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## Use of negative pressure to prevent progression of partial thickness burns

The progression of partial thickness burns to deeper partial thickness or full thickness burns is a major problem in burn therapy. The ability to control or diminish the depth of burns would greatly enhance the prognosis and decrease the morbidity for these wounds.

Sixteen 2 centimeter diameter standardized depth partial thickness burns were created with heated stainless steel rods on each side of anaesthetized pigs (n=5). A device for applying negative pressure was placed over the burns on each side of the animal. The device/burned area was covered and sealed with an adhesive sheet. Negative pressure (150 mm Hg) was applied to the burns on the left side of each animal. The animals were anesthetized daily, and elliptical, full thickness biopsies extending from non-injured tissue through the center of the burn into non-injured tissue were harvested from non-treated and treated sites. The excised tissues were fixed in formalin, processed for histological analysis and stained with Hematoxylin/eosin and Gomori's trichrome. The histologic slides were blinded, and were evaluated for degree of injury and a Dermatopathologist determined the maximum burn depth with a Breslow Local Scale.

The Breslow Level (maximum total depth) for the burns treated by negative pressure was  $0.095 \pm 0.025$ mm. The maximum depth of non-negative pressure treated wounds was  $0.885 \pm 0.115$ mm. This represents a 112% reduction in the depth of the burn. These values are significantly different at  $p < 0.001$ .

The application of negative pressure to a partial thickness wound prevented the progression in depth of the burn in a pig model. It is postulated that negative pressure minimizes the zone of stasis adjacent to burns and increases revascularization of this area. Prevention of burn progression from a partial thickness injury to a full thickness injury greatly decreases the severity of the wound, decreases the intensity of the treatment and care, and greatly affects the final outcome of the treatment.