

THE RESTORATIVE POWER OF SODIUM HYALURONATE

Introduction

More and more people have the sensation of dry eyes. In many cases, this is due to fact that many of our activities are carried out in air conditioned environments with very low relative humidity.

Also, the number of people using computers for their work is increasing every day, and this activity significantly decreases blinking frequency, therefore lowering tear quality.

In low humidity, tear evaporation increases and if it is not replaced, the eye dries out and produces the feeling of dry eyes. The result is the appearance of red, bloodshot eyes.

There are wetting drops and artificial tears that contain wetting agents to counteract these symptoms. These symptoms can be eliminated by occasionally adding several drops to the lachrymal sac.

However, the wetting agents in these products, apart from being synthetic, do not remain long in the tears, and they must be re-applied frequently by adding more drops.

To provide a definitive solution to these two disadvantages, what is needed are long-lasting wetting drops that are compatible with the eye.

Acuaiss provides a solution to this problem. As a wetting agent, it uses sodium hyaluronate, which is a natural, bio-compatible molecule that remains in the eye for a long time (long-lasting effect) because of its capacity to attach to the membranes of the cells in the epithelial tissue.

Acuaiss is recommended for people with eye dryness, for use in all activities in air conditioned or low-humidity environments, and also to extend contact lens wear time.

What is sodium hyaluronate?

It is a glycosaminoglycan present in the intercellular matrix of the connective tissue of almost all vertebrate animals. It is a linear repeating disaccharide, β -D-glucuronil- β -N-acetyl-glucosamine with a very high molecular weight.

Sodium hyaluronate is found naturally in the form of sodium salt, forming a highly viscous fluid with excellent wetting and lubricant properties. For example, it is found in high concentrations in the umbilical cord, in the vitreous humor in the eye, in synovial fluid, in groups A and C of the hemolytic streptococcus, etc.

Properties of sodium hyaluronate

Sodium hyaluronate has the following properties:

1. It acts as a lubricating agent due to its visco-elastic behavior.
2. It is a powerful wetting agent.
3. It has bio-adhesive and mucomimetic properties.



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Lubricating properties

Sodium hyaluronate behaves like a visco-elastic polymer with tixotropic properties. This makes it a very suitable component for incorporation into artificial tears and wetting drops.

0.1% sodium hyaluronate solutions, simulating the natural behavior of tears, initially have the consistency of a gel (when the eye is open, they have high viscosity) that transforms into a liquid during blinking (high elasticity during blinking), with its consistency returning to that of a gel after the blink.

If we could see the sodium hyaluronate molecules during blinking, we would better understand this behavior, which occurs in all liquids with non-Newtonian characteristics: the sodium hyaluronate molecules have a structure of spirals that interweave to form gels. These gels are solutions that are quite viscous. During blinking, specifically when the tear layer is prepared to be extended again, the sodium hyaluronate fibers stretch, losing the spiral structure that favors the interweaving, which results in decreased viscosity and more elastic behavior.

Low viscosity during blinking ensures efficient wetting of the entire surface of the eye before the solution returns to its previous viscous consistency.

Wetting property.

The main characteristic that distinguishes sodium hyaluronate from other wetting agents such as hpmc, hec, carmelose, pvp, etc. is that its water-retention capacity is practically independent from ambient humidity. This explains its property of maintaining constant wetting capacity even with significant changes in ambient humidity.

The result of this high level of wettability is that tear transparency remains stable, increasing comfort.

Bio-adhesive and mucomimetic properties

Sodium hyaluronate has bio-adhesive and mucomimetic properties when it is applied to the eye.

It interacts with the pre-corneal mucine layer (the part of the tear closest to the corneal endothelium) forming a protective shield on the surface of the eye that prevents cell loss and increases the duration of the acid's wetting effect, long-lasting effect.

Specific points have been identified where sodium hyaluronate joins in the corneal endothelium of humans and animals. These points are places where the protective shield is anchored.

Acuaiss. Clinical study and long-lasting effect

The product was studied in 38 contact-lens users and 40 people who had received refractive surgery. The results confirm that the product is tolerated extremely well by the patients. 98.7% of the patients tolerated the product well.

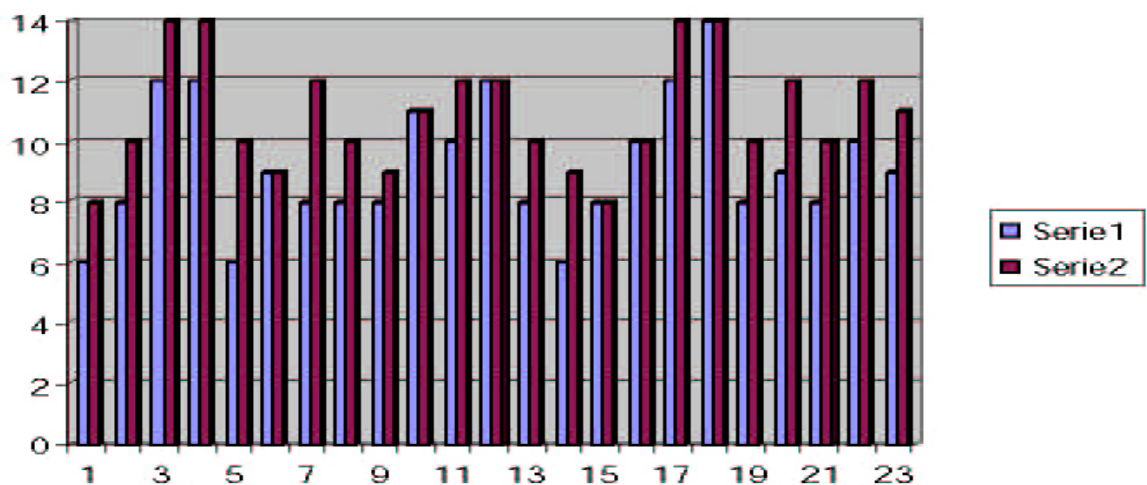


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A significant improvement in tear quality was also observed: 64% of patients, 50 patients (31 who had the operation and 19 contact-lens users) showed an improvement in tear quality during the study.

The long-lasting effect was especially notable in contact-lens users, because a significant increase in the time that they could wear their lenses was observed. Contact-lens users extended the daily wear time because the sodium hyaluronate remains in the eye and does not disappear through the lachrymal sac. Diagram IV helps show how the average lens usage time increases by approximately two hours (the average usage figure increased from 8 to 10 hours).

DIAGRAM IV. Daily wear time in contact-lens users



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