

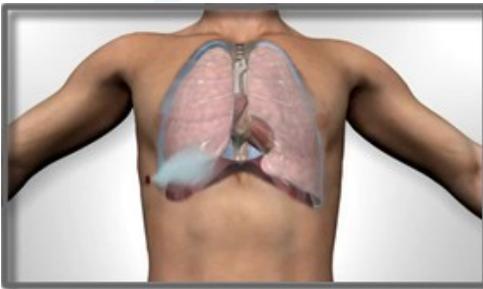
Open Pneumothorax – Recognition, Treatment and Complications

Open pneumothorax (or sucking chest wound) can be devastating when not recognised and treated appropriately. The chest cavity needs to be intact in order for ventilation to be effective. As such, standard field care focusses on sealing the chest wound with an occlusive dressing.

This article is aimed at the basics (as I have been accused of sometimes providing too much depth to our articles), because in essence, the basics is what saves lives... Agree? I say this based on experience and not through knowledge gained from textbooks.

For our basic providers, you don't need to be swamped with piles of equipment and 20 reference books to make a difference. It is better to be armed with knowledge that can be converted into practical skills. Reciting 100 references is not going to save the patient. Only doing saves lives... So even if you practise basic care... do it... but most importantly, do it well...

Definition of Open Pneumothorax

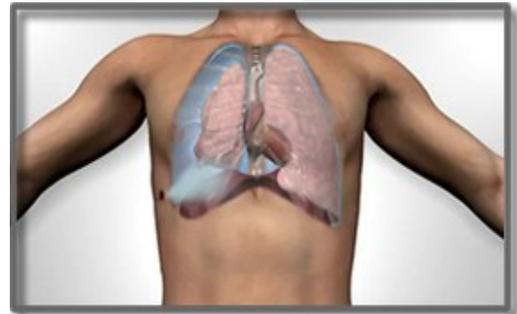


Open pneumothorax occurs when penetrating trauma causes a break in the integrity of the chest wall. If the hole in the chest wall is greater than $\frac{2}{3}$ the diameter of the trachea, air will preferentially enter through the hole in the chest cavity during inspiration.

This occurs because the hole in the chest wall is far shorter than the trachea and therefore offers less resistance to flow.

This results in a collapsed lung, inadequate ventilation and oxygenation and a progressive build-up of air in the affected pleural space.

In the event that the hole in the chest cavity has a flap associated with it, the open pneumothorax may lead to a tension pneumothorax requiring needle thoracostomy.



Diagnosis

A clinical diagnosis should be made during the primary survey. During visual inspection of the chest, a wound may be seen that appears to be 'sucking' air (sometimes audible) into the chest cavity during inspiration and may produce bubbling blood during exhalation.

In addition to this, the patient may have rapid, shallow and laboured respirations which usually become progressively worse as lung expansion decreases in the affected hemithorax. Patients who are hypoxic can be extremely combative. This is often misinterpreted as a 'difficult' patient and the results of this oversight will be disastrous for the patient. Furthermore, poor air entry will be detected in the affected hemithorax during auscultation and hyperresonance likely on percussion.

Emergency Care



Provide the patient with high flow oxygen via a face mask.

Perform a thorough chest exam. Look, listen and feel.

Control any visible external bleeding by direct pressure. Most bleeding will likely occur into the chest cavity. For this reason it is near impossible to determine the severity of the injury based on

visible external blood loss. Rather use the mechanism of injury and the potential energy transferred to guide you in assessing potential severity.

Apply a non-porous occlusive dressing over the wound (such as plastic, or foil from space blanket) and tape it down on 3 sides.

Ensure that the patient is monitored very carefully as there is a potential that the open side of the 3-sided tape may stick to the chest wall and be ineffective.

Using the CritiSeal to seal the chest wound



CritiSeal is an occlusive chest wound dressing developed and manufactured by Be Safe Paramedical specifically for the treatment of open pneumothorax. It consists of a non-porous pad with a thick gel adhesive backing that promotes excellent chest wall adhesion. Incorporated into the pad is a one-way valve system that allows venting of the chest cavity during expiration and stops air from being drawn into the chest cavity during inspiration.

Simply remove the CritiSeal from its foil packaging. Use the 100x100 trauma pad (included in the pack)

to wipe away excess blood or fluid from the chest wall. Hold the tab on the CritiSeal and peel away protective backing.

Centre the one-way valve directly over the hole in the chest and apply firm downward pressure to secure the CritiSeal in place. Continuously monitor the patient for improvement.

CritiSeal is the most cost-effective purpose designed chest wound seal on the South African market. It is extremely easy and effective to use and is therefore suitable for use by all levels of emergency care providers.

Challenges in care

One of the major challenges in caring for an open pneumothorax is the technique used to seal the chest wound. In my experience, a good seal and one-way valve effect can only be achieved with good quality disposables. Have you ever tried to get paper tape to stick to a shocked patient's chest? It just doesn't work. Most commercial tapes used by Emergency Services are bought in bulk, with a major focus on quantity and cost rather than quality. When these tapes are used under normal circumstances, they provide adequate adhesion. When used on patients who are severely compromised and shocked they dramatically lose their efficacy. The key is therefore to have a roll of good quality tape available at all times. Save it for special circumstances so to speak.

Another challenge is finding the correct material to provide a non-porous seal. Regular gauze and trauma pads are too porous and thus not really suitable for use as an occlusive dressing. I have seen emergency care providers use the plastic packaging of gauze pads, cut up rescue blankets and even a piece of a surgical glove to try and get a good seal. Yes they will all work (to some degree); however they can be a challenge to tape in place.

My personal opinion is... splash out a few Rand and kit your jump bags with a couple of CritiSeal Chest Wound Seals and ensure that you have the correct tools to effectively care for the next open pneumothorax you treat. For further information on the CritiSeal, see the product showcase column...

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