# Boy, 9, With Eye Pain, Blurred Vision, and Tearing

Angela Ullon, MPAS, PA-C

**Angela Ullon** practices at Redlands Community Hospital in Redlands, CA.

IN THIS ARTICLE



An otherwise healthy 9-year-old boy is brought to the emergency department (ED) by his father for evaluation of severe pain, blurry vision, and four hours of tearing in his right eye. The patient was in school when he experienced sudden-onset irritation and scratching pain that caused him to rub his eye. He says it "feels like there is something in my eye," but he denies any known substance or foreign body. He has no medical or surgical history, does not wear contact lenses or eyeglasses, and denies loss of vision. There is no history of recent illness or travel.

On evaluation, the patient is in no acute distress but is holding his right eye closed due to foreign-body sensation and increased photosensitivity and tearing. There is no obvious erythema or swelling in the upper or lower eyelids bilaterally. A visual acuity test with a Snellen eye chart shows 20/20 vision in the left eye and 20/50 in the right, secondary to pain, photophobia, and excessive tearing. The patient's right sclera is significantly injected. Intraocular pressure, measured with a tonometer, is 12 to 14 mm Hg. A fluorescein stain of the eye yields no significant findings. The globe is intact.

At first glance, a slit-lamp exam shows no obvious signs of a foreign body. But much higher magnification reveals substantial conjunctival injection and numerous intracorneal linear foreign bodies in the right eye (see Figure 1 for example [not the case patient]). The anterior chamber shows no inflammatory reaction, and findings in the posterior segment are unremarkable.

The initial diagnosis is simple conjunctivitis—but closer examination reveals multiple fine, barbed hairs embedded in the patient's right cornea. Upon further questioning, the patient reports that prior to symptom onset, he had been holding the classroom pet, a Chilean Rose tarantula, in the palm of his hands.

## DISCUSSION

Foreign body injury is a common cause of ocular pain and corneal damage, which can lead to challenging complications. Ophthalmic emergencies account for 2% of ED visits in the US annually and are a major cause of visual impairment.[1] But when a painful eye is the chief complaint, contact with insects, plants, or spiders is rarely included in the differential. Tarantulas are popular classroom and household pets, however, and ocular injury should be suspected in anyone who has been holding a tarantula prior to onset of pain.

### Ophthalmia nodosa

Tarantulas are one of the most common arachnids known to cause *ophthalmia nodosa*—a granulomatous reaction of the conjunctiva or cornea to an implanted plant, insect, or spider hair that typically manifests with photophobia, irritation, and chemosis.[2,3] Tarantulas, when scared or defending their eggs, shoot urticating setae at the threat—a defensive mechanism largely unknown to parents, tarantula owners, and medical professionals.

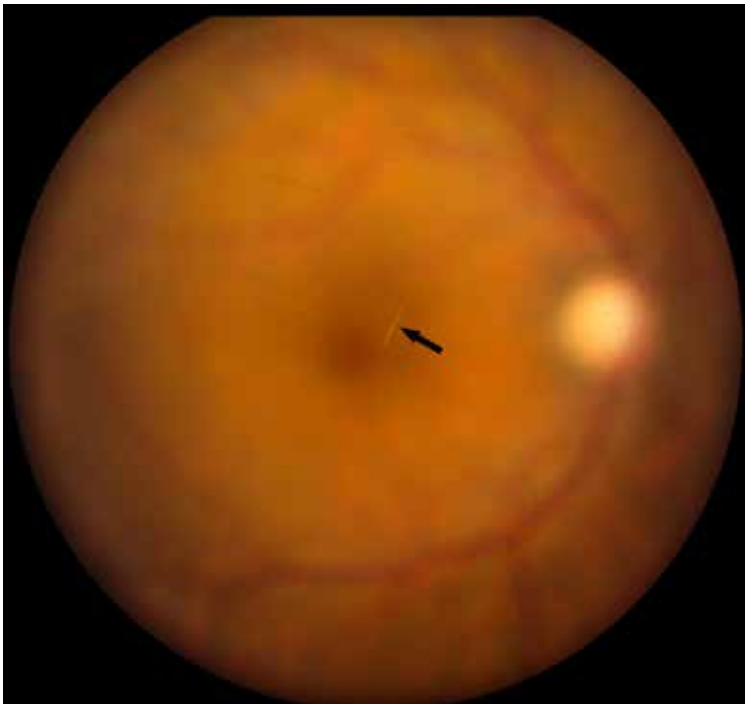
Urticating setae are found in roughly 90% of tarantula species throughout tropical and subtropical regions.[4] Depending on the species, setae can be located on the distal prolateral surface of the palpal femur or the dorsum of the abdomen. They can be released when the tarantula scratches its legs against the abdominal urticating setae patch or scratches the palps against

the chelicerae (appendages in front of the mouth), or when direct exterior contact is made with the abdominal setae.[4]

There are six types of urticating hairs. Each is attached to the spider's cuticle by either a stalk (which represents the break-off region) or a socket.[4] Tarantula hairs range in size from 0.1 mm to 0.3 mm and have a sharp, pointed head and numerous barbs, which help embed them in the target.[5] They are long and thin, to facilitate deep tissue penetration, and can enter the eyes, lungs, or other body parts (see Figure 2, page 36).

Ocular injury from tarantula hairs commonly involves conjunctival injection, foreign body sensation, periorbital facial rash, photophobia, and tearing.[3] When a tarantula's cloud of barbed hairs is flicked into the eye and pierces the cornea, it can cause infection, irritation, scarring on the cornea, or vision loss. Eye movement or rubbing can cause the hairs—and their toxins—to migrate over time, traveling like an arrow (the tip and barbs resist backward movement) to the anterior chamber, lens, vitreous, and retina.[6,7] This can cause corneal scars, cataracts, vitritis, or macular edema, and creates the possibility for acute or chronic conjunctivitis.[7]

**FIGURE 1**



Patients often report a foreign-body sensation, but initial examination may show no obvious signs of the source. High magnification is needed to appreciate the offending material.
Photo courtesy of Richard Hackel, FOPS, and the Kellogg Eye Center.

## Diagnosis and management

Ophthalmic emergencies can affect the visual system and, if left untreated, can lead to permanent vision loss. Affected patients require immediate medical attention and should be referred to an ophthalmologist for follow-up care.

***Diagnosis.*** A thorough history and physical exam are of utmost importance; tiny setae can be easily overlooked if the examiner is not diligent, and the similar symptomatology can lead to misdiagnosis as simple conjunctivitis.[3] A visual acuity test and slit-lamp exam are useful for confirmation.

***Treatment.*** Once the diagnosis is confirmed, treatment should consist of mild topical antibiotics and steroids to effectively control infection and inflammation. While topical steroids may be appropriate, local adverse events associated with their use (eg, glaucoma, cataracts) can be problematic. Gentle eye irrigation has been noted by some researchers as contraindicated, while others find it useful to flush out some of the hairs.[5,8,9]

Most of the visible protruding tarantula hairs can and should be removed under microscopy during slit-lamp exam. Hairs that are buried in the cornea, however, are nearly impossible to remove and pose a threat of further complications, as described. Conservative management with careful observation is therefore recommended. If the patient develops a granuloma, excision—along with a course of systemic steroids and setae removal via vitrectomy—may be needed.[9]

The good news is that, in many cases, deeper hairs are absorbed without complication, making their removal unnecessary.[5] Factors that encourage leaving the setae untouched include a large number of hairs, deep corneal penetration, lack of patient tolerance for the procedure, and risk for perforation.[3]

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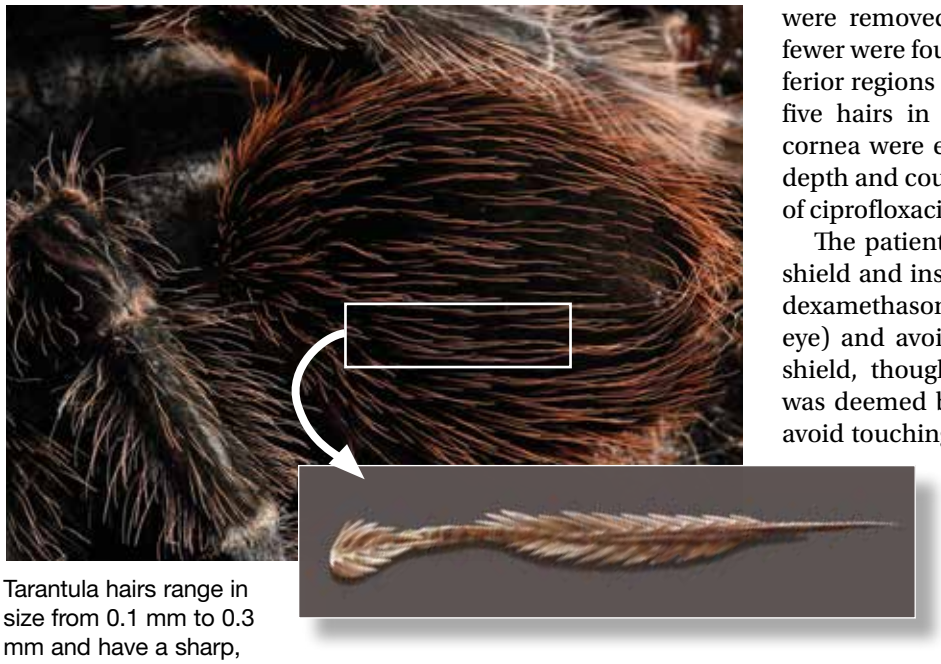
**FIGURE 2**



Tarantula hairs range in size from 0.1 mm to 0.3 mm and have a sharp, pointed head and numerous barbs that help them embed in the target. They are long and thin, to facilitate deep tissue penetration.
Credits: Top, ScienceSource/Francesco Tomasinelli; Bottom, ScienceSource/Power and Syred.

More invasive treatments (eg, laser photocoagulation, intraocular surgery) to remove offending hairs are possible, but literature on the outcome of these interventions is limited. One report to date used argon laser photocoagulation to treat endophthalmitis from vitreous hairs.[10] The laser can fragment the hairs so that they lose their barbed characteristic and cannot penetrate deeper.[6]

***Follow-up.*** Close follow-up is advised, and patients should be educated on the importance of medication compliance and return visits for reevaluation. Given the potential dangers of handling these spiders, tarantula owners should be advised to use protective gloving and goggles.[2,5,8,9]

## OUTCOME FOR THE CASE PATIENT

The case patient was sent to an ophthalmologist on day 1. Proparacaine was placed in his right eye, and all of the superficial tarantula hairs were removed using 25- and 30-gauge needles with jeweler forceps under slit-lamp microscopy. Most of the hairs were removed from the superior cornea; fewer were found in the paracentral and inferior regions of the cornea. Approximately five hairs in the paracentral area of the cornea were embedded in the midstromal depth and could not be removed. One drop of ciprofloxacin was administered.

The patient was sent home with an eye shield and instructions to use tobramycin/dexamethasone eye drops (qid in his right eye) and avoid rubbing the eye. (The eye shield, though not technically necessary, was deemed beneficial to help the patient avoid touching the eye.) He was scheduled to return to the clinic one week later.

On follow-up, a careful exam performed under microscopy showed that the five tarantula hairs were still embedded, and an additional six hairs were found in the deep stroma. Superficial punctate keratitis—an eye disorder caused by epithelial cell death on the surface of the cornea—was noted, but no anterior chamber cells were seen. The patient was instructed to continue using the eye drops as prescribed until finished, then start using loteprednol (tid) and artificial lubricating tears (every 2 h).

He returned to the clinic every two weeks for a total of 10 visits. At the end of the treatment course, the remaining tarantula hairs were unable to be removed. The patient used tapering doses of topical eye steroids and antibiotic drops secondary to flare-up.

## CONCLUSION

Determining the etiology of ophthalmic emergencies is essential to timely and appropriate management. In this case, a recognized but often overlooked cause, tarantula hairs, made the diagnosis more complicated than simple conjunctivitis. When ocular injury is suspected, the provider must obtain an accurate and detailed history along with a thorough physical exam. Since patients must comply with medication regimens to prevent acute and chronic infection, a clear treatment and follow-up plan should be established. With

these in place, ophthalmia nodosa caused by urticating setae can be effectively managed. **CR**

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