

The administration of topical eye medications must be given the same priority and attention to safety as drugs administered by the systemic route

How to administer eye drops and ointments

Learning points...

- › Why eye drops and ointments are prescribed
- › Complications with the administration of these topical drugs
- › Procedure for administration of eye drops and ointments

Author Mary Shaw is senior lecturer at University of Manchester.

Abstract Shaw M (2014) How to administer eye drops and ointments. *Nursing Times*; 110: 40, 16-18.

Eye drops and eye ointments are the main treatment for most eye conditions and after eye surgery or surgery to the periocular structures. This article outlines the role nurses play in ensuring the safe administration of topical eye medication and that patients adhere to their treatment regimens.

The eyes are a vital part of the central nervous system. They convert light into electrical impulses that are transmitted to the occipital region of the brain, where they are interpreted into meaningful images. The eyes enable us to navigate our environment, see fine detail, interpret colour, and maintain our health and safety while performing everyday activities. However, little attention tends to be paid to the eyes or their surrounding structures until something goes wrong with them; Marsden and Shaw (2003) highlighted health professionals' lack of understanding of eye conditions.

Administration principles

Eye drops and ointment are prescribed to treat acute or long-term eye conditions and/or the structures surrounding eyes. They are the mainstay of treatment for eye disease as they are administered directly to their site of action and are, therefore, more effective than medications administered orally. They are also used to prevent or treat infection or inflammatory conditions and, in some instances, are used to relieve discomfort or to prevent damage, such as with dry-eye treatment (Marsden, 2007).

For patients to gain maximum therapeutic effect, it is imperative that topical eye medication is given the same priority as medications that are administered systemically. The standards governing the administration of topical eye treatments are exactly the same as those covering other routes of administration; professional guidance on the administration of medicines is available from both the Nursing and Midwifery Council (2010) and the Royal College of Nursing (2013).

Nurses, patients and carers need a good knowledge and understanding of the therapeutic effects and potential side-effects of the topical drugs they administer. They must also be familiar with potential drug interactions that can occur between different types of eye drops and ointment, and also between these and drugs delivered by any other route (Andrews, 2006) – as an example, timolol eye drops may interact with insulin.

Administering drops and ointment

Eye drops and ointment should be administered:

- › At the correct time;
- › In the correct strength;
- › Via the correct route;
- › To the right person;
- › Into the correct eye.

Some eye drops have a long-acting effect on the pupil so it is vital they are instilled into the correct eye. For example, atropine 1% makes the eye light sensitive as the pupil will not contract in bright light. Administration procedures are stated in Boxes 1 and 2.

It is vital to establish the patient is not allergic to any of the eye drops or ointment ingredients. Before instilling these, the eye and eyelids should be examined for signs

5 practice points

1 Eye drops and ointments are prescribed to treat acute or long-term eye conditions

2 Topical eye medications are subject to the same standards as drugs given by other routes

3 Interactions can occur between different types of eye drops and also with drugs delivered by other routes

4 Systemic absorption of eye drops and ointments occurs via the conjunctival blood vessels or the nasal mucosa

5 Eye drop dispensing aids can help patients to self-medicate

FIG 1. INSTILLATION OF EYE DROPS



FIG 2. CLOSE TEAR DUCT



FIG 3. EYE DROP DISPENSER



of improvement or deterioration. In case of the latter, medical help should be sought without delay.

Systemic absorption

Systemic absorption (SA) of eye drops and ointments occurs via the conjunctival blood vessels or the nasal mucosa. This is a particular issue when drugs such as beta-blockers are prescribed (Marsden, 2007). For example, the beta-blocker timolol can cause bronchoconstriction, hypotension, bradycardia, nausea, diarrhoea, anxiety, depression, hallucinations and fatigue. These effects can be reduced through the use of punctual occlusion (keeping the eye closed for a slow count of 60) after administration. Alternatively, the patient can apply digital pressure to the tear drainage system at the nasal corner of the closed eyelids (Fig 2). These techniques minimise the amount of drug being taken into the nasolacrimal system and into the systemic circulation.

In a theatre setting or when the eye is thought to have been lacerated or penetrated, preservative-free eye drops must be used to stop potentially sight-threatening complications. The preservative will cause intraocular irritation and inflammation.

Eye ointment, if prescribed for the eye itself, should be applied into the lower fornix in a strip of approximately 5mm. If prescribed for treating the eyelids, care should be taken to ensure the ointment is not placed in the eye itself.

Eye drop dispensing aids

Eye drop dispensing aids (Fig 3) can help patients to self-medicate and become independent in managing their own condition, particularly when it is long term, such as open-angle glaucoma. The dispensing aid must match the patient's needs and must also fit the eye drop bottle. When patients are prescribed several different eye drops, they will need an aid for each bottle.

Eye drop aids are available on prescription but some pharmaceutical companies provide them free of charge for their products. The International Glaucoma Association

(www.glaucoma-association.com) has developed a compliance briefcase that contains samples of most types of eye drop aids and provides these free of charge to eye units in the UK.

Generic eye drops

Many eye drops are now off licence and a generic product may be prescribed. Generic preparations are generally cheaper than proprietary products; they usually contain the same ingredients but not necessarily in

the same quantities. This may cause sensitivity, resulting in sore eyes. If this occurs, the proprietary item may be dispensed.

It should be noted that generic bottles are not a uniform size and, as a result, the drop size itself may be larger. This can result in the drug not lasting as long as the proprietary brand.

Safety considerations

After administration of eye drops or ointments, patients must be advised against

BOX 1. PROCEDURE FOR INSTILLING EYE DROPS

- Position the patient comfortably, either sitting or lying down (semi-prone or recumbent) with the head supported
- Wash hands before and after instilling eye drops to prevent cross infection and to remove drug residue from the hands
- Some local policies require that non-sterile gloves are used when instilling eye drops or ointment and that an aseptic non-touch technique is used for first post-operative dressing and application of eye drops (Shaw et al, 2010)
- Cleaning the eye may be required, for example when there are crusty or purulent deposits on the eyelids. Clean the lids with non-woven or cotton wool swabs dipped in cooled boiled water or sterile saline solution (cotton wool is contraindicated when there are sutures on the skin)
- Establish that you have the correct eye drops and that they have not expired
- Gently agitate the bottle before use to make sure the drug is properly mixed
- Warn the patient the drops will sting transiently when administered (Andrews, 2006)
- Instil the eye drop into the space (fornix) created by gently pulling down the lower lid (Fig 1)
- Ask the patient to look up – this helps to ensure the eye drop does not land directly onto the sensitive cornea
- Once the eye drop is instilled, release the eyelid, using a tissue or swab to dab any excess from the cheek
- Avoid holding the tissue too close to the eye, to prevent the drug wicking away from the eye
- Where multiple drops and/or ointment are prescribed for one or both eyes, the order of administration is important to ensure maximum therapeutic effect of each (Andrews, 2004) (see Table 1)
- Only one drop of each drug is required; more than this will create overflow onto the cheek. Ideally, five minutes should elapse between administration of a different eye drop to achieve maximum therapeutic effect (Andrews, 2006)

Closed eye technique

Alster et al (2000) recommended a technique for patients who find it difficult to have drops instilled directly into the eye, for example, children or older people:

- Ask the patient to lie flat or with their head tilted back
- Administer a drop of the medication onto the closed eyelid in the nasal corner
- Ask the patient to open the eye and close it gently once the drug has entered it

BOX 2. PROCEDURE FOR APPLYING EYE OINTMENT

- Establish what the eye ointment has been prescribed to treat – it may be for structures other than the eye, such as an eyelid wound
- Wash hands before and after applying ointment, to prevent cross infection and to remove drug residue
- Some local policies require that non-sterile gloves are used when instilling routine eye ointments and that an aseptic non-touch technique is used for the first post-operative dressing and application of eye ointment (Shaw et al, 2010).
- If prescribed for the eye itself, instil a thin ribbon of the ointment into the lower fornix then ask the patient to close the eye
- The ointment may take a few moments to melt and spread over the eye. Initially, it may cause some blurring of the vision
- Wipe the excess from the eyelids
- Normally, when a patient is prescribed eye ointment, it is necessary to clean the eyelids before the next treatment is applied
- If patients are applying their own ointment but find the ribbon technique awkward, suggest they squeeze a blob of the ointment into the lower fornix

driving or operating machinery until their vision has cleared and/or their eyes have stopped stinging.

Correct medication storage is essential. Some eye drops, such as chloramphenicol, must be stored in a refrigerator before and after opening while others are stored in the refrigerator after opening only – it is important to read the instructions carefully.

In hospital settings, eye drops should be discarded after seven days and replaced if the treatment continues. In non-hospital settings, drop bottles should be replaced every 28 days (Andrews, 2006).

Documentation

The drugs administered should be documented accurately in patients' notes in accordance with local and national guidance, and nurses should also evaluate the effect of treatment (RCN, 2013; NMC, 2010).

Conclusion

Nurses, patients and carers must have an up-to-date knowledge and understanding of the therapeutic effects and potential side-effects of the topical drugs they are using for eye conditions. They should also

TABLE 1. ORDER OF EYE DROP/OINTMENT ADMINISTRATION

Order	Drug	
A	Local anaesthetics <ul style="list-style-type: none"> ● Oxybuprocaine hydrochloride ● Proxymetacaine Miotics <ul style="list-style-type: none"> ● Pilocarpine (eye drops) 	Mydriatics and cycloplegics <ul style="list-style-type: none"> ● Atropine ● Cyclopentolate ● Homatropine ● Tropicamide
	Sympathomimetics <ul style="list-style-type: none"> ● Phenylephrine ● Adrenaline ● Apraclonidine ● Brimonidine 	Tear deficiency products <ul style="list-style-type: none"> ● Acetylcysteine ● Carbomers ● Hydroxyethylcellulose ● Hypromellose ● Polyvinyl alcohol ● Sodium chloride
C	Non-steroidal preparations <ul style="list-style-type: none"> ● Diclofenac ● Ketorolac 	Steroids <ul style="list-style-type: none"> ● Betamethasone ● Dexamethasone ● Fluorometholone ● Prednisolone
D	Antibiotics <ul style="list-style-type: none"> ● Cefuroxime ● Chloramphenicol (eye drops) ● Ciprofloxacin ● Fusidic acid ● Gentamicin ● Neomycin ● Penicillin Antifungals <ul style="list-style-type: none"> ● Miconazole Anti-inflammatory <ul style="list-style-type: none"> ● Antazoline ● Lodoxamide ● Sodium cromoglicate Beta-blockers <ul style="list-style-type: none"> ● Betaxolol ● Carteolol ● Levobunolol ● Metipranolol ● Timolol 	Carbonic anhydrase inhibitors <ul style="list-style-type: none"> ● Dorzolamide Prostaglandin analogues <ul style="list-style-type: none"> ● Bimatoprost ● Latanoprost ● Tafluprost ● Travoprost Ointments <ul style="list-style-type: none"> ● Acyclovir ● Atropine ● Betamethasone ● Chloramphenicol ● Chlorotetracycline ● Gentamicin ● Hydrocortisone ● Liquid paraffin ● Pilocarpine
	Source: Andrews (2004)	

ensure the drugs are used at the correct time and in the correct order (Table 1), with an appropriate time lapse (ideally five minutes) between drugs when more than one is prescribed. One drop of each drug is sufficient and action should be taken to ensure the risk of adverse systemic absorption is minimised. Drop-dispensing aids can be used to enable patients to become self-sufficient with eye drop administration. **NT**

References

- Alster Y et al (2000) Intraocular penetration of vancomycin eye drops after application to the medial canthus with closed lids. *British Journal of Ophthalmology*; 84: 3, 300-302.
- Andrews S (2006) Pharmacology. In: Marsden J. *Ophthalmic Care*. Chichester: Whurr Publishers.
- Andrews S (2004) *Order of Eye Drop/Ointment*

Administration. Manchester: Central Manchester FT.

Marsden J (2007) *An Evidence Base for Ophthalmic Nursing Practice*. Chichester: Wiley.

Marsden J, Shaw M (2003) Correct administration of topical eye treatment. *Nursing Standard*; 9: 17, 42-44.

Nursing and Midwifery Council (2010) *Standards for Medicines Management*. tinyurl.com/NMCMedsManagement

Royal College of Nursing (2013) *Better Medicines Management: Advice for Nursing Staff and Patients*. London: RCN. tinyurl.com/RCNBetterMedsManage

Shaw ME et al (2010) *Ophthalmic Nursing*. Chichester: Wiley-Blackwell.

For more on this topic go online...

- Patient support to reduce risk of diabetic retinopathy
- [Bit.ly/NTRetinopathyRisks](http://bit.ly/NTRetinopathyRisks)

