corneal surface forming a glycocalyx, or gel-like, environment that keeps the demulcent system in contact with the ocular surface for a longer period of time. Systane is said to create an ocular shield, allowing for epithelial repair that promotes patient comfort and relief of symptoms.

Studies have shown that formulations of artificial tears without preservatives are less likely to irritate the ocular surface than those with preservatives. Both practitioners and patients should be aware, however, that nonpreserved products may have limited stability and require specialized storage conditions (e.g., refrigeration) once they are opened.

**Dosage and Administration Guidelines** Most patients with mild cases of dry eye instill drops of artificial tears once or twice per day, typically on arising in the morning and/or before bedtime (Table 28-2). Recommending drops at least twice per day is a good starting point. The viscosity of the drops and amount used can then be adjusted based on the patient’s response. For more severe cases, the dosage can be increased to three to four times daily. If the patient’s clinical needs and response to therapy indicate more frequent use, these solutions may be given as often as hourly. Preservative-free products or those with less-toxic preservatives (e.g., Purite or sodium perborate; see Ophthalmic Preservatives) are preferred in patients with moderate to severe disease.

**Safety Considerations** Use of ocular lubricants requires balancing the number of drops per day, the viscosity of the recommended solution, and the presence of a preservative. As the number of drops per day increases, toxicity from preservatives becomes more likely.

Although PVA is compatible with many commonly used drugs and preservatives, certain compounds (including sodium bicarbonate, sodium borate, and the sulfates of sodium, potassium, and zinc) can thicken or gel solutions. For example, sodium borate is found in some extraocular irrigating solutions or irrigants, and may react with contact lens wetting solutions containing PVA. Thus, it is important to be cautious when using solutions that contain PVA.

**Nonmedicated Ophthalmic Ointments**

The primary ingredients in commercial nonprescription ophthalmic ointments (Table 28-1) are white petrolatum (a lubricant and ointment base), mineral oil (which helps the ointment melt at body temperature), and lanolin (which facilitates incorporation of water-soluble medications and also prevents evaporation).

**Mechanism of Action/Indications** The principal advantage of nonmedicated (bland) ointments is their enhanced retention time in the eye, which appears to enhance the integrity of the tear film. Thus, both mucin- and aqueous-deficient eyes can benefit from the application of lubricating ointments.

**Dosage and Administration Guidelines** Ointment formulations are usually administered twice daily (Table 28-3). However, depending on the patient’s clinical needs

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**TABLE 28-2 Administration Guidelines for Eye Drops**

1. If you have difficulty telling whether eye drops touch the eye surface, refrigerate the solution before instilling it. Do not refrigerate suspensions.
2. Wash hands thoroughly. Wash areas of the face around the eyes. Contact lenses should be removed unless the product is designed specifically for use with contact lenses.
3. Tilt head back.
4. Gently grasp lower outer eyelid below lashes, and pull eyelid away from eye to create a pouch.
5. Place dropper over eye by looking directly at it as shown in the drawing.
6. Just before applying a single drop, look up.
7. As soon as the drop is applied, release the eyelid slowly. Close eyes gently for 3 minutes by placing your head down as though looking at the floor (using gravity to pull the drop onto the cornea). Minimize blinking or squeezing the eyelid.
8. Use a finger to put gentle pressure over the opening of the tear duct.
9. Blot excessive solution from around the eye.
10. If multiple drop therapy is indicated, wait at least 5 minutes before instilling the next drop. This pause helps ensure that the first drop is not flushed away by the second, or that the second drop is not diluted by the first.
11. If using a suspension, place that drop in last.
12. If both drop and ointment therapy are indicated, instill the drops at least 10 minutes before the ointment so that the ointment does not become a barrier to the drops’ penetrating the tear film or cornea.

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**TABLE 28-3 Administration Guidelines for Eye Ointments**

1. Wash hands thoroughly. Wash areas of the face around the eyes.
2. If both drop and ointment therapy are indicated, instill the drops at least 10 minutes before the ointment so that the ointment does not become a barrier to the drops’ penetrating the tear film or cornea.
3. Tilt head back.
4. Gently grasp lower outer eyelid below lashes, and pull eyelid away from eye as shown in the drawing.
5. Place ointment tube over eye by looking directly at it.
6. With a sweeping motion, place 1/4 to 1/2 in. of ointment inside the lower eyelid by gently squeezing the tube, but avoid touching the tube tip to any tissue surface.
7. Release the eyelid slowly.
8. Close eyes gently for 1 to 2 minutes.
9. Blot excessive ointment from around the eye.
10. Vision may be temporarily blurred. Avoid activities requiring good visual ability until vision clears.