

Available online at [ScienceDirect](https://www.sciencedirect.com)

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

Letter to the Editor

Anti-choking suction devices use. A pilot simulated study with parents and kindergarten teachers



To the Editor,

Foreign body airway obstruction (FBAO) events are relatively common in children,¹ particularly in preschool-age due to several factors such as immature chewing ability and dentition, narrower airways and specific behaviours such as high levels of activity, play, and distractibility that increase the risk of choking.² Most children choking events happen at home or at school, where children spend most of their time while cared or supervised by parents or kindergarten teachers.³

The indication of anti-choking suction devices as a step in the FBAO treatment is controversial due to the limited to date evidences and their potential risks.^{4,5} These devices are Class 1 registered by the Food and Drug Administration (FDA) for use in a choking emergency, a simple registration for low-risk devices that are exempted from further FDA clearance or formal approval and have not passed through a submission and assessment process.⁴ Therefore, this simulation pilot study aimed to evaluate the ability of naïve parents ($n = 43$) and kindergarten teachers ($n = 8$) to use the anti-choking suction devices (LifeVac[®] and DeCHOKER[®]).

Participants ($n = 51$) were asked to act in a simulated choking situation in two different scenarios: 1) using LifeVac[®] device; and 2) using DeCHOKER[®] device, in both cases with the only help of the manufacturer's leaflet instructions.^{6,7} We observed that participants could correctly perform most of the indicated steps with both devices without significant differences between them (Table 1). The weakest step was keeping the mask fixed to the victim's airway throughout

the procedure: 43.1% failed to do so with LifeVac[®] device and 33.3% with DeCHOKER[®]. The only variable with significant differences between the devices was the time spent on performing the test: a median of 9 s less with LifeVac[®] than with DeCHOKER[®] ($p < 0.001$) (Table 1). The estimated success rate was similar with both devices.

We observed that although they were naive, most participants were able to use both anti-choking devices with the only help of the manufacturer's leaflets in less than one minute. However, they often failed in the critical step of fitting and keeping the mask to the victim's airway.

Our results agree with those of the study by Patterson et al.⁸ They showed a higher number of successful FBAO removal in a shorter time with LifeVac[®] (82% in the first minute compared to 44% cases using DeCHOKER[®] and 67% using abdominal thrusts). These facts could indicate that if these devices had a place in the FBAO guidelines, although they would not be the cause of a significant delay in treatment, laypeople (especially parents and schoolteachers) should be trained previously, just like with other basic life support protocols.^{9,10}

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Table 1 – Descriptive analysis of the performance of the treatment of the adult victim with FBAO with LifeVac® and DeCHOKER® device.

	LifeVac®		DeCHOKER®		p-value
Inserting the mask into the device	Yes	46 (90.2)	–	–	
	No	5 (9.8)			
Place the mask covering nose and mouth of the victim correctly	Yes	40 (78.4)	Yes	46 (90.2)	0.109 [†]
	No	11 (21.6)	No	5 (9.8)	
Fixing the mask to the victim's airway	Yes	42 (82.4)	Yes	45 (88.2)	0.453 [†]
	No	9 (17.6)	No	6 (11.8)	
Push in handle	Yes	50 (98.0)	–	–	–
	No	1 (2.0)			
Pull handle (LifeVac®) // Pull the plunger out with force (DeCHOKER®)	Yes	50 (98.0)	Yes	50 (98.0)	1.000 [†]
	No	1 (2.0)	No	1 (2.0)	
Keeping the mask fixed to the victim's airway throughout the procedure	Yes	29 (56.9)	Yes	34 (66.7)	0.405 [†]
	No	22 (43.1)	No	17 (33.3)	
Performed all steps correctly	Yes	26 (51.0)	Yes	29 (56.9)	0.678 [†]
	No	25 (49.0)	No	22 (43.1)	
Estimated Success rate	100 (83.0 – 100.0)		100 (75.0 – 100.0)		0.796*
Time until device fitting on the victim (seconds)	31.9 (24.8 – 38.2)		39.6 (29.8 – 57.2)		< 0.001*
Overall time (seconds)	39.3 (31.4 – 44.4)		55.6 (38.9 – 71.0)		< 0.001*

FBAO: Foreign Body Airway Obstruction.

Continuous variables [median (interquartile range)].

Categorical variables [absolute frequency (relative frequency)].

* Wilcoxon test.

† McNemar test.

REFERENCES

- Committee on Injury, Violence, and Poison Prevention. Prevention of choking among children. *Pediatrics* 2010;125:601–7. <https://doi.org/10.1542/peds.2009-2862>.
- Denny SA, Hodges NL, Smith GA. Choking in the Pediatric Population. *Am J Lifestyle Med* 2014;9:438–41. <https://doi.org/10.1177/1559827614554901>.
- American Academy of Pediatrics. Guidelines for emergency medical care in school. *Pediatrics* 2001;107:435–6. <https://doi.org/10.1177/1559827614554901>.
- Van de Voorde P, de Lucas N. A 'foreign body' in the 'foreign body airway obstruction' algorithm. *Resuscitation* 2020;153:258–9. <https://doi.org/10.1016/j.resuscitation.2020.05.030>.
- Dunne CL, Peden AE, Queiroga AC, et al. A systematic review on the effectiveness of anti-choking suction devices and identification of research gaps. *Resuscitation* 2020;153:219–26. <https://doi.org/10.1016/j.resuscitation.2020.02.021>.
- Lifevac [Internet]. [Cited 2022 Mar 12]; Available from: <https://lifevac.life>.
- Dechoker [Internet]. [Cited 2022 Mar 12]; Available from: <https://www.dechoker.com>.
- Patterson E, Tang HT, Ji C, et al. The efficacy and usability of suction-based airway obstruction: a manikin randomised crossover trial. *Resuscitation Plus* 2021;5:1000067. <https://doi.org/10.1016/j.resplu.2020.100067>.
- Abelairas-Gómez C, Carballo-Fazanes A, Martínez-Isasi S, et al. Knowledge and attitudes on first aid and basic life support of pre- and elementary schoolteachers and parents. *An Pediatr (Barc)* 2020;92:268–76. <https://doi.org/10.1016/j.anpede.2019.10.005>.
- Abelairas-Gómez C, Schroeder DC, Carballo-Fazanes A, et al. KIDS SAVE LIVES in schools: cross-sectional survey of schoolteachers. *Eur J Pediatr* 2021;180:2213–21. <https://doi.org/10.1007/s00431-021-03971-x>.

Aida Carballo-Fazanes^{a,b}
 Cristian Abelairas-Gómez^{a,b,c,*}
 Emilio Rodríguez-Ruiz^{b,d}
 Roberto Barcala-Furelos^{b,e}
 Antonio Rodríguez-Núñez^{a,b,f}

^a CLINURSID Research Group, Psychiatry, Radiology, Public Health, Nursing and Medicine Department, Universidade de Santiago de Compostela, Spain

^b Simulation, Life Support, and Intensive Care Research Unit (SICRUS) of the Health Research Institute of Santiago de Compostela (IDIS), Santiago de Compostela, Spain

^c Faculty of Education Sciences, Universidade de Santiago de Compostela, Santiago de Compostela, Spain

^d Intensive Care Medicine Department. University Clinic Hospital of Santiago de Compostela (CHUS), Galician Public Health System (SERGAS), Santiago de Compostela, Spain

^e REMOSS Research Group, Faculty of Education and Sport Sciences, Universidade de Vigo, Pontevedra, Spain

^f Pediatric Critical, Intermediate and Palliative Care Section, Pediatric Department. Hospital, Clínico Universitario de Santiago de Compostela, Spain

* Corresponding author at: Faculty of Education Sciences, Avenida Xoan/XXIII, s/n, 15782 – Santiago de Compostela, Spain.

E-mail address: cristian.abelairas.gomez@usc.es (C. Abelairas-Gómez).

Received 6 June 2022

Revised 7 June 2022

Accepted 8 June 2022

<https://doi.org/10.1016/j.resuscitation.2022.06.005>

© 2022 Elsevier B.V. All rights reserved.