**File History – INTERNAL USE ONLY**

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| --- | --- | --- | --- |
| **Date** | **Name** | **Version** | **Notes** |
| 20220805 | Adrian Taylor | 0.1 | Initial draft |
| 20220808 | Samanda Stroud | 0.2 | EQA of first draft |
| 20220808 | Adrian Taylor | 0.3 | Revisions per EQA |
| 20220811 | Adrian Taylor | 1.1 | Updates per client feedback |
| 20220811 | Samanda Stroud | 1.2 | QA of updates against client feedback |
| 20220812 | Adrian Taylor | 1.3 | Updates per EQA |
| 20220823 | Adrian Taylor | 2.1 | Updates per client feedback |
| 20220823 | Samanda Stroud | 2.2 | QA following updates |
| 20220824 | Adrian Taylor | 2.3 | Updates per EQA |
| 20220824 | Adrian Taylor | 2.4 | Incorporation of two additional AR scenes |
| 20220825 | Samanda Stroud | 2.5 | Minor updates following Design QA |
| 20220826 | Eric Chung | 2.6 | Minor updates to AR instructional copy |

**(the second chart below is a summary of the one above. Chart above is for INTERNAL USE ONLY. Chart below is for client)**

**File History**

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| **Date** | **Name** | **Version** | **Notes** |
| 20220808 | Red Nucleus | 1.0 | Draft copy deck creation |
| 20220812 | Red Nucleus | 2.0 | Revised copy deck per client feedback |
| 2022xxxx | Red Nucleus | 3.0 | 2nd round of revisions to copy deck per client feedback |

**Summary and Scope of Project**

* Disease-state education tactic for use at conferences (eg, seeing the mite, collarettes, pathogenesis, diagnosis, management)
* User will view AR experience by scanning QR code affixed to a plush *Demodex* mite
* Up to two AR 3D models paired to content in the MOD animation
* Therapeutic: TP-03 (lotilaner)

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**Learning Objectives**

* Impact of *Demodex* blepharitis on the patient (eg, prevalence of *Demodex* blepharitis, physiological burden, psychosocial burden)
* Disease pathogenesis (eg, collarette composition, MOD of mites in *Demodex* blepharitis)

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| **Scene** | **Topic of Infographic Animation** |
| **1** | About *Demodex* Blepharitis:   * Prevalence of blepharitis * Larger-scale context of *Demodex* blepharitis * Prevalence of *Demodex* blepharitis, especially among patients presenting in eye care clinics * The *Demodex* mite (AR component) |
| **2** | Pathogenesis:   * Collarette formation * Collarettes as pathognomonic sign of *Demodex* blepharitis * Demonstrating how mites contribute to bacterial, chemical, and mechanical damage on the way to collarette formation (AR component) |
| **3** | Symptoms:   * Description of symptoms (AR component) * Difficulties diagnosing *Demodex* blepharitis as its symptoms are like other ocular disorders |
| **4** | Diagnosis:   * Burden associated with symptom duration / misdiagnosis * Importance of looking down during slit lamp exam (AR component) |
| **5** | Patient impact:   * Prevalence of symptoms * Daily activities * Unmet needs in disease management |
| **6** | Summary:   * Key takeaways |

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| **Component** | **Content for Video (script)** | **FPO Images for Video (on-screen)** |
| [Global assets] | [Button] Home  [Button] References  [Footer] 2022 © Tarsus Pharmaceuticals Inc  [Button] Privacy Policy | [Tarsus logo] |
| [Introductory screen] | [Title]  *Demodex* Blepharitis: Clinical AR Experience  [Subtitle]  Exploration of disease pathogenesis and burden  [Button] Begin Experience →  [Button] Onboarding Guide | [FPO visual] |
| [Landing page] | [Title]  *Demodex* Blepharitis: Clinical AR Experience  [Subtitle]  Exploration of disease pathogenesis and burden  [Button] About *Demodex* Blepharitis  [Button] Pathogenesis  [Button] Symptoms  [Button] Diagnosis  [Button] Patient Impact  [Button] Summary | [FPO visual] |
| **[Scene 1 (AR)]** | [Title] About *Demodex* Blepharitis  [Subtitle]  An introduction to blepharitis and *Demodex* mites  [Copy]  Blepharitis is the inflammation of the eyelids, causing irritation and redness.1[Mayo Clinic p1-para1; Mayo Clinic p1-para2]  69% of blepharitis cases are due to *Demodex* mite infestation, resulting in *Demodex* blepharitis.2[Trattler 2022-p1158-table2]  In a retrospective study of 1032 patients across 6 eye care clinics throughout the United States,approximately 60% of patients were diagnosed with *Demodex* blepharitis. This is similar to the proportion of patients diagnosed with dry eye disease (58%). *Demodex* blepharitis is often misdiagnosed due to symptoms that are similar to other ocular conditions.2,3 [Trattler p1158-table2; Fromstein p62-col1-para3]  *Demodex folliculorum* and *Demodex brevis* are the 2 species of *Demodex* mite found in humans. They have a life span of approximately 14 to 18 days.4[Litwin p2-col1-para2, p3-col1-para2]  [Instructional AR copy]  The section below is enhanced with AR content. Look for the button with the icon on the left to begin the AR experience.  [Instructional copy for AR model]  Focus on the *D. folliculorum* mite, which is characterized by its scaly body and 4 pairs of claws that enable it to anchor itself in hair follicles and cause epithelial microabrasions.5,6[Zhang 2020-p390-col1-para2; Liu 2010 p2-para5]  [Button]  Pathogenesis → | [AR component starts at a 1:1 scale, but zooming in is possible]  [AR component]   * Close-up of *Demodex* folliculorum mite, displaying its claws and scaly texture   [FPO image]    [Button] Open in AR  [QR Code]  [Disclaimer copy] iOS 13+, iPadOS 13+, or Android with ARCore 1.9+ required.  [Close button] |
| **[Scene 2 (AR)]** | [Title] Pathogenesis  [Subtitle]  How the *Demodex* mite contributes to disease  [Copy]  Collarettes are a pathognomonic sign of *Demodex* blepharitis.3,7,8[Gao p3089-col2-para3-ln1-3; Kasetsuwan p122-col2-para2-ln1-7; Fromstein p58-col1-para3]  Collarettes are translucent, solidified exudative excretions that form a cylindrical collar that cuffs around the base of the eyelash follicle causing irritation.3,5,7[Zhang p404-col1-para2; Gao p3089-col2-para3-ln1-3; Fromstein p58-col1-para3]  Collarettes are composed of regurgitated undigested mite waste products combined with epithelial cells, keratin, mite eggs, and secreted proteases and lipases.3,7,8[Gao p3093-col1-para4-ln7-11, Kasetsuwan p122-col2-para2-ln1-7; Fromstein p58-col1-para3]  *Demodex* mites impact the eyelids in 3 different ways:   * Mechanical: by attaching to eyelash follicles and leaving claw abrasions that cause lash distension3,5,6[Zhang p404-col1-para1; Liu p2-para5; Fromstein p58-col1-para3] * Bacterial: by carrying bacteria on their exterior surface, which may elicit immune responses6,9[Liu p3-para1; Li p7-para1-ln2-12] * Chemical: by plugging meibomian glands to alter meibum composition, potentially leading to the degeneration of conjunctival tissue5,7[Gao p3093-col2-para2; Zhang p404-col2-para2; p408-col1-para1-ln2-8]   [Instructional AR copy]  The section below is enhanced with AR content. Look for the button with the icon on the left to begin the AR experience.  [Instructional copy for the AR model]  **Inspect the collarettes from the front** In this frontal view, focus on the composition and location of collarettes at the base of the eyelash follicle.  **Try to find the mites hiding in the follicle cross-section**  In this cross-sectional view, focus on the *D. folliculorum* mites burrowing into the epithelial cell lining, leading to inflammation at the base of the eyelash follicle.  [Button] Symptoms → | [AR component starts at a 1:1 scale, but zooming in is possible]  [AR component]   * Front view: close-up of collarettes, including mites and base of eyelashes * Side view: cross-section of eyelashes, displaying base of eyelash follicles and *D. folliculorum* mites burrowing into the epithelial cell lining   [FPO image]  Graphical user interface, application  Description automatically generated  *Demodex folliculorum*  Base of eyelash follicle  Epithelial cell lining  *Demodex folliculorum*  Collarettes  [Front view label 1] Collarettes  [Front view label 2] *Demodex folliculorum*  [Side view label 1] Epithelial cell lining  [Side view label 2] Base of eyelash follicle  [Side view label 3] *Demodex folliculorum*  [Button] Open in AR  [QR Code]  [Disclaimer copy] iOS 13+, iPadOS 13+, or Android with ARCore 1.9+ required.  [Close button] |
| **[Scene 3 (AR)]** | [Title] Symptoms  [Subtitle]  Identifying common clinical features of *Demodex* blepharitis  [Copy]  Common symptoms of *Demodex* blepharitis include10,11:[Yeu p2-col1-para2, p2-col2-para1; O’Dell p2-para3-ln2-5]   * Itchy eyes * Dry eyes * Watery eyes * Missing or misdirected eyelashes * Lid margin inflammation * Lid erythema   In an observational study of 311 patients across 8 ophthalmic and optometric centers throughout the United States, over 50% of patients experienced symptoms of *Demodex* blepharitis for at least 4 years.11[O’Dell p2-para2-ln1-2; p2-para3-ln2-3]  [Instructional AR copy]  The section below is enhanced with AR content. Look for the button with the icon on the left to begin the AR experience.  [Instructional copy for AR model]  Can you spot the common symptoms of *Demodex* blepharitis?  Open in AR for a closer look. Zoom in on the model or move your device closer to see the symptoms located around the eye.  [Button] Diagnosis → | [AR component starts at a 1:1 scale, but zooming in is possible]  [AR component]   * Close-up of the eye of a *Demodex* blepharitis patient * Characteristics: female patient with swollen eyelids looking straight ahead, exposing symptoms of lid erythema, watery eyes, lid margin inflammation, and misdirected lashes   [FPO image]  Graphical user interface  Description automatically generated  Lid margin inflammation  Misdirected lashes  Watery eyes  Lid erythema  [Button] Identification of Symptoms  [Label 1] Lid erythema  [Label 2] Watery eyes  [Label 3] Lid margin inflammation  [Label 4] Misdirected lashes  [Button] Open in AR  [QR Code]  [Disclaimer copy] iOS 13+, iPadOS 13+, or Android with ARCore 1.9+ required.  [Close button] |
| **[Scene 4 (AR)]** | [Title] Diagnosis  [Subtitle]  Identifying *Demodex* blepharitis through slit lamp examination  [Copy]    *Demodex* blepharitis can be diagnosed during a standard slit lamp exam, as collarettes are visible when the patient looks down, exposing the base of lashes on the upper lid.2 [Trattler p1157-para3-ln1-4] Collarettes may be missed during a slit lamp exam even with a lid lift if a patient is looking straight ahead.12[Cataract & Refractive Surgery Today p2-fig]  [Instructional AR copy]  The section below is enhanced with AR content. Look for the button with the icon on the left to begin the AR experience.  [Instructional copy for AR model]  Can you spot the collarettes?  Open in AR for a closer look. Zoom in on the model or move your device closer to see the collarettes located at the base of the lashes. Note that collarettes are much clearer when the patient is asked to look down during a slit lamp exam.  [Button] Patient Impact → | [AR component starts at a 1:1 scale, but zooming in is possible]  [AR component]   * Face of a *Demodex* blepharitis patient * Characteristics: female patient with swollen eyelids looking down during a slit lamp exam, clearly exposing lash bed with collarettes   [FPO image]  Graphical user interface, text, application, chat or text message  Description automatically generated  Ask patients to look down during a slit lamp exam  Collarettes  [Button] Identification of Collarettes  [Label 1] Ask patients to look down during a slit lamp exam  [Label 2] Collarettes [one label, with numerous arrows pointing at the collarettes that are visible]  [Button] Open in AR  [QR Code]  [Disclaimer copy] iOS 13+, iPadOS 13+, or Android with ARCore 1.9+ required.  [Close button] |
| **[Scene 5 (Video)]** | [Title] Patient Impact  [Subtitle]  *Demodex* blepharitis negatively impacts daily quality of life  [Copy]  Patients with *Demodex* blepharitis experience both symptoms and an impact on daily activities.  In an observational study of 311 patients throughout 8 ophthalmic and optometric centers across the United States, approximately half of patients reported itchy eyes (n/N=157/285) and dry eyes (n/N=131/285) among their top-three most bothersome symptoms.11,13[O’Dell p2-para2-ln1-2; p2-para3-ln2-4; Atlas figure 2] Furthermore, approximately one quarter of patients worried that *Demodex* blepharitis caused their eyes or eyelids to have a negative appearance to others (n/N=68/296).11,14[O’Dell-p3-para1-ln6-8; Atlas manuscript p6-para5-ln8-9]  There are currently no FDA-approved prescription treatments for *Demodex* blepharitis. Therefore, there is an unmet need to help treat this condition.10,15[Lam-p1-abstract; Yeu p8-col1-para1] | [10 second video clip]  [View of slit lamp apparatus, slowly panning to show head-on view of patient experiencing discomfort (eg displayed by patient blinking)]  [FPO image] |
| **[Scene 6]** | [Title] Summary  [Copy]  In this module, you have learned about the prevalence and pathological features of *Demodex* blepharitis, as well as how to diagnose this condition during a routine eye exam.  The AR exploration experience also helped you understand:   * The importance of patients looking down during a slit lamp exam to identify collarettes and diagnose *Demodex* blepharitis * The high prevalence of *Demodex* blepharitis patients that come into eyecare clinics |  |

**References:**

**1.** Mayo Clinic. Blepharitis. Accessed August 5, 2022. https://www.mayoclinic.org/diseases-conditions/blepharitis/symptoms-causes/syc-20370141

**2.** Trattler W, Karpecki P, Rapoport Y, et al. The prevalence of *Demodex* blepharitis in US eye care clinic patients as determined by collarettes: a pathognomonic sign. *Clin Ophthalmol.* 2022;16:1153-1164. doi:10.2147/OPTH.S354692

**3.** Fromstein SR, Harthan JS, Patel J, et al. Demodex blepharitis: clinical perspectives. *Clin Optom (Auckl)*. 2018;10:57-63. doi:10.2147/OPTO.S142708

**4.** Litwin D, Chen W, Dzika E, et al. Human permanent ectoparasites; recent advances on biology and clinical significance of *Demodex* mites: narrative review article. *Iran J Parasitol*. 2017;12(1):12-21.

**5.** Zhang AC, Muntz A, Wang MTM, et al. Ocular *Demodex*: a systematic review of the clinical literature. *Ophthalmic Physiol Opt*. 2020;40(4):389-432. doi:10.1111/opo.12691

**6.** Liu J, Sheha H, Tseng SC. Pathogenic role of *Demodex* mites in blepharitis. *Curr Opin Allergy Clin Immunol.* 2010;10(5):505-510. doi:10.1097/ACI.0b013e32833df9f4

**7.** Gao YY, Di Pascuale MA, Li W, et al. High prevalence of *Demodex* in eyelashes with cylindrical dandruff. *Invest Ophthalmol Vis Sci*. 2005;46(9):3089-3094. doi:10.1167/iovs.05-0275

**8.** Kasetsuwan N, Kositphipat K, Busayarat M, et al. Prevalence of ocular demodicosis among patients at tertiary care center, Bangkok, Thailand. *Int J Ophthalmol.* 2017;10(1):122-127. doi:10.18240/ijo.2017.01.20

**9.** Li J, O’Reilly N, Sheha H, et al. Correlation between ocular *Demodex* infestation and serum immunoreactivity to *Bacillus* proteins in patients with facial rosacea. *Ophthalmology.* 2010;117(5):870-877. doi:10.1016/j.ophtha.2009.09.057

**10.** Yeu E, Holdbrook M, Baba SN, et al. Treatment of *Demodex* blepharitis: a prospective, randomized, controlled, double-masked clinical trial comparing topical lotilaner ophthalmic solution, 0.25% eyedrops to vehicle. *Ocul Immunol Inflamm*. 2022:1-9. doi:10.1080/09273948.2022.2093755

**11.** O’Dell L, Devries D, Dierker D, et al. Impact of *Demodex* blepharitis on patients. Oral presentation at: American Academy of Optometry Annual Meeting; November 3-6, 2021; Boston, MA. Session P-05.

**12.** Cataract & Refractive Surgery Today. Impact of Demodex blepharitis and importance in early detection. Accessed August 5, 2022. https://crstoday.com/articles/oct-2021/impact-of-demodex-blepharitis-and-importance-of-early-detection

**13.** Data on file. Atlas Publication Figure 2. Tarsus Pharmaceuticals Incorporated; 2022.

**14.** Data on file. Atlas Manuscript Draft. Tarsus Pharmaceuticals Incorporated; 2022.

**15.** Lam NSK, Long XX, Li X, et al. Comparison of the efficacy of tea tree (*Melaleuca alternifolia*) oil with other current pharmacological management in human demodicosis: a systematic review. *Parasitology*. 2020;147(14):1587-1613. doi:10.1017/S003118202000150X