Synergistic Effects of Polysaccharides on Protein Adsorption and Tribological Behaviors of Orthokeratology Lens

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Orthokeratology is a long-term, costly treatment for myopia correction. The lenses are worn overnight to reshape the cornea. The orthokeratology lens is in contact with the tear film so once it is inserted into the eye, ocular discharges are easily accumulated on the lens after wearing. While the current cleaning mechanism is to use the cleaning solution between weeks, which only removes about 2% of proteins after testing, the remaining ocular discharges that deposit onto the lens may cause corneal abrasions and bacterial infections. In addition, cleaning effectiveness is better when the deproteinizing solution is applied every night, but it is irritating and easy to damage lens surfaces. Hence, this study aims to investigate the effects of tears proteins adsorption and tribological behavior of polysaccharides on orthokeratology lenses. It is our goal to successfully and efficiently remove the adsorption of tear proteins from the lens, thus eradicating the risk of infection and abrasion caused by protein adsorption. Protein deposition analyses were conducted, and the accumulated protein amounts were quantified daily. In-vitro friction tests are designed to simulate the abrasion between the orthokeratology lens and corneal. The goal is to determine whether cleaning the adsorbed proteins on lenses will reduce friction and improve lubrication. Following lens cleaning with polysaccharide-containing cleaning solutions and a commercial contact lens care solution, the protein adsorption behavior and optical characteristics were compared in this study. Additionally, the experiment will study and analyze the properties and surface conditions of the orthokeratology lens.

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