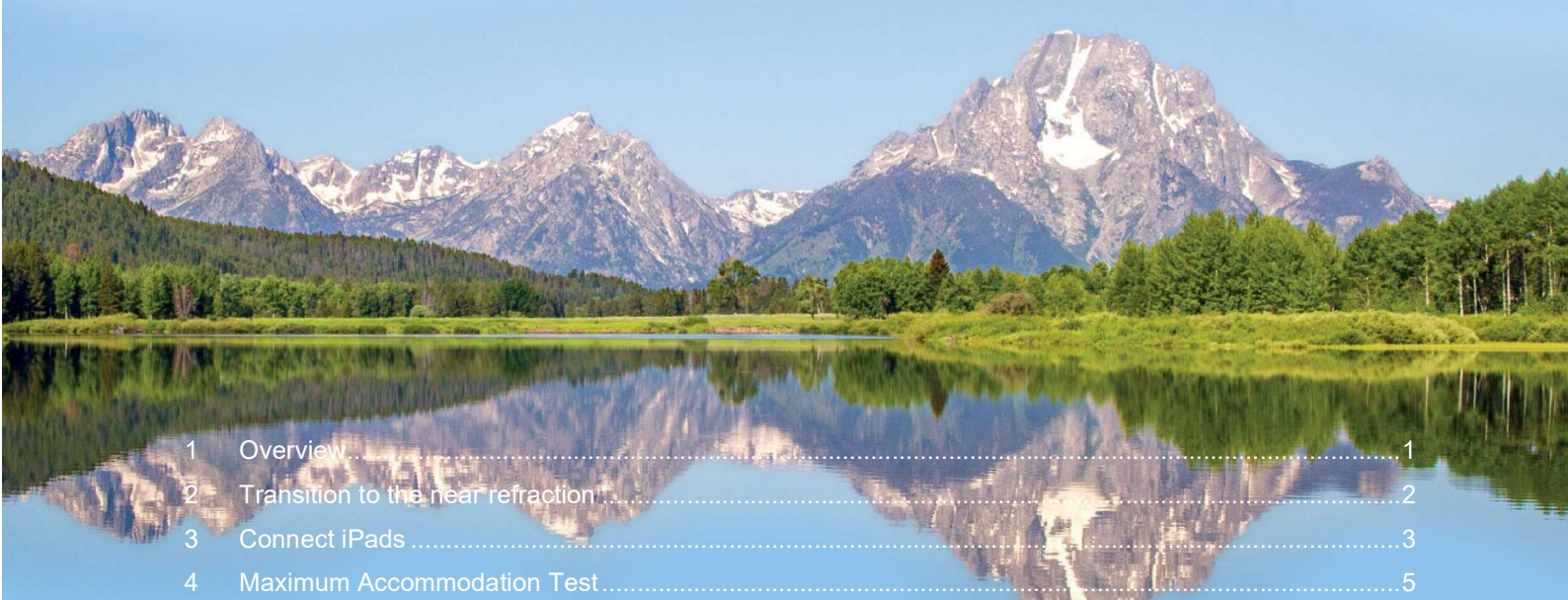




PASKAL 3D Version 4.0

Module PASKAL N

Process of the near eye glass determination



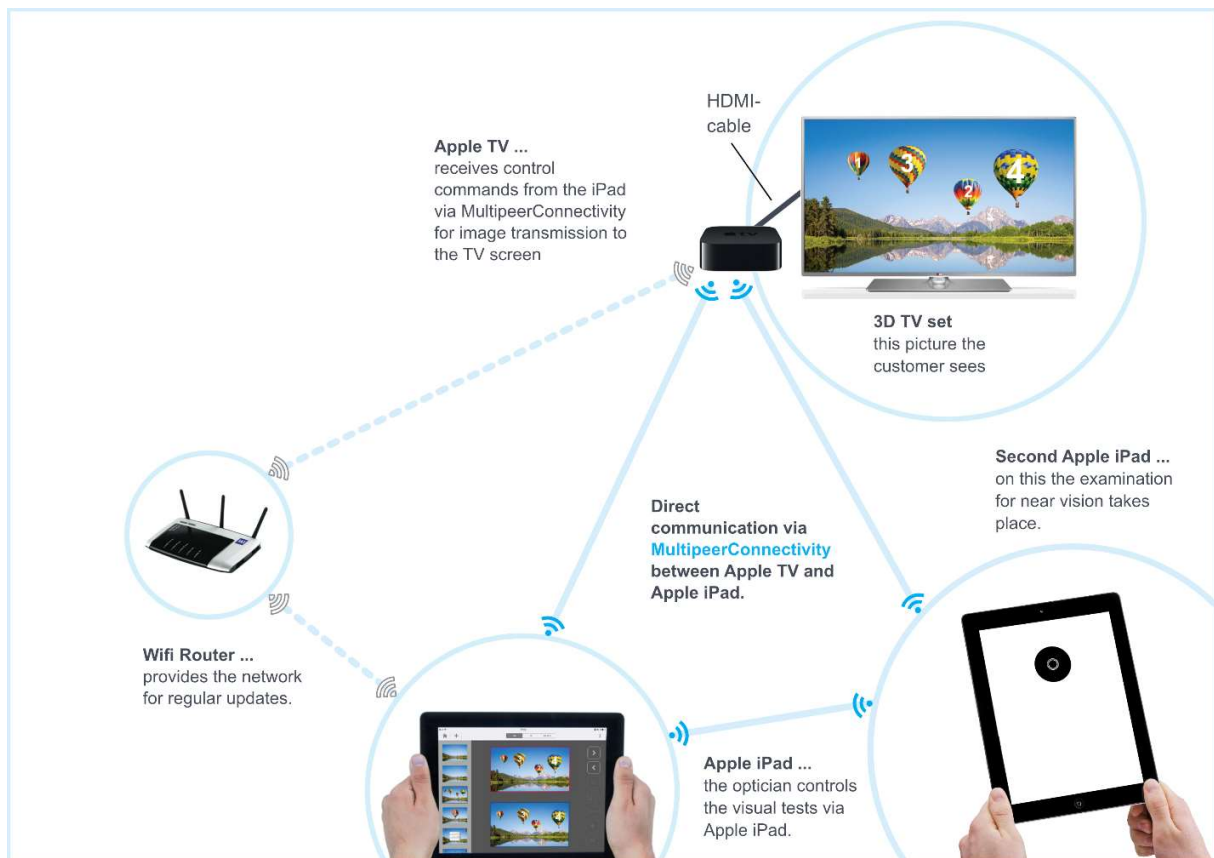
1	Overview	1
2	Transition to the near refraction	2
3	Connect iPads	3
4	Maximum Accommodation Test	5
5	Visual acuity test.....	11
6	Reading sample for plausibility check	12
7	Smartphone	16
8	Text messages	16
9	PASKAL N Test	17
10	Near astigmatism.....	18
11	Amsler Test (white)	19
12	Overview of all test categories and tests	20

1 Overview

With the new version PASKAL 3D 4.0, a new module is introduced. PASKAL N allows you to test the near vision and to find the optimal addition. In total, the module contains more than 40 tests, which can be individually combined to create different test series.

The PASKAL experts have put together a standard test series for the examination of the near vision, which is ideal for a smooth transition from the standard series of the 3D refraction for the distance.

An additional iPad (for the patient) is required to use PASKAL N. The following figure gives an overview of the required hardware as well as the technical connections.



The PASKAL N tests are displayed on the patient's iPad, meaning the PASKAL 3D app must also be installed (minimum Software Update requirements for the iPad: iOS 12 or newer).

The new version PASKAL 3D 4.0 is a separate new app, which has to be downloaded from the App Store. The basic requirements to use this App are the acquisition of a license and the successful registration via IPRO. All Apple devices used for PASKAL N must have the same PASKAL 3D app version installed.

The following document describes the process of the standard series for the near vision step by step.

2 Transition to the near refraction

With PASKAL 3D an eye glass determination for the distance was carried out. The 3D final images are shown, to ensure a smooth transition to the near refraction with PASKAL N. At the beginning, a 3D picture of a home office is presented, which serves to transfer the patient consultation to the near eye glass determination.

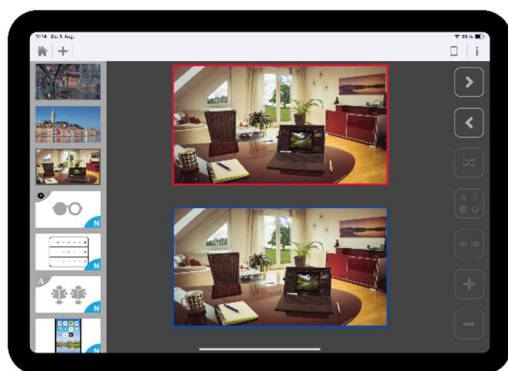
Here's what it looks like on the devices:

View Apple TV



View iPad (Remote)

View iPad (Patient)

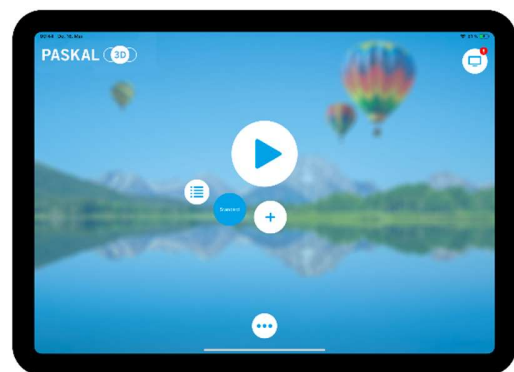
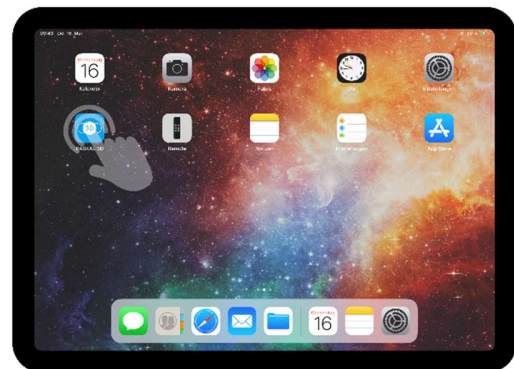


3 Connect iPads

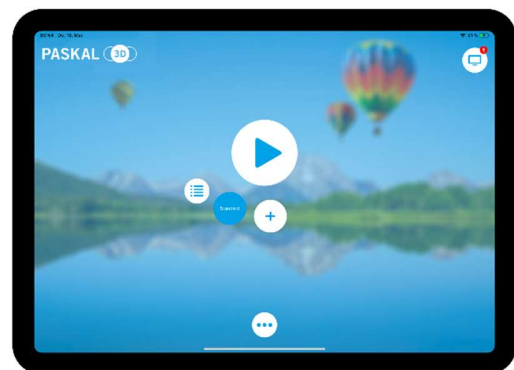
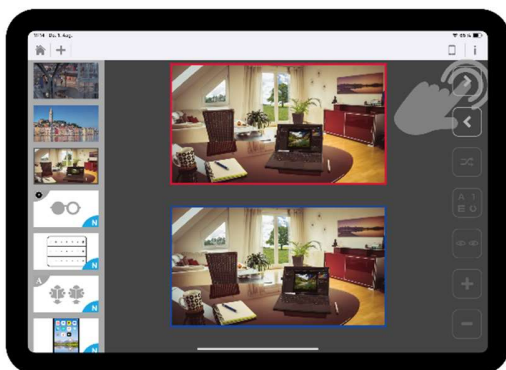
- To view the tests on the patient's iPad, both devices must be connected.
- To start the test series, the PASKAL 3D App is opened on the patient's iPad.

View iPad (Remote)


View iPad (Patient)



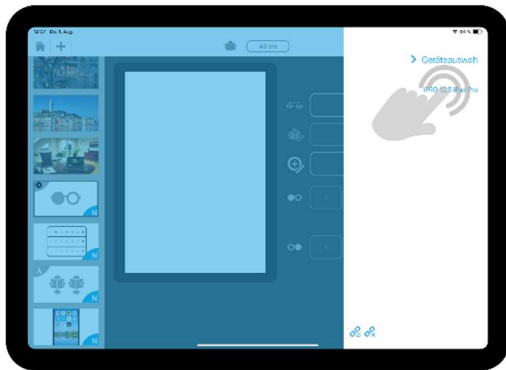
- The test is started via the control iPad, by pressing "Next" or the preview image of the test. By default, the first test of the near refraction is presented straight after the 3D Home office picture.



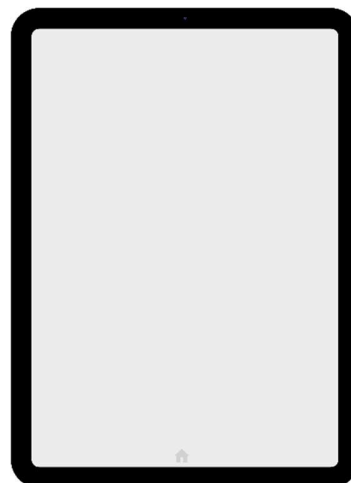
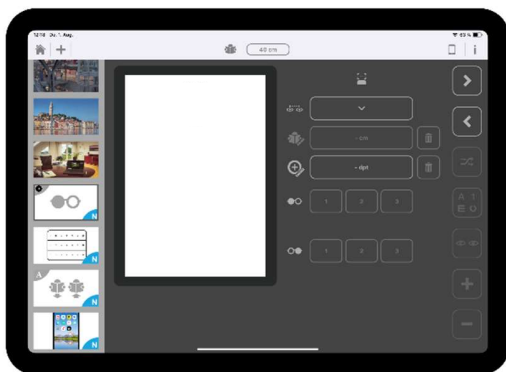
- The device list opens up automatically (if necessary, this list can be opened at any time with the "App Icon" (see figure) on the remote iPad.

Figure. "App Icon" 

- The remote iPad is connected with the patient's iPad by clicking on the respective device name in the list.



- The view on the patient's iPads changes as soon as the two iPads are connected.



4 Maximum Accommodation Test

- Before the iPad is given to the patient and the near refraction can be started, the PD must be entered on the remote iPad.

View iPad (Remote)

View iPad (Patient)



Entering the eye distance (distance - PD)

Through tapping on the control iPad, the drop-down menu opens up. The eye distance is entered in millimeters (mm) and confirmed by tapping "finished".



- Now the iPad is given to the patient. He is asked to hold it in portrait format (camera above) and in his habitual reading distance.
- It is important that the patient is in the viewing area of the iPad camera. This can be checked with the icon on the remote iPad.



Customer is not recognized by the camera > Measurement functions inactive



Customer is recognized by the camera > Measurement functions active

- The measurement of the habitual reading distance is ready to start.

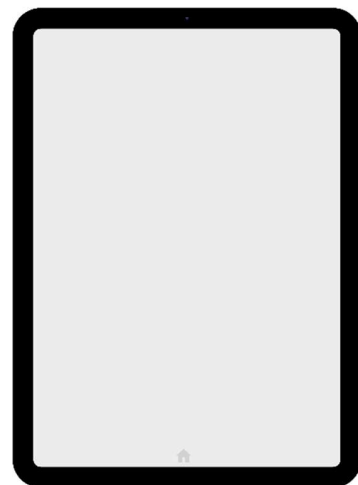


Measuring the habitual reading distance:

The patient has the measuring glasses with the long distance correction on, keeps the iPad in his habitual reading distance and looks at the white screen. By pressing on the distance, the measurement is started.

View iPad (Remote)

View iPad (Patient)



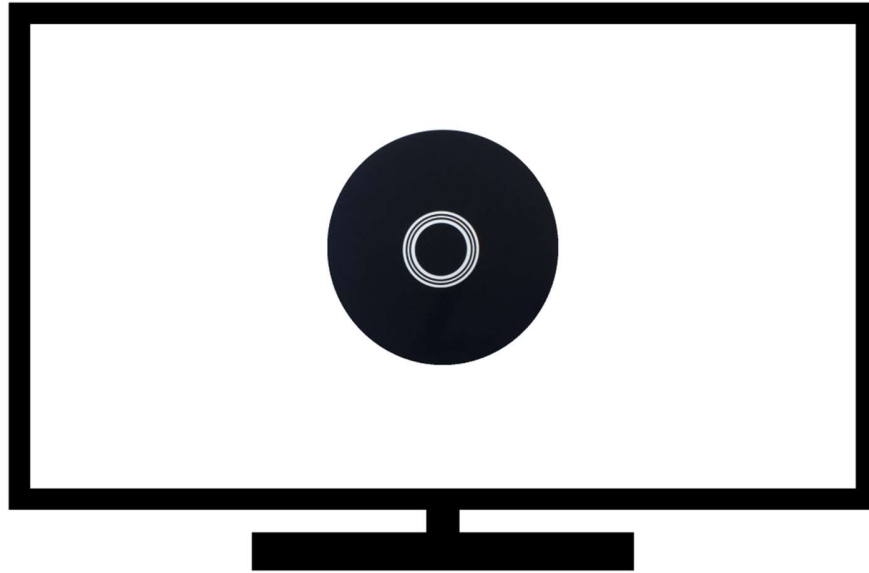
The measured distance is displayed in centimeters (cm).

- With the following test, the maximum accommodation success is measured. This test is explained to the patient on the PASKAL TV. Duan's line figure appears on the screen, alternately switching from sharp to blurry. This image simulates the visual impression that the patient will now experience.

Explanation: "Move the iPad with the line figure closer to your eyes until you see the double circles blurry. As soon as this point is reached, move the iPad further away again, until you see

the double circles sharp again. Hold the iPad at this exact distance, and signalise that the measurement can be started."

View on the PASKAL screen



Illustrations: Sharp and blurry image of the Duane's line figure.

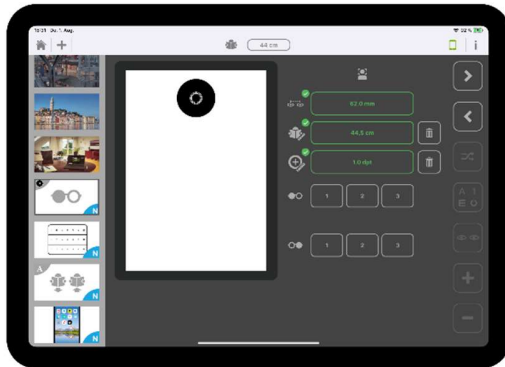
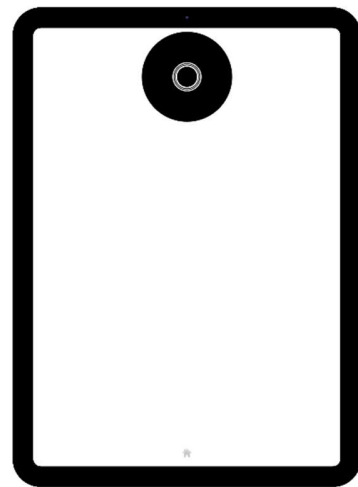


- Depending on the accommodation capacity, a temporary auxiliary addition might be necessary. This has to be decided before starting with the actual measurement. The patient should be able to see the Duan's line figure sharply. If his accommodation capacity is not sufficient enough for this, a temporary auxiliary addition, with values of +1.00 to +2.00 dpt is added to the measuring glasses.



Entering the temporary auxiliary addition

The auxiliary addition has to be chosen from the respective box on the remote iPad.

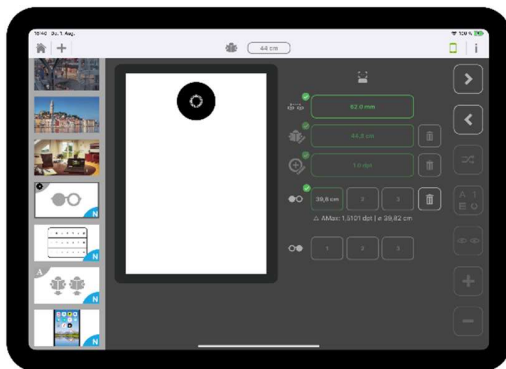
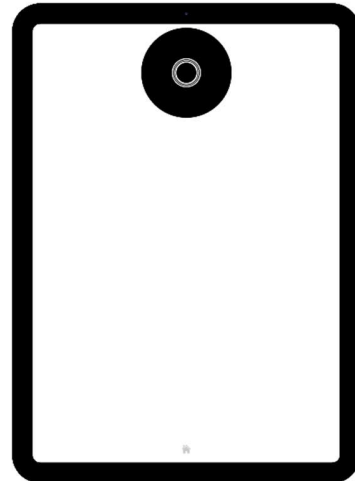


Measurement of the maximum accommodation capacity

After the measurement is explained to the patient and the auxiliary addition is added to the measuring glasses as well as entered on your remote iPad, a cover plate must be placed in front of the left eye. The measurement can begin.

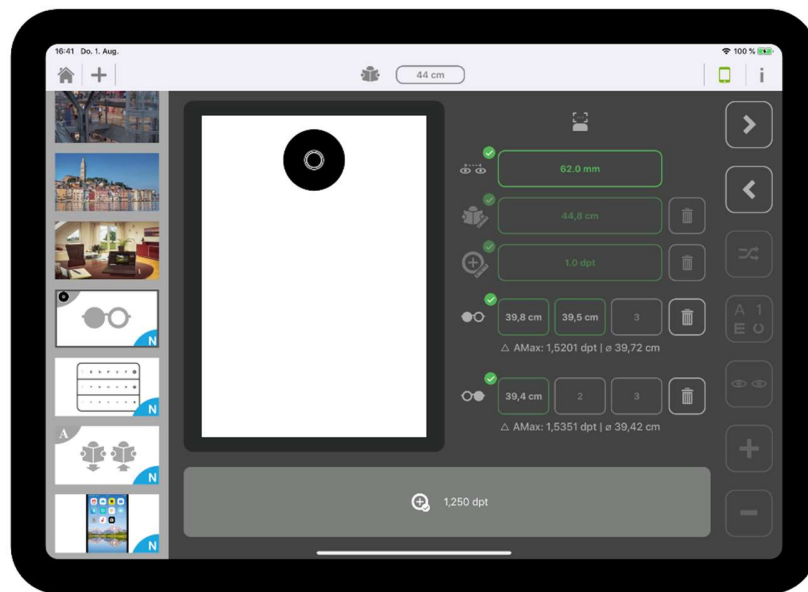
View iPad (Remote)

View iPad (Patient)



The process can be repeated up to 3 times per eye.

- After a successful measurement, the right eye is covered and the measurement for the left eye can start. As a result, the individual addition for the habitual reading distance is calculated, based on the 2/3 rule according to Sheard.





The individually calculated addition is displayed in the lower area of the remote iPad, next to the icon on the right.

- The cover plates are removed and the recommended addition is added to the measuring glasses.

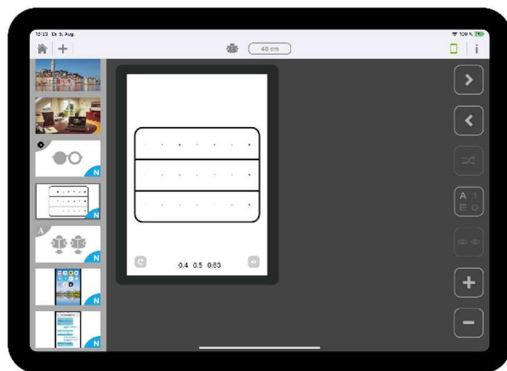
5 Visual acuity test

- In the standard test series, the visual acuity test uses the previously measured habitual reading distance, which is displayed in the center of the upper toolbar on the remote iPad.

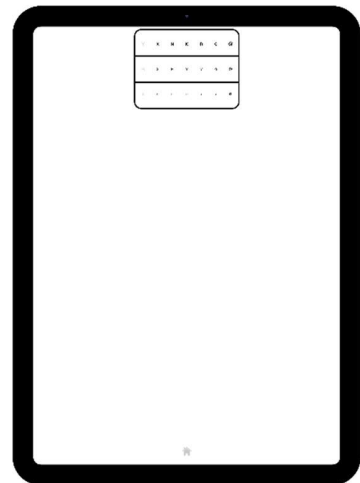
Figure for the habitual reading distance:

- The visual acuity used the distance displayed here.  
- The distance can be changed manually, by tapping the given distance.
- This test determines the near visual acuity of the patient, which should be equivalent to about 80% of the visual acuity for the distance.

View iPad (Remote)



View iPad (Patient)



6 Reading sample for plausibility check

- In the standard test series, this test uses the eye distance, the habitual reading distance and the previously individually calculated addition from the "Maximum Accommodation Test".
- The aim of this test is to determine the usage area with the calculated addition.
- The previously determined habitual reading distance is automatically applied.

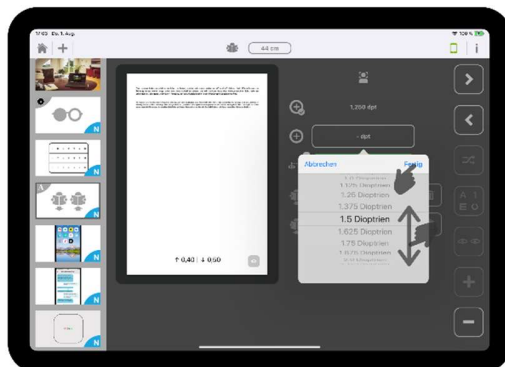
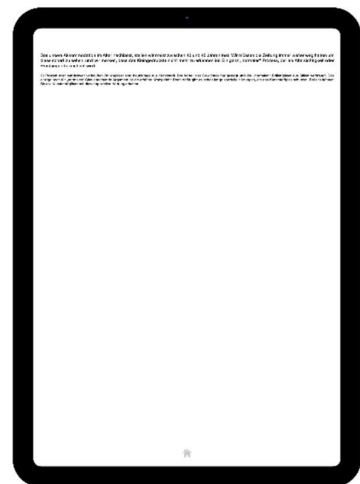
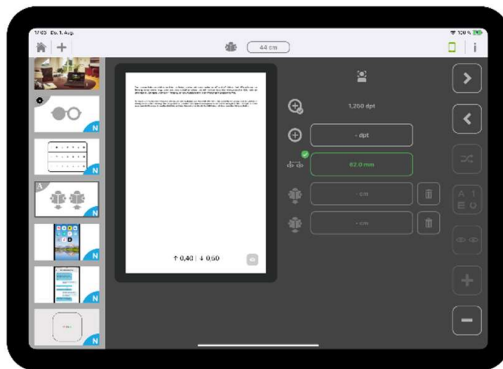
View iPad (Remote)

View iPad (Patient)



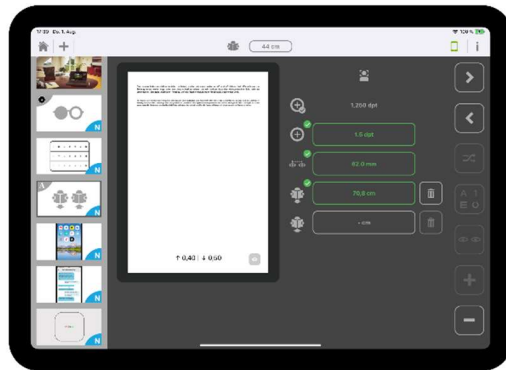
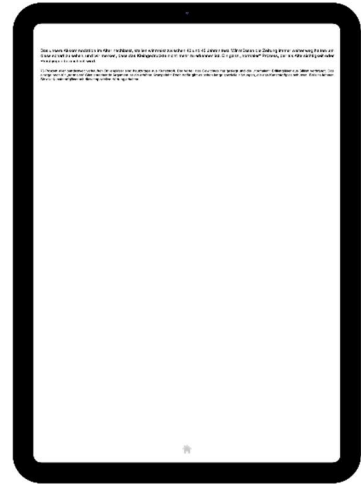
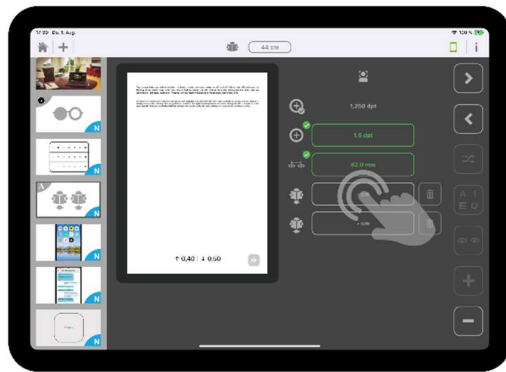
Entering the actual addition

The addition, that is currently used for the measuring glasses has to be entered here. This may differ slightly from the result of the calculated addition.



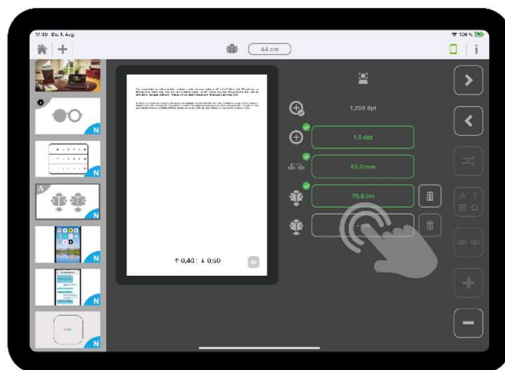
Measurement of the "distance point" with addition

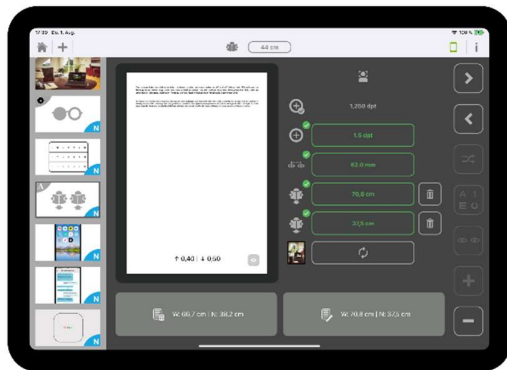
The patient has added the final near correction in the measuring glasses and looks binocularly at the larger reading text. Now, he should move the iPad further away until the letters don't appear as sharp anymore. At this exact distance, the measurement is started.



Measurement of the "near point" with addition

The patient looks binocularly at the smaller reading text. He should move the iPad closer to his eyes, until the letters become blurry, followed by moving the iPad away from his eyes until they appear sharp again. At this point, the measurement is started (the blur limit is searched).





Calculated result

Here, the expected result is displayed, based on the added addition and the habitual reading distance.



Measured result

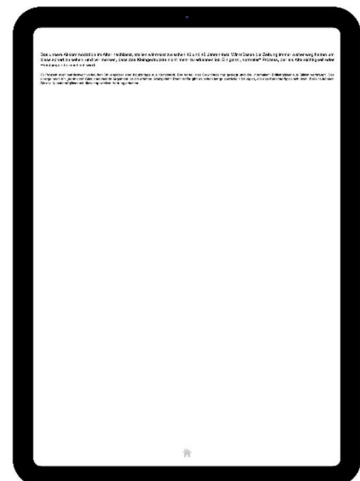
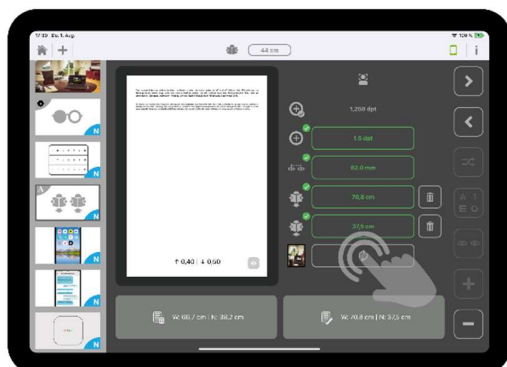
Here, the actual result of the measurement is displayed.

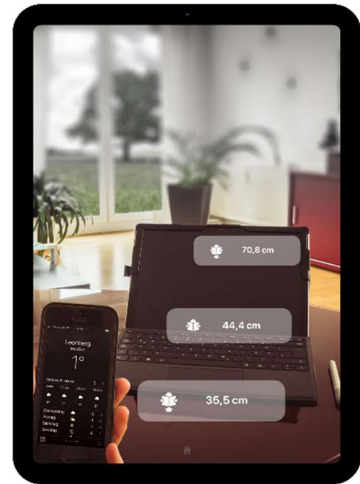
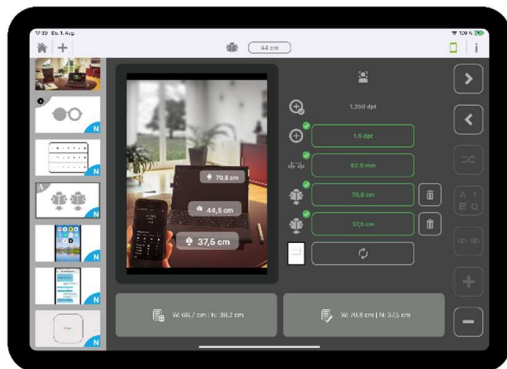


Change of view

Change to the consultation view.

- The measured result is compared with the calculated result. This is an indication, whether the determined addition is correct.
- The obtained results can be presented to the patient by pressing the "Change of view" button.





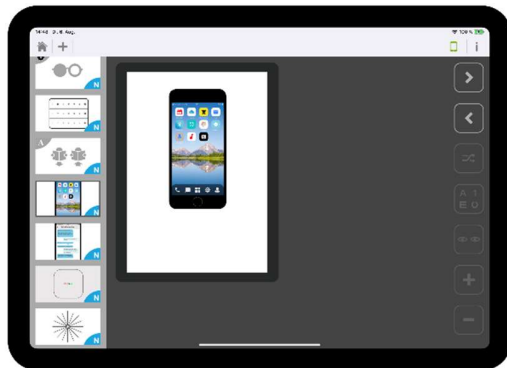
Both iPads display an overview of the distance.

The determined distances and the necessary close correction, glide view, PC glasses, reading glasses etc. can be shown to, as well as discussed with the patient.

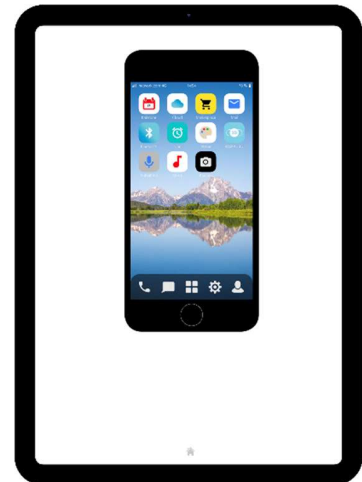
7 Smartphone.

- The aim of the test is to check the reading ability, using realistic reading samples.

View iPad (Remote)



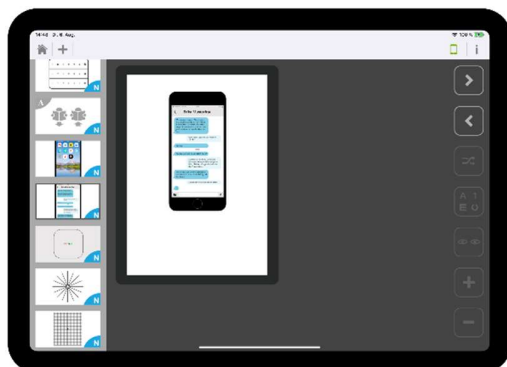
View iPad (Patient)



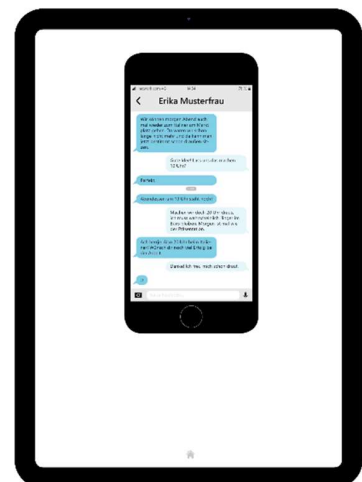
8 Text messages

- The aim of the test is to check the reading ability, using realistic reading samples.

View iPad (Remote)

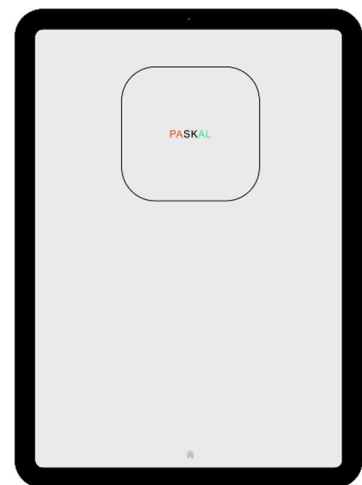
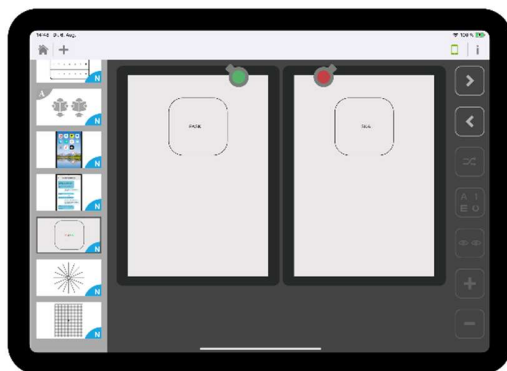


View iPad (Patient)



9 PASKAL Near Test

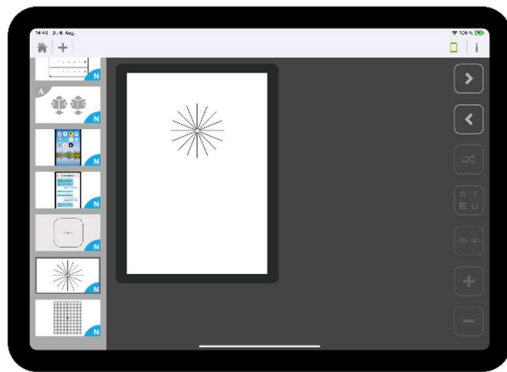
- The aim of the test is a screening for the near-phoria.
- To carry out this test, you need a red-green filter (recommendation: from Oculus) for the measuring glasses. The red filter is added in front of the right and the green filter in front of the left eye. In order to compensate the dioptric wavelength difference between red and green, a measuring glass +0.75 dpt is placed in front of the left eye, in addition to the red filter.
- The patient is asked to read the displayed word.
 - If the patient can read the word >> PASKAL<< there is nothing else to do.
 - If parts of the word disappear, this could be caused by suppressions or a phoria.
 - If the word shifts, this indicates a near-phoria:
 - if the word shifts apart >> PASK SKAL >>, this indicates an esophoria,
 - if the word shifts into one another or on top of each other or if the patient reads >> SKAL PASK >> , this indicates an exophoria
- If the patient's behavior is suspicious and he complains about asthenopic complaints, further optometric close-up tests must be carried out in order to analyze the vergence accommodation system in more detail.



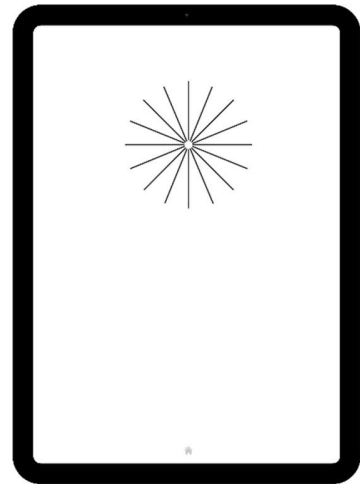
10 Near astigmatism

- This test is used to determine a near astigmatism. **It is performed monocularly.**
- If the patient recognizes all strokes as equally black, there is no indication of a near astigmatism.

View iPad (Remote)



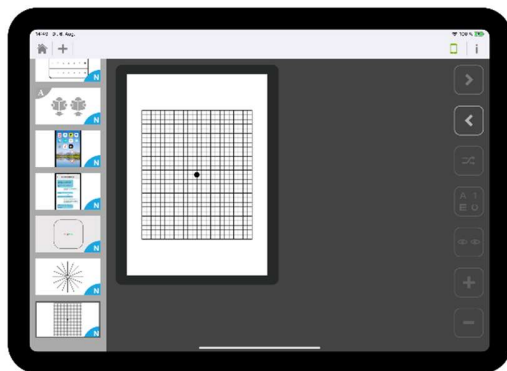
View iPad (Patient)



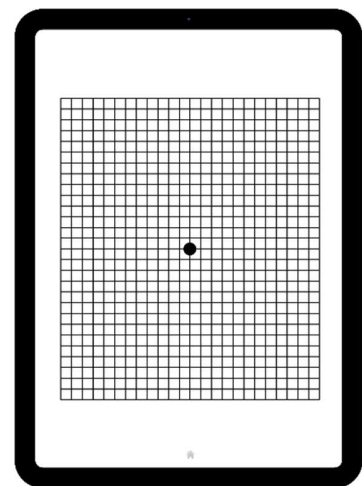
11 Amsler Test (white)

- The aim of the test is to check the central visual field. **The test is performed monocularly.**
- The patient has to answer the following questions:
 - Do you see the black dot in the middle of the square?
 - Do you see the entire test, are all lines visible?
 - Are some lines distorted or interrupted?
 - Are the lines perpendicular?
- If the patient perceives distortions of the lines, this indicates possible retinal diseases that need to be clarified medically.

View iPad (Remote)



View iPad (Patient)



12 Overview of all test categories and tests

Near-test	
Monocular tests	<ul style="list-style-type: none"> ✓ Maximum Accommodation Test ✓ Maximum accommodation test with reading sample ✓ Plausibility test ✓ Optotypes Standard Near ✓ Reading sample plausibility ✓ Reading sample standard ✓ Duane's line figure ✓ Duane (round) ✓ Red-Green Test White ✓ Red-Green test (graduated) ✓ Red-green test (reading sample) ✓ Near astigmatism ✓ Stroke pattern
Stereo (separation) tests	<ul style="list-style-type: none"> ✓ Worth Test ✓ Near exophoria ✓ Hakentest (vertical) ✓ Hakentest (horizontal) ✓ PASKAL Nah Test ✓ Cross test ✓ Cross Test Grolman ✓ Stereo test with different gradation ✓ Pointer test ✓ Double-Pointer test ✓ Schober Test ✓ Schober Test (large) ✓ Random Dot Test
Reading samples	<ul style="list-style-type: none"> ✓ Sheet music ✓ Sheet music 2 ✓ Map ✓ Navigation ✓ Smartphone

	<ul style="list-style-type: none"> ✓ Chat
Screening Tests	<ul style="list-style-type: none"> ✓ Amsler Test (black) ✓ Amsler Test (white) ✓ Amsler Test (black rough) ✓ Amsler Test (white rough) ✓ Ishihara Color Panels 1 ✓ Ishihara Color Panels 2 ✓ Ishihara Color Panels 3 ✓ Ishihara Color Panels 4 ✓ Ishihara Color Panels 5 ✓ Ishihara Color Panels 6 ✓ Ishihara Color Panels 7 ✓ Ishihara Color Panels 8 ✓ Ishihara Color Panels 9 ✓ Ishihara Color Panels 10 ✓ Ishihara Colour Panels 11