Hydrophobicity of artificial eye surfaces before and after cleaning.

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Background

Mucoid discharge is a pervasive and inconvenient condition associated with artificial eye wear. Artificial eye cleaning regimes are associated with discharge frequency and volume but a causal link has not been found*.

Aim

The aim of this experiment was to measure the hydrophobicity of artificial eye surfaces before and after cleaning and removal of surface deposits.

Method

Eighteen anophthalmic patients were recruited. The wetting angles on the surface of their artificial eyes were measured by a goniometer using distilled water droplets. The measurements were taken before and after cleaning. Statistical analysis was carried out using a 2 sample t-test assuming unequal variances .

Results

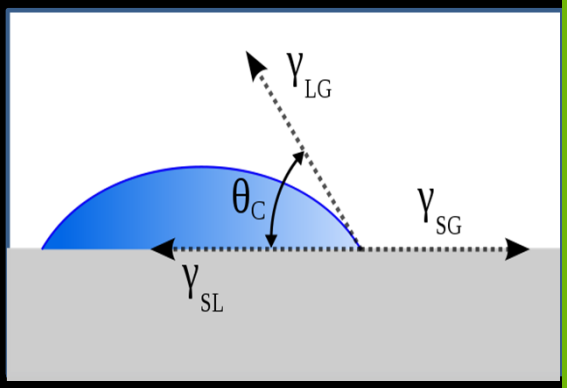
The mean of the wetting angles before cleaning was 29.8° and after cleaning it was 80.8° ($p<0.0001$).

Conclusions

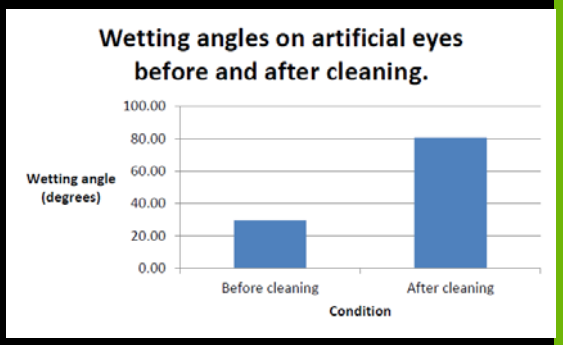
The finding that hydrophobicity levels rose significantly after artificial eyes were cleaned suggests that the tear film is likely to break up when the artificial eye is re-inserted in the socket. The resulting dry areas may mildly irritate the conjunctiva leading to the production of mucins and increased discharge.

The result of this experiment provides causal evidence for the finding that more frequent cleaning is associated with more severe discharge. This is an important outcome because discharge is the main current concern for anophthalmic patients after health of the remaining eye**.

A water droplet is being syringed on to an artificial eye set up in a goniometer.



The wetting angle, θ_C, is the angle formed by the water droplet at the three-phase boundary where the water, air and artificial eye surface intersect.



Surface hydrophobicity increased significantly after cleaning.

*Pine K R, Sloan B, Stewart J, Jacob R. A survey of prosthetic eye wearers to investigate causes of mucoid discharge. *Clinical Ophthalmology.* 2012;6:707-713.
**Pine, KR, B Sloan, J Stewart, R Jacobs, Concerns of anophthalmic patients wearing artificial eyes. *Clinical and Experimental Ophthalmology. 2011;* 39 (1): 47-52.