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Adapting a dermatological multi-laser fluorescent confocal microscope for ophthalmology applications

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ABSTRACT

Purpose: To adapt for ophthalmology the only multi-laser fluorescent confocal microscope available on the market and initially developed for dermatology (Vivascope 1500, MAVIG, GmbH). The arm that maintains the microscope in contact with the skin was too rigid and imprecise, and the disposable plastic window placed at the interface between the tissue and the microscope objective was too large. Both were not convenient for high quality corneal and ocular adnexa imaging **Methods:** We designed specific stands to create a take-down interface between the confocal microscope, his dermatological arm support and an ophthalmology examination table comprising a 5 degrees of freedom stand (Zeiss, Germany). A male guide rail was machined in polyoxymethylene and permanently fixed on the confocal microscope to avoid repetition of assembly and disassembly. Two females guide rails machined in aluminium 7075 were fixed on the dermatological arm support on the one hand and on an ophthalmological stand on the other hand. Rails were blocked with simple screws. We also designed a new adapter to receive disposable caps already available for corneal confocal microscopy. A lateral camera allowed live visualization of the objective/eye contact **Results:** These new interfaces allowed easy and solid fastening of the confocal microscope on each arms of the two specialties providing optimal conditions for clinical examination. The new ophthalmology arm allowed a precise positioning of the contact objective on the patient eye **Conclusion:** Thanks to theses adaptations, the first multilaser fluorescent confocal microscope is now usable by ophthalmologists, and opens a completely innovative field of exploration