

Demodecosis and its treatment

CLINICAL ALERT

It was recently reported to the College that a patient of one of its members suffered a serious chemical burn of the cornea while being treated for *Demodex* blepharitis with Tea Tree Oil (TTO). The particular treatment is mentioned in the College Clinical Management Guideline on Blepharitis (v14):

'*Demodex* mites can be dose-dependently killed by daily lid scrub with 50% tea tree oil (see evidence base), but this should be undertaken only by experienced practitioners as such preparations are toxic to the ocular surface.'

DEMODEX

The mite *Demodex* is an ectoparasite which colonises the skin of many animals. In humans, two varieties occur on the body surface. *D. folliculorum* is found in the eyelash follicles and *D. brevis* colonises the Meibomian glands and the sebaceous glands of the lashes. Mites are present on most normal healthy individuals, becoming more numerous over the years. Their association with marginal blepharitis has been the subject of debate but there is now evidence that links their presence to chronic lid margin and ocular surface inflammation and Meibomian gland dysfunction. Collectively, this group of conditions, when associated with *Demodex* infestation, is known as ocular demodecosis.

OCULAR DEMODECOSIS: INVESTIGATION AND TREATMENT

Ocular demodecosis causes itching, soreness, redness and crusting of the lid margins, and blurred vision. The characteristic signs include 'cylindrical dandruff' (cuffing of the lash bases), lash distortion and loss, blepharoconjunctivitis, blepharokeratitis and Meibomian gland dysfunction. There is also an association with rosacea.

In order to demonstrate with some certainty that a patient has ocular demodecosis it is recommended that two lashes are removed from each half of both lids (eight in all) and separately examined in pairs on microscope slides, under coverslips, with a very small amount of saline introduced at the side, using a bench microscope at 400x magnification. The *Demodex* 'score' can be expressed as the number of mites per eight lashes (see Gao et al, Invest. Ophthalmol. Vis. Sci. 2005).

The currently suggested treatment for ocular demodecosis involves the use of TTO. This is extracted from the leaves of *Melaleuca alternifolia*, a tree of the myrtle family that is native to Australia. The oil has anti-microbial and anti-inflammatory effects; it is not known which group or groups of its 100 or so components confer these properties. TTO has been shown to be effective in reducing or even eradicating *Demodex* populations in the lid margins.

Recommendations as to how TTO should be applied, how frequently, and at what concentrations, vary somewhat in the literature. However, it is generally agreed that the stronger preparations (typically 50%, diluted with mineral oil) should be administered only by practitioners under slit lamp observation, while the weaker preparations (up to 10%) are believed safe for patient use.

Author	Practitioner TTO strength	Practitioner TTO frequency	Patient TTO strength	Patient TTO frequency
Gao et al 2005 and Gao et al 2007	50%	weekly (three applications)	TTO shampoo, diluted in tap water	twice daily for one month, then daily
Liu et al 2010	50%	daily‡	5% ointment*	daily‡
Koo et al 2012	50%	weekly (three applications)	10% solution*	daily

*not commercially available in the UK

‡recommends *either* practitioner or patient treatment

EVIDENCE BASE

In common with other guideline developers, the College Clinical Management Guidelines Development Group uses the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach to communicate the quality of the evidence and the strength of recommendation for particular interventions. The use of TTO in ocular demodocosis was given a weak recommendation based on low quality evidence for its clinical effectiveness and the potential for harm. Although there is good evidence that TTO reduces *Demodex* counts, evidence for clinical improvement in symptoms is based on two small case series (Gao et al 2005, Gao et al 2007) and a single randomised controlled trial with a high risk of bias (Koo et al 2012). The decision to treat a patient with TTO should only be taken by practitioners following an assessment of the likely benefit of treatment versus the potential for harm.

SUMMARY

Demodex infestation of the lash follicles and the eyelid glands is fairly common and may contribute to the pathogenesis of some cases of chronic lid margin and ocular surface inflammation and Meibomian gland dysfunction. TTO has been shown to be effective in reducing *Demodex* populations. However, because it is known that 50% TTO can be toxic to the ocular surface, the College Clinical Management Guideline on Blepharitis recommends that only experienced practitioners should carry out this particular treatment. Great care is needed in the use of strong preparations of TTO, so that only lid tissue is treated, and afterwards the lid margins should be carefully wiped with dry cotton buds in order to remove residual TTO.

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