, which are based on stimulation of appropriate receptors, including light and color-therapy, acu-pressure, musical therapy, aroma therapy and etc. [4].

In literature there are some data about restoration of eyesight with acquired myopia by methods of corporal and auriculo-corporal acupuncture [2; 16; 45; 51; A.S. Skuratovich, 2009; S.V. Shmaley, 2007; Caceres V., 2008], with application of micro-puncture system of hands and soles (Su Joke therapy) [3; 9; 11; 12; 15; 19; F.B. Agayev, 2010; S.A. Obrubov, 2005; M.V. Kuznetsova, 2007], electric puncture, laser puncture [1; A.S., Strogal, 2003; M.V. Kuznetsova, 2007]. Specifying of appropriate part of body for micro-puncture system is carried out on the base of somatic topically organized diagram of body and internal organs [2; 3]. Estimation of zones' state permits to carry out diagnostic and treatment procedures both by reflex and rehabilitation specialists and by patients themselves [L.Ye. Gospodarova, 2003; 4].

As per theory and laws of Sy Joke (Onnury's) therapy, every organ of human body is represented in zones of correspondence, which are located in other parts of body and on hands and soles. Change of electric, magnetic properties of organ results in disorders of interaction in zones of correspondence and facilitates formation of painful points. With disorders of organs' functions, it is possible to restore electric interactions in appropriate reflexogenic zone and, consequently, in organ, with which this zone is connected, by influencing on zones with different methods [4].

Restoration of energetic properties of reflexogenic zones can be conducted with the help of application of plants' seeds, fixing them by plaster. It is also possible to fulfill point massage by fixed seeds. In our case, zones, corresponding to eyes are used [11].

In some cases, color painting of reflex zones is used for the same purpose [9].

Some authors dealt with development of rehabilitation program with optimal schema of needle therapy's application, oriented on improvement of visual analyzer's functional state, correction of clinical-functional indicators, reduction of asthenopic symptoms and on secondary symptoms of myopia [1; 11; 12; 14; S.S. Strogal, 2003].

Independent usage of point massage by patients, of magnetic properties of fingers, application of plants' seeds and color were determined as effective methods for self reflex therapy [3, 11]. Chinese schoolchildren compulsory practice traditional self massage of acupuncture points around eyes twice a day in order to reduce eyes' tiredness and prevent from myopia [36].

Methods of reflex therapy are universal by their influence on functional activity of all organism systems. RT regulates functional state of central nervous system, increases excitability of nervous centers, improves conducting of nervous impulses by periphery nerves. With purely local irritation of skin-nervous, muscular-sinew-nervous and vascular-nervous receptors in certain points of body we receive logical responsive, segment-organ and general responsive. System of biologically active points manifests pain-killing, anti-inflammation, myo-relaxing, lymph-draining, trophic, re-constructive, tonic and sedative effects [1; 9; 15; M.V. Kuznetsova, 2005; V.V. Neroyev, 2006]; it regulates homeostasis and adaptation level of organism [4]. However, at present, potentials of needle therapy has not been studied yet in the aspect of improvement of visual analyzer's functional state in complex treatment of progressing myopia of different degrees, as a method, facilitating elimination of asthenotopy, normalizing blood circulation in eye ball that prevents from eye myopia and from development of eye's dystrophic changes [1; M.V. Kuznetsova, 2005; F.B. Agayev, 2010].

For confirmation of effectiveness of rehabilitation with the help of reflex therapy of teen-agers with myopia complex examination implies application of classic ophthalmologic methods with optimal correction and without it, determination of dynamic and static refraction, tone of adaptation, reserve of relative adaptation's positive portion, adaptation reserve [S.A. Obrubov, 2005; O.V. Arutiunova, 2007].

In our opinion, considering influences on teen-ager's with myopia visual organs and organism, it is necessary to use:

- Direct communication with child in the process of studying and using of psycho-therapy methods in form of talks for creation of steady motivation for rehabilitation;
- Individual training of special exercises;
- General and special physical exercises, breathing exercises and other, which shall be fulfilled at classes as individual and group trainings;
- Individual teaching to methods of self reflex therapy;
- Methods of self reflex therapy: point self massage, application of plants' seeds, color therapy, twist gymnastic;
- Twist gymnastic for eye muscles in combination with exercises for fingers' and hands' muscles, alternated by breathing exercises.

In the base of patient's participation in rehabilitation process there is training of physical exercises and methods of self reflex therapy, which, in this connection, are not only medical but also pedagogic processes [12, 13].

After familiarizing of patients with micro-puncture systems of hands' and soles' correspondence, training of methods of influencing on zones of problematic organs in these systems, certain training on mastering of point massage methodic, application of plants' seeds and color therapy it is possible to use the above listed Su Joke methods for self reflex therapy [9, 10, 11].

The described influences of physical exercises on organism can be supplemented by methods of reflex therapy, intensifying their general influence on organism and, in particular, on functional state of eyesight organs.

Propaganda of healthy life style among children of school age and intensification of recreational functioning can help to prevent from appearance and progressing of myopia [46].

Analysis of scientific methodic literature, devoted to studying of rehabilitation measures' influence with myopia, showed that combined application of therapeutic gymnastics and reflex therapy results in significant

improvement of teen-agers' physical condition and increasing of their functional abilities [G.D. Zhaboyedov, 2002;V.G. Kovylna, 2008].

Conclusions:

Theoretical analysis of special scientific methodic literature permitted to make the following conclusions:

1. Increasing of myopia prevalence among children of school age against the background of risk factors' rising, which is connected with intensification of visual load during studying at school, requires development of new approaches to rehabilitation measures' realization.
2. Method of kinetic-therapy, with application of different by orientation exercises and twist gymnastics for eye muscles shall be applied for teen-agers with myopia, but with compulsory observance of recommendations for their using, with restricting of significant power strains, excessive physical loads and jumps.
3. Application of reflex therapy methods during rehabilitation of teen-agers with myopia is justified by positive effect, received after rehabilitation course.
4. Complex regulated application of therapeutic gymnastic and self reflex therapy methods (point massage, application of plants seeds, color therapy), in our opinion will ensure higher effect of rehabilitation measures.
5. The course of physical rehabilitation with application of kinetic therapy and self reflex therapy shall gradually go into long term rehabilitation process with creating of maximal motivation of its necessity for improvement of life quality in the future.

Foundation and development of physical rehabilitation program for patients of different age groups with different degrees of myopia with the help of kinetic therapy, reflex and self reflex therapy is, in our opinion rather promising direction.

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Cite this article as: Redkovets T.G., Romman Haytham J.M. Justification inclusion of physiotherapy and self-reflexotherapy program physical rehabilitation of adolescents with short-sightedness. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2014, vol.2, pp. 53-60. doi:10.6084/m9.figshare.923515

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Received: 23.12.2013
Published: 28.12.2013