

What's Eating You? Chiggers

Megan E. Hohenberger, MD; Dirk M. Elston, MD

PRACTICE POINTS

- The classic clinical presentation of chigger bites includes severe pruritus, cutaneous swelling, and erythematous papules and papulovesicles appearing in groups, most commonly affecting the legs and waistline.
- Because itching generally subsides within 72 hours of the chigger bite and cutaneous lesions typically heal within 1 to 2 weeks, treatment is focused on symptomatic relief.
- Symptomatic relief may be achieved by means of topical antipruritics or oral antihistamines as well as potent topical corticosteroids or an intralesional triamcinolone acetonide injection in severe cases.

Belonging to the Trombiculidae family of mites, chigger specifically refers to the larval stage of the mite's life cycle when it is able to bite its host. Although humans act as an accidental host, chiggers will latch on to the skin and their feeding process leads to localized inflammation and irritation. In most cases, these pruritic erythematous papules and papulovesicles are self-healing within a couple weeks, so only symptomatic relief is required as necessary by means of topical antipruritics, oral antihistamines, topical corticosteroids, or an intralesional triamcinolone acetonide injection in severe instances. The best practice, however, is to take preventative measures by completely covering one's skin and applying products containing DEET to the skin and clothing when traveling in infested areas.

Cutis. 2017;99:386-388.

Identifying Characteristics and Disease Transmission

Chiggers belong to the Trombiculidae family of mites and also are referred to as harvest mites, harvest bugs, harvest lice, mower's mites, and redbugs.¹ The term *chigger* specifically describes the larval stage of this mite's life cycle, as it is the only stage responsible for chigger bites. The nymph and adult phases feed on vegetable matter. Trombiculid mites are most often found in forests, grassy areas, gardens, and moist areas of soil near bodies of water. *Trombicula alfreddugesi* is the most common species in the United States, and these mites mainly live in the southeastern and south central regions of the country. Conversely, *Trombicula autumnalis* is most predominant in Western Europe and East Asia.¹

The life cycle of the mite includes the egg, larval, nymphal, and adult stages.² Due to their need for air humidity greater than 80%, mites lay their eggs on low leaves, blades of grass, or on the ground. They spend most of their lives on vegetation no more than 30 cm above ground level.³ Eggs remain dormant for approximately 6 days until the hatching of the prelarvae, which have 6 legs and are nonfeeding. It takes another 6 days for the prelarvae to mature into larvae. Measuring 0.15 to 0.3 mm in length, mite larvae are a mere fraction of the size of adult mites, which generally are 1 to 2 mm in length, and are bright red or brown-red in color (Figure 1).

The biting larvae have many acceptable hosts including turtles, toads, birds, small mammals, and

From the Department of Dermatology and Dermatologic Surgery of the Medical University of South Carolina, Charleston.

The authors report no conflict of interest.

All images are in the public domain.

Correspondence: Megan E. Hohenberger, MD
(mehohenberger@gmail.com).

humans, which act as accidental hosts. Larvae remain on vegetation waiting for a suitable host to pass by so they may attach to its skin and remain there for several days. In the exploration for an ideal area to begin feeding (eg, thin epidermis,⁴ localized increased air humidity⁵), larvae can travel extensively on the skin; however, they often are stopped by tight-fitting sections of clothing (eg, waistbands), so bites are mostly found in clusters. To feed, mite larvae latch onto the skin using chelicerae, jaw-like appendages found in the front of the mouth in arachnids.⁶ They then inject digestive enzymes that liquefy epidermal cells on direct contact, which results in the formation of a stylostome from which the mites may suck up lymph fluid and broken down tissue.⁷ Although the actual initial bite is painless, this feeding process leads to the localized inflammation and irritation noticed by infested patients.⁸

The classic clinical presentation includes severe pruritus and cutaneous swelling as well as erythema caused by the combination of several factors, such as enzyme-induced cellular mechanical damage, human immune response, and sometimes a superimposed bacterial infection. Papules and papulovesicles appear in groups, most commonly affecting the legs and waistline (Figure 2).⁹ Itching generally occurs within hours of larval latching and subsides within 72 hours. Cutaneous lesions typically take 1 to 2 weeks to heal. In some rare cases, patients may react with urticarial, bullous, or morbilliform eruptions, and the inflammation and pruritus can last for weeks.⁶ Summer penile syndrome has been noted in boys who display a local hypersensitivity to chigger bites.¹⁰ This syndrome represents a triad of penile swelling, dysuria, and pruritus, which lasts for a few days to a few weeks.



Figure 1. Chigger mite larval form with 6 legs.

Disease Management

Because the lesions are self-healing, treatment is focused on symptomatic relief of itching by means of topical antipruritics (eg, camphor and menthol, pramoxine lotion) or oral antihistamines (eg, diphenhydramine, hydroxyzine). Potent topical corticosteroids may be used to alleviate inflammation and pruritus, especially when occluded under plastic wrap to increase absorption. In severe cases, an intralesional triamcinolone acetonide (2.5–5 mg/mL) injection may be required.⁹ The best practice, however, is to take preventative measures to avoid becoming a host for the mites. Patients should take special care when traveling in infested areas by completely covering their skin, tucking pant cuffs into their socks, and applying products containing DEET (N,N-diethyl-meta-toluamide or N,N-diethyl-3-methylbenzamide) to the skin and clothing. The odds of prevention are increased even further when clothing also is treated with permethrin.¹¹

In parts of Asia and Australia, these mites may transmit *Orientia tsutsugamushi*, the organism responsible for scrub typhus, through their saliva during a bite.¹² Scrub typhus is associated with an eschar, as well as fever, intense headache, and diffuse myalgia. It responds well to treatment with doxycycline 100 mg twice daily.¹³ Studies investigating genetic material found in trombiculid mites across the globe have detected *Ehrlichia*-specific DNA in Spain,¹⁴ *Borrelia*-specific DNA in the Czech Republic,^{15,16} and *Hantavirus*-specific RNA in Texas.¹⁷ There is evidence that the mites play a role in maintenance of zoonotic reservoirs, while humans are infected via ingestion or inhalation of infectious rodent excreta.¹⁸



Figure 2. Chigger bites on the ankle.

REFERENCES

1. McClain D, Dana AN, Goldenberg G. Mite infestations. *Dermatol Ther.* 2009;22:327-346.
2. Lane RP, Crosskey RW. *Medical Insects and Arachnids.* London, England: Chapman & Hall; 1993.
3. Gasser R, Wyniger R. Distribution and control of Trombiculidae with special reference to *Trombicula autumnalis* [article in German]. *Acta Trop.* 1955;12:308-326.
4. Jones BM. The penetration of the host tissue by the harvest mite, *Trombicula autumnalis* Shaw. *Parasitology.* 1950;40:247-260.
5. Farkas J. Concerning the predilected localisation of the manifestations of trombidiosis. predilected localisation and its relation to the ways of invasion [article in German]. *Dermatol Monatsschr.* 1979;165:858-861.
6. Jones JG. Chiggers. *Am Fam Physician.* 1987;36:149-152.
7. Shatrov AB. Stylostome formation in trombiculid mites (Acariformes: Trombiculidae). *Exp Appl Acarol.* 2009;49:261-280.
8. Potts J. Eradication of ectoparasites in children. how to treat infestations of lice, scabies, and chiggers. *Postgrad Med.* 2001;110:57-59, 63-64.
9. Elston DM. Arthropods and infestations. *Infectious Diseases of the Skin.* Boca Raton, FL; CRC Press; 2009: 112-116.
10. Smith GA, Sharma V, Knapp JF, et al. The summer penile syndrome: seasonal acute hypersensitivity reaction caused by chigger bites on the penis. *Pediatr Emerg Care.* 1998;14:116-118.
11. Young GD, Evans S. Safety of DEET and permethrin in the prevention of arthropod attack. *Military Med.* 1998;163:324-330.
12. Watt G, Parola P. Scrub typhus and tropical rickettsioses. *Curr Opin Infect Dis.* 2003;16:429-436.
13. Panpanich R, Garner P. Antibiotics for treating scrub typhus. *Cochrane Database Syst Rev.* 2000;2:CD002150.
14. Fernández-Soto P, Pérez-Sánchez R, Encinas-Grandes A. Molecular detection of *Ehrlichia phagocytophila* genogroup organisms in larvae of *Neotrombicula autumnalis* (Acari: Trombiculidae) captured in Spain. *J Parasitol.* 2001;87:1482-1483.
15. Literak I, Stekolnikov AA, Sychra O, et al. Larvae of chigger mites *Neotrombicula* spp. (Acari: Trombiculidae) exhibited *Borrelia* but no *Anaplasma* infections: a field study including birds from the Czech Carpathians as hosts of chiggers. *Exp Appl Acarol.* 2008;44:307-314.
16. Kampen H, Schöler A, Metzen M, et al. *Neotrombicula autumnalis* (Acari, Trombiculidae) as a vector for *Borrelia burgdorferi* sensu lato? *Exp Appl Acarol.* 2004;33:93-102.
17. Houck MA, Qin H, Roberts HR. Hantavirus transmission: potential role of ectoparasites. *Vector Borne Zoonotic Dis.* 2001;1:75-79.
18. Yu XJ, Tesh RB. The role of mites in the transmission and maintenance of Hantaan virus (Hantavirus: Bunyaviridae). *J Infect Dis.* 2014;210:1693-1699.