



The “Needle-D” is Hollywood's New CPR:

Here's What the Movies Get Wrong

By Connor Narcisco

Surely, he was about to die. In a movie scene that is familiar to most infantrymen, Mark Wahlberg's character “Troy” is laying on his back in the sand, gasping for air after being shot in the chest. “Archie,” played by George Clooney, holds his ear to Troy's chest, and the film cuts to a slimy interior view of the major organs under Troy's ribcage. We see a gurgling hole in Troy's right lung, which has promptly deflated. “Air in his chest is crushing his lung,” observes Archie. The film is *Three Kings*, David O. Russell's 1999 rendering of the first Iraq War, and the injury is a tension pneumothorax.

Archie fumbles through his kit and produces a long needle, which he pushes into Troy's chest, below the right clavicle. Affixed to the end of the needle is a three way stop-cock. He twists the valve open, and as if by magic Troy is immediately relieved. His lung re-inflates and he's able to breathe and speak again. Archie instructs Troy to release the valve every 15 minutes or so, as the pressure rebuilds.

In *Three Kings*, Hollywood presented a depiction of the needle decompression to a mainstream audience for the first time. Since then, this method of rapid resuscitation has grown in popularity among screenwriters. The procedure is hot right now, and appears to have replaced CPR and rescue breaths (mouth-to-mouth) as Hollywood's climactic life-saving intervention of choice. The “Needle-D,” as it's referred to by medics, has appeared in a number of recent big-budget films, including *Guardians of the Galaxy*, *Focus*, and *Mad Max: Fury Road*. The procedure's prominence could be a reaction to on-screen gun violence, the amount of which has tripled in PG-13 movies since 1985.¹ Regardless, it is certainly well suited to modern action heroes, who routinely thrill audiences by fighting to within inches of their lives.

The Needle-D is indeed a legitimate and effective treatment for a condition known as a tension pneumothorax, but as tends to happen in Hollywood, most dramatizations indulge in fantasy - either by omitting crucial steps, or by portraying acts of total nonsense.

If you've worn an IFAK in the last ten years, then you know what the needle looks like. Combat units began distributing the pen-shaped tool with the red cap once military doctors identified the pneumothorax as an injury that could be successfully treated on the battlefield. After massive hemorrhaging, the tension pneumothorax is the second most common cause of preventable death in combat, and the concepts behind the procedure are something anyone with a little training can understand.

The basic mechanics of the lungs are fairly simple. Each lung rests inside its own chamber, known together as the left and right pleural cavities. These cavities are not connected to each other, however both will inflate simultaneously as you breathe. The lungs are inert; they do not have muscles. They expand and contract due to pressure differences between the pleural cavities and the atmosphere outside. That imbalance is generated by the surrounding musculature, including the diaphragm, the intercostal muscles, and various other accessory groups. These muscles work in concert to expand the chest, which in turn draws air into the lungs through the nose and mouth.

A standard pneumothorax is defined as an abnormal accumulation of air inside of the pleural cavities, but outside of the lungs. A pneumothorax can occur spontaneously, or as the result of a disease, but it is associated primarily with trauma. Penetrating trauma has the potential to create a conduit between the pleural space and the outside world. A large enough hole, in the proper shape, may act as a one way valve, sucking air into the chest upon inspiration. Holes in the lungs themselves can produce a similar effect. When enough air has collected around the lung, the inflated cavity will begin to press the heart and major vessels up against the opposite lung, impairing



circulation. The lung on the affected side will “collapse,” and the condition will have earned the full moniker: A tension pneumothorax.

As the name would imply, a Needle-D is meant to be performed with a needle and catheter, normally 14 gauge by 3.25 inches. A stop-cock or valve isn't necessary - leaving the catheter open allows the pressure to exit continuously, and the narrow width of the catheter is too small to suck in air in the opposite direction. (You won't give your patient a pneumothorax by performing the procedure.)

Hollywood being Hollywood, the movies have preferred to depict more imaginative techniques. (Caution: Some spoilers ahead.) In *Mad Max*, Charlize Theron, in the role of “Furiosa,” is stabbed in her right side, underneath her arm. She struggles for what appear to be her final breaths. “She’s pumping air into her chest cavity,” announces a comrade, “she’s collapsing her lungs, one breath at a time.” Thinking quickly, Max locates a knife and jabs Furiosa beneath her arm on the left side of her chest. Air rushes from the new wound and Furiosa is revived.

A Needle-D is always performed on the side of the injury first (You’ll recall that the two cavities are not connected). Here, we have to assume that Furiosa somehow suffered a second pneumothorax on her left side, otherwise Max’s intervention would have been useless at best. In fact, with a tool as large as a knife, the procedure could have caused the other lung to deflate as well.

Equally important would be the management of the original wound. If possible, and before a Needle-D is even considered, an occlusive dressing should be applied over any open holes between the neck and the navel. A seal can be achieved by using strong tape, plastic, or gauze with vaseline - anything to prevent the free flow of air. By failing to address the source of the pneumothorax, you essentially ensure that the problem won't go away. Like Furiosa, Troy in *Three Kings* also does not receive an occlusive dressing. While decompressions are getting popular in movies, chest seals are not.

The award for the most outlandish portrayal of a chest decompression though, goes to Will Smith, who plays veteran con-artist “Nicky” in the mediocre and problematic movie *Focus*. Actor Gerald McRaney is “Owens,” one of Nicky’s partners, and Owens makes a bold decision. He shoots Nicky on purpose, in a deliberate attempt to fake Nicky’s death. “You shoot between the third and the fourth rib, just about eleven o’clock off the left nipple,” Owens explains as he frantically patches Nicky up. “That misses the heart and the major arteries. It does however, puncture the lung.”

The best operators in the world would never attempt to do this. “Bullets are notoriously difficult to ‘guide,’ as they bounce, tumble and do all sorts of unpredictable things,” says Dr. Adrian Barbul, professor of surgery at Vanderbilt School of Medicine. Ribs are not typically visible, and by grazing one of them a bullet could be deflected in any number of odd directions under the skin.

Owens brings Nicky back to life, of course, by laying him on his back, inserting an improvised pump beside the entrance wound, and suctioning the blood out of his chest. By doing so, *Focus* takes the act of decompression one step further, simulating blood in the pleural cavity, which medics call a hemothorax. Emergency room doctors typically treat this condition by performing a tube thoracostomy, which is the placement of a chest tube under the armpit, near the fifth rib, along the mid-axillary line. Blood reacts to gravity, so a doctor would not attempt to insert a drain over the patient’s heart.

To continue from here would be to squabble over details. The truth is that a Needle-D is a relatively easy procedure that can buy your patient some time. Some of the telltale indicators of a tension pneumothorax, such as tracheal deviation or jugular vein distention, are end-stage signs and might be imperceptible to the untrained eye anyway. Major Mike Way was an Army special operations flight medic. His approach was more practical: “A patient gets needed by meeting two criteria. Do they have mechanism of injury? And are they in respiratory distress?”



In order to avoid vital organs, proper site placement is also critical. The needle should only be inserted above the third rib, along the mid-clavicular line, or above the 4th or 5th rib, along the anterior axillary line (basically a hand width below the armpit.) Do not delay evacuation to a hospital, and whenever possible, defer to a trained professional (Actors don't count).

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1. <https://www.aap.org/en-us/about-the-aap/aap-press-room/Pages/Gun-Violence-has-Tripled-in-PG-13-Movies.aspx>