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AUTHORS

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Study Group: (none)

ABSTRACT

TITLE: Hardware Modifications to Enhance the Eye Surface Profiler
ABSTRACT BODY:
Purpose: The Eye Surface Profiler (ESP) is an instrument that estimates the shape of the cornea, limbus and a portion of the sclera. Sodium fluorescein is instilled into the ocular tear film, the ESP projects blue fringe patterns from two directions and the resulting green fluorescent emission patterns are analysed. The ESP is a useful clinical and research tool and we found that its operation could be enhanced. The focusing system is relatively insensitive to changes in position and, although crucial to the operation of the instrument, tear film fluorescence cannot be viewed before data is collected. We addressed these issues to enhance its operation.
Methods: A video camera was attached to the ESP to view the instrument's focusing spots from a second direction. The operator can then position the ESP at a more repeatable distance (Z) from the eye. X/Y alignment is handled via the original ESP focusing system. A blue LED ring light, operated via a footswitch, was also attached to the camera to give a live view of tear fluorescence. When consistent fluorescein coverage was observed, the operator switches off the ring light and collects data immediately with the original flash system.
To investigate repeatability, five maps were collected for the right eyes of 3 subjects using A) the original ESP focusing technique (ESPf) and B) our new camera and focusing technique (NEWf). Maps for each subject for each technique were filtered to remove artefacts then averaged to derive a standard deviation map (SD at each map grid point). To compare ESPf with NEWf, the SD maps for all subjects were averaged and split into 'corneal' (central 10 mm diameter) and 'limbal/scleral' (outside 10 mm diameter) regions.
Results: The 'corneal' average SD was 8.6 um for ESPf and 4.8 um for NEWf (44% reduction). The 'limbal/scleral' average SD was 19.6 um for ESPf and 11.1 um for NEWf (43% reduction).
Conclusions: The hardware modifications to the ESP have enhanced focusing precision and reduced variability between maps for the eyes tested. By viewing tear film fluorescence prior to collecting data, we have also ensured that tear film artefacts have less impact on data quality.

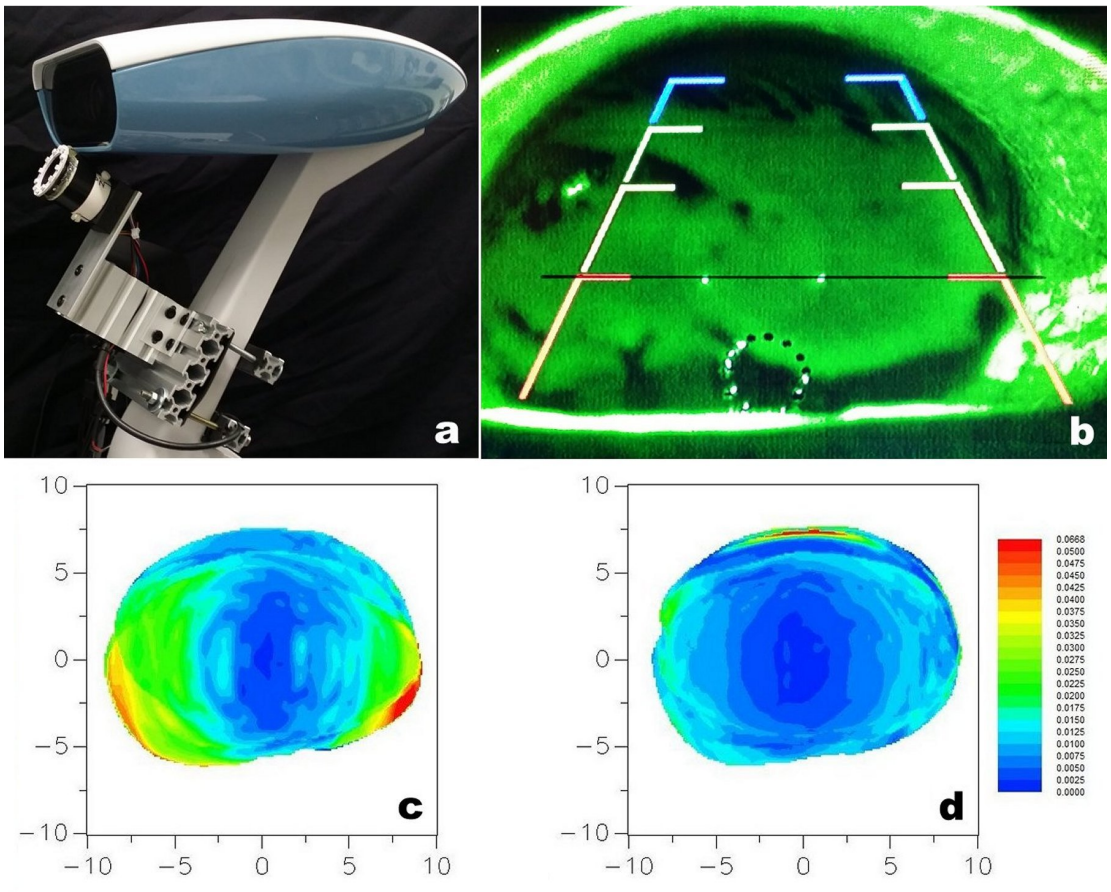

Figure 1 : camera and ringlight on ESP (a), image showing focusing spots and poor fluorescein coverage (b), SD map for ESPf (c) and SD map for NEWf (d)

DETAILS

PRESENTATION TYPE: Poster Only
CURRENT REVIEWING CODE: 1800 corneal imaging and topography - CO
CURRENT SECTION: Cornea
Clinical Trial Registration (Abstract): No
Other Registry Site (Abstract): (none)
Registration Number (Abstract): (none)
Date Trial was Registered (MM/DD/YYYY) (Abstract): (none)
Date Trial Began (MM/DD/YYYY) (Abstract): (none)
Grant Support (Abstract): No
Support Detail (Abstract): None

TRAVEL GRANTS and AWARDS APPLICATIONS

AWARDS:

AFFIRMATIONS

Affirmations: Affirmation that abstract data/conclusions have not been published; not redundant with other submissions from same investigators.
Affirmations: Affirmation to reveal essential structure, novel compound elements, or identify new gene compounds.
Affirmations: Affirmation of compliance with ARVO’s Statement for Use of Human Subjects and/or Declaration of Helsinki.
Affirmations: Affirmation of compliance with ARVO policy on registering clinical trials.
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