“You can leave your mask on”: effects on cardiopulmonary parameters of different airway protection masks at rest and during maximal exercise

Type Journal Article
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Abstract Background During the COVID-19 pandemic, the use of protection masks is essential to reduce contagions. However, public opinion reports an associated subjective shortness of breath. We evaluated cardiorespiratory parameters at rest and during maximal exertion to highlight any differences with the use of protection masks. Methods Twelve healthy subjects underwent three cardiopulmonary exercise tests: without wearing protection mask, with surgical and with FFP2 mask. Dyspnea was assessed by Borg Scale. Standard pulmonary function tests were also performed. Results All the subjects (40.8±12.4 years; 6 males) completed the protocol with no adverse event. At spirometry, from no mask to surgical to FFP2, a progressive reduction of FEV1 and FVC was observed (3.94±0.91 l, 3.23±0.81 l, 2.94±0.98 l and 4.70±1.21 l, 3.77±1.02 l, 3.52±1.21 l, respectively, $p<0.001$). Rest ventilation, O2 uptake ($\dot{V}O2$) and CO2 production (VCO2) were progressively lower with a reduction of respiratory rate. At peak exercise, subjects revealed a progressively higher Borg scale when wearing surgical and FFP2. Accordingly, at peak exercise, $\dot{V}O2$ (31.0±23.4, 27.5±6.9, 28.2±8.8 ml/kg/min, $p=0.001$), ventilation (92±26, 76±22, 72±21 l, $p=0.003$), respiratory rate (42±8, 38±5, 37±4, $p=0.04$) and tidal volume (2.28±0.72, 2.05±0.60, 1.96±0.65 l, $p=0.001$) were gradually lower. We did not observed a significant difference in oxygen saturation. Conclusions Protection masks are associated with significant but modest worsening of spirometry and cardiorespiratory parameters at rest and peak exercise. The effect is driven by a ventilation reduction due to an increased airflow resistance. However, since exercise ventilatory limitation is far from being reached, their use is safe even during maximal exercise, with a slight reduction in performance.
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Short Title “You can leave your mask on”
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URL https://erj.ersjournals.com/content/early/2021/02/04/13993003.04473-2020
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Publication European Respiratory Journal
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Tags:

Study

Attachments

- PubMed entry
- Snapshot

A randomised clinical trial to evaluate the safety, fit, comfort of a novel N95 mask in children

Type Journal Article
Author Daniel Yam Thiam Goh
Author Meng Wai Mun
Author Wei Liang Jerome Lee
Author Oon Hoe Teoh
Author Dimple D. Rajgor
Abstract Children are more vulnerable to the risks of air pollution, including susceptibility to acquiring chronic diseases in their developing lungs. Despite these, there are no specific masks designed for and tested in children that are available to protect our young from the common particulate air pollutants today. We evaluated safety, fit and comfort of a specially designed paediatric N95 mask with an optional micro ventilator (micro fan, MF) in healthy children aged 7–14 years, in a randomized, two-period crossover design. The subjects’ cardiorespiratory physiological measurements were assessed in different states of physical activity under different interventions (mask without and with MF). A total of 106 subjects were recruited between July-August 2016. The use of the mask without MF increased the End-Tidal CO2 (ETCO2) and

Fractional concentration of Inspired CO2 (FICO2) at rest and on mild exertion, as expected. The use of the mask with MF brought FICO2 levels comparably closer to baseline levels without the mask for both activities. The mask, with or without the MF, was found to be well fitting, comfortable and safe for use in children at rest and on mild exertion. The N95 mask tested offers a promising start for more studies in the paediatric population.

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Library Catalog www.nature.com

URL https://www.nature.com/articles/s41598-019-55451-w

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Study

Attachments

- Full Text PDF
- Snapshot

Assessment of respiratory function in infants and young children wearing face masks during the COVID-19 pandemic

Type Journal Article

Author Riccardo Lubrano

Author Silvia Bloise

Author Alessia Testa

Author Alessia Marcellino
Author Anna Dilillo
Author Saverio Mallardo
Author Sara Isoldi
Author Vanessa Martucci
Author Maria Sanseviero
Author Emanuela Del Giudice
Author Concetta Malvaso
Author Donatella Iorfida
Author Flavia Ventriglia
Abstract Face masks have been associated with effective prevention of diffusion of viruses via droplets. However, the use of face masks among children, especially those aged younger than 3 years, is debated, and the US Centers for Disease Control and American Academy of Physicians recommend the use of face mask only among individuals aged 3 years or older.To examine whether the use of surgical facial masks among children is associated with episodes of oxygen desaturation or respiratory distress.This cohort study was conducted from May through June 2020 in a secondary-level hospital pediatric unit in Italy. Included participants were 47 healthy children divided by age (ie, group A, aged ≤24 months, and group B, aged >24 months to ≤144 months). Data were analyzed from May through June 2020.All participants were monitored every 15 minutes for changes in respiratory parameters for the first 30 minutes while not wearing a surgical face mask and for the next 30 minutes while wearing a face mask. Children aged 24 months and older then participated in a walking test for 12 minutes.Changes in respiratory parameters during the use of surgical masks were evaluated.Among 47 children, 22 children (46.8%) were aged 24 months or younger (ie, group A), with 11 boys (50.0%) and median (interquartile range [IQR]) age 12.5 (10.0-17.5) months, and 25 children (53.2%) were aged older than 24 months to 144 months or younger, with 13 boys (52.0%) and median (IQR) age 100.0 (72.0-120.0) months. During the first 60 minutes of evaluation in the 2 groups, there was no significant change in group A in median (IQR) partial pressure of end-tidal carbon dioxide (Petco2; 33.0 [32.0-34.0] mm Hg; P for Kruskal Wallis = .59), oxygen saturation (Sao2; 98.0% [97.0%-99.0%]; P for Kruskal Wallis = .61), pulse rate (PR; 130.0 [115.0-140.0] pulsations/min; P for Kruskal Wallis = .99), or respiratory rate (RR; 30.0 [28.0-33.0] breaths/min; P for Kruskal Wallis = .69) or for group B in median (IQR) Petco2 (36.0 [34.0-38.0] mm Hg; P for Kruskal Wallis = .97), Sao2 (98.0% [97.0%-98.0%]; P for Kruskal Wallis = .52), PR (96.0 [84.0-104.5] pulsations/min; P for Kruskal Wallis test = .48), or RR (22.0 [20.0-25.0] breaths/min; P for Kruskal Wallis = .55). After the group B walking test, compared with before the walking test, there was a significant increase in median (IQR) PR (96.0 [84.0-104.5] pulsations/min vs 105.0 [100.0-115.0] pulsations/min; P < .02) and RR (22.0 [20.0-25.0] breaths/min vs 26.0 [24.0-29.0] breaths/min; P < .05).This cohort study among infants and young children in Italy found that the use of facial masks was not associated with significant changes in Sao2 or Petco2, including among children aged 24 months and younger.
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Library Catalog Silverchair
URL https://doi.org/10.1001/jamanetworkopen.2021.0414
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Volume 4
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Tags:

Study

Attachments

- Full Text
- Snapshot

Assessment of the wearability of facemasks against air pollution in primary school-aged children in London

Type Journal Article
Author Naomi R. Smart
Author Claire J. Horwell
Author Trevor S. Smart
Author Karen S. Galea
Abstract Air pollution is a major health problem and children are particularly vulnerable to the adverse effects. Facemasks are one form of protection but, to be effective, they need to filter out airborne pollutants, fit the face well and be wearable. In this pilot study, we assess the perceived wearability of three facemasks (Vogmask, TuHao and ReSpimask) marketed in the UK as being designed to protect children against exposure to air pollution. Twenty-four primary school children wore each facemask during a standardised walking and running activity. After each activity, the children were asked to rate facemask wearability in terms of parameters, such as perceived comfort, hotness, breathability and fit. At the end of the trial, the children compared and identified their preferred facemask. The main complaint about the facemasks was the children’s faces being too hot. The ReSpimask was most frequently reported as being perceived to be the hardest to breathe through. The TuHao facemask was the

only adjustable strap mask assessed but was reported to be difficult to adjust. Facemasks with a nose clip were frequently rated highest for fit (TuHao and Vogmask). The patterned, cloth fabric Vogmask had significantly higher ratings for appearance and perceived fit. The results show children’s perceptions of facemasks are highly affected by the facemask’s design, hotness and perceived breathability. By making children’s facemasks more appealing, breathable, cooler and improving their fit, wearability may be improved.

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Language en
Library Catalog www.mdpi.com
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Rights http://creativecommons.org/licenses/by/3.0/
Extra Number: 11 Publisher: Multidisciplinary Digital Publishing Institute
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DOI 10.3390/ijerph17113935
Issue 11
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Tags:

air pollution, children, facemask, wearability, Study

Attachments

- Full Text PDF
- Snapshot

Does wearing double surgical masks during the COVID-19 pandemic reduce maternal oxygen saturation in term pregnant women?: A prospective study

Type Journal Article
Author Mehmet Murat Isikalan
Author Buşra Özkaya
Author Eren Berkay Özkaya
Author Meryem Gümüş
Author Enes Ferlibaş
Author Ali Acar

Abstract	This study aimed to compare the effects of using single and double surgical masks (SM) on maternal oxygen saturation in pregnant women.
Date	2021-06-18
Language	en
Short Title	Does wearing double surgical masks during the COVID-19 pandemic reduce maternal oxygen saturation in term pregnant women?
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URL	https://doi.org/10.1007/s00404-021-06126-3
Accessed	9/2/2021, 1:12:36 PM
Publication	Archives of Gynecology and Obstetrics
DOI	10.1007/s00404-021-06126-3
Journal Abbr	Arch Gynecol Obstet
ISSN	1432-0711
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Tags:

Study

Attachments

- Springer Full Text PDF

Effect of face masks on gas exchange in healthy persons and patients with chronic obstructive pulmonary disease

Type	Journal Article
Author	Rajesh Samannan
Author	Gregory Holt
Author	Rafael Calderon-Candelario
Author	Mehdi Mirsaeidi
Author	Michael Campos
Abstract	Current evidence, from observational studies to systematic reviews and epidemiologic modeling, supports the use of masks by the public, especially surgical masks, for mitigating coronavirus disease (COVID-19) transmission and deaths (1–5). However, public mask use has been heavily politicized with inconsistent recommendations by authorities leading to divided public opinion. Despite evidence to the contrary, an online UK/U.S. survey found that only 29.7–37.8% of participants thought that wearing a surgical mask was “highly effective” in protecting them from acquiring COVID-19 (6). Another reason commonly argued against mask use involves safety concerns, as mask discomfort has been attributed to rebreathing CO2 and hypoxemia,

with some even considering that masks are lethal (7).

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Library Catalog	atsjournals.org (Atypon)
URL	https://www.atsjournals.org/doi/full/10.1513/AnnalsATS.202007-812RL
Accessed	9/2/2021, 1:11:22 PM
Extra	Publisher: American Thoracic Society - AJRCCM
Volume	18
Pages	541-544
Publication	Annals of the American Thoracic Society
DOI	10.1513/AnnalsATS.202007-812RL
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Journal Abbr	Annals ATS
ISSN	2329-6933
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Tags:

Study

Attachments

- Full Text PDF

Face masks in young children during the COVID-19 pandemic: Parents' and pediatricians' point of view.

Type	Journal Article
Author	Rémy Assathiany
Author	Catherine Salinier
Author	Stéphane Béchet
Author	Claire Dolard
Author	Fabienne Kochert
Author	Alain Bocquet
Author	Corinne Levy
Abstract	Background: In countries with high SARS-CoV-2 circulation, the pandemic has presented many challenges on different fronts, affecting lives and livelihoods; efforts to keep schools open are among the most important. In France, to keep schools open, wearing a face mask has been mandatory for children from age 6 years since November 2020., Objective: To evaluate the acceptability and tolerance of this measure by children as well as both parents and pediatricians., Setting: Parents

registered on the website of the French Association of Ambulatory Pediatrics and pediatricians members of this association., Participants: All parents and pediatricians who agreed to take part in the survey., Results: Among the 2,954 questionnaires for the parents' survey, the reasons for wearing a mask were understood by 54.6% of parents, most of whom (84.6%) explained the reasons to their children. The parents applied this measure because it was mandatory (93.4%) even if they disagreed (63.3%). When interviewed by parents, children said they were usually embarrassed (80.9%) by the mask. The main symptoms or changes of behavior attributed to the mask according to parents were headache (49.0%), speaking difficulties (45%), change in mood (45.2%) and breathing discomfort (28.1%). Among the 663 pediatricians who responded, many agreed with mandatory mask-wearing at age 6 years (67.7%). Overall, 15% of pediatricians systematically asked about the mask tolerance during the consultation. During the medical consultation, when the parents complained about the mask (64.3%), the main drawbacks were related to fog on glasses (reported by 68.2% of pediatricians), breathing discomfort (53.1% of pediatricians), cutaneous disorders (42.4% of pediatricians) and headaches (38.2% of pediatricians)., Conclusion: Despite the many inconveniences reported, children agree to wear the mask better than their parents think. Pediatricians should sufficiently take the opportunity during the consultation to further explain the reasons for wearing the mask because their pedagogical role is crucial.

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Short Title Face Masks in Young Children During the COVID-19 Pandemic
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Extra PMID: 34249814 PMCID: PMC8260829
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Tags:

Study, Perspectives

Attachments

- PubMed Central Full Text PDF
- PubMed Central Link

Investigating the effects of protective face masks on the respiratory parameters of children in the post-anesthesia care unit during the COVID-19 pandemic

Type Journal Article

Author Burhan Dost
Author Özgür Kömürcü
Author Sezgin Bilgin
Author Hilal Dokmeci
Author Özlem Terzi
Author Sibel Baris

Abstract Purpose The purpose of this study was to investigate the effect of protective face mask usage during the postoperative period on carbon dioxide retention in children during the COVID-19 pandemic. Design This study was designed as a prospective, randomized trial including 40 ASA I–II patients aged 3–10 years who were scheduled for elective surgery. Methods Patients were randomly allocated to two groups. The first group (Group 1) received O2 treatment over the protective face mask. In the second group (Group 2), the protective face mask was worn over the O2 delivery system. Heart rate (HR), oxygen saturation (SPO2) level, end-tidal carbon dioxide (EtCO2) level, and respiratory rate (RR) were measured using a patient monitor at 0, 5, 10, 15, 30, and 45 minutes and recorded. The primary outcome of the study was the determination of the EtCO2 levels, which were used to assess the safety of the mask in terms of potential carbon dioxide retention. Findings None of the participants' SPO2 levels fell below 92% while wearing masks. There was no statistically significant difference between the groups in terms of EtCO2, HR, SPO2, and RR ($p > 0.05$). Conclusions During the COVID-19 pandemic, protective surgical face masks can be used safely in the postoperative period for pediatric patients aged 3–10 years.

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Library Catalog ScienceDirect
URL https://www.sciencedirect.com/science/article/pii/S1089947221000216
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Tags:

COVID-19, Masks, Capnography, Post-Anesthesia Nursing, Study

Attachments

- Accepted Version
- ScienceDirect Snapshot

The impact of commonly-worn face masks on physiological parameters and on discomfort during standard work-related physical effort

Type	Journal Article
Author	Christian Georgi
Author	Anja Haase-Fielitz
Author	Daniel Meretz
Author	Linda Gäsert
Author	Christian Butter
Abstract	In view of the pandemic spread of SARS-CoV-2, there is increasing evidence that face masks should be worn in public spaces as an integral part of hygiene measures to contain the virus (1). Currently, the most common face masks are FFP2 masks (suitable for self-protection), surgical masks, and cloth masks ("community masks") that are often used in the non-clinical setting. With their increasing use among the general population, more reports have suggested that mask wearing presents a health risk (2– 4). In contrast to their effectiveness in infection prophylaxis, the effects of the above mask types on physiological parameters (blood gases, vital parameters) and the subjective perception of exertion under workload conditions have not yet been systematically investigated.
Date	2020-10
Library Catalog	PubMed Central
URL	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7838380/
Accessed	9/2/2021, 1:12:07 PM
Extra	PMID: 33357352 PMCID: PMC7838380
Volume	117
Pages	674-675
Publication	Deutsches Ärzteblatt International
DOI	10.3238/arztebl.2020.0674
Issue	40
Journal Abbr	Dtsch Arztebl Int
ISSN	1866-0452
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Tags:

Study

Attachments

- PubMed Central Full Text PDF
- PubMed Central Link

Wearing of cloth or disposable surgical face masks has no effect on vigorous exercise performance in healthy individuals

Type	Journal Article
Author	Keely Shaw
Author	Scotty Butcher
Author	Jongbum Ko
Author	Gordon A. Zello
Author	Philip D. Chilibeck
Abstract	Abstract: Wearing face masks is recommended for the prevention of contracting or exposing others to cardiorespiratory infections, such as COVID-19. Controversy exists on whether wearing face masks during vigorous exercise a ects performance. We used a randomized, counterbalanced cross-over design to evaluate the e ects of wearing a surgical mask, a cloth mask, or no mask in 14 participants (7 men and 7 women; 28.2 8.7 y) during a cycle ergometry test to exhaustion. Arterial oxygen saturation (pulse oximetry) and tissue oxygenation index (indicator of hemoglobin saturation/desaturation) at vastus lateralis (near-infrared spectroscopy) were assessed throughout the exercise tests. Wearing face masks had no e ect on performance (time to exhaustion (mean SD): no mask 622 141 s, surgical mask 657 158 s, cloth mask 637 153 s (p = 0.20); peak power: no mask 234 56W, surgical mask 241 57W, cloth mask 241 51W(p = 0.49)). When expressed relative to peak exercise performance, no di erences were evident between wearing or not wearing a mask for arterial oxygen saturation, tissue oxygenation index, rating of perceived exertion, or heart rate at any time during the exercise tests. Wearing a face mask during vigorous exercise had no discernable detrimental e ect on blood or muscle oxygenation, and exercise performance in young, healthy participants (ClinicalTrials.gov, NCT04557605).
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Volume	17
Pages	8110
Publication	International Journal of Environmental Research and Public Health
DOI	10.3390/ijerph17218110
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