

All Stings Considered...

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Of the more than 3,000 kinds of spiders in the United States, only about 60 species have been implicated as causing medically significant bites to people. Many spiders are not capable of breaking the skin with their fangs while other species contain venom that causes no reaction. Spiders are usually very timid and will only bite if mishandled, cornered, or injured. Even when they do bite, spiders do not always inject venom. The severity of the reaction to a spider bite will differ among individuals, but most spider bites are less painful than a bee sting.

Spider bites are placed into three separate categories; possible, probable, and proven. A *possible* spider bite is one which the physician feels *could* be a bite by a spider, but lack sufficient clinical or circumstantial evidence to support a firm diagnosis. A *probable* spider bite is one in which the clinical and/or circumstantial evidence support the likelihood of spider bite, but the biting spider was not recovered and positively identified. A *proven* spider bite applies to those cases in which the clinical and circumstantial evidence support the diagnosis of spider bite, and *the* biting spider was captured and positively identified.

Most spider bites are single, not in rows or patches like those of some parasitic arthropods (such as bed bugs, biting midges, black flies, fleas and mosquitoes). Multiple bites do occasionally occur, such as when the spider is trapped between skin and clothing and cannot escape. Actual spider bites show two puncture marks although the wound is not always obvious. A rather typical reaction may involve localized reddening and various degrees of swelling, itching, and pain. Within a few hours a small red, blue, or black discoloration can develop around the bite site. The area may remain tender for a few days, and eventually a small sore can develop that soon begins healing.

Clinically Significant Spiders

Unfortunately, not all spider bites are as mild and fast healing as the typical bite. There are four types of spiders in the United States that are considered to be clinically significant. These are the black widow, the brown recluse (and other species of recluse), two species of the yellow sac spider, and the hobo spider.

The major differences in the symptoms and treatment of bites from these spiders deal with the type of venom the spider injects. Spider venom, like snakebite venom, is generally either neurotoxic or cytotoxic. In spiders it is typically the web dwellers that have neurotoxic venom and the non-web dwellers have the cytotoxic venom.

Neurotoxic venom affects the neuromuscular junctions. There is usually a sharp, burning pain at the site, spreading to the lymph nodes within 15 minutes. Severe muscle pain and cramps typically develop within an hour, resulting in tightness in the chest and difficulty in walking. Additional symptoms may include anxiety, raised blood pressure, breathing difficulties and heart palpitations, nausea and vomiting, sweating, excessive salivation and watery eyes. The body temperature could either fall or rise above normal and the blood pressure may rise with an increased pulse rate. A rash might develop

The only spiders in the group we are discussing with neurotoxic venom are the widow spiders. Three common species (black widows) and two lesser known species (red and brown widows) exist in the United States. Less than 5% of untreated cases result in death, usually as a result of respiratory failure. Those more severely affected are children (smaller blood volume) and the elderly who might suffer respiratory or heart failure.

Cytotoxic venom affects the cellular tissue and is usually restricted to the area of the bite but can spread. The bite is at first painless with symptoms developing about 2-8 hours after the bite. Typical symptoms may include the development of an open ulcerating lesion, with the associated classical "Bulls-eye" pattern within two to three days. This lesion may take as long as three to six weeks to completely heal.

Of the spiders we are discussing, those with cytotoxic venom include the recluse family, the yellow sac family, and the hobo spider. Bites from these spiders with cytotoxic venom are either known to or are suspected to produce *dermonecrosis* – a necrotic lesion of the skin. When associated with a spider bite, this is referred to as *necrotic arachnidism* or *necrotic envenomation*, a term meaning "spider bite which causes tissue death."

Identifying the culprit

The Widow Spiders



Western Black Widow
(Brocketts Film Fauna, Inc.)

The widow spiders, genus *Latrodectus*, are among the most recognized spiders on earth; they are the largest of the cobweb weavers, family *Theridiidae*, and all species are venomous. The term *widow* spider originated from the idea that the females devour the males after, or during, mating. This mate devouring behavior is somewhat a myth. While it may occur in captive situations, where the male cannot escape, it is uncommon in the field.

Widow spiders inhabit the warmer regions of the world to latitudes of about 45° north and south. They can be found on the underside of rocks and ledges, in plants, debris piles, woodpiles, etc. Widow spiders build strong, sloppy webs, in which the females usually remain, hanging upside down most of the time. Female widow spiders are bulbous and shiny in appearance, and may have bodies 12-16 mm (0.45 to 0.6 inches) long. Males are much smaller than the females, with longer legs; they are so different in appearance than females, that they are rarely recognized as widow spiders by the lay person. Males are not considered a threat to humans, although they do possess venom and can bite. Juvenile widow spiders are usually light colored, and darken to their adult coloration gradually, with each successive molt of their exoskeleton.

The term **black widow** refers to those species in the United States, Europe, and some other areas, which are shiny black in appearance.

The southern widow, *Latrodectus mactans*, is the most well known of the U.S. black widows. Its Latin name translates to "murderous biting robber." The southern widow is found in the southeastern U.S., west to central Texas and Oklahoma, and north to southern New York; it is also found in the West Indies. Like most widow spiders, it prefers dark, cool places to build its web, such as outhouses, window wells, under well covers, and beneath trash. The red "hourglass" of the southern widow is actually shaped more like an *anvil* than a perfect hourglass in most specimens. The southern widow causes many envenomations in humans, particularly in the southern part of its range, where it is most common.

The western black widow, *Latrodectus hesperus* (photograph), ranges from extreme southwestern Canada, south into Mexico, and east to west Texas. *Hesperus* is the common black widow of the western United States, and is abundant in regions of Arizona, California, and other westerly locales. One of its favored natural habitats is in abandoned rodent holes, but it is often found around human habitations, even in the "downtown" districts of many western U.S. cities. The western widows' general appearance is very similar to that of the southern widow; the "hourglass" marking in the western widow is usually shaped like a perfect hourglass, though it is divided into two separate "spots" in some specimens. Like its southern cousin, the western widow causes a large number of bites, particularly in the southern part of its range.

The northern widow, *Latrodectus variolus*, is the third *black widow* found in the United States. It is found from extreme southeastern Canada, throughout the New England states, and south to northern Florida. It prefers undisturbed wooded areas, stone walls, stumps, and similar habitats. The "hourglass" of the northern widow is usually divided into two separate, elongate markings. This species is most common in the northern part of its range. While its venom is very similar to that of the southern and western widows, and bites do occur, it does not appear to bite humans as often as those species.

The red widow, *Latrodectus bishopi*, is a U.S. species with a restricted range, being found only in palmetto fronds of sandy, scrub-pine regions of central and southern Florida. This spider is rather brightly colored, with red legs and cephalothorax (fore-part of the body), and a black abdomen with orange and white markings down the back and sides. The "hourglass" usually consists a single red elongate marking. Little is known of the bite of the red widow, but its venom is probably quite toxic to mammals.

The brown widow, *Latrodectus geometricus*, is a cosmopolitan species, found in most tropical seaports around the world; it is an introduced species in Florida. Coloration may vary, but is usually brown to gray, with white and black markings on the back and sides of the dorsal abdomen: The "hourglass" is usually complete. This species is often found on or around human habitations and other buildings. While definitely venomous to humans, bites tend to be less severe than those of most other widow spiders.

The Recluse Spiders



Brown recluse spider
(Courtesy of the Univ. of Nebraska)

The brown recluse spider or *Loxosceles reclusa* belongs to the genus *Loxosceles*, a unique family of arachnids known as the *Sicariidae*, or six-eyed sicariid spiders. The sicariids have six (rather than the typical eight) eyes, which are arranged in a horseshoe pattern in three clusters of two eyes each. The family consists of the recluse spiders, and the six-eyed crab spiders, genus *Sicarius*, of Central and South America, and South Africa.

In the United States there are eleven indigenous species of recluse spider, and two species introduced from other countries. The most noted of these is the brown recluse. The brown recluse is found in the Midwest and parts of the south; it ranges (see map) from southern Wisconsin east to Ohio, and south to extreme northern Florida and central Texas.

The adult brown recluse has a body length of 10-12 mm (0.4 to 0.5 inches.)

The other ten recluse species which are indigenous to the United States range throughout the lower southwest, from southern California through southern Texas. Other U.S. indigenous and introduced recluse spiders are:

- The **Apache recluse**, *Loxosceles apachea*: Ranges from southeastern Arizona, through southern New Mexico, to extreme western Texas.
- The **Arizona recluse**, *Loxosceles arizonica*: Found in central and southern Arizona, and southeastern California.
- The **Baja recluse**, *Loxosceles palma*: Found in southern California, and northern Baja, Mexico.
- The **Big Bend recluse**, *Loxosceles blanda*: Western Texas.
- The **Chilean recluse**, *Loxosceles laeta*: **Introduced** from South America, colonies exist in southern California. A large (25 mm) spider, with a particularly severe bite.
- The **desert recluse**, *Loxosceles deserta*: A pale colored species which ranges from south-central to southern California, east to south-central Arizona, and north to southern Nevada and the Saint George, Utah area.
- The **Grand Canyon recluse**, *Loxosceles kaiba*: Grand Canyon area, Arizona.
- **Martha's recluse**, *Loxosceles martha*: Southern California.
- The **Mediterranean recluse**, *Loxosceles rufescens*: An **introduced** species from the Mediterranean region, which has been found in various cities across the U.S. Its bite is not regarded as being as severe as some of the other spiders of this genus.
- **Russell's recluse**, *Loxosceles russelli*: Found in the Death Valley area of southern California.
- The **Texas recluse**, *Loxosceles devia*: Southern Texas.
- The **Tucson recluse**, *Loxosceles sabina*: The Tucson area of southern Arizona.

These other recluse spiders look very much like the brown recluse, and can be positively distinguished only by an expert. The key in identifying these types of recluse spiders lies in the geographic area in which the spider is found or the bite occurs.

The recluse spider is also called the "fiddleback" or "violin" spider, due the violin-like marking on the dorsal *cephalothorax* (head region.) Many publications refer to the violin marking on the *dorsal* (top) surface of the cephalothorax as the most important diagnostic feature. Although this marking is fairly consistent in mature brown recluses and Texan recluses, it can vary in intensity and often fades in preservative. It is very faint to nonexistent in several recluse species found in the southwestern United States (e.g., the desert recluse.)

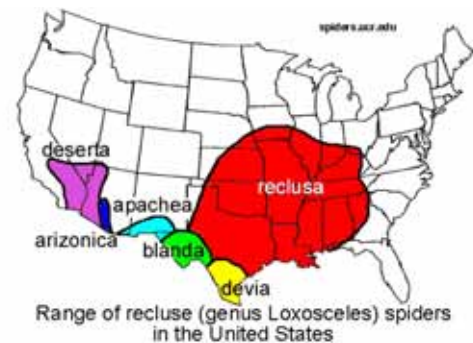


Image courtesy of the University of California, Riverside.

The brown recluse became the first U.S. spider associated with necrotic arachnidism in 1957, when it was linked to severe bites in the Midwest. Although several toxins have been isolated from its venom and various enzymatic activities have been identified, the medically important component appears to be sphingomyelinase D. This enzyme is otherwise found only in a few *pathogenic* (disease-causing) bacteria. This venom component has been identified in all species of the recluse thus far tested, and it would not be surprising if all recluse spiders are capable of causing necrotic skin lesions. Sphingomyelinase D causes dermonecrosis, platelet aggregation, and complement-mediated hemolysis *in vitro*, and it is potentially responsible for both the ulcerating and systemic effects seen in humans. All recluse spiders, as well as the six-eyed crab spiders, are now considered venomous to humans.

The Hobo Spider



Hobo Spider (Maxence Salomen 2002)

The hobo spider, *Tegenaria agrestis*, is a moderately large spider of the family *Agelenidae* which is originally indigenous to Western Europe. The hobo spider was most likely introduced into the northwestern United States through the port of Seattle sometime before the 1930's. The means of the spiders' introduction into the United States was almost certainly commercial shipping vessels carrying cargo originating from agricultural areas of Europe. It is highly probable that they were transported to and arrived in the Port of Seattle as egg cases attached to wood, etc., rather than as mobile organisms. Considering the seasonal nature of the hobo spider, it is highly unlikely that a viable breeding population would have developed in the United States based upon the occasional introduction of adult or juvenile specimens.

They are brown and measure roughly 10-15 mm (0.4 - 0.6 inches) in body length and 15 to 45 mm (0.6 - 1.8 inches) in leg span. Their legs show no distinct rings and have short hairs. Their abdomens have several chevron shaped markings. Males are distinctively different from females in that they have two large *palpi* (mouth parts) that look like boxing gloves. These palpi are often mistaken for fangs or venom sacs, but they are in fact the male genitalia. The females also have these palpi, but the ends are not enlarged as they are in the males. Females tend to have a larger and rounder abdomen when compared to males.

The hobo spider has a distinctive web that is horizontal and flat with a funnel at one end. These funnel shaped webs are often attached to an object in the yard, by the foundation of structures, or anything that remains stationary near the ground. The spiders rarely climb vertical surfaces and are uncommon above basements or ground level.

In the late 1960's and early 1970's physicians in Idaho, Oregon and Washington were presented with cases of probable spider bite that closely resembled bites caused by the brown recluse spider. The brown recluses range precluded it from being a suspect, and no viable population of brown recluse spiders has ever been found in this region. Studies conducted between 1974 and 1982 suggested that another spider was probably the actual agent of these envenomations. In 1983, field studies revealed that the hobo spider was the actual cause of such bites in the northwest, and the spiders' ability to produce necrotic lesions and systemic illness was demonstrated in a toxicology study on rabbits conducted in 1987. In this study lesions appeared after spiders were induced to bite the rabbits.

Recent attempts to replicate the study (by injecting venom to ensure envenomation) have failed to produce necrotic lesions. There is even question as to whether the lesions observed in the original study were necrotic. Hobo spiders are common in Europe, though bites are relatively unknown, and there are no confirmed reports of them causing necrosis despite hundreds of years of coexistence there. The only documented case of a verified hobo spider bite leading to necrotic skin lesions involves a person who had a pre-existing medical condition (phlebitis) that can also cause the appearance of skin lesions. Nonetheless, it is believed by some that hobo spiders are dangerous to humans.

The Yellow Sac Spiders



Yellow Sac Spider (R. Bessin, 2002)

The yellow (golden) sac spiders, genus *Cheiracanthium* are members of the spider family *Clubionidae* (sac spiders). Members of this family typically build a sack-like, silken tube in foliage or under bark or stones as their lair. There are two species documented to be of clinically significance, *Cheiracanthium inclusum* and *Cheiracanthium mildei*.

Yellow sac spiders can be found walking about on foliage; under leaf litter, stones, and boards; and on buildings under the window sills and siding, in addition to the corners of walls and ceilings within homes. They probably account for more spider bites than any other spider, and their bites are sometimes misdiagnosed as brown recluse bites by health care providers. *C. inclusum* is indigenous to much of the United States (except in the northernmost states), while *C. mildei*, which is an introduced species from Europe, was found throughout much of the Northeast as of 1978. It is likely that *C. mildei* has substantially

increased its range since that time. These spiders are relatively small (10 mm (0.4 inch) body length), and are yellowish to golden in color. They are difficult to distinguish from one another, and positive species identification requires examination by an arachnologist.

They are very prone to bite defensively (more so than any other significantly venomous U.S. spider), and some bites in humans have occurred in unusual places, such as in automobiles and swimming pools. The bite of *C. inclusum* is more destructive than the bite of *C. mildei*. Humans usually incur *C. inclusum* bites outdoors while gardening in the summer. *C. mildei* will readily bite, despite their small size, and they have been observed crawling across the human skin surface and biting without provocation.

The yellow sac spider was first identified as a probable cause of necrotic arachnidism in 1970, when it was linked with skin lesions in the Boston, Massachusetts area (where it is the most common spider found in houses); it is also common in houses in New York City. In the late 1970's and early 1980's the yellow sac spider produced a significant number of bites in the Provo, Utah area, and has been reported responsible for bites in Georgia and southwestern Canada; bites by this species are probably far more common and widespread than this, and it is likely that more reports will surface as the yellow sac spider becomes better known as a clinically significant spider.

Yellow sac spiders have been implicated in cases of necrotic arachnidism in North America, Europe, and South Africa. The association between bites by this spider and necrotic arachnidism has been repeatedly cited in review articles, medical textbooks, and correspondence in medical journals. In these citations, the lesions are often described as being similar or less virulent than that of the brown recluse spider. However, recent studies shown that yellow sac venom does not contain sphingomyelinase D, the enzyme in recluse venom purported to cause necrotic arachnidism. Also, using rabbit models, researchers could not induce necrotic arachnidism with yellow sac venom. However, as with the hobo spider, the yellow sac spider is still considered to be clinically significant.

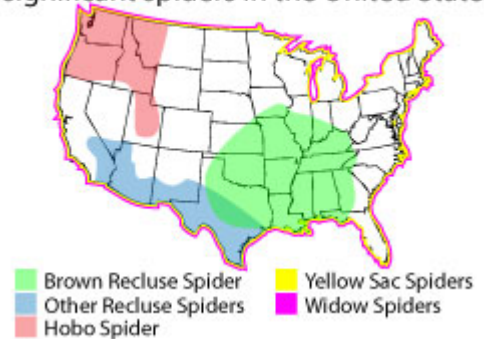
Ranges of Clinically Significant Spiders

Each of the clinically significant spiders listed above; the recluse spiders, the yellow sac spiders, the hobo spider, and the widow spiders has a specific range in which it lives. These ranges are defined by many factors, including, but not limited to the spiders' mobility, the presence of predatory species outside its known range, and its climatic adaptability:

The ranges of the widow spiders and the yellow sac spiders cover the entirety of the United States, while the hobo spider and recluse spiders have limited ranges within the United States.

It becomes obvious when looking at the ranges of the various spiders that many of the spider bites reported in the media as having been inflicted by a brown recluse occurred well outside the known range of that spider. While the hobo spider and the yellow sac spider are each suspected of being able to produce a necrotic lesion as one of its symptoms, recent research finds this to be questionable, and is pointing to other causes as to the associated lesions. The systemic effects of the bites of these various spiders differ, and they are effectively treated in different ways. Knowledge of the ranges of these spiders can help prevent the misdiagnoses of a bite, and can be essential in helping the victim of a spider bite receive the best possible care.

Estimated ranges of clinically significant spiders in the United States



Along came a spider...

Throughout the United States, spiders are often blamed as the cause of many dermatological wounds in medical diagnoses. In virtually every case, no spider is seen nor felt inflicting a bite, nor is the alleged spider collected in the incident. Most "potential spider bite" diagnoses are made solely on the symptoms of the lesion.

In the case of necrotic wounds, brown recluse spider bite is a very common conclusion of medical personnel throughout North America (including such ludicrously inhospitable places as Canada and Alaska) where no brown recluses have ever been found.

Even cases where the spider has been captured are often incorrectly deemed to be brown recluse bites simply because the observers saw a violin-like marking on the spider. Many spiders have dark markings on their bodies that may look like a violin and have been misidentified because of that. A great many common and harmless spiders look very similar to recluses. It is always best to seek out a qualified arachnologist, who are unfortunately few and far between. Even entomologists, doctors and public health officials who lack training in arachnology have been overconfident of their abilities and have misidentified harmless spiders as recluses.

Checking the eye pattern is the best way to eliminate almost all suspect non-recluse spiders from consideration. The presence or absence of the violin marking may lead to misidentifications. Non-arachnologists (including physicians) have a strong tendency to see “violins” on all body surfaces of harmless spiders and incorrectly assume that they have properly identified a brown recluse spider.

In addition, the abdomens of all North American recluses are covered with fine hairs and are uniformly colored, although the coloration can vary from light tan to dark brown, depending in part on what they have eaten recently. There is never a coloration pattern on the abdomen of North American specimens. Finally, the uniformly colored legs are similarly covered with fine hairs whereas many non-recluse spiders have stout spines and/or stripes, rings, or spots on their legs.

While some other spiders share each of these physical characteristics, to be identified as a recluse spider, it must have all five of these characteristics:

- six eyes in dyads (pairs)
- uniformly colored abdomen with fine hairs
- no spines on the legs
- uniformly colored legs
- body not more than 3/8 - 1/2” in length

Medical personnel unfamiliar with spider bites tend to diagnoses “brown recluse” because that is the most common and, unfortunately, most sensational cause of necrotic wounds that they have read about. However, there are many other conditions can cause necrotic wounds that are frequently misdiagnosed as brown recluse bites. Many of these are disease states in which arthropods are not involved. If arthropods are in fact implicated, physicians should not immediately consider spider bites as the likely cause. Instead, they should first consider creatures that actively seek mammals for blood meals, such as ticks, fleas, bedbugs, and assassin bugs. Bites by these arthropods can also cause dermonecrosis.

Additionally, consideration should be given to the existence of other disorders or disease states which include dermonecrosis in their symptomology. Below is a list of skin afflictions, disease states, disorders, underlying conditions and reactions that have been misdiagnosed as necrotic arachnidism by medical personnel.

Conditions that have been misdiagnosed as brown recluse spider bites as reported in the medical literature		
Arthropod-induced Lyme disease Rocky Mountain spotted fever <i>Ornithodoros coriaceus</i> bite (soft tick) insect bites (flea, mite, biting fly)	Bacterial <i>Staphylococcus</i> infection <i>Streptococcus</i> infection Gonococcal arthritis dermatitis Cutaneous anthrax	Fungal Sporotrichosis Keratin cell mediated response to fungus
Viral Infected herpes simplex Chronic herpes simplex Varicella zoster (shingles)	Underlying disease states Diabetic ulcer	Topical Poison ivy/poison oak Chemical burn
Lymphoproliferative disorders Lymphoma Lymphomatoid papulosis	Vascular disorders Focal vasculitis Purpura fulminans Thromboembolic phenomena Polyarteritis nodosa	Misc./Multiple causative agents Pyoderma gangrenosum Pressure ulcers Stevens-Johnson syndrome Erythema multiforme Erythema nodosum Toxic epidermal necrolysis (Lyell's syndrome)
Reaction to drugs Warfarin poisoning		

From “Causes of Necrotic Wounds other than Brown Recluse Spider Bites” R. Vetter, University of California, Riverside.

The importance of considering other causes for dermonecrosis before settling on “spider bite” cannot be overstated. For example, Lyme disease can cause a “bull’s-eye wound,” which is a diagnostic symptom of brown recluse envenomation. For this reason alone, Lyme disease can and has been misdiagnosed as a brown recluse bite. Because Lyme disease can lead to irreversible neural and cardiac complications, its misdiagnosis as a brown recluse bite and the subsequent delay in providing effectual treatment of the actual disease state could have grave consequences.

Finally, other conditions may co-exist with spider bites. Therefore, even in cases of verified spider bite, differentiation must be made between the toxic effects of the venom and secondary infections, such as may be incurred when scratching opens the wound.

Signs and Symptoms

Spider venom poisoning is characterized by a set of *signs* (observable physical or objective evidence of disease) and *symptoms* (complaints that the bite victim relays to the physician, etc.), which lead to the diagnosis of spider envenomation.

When envenomation does occur from the bite of a spider, *local* and/or *systemic* manifestations may appear. The severity of these phenomena is dependent on the type of spider, and in the case of the hobo spider, on the age and sex of the biting spider. For example, in laboratory experiments the venom of the male hobo spider produces more severe effects than that of the female, and evidence exists suggesting that the venom of sub-adults may be more toxic than that of adults.

Bites by widow spiders often are initially painful, but sometimes are not felt. The local dermal reaction is minimal, usually consisting of little more than an area of *erythema* (redness) around the bite site, which disappears within several hours; no tissue necrosis occurs following bites by widow spiders. A potent neurotoxin in the venom induces the disease state *latrodectism*, which manifests itself with severe muscle cramping and spasms; the cramping usually begins in the large muscle masses of the legs, or the abdomen. The abdomen can exhibit a board-like rigidity, and the pain has been compared to that of acute appendicitis, and to childbirth. Some widow bite victims experience anxiety, profuse sweating, nausea, *piloerection* (hair standing on end), increased blood pressure, and other unpleasant manifestations. Paralysis, stupor and convulsions, as well as psychological abnormalities may occur in severe cases. Death can occur in a small percentage of cases, particularly when the victim is a small child or elderly person.

Bites by recluse spiders are frequently painless. For this reason, many bites go unnoticed until symptoms begin to develop. Following envenomation, a large (several cm.) area of redness (*erythema*) forms around the bite site: This *usually* disappears within a few hours, leaving a small reddish *induration* (hardened area), which is not dissimilar to the classical "mosquito bite". Within 24 to 48 hours blistering may occur at the bite site. Within an additional 24 hours these blisters may rupture, leaving an open ulceration. Within a few days of ulceration, if left uncovered, *eschar* or "scab" formation begins to develop over the lesion, and by three weeks post-bite this becomes pronounced, giving the lesion a "target and bulls-eye" appearance. Following this, the "scab" is sloughed and the lesion generally heals, leaving a scar, within 45 days of the original bite. In some instances, particularly when the bite is delivered in an area of fatty tissue, such local lesions may become deep and extensive, and may not heal for two to three years.

The systemic effects of brown recluse spider bite (which occur in a small percentage of cases) are referred to as the disease state *loxoscelism*. The most common reported symptoms are chills, fever, nausea, muscle pain, and other flu-like symptoms. In severe cases convulsions may occur, as well as abnormalities in the clotting ability of the blood. *Hemolysis*, or damage to red blood cell walls resulting in leakage of the red, oxygen carrying protein *hemoglobin* occurs in some cases; this can result in the death of the victim when the discarded red blood cell casts are filtered through the kidneys, causing renal failure. Systemic poisoning effects from the other various members of the genus *Loxosceles* may vary from species to species. Little is known about the venom and bite of the lesser known species of recluse spiders.

Bites by hobo spiders are also frequently painless, followed by localized redness, swelling and itching. The development of a necrotic lesion from a hobo spider bite has been reported, although current research holds that this is unlikely, and if present is caused by other vectors such as secondary infections.

Systemic or generalized effects of a hobo spider bite are referred to as the disease state *tegenarism* and are seen in about 45% of those envenomated by hobo spiders. The most common reported symptom is severe headache, which usually does not respond to over the counter analgesics (aspirin, which can prolong bleeding time, should not be used for hobo spider bite induced headaches.) In addition to this, victims may experience a dry mouth, nausea, weakness and lethargy, dizziness, visual disturbances, hallucinations, joint pain and/or other undesirable effects. As with many types of complex poisoning, most victims of systemic *tegenarism* do not experience all of these phenomena, but that is dependent upon the severity of the poisoning. About 15% of envenomated subjects are poisoned severely enough to require hospitalization. In rare cases *aplastic anemia* (bone marrow failure) can develop several weeks after the bite, which results in a fatal outcome. Another rare but dangerous condition that has been seen following hobo spider envenomation is the development of severe intractable vomiting accompanied by secretory diarrhea.

Envenomation by yellow sac spiders generally produces instant, intense stinging pain, not unlike that of the sting of a wasp or hornet. This may be followed by localized redness, swelling and itching. Due to the absence of sphingomyelinase D in the yellow sac spider's venom, necrotic lesions reported from yellow sac spiders are now thought to have been caused by secondary infections.

Systemic effects of yellow sac spider bites are *usually* not severe, but when they occur may include chills, fever, headache, dizziness, nausea, anorexia, and sometimes shock.

What to do when someone is bitten

Provide Reassurance: Calming and reassuring the patient is an important part of initial and continuing care. Some important information that can be conveyed to a patient includes the following:

- Over 80% of bites initially self identified as "spider bites" eventually turn out to be bites by parasitic arthropods such as bed bugs, biting midges, black flies, fleas and mosquitoes. These types of bites are typically in patches, rows, or groups. Spiders, on the other hand, tend to bite once, unless trapped by clothing. While a spider bite should not be ruled out based on this, particularly in light of other clinical evidence, informing a patient of this information can help relieve some of the psychological phobias associated with spider bites.
- Most spider bites are no more painful than a bee sting, and if not accompanied by an allergic reaction to the venom, require little more first aid.
- A large percentage (perhaps 50% or more) of defensive bites by spiders are "dry", and no venom is injected when the spider bites. Spiders, like many other venomous creatures, are more likely to incorporate venom in a *food getting* bite than in a defensive bite.
- Necrotic arachnidism does not invariably develop following a brown recluse bite.
- While bites by hobo and yellow sac spiders are have had reported cases of dermonecrosis, recent studies indicate that proven (as opposed to probable or suspect) bites from these spiders have not been shown to produce the severe symptoms that can follow from a recluse spider bite.
- While extremely painful, the bite of one of the widow spiders is seldom fatal. While this may not be reassuring to a patient in pain, it can be very reassuring to friends and family.

Provide effective First Aid: For our part, our treatment of any type of spider bite, be it clinically significant or not, will be virtually unchanged. Typical first aid for a spider bite includes:

- Cleaning the site well with soap and water.
- Applying a cool compress over the bite location.
- OTC medications such as acetaminophen or ibuprofen may be effective to relieve minor signs and symptoms in adults. Aspirin is not recommended.
- Be observant for any signs of an allergic reaction to the bite. This can occur from the bite of any type of spider, clinically significant or not.
- Treatment in a medical facility may be necessary for children less than 6 years old and for adults with severe signs and symptoms.

Clinically, for most spider bites, no further first aid is typically required. However, it would be prudent to advise a patient that they should seek medical attention. If a patient has been bitten by or thinks that they have been bitten by a spider of clinical significance rapid and proper treatment is essential:

- The recommended treatment for spider bites is referred to as the RICE method: Rest, Ice, Compress, and Elevate.
 - **Rest:** Keep the patient or the affected part as motionless as possible.
 - **Ice:** Apply crushed ice to the affected area. The cold helps to retard the venom action and reduces pain. This must be done within minutes of being bitten. Do not cool for an extended period and remove periodically for the feeling to return otherwise tissue damage might result.
 - **Compress:** Apply a compression bandage, winding towards the bite to retard the spread of the venom.
 - **Elevate:** Elevate the affected area.
- Eating, drinking and smoking should be avoided.
- Strongly recommend medical assistance.

Gather evidence: If possible, if someone is bitten by *any* spider, and they actually catch *the* spider in the act, *always* capture the spider for identification by a qualified arachnologist. *Never* discard a spider that has definitely bitten a human. In the case of the hobo spider, not only is positive species identification important, but so is a determination of the spiders sex and age; these factors can help predict the severity of potential poisoning, and assist the attending physician in charting a course of treatment. Preserve the spider (or whatever parts of it remain) and send it to the clinic with the patient.

Properly identify the spider: Most people, including doctors and nurses, lack the experience and training to properly recognize and positively identify the specific specie, gender and age of a spider. The following individuals – all qualified arachnologists – have volunteered their services to aid in the identification of spiders that have or may have been involved in a human bite.

U.S. contacts for the Identification of Spiders		
<p>Northwestern United States (Washington, Oregon, Idaho)</p> <p>Dr. Rod Crawford Curator of Arachnids Burke Museum University of Washington P.O. Box 353010 Seattle, WA 98195-3010 Telephone: (206) 543-9853 E-Mail: tiso@u.washington.edu</p>	<p>United States (all areas)</p> <p>Dr. Rick Vetter Department of Entomology University of California – Riverside Riverside, CA 92521 Telephone: (951) 827-5805 E-mail: vetter@ucr.edu</p>	<p>Northeast</p> <p>Dr. Richard A. Bradley, Associate Professor Department of Evolution, Ecology, and Organismal Biology 1465 Mt. Vernon Ave. Marion, OH 43302 Telephone: (740) 389-2361 E-mail: bradley.10@osu.edu</p>
<p>Arid Southwest (Arizona, New Mexico, NW Texas)</p> <p>Dr. David B. Richman New Mexico State University Dept of Entomology, Plant Pathology & Weed Science W. 168 Skeen Hall Las Cruces, NM 88003 Telephone: (505) 646-2900 E-Mail: nmbugman@taipan.nmsu.edu</p>	<p>United States (all areas)</p> <p>Dr. Greta Binford, Ph.D. Assistant Professor of Biology Lewis & Clark College Bio-Psych Rm 224 0615 SW Palatine Hill Rd. Portland, OR 97219-7899 Telephone: (503) 768-7653 E-mail: binford@lclark.edu</p>	<p>Southeast (Carolinas, Georgia, Florida, Alabama)</p> <p>Dr. G.B. Edwards Division of Plant Industry Florida State University 1911 SW 34th St. Gainesville, FL 32608 Telephone: (352) 372-3505 x 194 Email: edwardg@doacs.state.fl.us</p>

Questions directed to the above individuals should be from members of the medical community or persons looking for spider identification in association with a medical condition, not questions regarding bites or envenomation.

Spiders submitted for positive identification should always be accompanied with basic collection information, including the date, the exact location (street address, etc.), the name and email address of the collector(s) and any other information about the spider that is available. Do not ship spiders in a simple mailing envelope and do not ship live spiders!

1. Kill the spider by freezing or if you have smashed it, just take it in the smashed form. Even though you may think a smashed spider is useless, a trained arachnologist will be able to find the necessary anatomical features necessary for species identification.
2. To ship the spiders either:
 - a. Preserve the spider in alcohol and on the day of shipping, pour off the alcohol and send the spider damp inside a small sealed vial (preferred) or
 - b. Air-dry the spider for a few days in order that it doesn't rot.
3. Pack the spiders in a small container so that they don't get crushed in the mail.

Contact the individual to whom the spider will be shipped for specific instructions.

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