# MANAGEMENT OF DIABETIC FOOT BY NATURAL HONEY

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**Background:** Many studies have demonstrated that honey has antibacterial activity *in vitro*, and a small number of clinical case studies have shown that application of honey to severely infected cutaneous wounds is capable of clearing infection from the wound and improving tissue healing. Research has also indicated that honey may possess anti-inflammatory activity and stimulate immune responses within a wound. The overall effect is to reduce infection and to enhance wound healing in burns, ulcers, and other cutaneous wounds. The objective of the study was to find out the results of topical wound dressings in diabetic wounds with natural honey. **Methods:** The study was conducted at department of Orthopaedics, Unit-1, Liaquat University of Medical and Health Sciences, Jamshoro from July 2006 to June 2007. Study design was experimental. The inclusion criteria were patients of either gender with any age group having diabetic foot Wagner type I, II, III and IV. The exclusion criteria were patients not willing for studies and who needed urgent amputation due to deteriorating illness. Initially all wounds were washed thoroughly and necrotic tissues removed and dressings with honey were applied and continued up to healing of wounds. **Results:** Total number of patients was 12 (14 feet). There were 8 males (66.67%) and 4 females (33.33%), 2 cases (16.67%) were presented with bilateral diabetic feet. The age range was 35 to 65 years (46±9.07 years). Amputations of big toe in 3 patients (25%), second and third toe ray in 2 patients (16.67%) and of fourth and fifth toes at the level of metatarsophalengeal joints were done in 3 patients (25%). One patient (8.33%) had below knee amputation. **Conclusion:** In our study we observed excellent results in treating diabetic wounds with dressings soaked with natural honey. The disability of diabetic foot patients was minimized by decreasing the rate of leg or foot amputations and thus enhancing the quality and productivity of individual life.

**Keywords:** Diabetic Foot, Diabetic Foot Ulcer, Natural Honey

## INTRODUCTION

Although honey has been used as a traditional remedy for burns and wounds, the potential for its inclusion in mainstream medical care is not well recognised. Many studies have demonstrated that honey has antibacterial activity *in vitro*, and a small number of clinical case studies have shown that application of honey to severely infected cutaneous wounds is capable of clearing infection from the wound and improving tissue healing. The physicochemical properties (e.g., osmotic effects and *p*H) of honey also aid in its antibacterial actions. Research has also indicated that honey may possess anti inflammatory activity and stimulate immune responses within a wound. The overall effect is to reduce infection and to enhance wound healing in burns, ulcers, and other cutaneous wounds. It is also known that honeys derived from particular floral sources in Australia and New Zealand (Leptospermum spp) have enhanced antibacterial activity, and these honeys have been approved for marketing as therapeutic honeys.[1]

The use of honey as a medicine is referred to in the most ancient written records.[2] Honey was prescribed by many physicians of ancient races to people for a wide variety of ailments. The ancient use of honey as wound dressing has been described by Beck & Smedley[3], Majno[4], and Forrest[5]. The Prophet Muhammad SAW recommended the use of honey for the treatment of diarrhoea.[6]

Wound healing is a complex and highly regulated process that can be compromised by both endogenous factors (pathophysiological) and exogenous factors (micro-organisms). Microbial colonization of both acute and chronic wounds is inevitable, and in most situations endogenous bacteria predominate, many of which are potentially pathogenic in the wound environment.[7]

Diabetic foot ulcers (DFUs), a leading cause of amputations, affect 15% of people with diabetes. A series of multiple mechanisms, including decreased cell and growth factor response, lead to diminished peripheral blood flow and decreased local angiogenesis, all of which can contribute to lack of healing in persons with DFUs.[8]

The objective of the study was to find out the results of topical wound dressings in diabetic wounds with natural honey.

## MATERIALS AND METHODS

The study was conducted at Department of Orthopaedic Surgery & Traumatology Unit-1, Liaquat University of Medical & Health Sciences, (LUMHS) Jamshoro, Pakistan, from July 2006 to June 2007. The

study design was experimental. Patient of either gender with any age group having diabetic foot Wagner type I, II, III & IV presenting at LUMHS during the study period were included in the study. Patients not willing for the study and who needed urgent amputation due to deteriorating illness were excluded from the study.

The objective and importance of research was read upon them before getting their consent in writing. All patients were assessed on the basis of Wagner's grading system for diabetic foot.

The first dressing was done in Operation Theatre. All wounds were washed with normal saline, hydrogen peroxide and pyodine solution thoroughly and necrotic tissues removed with or without anaesthesia. After debridement, sterile dressing gauze was prepared and natural honey was applied in layers over it and then placed over wound. Whole foot was packed with sterilized cotton and crepe bandage to prevent dust and other infecting factors. The dressings in same manner were done in ward dressing room with aseptic measures till the healing of wounds. The initial dressings were changed within 24 hours followed by 48 hours then twice in a week depended on the condition of wound. Soakage over dressing was the main cause of contamination. Care was also explained to nursing staff, patient, and the attendants. Weight bearing was not allowed initially in all patients having sole involvement.

## RESULTS

Total number of patients was 12 with 14 feet. There were 8 males (66.67%) and 4 females (33.33%), 2 cases (16.67%) were presented with bilateral diabetic feet. The age ranged was 35 to 65 (46±9.07) years. There were 6 (42.85%) Grade III, 4 (28.57%) Grade IV and 4 (28.57%) were Grade II (Table-1). Staphylococcus aureus was positive in 8 (57.14%), E. coli in 4 (28.57%), Pseudomonas in 1 (7.14%) and Proteus in 1 (714%) feet (Table-2). Split thickness skin graft was applied in 6 feet in 4 patients (33.33%). Wound closure done in 4 patients (33.33%) after control of infection and wound healed with regular dressings with honey in 4 (33.33%) patients.

Amputations of big toe in 3 patients (25%), second and third toe in 2 patients (16.67%) and of $4^{th}$ $5^{th}$ toes at the level of metatarsophalengeal joints were done in 3 patients (25%). All wounds healed well and only one patient (8.33%) had below knee amputation.

**Table-1: Grading of wounds according to Wagner's grading system**

| Grade | No. of feet | Percentage |
|---|---|---|
| II | 4 | 28.57 |
| III | 6 | 42.85 |
| IV | 4 | 28.57 |

**Table-2: Positive culture (Total Feet=14)**

| Micro-organism | No. of feet | Percentage |
|---|---|---|
| Staphylococcus aureus | 8 | 57.14 |
| E. coli | 4 | 28.57 |
| Pseudomonas | 1 | 7.14 |
| Proteus | 1 | 7.14 |

**Table-3: Amputation (Total Patients=12)**

| Amputation | No. of feet | Percentage |
|---|---|---|
| Big toe | 3 | 25.0 |
| $2^{nd}$ & $3^{rd}$ toe with ray | 2 | 16.67 |
| $4^{th}$ & $5^{th}$ at MTPJ level | 3 | 25.0 |
| Below knee | 1 | 8.33 |

## DISCUSSION

The role and significance of micro-organisms in wound healing has been debated for many years. While some experts consider the microbial density to be critical in predicting wound healing and infection, others consider the types of micro-organisms to be of greater importance. However, these and other factors such as microbial synergy, the host immune response, and the quality of tissue must be considered collectively in assessing the probability of infection. Debate also exists regarding the value of wound sampling, the types of wounds that should be sampled, and the sampling technique required to generate the most meaningful data. In the laboratory, consideration must be given to the relevance of culturing polymicrobial specimens, the value in identifying one or more micro-organisms, and the micro-organisms that should be assayed for antibiotic susceptibility. Although appropriate systemic antibiotics are essential for the treatment of deteriorating, clinically infected wounds, debate exists regarding the relevance and use of antibiotics (systemic or topical) and antiseptics (topical) in the treatment of non healing wounds that have no clinical signs of infection. In providing a detailed analysis of wound microbiology, together with current opinion and controversies regarding wound assessment and treatment, this review has attempted to capture and address microbiological aspects that are critical to the successful management of micro-organisms in wounds.[9]

The medical literature on treating wounds with honey has been recently reviewed in specialist wound care journals, with focus on the medical evidence[10] and focus on the clinical aspects[11]. In the numerous reports in the medical literature on the use of honey as a wound dressing the types of wounds on which the honey has been successfully used are very varied: abrasions[12] amputations[13] abscesses[14] diabetic foot ulcers[15] and other diabetic ulcers[16].

Screening programs and foot care education is of paramount importance to decrease the amputation rate and mortality. Health education and meticulous preventive measures can curtail high mortality and morbidity in our society. Natural honey

is one of the best topical dressings to prevent the amputations of diabetic foot.

## CONCLUSION

In our study we observed excellent results in treating diabetic wounds with dressings soaked with natural honey. The disability of diabetic foot patients was minimized by decreasing the rate of leg or foot amputations and thus enhancing the quality and productivity of individual life.

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