

## Using an Airway Clearance Device for Choking

***In this Fact Sheet, WorkCare Executive Chairman and Chief Medical Officer Peter P. Greaney, M.D., opines on the use of suction-based airway clearance devices as a first-aid measure to remove a foreign body airway obstruction (FBAO) when someone is choking.***

Foreign body airway obstruction (FBAO) devices that are designed to suck an object out of a person's airway are not typically part of a standard emergency response to choking in workplaces where food is consumed.

I decided to look into the efficacy of FBAO devices after reading a study published in *BMC Medical Education*. In the study, health science students used anti-choking devices without any training and reported that they were easier to administer than the currently recommended first-aid protocol. A critical review of this and other studies leads me to believe that an opportunity exists to enhance first-aid options and the response capabilities of emergency medical services personnel in the event a customer or co-worker has a FBAO.

### Background

The current response for a FBAO is based on a stepwise approach that incorporates techniques including coughing, back blows, abdominal thrusts, and chest thrusts combined with compressions. Abdominal thrusts (the Heimlich maneuver) are reserved for severe cases that are not relieved by back blows alone.

These are the American Heart Association's first-aid protocols for choking:

#### Adult and child

- Partial blockage – Allow the person to cough, monitor them.
- Severe blockage - Abdominal thrusts until the object is removed or the person stops responding. If the person stops responding, perform CPR and call 911. If an object is visible in the mouth, remove it.

#### Infant

- Severe FBAO - Five back slaps followed by chest thrusts with head slightly down. If the infant stops responding, perform CPR and call 911. If an object is visible in the mouth, remove it.

The current paramedic standard is the same as that for a layperson. However, it progresses to more advanced procedures not available to the public.

While standard protocols have been proven to be successful 86 percent of the time, morbid obesity, pregnancy and being wheelchair-bound have been shown to prevent the successful administration of standard anti-choking maneuvers. When these maneuvers are not successful, there is a wait for emergency personnel to arrive while continuing a protocol that has been unsuccessful thus far. In addition, invasive procedures, such as a cricothyrotomy or the use of Magill forceps, require advanced medical training and can lead to complications. (Related citations: [Frontiers in Medicine](#), M. McKindley, et al.; published online Feb. 2, 2022 and [Prehospital Emergency Care](#), A. Soroudi, et al.; 11 (1), January-March, 2007)

### Suction-based Airway Clearance Devices

Health risks associated with protocols for FBAO removal have driven interest in alternative strategies by those who see the need for an inexpensive, readily available, simple-to-use aid. In response, suction-based airway clearance devices have been developed in which manual suction is applied via a face mask. The victim may be seated, or lying down.



I investigated the use of two such devices, LifeVac and Dechoker. Both devices are promoted as being straightforward to use.

The LifeVac is a face mask attached to compressible bellows. The mask is held over the choking person's mouth and nose, then the handle of the bellows is pressed downward and sharply pulled upward. The Dechoker is a face mask attached to an oropharyngeal tube attached to a large cylinder with a plunger. To generate negative pressure, the plunger is sharply pulled backward. Keeping the mask fixed to the victim's airway throughout the procedure is critical for successful foreign body removal.

In the crossover trial published in *BMC Medical Education*, 42 health science students were asked to solve a FBAO event in three simulated scenarios on a manikin: 1) using the LifeVac; 2) using the Dechoker; and 3) following current FBAO protocols. Participants achieved correct compliance between 80 to 100 percent of the time without any training on the use of the two devices. Overall test times were significantly shorter with LifeVac than Dechoker. The most frequently failed part of the test was keeping the mask fixed to the victim's face throughout the procedure.

Regarding the recommended standard protocol, a 50 percent correct compliance rate was obtained among those with prior training compared to 31.3 percent compliance for those without training. When participants were asked which device they would choose after having used both, 55.8 percent chose LifeVac. (Related citation: [BMC Medical Education](#); B. Cardalda-Serantes, A. Carballo-Fazanes, et al.; Article No. 365, May 23, 2023)

In another randomized crossover trial conducted at a medical school in the United Kingdom, a manikin was used to compare LifeVac and Dechoker against the current standard of care. In the trial, a FBAO was successfully removed in 99 percent of the cases with LifeVac, 74 percent with Dechoker and 71 percent with abdominal thrusts. Removal in less than one minute occurred in 82 percent of the cases using LifeVac, 44 percent using

Dechoker and 67 percent using abdominal thrusts. Across group comparisons, LifeVac was consistently superior to abdominal thrusts. (Related citation: [Resuscitation Plus](#); E. Patterson, et. al; Vol. 5, March 2021)

## Key Considerations

Key considerations associated with the use of these devices in emergency situations include the following:

1. Their use may distract the rescuer from other immediately available techniques such as back slaps and abdominal thrusts.
2. The successful removal of a FBAO using a suction device relies on the generation of sufficient negative pressure, which depends on achieving an effective face mask seal. This necessary aspect should be reinforced during training.
3. Externally applied devices are currently registered as a Class 1 Food and Drug Administration (FDA) "suction apparatus." They do not require FDA approval.
4. Use of these devices has not yet been recommended by the American Heart Association or the American Red Cross, although they are expected to be considered for inclusion when protocols are updated in the future.

## Recommendations

In my opinion, a suction-based airway clearance device should be part of standard first-aid equipment to use in the event of a choking emergency, especially where food is consumed. Ideally, the device would be deployed in a highly visible area. Both adult- and pediatric-size masks should be available and replaced every three years. All personnel who work in the area should receive video-based training, and as feasible, practice on a manikin.

*For assistance with your company's first-aid response protocols and supplies, contact WorkCare: [info@workcare.com](mailto:info@workcare.com).*