

CLINICAL QUICK HIT: VAN ORDEN TRAINING UTILIZING THE STEREOSCOPE FOR iPad

BACKGROUND:

Millard E. Van Orden developed a stereoscopically drawn visual pattern to gain insight on the patient's binocular visual behavior pattern. This drawing records the projection in space of corresponding visual areas. When used for training, the patient receives feedback on the reorganization of visual space and stability of eye posture and binocular vision. Van Orden (VO Star) drawings provide specific feedback on fixation, suppression, central/peripheral relationships, posture and binocularity.

PROCEDURES:

VO Star drawings were completed with the Translucent Correct-eye-scope set at 0-0 and the Stereoscope for iPad by Gerull Labs set at 0 (optical far-point). The optics of the prismatic lens allow for a distance accommodative and vergence demand, but a physical distance of 20 centimeters. Targets included a binocular vision space testing, far point – peripheral control, base-in projection stereo training, and base-out projection stereo training. Instructions were the same for both the traditional and digital drawings and followed the Van Orden Technique of Visual Rehabilitation Instruction Manual (Keystone View Company¹). Pencils were used for paper drawings and styluses were used for digital drawings. The Opto App was used with the Stereoscope for iPad to record results.

APPLICATION:

This therapy training exercise compared visual performance when looking in a digital environment versus a traditional training environment.

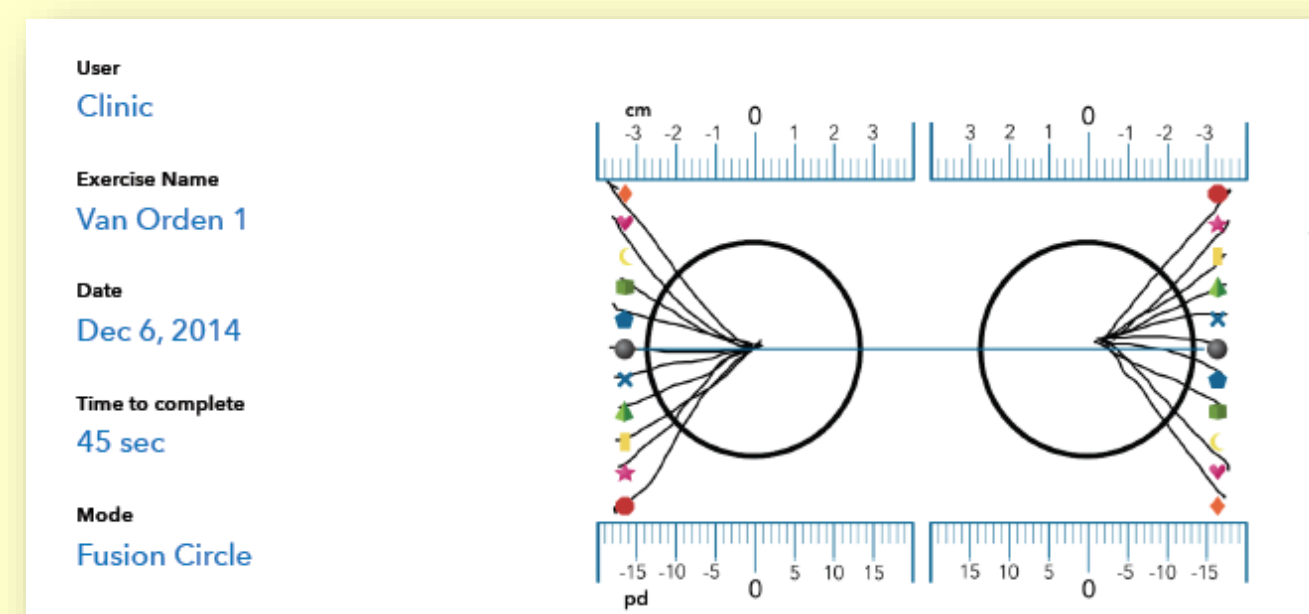
INNOVATIVE CHARACTERISTICS:

1. Ability to complete testing and training in more postures with the same device (standing or sitting, primary gaze or up/down gaze).

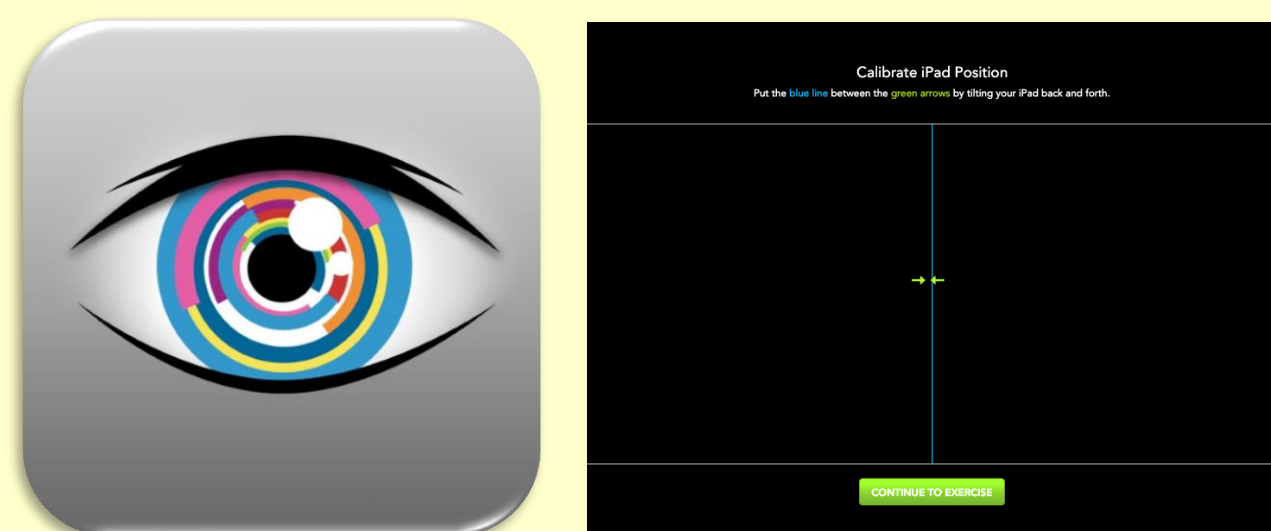


Age 3, standing - vertically attached by magnet Age 60, seated - gecko attached to desk Age 39, seated - gecko sitting on a table Age 7, standing - gecko attached to table

2. Ability to add images to electronic health records for performance documentation. You are also able to print or send the report.



3. Overlay with a reference scale in millimeters and prism diopter increments.
4. Ability to test visual performance when viewing a digital device.
5. The drawing form is unable to slip or move off-center. An alignment and balance guide is built into the Opto App². The Stereoscope for iPad firmly attaches to surfaces by gecko pad (suction cups) or magnetic base.



Instructions: Place the iPad into Stereoscope so that the alignment bar is centered in the stand and the iPad is balanced as indicated by the arrows.

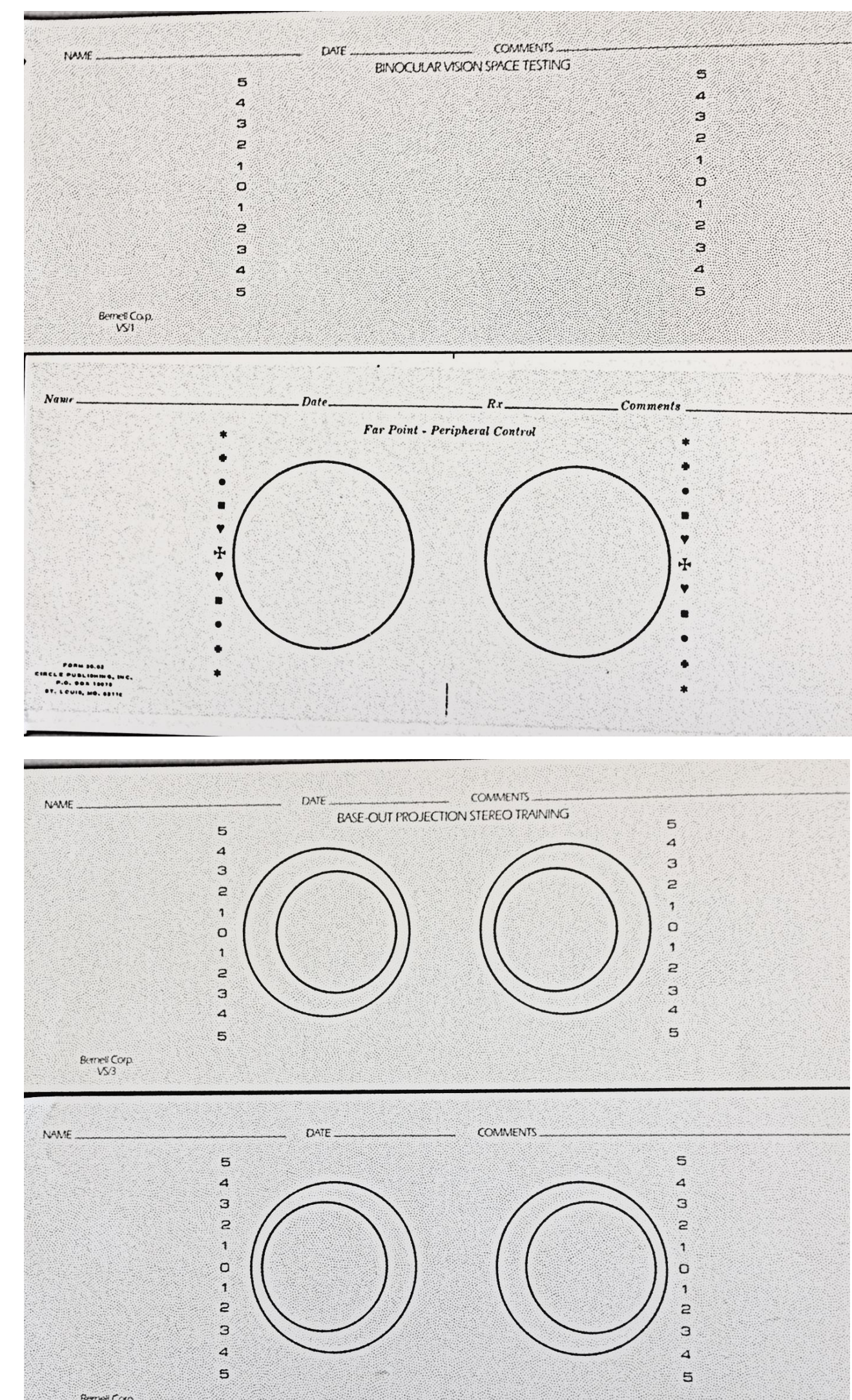


Figure 1: Examples of paper forms used for VO Star Drawings.

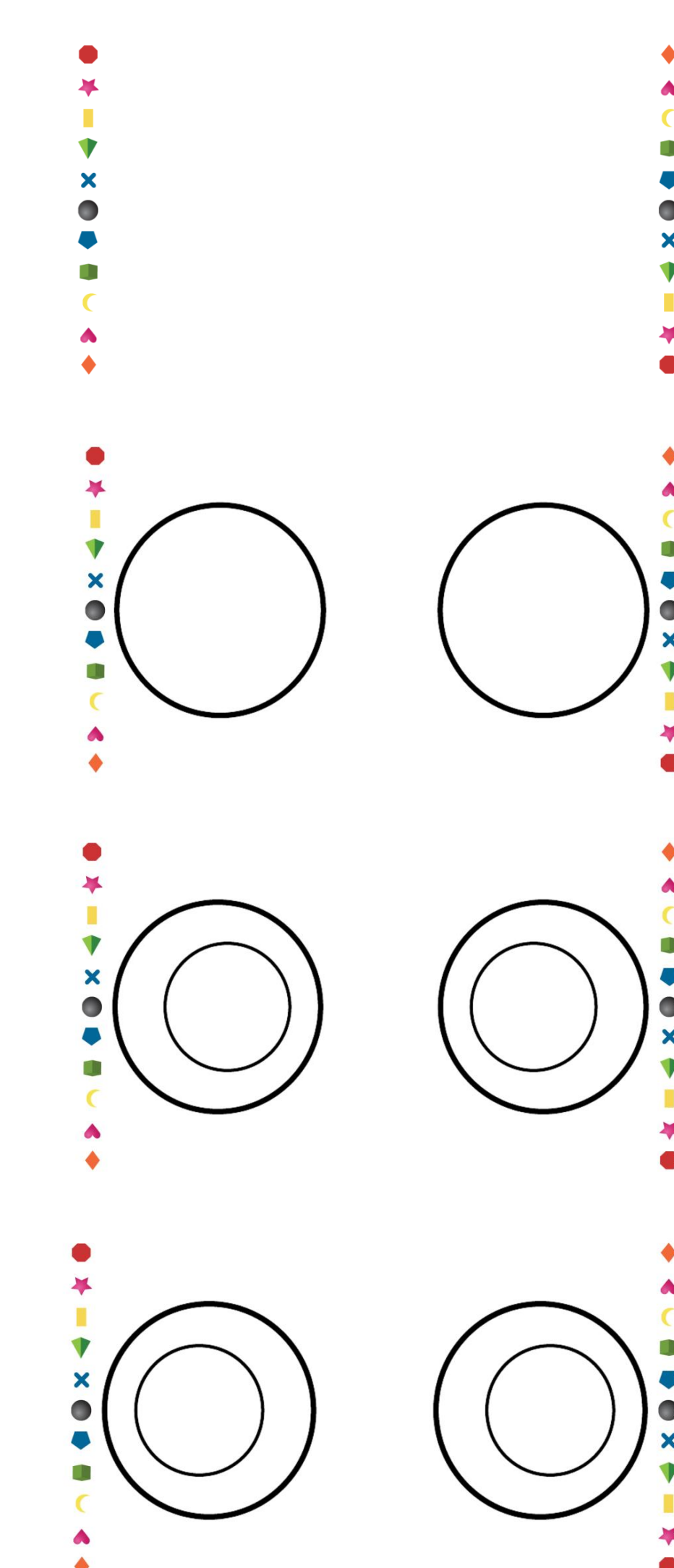


Figure 2: Examples of digital screens used for VO Star Drawings.

Examples of VO Star Drawings

Figure 3: Binocular Vision Space Testing.

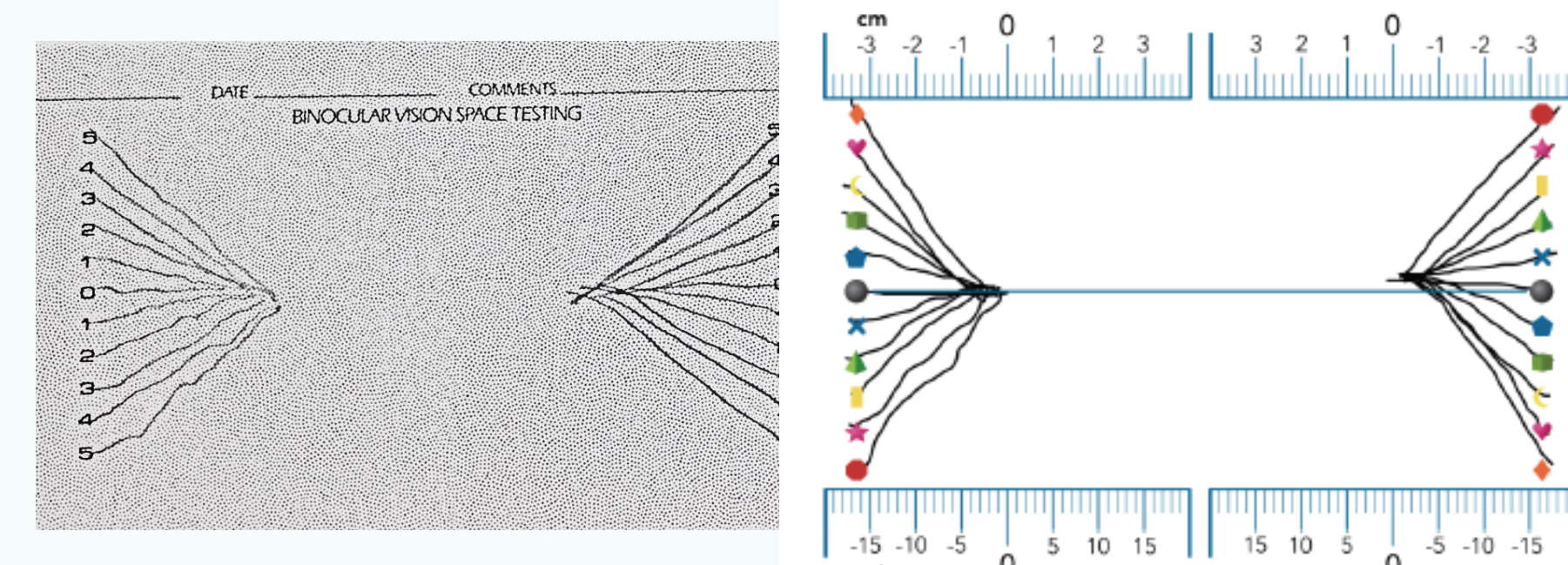


Figure 4: Far Point – Peripheral Control

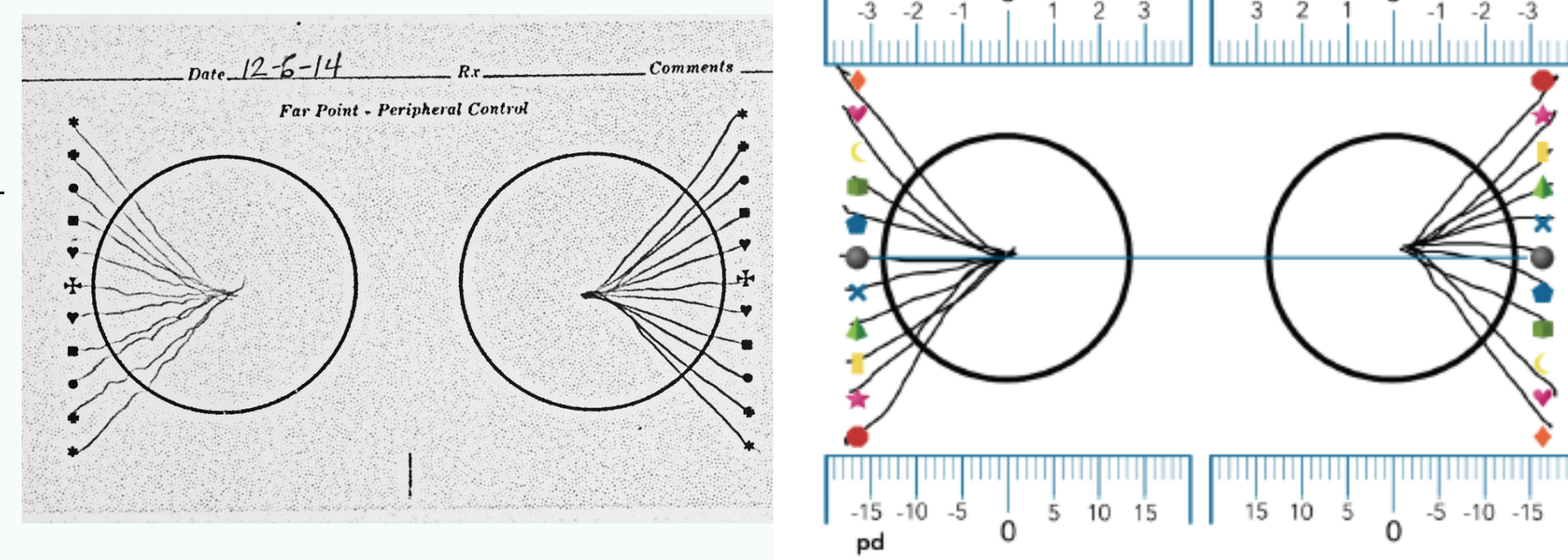


Figure 5: Base-In – Projection Stereo Training

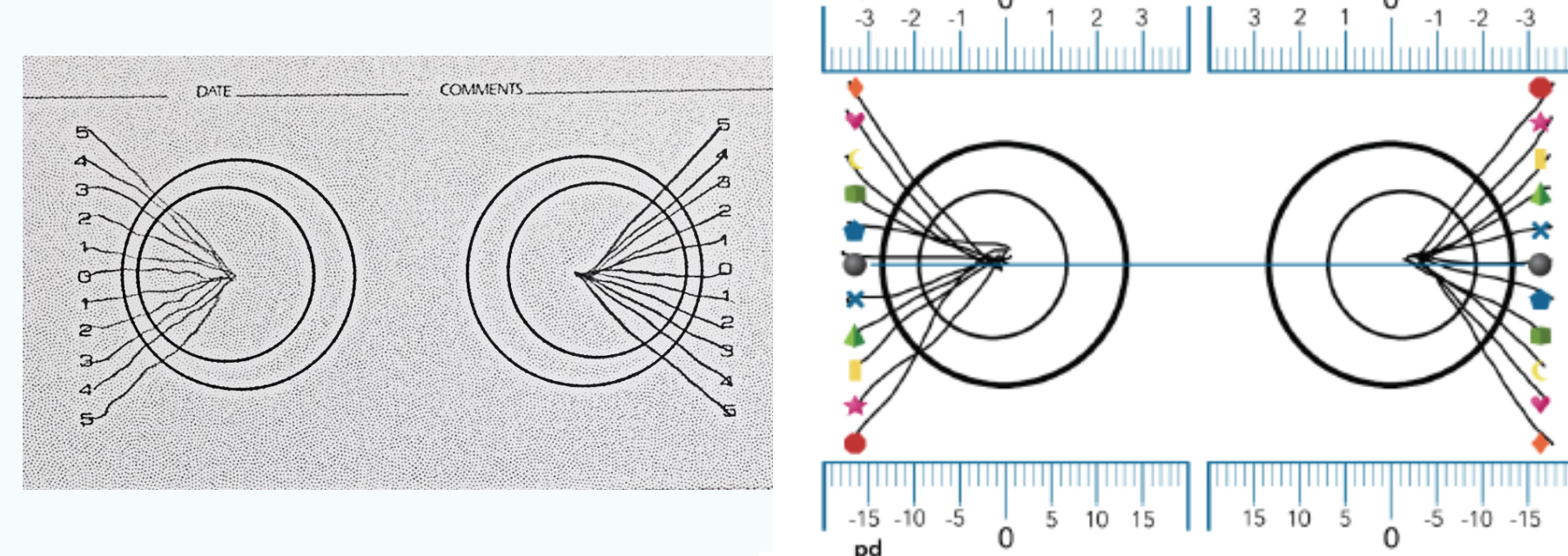
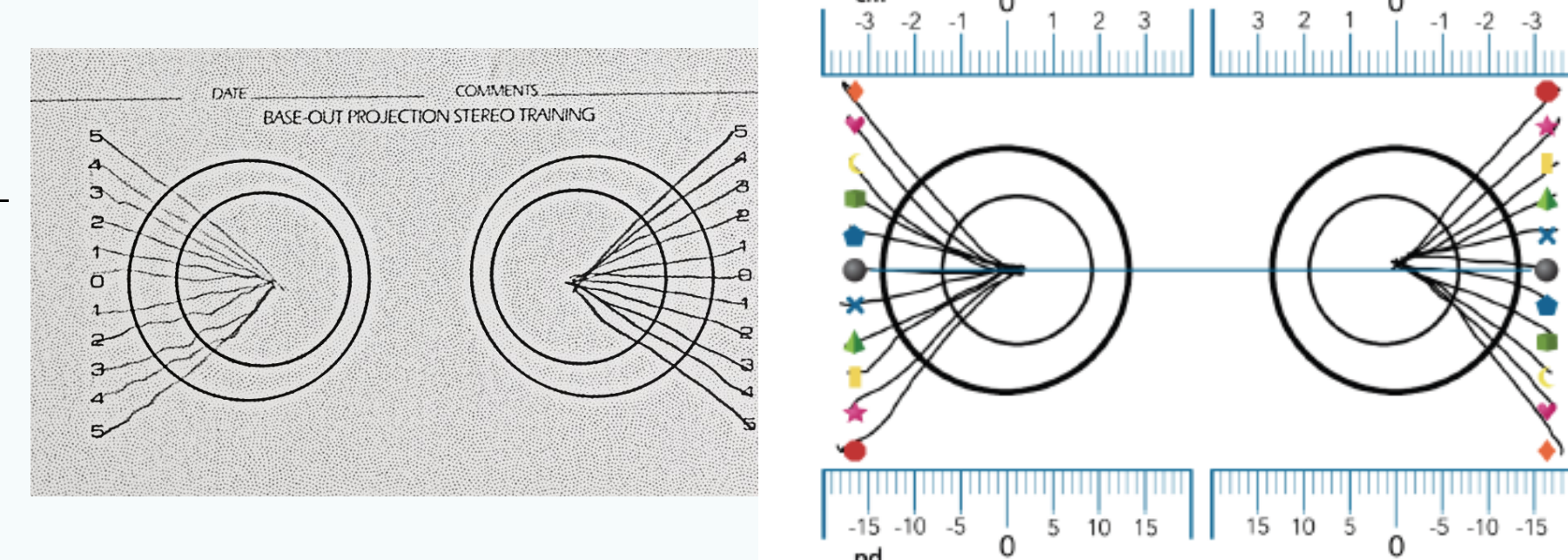


Figure 6: Base-Out – Projection Stereo Training



Notes: Digital version slightly more concave, attention shift from ground to figure.

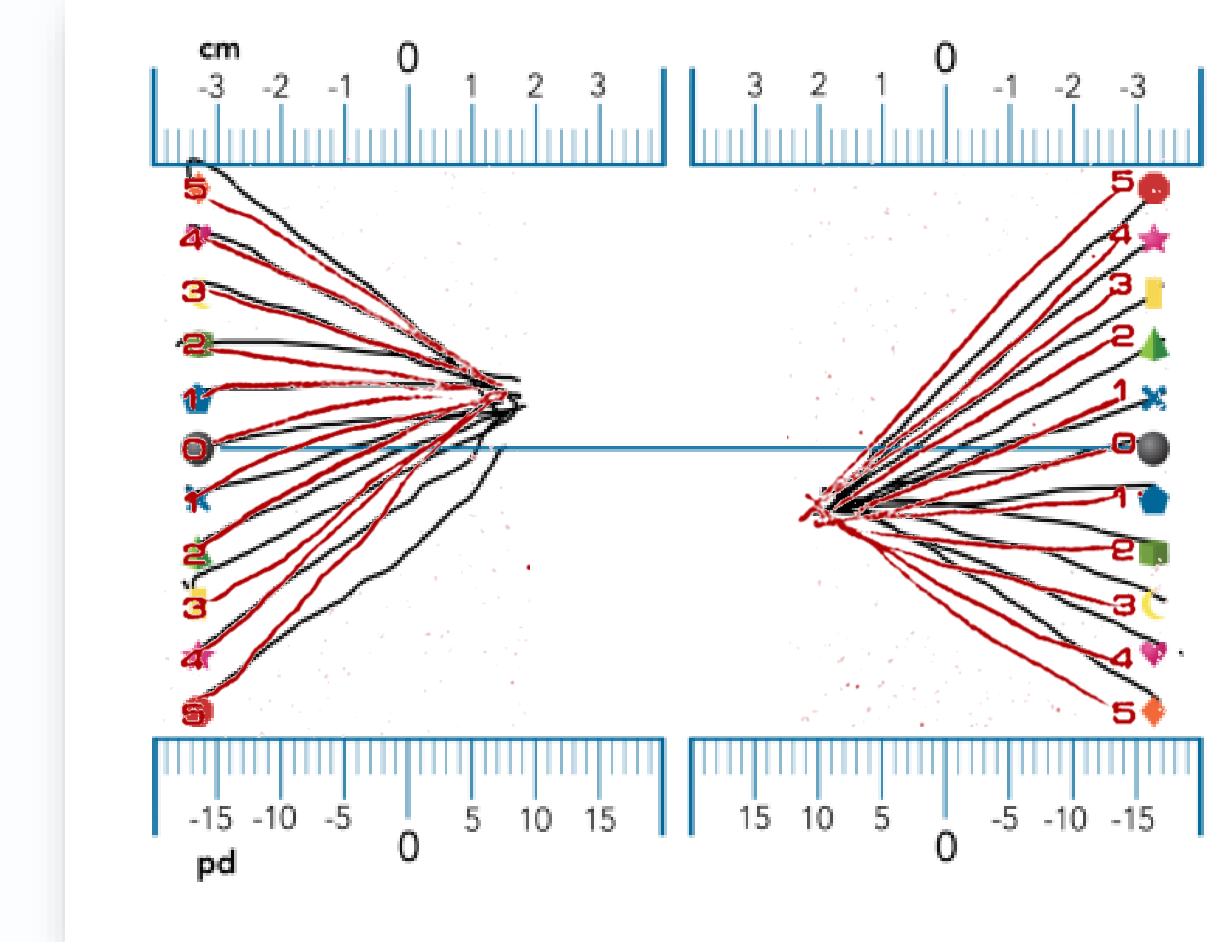
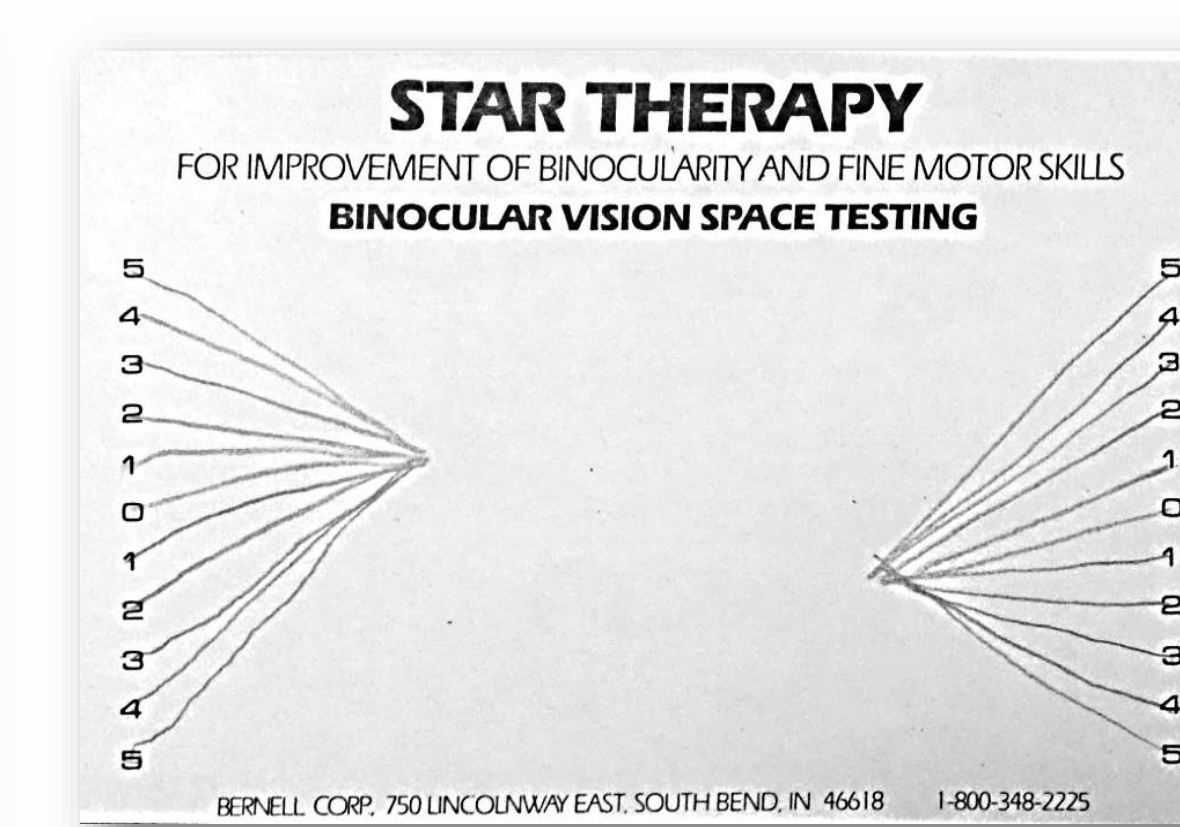
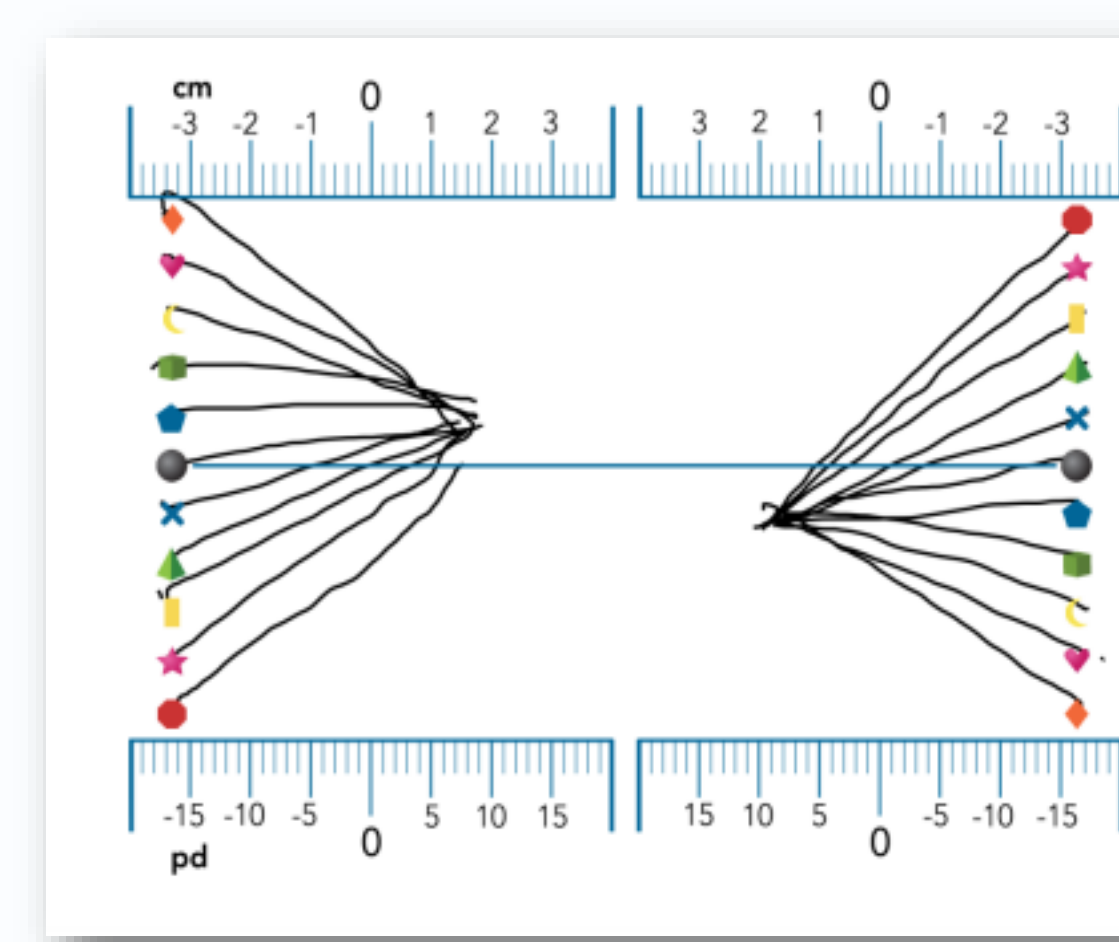


Figure 7: Patient A has a congenital 4th Nerve palsy which causes hypertropia. The first image was completed on the Stereoscope for iPad. The second image was performed the same visit on the Correct-Eye-Scope. The Third image is a composite of both images.

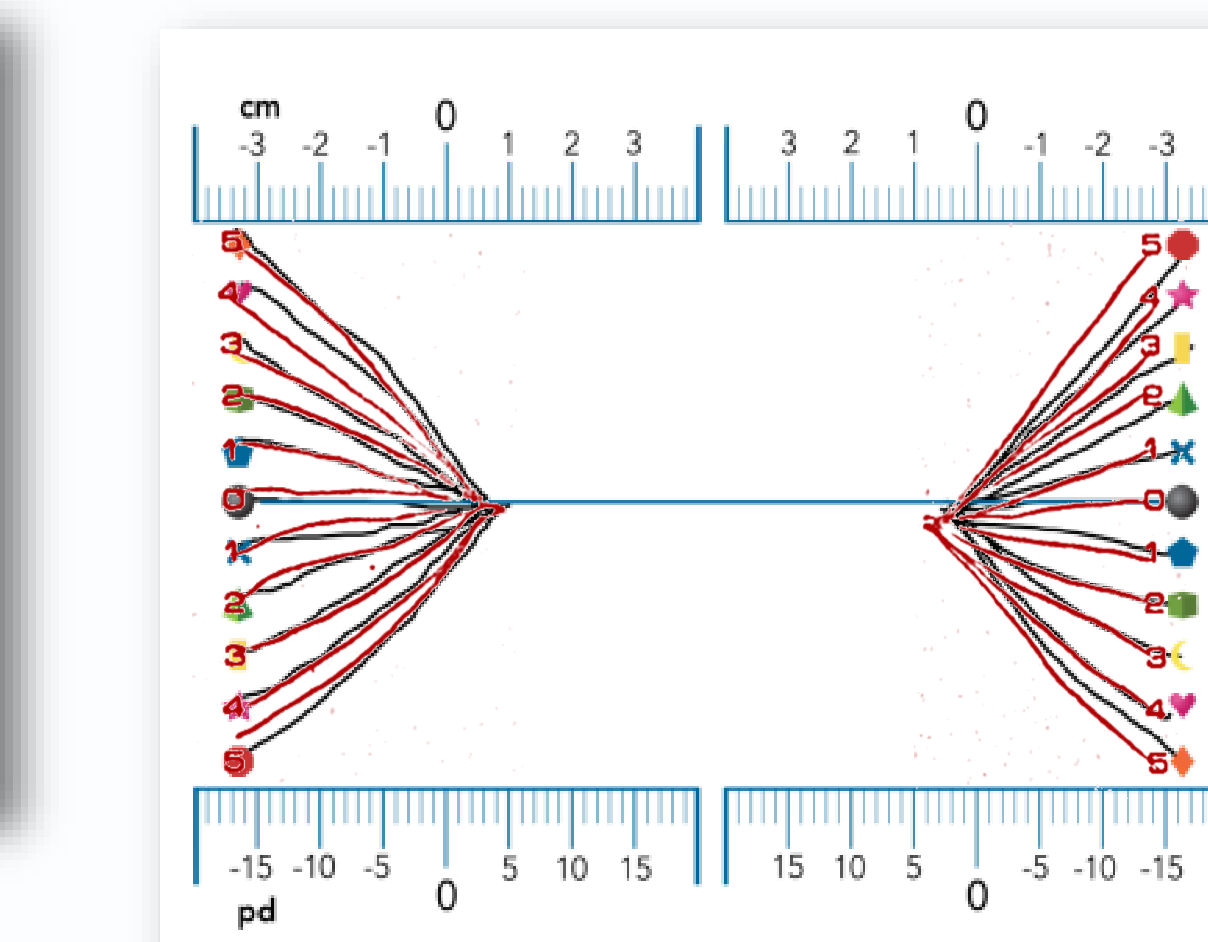
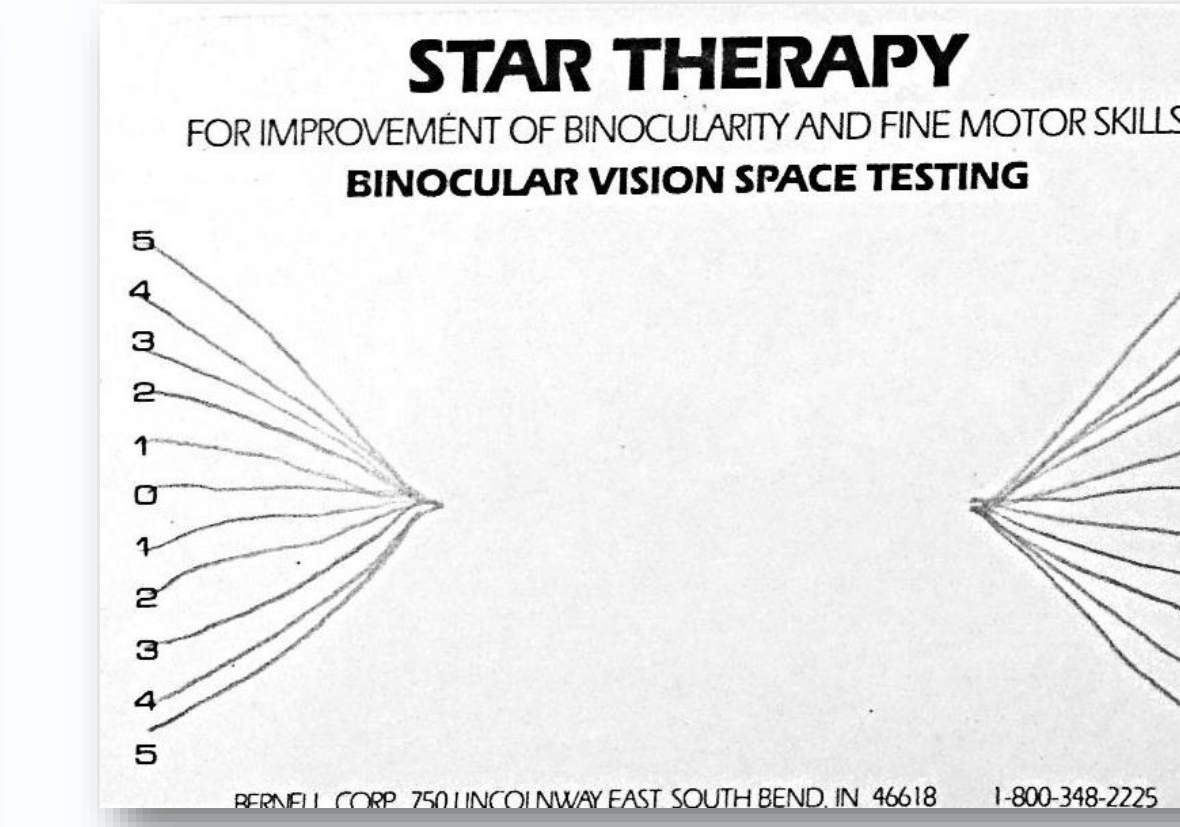
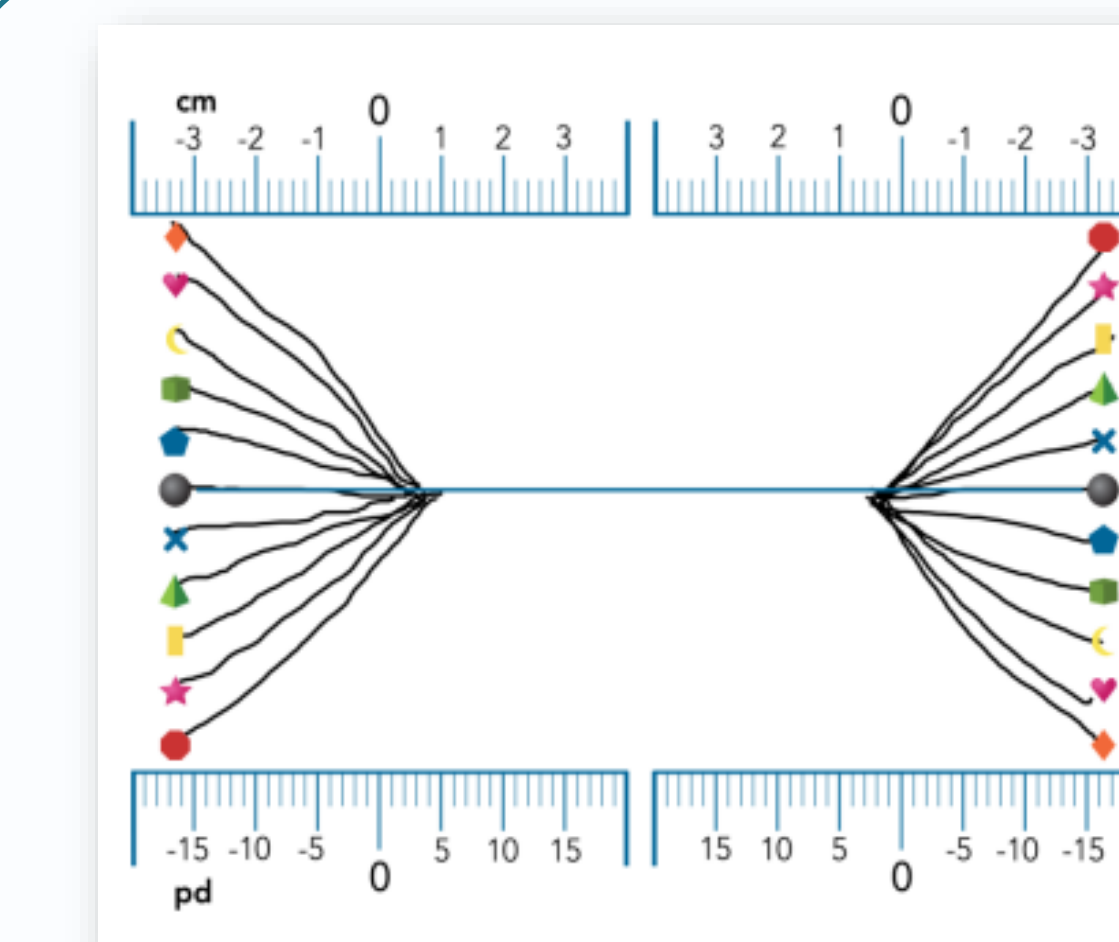


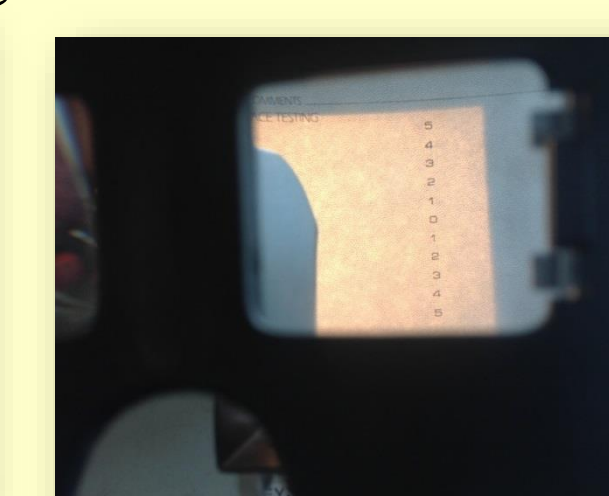
Figure 8: Patient B is diagnosed with esophoria and difficulty with random dot stereopsis. The first image was completed on the Stereoscope for iPad. The second image was performed the same visit on the Correct-Eye-Scope. The Third image is a composite of both images.

DIFFERENCES FROM TRADITIONAL TESTING:

1. Less tactile feedback is experienced by the patient when comparing a stylus/screen to a pencil/paper task.
2. The weight of the line with a pencil may differ with the pressure placed on the pencil when drawing. Although a pressure sensitive stylus is currently in development for artists, the App is unable to currently replicate this on the iPad.
3. Van Orden described two columns of eleven equally spaced targets separated by 148 mm¹. The Opto App matches this traditional pattern, although some paper patterns currently in use are set to separations of 140 mm for distance testing and 95 mm for near testing.



Correct-Eye-Scope



View through ocular

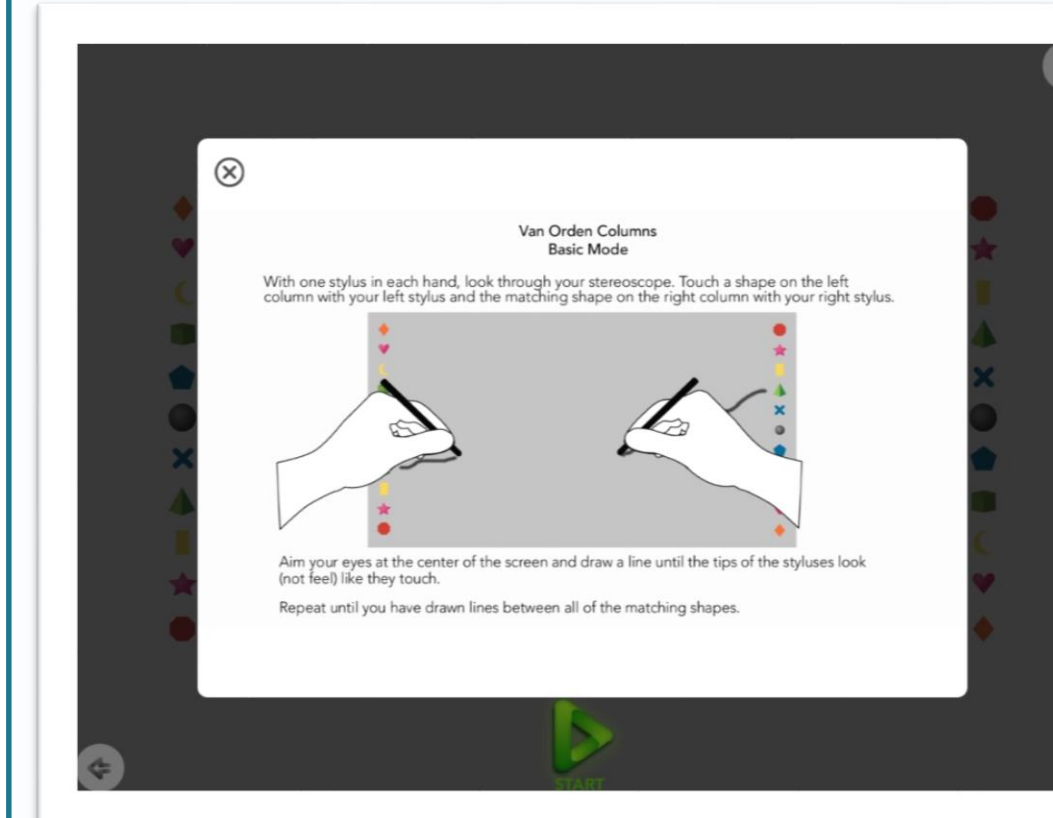
Side-by-side comparison of the Stereoscope for iPad and the Correct-Eye-Scope



4. Instead of dots, symbols or numbers, colorful shapes are used in the Opto App which cue the patient to match the figures. An upcoming version of Opto is planned to include only black targets.
5. Some training forms contain speckled backgrounds. The Opto App currently only uses a uniform gray background.
6. The Stereoscope for iPad is able to hold trial lenses. A trial frame is necessary to hold auxiliary lenses when using the Correct-Eye-Scope.
7. The iPad runs off of battery power so may be placed away from power outlets.

REFERENCES:

1. Van Orden Technique of Visual Rehabilitation Instruction Manual (Keystone View Company, www.keystoneview.com/download_manuals/6104_van_orden.pdf)
2. www.Gerull-labs.com (g-Labs)
3. A special thanks to Marisa Atria Kruger, OD, FCOVD, CHom for her insights on the VO Star.



ACKNOWLEDGEMENTS:

Dr. Simonson is a co-founder for Gerull Labs and would like to thank the team of Doug Gerull, Rebecca Gerull and Jennifer Knock for their work to develop a modern and clinically useful Stereoscope for iPad and Opto app for vision therapy.