

PURPOSE

Peripheral visual acuity is measured with the patient fixating to a central test. However, during the measurement the patient could involuntarily look towards the peripheral visual acuity test and therefore compromise the measurement. The purpose of this work was to study the fixation during peripheral visual acuity testing.

MATERIALS AND METHODS

Measure: Visual acuity was measured, while recording eye movements, using the Landolt test with an eccentricity of 0° or 20°, figure 1.

Two different measures, figure 2, were carried out:

- With no control of the fixation.
- With control of fixation based on 300ms exposure times for the visual acuity test.

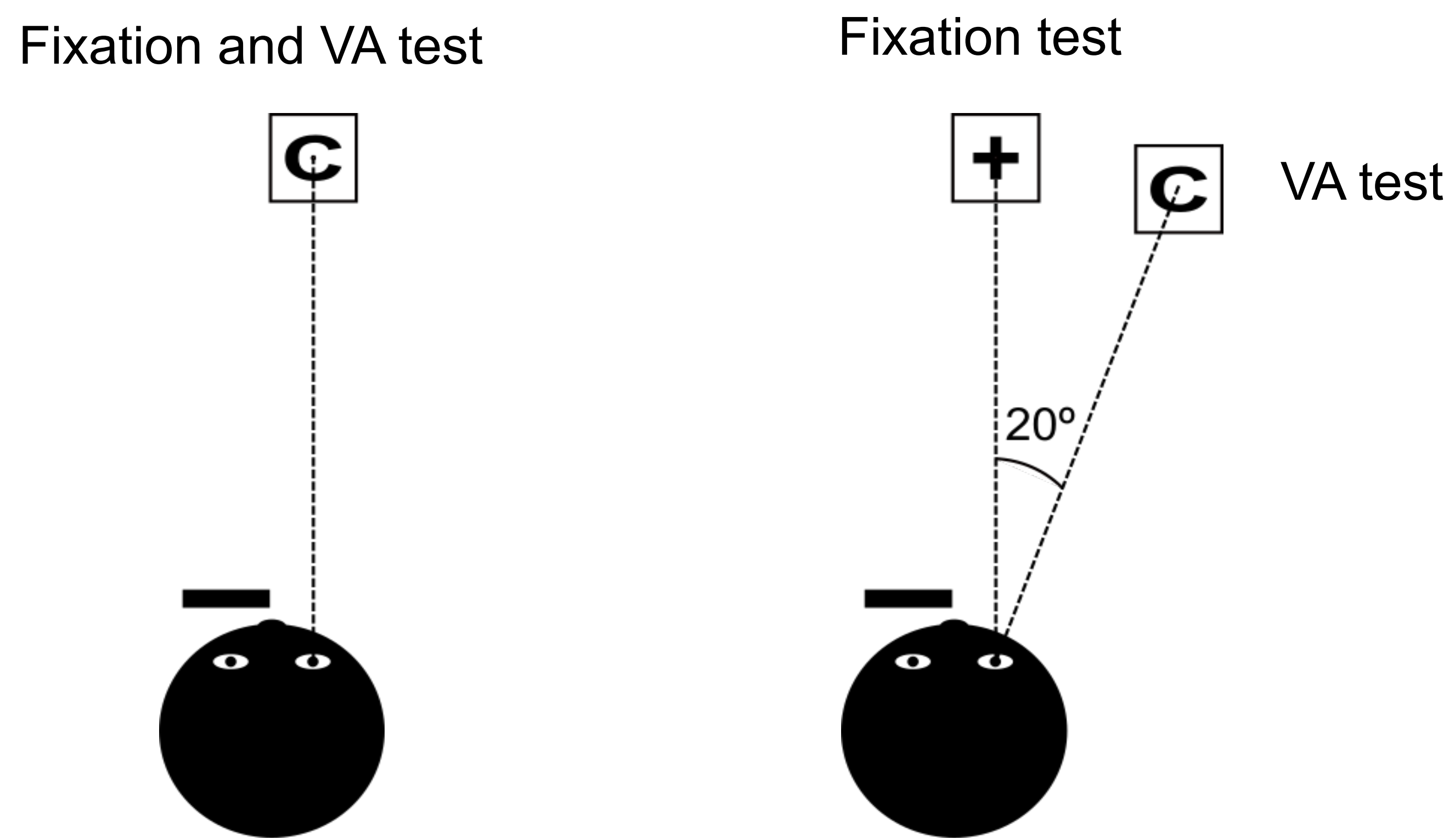


Figure 1. Measurement set-up for 0° (left) and 20° (right) eccentricity

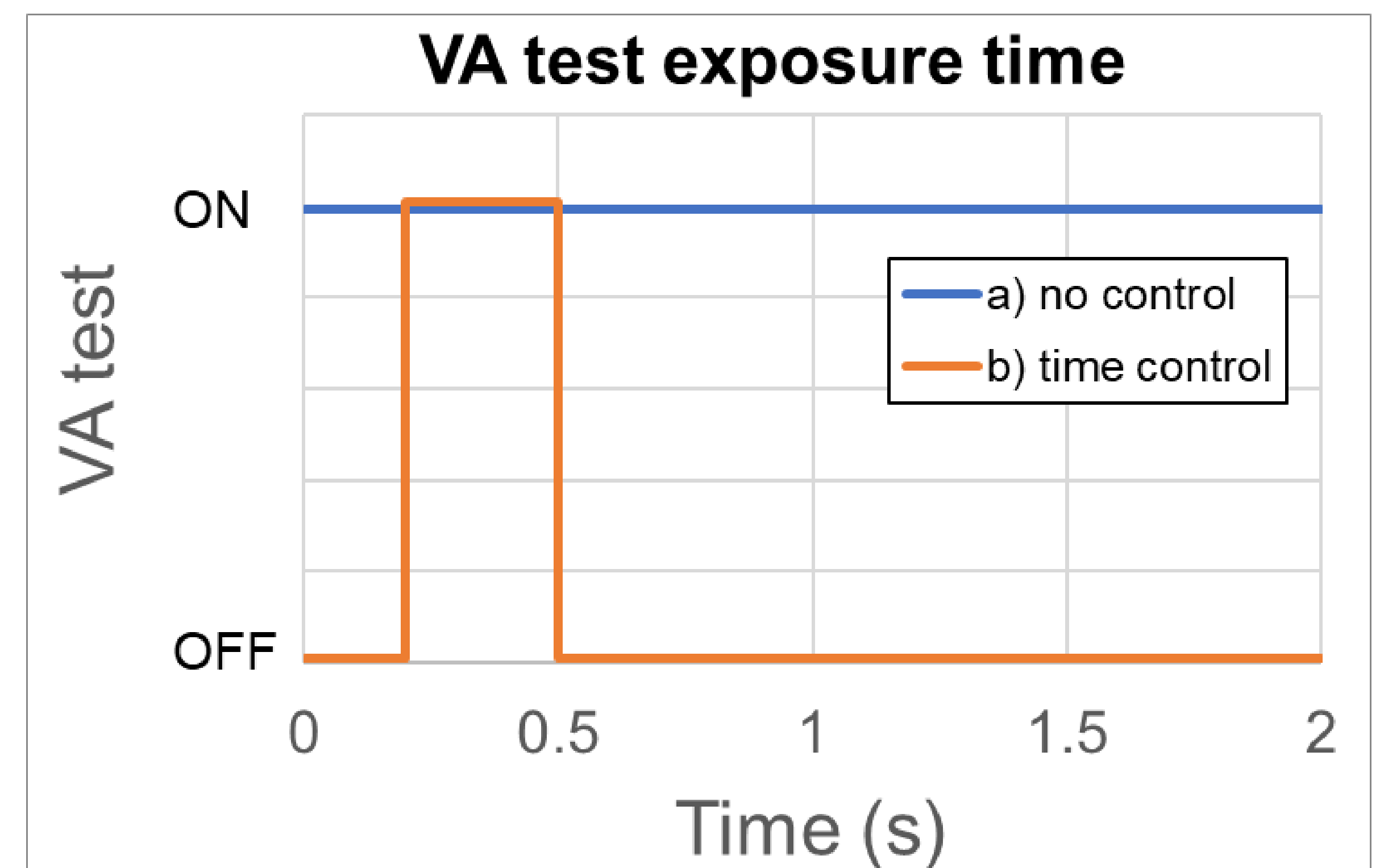


Figure 2. VA test exposure in the different measures.

Material: Eye movements were recorded during each measurement, with the PupilCore (Pupil Labs GmbH) eye tracker, with a sampling rate of 240Hz.

Subjects: 5 young healthy subjects 3 men and 2 women, with age 33.8 ± 6.5 years. The mean refractive error was -0.78 ± 1.23 D for the sphere and -0.34 ± 0.11 D for the cylinder and the mean visual acuity 1.16 ± 0.09 .

RESULTS

Figure 3 shows an example of gaze position during the 20° peripheral visual acuity test for a patient for both no control (blue) and time control (red) of fixation conditions. As can be seen, in the no control condition (blue) a saccade towards the visual acuity test (20°) is driven.

The table below summarizes the horizontal gaze position for central and peripheral (no and time control) measurements. The mean \pm sd of gaze position and maximum deviation towards visual acuity test for all patients is shown.

| | Central | Peripheral | |
|---|-----------------|------------------|-----------------|
| | | No control | Time control |
| Mean \pm sd horizontal gaze position (°) | 0.13 ± 0.46 | 0.25 ± 1.05 | 0.32 ± 0.34 |
| Mean \pm sd maximum horizontal gaze deviation (°) | 2.97 ± 2.02 | 10.32 ± 9.09 | 5.53 ± 2.81 |

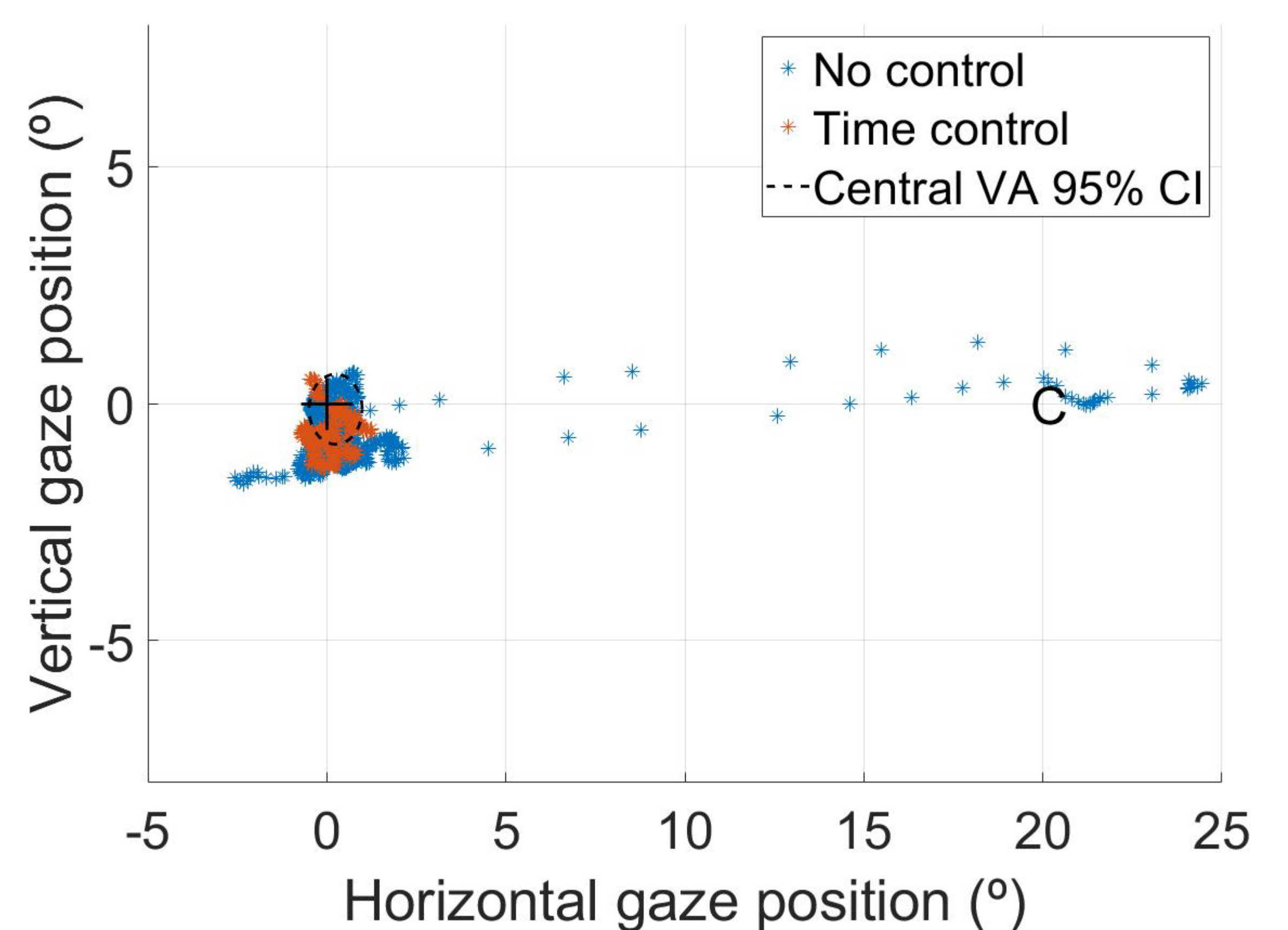


Figure 3. Example of gaze position during peripheral visual acuity test with no control (blue) and with time control (red) of fixation. The dashed black line indicates the 95% confidence interval for the central visual acuity measurement. The fixation cross and Landlt C are also represented.

CONCLUSIONS

- Fixation during visual acuity differs between central and peripheral measurements.
- Peripheral measurements showed deviations towards the visual acuity test up to 10°.
- The short exposure time strategy improved the fixation during peripheral visual acuity testing.

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