Is There a Difference? TWO Negative Pressure Wound Therapy (NPWT) Systems are Compared for Accurate Pressure Delivery and Efficient Fluid Removal

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In order to maximize the healing potential, Negative Pressure Wound Therapy (NPWT) systems must be able to accurately deliver the set level of negative pressure and maintain this set level during fluctuations in wound exudate volume and viscosity. Additionally, the European Wound Management Association (EWMA) International Consensus Review states that NPWT systems containing an electronically-controlled feedback loop ensure maintenance of set pressure, guarantee the effectiveness of therapy and provide higher patient safety.[1]

While instrumental to effective NPWT delivery, not all NPWT systems have the technical capability to meet all these standards, which can potentially lead to complications in wound healing.

System A‡: Medela Invia® Liberty™ NPWT System

System B˄: Cardinal Health Catalyst

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2. Paglinawan R, Schwab P, Bechert K. Negative pressure wound therapy system Innovates standard of care via intelligent pressure control and dynamic exudate removal. Wounds. 2020;32(10):S1-S8.
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˄ Testing was conducted at an independent third party laboratory using a test protocol designed by the manufacturer of System A‡.
Outcomes may not be indicative of clinical performance.

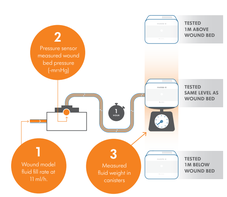
PURPOSE / METHODOLOGY

The objective of this study was to determine the ability of 2 NPWT systems 1- to maintain set pressure in a simulated wound bed when placed at different heights in relation to the wound and 2- to efficiently remove a simulated fluid bolus. System A‡ is a double lumen tubing NPWT system with an electronically controlled feedback system which dynamically responds to fluctuations in fluid volume and/or viscosity; System B˄ is a dual-lumen system that lacks an electronically controlled feedback system.

TEST METHOD #1
Accurate Pressure Delivery to the Wound Bed

Test 1 was performed to assess the ability of each NPWT system to accurately deliver the set negative pressure (mmHg) at 3 different heights in relation to the wound model (1 meter above, same level, and 1 meter below) while simultaneously removing a simulated bolus of exudate. The test was performed at –125 mmHg and –75 mmHg for System A‡ and –120 mmHg and –70 mmHg for System B˄. Different negative pressure settings were used for System B˄ due to the limited prescribed pressure setting available on this device **(Figure 1)**. The test method was repeated 3 times for each NPWT system at each pressure setting.

Figure 1

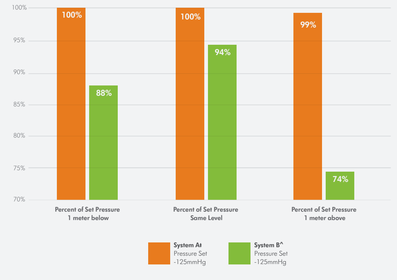


	Pressure 1 Setting	Pressure 2 Setting
System A‡	-125 mmHg	-75 mmHg
System B˄	-120 mmHg	-70 mmHg

RESULTS

System A‡ delivered the set level of negative pressure to the wound model regardless of the device position. System B˄ did not maintain set pressure at any height related to the wound. The performance of System B˄ was least effective when the device was set at –120 mmHg and 1m above the wound model **(Figure 3)**.

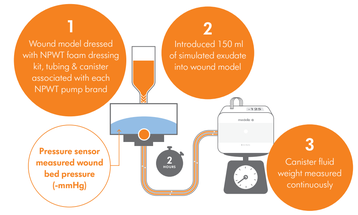
Figure 3: Percent of Set Pressure Delivered to Wound Bed



TEST METHOD #2:
Efficient Exudate Removal

Test 2 was performed to assess the ability of each NPWT system to maintain the set level of negative pressure and remove fluid after a sudden introduction of 150 mL of simulated wound exudate. Negative pressure levels were set at –125 mmHg for System A‡ and –120 mmHg for System B˄. Each device was at the same level as the wound model and repeated 3 times per system **(Figure 2)**.

Figure 2



RESULTS

System A‡ removed simulated wound fluid more efficiently than System B˄, evacuating 89% of the fluid into the canister and re-establishing and maintaining the set pressure of –125 mmHg in under 20 minutes.[4] System B˄ failed to remove any detectable level of simulated wound exudate throughout the 2 hour study period. System B˄ was unable to consistently provide set pressure to the wound bed throughout the 2 hour time frame and there were multiple pressure excursions throughout the testing period that were greater than 10% of the set pressure. **(Figure 5)**.

Figure 4: Comparison of Exudate Removal Rates

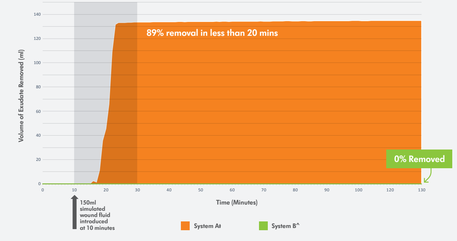
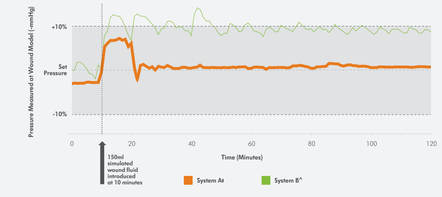


Figure 5: Comparison of Re-establishing Set Pressure



CONCLUSION

NPWT systems that cannot remove fluid efficiently nor maintain set pressure may negatively impact the therapy's effectiveness.[3] System A‡, with its electronically controlled feedback system that can dynamically sense and respond to changing fluid volumes and viscosities, more efficiently removes exudate and outperforms the other NPWT system tested.