

# Evidence Summary: Wound Management — Low resource communities: Banana Leaf Dressing

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## QUESTION

What is the best available evidence regarding sterilised banana leaf dressings for wound management?

## CLINICAL BOTTOM LINE

Banana leaf dressings (BLD) provide a low cost, traditional wound dressing option in tropical countries where supplies are easily accessible at no or very low cost.<sup>1,4</sup> Banana leaves have a waxy surface that prevents the dressing adhering to the wound and, although impervious to water, they allow exudate to drain from the wound due to slits made or cracks occurring in the leaves during the preparation process.<sup>1</sup>

**Note: Untreated banana leaves are heavily contaminated with various fungi and pathogens and must be sterilised before use as dressings.**

Very limited research has been conducted on this type of wound dressing. Studies have investigated their effectiveness in the management of partial thickness burns,<sup>5</sup> skin graft donor sites<sup>1,4</sup> and surgical incisions.<sup>2</sup> In these studies BLD are associated with rapid healing of skin graft donor sites,<sup>1</sup> and a low<sup>1</sup> or no incidence<sup>2</sup> of wound infection. Patients reported that BLD are comfortable to wear and associated with low levels of or no pain, including on dressing removal.<sup>1,4,5</sup> Effective use of BLD has been reported in patients ranging in age from 11 months to 38 years without diabetes mellitus.<sup>5</sup> Two methods of preparing the dressings have been developed, one less time consuming than the other.<sup>1,2,5</sup> (See associated Recommended Practice document.)

## Effectiveness in promoting healing

- A split-body RCT (n=30) reported complete epithelialisation for skin graft donor sites occurred significantly (p<0.001) faster for sites dressed with BLD (range 8 to 10 days, mean 8.67, SD 0.84) compared with sites dressed with vaseline gauze (range 9 to 13 days, mean 11.73, SD 1.05).<sup>1</sup> (Level 1c evidence)
- A second split-body RCT (n=30) reported that total wound healing for partial thickness burns managed with povidone-iodine ointment and BLD had occurred within 10 days for the majority of participants. There was no significant difference in healing rates compared to potato peel dressings.<sup>5</sup> (Level 1c evidence)

## Effectiveness in preventing infection

- In one split-body RCT (n=30) no skin donor sites dressed with BLD showed signs of infection compared with 10% of skin donor sites dressed with vaseline gauze; however, this was not significantly different.<sup>1</sup> (Level 1c evidence).

- One observational article reported that the infection rate in partial thickness burns treated with BLD was not greater than that observed with paraffin impregnated gauze (no data provided).<sup>3</sup> (Level 5c evidence).
- In an observational study of post-surgical patients (N=100) no incisional infections were reported among the 43 patients who were able to be followed up in person or by telephone at 7 and 14 days. The same study had initially tested sterilised banana leaf dressings on mice compared to a control group treated with petroleum jelly gauze with no greater infection rate in the wounds treated with BLD.<sup>2</sup> (Levels 4b & 5c evidence)

## Effectiveness in managing pain

- In one split-body RCT that evaluated pain during dressing changes, 93% of patients classified pain during BLD changes as tolerable. This compared to 90% classifying potato peel dressing changes as tolerable (p=not significant).<sup>5</sup> (Level 1c evidence)
- A second split-body RCT reported significantly less general pain (1.1±0.71 versus 6.9±0.84 on an 11-point visual analogue scale) and pain on dressing removal (0.97±0.61 versus 9.47±0.77 on the same scale) for BLD compared with vaseline gauze.<sup>1</sup> (Level 1c evidence) Results from these split-body RCTs<sup>1,5</sup> may be influenced by the order in which dressings are removed from the wound sites but this was not reported in the trials.
- 95% of patients described BLD as comfortable to wear and 5% reported minor discomfort. There was no significant difference in comfort ratings compared to potato peel dressings.<sup>5</sup> (Level 1c evidence)
- In a small RCT (N=30) in which the burn donor sites of the experimental group were treated with autoclaved BLD and the control group with paraffin gauze dressing, the results indicated significantly less pain in the experimental group (p<0.05) as well as no pain on removal of dressing (p<0.05).<sup>4</sup> (Level of evidence 1c)

## Contraindications and side effects

- No signs of allergy or other side effects have been observed in participants treated with BLD.<sup>1,5</sup> (Level of evidence 1c),<sup>2</sup> (Level of evidence 4b)

## OTHER FACTORS FOR CONSIDERATION

- *Cost.* Banana leaf dressings was reported to be 160 times cheaper than impregnated gauze and 5,200 times cheaper than a biosynthetic dressing in India in 2003.<sup>5</sup> In 2003, the average cost of a BLD was less than \$US 0.02.<sup>1</sup>

- *Ease of preparing and applying.* In one trial 100% of health care professionals preparing and applying BLD rated its handling as easy (scale=easy or difficult).<sup>5</sup>

## CHARACTERISTICS OF THE EVIDENCE

This evidence summary is based on a structured search of the literature and selected evidence-based healthcare databases (including developing nations' health care journals) combining search terms that describe wound management and banana leaf dressings. The evidence in this summary comes from:

- Three RCTs conducted in India: two split-body RCTs,<sup>1,4,5</sup> one in which blinding of participants was reported and an RCT with limited details reported.<sup>4</sup> (*Level of evidence 1c*)
- A mixed methods study including in-vivo laboratory and clinical observational components.<sup>2</sup> (*Levels of evidence 4b & 5c*)
- One article with limited details based on observations of a number of cases treated with BLD in Thailand.<sup>3</sup> (*Level of evidence 5c*)

## BEST PRACTICE RECOMMENDATIONS

- Banana leaf dressings offer a low cost dressing option for managing partial thickness burns, skin graft donor sites and surgical incisions in settings where there is limited or no access to advanced wound care products. (Grade B).
- Banana leaf dressings are effective in promoting healing in partial thickness burns and skin graft donor sites. (Grade B).
- Banana leaf dressings provide patients with relief from pain, including during dressing changes. (Grade B).

## REFERENCES

1. Gore M, Akolekar D. Banana leaf dressing for skin graft donor areas. *Burns* 2003;29(5):483–486. (*Level of evidence 1c*)
2. Guenova E *et al.* Banana leaves as an alternative wound dressing. *Am Soc Dermatol Surg* 2012;39(2):290–297. (*Levels of evidence 4b & 5c*)
3. Chongchet V. The use of sterile, steamed banana leaves in the local treatment of burns. *Burns* 1980;6(4):264–265. (*Level of evidence 5c*)
4. Prasannababy S. The efficacy of dressing with banana leaves on donorsite wound of the patients with burns. *Nurs J India* 2000;91(5):108. (*Level of evidence 1c*)
5. Gore M, Akolekar D. Evaluation of banana leaf dressing for partial thickness burn wounds. *Burns* 2003;29(5):487–492. (*Level of evidence 1c*)

## RECOMMENDED PRACTICE

Untreated banana leaves are heavily contaminated with various fungi and pathogens and must be sterilised before use as dressings.

### Preparation

- Two techniques for preparing BLD are reported in the literature:<sup>1, 2</sup>
  - o Remove visible dirt and gently wash the banana leaf in clean water
  - o Remove the mid-rib of the banana leaf
  - o Paste the leaf to a piece of bandage cloth using a paste made from fine flour, hang the leaf to dry for 24 hours, roll the BLD and autoclave in a paper bag<sup>1</sup>

OR

- o Sterilise the banana leaves without any additional material.<sup>2</sup>

### Means of sterilisation:

- o The most effective method is a steam steriliser (autoclave at 121°C followed by 15 minutes holding time) under pressure or a household pressure cooker (level 3 for 15 minutes (excess pressure approximately 1,000 hPa). These methods inactivate mesophilic bacteria and result in sterile banana leaves.
- o If neither of these means of sterilisation are available, boiling in water (immersed for 5–10 minutes) destroys fungi and reduces the bacterial load to an extent that makes them suitable for use on surgical wounds (bacteria less than 100 colony forming units per 100 cm<sup>2</sup> of leaf area).
- o If frequent power outages are a problem or there is no electricity supply, boiling the leaves on a kerosene stove has been used as an effective method to reduce the bacterial load.
- o Chemical disinfection with providone-iodine has not been demonstrated to be effective.<sup>2</sup>

### Storage

- If the first means of preparing the leaves is used, then the recommended length of storage for the bagged dressing is 3–4 days,<sup>5</sup> although it has been reported that fungal growth on the leaves does not normally appear until 7–10 days after sterilisation.<sup>1, 3</sup>
- For the second preparation method it is suggested that the leaves be sterilised on the day of use.

### Application

Apply the banana leaf directly to the wound, cover with an absorbent cotton pad or gauze as appropriate and bandage (or tape) firmly to prevent slippage.<sup>1, 2</sup> Banana leaf dressings have been used both with (povidone-iodine ointment)<sup>5</sup> and without concurrent antiseptic.<sup>1-3</sup>

### Frequency of dressing changes

This is determined by the type of wound and related surgical protocols/orders. If any problems are identified in the interim e.g. soakage or signs of infection, the dressing needs to be removed, the wound assessed and findings reported.

## REFERENCES

1. Gore M, Akolekar D. Banana leaf dressing for skin graft donor areas. *Burns* 2003;29(5):483–486. (*Level of evidence 1c*)
2. Guenova E *et al.* Banana leaves as an alternative wound dressing. *Am Soc Dermatol Surg* 2012;39(2):290–297. (*Levels of evidence 4b & 5c*)
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