# A novel model for scald burn research

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*Introduction*
The relationship between burn temperature, duration of exposure and tissue injury depth for scald burns has not been validated by comprehensive histological evaluation. Our aim was to develop a robust porcine burn model capable of creating reproducible scald burns.
*Methods*
We conducted a pilot study with 4 juvenile pigs, creating 4 replicates of each burn combination; $50^0$C for 1, 2, 5 and 10 minutes and $65^0$C, $70^0$C, $75^0$C and $80^0$C for 5 seconds. Wound evaluation, biopsies and Laser Doppler Imaging (LDI) were performed at 1, 24, 72 hours and at day 7 post-burn.
*Results*
A consistent water temperature was maintained within the scald device for long durations; (e.g. 49.3 ± 0.1°C when set at 50°C). $50^0$C for 10 minutes created a severe burn, with 73 ± 19% of the dermis damaged at 7 days post-burn. For 5 second duration burns; 75°C scalds had significantly ($p<0.008$) deeper tissue damage at day 3 than day 7 post burn, whereas 80°C scalds were still deepening by day 7 post burn. The macroscopic and histologic appearance was consistent between replicates of burn conditions. The correlation between LDI perfusion units and histological depth evaluations ($r = 0.418$) was strengthened when the 1hr scans ($r = 0.665$) or the 1hr and 24hr scans were excluded ($r = 0.701$).
*Conclusions*
We have developed a reliable and safe model of porcine scald burn injury. Our novel apparatus with continually refreshed water, improves accuracy of scald creation for long exposures. Scalds from water at 50°C for 10 minutes and 80°C for 5 seconds were the only burns tested which showed deep dermal tissue damage at day 7 post burn.

**Key Words**

Burn Model, Porcine, Pig, Scald, Histology, Laser Doppler Imaging, Burn Depth

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