

DEVELOPMENT AND CLINICAL TESTING OF A NEGATIVE PRESSURE WOUND THERAPY DEVICE

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DECLARATION

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ABSTRACT

Negative Pressure Wound Therapy (NPWT) is a type of treatment in which suction is applied to a wound bed in combined with a specialized dressing to increase the wound healing rate. This study aims to develop a fully automated, portable and user friendly NPWT device and it is capable of increasing the healing rate of wounds, which cannot be healed by only using conventional wound treating methods. The pressure of the developed device can be controlled within the range of -25 mmHg to -250 mmHg with an accuracy of ± 3 mmHg. Pressure controlling is done by controlling rpm of the motor in the vacuum of the device. Dimensions of the developed device are 30 cm \times 20 cm \times 15cm, voltage is 12 V and power consumption range is 4 W to 10 W. The satisfactory level of user friendliness of the device was shown when it was being clinically tested by non-technical medical staff. To evaluate the performance of the device, it was clinically tested and validation was done by analyzing the clinical results. It was proved that this device has the same performance as previously validated NPWT devices, during the clinically testing. Reliability of the device was validated by longer period clinical testing at hospital. Portability, size reduction and possibility to operate using battery power supply are the other advantages of the device compared to other NPWT devices developed in Sri Lanka.

Keywords: NPWT, rpm, vacuum pump, clinical testing

This work is dedicated to my parents and my brother

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LIST OF ABBREVIATIONS

Abbreviation	Description
DoME	Department of Mechanical Engineering
FoM	Faculty of Medicine
GHC	General Hospital Colombo
NPWT	Negative Pressure Wound Therapy
PIC	Peripheral Interface Controller
PWM	Pulse Width Modulation
RPM	Revolutions Per Minute
UoM	University of Moratuwa

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