



## EVALUATION OF BANANA LEAVES (*MUSA PARADICIASA*) AS AN ALTERNATIVE WOUND DRESSING MATERIAL COMPARED TO PETROLEUM JELLY GAUZE DRESSING IN ABRASIONS OVER HEAD, NECK AND FACE

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### ABSTRACT

An important factor in the healing of superficial abrasions is early and effective coverage with a dressing that protects the wound from trauma, drying and desiccation. Pain and anxiety experienced by the patients, during and after dressing changes is always important issue amongst health care workers. In India cost and availability of dressing material are also important factors.

**Aim:** Present study was performed to establish properties of banana leaf (*Musa paradisiaca*) dressing as an alternative wound dressing material compared to conventional petroleum jelly gauze dressing in patients with abrasions over head, neck and face.

**Materials and methods:** 40 patients having abrasions over head, neck and face were included in study out of which, 20 patients were given banana leaf dressing and 20 patients were given petroleum jelly gauze dressing. After debridement and thorough cleansing of abrasions, dressing was applied directly over the wound and was changed every day for 7 days. Pain during dressing change, discomfort, status of wound bed and ease of handling dressing material were assessed.

**Results:** Analysis of the scores revealed that both banana leaf dressing and petroleum jelly gauze dressing were parallel with respect to all parameters except banana leaf caused minimal pain and trauma to the wound during dressing change in majority of the patients and the difference was statistically significant.

**Conclusions:** Banana leaves (*Musa paradisiaca*) can be considered among the choices of wound dressing material in abrasions over head, neck and face as they have been shown to cause less pain and trauma during dressing changes, as well as having additional benefits such as affordability and availability, comfort, and convenience of use by healthcare workers.

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### INTRODUCTION

India is gifted with rich flora that is widely distributed throughout the country. Herbal medicines are used in the treatment and cure for various diseases as traditional method of medicinal practice such as in Ayurveda. Plant derived drugs are very commonly used in India and China. Numbers of drugs are developed from plants either by isolating active ingredients from plant or by using plant as whole [1].

An abrasion is wound caused by superficial damage to skin. As face is an esthetic zone of body, facial abrasions needs early and effective coverage to protect and prevent it from drying.

When a gauze dressing is applied to a wound, it does not provide a moist environment for wound healing. It can cause tissue damage at the time of removal since it dries and adheres to the wound bed, delaying or interrupting the process of wound healing [2,3].

The optimal wound dressing material is one that can keep the wound moist while simultaneously acting as a barrier to pathogens. It should also be non-adherent, nontoxic, non-allergenic, non-sensitizing, and readily removed/changed without creating friction or irritation [2].

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In clinical practice and research, banana leaves have been shown to be a useful dressing material. Literature has the use of banana leaves as an alternative wound dressing material in burns, skin graft donor area and different surgical wounds. Banana leaves can be used as a substitute dressing material in clinics and hospitals where cost and availability are crucial factors [4, 5].

Present study was performed to establish properties of banana leaf (*Musa paradisiaca*) dressing as an alternative wound dressing material compared to conventional petroleum jelly gauze dressing in patients with abrasions over head, neck and face.

## MATERIALS AND METHODS

### Study population

The study included 40 patients who came to KLE's Dr. Prabhakar Kore Hospital and Research Centre in Belagavi, Karnataka, India, for treatment.

### Materials

The procedure required banana leaves from the species *M. paradisiaca*, as well as gauze and tissue plaster to keep the dressing in place.

### Inclusion criteria

Patients in the age group of 10-50 years with abrasions over the head, neck and face region who were admitted to KLE's Dr. Prabhakar Kore Hospital and Research Centre, Belagavi between September 2014 and May 2016 were included in the study after receiving approval from Research and Ethical Committee, KLE VK Institute of Dental Sciences, Belagavi.

### Exclusion criteria

Medically compromised patients, psychiatric patients, substance abusers (including alcohol and cigarettes) and those with history of chemotherapy or radiotherapy were excluded from the study. Moreover, wounds showing signs of infection were also excluded.

### Data collection

SIMPLE RANDOMIZED SAMPLING METHOD (SRS) was used for the sample selection. Control and samples were selected on the basis of their similar characteristics. Patients were explained about the study following which written informed consent for participation was obtained from them and a standard proforma was employed to gather all the necessary information.

### Statistical analysis

The data collected were analysed using chi-square test and unpaired t-test.

### Procedure

Forty patients, 20 of whom were treated as controls with petroleum jelly gauze dressing (Fig 1) and the other 20 were treated as study samples with banana leaf dressing (Fig 2).



Fig 1 Petroleum jelly gauze dressing.



Fig 2 Autoclaved banana leaf.

Freshly cut banana leaves from the species *M. paradisiaca* which are commonly available in Belgaum territory were obtained from an agriculture farm and washed thoroughly. These banana leaves were autoclaved at 15 lbs/in<sup>2</sup> pressure for 121°C for 15 minutes [5,6]. A small gauze and tissue plaster was used to keep the dressing in place.

For pain assessment during dressing changes, the NIH PAIN SCALE was employed. The EXUDATE INTERACTION SCALE, developed by the World Union Wound Healing Societies in 2007, was used to assess the dressing. The health professionals were asked to note the dressing handling characteristics for each patient as Easy to Handle: Score 1, Difficult to Handle: Score 2. Patient comfort characteristics were noted as Comfortable Feeling: Score 1, Minor Discomfort: Score 2, Extreme Discomfort: Score 3.

The dressings were changed every day for seven days, and the patients were called for a follow-up on the fourteenth day. Patients were recalled to the department and clinical examination was performed.

## RESULTS

Table 1 shows age wise distribution of the study subjects. A total of 40 patients were included in the study. 20 patients were treated with banana leaf dressing and the other 20 patients with petroleum jelly gauze as dressing.

### Table 1 Distribution of the study subjects according to age.

Type of dressing	N	Mean age	Std. Deviation (+)
Banana leaf	20	31.00	10.10
Petroleum jelly gauze	20	29.95	7.11
Unpaired t-test p value = 0.70 (Not significant)			

Table 2 shows distribution of study subjects according to gender.

**Table 2 Distribution of the study subjects according to gender.**

Type of dressing	Gender	Frequency	Percentage (%)
Banana leaf	Male	19	95.0
	Female	1	5.0
	Total	20	100.0
Petroleum jelly gauze	Male	14	70.0
	Female	6	30.0
	Total	20	100.0

Table 3 shows distribution of study subjects according to the pain score. Patients with banana leaf dressings reported mild to no pain and patients with petroleum jelly gauze dressings reported mild pain.

**Table 3 Distribution of the study subjects according to pain score**

Type of dressing	Pain score	Frequency	Percentage (%)
Banana leaf	No pain	17	85.0
	Mild pain	3	15.0
	Moderate pain	0	0.0
	Severe pain	0	0.0
	Total	20	100.0
Petroleum jelly gauze	No pain	9	45.0
	Mild pain	10	50.0
	Moderate pain	1	5.0
	Severe pain	0	0.0
	Total	20	100.0

Table 4 shows distribution of study subjects according to status of the wound bed. In both groups, it was noted that wound bed was moist during every dressing change.

**Table 4 Distribution of the study subjects according to status of the wound bed.**

Type of dressing	Status of wound	Frequency	Percentage (%)
Banana leaf	Dry	0	0.0
	Moist	20	100.0
	Wet	0	0.0
	Saturated	0	0.0
	Leaking	0	0.0
	Total	20	100.0
Petroleum jelly gauze	Dry	0	0.0
	Moist	20	100.0
	Wet	0	0.0
	Saturated	0	0.0
	Leaking	0	0.0
	Total	20	100.0

**Table 5 Distribution of the study subjects according to handling characteristics.**

Type of dressing	Handling characteristics	Frequency	Percentage (%)
Banana leaf	Easy to handle	20	100.0
	Difficult to handle	0	0.0
	Total	20	100.0
Petroleum jelly gauze	Easy to handle	20	100.0
	Difficult to handle	0	0.0
	Total	20	100.0

Table 6 shows distribution of study subjects according to comfort characteristics. Patients were comfortable with both dressing materials.

**Table 6 Distribution of the study participants according to comfort characteristics.**

Type of dressing	Comfort characteristics	Frequency	Percentage (%)
Banana leaf	Comfortable feeling	20	100.0
	Minor discomfort	0	0.0
	Extreme discomfort	0	0.0
	Total	20	100.0
Petroleum jelly gauze	Comfortable feeling	20	100.0
	Minor discomfort	0	0.0
	Extreme discomfort	0	0.0
	Total	20	100.0

Table 7 shows analysis of values of pain score, revealing that banana leaf dressing is less painful than petroleum jelly gauze dressing. ( $p < 0.001$ ).

**Table 7 Association between the type of dressing and pain score.**

Type of dressing	Pain score	Frequency	Percentage (%)	Chi Square value	p value
Banana leaf	No pain	17	85.0	31	<0.001*
	Mild pain	3	15.0		
	Moderate pain	0	0.0		
	Severe pain	0	0.0		
	Total	20	100.0		
Petroleum jelly gauze	No pain	9	45.0		
	Mild pain	10	50.0		
	Moderate pain	1	5.0		
	Severe pain	0	0.0		
	Total	20	100.0		

\*Statistically significant

## DISCUSSION

The objective of this study was to see if banana leaf (*M. paradisiaca*) could be used as an alternative wound dressing material to the conventional petroleum jelly gauze for abrasions on the head, neck and face.

When petroleum jelly gauze dressings were removed from the wound bed during dressing changes, we discovered that they caused tissue trauma. However, trauma and pain experienced during dressing changes were minimal due to its low adhering nature. Banana leaf dressing, on the other hand, is completely non-adherent; trauma and pain during dressing changes were significantly lower than with petroleum jelly gauze dressing. ( $p < 0.001$ ). Moffatt *et al.* conducted a study in 2003 to better understand wound pain and trauma during dressing changes. They stated that dressing removal is the most painful part of the procedure, and that dried-out dressings and adhering products are the probable cause of pain and trauma. They concluded that dressings should be non-traumatic in order to prevent tissue trauma [2]. According to our study, banana leaf dressings were found to be less painful during dressing removal and led to minimal damage to the newly formed epidermis. Also, when compared to conventional petroleum jelly gauze dressings, patients with banana leaf dressings were more comfortable with each dressing change.

Autoclaved banana leaves were employed over partial thickness burns and skin graft donor sites by Gore and Akolekar in 2003. The banana leaf dressing allows early epithelization and minimal pain during dressing changes, according to the researchers. The findings of their study helped to establish banana leaves as a viable alternative dressing material with regards to its great abundance and desirable

properties [4,5]. Our findings are consistent with those of Gore and Akolekar.

For sterilisation of banana leaves, we employed autoclaving at a pressure of 15 lbs/in<sup>2</sup> at 121°C for 15 minutes. Autoclaving ensured complete sterilization. None of the study participants showed signs of infection, tissue dehiscence or suture breakage.

Srinivas et al. tested different methods for sterilising banana leaves. He learned that autoclaving is the only way of sterilising that works [6]. Thus, we can infer that autoclaving provides complete sterilization has no negative effect on the properties of banana leaves as a dressing material.

In 2013, Guenova et al. employed banana leaf dressings to treat post-surgical wounds. Patients with webbed fingers, phimosis, penile candidiasis hernia, fibroadenoma were selected for banana leaf dressing. After autoclaving the banana leaf dressings, they were applied to cover the wound after surgery. After 24 hours, 7 days and 14 days, follow-ups were conducted. Banana leaf dressings are beneficial and well accepted by patients, according to the authors [7].

Furthermore, Gore, Umakumar and Iyer assessed the effectiveness of polyethylene surgical drape and banana leaf dressing on split thickness skin grafts (STSG) donor sites. Both dressing materials were found to be equally efficient, with the exception that polyethylene surgical drapes induced less pain during dressing removal than banana leaves[8]. Banana leaf dressing, on the other hand, outperformed petroleum jelly gauze dressing in our trial. The use of polyethylene surgical drapes over facial wounds and their comparison with banana leaf dressings need to be studied further in clinical settings.

In developing nations like India, where cost and availability of dressing materials are major considerations, banana leaf dressing could become a viable alternative. Banana leaves are widely available, grown all year, have all the desirable qualities of an ideal wound dressing material, and are also easy to prepare and use. Therefore, we highly encourage usage of banana leaf dressings over facial, head and neck injuries.

### **Our observations during the study**

Dressing has to be freshly prepared and kept in aseptic conditions. After seven to ten days, fungal growth appears on autoclaved banana leaves. Therefore, the dressing should be prepared and employed within a period of three to four days. Awareness needs to be raised in patients regarding the utility of banana leaf dressing. Banana leaf dressing tends to slip because of its non-adherent property making the use of gauze and sticking plaster necessary for support. Banana leaves should be thoroughly washed before autoclaving to eliminate dust, debris, and pesticides.

## **CONCLUSION**

Statistical analysis of the study revealed that both banana leaf dressing and petroleum jelly gauze dressing were parallel with respect to all parameters except banana leaf caused minimal pain and trauma to the wound during dressing change in majority of the patients and the difference was statistically significant. (p>0.001).

To conclude, banana leaves (*Musa paradisiaca*) can be considered among the choices of wound dressing material in abrasions over head, neck and face as they have been shown to cause less pain and trauma during dressing changes, as well as having additional benefits such as affordability and availability, comfort and convenience of use by healthcare workers. As a result, banana leaf dressing can be used on a regular basis. Because banana leaf dressing has similar/better characteristics as a dressing material than petroleum jelly gauze dressing, we advocate using banana leaf on a routine basis in all clinical set-ups.

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