Workflow for VR-Phore

1 Pre-tasks

Download the APKs onto smartphones (image resolution improves with high-quality devices; ensure the Display Mobile (DM) fits securely into the VRHMD slot). Prepare the controller and application setup.

2 Clinical Tasks

2.1 By Clinician

- Select the number of slides for each test (SMP, Fusion, and Stereopsis).
- Choose the number of macular or peripheral test slides.
- (Version 2): A set of slides can be shown for clinicians to select for each test.
- Measure IPD:
  - Method 1: Use standard clinical methods (e.g., scale).
  - Method 2: Adjust the lens in the VR HMD (not usually optimal if directly done by a strabismus patient).
  - A rough way to measure IPD would be to set the patient to look straight and check if the images are centered (similar to a synoptophore). Then move the slides equally apart or close together as in convergence/divergence sections.
- Calibration – Center the images on each eye's display. Usually done by a person without deviation or phoria, who wears the HMD to check if the default-centered images are fused.

2.2 Patient Instructions

The patient is given instructions to:

- Operate the controller – use the scroll action to move images and double-click anywhere on the screen to indicate alignment completion.

- Move images using one (single image) or two thumbs (both images simultaneously).
- Perceive fusion, for example, recognizing a lion inside a cage or seeing a complete mouse or cat.

2.3 Fitting the VRHMD

The VRHMD is placed gently on the patient's head while they are seated, with the straps tightened if needed. A few sample slides are shown, and the child is asked:

- Do you see images?
- Are they near the center or away?
- Close one eye and describe the image (repeat with the other eye).
- Is the display too bright?
- Try using the controllers.

The clinician enters the patient's details on the controller (or possibly the display mobile). The clinician can select whether the left or right eye image is fixed, or if both images will move. The SMP/Fusion and Stereopsis sets are shown in a predefined or selectable order (Version 2 of the application allows the clinician to choose the order). Position and angle data from the calibrated center are logged, with a 6-second gap between slides.

2.4 Additional Control Options

The clinician can select the axis of movement, such as moving linearly (one-axis) or in a plane (two-axis). The patient can rotate the image perpendicularly on one axis, enabling measurement of torsional values. For example, swiping left or right moves the image linearly, while upward and downward swipes rotate it clockwise and counterclockwise, respectively. Convergence ranges can also be measured, including degrees to which the participant can achieve fusion.

3 Post-Task

Once the deck is complete, the HMD and controller are gently removed from the patient. The clinician can check a CSV file, which displays the angle values for each slide set/test.