

## Principles of Wound Healing and Known Effects of Pine During the Healing Process

Wound healing is the natural occurrence of cellular repair when the healthy tissue has been compromised. The course of healing is a systematic process of cellular events that is broken up into four phases: hemostasis, inflammatory, proliferation, and maturation. Here, you will find descriptions of all four stages of wound healing, the principal of moist wound healing, and an analysis of pine resin and why it is so effective in assisting in the natural healing process.

### The Four Phases of Wound Healing

Once a wound is inflicted and healthy tissue is damaged, the hemostasis phase begins. Vasoconstriction, the constriction of blood vessels, naturally occurs, which limits the amount of blood loss, and a clot formation takes place. The clumping of these platelets result in the release of growth factors, which attract inflammatory cells to the compromised area.



During the inflammatory phase, blood clotting begins to dissipate. This is followed by increased blood flow, which is accompanied by the inflammatory cells. In a sense, increased blood flow can be visualized by picturing a pressure washer spraying all leaves and debris off of a driveway. Your blood will push any foreign matter out of the wound. The inflammatory cells help fight infection and remove, or debride, necrotic or contaminated tissue. This type of debridement is called autolytic debridement. Depending on the severity of the wound damage, debridement may require the attention of a medical professional. The pain during this stage is caused by the swelling of the tissue, which presses on nerves. Chemical substances also convert a molecular signal, which is another way the body allows you to feel discomfort. Typically, the inflammation lasts for the first day or two.

Below are a few different debriding techniques that are widely used in the medical field today.

- Autolytic, which is previously mentioned, is the body's own systematic way of expelling dead tissue.
- Enzymatic is a chemical debridement which could cause complications with healthy tissue surrounding the injury.
- Mechanical debridement is the use of wet and dry dressings that are changed throughout the healing process. There is a possibility that the removal of these dressings can peel away not only dead tissue, but the healing tissue as well. This process is best for large areas of unhealthy tissue.
- Surgical debridement is the most prominent with chronic wounds, or wounds that have large areas that have been compromised. This can be extremely painful, as a well-known technique is the use of a metal brush to scrape away the dead tissue, however, there is less room for error in comparison to the mechanical and enzymatic.

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- Maggot debridement is the act of using larvae to remove necrotic tissue. This option is somewhat controversial, as most would see it as taboo to knowingly allow flesh to be eaten away by an insect, however, it has proven to be extremely effective because the maggots selectively eat only the dead tissue, leaving healthy new tissue untouched.

After inflammation subsides, the proliferation phase begins. This is centered around the formation of granulation tissue, which includes inflammatory cells, fibroblasts (connective tissue), and new blood vessels. This is the pinkish tissue that forms 3-5 days after an injury. Wound contraction begins, and the wound begins to close.

Lastly is the maturation, or remodeling phase. Here, collagen is molded and aligned to be able to function similarly to the original tissue that it is replacing. The wound is completely closed during this stage of progression. Once the wound has healed, a scar might form.

### Beliefs Behind Moist Wound Healing



The idea of moist wound healing seriously challenges the way most of us have been taught on how to properly deal with an infliction. The old belief of letting air get to a wound has been around for so long that it has been imprinted into our minds as the correct way to allow yourself to heal. But is that method really accurate? More and more medical professionals are acknowledging that practice to be incorrect. Letting a wound “air out” leaves it exposed to infection and causes a scab to form. The scab takes longer to heal than the area normally would during a moist wound healing treatment, and in many cases will result in a scar.

In moist wound healing, the wound exudate, or fluid, provides all of the cells with ideal conditions to destroy bacteria, debris, and necrotic tissue. YES- it is absolutely possible that moist wound healing can debride a wound without surgical, or larvae involvement! The cellular removal of any dead tissue, bacteria, or foreign matter significantly minimizes the possibility of infection. The exudate also acts as a transport medium for a variety of bioactive molecules, or mediators, such as enzymes, growth factors, and hormones, which make sure the progression of the healing process advances in an organized fashion.

Medical professionals are now noticing that with moist wound healing, blood circulation is increased, which speeds up the healing process, dramatically reduces the chance of infection, is proven to result in less scarring, and cells are provided with the necessary moisture that they need to grow and function properly! The most common medium for moist wound healing is known as a hydrofiber dressing, which are soft, sterile bandages that can absorb a large amount of exudate. The exudate fluid is transformed into a soft gel, which creates the moist environment that cells need to thrive and support the natural healing progression.

Puremedy's Original Healing Salve, which is the base for all of our products, gives moist wound healing an extra boost by increasing oxygen and blood circulation in the tissue. Blood contains nutrients, proteins, hormones, enzymes and mediatory cells, which conduct proper healing progression. With increased circulation, follows the drawing of any toxins, debris, or impurities. With this salve, there is no need to clean or debride a wound. It will naturally do it on its own! The Original Healing Salve has also been proven to be anti-microbial, killing bacteria and super bugs (even MRSA, E-Coli, and Strep) by suffocating the cells,

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inhibiting them from reproducing. With Puremedy, there is no need for anything else. All of the ingredients in our salves work together to act as a one-step treatment for wound care!

### The Historical Healing of Pine and Why it is Still Used Today



Naturally harvested coniferous resins have been used in traditional medicine for hundreds of years, particularly in home made resins, for infections and wound healing. These resins can be derived from any conifer tree including pine, spruce, balsam, and fir. The healing properties have been proven to be fundamentally monumental in aiding in the body's natural healing process. What is truly amazing is the fact that so many cultures (officially) dating back to the 1500's have been using this as a miracle tool to heal wounds and fight infections... But as folk tails and beliefs are passed down, many know that pine has been used as a science even before then! During mummification, Ancient

Egyptians used coniferous resin soaked linens to prolong the preservation of the body and to deter insects and microbes from destroying the tissue. In Native American cultures, pine has been sacred for a number of reasons. The sap, because of it's antimicrobial and healing properties in fighting infections, the bark can be eaten in times of serious hunger, and can also be used in tea to ease a bad cough/ strep throat, and the needles (in the young stages) are a great source of vitamin C, A, E, and B vitamins. Due to the substantial anti-proliferative and anti-mutagenic properties, they also can be brewed in a tea to assist in preventing the growth of cancerous cells.

The first medical publication claiming to use a pine salve during medicinal practice was noted in 1578 by a Swedish doctor in Finland. He wrote about the natural resin being effective for serious leg wounds, and noted the recipe and application as, "take wax and white spruce resin, both 2 pellets, rams tallow 2 pellets, ship pitch, and olive oil, both 6 pellets... keep in a glass container. The wound has to be washed three times a day with sweet wine, then spread with the above mentioned salve". Traditionally, these types of salves were boiled with butter or animal fat and used as a "resin suction", which we refer to as a drawing salve, where all toxins, debris, bacteria, and other contaminants are naturally pulled out of the tissue.

So what makes pine resin such a powerful force in wound healing? The answer is in it's components. Coniferous resin is





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made up of pure resin acids and various terpenes. Terpenes are a very diverse group of compounds that are produced by many plants that are used for medicinal purposes (i.e. essential oils and cannabis). These terpenes have been used to relieve acne and other skin conditions, and has also acted as an aid social anxiety and sleeping disorders. Many terpenes are highly anti-microbial against most common fungus, viruses, and a wide range of gram positive and gram negative bacteria, such as E-Coli, Strep, and MRSA. Not only does the pine resin stop these harmful organisms from reproducing, but it actually attacks and deconstructs the cell wall and membrane structures!

In a clinical trial performed in 2008, 37 patients with severe, grade II-IV pressure ulcers were monitored during the course of their healing. The patients were split into two groups of treatments. The first group were treated with a hydrofiber dressing, and the second group was treated with a pine resin salve. Hydrofiber dressings are commonly used by medical professionals in wound healing. They are sterile bandages that absorb a large amount of exudate fluid, which is transformed into a soft gel, producing a moist environment to support natural healing progression. In this treatment, the resin salve was significantly more effective in wound improvement and healing. ALL pressure ulcers healed except for one ulcer in one patient. Less than half of the ulcers fully healed in the hydrofiber group.

In another clinical trial, 23 patients with chronic, or complicated, surgical wounds were treated with a resin salve. All patients fully recovered, on an average of 24-43 days without any complications or side effects.

As you can see, pine truly is a miracle solution in the wound care industry that has not been fully explored yet, which makes Puremedy Bio-cepticals such a revolutionary company. Pine is one of the three powerful ingredients in most of our salves (three products are excluded: Just Calendula, Hot Rash, and Calendula Plus St. John's Wort). The magic of the pine resin allows the stimulation of blood circulation which speeds up the healing process naturally, and kills off bacteria while restraining the bacteria from reproducing! In a lab study, the original recipe, which is the base to all of our drawing salves, kills off super bugs such as E-Coli, Strep, and even MRSA! It is the only product on the market, including pharmaceuticals, that can increase blood circulation topically. This profound recipe, The Original Healing Salve, is actually on its way to being approved and certified by the FDA as a wound care ointment! Meaning, our products will be more accessible to people around the world who really need them, and it will be covered by insurance!

This is a natural (and more effective) alternative to Neosporin, and above all, has not been tested on animals! Our salves are 100% pure and natural. Everything is organic and from the Earth. Puremedy is a company that is built on love and healing, and all of this is reflected in our products.

