Dermatologic Implications of Prickly Pear Cacti (*Opuntia*)

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PRACTICE **POINTS**

- Prickly pear cacti have fine spines that must be removed via scorching or mechanical means before the fruit can be handled safely.
- Prickly pear spines that become embedded in the skin are associated with local and systemic inflammatory conditions as well as allergic contact dermatitis.
- Preclinical studies have suggested that extracts of the prickly pear cactus could be used in medicine for their anti-inflammatory effects.

Prickly pear cacti spines that become embedded in the skin are associated with local and systemic inflammatory conditions as well as allergic contact dermatitis. Preclinical studies have suggested that extracts from the prickly pear cactus may be used in medicine due to their anti-inflammatory properties. This manuscript discusses complications and therapeutic possibilities related to the cacti.

The genus of flowering plants commonly known as prickly pear cacti (*Opuntia*) or sabra are native to the Americas but are naturalized in many parts of the world, particularly southwest Asia and Sicily, Italy, where they are grown commercially and commonly are seen growing on rocky hillsides. (Figure 1). A prickly pear cactus has paddles that represent modified stems, and the spines are modified leaves (Figure 2). Its bright red or yellow flowers, dark-red fruit, low water requirement, and adaptability to poor-quality soil make it an attractive plant for landscaping and an important agricultural crop in many parts of the world, including the United States, Mexico, and Southern Europe. The prickly pear fruit is tasty but loaded with seeds and often is eaten fresh or used to make jam. The paddles are sometimes cut into strips, breaded or battered, and fried. The spines are easily embedded in skin and are an important cause of dermatitis.

Identifying Features

Opuntia species are found in both warm and temperate zones and grow well in arid climates. Like other cacti, they are distinguished by their water-hoarding stems and glochids (needlelike modified leaves). In prickly pears, the stems flatten to leaflike paddles that alternate in direction.

FIGURE 1. *Opuntia* species (prickly pear) are seen growing on rocky hillsides.

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Photosynthesis occurs in the stem tissues, while modified leaves (spines) are purely for defense against predators and unsuspecting humans. *Opuntia* species are easily identified by their broad flattened stems and dark-red fruits, both of which bear glochids (Figures 3-5).

Dermatologic Implications of Prickly Pear Injury

Prickly pear spines are very small, sharp, and difficult to see. They embed in the skin in great numbers when the plant or its fruit are handled by unsuspecting humans and have a tendency to burrow into soft tissue and underlying structures. It is very difficult to remove prickly pear spines with forceps, and attempts to do so often drive them deeper into the skin.[1] Better results are obtained by tape stripping or using water-activated cosmetic pore strips.

Cactus spine injuries may lead to mucoceles of the oral mucosa and sinuses, especially in individuals who attempt to bite into the fruit without first scorching the spines with a blow torch.[2] Inflammatory responses to the embedded spines are common and often result in prolonged erythematous inflammatory papules at sites of injury. Recalcitrant dermatitis and edema of underlying tissues typically occur near the point of entry of a prickly pear spine and extend to areas where the spine migrates.[3,4] Individuals who casually brush up against the plant may not be aware that they have been inoculated with the spines and may not relate the prior accidental contact with the onset of erythematous papules and edema that occurs days later. Biopsy may reveal the prickly pear spines or a granulomatous reaction pattern within the dermis. Linear patterns of necrosis surrounded by palisading histiocytes may be noted, representing the tract of the inoculation injury.

If identified in tissue, glochids are variably refractile and measure 40 to 70 µm in diameter. Glochids initiate a delayed-type hypersensitivity and foreign body response. A T-helper 1 cytokine signal is typical, and there may be a secondary influx of neutrophils, but tissue eosinophilia is uncommon. Systemic inflammation also has been reported, including eosinophilic cholangitis without biliary stricture[5] and septic and aseptic arthritis near the site of leaf puncture and at distant sites.[6,7] Allergic contact dermatitis has been reported due to contact with the fruit of the plant and can be confirmed by patch testing.[8,9]

FIGURE 2. A and B, *Opuntia* species (flowering prickly pear cacti) have paddles that represent modified stems, and the spines are modified leaves.

FIGURE 3. Broad flattened stems and dark-red fruits on the *Opuntia* species (prickly pear).

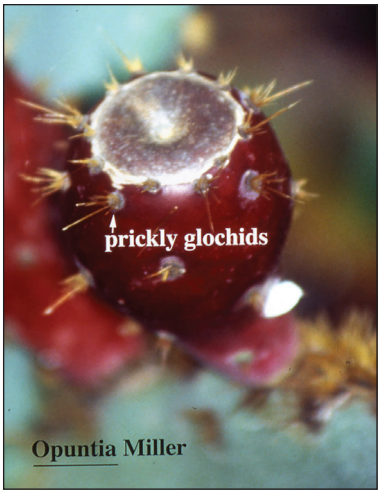

FIGURE 4. *Opuntia ficus-indica* (L.) Miller (prickly pear) is easily identified by its broad, flattened stems and dark-red fruits.

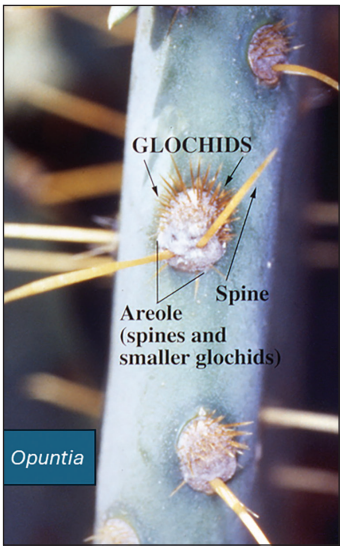

FIGURE 5. *Opuntia ficus-indica* (L.) Miller (prickly pear) glochids.

Potential Medicinal Benefits

Prickly pear cacti have shown potential medicinal properties. While the spines may produce intense inflammation when embedded in the skin, extracts of the fruit and leaf juices have shown anti-inflammatory properties. Various vesicle and polysaccharide extracts of *Opuntia* cacti have been shown to reduce environmental and chemical stressors associated with open wounds.[10-12] Preclinical studies also have suggested that they could be helpful in speeding the wound-healing process when applied topically. *Opuntia* species also have shown promise in reducing hyperpigmentation after topical application.[13] Preliminary data in animals also have suggested that oral administration of the fruit may slow kidney deterioration in patients with diabetes.[14] Following tissue penetration by the spines, *Opuntia* extracts have demonstrated the ability to prevent calcium deposition in soft tissue.[15] Similar preliminary data also have suggested that *Opuntia* extracts may reduce toxicity from cadmium, chromium, methotrexate, and acetaminophen.[16-19] Extracts from the peel of the red pitaya (*Hylocereus polyrhizus*), a closely related cactus, have been studied for their potential to prevent the advance of alcohol-associated liver disease, suggesting that studies evaluating the benefits of prickly pear cacti and related species may be worth pursuing.[20]

Final Thoughts

Prickly pear cacti have the potential to act as both friend and foe. The flowers and fruit are beautiful, and the plant is well adapted to xeriscape gardens in areas under perpetual water restriction. The fruit and flesh are edible if handled properly, and prickly pear jam is delicious. While the spines are capable of inflicting local injury and migrating to internal sites, causing arthritis and other deep tissue injury, extracts of the fruit and stems have potential uses for their anti-inflammatory effects and ability to protect against toxic injury. Further studies are needed to evaluate the therapeutic potential of *Opuntia* and related species.

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