

## **Summary**

The objective of this study was to assess the effect of visual and physical exercises based on the Self –Healing Method on the visual acuity of students. Thirty-five students from the first to the fifth grade participated, with the preventative purpose of acquiring healthy habits involving vision, body, and breathing. The results reinforce the importance of the evaluation and visual therapy associated with the neuropsychomotor development, facilitating learning and socialization of the student.

Descriptors: 1. Visual Acuity. 2. Self-Healing Method. 3. Student well-being.

## **Introduction**

The assessment of visual acuity in students and the completion of vision exercises is mostly preventative so that children do not develop bad vision habits as they begin academic life.

Good vision is essential for learning and is responsible for the majority of external sensory information that we receive from the external environment. The integrity of this method of perception is indispensable in the learning of a child. Upon entering school, children undergo an intense amount of intellectual and social activities, which are directly associated with motor and visual skills. Considering the importance of vision in the education and socialization of children, actions that promote health and health education assume decisive importance.

According to Meir Schneider, many visual problems result from straining to see, read, and write, a bad habit acquired in the first years of school as students try to please parents and teachers. This tension can be alleviated with relaxation techniques as well as physical and visual exercises, leading to improved visual acuity, and learning that will last a lifetime.

The Self-Healing Method works the body and vision by incorporating bodily consciousness, breathing, integrated movement, stretching, facial and body massaging, visualization, and exercises specifically for the eyes. The method exhibits the potential humans possess to self heal and strengthens the body-mind connection via exercises aimed at vision and the entire body. Complete development of neuromuscular skills depends on the organization of the senses throughout the central nervous system, which creates the base for the potential development of skills, behaviors and learning. The neuromuscular skills develop as children attempt new movements or sensory experiences for their gratification.

Learning involves neurobiological integrity and the presence of social facilitation.

Multidisciplinary and interdisciplinary teams only experience success when they act together in conjunction with the family and the student in order to optimize results and focus on improving learning performance.

One learns through cognition, but one also undoubtedly learns through emotion as well. The challenge is to unite coherent content, desires, curiosities and enthusiasm to create fulfilling learning.

We were motivated to develop this study by the need to assess the visual acuity of students, after performing the body and eye exercises under the direction of physical therapists.

## Methodological Procedures

This is a transversal study. The data came from a private school for primary and secondary education in the city of Sorocaba, Brazil. The institution was chosen because the therapists had the support and access to materials needed to develop the study. The study took place over a 3-month period and the study group consisted of 35 students in the first to fifth grades along with 2 teachers. The study was developed in 4 phases.

In the first phase, the proposal of the study regarding the students' vision was presented to the school directors and then later to the teachers and parents of the students in grades 1-5 in order to gain their approval.

In the second phase, the students underwent the initial evaluation of visual acuity (Annex 1). The following aspects of visual acuity were assessed and recorded: far and near, ocular dominance, peripheral vision, ocular convergence and binocular fusion.

In order to assess visual acuity, students were asked to look at a Snellen Chart from a distance of 6 meters. First, both eyes were tested together; then each eye was tested individually while the other eye was covered. One student needed to be tested from a distance of a meter and a half. A chart with letters in different positions (Photo 1) was used for a student who still did not know the alphabet, so Table 1 consists of 33 students.

Photo 1 – The letter E

For the evaluation of visual acuity from close-up, we used a Self Healing Method table consisting of large and small letters (Photo 2), ranging from type 16 to type 2 font sizes. In this test the student held the paper 30 centimeters from his/her face and read with both eyes open. The student then read with each eye individually while the other eye was covered.

In the ocular dominance test, students were asked to make a triangle with their hands while keeping their elbows slightly bent and focus on an object in the center of the triangle. Students' eyes were alternatively covered and they were asked to identify with which eye the object in the triangle appeared more focused.

To confirm the test, we asked the students to focus on an object through a plastic cone and bring the cone closer to their eyes, while maintaining the object focused. This exercise was implemented, because typically the participant unintentionally holds the cone up to the dominant eye. In the evaluation of ocular dominance 25 out of 35 students demonstrated right eye dominance (71.43 %) and 10 children (28.57%) left eye dominance.

In the peripheral vision test, students held an object (toothpick with a colored circle glued at the tip) in each hand, starting with their arms extended in front of them and then moving each arm one at a time outward, creating a 90° angle.

In the ocular convergence test, students fixed their gaze on their fingers at a distance of 30cm from the face and continued doing that while bringing their fingers toward the tip of the nose. We noted if the participants managed to converge their eyes and if heterophoria occurred.

The fusion test was conducted in two parts: one with paper and one with beads. The student was asked to hold a sheet of paper (Photo 3) approximately 30cm from the face, by placing the

forefinger between the two columns of the sheet. The participants then needed to stare at the finger and state if they saw one or two columns on the paper. The fusion test with beads (Photo 4) was carried out two times, each time asking students to hold a string at the tip of the nose, focus on the requested bead, and observe what happened to the two other beads.

In the third phase of the study, each grade of students took part in a 30-minute exercise session on a weekly basis. The exercises were carried out with the presence and participation of the responsible teacher, who was encouraged to continue the exercises on a daily basis. A spreadsheet of activities was prepared, in accordance with the weekly sequence of exercises to facilitate taking attendance and documenting the activities conducted throughout the study period (Annex 2). Teachers were trained in how to conduct the activities with the students and the school supplied the material that was tailor-made under the guidance of physiotherapists for the students and teachers. An individual material kit was prepared for each student.

In the fourth phase, the final evaluation of the visual acuity of the students (Annex 1) was conducted. A presentation of the results along with photos from the study was made to the board, teachers, and parents. The participants in this study were volunteers. After reading and signing the free and informed consent form, 33 parents authorized the utilization of student photos and the publication of results in academic and scientific media.

### **Results and Discussion**

Visual acuity is the ability of the eyes to distinguish, discriminate and perceive shapes along with the contours and the spatial details of objects. Central visual acuity is comprised of the vision of shapes and the vision of colors, regulated by the photosensitive cells located in the retina (cones). (6) The Snellen table is the most commonly used method to detect deficiencies in central visual acuity.

Of the 35 students evaluated, only 3 used glasses. In these 3 cases, the evaluation of visual acuity from far and near was performed with and without glasses.

As seen in Table 1, an improvement varying from one to four lines occurred in both eyes. Each line corresponds to an improvement of 11.1% in the reading of the Snellen chart, in that 13 students (39.4 %) improved one line, 17 students (51.5 %) maintained and 3 children (9.1 %) showed improvements varying from two to four rows.

In relation to the right eye, 13 students (39.4 %) showed improvement in reading a line, 12 students (36.4%) maintained and 7 students (21.2%) improved in reading two to three lines. Only one student (3%) regressed one line.

In relation to the left eye, 12 students (36.4%) improved one line, 12 students (36.4%) maintained and 7 students (21.2%) improved from two to four lines, while 2 children (6%) regressed two lines.

The Zamberlam Studies (7) confirm the data presented in this study: they found that about 7-25% of pre-school age children have some kind of visual disturbance which can cause irreparable damage, learning disabilities, or limit intellectual, psychological, and social development.

Table 1: Distribution of visual acuity from afar using the Snellen table after reassessment of students

Visual Acuity from far		
Both Eyes	Right eye	Left Eye
13 students improved 1 line	13 students improved 1 line	12 students improved 1 line
1 student improved 2 lines	5 students improved 2 lines	4 students improved 2 lines
1 student improved 3 lines	2 students improved 3 lines	2 students improved 3 lines
1 student improved 4 lines	12 students maintained	1 student improved 4 lines
17 students maintained	1 student regressed one line	12 students maintained
2 students didn't improve	2 students didn't improve	2 regressed one line
		2 students didn't improve

Table 2 reveals that most students could read letters of type 2 through type 12 fonts. The most significant difference was in the reading of the type 4 and type 2 fonts. 16 students (48.5%) were able to read type 4 in the initial reading while 24 students (72.72%) were able to read type 4 in the final reading. 2 children (6%) were able to read type 2 in the initial reading while 4 children (12%) were able to read type 2 in the final reading.

In the study of the Self-Healing Method eight font sizes were utilized: 2, 4, 6, 8, 10, 12, 14 and 16. Each change of font from higher to lower corresponds to a 12.5% improvement in the reading of the chart, i.e., the data showed that overall the students' rate of improvement almost doubled when it came to reading the table close-up. All students were able to read the letters in type 14 and type 16 fonts.

Table 2: Distribution of Visual Acuity from close-up after the 2012 reassessment of the students, using the table of the Self-healing method with large and small letters, ranging from type 16 to type 2 fonts.

Initial Assessment	Final Assessment
2 students managed to read 12 size font	1 student managed to read 12 size font
1 student managed to read 8 size font	No student managed to read 8 size font
14 students managed to read 6 size font	6 students managed to read 6 size font
16 students managed to read 4 size font	24 students managed to read 4 size font
2 students managed to read 2 size font	4 students managed to read 2 size font

In relation to ocular dominance the eye position is independent of lateral movement. Whenever a person is straining, he is using one of his eyes more than the other. The exercise of covering the dominant eye can make a big difference helping to integrate the center and the periphery. This exercise creates equality in the brain, which fends off stress generated by the underutilization of the weaker eye and the overuse of the stronger eye. Furthermore, the exercise develops the crystalline lens and also benefits the central vision allowing the strong eye to rest and the weak crystalline lens to work, strengthening the nerve impulses and the muscles of this eye. This study emphasized the importance of binocular equilibrium & visual motor co-ordination through having students complete visually stimulating psychomotor activities such as hopscotch, the balloon game, 2 square, and bubble bursting, while wearing special glasses that covered the dominant eye.

In relation to the initial evaluation of peripheral vision, 18 out of 35 students (51.4 %) achieved an angle of 90 ° and 17 students (48.6 %) did not; however, in the final evaluation of the peripheral vision, 33 out of 35 students (94.2 %) achieved an angle of 90 ° and 2 children (5.8% ) did not. This improvement was significant due to the importance of peripheral vision in relation to spatial orientation, balance, coordination, locomotion, individual security in the sense of reacting to lateral stimuli, and achieving relaxation of central vision.

The data presented corroborate Meir thought that urban life causes atrophy in the perception of peripheral vision: when we spend a great deal of time focusing on what is in front of us, we tend to ignore our peripheral field. When we strain our central vision, it reduces in clarity, and with time, we lose it. In the long term, we lose the connection between the brain, the optic nerve and the rod cells on the outer edge of the retina. Coupled with genetic tendencies, this chain of events may be the cause of glaucoma. Instead of the brain forcing the eye to remain still and see a picture, stimulating peripheral vision will make the eye work in a smooth manner and make it easier to see our surroundings as a whole. To activate peripheral vision, exercises must block the central vision and stimulate peripheral vision with movement of hands, objects and lights.

The body uses different sources such as exteroceptors, which situate us to our environment (touch, sight, hearing); proprioceptors, which orient the different parts of our body in relation to the whole in a set position in space; and the higher centers, which integrate the strategic selectors, the cognitive processes, and treat the data pulled from the two preceding sources. Innumerable studies in neuroscience irrefutably demonstrate the role of the eye as captor of the postural system. The eye is at the same time an endoceptor and an exteroceptor of the tonic postural system. The exteroception is essentially the dependence on the rod cells in the peripheral vision. The proprioception is linked to extra-ocular muscular activity and to the oculocephalogyric routes that run from the muscles of the neck and shoulders to the eyes.

Table 3, verifies that out of the 35 students, 29 students (82.5%) converged their eyes, and only 6 students (17.5%) demonstrated convergence insufficiency. The convergence test is important in order to detect disturbances of convergence in pre-school, thus preventing visual alterations like squinting. We believe that the performance of exercises of the extraocular muscles can balance the inadequacies of convergence.

Binocular vision is responsible for the perception of distances, depth perception and seeing objects as three-dimensional. Investigating the prevalence of causes leading to visual dysfunction permits better planning of preventive ophthalmologic programs. This assertion was reinforced in the study of Temporini, which demonstrates that the early identification of eye problems in a child, such as the errors of refraction and squinting, contributes to the prevention of permanent damage to binocular vision.

Convergence can be defined as the disposition of lines that are driven to the same point, which means that in convergence insufficiency both eyes would have difficulty in monitoring a nearby object directing itself to the tip of one's nose, in that one or both eyes may deviate in the opposite direction when trying to focus on the object.

People with convergence insufficiency tend to have complaints of tired eyes after extended readings or long periods of working at the computer; they may experience blurred vision, struggle to stay focused on lines of text when reading and feel like their eyes are burning, especially towards the end of the day.

Convergence insufficiency and heterophoria are the causes of 82% of migraines, headaches and functional dizziness. People with such ocular disequilibrium may exhibit physical signs like altered posture, especially of the head and shoulders, columns with adaptive scoliosis, and malocclusion such as cross bite and loss of upper and lower teeth contact. In many cases speech defects (difficulty in articulating words), dysorthographia (difficulty learning and developing the skill of expressive written language) and dyslexia

(difficulty in learning reading and writing) may appear together or separately as a consequence of convergence insufficiency.

Convergence insufficiency never corrects itself; rather it causes a new integration of body schema that will work with the insufficiency and the postural disequilibrium that accompanies it. If convergence insufficiency is left untreated, the individual may spend the rest of his life with postural disequilibrium. Having great vision does not rule out, in any form, a possible diagnosis of convergence insufficiency or heterophoria. We stimulate the ocular exteroception and postural tonic through body movements, equilibrium and motor co-ordination.

We can treat convergence insufficiency through movements of all the ocular muscles, in a targeted manner, with eyes open and closed for different directions and senses.

Table 3: Final Distribution of Visual Convergence

Year	Converged	Didn't converge	Students that had insufficient convergence
1st	7	1	1 student with right eye
2 <sup>nd</sup>	5	2	1 student with right prosthesis and 1 student with the left eye
3rd	8	1	1 student with the left eye
4th	5	2	1 student with the right eye and 1 student with the left eye
5th	4	0	

Table 4 depicts the results of the fusion paper and bead tests. 29 out of 35 students (82.8%) reported fusion of the columns on the paper in the initial test while 6 students (17.2%) did not. In the final evaluation, 32 out of 35 students (91.4%) reported fusion while 3 students (8.6%) did not.

In the initial evaluation of fusion with beads, 24 out of 35 students (68.6%) reported the fusion while 11 students (31.4%) did not. In the final evaluation, 32 out of 35 (91.4%) students reported the fusion while only 3 (8.6%) did not.

Overall, the group demonstrated an improvement of 8.6% in the final fusion test with paper and an improvement of 22.8% in the final test with beads. This result reinforces the importance of fusion exercises with beads in the rehabilitation of visual acuity.

The completion of fusion exercises was relevant for the development of binocular vision, benefitting the equilibrium of ocular muscles.

Bricot highlights that among the diseases that arise with postural tonic disequilibrium stemming from ocular input, we have refractive errors, in respect to sensory exteroception of the eye, and convergence insufficiency and heterophoria (squinting), which concern extraocular muscle proprioception. While the refractive errors (myopia, astigmatism and hypermetropia) are, in most cases, discovered and corrected, the same does not happen with the secondary conditions (convergence insufficiency and heterophorias), which are rarely even diagnosed. It is absolutely necessary then that schools organize early screenings for these conditions.

Table 4: Distribution of the positive results of the students on the fusion tests with paper and with beads.

Year	Paper fusion		Bead fusion	
	Initial	Final	Initial	Final
1 <sup>st</sup>	6	7	4	7
2 <sup>nd</sup>	5	5	5	5
3 <sup>rd</sup>	9	9	6	9
4 <sup>th</sup>	6	7	5	7
5 <sup>th</sup>	3	4	4	4
T	29	32	24	32

Before reaching school age, most of the visual difficulties of an impaired child may go unnoticed by the family, due to lack of information and/or absence of signs or complaints. Upon entering school, however, ocular disturbances manifest themselves, pre-existing or not, evidenced based on the visual effort needed to achieve the teaching-learning process. The visual problems affect school performance and the socialization of the child, requiring early intervention for identification and treatment.

It is known that starting school comes with many expectations; children begin to compose a new social environment, as well as participate in many experiences for the first time. (14) When performing new movements, the pre-motor cortex of the brain is activated with the cerebellum, parietal cortex, and the prefrontal cortex. In other words, the exercise will be surprising the brain with this new information.

When learning, a child demonstrates concentration and attention, both important and fundamental aspects for cognitive and motor development to take place, but learning depends on

other factors as well: stimulus, interest, and proper functionality of the structures that will receive such stimuli and especially the attention of this child. The cerebellum is vital for voluntary shift of attention between the auditory and visual stimuli. The role of the cerebellum in these shifts of attention is considered important in communication and social situations; therefore, in addition to its role in the control and motor planning, the cerebellum contributes to the voluntary deviations of attention.

We believe that visual capacity developed early in life may present reversible alterations and in most cases, it can be corrected with adequate therapy and stimuli that integrate psychomotor skills, vision, mind and body.

The Self-Healing Method works the body and vision seamlessly with body awareness, breathing, joint mobilization, muscular stretching, visual and body massage, visualization and eye specific exercises. The method believes in the self-healing potential of every human being and deepens the mind-body connection. It helps people to fix and maintain their vision as a way to increase the duration and quality of their life.

### **Conclusion**

We realized during this study that both the students and the teachers were cooperative and interested, not only during the process of assessment and reassessment, but also during the visual and bodily activities that were offered. The result of the reassessments was amazing, since we have no parameters with similar studies.

The relevant results observed during the three months of our study were:

- In visual acuity, there was an improvement of 39.4 % in both eyes in reading a line on the Snellen chart from afar.
- In close visual acuity, using the table of large and small letters from the Self Healing method, the most significant improvement observed was 24.2 % in reading letters of type 4 Font.
- In relation to the final evaluation of peripheral vision, there was an improvement of 42.8 % of students who achieved the angle of 90°.

In the positive results of fusion tests with paper there was an improvement of 8.6 %, and on the fusion test with beads, an improvement of 22.8 %.

We stress the need to explore the performance of visual therapy in connection with the health of students, and that visual therapy is a preventative procedure that stimulates the global development of a student, affecting socialization and the education of a student.

### **Bibliographic references**

1. GRANZOTO, Jose Aparecido et al. Evaluation of visual acuity in 1<sup>st</sup> grade students of fundamental education. Arq. Bras. Oftalmol., Sao Paulo, v. 66, n. 2, p. 167-171,2003. Available in: <<http://www.scielo.br/pdf/abo/v66n2/15468.pdf>>. Accessed on: 26 Mar 2013.
2. SCHNEIDER, M. The self-healing manual: self-healing method. 3. ed. Sao Paulo: Triom, 2003.
- 3 SOUZA, Telma de Araujo; SOUZA, Estevam of Vivian; LOPES, Marcia Caires Bestilleiro; Kitadai, Silvia Prado Smit. Description of psychomotor development and vision of children with visual impairment. Arq Bras. I. Ophthalmology, Sac Paulo, v.. 73, n. 6, p. 526-530.2010. Available in: <<http://www.scielo.br/pdf/abo/v73n6/v73n6a12.pdf>>. Accessed on: March 26

, 2013.

4 FONSECA, V. Cognition, Neuropsychology and learning: neuropsychologic and psychopedagogic approach. Petrópolis: Voices, 2007.

5. RELVAS, Marta Pires. Neuroscience and education, genres and potential in the classroom. 2. Ed. Rio de Janeiro, WAK, 2010.

6. BRAZILIAN COUNCIL OF OPHTHALMOLOGY. National Campaign of Visual Rehabilitation (SP): See well Program Brazil: a guidance manual. Sao paulo; 1999.

7. ZAMBERLAN, FRRS Ocular health of students from 5<sup>th</sup> to 8<sup>th</sup> grade of fundamental teaching of a school on the outskirts of Avare-SP- Brazil. Rev. Bras. OFTAL., Rio de Janeiro, vol. 61, n. 1, p. 50-53, 2002.

8. BRICOT, Bernard. Posturology clinic. Sao paulo: CIES Brazil 2010

9. Estacia, Paul et al. Prevalence of refractive errors in school children of the first grade of elementary school in northeastern Rio Grande do Sui. Rev. Bras. Ophthalmol., Rio de Janeiro, vol. 66, n. 5, p. . 297-303, 2007 Available in: <<http://www.scielo.br/pdf/rbof/v66n5/a02v66n5.pdf>>. Accessed on: March 26 , 2013.

10. BRICOT, Bernard. Global Postural reprogramming. Montpellier Sauramps Medical, 1996.

11. Armond, Jane Eston; TEMPORINI, Edmea Rita; ALVES, Milton Ruiz. Promotion of ocular health in school: perceptions of teachers about refraction errors. *Arq Bras. Ophthalmol.*, Sao Paulo, vol. 64, n. 5, p. 395-400, 2001. Available at: <<http://www.scielo.br/pdf/abo/v64n5/8356.pdf>>. Accessed on: 26 March 2013.
12. TEMPORINI, ER Prevention of visual problems in schoolchildren: conduct of teachers of the school system of the State of Sao Paulo, Brazil system. *Rev. Bras. Saíide Esc, Campinas*, v. 1, n. 3/4, p. 68-75, July / out. 1990.
13. BRAZILIAN COUNCIL OF OPHTHALMOLOGY. Brazil: a guidance manual. Sao paulo; 1999.
- 14 CHAVES, N. The health of your eyes: light, darkness and movement. Rio de Janeiro. Imago, 2002. National Campaign of Visual Rehabilitation (SP):
15. GARVES, Wilson Cezar. Exercise of walking backwards: a practice of the Self-Healing Method of Meir Schneider from the standpoint of biomechanics and neuroscience. 2006. Monograph (Specialization in Physiology, Biomechanics, Trauma and Rehabilitation of Exercise and Sports) - University of Sao Paulo, Sao Paulo, 2006
16. EKMAN, Laurie Lundy. Neuroscience: Fundamentals for Rehabilitation. Rio de Janeiro: Guanabara Koogan 2000
17. SCHNEIDER M. visual health for a lifetime. Sac Paulo: CuItrix. 2012

Appendix 1 - Initial and Final Visual Assessment

Name: Age: Date: // Date of birth: //

Series: Professor: Visual Evaluation Standing:  
visual acuity from up close without correction

AO: vision line

OD: vision line

OE: vision line

Peripheral Vision: OD:  90 °  less than 90 °

OE:  90 °  less than 90 °

Ocular Convergence:  OD  OE  normal

Fusion:

Paper:  yes  No

Beads:  yes  no

observations reported on the child:

## Annex 2 Monthly worksheet for teachers

### Exercises

Dates performed

Sunning 3X / palming 3X

Normal Sky and head movement up and down

Orientation to sit properly

abdominal breathing in seated and standing position

3 types of exercises to activate peripheral circulation

Looking far and details

Balance while Standing with the head down

Normal Swing, diagonally, up and down

stimulation of peripheral vision with hands

stimulation of peripheral vision with Melissa involving marching forward, back and to the side and hug

Both hands small circumduction, medium and large (with or without buffer)

Place one foot forward, lateral and rotation int. and ext. with knee flexed or extended

Exercises with the balloon game, covering the dominant eye

Exercise playing team ball, capping the dominant eye

Exercise with 1 ball in pairs, capping dominant eye

Exercise with 1 ball in pairs, covering dominant eye

Exercise of hopscotch, covering dominant eye

Exercise of moving extrinsic muscles up, down, and lateral circles on both sides; Seated, Standing

Abdominal Centering with the Indian dance (with or without Melissa)

Rotation of head, mouth opening, and rubbing their hands

Massage tennis ball, thigh and hip rotation in 2 directions and toward the knees (with or without tennis ball )

Circles with the head on both sides incorporating abdominal breathing

Tennis ball massage on the feet, and with the body against the wall

facial massage and scalp and facial mimicry

Blinking rapidly, alternately, butterfly

tactile perception of eyelashes and eyelids

Exercise of convergence with the index finger, fusion exercise with paper and beads

Palming while inhaling 4 times and exhaling 6 times