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Home vision therapy for children

Abstract

Home Vision Therapy for Children is intended to provide a course of activities for the child with the parent as the "therapist" or monitor. Brief explanations of certain conditions affecting youngsters are provided to hopefully give the parent a better understanding of their child's visual problems. Pacific University College of Optometry's Vision Therapy Service has hundreds of activities for many different visual impairments. My goal is to provide a condensed section of activities more specific to children who are below kindergarten age or ability. This will provide Pacific interns an opportunity to more efficiently choose and organize appropriate activities for their patients. Home Vision Therapy for Children is at this point oriented towards amblyopia and anti-suppression. There is a need for additional areas to be addressed such as ocular motility and convergence activities.

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**HOME VISION THERAPY
FOR CHILDREN**

By

JAMES A. MOORE

A thesis submitted to the faculty of the
College of Optometry
Pacific University
Forest Grove, Oregon
for the degree of
Doctor of Optometry
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BIOGRAPHY

James A. Moore refers to South Dakota as his home, although while growing up as an "Army brat," he resided in many different states and traveled throughout the world. James first attended North Texas State University's College of Music. Following his short-lived musical fame, he resided in northern Minnesota where he joined the Army National Guard as a medic. This opened his eyes to the possibility of a health professions career and provided a means of financing education. James returned to school at Black Hills State University in Spearfish, South Dakota. He entered Pacific University's College of Optometry in the fall of 1994. James has a B.S. in Visual Science from Pacific University and will receive his Doctor of Optometry degree in May of 1998. James will practice in either Colorado or Montana where he hopes to specialize in ocular disease.

ABSTRACT

Home Vision Therapy for Children is intended to provide a course of activities for the child with the parent as the "therapist" or monitor. Brief explanations of certain conditions affecting youngsters are provided to hopefully give the parent a better understanding of their child's visual problems.

Pacific University College of Optometry's Vision Therapy Service has hundreds of activities for many different visual impairments. My goal is to provide a condensed section of activities more specific to children who are below kindergarten age or ability. This will provide Pacific interns an opportunity to more efficiently choose and organize appropriate activities for their patients.

Home Vision Therapy for Children is at this point oriented towards amblyopia and anti-suppression. There is a need for additional areas to be addressed such as ocular motility and convergence activities.

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VISION THERAPY FOR CHILDREN

AMBLYOPIA

Amblyopia is defined as the condition of reduced visual acuity that is not correctable with either glasses, contact lenses, or refractive surgery. The word *amblyopia* literally means "dullness of vision" and is sometimes called "lazy eye."

The development of equal vision in both eyes is necessary. When one eye develops good vision while the other does not, the eye with the poorer vision is called amblyopic. Usually, only one eye is affected by amblyopia.

The reduced acuity is caused by an interference in normal vision development. The brain does not learn to interpret a clear image. Amblyopia can be caused by many different situations: an eye turn, uncorrected high nearsightedness or farsightedness, or a disease that interrupts visual stimulation and prevents normal development of that eye.

STRABISMUS

Strabismus is a condition when the eyes are crossed, turned out, or otherwise misaligned. Strabismus is more commonly known as "crossed eyes" or "wandering eye." One eye may turn up or down, in or out, or may wander in several directions. Either eye may be involved or the strabismus may alternate between the two eyes. Strabismus may not be present at all times, but can present when a person is ill, tired, or intensely concentrating on objects.

When one eye is not pointing in the same direction as the other, a person will see double. This is normal and it encourages the brain to keep the eyes straight and well aligned so only one image is seen. If a child (or adult) is unable to keep both eyes aligned, the brain will often suppress or ignore the information from the wandering eye to prevent double vision. If suppression occurs in a child, normal visual development may not occur and the eye can become amblyopic.

Occlusion (Patching) Therapy

Occlusion therapy is utilized in the treatment of amblyopia and by covering or patching the stronger eye and forcing the weaker eye to be used by the child. This is an effective treatment used widely for amblyopia. Incorporating training designed by your eye doctor along with normal day-to-day activities during periods of occlusion should enhance your child's visual abilities.

Antisuppression Techniques for Amblyopia Therapy

When a child has amblyopia or strabismus, there is a tendency to shut one eye off. This is called suppression. Patching forces one eye to be used and makes it stronger. Once visual function has improved in that eye, the next step is to let information into the other eye.

Biocular refers to using both eyes at the same time but not necessarily together. The goal in biocular training is to prevent suppression, making sure both eyes stay turned on at all times.

The next step in antisuppression therapy is binocular training. Binocular vision implies using both eyes at the same time *and* using them together. Binocular vision is necessary for good depth perception (seeing things in three dimensions).

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ACTIVITIES FOR THE INFANT AMBLYOPE

Purpose: To assist in establishing a match between visual and kinesthetic direction while performing amblyopia training.

Methods: **While wearing a patch over the 'good' eye, have infant:**

1. Pursue a moving object.
2. Pay attention to parent's faces or soft, noise-making toys.
3. Play with a cradle gym.
4. Swipe at small toys.
5. Search visually for sounds.
6. Stack or play with blocks of different sizes and shapes.
7. Play with jack-in-the-box toys and stuffed toys.
8. Look at their own image in a mirror.
9. Play peek-a-boo games.
10. Play with a flashlight or bright objects.
11. Play catch with a ball or bean bags.

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PAPER/PENCIL ACTIVITIES FOR AMBLYOPIA

- Purpose:** To assist in establishing a match between visual and kinesthetic direction and position in space while performing amblyopia training.
- Apparatus:** Paper, pencil, newspaper and patch for preferred (good) eye.
- Method:**
1. **Dot the dot** - home assistant (parent or sibling) makes a number of dots on the paper. The patient is to bring his/her own pencil down from several inches in an effort to land directly on the dot in one continuous movement. Start with dots large enough for the child to see and reduce the size as performance improves. Repeat with each hand.
 2. **Scrub the line** - home assistant makes a series of zig-zag and curved lines on the paper. The patient is to scrub the line, keeping the pencil point oscillating rapidly and equally across the line. Repeat with each hand.
 3. **Follow the path** - home assistant draws two nearly parallel lines, zig-zagging across the paper. The lines should be made to come even closer to each other as they go. The patient is to draw his/her pencil between the two lines without touching either one, as far as possible. Repeat with each hand.
 4. **Dot the center of O's** in the newspaper.
 5. **Trace a picture** using tracing paper placed over the picture to be traced.

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SHOELACE SEWING

- Purpose:** To assist in establishing a match between visual and kinesthetic direction and position in space while performing amblyopia training.
- Apparatus:** Paper, pencil, shoelace, pictures from a coloring book and patch for preferred (good) eye.
- Method:**
1. Home assistant (parent or sibling) punches small holes in a piece of paper. Using a shoelace, the patient threads it through the holes.
 2. Designs may be punched in the paper to make this task more interesting. Different colored shoelaces may also be used.
 3. Home assistant cuts pictures from a coloring book. Using the shoelaces, have the patient sew along the design.
 4. Mazes may also be used. Have the patient attempt to sew their way through the maze using the shoelace.

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STRINGING BEADS AND CHEERIOS

- Purpose:** To develop fine motor control, dexterity, and visual motor integration while performing amblyopia training.
- Apparatus:** Thirty 1/2" round beads, flat box to serve as a work tray, storage container, string or lacing material, Cheerios, and a patch for the preferred eye.
- Method:**
1. Put a knot in the string. This end is to remain in the container to prevent dropped or lost beads.
 2. All thirty beads are strung as quickly as possible. This is a warm-up procedure and should not be timed. Return the beads to the container.
 3. String the beads rapidly for 30 seconds. Record the number of beads strung. Decrease the time allowed if the child is able to complete the task in less than 30 seconds.
 4. Practice stringing all 30 beads until increased speed and dexterity are noted. Do not time these practice trials.
 5. Repeat the timing procedure and compare with earlier results. Encourage individual improvement.
 6. With increased skill, change hands so that the opposite hand is used to pick up the beads and put them on the string.
 7. For variety, string the Cheerios instead of the beads, or try to alternate between the beads and Cheerios.

*** This activity is not recommended for children under 3 years of age.**

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LIMA BEAN AMBLYOPIA THERAPY FOR HOME

PURPOSE:

To aid in the development of eye-hand coordination and fine motor control, and to provide visual stimulation to reduce the magnitude of amblyopia.

APPARATUS:

Lima Beans, cup with various sized openings, and a patch for the preferred (good) eye.

METHOD:

1. This activity may be done with the patient sitting on the floor or at a desk or table.
2. If fine motor control and eye-hand coordination are poor, the patient may begin by picking up the lima beans, one at a time, between his thumb and index finger and drop them into a large mouthed cup from a close distance.
3. In the early stages of therapy, the patient may be permitted to place the bean directly over the cup and then raise his hand 5-6 inches above it before dropping the bean. As skill develops, this step is eliminated, the distance above the cup from which the bean is dropped increased, and the cup opening is decreased.
4. If various size cup openings are not available, a large mouth cup may be modified by cutting various sized apertures from cardboard and placing them over the cup opening.
5. When proficiency has been obtained using the fingers, the activity is repeated using a spoon to pick up and drop the beans into the cup.
6. A percentage score may be obtained by dividing the total number of beans attempted into the number of beans in the cup multiplied by 100. This data may also be graphed to observe progress.
7. Another method used to follow performance is to set a time limit and record the number of beans dropped in the cup during that time. This data may also be graphed to observe progress.

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RICE & TWEEZERS

- Purpose:** To aid in the development of eye-hand coordination and provide visual stimulation to reduce the magnitude of amblyopia.
- Apparatus:** Rice, tweezers, vials with various size openings, patch for the preferred eye and a towel.
- Method:**
1. Have the patient sit on the floor or at a desk or table. If the activity is done at a table or desk, or if the floor is tile or wood, a towel should be placed under the vial to prevent the misdirected rice from bouncing and scattering.
 2. If the eye-hand coordination is poor, the patient may begin by picking up the rice one at a time between his/her thumb and index finger and dropping them into a large mouthed vial from a close distance.
 3. In the beginning stages the patient may be permitted to place the rice directly over the vial opening and then raise his/her hand 4-5 inches above it before releasing the rice. As performance improves, this step is eliminated, the distance above the vial from which the rice is dropped is increased, and the vial opening is decreased.
 4. If various size vials are not available, a large mouthed vial may be modified by cutting various size apertures from cardboard and placing them over the bottle opening.
 5. When proficiency has been obtained using the fingers, the activity is repeated using tweezers to pick up and drop the rice into the vial.
 6. Record the number of rice in the vial over the total number attempted multiplied by 100 to arrive at a percent score, which may then be graphed to observe progress.
 7. A time limit may be used and a record kept in graph form displaying the number of rice dropped in the vial in the given time period.

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**MODIFIED BROCK POSTURE BOARD
FOR ANTI-SUPPRESSION TRAINING**

- Purpose:** To monitor suppression while training binocularity and improving motor development.
- Apparatus:** Red acetate sheet (8x10), white blank paper (8x10), penlight, orange felt tip pen, red/green glasses
- Method:**
1. Draw (or have the child draw) pictures or objects with the orange felt tip pen on the white sheet of paper; specific objects such as a house with a roof, window and doorknob are best.
 2. Make a “sandwich” such that the white paper with the orange picture is on the top, the red acetate sheet is in the middle, and the penlight is underneath. When the penlight is held “flush” against the red sheet, it will shine onto the white paper as a small red light.
 3. Put on the red/green glasses (over your “regular” glasses if you wear glasses). The small red light is seen by the eye looking through the red lens and the orange picture is seen by the light looking through the green lens.
 4. Play “hide and seek” or a similar game, challenging yourself (or the child) to see if you can find the location of the red light in the orange picture.
- Goals:**
1. To keep both eyes turned on together.

Hint: If “red eye” has trouble seeing the red light, keep flashing the light on and off. If “green eye” has trouble seeing the picture, briefly cover the “red eye”.
 2. To see the red light in the location where it “really” is.

Hint: If you are shining the light in the window, but the child reports it to be in the doorknob, lift up on the red/green glasses, have them acknowledge that it really is in the window, and ask them to put the glasses back on while trying to maintain it in the window.

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**MAZES, HIDDEN PICTURES, AND DOT-TO-DOT
ANTI-SUPPRESSION TRAINING FOR CHILDREN**

- Purpose:** To monitor suppression while training binocularity.
- Apparatus:** Red and green acetate sheets (8x10), red/green glasses, dry erase marker, various mazes, hidden picture puzzles, and/or dot-to-dot activities.
- Method:**
1. Have the child put on the red/green glasses, with the red over the eye that has a tendency to suppress. If the child already wears glasses, put the red/green over the top of theirs. The child should be seated at a table or desk and have good lighting provided.
 2. Begin with any of the three activities. Whichever one chosen, place the red acetate over the sheet containing the activity of interest.
 3. Make sure the child can see the activity of interest such as the dot-to-dot under the acetate. Have the child start to connect the dots. Using a dry erase marker allows the acetate sheets to be used repeatedly.
- Goals:**
1. To keep both eyes turned on together. Only one side of the activity showing indicates that the child has suppressed one of their eyes. If they cannot see the side with the red acetate filter, then they are suppressing the eye which has the red filter over it, and vice versa.
 2. To develop ocular function while performing activities that are fun and interesting for the child.

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BLACK FELT BLANKET GAMES

- Purpose:** To assist in training antisuppression and amblyopia.
- Apparatus:** Red/green anaglyphic glasses, large section of black felt, objects that are red such as a light, ball, candies, etc...
- Method:**
1. Have the child wear the red/green glasses. If the child is wearing glasses already it may be necessary to tape the filters over the child's lenses. Place the red filter over the amblyopic eye or the eye that suppresses
 2. Red objects must be used so they cannot be seen with the green filter and only the eye wearing the red filter will be able to see them.
 3. When selecting an object for the first time, look through the green filter to make sure that it cancels the image out.
 4. Have the child roll a red ball, chase a red flashlight beam, pick up red candies or toys, etc...
 5. Remember to keep the activity fun and exciting. Use caution not to use items that the child will choke on.

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**TELEVISION TRAINER
ANTI-SUPPRESSION TRAINING FOR CHILDREN**

- Purpose: To monitor suppression while training binocularity.
- Apparatus: Red and green acetate sheets (8x10), red/green glasses, and a TV.
- Method:
1. Have the child put on the red/green glasses. If the child already wears glasses, put the red/green over the top of their glasses or you can tape the filters to the lenses.
 2. Tape the sheets of red and green acetate to the front of the TV screen. Have the red on one side of the screen and the green covering the other side of the screen.
 3. Have the child watch the television from an appropriate distance; not too close. Have the child let you know if they ever see only one side of the television screen.
- Goals:
1. To keep both eyes turned on together. Only one side of the TV screen showing indicates that the child has suppressed one of their eyes. If they cannot see the side with the red acetate filter, then they are suppressing the eye which has the red filter placed over it, and vice versa.
 2. To provide the child with a training activity which is fun. This activity could also be performed while the child is playing on a computer or video games.