

Medicinal Mushrooms in Wound Healing

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Much of the mainstream focus on medicinal mushrooms in podcasts, ads, web articles, books and social media revolves around things we ingest like pills, powders, tinctures and sautéed sporocarps. This article will explore a different aspect of medicinal fungi – their application in healing wounds – by examining the influence fungi had on ancient peoples.

People have most likely been using fungi since we first evolved.¹ For as long as humans have existed, humans have been getting injured. Like many of us today, our ancient ancestors knew that limiting bleeding and infection was paramount for survival. Our ancestors didn't have the broad body of scientific knowledge or analytical equipment that we have today, but this didn't stop them from discovering the antibiotic, antifungal, anti-inflammatory, styptic (i.e., causing bleeding to stop), pro-healing properties of many medicinal mushrooms. Ethnomycological reports reveal that many cultures around the world have used fungi to staunch bleeding, prevent infection and promote wound healing. After researching the topic of mushrooms for wound healing, I have come away convinced that no matter where you're from, there's a chance your ancestors leveraged the wound-healing properties of medicinal fungi. However, I would recommend caution about attributing properties to each mushroom species mentioned given that it is possible mushrooms were misidentified as similar species (either by the ethnobiologist or the interviewee), and that changes in taxonomy and nomenclature may have occurred. Finally, it is important to note that historical use of any fungi is not a recommendation for medicinal use today.

In my foray for reports of wound-healing fungi, one group of mushrooms surprised me most with its extensive history: the humble puffballs. Native peoples of North America used puffballs and their spores for healing all sorts of wounds. In my research, most reports refer to mushrooms in the Lycoperdaceae like species of *Lycoperdon*, *Calvatia*, and *Bovista*, but ethnomycologists report essentially all the puffball-esque fungal groups as having been used to improve outcomes after certain injuries including stalked puffballs of Agaricaceae (*Tulostoma* and *Battarrea*), earthstars in Geastraceae (*Geastrum*),² and earthballs in Sclerodermataceae (*Scleroderma*).³ Many First Nations of

modern-day Canada and the United States used the powdery mature fruit body of Lycoperdaceae puffballs and/or their spores to aid clotting for nosebleeds, cuts and other bleeding wounds. A common use of spores of *Lycoperdaceae* and *Geastrum* species was as a styptic on newborn infants' umbilical cords.² Other reported wound-healing uses for *Lycoperdon* species are the application of gleba or spores to limit infection and improve healing of burns, infections and sores. Although mature puffballs and spores seem to have been the most common remedies, younger immature puffballs were also often dried, powdered and used for wounds or sores.² Puffballs were applied as bandages by some Indigenous peoples like the Inuit at Nunavik with *Lycoperdon* species,³ and the Cree are reported to have applied dried slices of *Calvatia*

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gigantea to bleeding wounds.⁴ Some peoples, like the Kwakiutls and Mohegans, developed composite wound dressings of puffball spores, spiderwebs, and sometimes additional biomaterials like certain tree barks.² Maybe it's not quite a wound-healing application, but the inner flesh of younger puffballs was used by some peoples to remove objects stuck in their eyes.

Puffballs aren't the only fungi with recorded historical usage for wound healing in North America. To stop bleeding, many Northern Plains peoples used the aromatic bracket polypore *Haploporus odoratus* as a styptic.^{3,5} Peoples in northwestern North America are also reported to have made a poultice (i.e., a wetted mass of material applied to a sore or wound) out of old man's beard lichen (*Usnea longissima*).⁶ Another less directly fungal wound-healing application was known to the Inuit of Nunatsiavut who would harvest certain boletes that often house fly larvae (maggots) which were used to clean wounds.³

While it is abundantly clear that North America's Indigenous populations leveraged the styptic, pro-healing powers of mushrooms, there are plenty of reports of other cultures around the world using fungi for wound healing. The use of puffballs for this purpose was widespread, with reports from Nigeria, India, the Balkan peninsula,⁷ Nepal,⁸ and Japan.³ Polypores have several other reports of being utilized as a wound-healing technology by Indigenous cultures, including *Fomitopsis betulina* used as a styptic in Russia, Poland and other Baltic countries. *Fomes fomentarius* was pounded and moistened and then applied to wounds to stop bleeding in many European cultures, India, and Siberia. Sclerotium of the tiger milk mushroom (*Lignosus rhinoceros*) was used to treat wounds in Malaysia.⁷ *Podaxis pistillaris* in India⁹ was applied to burns. In Rwanda, *Pisolithus arhizus* was used to treat a variety of wounds.¹⁰ According to David Arora, *Panellus stipticus* has been reportedly used, as the name suggests, as a styptic.¹¹ Not to be outdone by all these basidiomycetes, several representatives from Ascomycota have historical use in wound healing including King Alfred's mushroom (*Daldinia concentrica*) in India⁹ and yellow morels (*Morchella esculenta*) on the Indian subcontinent⁷, with both being applied to a variety of wounds as a dried powder. In the Middle East, an aqueous extract of the desert truffles of *Termania* and *Terfezia* is prepared by boiling truffles and is used to treat various eye infections and conditions such as trachoma.¹² An overview of wound-healing fungi would not be complete without mentioning molds like those that produce the famous antibiotic penicillin. I could not find any ethnomycological reports of mold use; however, references to the use of mold on foods

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to treat wounds exist in ancient Greek, Chinese and Egyptian cultures.¹³

I've provided many examples here, but for more specific information on the many peoples, mushrooms, and uses, the reader is encouraged to comb through my sources (listed below) as there are too many examples to include in a single article (sources # 2, 3, and 7 have nicely organized tables). Also worth noting is that many of these mushrooms had further significance beyond wound healing; some have cultural or spiritual significance, some were used for food, and some as commodities. Given that published ethnomycological reports don't even begin to cover a fraction of the overall Indigenous knowledge, many other fungi were likely used in wound healing throughout history.

As the mushrooms discussed above cover such a wide range of fungal taxonomy, it makes one wonder what other mushrooms might possess wound-healing properties.

Likewise, the myriad mushrooms used for wound healing in ancient civilizations call for laboratory or clinical studies to determine their efficacy and optimal dosage. A mushroom's maturity level may also be an important factor. And then there's the question of fruit body versus mycelium. We need to know which molecules in mushrooms contribute to the wound-healing process. Stay tuned for the next edition of the *Mycophile* for a follow-up article diving into these questions!

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