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End-of-day friction of 1-day contact lens materials

Statement of the Problem: Lubricity, or friction, of contact lenses have been proposed as a predictive quantity of comfort. However, friction is typically evaluated on pristine lenses, ignoring the potential fouling by tear components for one day wearing. In addition, the measured friction force on soft materials is typically not a linear function of the applied normal load, invalidating Amonton's first law and the concept of a "coefficient of friction". In this contribution, a method will be presented for *in-vitro* ageing of soft contact lenses, and a data analysis strategy to convert frictional loss into energy expenditure as an alternative of coefficient of friction as a single figure-of-merit for the lubricity of contact lens materials.

Methodology & Theoretical Orientation: The frictional properties of lenses were evaluated by sliding a mucin-coated glass plate against lens sitting on a rounded sample holder, in a tear like fluid. The normal load was varied between 0.25-4 mN, the sliding speed was 1 mm/s and the sliding distance 1 mm. Two contact lens materials were considered: senofilcon A and delefilcon A. The theoretical treatment of the data was done by treating the lens as an elastic foundation.

Findings: The energy expenditure of the lenses over a 2 mm sliding distance was determined for pristine and aged lenses (mean±95% CI). On senofilcon A, the energy expenditure changed from 66±7 nJ to 86±11 nJ after ageing. On delefilcon A, the corresponding values were 71±8 nJ and 610±75 nJ.

Conclusion & Significance: The frictional properties of contact lens materials are susceptible to simulated ageing. Increases in this energy after a day's wearing may have an impact on the lens perceived level of comfort. Frictional energy is suggested as an alternative to coefficient of friction when quantifying frictional properties of soft contact lens materials.

Biography

At SuSoS we offer various solutions for surface technology, such as coating products-coated devices or coating chemicals-and services such as coating, surface analysis and contract research. Since 2004, we have focused on researching the chemical interactions between substrates and coatings, in order to broaden our understanding and optimize and fine-tune these interactions for many different applications.

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