

# PLEURAL DECOMPRESSION DEVICE

Failure to decompress a tension pneumothorax is a well-recognised cause of avoidable, early trauma deaths. Alfred Health and Monash University have developed an innovative device to safely deliver rapid and successful pleural decompression in trauma care settings. The Semi-automated Pleural Decompression device (SaPD©) addresses the reported failures of current procedures.

- **Proper placement of decompression device**
- **Chest wall fixation**
- **Unique assembly allowing safe air and fluid extraction**
- **Functions as an 'intelligent' intercostal catheter**
- **Preliminary testing completed**

## THE CHALLENGE

Tension Pneumothorax (tPTX) is a condition in which air becomes trapped under pressure in the pleural space following lung injury. This injury can quickly become life-threatening if untreated.

tPTX has been identified as a main contributor to preventable death in combat environments and in civilian trauma systems.<sup>2,3</sup>

Decompressing the pleural space using conventional methods, such as Needle Thoracostomy and Tube Thoracostomy have a high risk of failure due to:

- Inability to reach the pleural space
- Improper deployment
- Inappropriate catheter length
- Occlusion secondary to catheter kinking or blockage.

Clearly a better system would result in significantly improved outcomes for patients.

## THE TECHNOLOGY

Researchers from Alfred Health and Monash University have developed a device to safely and accurately open an anatomical space for fluid and/or air extraction. The all-in-one device allows efficient pleural decompression with reduced risk to the patient.

Key features include:

- Chest wall fixation at an optimal insertion angle
- An adhesive thoracic footing with integrated electrodes to allow the monitoring of patient vital signs
- An automated extendable blunt tip which protrudes from the obturator on entering the pleural space to prevent organ injury
- An extendable cannula which caters for varying chest wall sizes
- A deployable flex valve mechanism to allow one-way air and fluid release.

**Intellectual property:** International patent PCT/AU2017/051286 filed.

## THE OPPORTUNITY

This is a unique opportunity where the technology has undergone bench-top development as well as preliminary testing. The design features have been optimized and tested. Biocompatible and cost-effective materials need to be established.

The team consists of experienced trauma doctors and engineers with extensive knowledge in first responder resuscitation, through their work in prehospital as well as combat casualty settings.



Figure 1: SaPD© pleural decompression device (intelligent intercostal catheter).

## References

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2. Butler FK, Jr., Holcomb JB, Giebner SD, McSwain NE, Bagian J. Tactical combat casualty care 2007: evolving concepts and battlefield experience. *Military Medicine*. 2007;172(11 Suppl):1-19.
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