

Wound healing? Think growth factors.

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Orthodox Wound Management

"In a moist environment exudate provides the cells involved in wound repair with nutrients, controls infection, and provides the best environment for healing." ¹

I think most of us who work at healing wounds would agree with this statement. We know that exudate contains a high concentration of protein and cellular debris that responds to inflammation, helps prevent infection and facilitates healing. Most importantly, it contains **growth factors** without which no wound would ever heal.

Why then do we wash the wound clean every time we change dressings if we're washing away exudate loaded with healing potential? And why do we keep the wound moist when this could reduce growth factor concentration and bioactivity? The reason is simple. Exudate is sticky. It adheres to dressings making them difficult to remove which can be painful for the patient.

There must be a better way – and there is.

Approaching Wound Healing With a Growth Factor Mindset

When you think about it, the orthodox approach to wound healing is rather mechanistic. Keeping the wound moist is an age-old concept based mainly on clinical experience, the conventional wisdom that "moist is good" and research showing cells grow faster in wet rather than dry environments. So let's approach the problem from a different perspective.

Since I began using a herbal (wheatgrass) extract in 1995, I have been able to achieve much faster healing rates than one normally observes, and have never had a wound or burn that became infected. I managed this *not* by keeping the wound surface moist, but keeping it **dry**.

How can this be possible? The secret I believe lies in the ability of wheatgrass to **stimulate growth factor activity**.

If there was such a thing as an ideal wound-healing facilitator, it would at least need to be able to:

1. Seal the wound surface to retain exudate
2. Prevent dressing adherence to the wound surface
3. Prevent infection
4. Reduce inflammation
5. Hasten healing
6. Prevent or reduce pain
7. Reduce scarring

Interestingly enough, all these characteristics are dependent upon the presence and activity of **growth factors**.

You will recall that growth factors are small proteins that attach to receptors on the cell surface. Their function is to activate cell proliferation and differentiation. For example, fibroblast growth factor (FGF) causes epithelial cells to divide and help re-cover wound surfaces. Numerous other factors help to reduce inflammation and pain, prevent infection and reduce scarring. But, if we wash these factors away when dressings are changed and dilute them with wet dressings, it is more than likely the healing process will be slowed, not accelerated.

In fact, we need to re-epithelialise the wound surface as quickly as possible. Today, there are many so-called wound-healing facilitators, but they are expensive, often time consuming to apply and, unfortunately, not always successful. So why not use something that hastens re-epithelialisation and prevents infection at a fraction of the cost of more sophisticated alternatives?

Wheatgrass as a Wound-Healing Facilitator

Since the 1930's, wheatgrass (and other cereal grasses) have been known to contain "growth factors"² (the term used in those days to describe substances that caused macroscopic growth in laboratory animals) capable of promoting rapid re-epithelialisation of acute wounds and burns.^{3, 6-10} Wheatgrass was also used as a potent antibacterial and anti-inflammatory agent.

However, by far the most important attribute of wheatgrass is its **ability to generate a layer of new epithelial cells to cover the wound (or burn) surface within 24-36 hours**.

This process **seals the wound, contains the exudates and eliminates ooze and old blood** (Figs. 1 & 2).

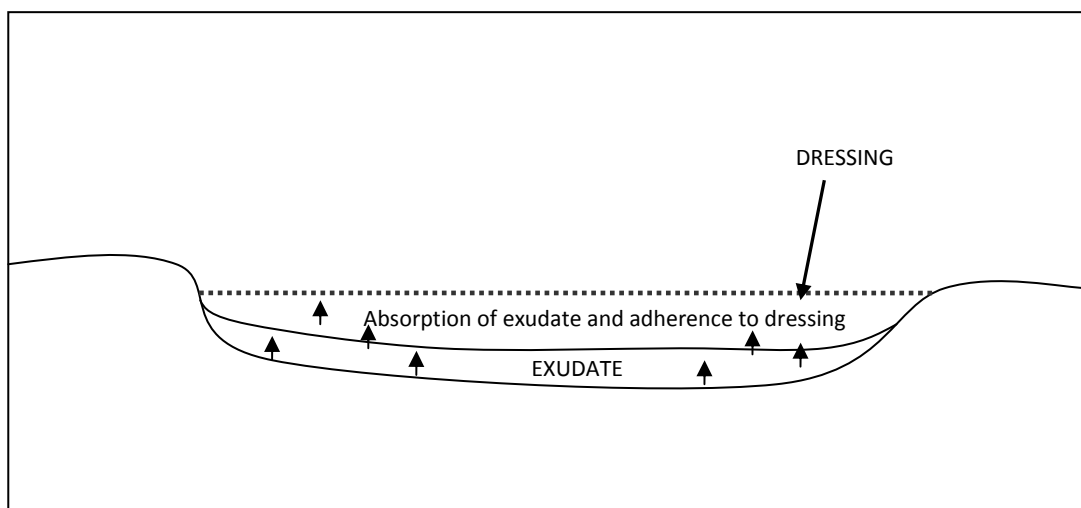


Fig. 1. Orthodox wound management

Dressing absorbs exudates, sticks to wound surface.

Removal of dressing is often painful.

Surface must be moistened to reduce dressing adherence to wound.

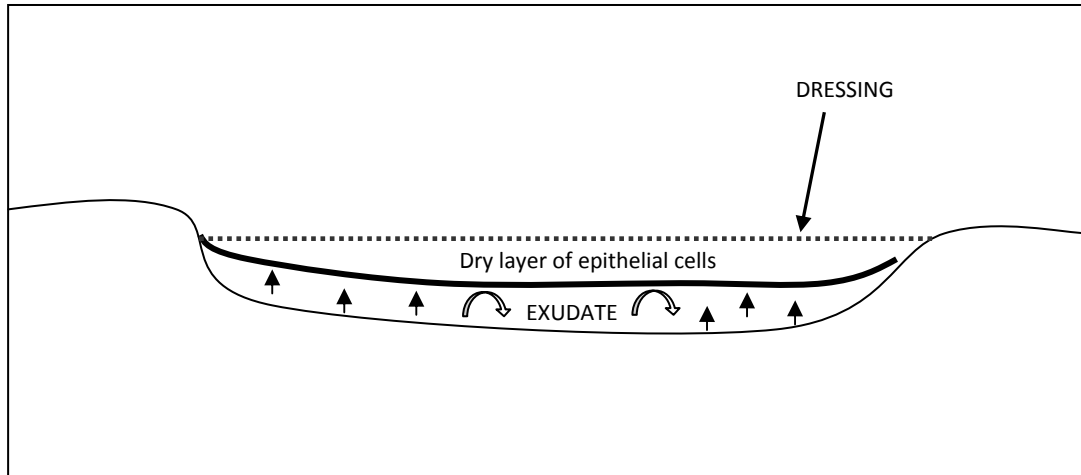


Fig. 2. Wound management with wheatgrass

Wheatgrass stimulates rapid re-epithelialisation of wound surface.
 Exudate is preserved while wound surface remains dry.
 'Non-stick' surface facilitates pain-free removal of dressing.
 Wound heals faster due to retained exudate.

This wound-healing method represents a major departure from orthodox wound-healing methods in that it:

1. Allows growth factor activity to remain undisturbed by dressing changes.
2. **Prevents infection** by sealing the wound surface.
3. Renders the wound **dry** and **clean** providing a **“non-stick” surface** that enables easy, painless removal of dressings; dressings need changing only every 2 or 3 days.
4. Significantly reduces **inflammation, pain and scarring**.

Note: These attributes can also be very important in the treatment of burns. The sealed wound prevents fluid loss and infection and pain is often rapidly relieved, possibly via Substance-P inhibition.⁴

How Does Wheatgrass Work?

No one really knows, but I have already mentioned 1930's evidence of high levels of growth factors in cereal grasses. Dubbed the “Grass Juice Factor” it not only dramatically increased growth rates in laboratory animals, but increased fertility rates as much as 85%. Many years later, a laboratory study⁵ showed increased production of growth hormone in rats fed green barley (cereal) juice. Although we can't extrapolate to humans, perhaps this study provides a clue. After all, growth hormone activates growth factors that affect all body cells. However, this does not explain the rapid re-epithelialisation of wounds by wheatgrass. Observations of numerous wheatgrass-treated wounds suggest to me a local process of growth factor stimulation rather than a systemic one. I will illustrate with some of my own cases.

Case 1 – Chronically split lip (Fig. 3.)



This 20 y.o. male suffered from a very painful split lower lip for 12 months. Treatments including steroid creams, anti-fungal, antibiotics and emollient creams were unsuccessful. The wound completely healed 2 weeks after applying 2% wheatgrass extract. Could this chronic wound have healed so rapidly other than by growth factor activation? I doubt it.

Case 2 – Slow healing skin graft

This 50 y.o. businessman suffered a deep dog bite to the lower leg. A split skin-graft was applied and orthodox wound management with antibiotic dressings commenced. Six weeks later the graft had failed to “take” (Fig. 4.). Note the depressed, rough surface of the grafted skin, and the poor, irregularly contoured attachment to surrounding normal skin. The wound was cleaned; wheatgrass extract (4% solution) applied and covered with a light, non-adherent dressing. The patient changed the dressing daily.



Fig. 4.



Fig. 5.

Two days later (Fig.5.) there is marked improvement. Note the **dry** surface over the yellow granulation areas where re-epithelialisation has already sealed the wound surface. The depressed areas have now filled in, the grafted skin is looking homogeneous and healthy and has blended seamlessly with the surrounding normal skin (arrows). The dressing was easily removed with no adherence to the wound surface.



Fig. 6.



Fig. 7.

One week after the first application of wheatgrass extract, (Fig. 6) skin coverage is strong and healthy.

20 days after the first wheatgrass extract application, the wound has healed completely. (Fig. 7)

This series of photographs clearly shows tissue revitalisation and acceleration of the surface wound healing process, most likely via growth factor activation.

To summarise, wheatgrass extract is a highly effective, safe and economical wound-healing facilitator. It provides:-

- Rapid healing
- A dry, non-adherent surface
- Ease of self-management
- Minimal antibiotic requirement
- Significant cost saving for the patient and treating institution
- Safety for use in children, during pregnancy and breastfeeding, and in sensitive areas e.g. periorbitally.

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About the author

Dr. Chris Reynolds graduated in Medicine at the University of Western Australia in 1973. He has spent most of his working life as a general practitioner. Due to the high efficacy of his wheatgrass extract in some areas of clinical medicine, he now specialises in the treatment of skin disorders, wound healing and soft-tissue injuries.

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