

## HOME VISUAL TRAINING SUGGESTIONS

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In the course of rendering modern visual care it is most necessary to give some type of visual training to a large percentage of patients in order to achieve a reasonable improvement in visual efficiency. There are a great many of these patients who should have training in the office with instruments designed primarily for that purpose, however many patients can not come to the office at regular intervals, three times a week, without inconvenience, or they feel that they can not afford it. Due to this unfortunate circumstance there are many patients who can only do home training, but this helps greatly if done regularly.

In all cases it is a primary concern to improve basic visual skills so there will be no antagonisms present to retard action of the extrinsic muscles under skeletal neural control, or hesitance in accommodative facility under visceral neural control, and both systems must synchronize with each other.

To improve the skeletal functions it is necessary to learn proper control of the muscles by practicing the use of them. This is easily done by a variety of pursuit and fixation movements of the eyes. In all cases it is best to improve these functions monocularly first, then binocular training is taken only after the monocular functions have greatly improved. This monocular work is done with both eyes open but one eye occluded either with a plastic occluder clipped over one lens of the patients glasses or with a deep cup patch occluder tied around the head that will allow free movement of the covered eye. Head is held straight forward and only the eyes are moved. Some examples of pursuit training are listed below.

1. Follow with the uncovered eye the eraser of a pencil moved slowly in a large circular direction by some other person.

2. Place a small fixation target at one end of a yard stick, bright colored paper glued to the stick, so that it protrudes above the edge of the stick about 1/4 inch like a gun sight. The stick is held by the patient so that the plain end

is steady against his cheek below the eye being trained and the stick is moved so that the fixation target rotates in a large circle and the patient looks down the edge of the stick following the target.

3. Cut out a cardboard circle about 2 feet in diameter and punch a large nail, 60 penny common, through the center of it, but leave the hole small enough so the nail head will not come through the cardboard. Place a large thread spool on the nail, or similar pulley wheel with a small center hole just slightly larger than the nail. Attach a long heavy string to the cardboard circle close to the peripheral and wrap the string around the spool or pulley. Then if the nail is held in one hand and the string pulled with the other hand, it makes the circle go around. The patient stands in front of the circle on the nailhead side and follows a bright colored fixation target on the peripheral edge of the circle while some other person at home pulls the string to move the rotating device.

4. A 2 or 3 inch diameter solid sponge rubber ball with a string punched through it can be suspended by the string from overhead. The ball should hang 2 or 3 feet above the floor and the patient can lay on the floor on his back directly under the ball and follow the ball as it swings in a circular movement.

5. The patient follows the chalk as he draws a large circle on a chalkboard over and over in the same circle.

Give 50 to 75 rotations clockwise and the same number counter clockwise in any above procedure.

*Some examples of fixation movements are as follows:*

1. Some person holds two different colored pencils in front of the patient about 20 to 24 inches apart and 18 to 20 inches from the patients eye, and calls out the colors to patient at about 1 second intervals, for example red - green - red - green, etc. The pencils are held first to give horizontal fixation on the 180 line, then vertical on the 90 line, then the two diagonals on each side of the first directions.

2. On a large cardboard circle 20 to 24 inches in diameter, place numbers around the periphery in such a position that two numbers are un the 180 line, two numbers on the 90 line, and two for each of the two diagonal directions. Someone then calls the numbers out to the patient and he looks from one number to the other as they are called to him. This is done with the circle of numbers directly in front of the patient about 20 to 24 inches from his eyes.

3. The patient stands at one end of a fairly large room and some other person calls out different objects in the room to him, such as chair, clock, lamp, vase, etc. The patient looks from one object to the other for 3 to 5 minutes with each eye. This brings in the size and distance factor as well as learning sacaddic movements.

4. A dot is placed on a chalkboard by someone and the patient is instructed to place his chalk upon this dot. The other person then places another dot on the board in any position and the patient is instructed to connect the dots with a line. He is now instructed to hold his chalk on the second dot so he will be ready to move immediately to the third dot which will next be put on the board. This can continue until the board is full of dots and lines in every conceivable direction.

Of equal importance besides rotations and fixations is accommodative ability both as to amount of it and speed and flexibility of function. Some examples of home training for these is as follows,

1. Have a printer to print some letter or number charts on plain white paper 9 x 11 inches so that there are one line each of 20/100 and 20/60 size letters, and at least two lines each of 20/40, 20/30, and 20/20 letters. Keep a supply of these in your office and give one to each patient you desire to have this training. With one eye occluded have the patient look at one word of small print in a book or paper and pull the print as close to his eye as he can to barely make out each letter in the word, then look at one letter or number on the smallest line he can make out on the distance chart you have furnished him, placed approximately 20 feet away. The patient reads the book or paper in this manner, one word at near and one letter at distance, etc., going over and over the letters on the distance chart while he continues through the subject matter at the near point. It is necessary to hesitate slightly at both distances to begin with in order to give the eyes time for maximum response, and sometimes it is necessary for the patient to blink his eyes to achieve satisfactory clarity at one point or another, but as the ability improves the print can be held closer to the eye and patient can change focus faster from near to far etc. Have the patient read 10 to 15 minutes with each eye in this manner.

2. This procedure requires the same set up as described in No 1. above, except that the patient holds a large table spoon or any long handle occluder in one hand and the small print in his other hand. Instead of doing the accommodative work with one eye constantly occluded, he alternates the occlusion so that he reads a word of print with one eye and a letter on the distant chart with the other eye, alternating eyes each time he changes from near to far etc. Do this so that each eye will have 10 to 15 minutes work at both distance and near.

3. Provide yourself with several all metal, large eye size, frames and have your optical laboratory put flat lenses in each of these frames so that you have a +.50 sphere in one eye and -.50 sphere in the other eye of one frame, and do the same thing with other frames to give you + and -1.00, + and -1.50, + and -2.00, & + and -2.50. Then attach a wood handle about 10 inches long

**X R V F Z Q E**

**W N Y E D R S**

**W N K R N S G O**

**V S L M W K B C E**

**A Y Y C D E T F R**

**W Y Q R A T B N**

**W A Z C D S E F V**

**Q U E J Z Y N A C L M O N**

to each frame at or across the bridge so the handle is in the same plane as the lenses and at a right angle to a line between the center of the two lenses. With one eye occluded the patient holds small print at his usual reading distance or placed on a table, and with one hand holds a pair of the + and — glasses by the handle. He reads one line of print looking through the + lens, then turns the handle and reads the next line looking through the — lens, etc. Start with a weak set of lenses and progress to the stronger ones as the patients ability improves. These + and — glasses are loaned to the patient one pair at a time and exchanged for a stronger pair as he progresses. Read 10 to 15 minutes with each eye.

Every patient who needs visual training for improvement of ductions, accommodative functions, suppression of vision, amblyopia of any type, strabismus, or other problem, needs to have work in the above mentioned functions of monocular pursuit, monocular fixations and monocular accommodative rock. Each eye individually must perform its functions better before the two eyes can work together as a team with maximum efficiency. There are a few exceptions to this rule but they are unusual and I will not discuss them here. After the monocular functions are greatly improved, then all of the training procedures can be done binocularly, however as the monocular work improves, in most cases the binocular skills automatically improve simultaneously.

There are some patients who should have additional specific training directed at one particular aspect of their problem. This is given as an additional procedure at first with the basic work, and later done by itself to strengthen the weak abilities. A few examples of specific training are as follows.

1. For cases of suppression with amblyopia, or any case with uncorrectable poor vision, either monocular or binocular, and having no apparent pathological reason, this procedure will help many times. The patient places on the wall a letter chart, described in N<sup>o</sup> 1 of accommodative rock examples, in a completely dark room. He positions a light in such a way as to be close to the chart and shaded so that the light is directed on the chart but does not shine in the patient's face who is standing in front of the chart and as far away as he can to just be able to see some of the letters in the lines of larger size. The light wire is plugged into a 25¢ christmas tree light winker which is then plugged into the electrical outlet. These little light winkers are not designed for long or heavy duty use and the speed of the flash is not regulated precisely, but after the winker warms up in 10 to 15 seconds with a 60 to 100 watt light bulb, most of the winkers give about 1 to 2 seconds of light and 3/4 to 1 second of dark. The patient stares at the chart while the light goes on and off, trying to see the letters progressively better and gradually move farther from the chart and try to read smaller and smaller letters. This can be done with a reduced snellen chart at near also.



2. For any case that is suppressing, either monocular or alternating, or circumstance where patient needs work to improve simultaneous vision, this procedure helps. Have the patient stand in a corner of a room about 2 feet from each wall and face one of the walls. He then places a small bright colored picture at eye level on the wall not being faced and out from the corner as far as he is standing. Patient then holds a small round mirror 4 or 6 inches in diameter or oval shaped 3 x 5 against his upper cheek and on the same side of his nose as the small picture is on and as close to the nose as possible. The mirror is held at an angle so that the patient sees the picture in the mirror with the eye on that side and sees the design of the wall straight in front of him with the other eye. When the mirror is slowly angled back and forth the patient will see the picture move back and forth across the wall in front of him as long as he has simultaneous vision. If a large piece of paper with a different color and design from the wall with the picture on it is placed on the wall that the patient is facing and at eye level, this is helpful too. Due to the different images seen with each eye this stimulates simultaneous vision and if a suppression occurs, blinking by the patient helps to restore and maintain vision in both eyes. Watching the picture move back and forth also gives pursuit training. Patient should work a while with this set up, then reverse the set up so he faces the other wall and watches the picture with the eye that did see the wall in front of him.

3. Another procedure to help build simultaneous vision is done with bright red and green cellophane. The patient wears red and green anaglyphs, which are glasses with a red lens in one eye and a green lens in the other, or if he normally wears an Rx, then place a transparent red plastic clip over on his glasses before one eye and a green clip over before the other eye. Then a large piece of cardboard is secured and a hole is cut in it the same size and shape as the patient's television picture. The patient is also provided with some red cellophane and some green cellophane. This cellophane is attached to the cardboard covering the hole so that half of the hole is red and the other half is green. The cardboard is then hung over the front of the television set with string so that the hole is directly in front of the picture. The patient now watches the television picture and if he has simultaneous vision he will see the entire picture, however if the suppresses vision in one eye he will only see half of the picture and the other half will be solid black. This is accomplished by virtue of the green clip over before one eye will completely black out the half picture covered with red cellophane and the red clip over blacks out the green side of the picture. Be sure the cellophane is dark enough to black out the television picture completely when viewed through the clip overs or anaglyphs. Sometimes it is necessary to use a double thickness of cellophane over one side or the other of the picture to completely neutralize the color in the clip overs. These clip overs and cellophane are furnished to the

patient by the doctor. I use a dark red and dark green Sylvania Cellophane manufactured by Metal Goods Corporation in St. Louis 15, Missouri, U. S. A. and red and green clip overs manufactured by Watchemoket Optical Company in Providence Rhode Island, U. S. A. who also make opaque clip over occluders used often in monocular training. Substitute colored clip overs can be made by cutting a hole in an opaque clip over and attaching red cellophane over the hole of one occluder and another one has green cellophane. The patient sits at a close distance to the television picture and gradually moves away, maintaining the entire picture visible which gives simultaneous vision, or he starts at a great distance and gradually moves closer, depending on the visual problem and the coordination mechanism of the two eyes. If a suppression occurs, then the patient blinks his eyes to help overcome this or if that does not help then he occludes the non suppressing eye momentarily to force the other eye to see and in this way try to trick the suppressing eye into seeing all the time. The red and green clip overs are alternated in front of the eyes every 5 to 15 minutes to give further stimulation and prevent color fatigue. This same procedure can be used at the near point with the red and green cellophane being placed over a page of print in a book or paper instead of the television picture and a strong light is directed on the book or paper while the patient reads.

4. A method of giving fusion training is to have the patient hold a bright colored pencil or stick directly in front of his nose and while looking at the pencil be sure to see only one pencil and be conscious of seeing two distant targets 10 to 20 feet away. Then look at the distant target and be sure of seeing only one while maintaining consciousness of two pencils at the near point. The distant target can be any relatively small object of contrasting color to the background. The pencil must be held so the end of the patients nose, the pencil, and the distant target are all in a straight line. The pencil is held as close to the patients nose as he can maintain fusion when looking at it, whether the distance is at arms length or 2 inches from the nose, and as he looks back and forth from the pencil to the distant target, etc., trying to move the pencil gradually closer to the nose or farther away from the nose depending on the starting point of the pencil. Patient should gradually build up to where he can do 150 round trips at any position of the pencil. It is necessary for patient to always be sure there are two of the objects not being looked at to insure that simultaneous vision is present while doing this work. This procedure is called physiological diplopia training.

5. Another method of giving convergent fusion training is with a fusion card. This fusion card is a piece of good grade white cardboard  $2\frac{1}{2} \times 5\frac{1}{2}$  inches with 3 blue dots on one side of it and 3 red dots placed exactly opposite to the blue ones on the other side of the card. There should be a large red and large blue

round dot 20 millimeters in diameter placed opposite to each other in the center of the cardboard about 5 to 10 millimeters from the end of the card, and a set of small dots, 10 millimeters in diameter, placed in the center and about 25 millimeters from the opposite end of the card from where the large dots are. Then evenly spaced between the large and small dots should be placed a set of dots 15 millimeters in diameter. This gives three blue dots of different size and about 30 millimeters apart on one side and three red dots on the other side of the card. The patient holds the card between his thumb and forefinger on the bottom edge with the end of card touching the end of his nose and it should have about the same amount of light on each side of it. The card should be angled downward slightly on the distant end and the small dots should be closest to the nose with the large dots on the distant end. When the patient looks at the large dot, he sees a blue one with one eye and a red one with the other eye, which he should be able to fuse together giving only dot having a lavender appearance, and he should also see the other 2 blue dots with one eye and the 2 red dots with the other eye to give proof of simultaneous vision at all times, and produce a 5 dot situation. The patient looks at the large dot and is conscious of seeing the other 4 dots, then looks at any distant object directly in front of him, then back to the big dot, etc. If he can not fuse the 2 large dots, then the card can be moved out from the nose gradually until he can fuse them. The card does not work very well if the distant end is more than 10 inches from the nose. As the patients fusion ability improves then have him gradually move the card closer to the nose. He should build himself to where he can do 150 return trips, then he can work on the middle dot the same way, then finally he may work on the small dot. These fusion cards can be made yourself using colored art paper to cut out the dots and paste them on the white cardboard, or they can be ordered at a very nominal cost from Allbee & Son Company, Waterloo, Iowa, get Form 122.

There are a large number of other home training procedures in use, some commonly prescribed by most practitioners and others are pet procedures used by only a few. There is not time or space here to describe or discuss a large number of other procedures I know and use or have read of, some used for basic training and others for specific purposes. I am sure some of you have special training devices and procedures you already use that produce excellent results which I have not mentioned and probably never heard of, however there may be a few men that will derive some helpful information from this paper. I hope it will provoke some stimulating thought in all who read this.

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