



GRUPE
HOSPITALIER
DU HAVRE

ERPHAN
Équipe de recherche paramédicale
sur le handicap neuromoteur

UVSQ
université PARIS-SACLAY

Le réentraînement à l'effort avec ventilation à haut débit nasal est-il plus efficace ?

Guillaume PRIEUR, MKDE, PhD

Contre



Groupes de travail de la SPLF
pour l'exercice et la réhabilitation
Respiratoire



Liens d'intérêts

- Health Impact
- GHAHR
- Actukine
- FullPhysio
- Air Liquide
- ASTEN
- ASDIA
- EPIONE
- SOS oxygène

Aucun conflit d'intérêt en relation avec la présentation

Le haut débit nasal à l'effort....



Des publications...

> Respir Med. 2016 Sep;118:128-132. doi: 10.1016/j.rmed.2016.08.004.  Epub 2016 Aug 8.

Effects of heated and humidified high-flow nasal cannula during high-intensity constant-load exercise in patients with ventilator-dependent severe COPD: A Randomized Controlled Trial

1. Michele Vitacca², Giancarlo F. Ferrer¹, Annalisa Carlucci³

Randomized Controlled Trial > Medicine (Baltimore). 2021 Dec 23;100(51):e28032. doi: 10.1097/MD.00000000000028032. 

Effects of high-flow nasal cannula with oxygen on self-paced exercise performance in COPD: A randomized cross-over trial

Ke-Yun Chao^{1 2}, Wei-Lun Liu^{3 4}, Yasser Nassef⁵, Chi-Wei Tseng¹, Jong-Shyan Wang^{6 7 8}

> Front Med (Lausanne). 2021 Feb 17;7:595450. doi: 10.3389/fmed.2020.595450. 

Effects of high-flow nasal cannula with oxygen on exercise performance in COPD: A randomized trial

1. Laura Mayer^{1 2 3}, Simon R Schneider^{1 2 3}, Ulan U Sheraliev^{2 3 4}, Shaira D Aidaraliev^{2 3 4}, Anbaev^{2 3 4}, Silvia Ulrich^{1 2 3}

Serena Cirio¹, Matteo Mattei¹

Portable High-Flow Nasal Cannula in Patients with Severe COPD: A Randomized Controlled Trial

Annalisa Carlucci^{1 2}, Veronica Rossi¹, Barbara Fusar Poli¹, Alberto Malovini⁴

SYSTEMATIC REVIEWS

ANNALS OF THE AMERICAN THORACIC SOCIETY

Nasal High-Flow Therapy during Exercise in Patients with Chronic Obstructive Pulmonary Disease: A Systematic Review and Meta-Analysis

Guillaume Prieur^{1,2,3,4}, Mathieu Delorme⁵, Marius Lebret⁶, Yann Combret^{1,3,4}, Margaux Machefer⁷, Clement Medrinal^{3,4,5,6}, Pauline Smondack⁸, Francis-Edouard Gravier^{2,8}, Bouchra Lamia^{2,3,4}, Tristan Bonnevie^{2,8}, and Gregory Reychler¹

Epub 2021 Jun 29.

Effects of heated humidified nasal high flow supply on exercise tolerance in patients with chronic obstructive pulmonary disease: A pilot study

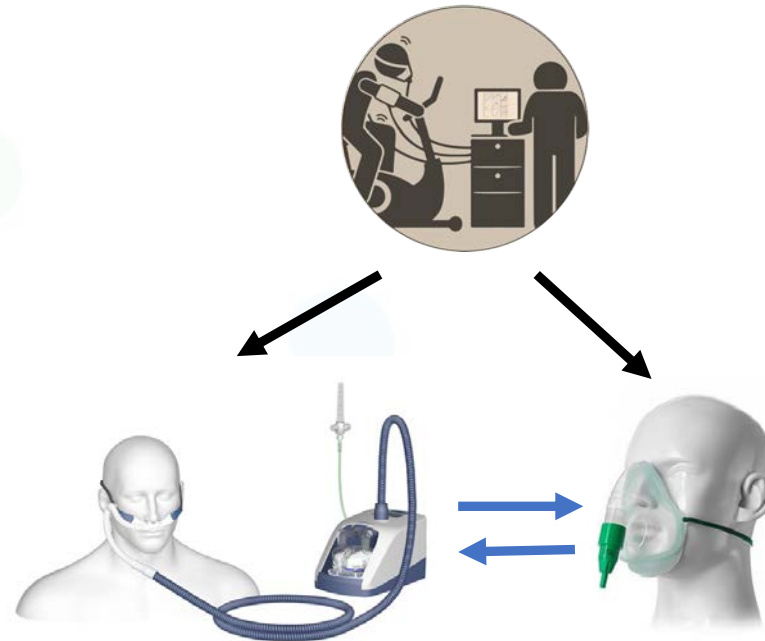
1. Aghajani¹, Daniel Veale¹, Samuel Verges², Frédéric Hérenget¹

Un peu d'histoire

respiratory MEDICINE

Effects of heated and humidified high flow gases during high-intensity constant-load exercise on severe COPD patients with ventilatory limitation

Serena Cirio ^a, Manuela Piran ^a, Michele Vitacca ^b, Giancarlo Piaggi ^a, Piero Ceriana ^a, Matteo Prazzoli ^a, Mara Paneroni ^b, Annalisa Carlucci ^{a,*}



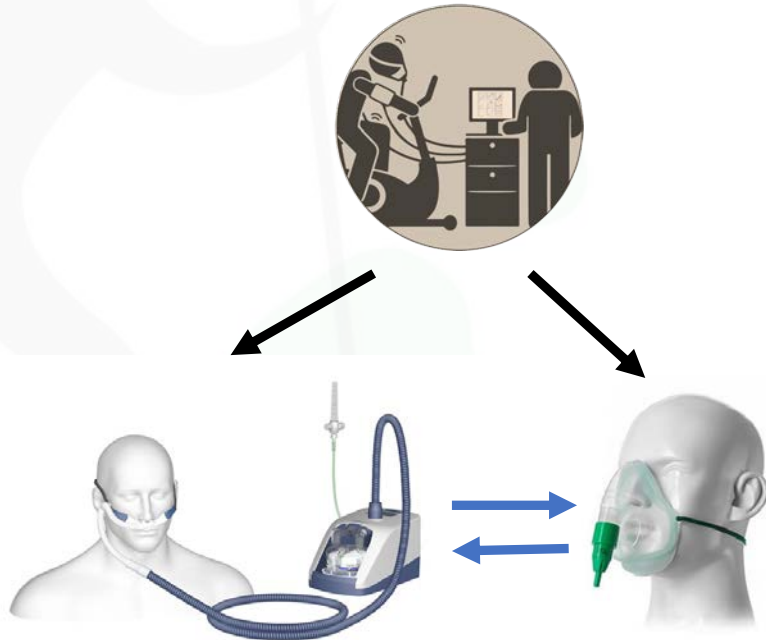
12 patients BPCO stable
VEMS 35 %
Débit 58,5 L/min
Iso FiO₂ (41 ± 36%)

Un peu d'histoire

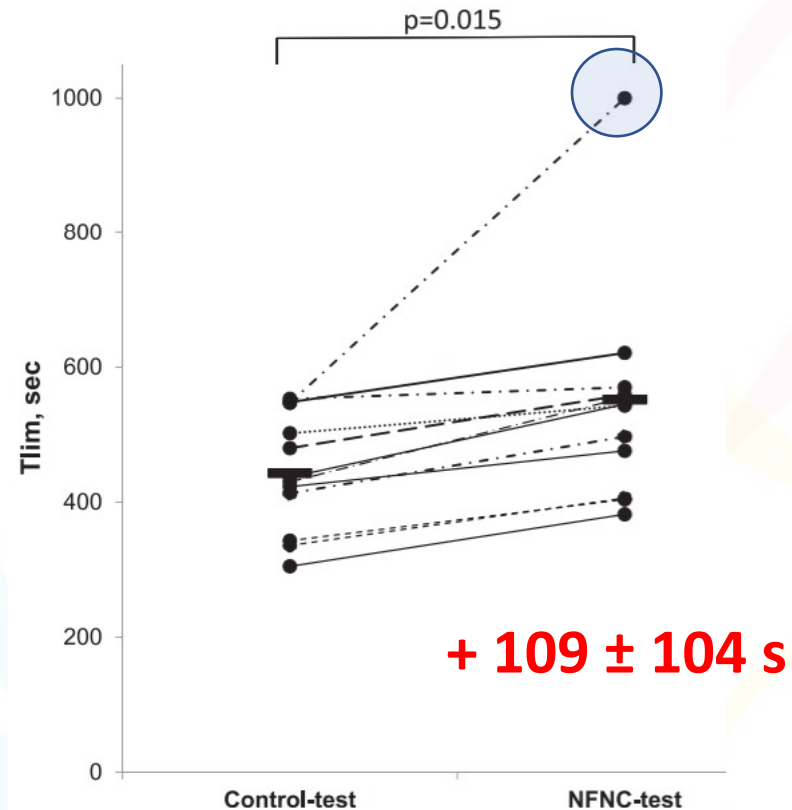
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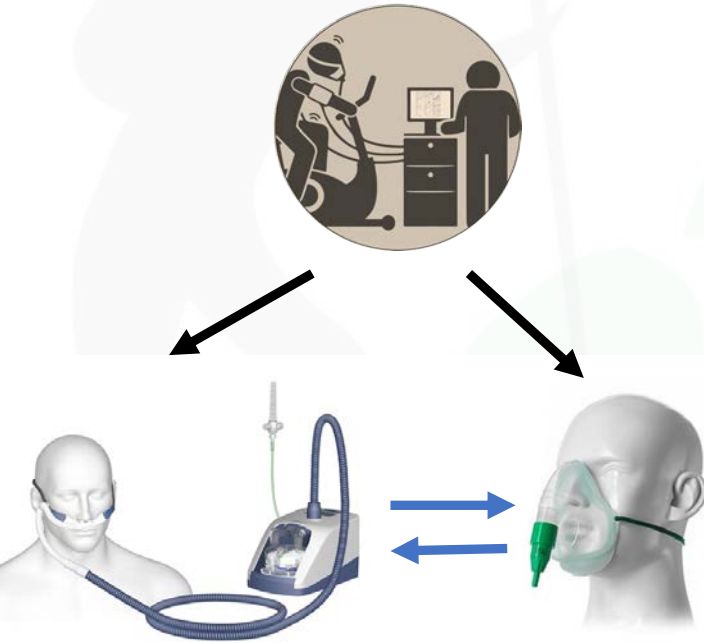


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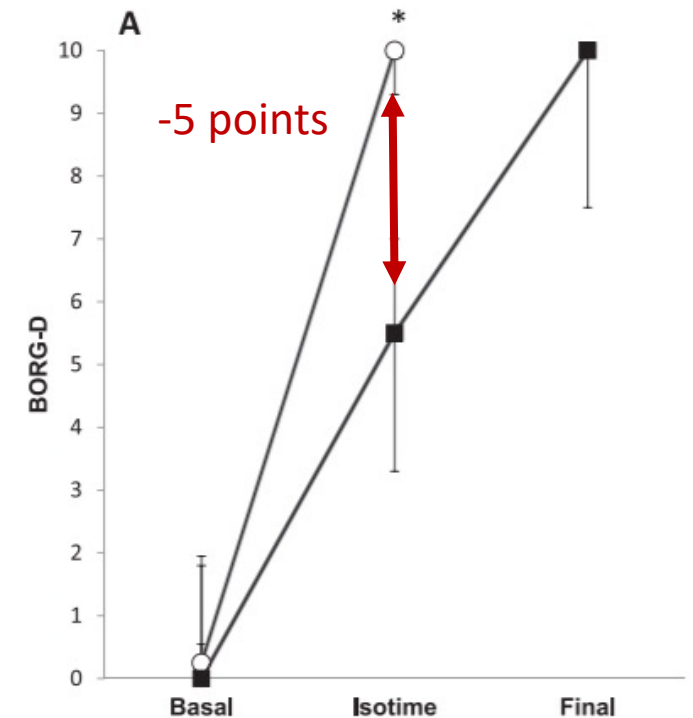
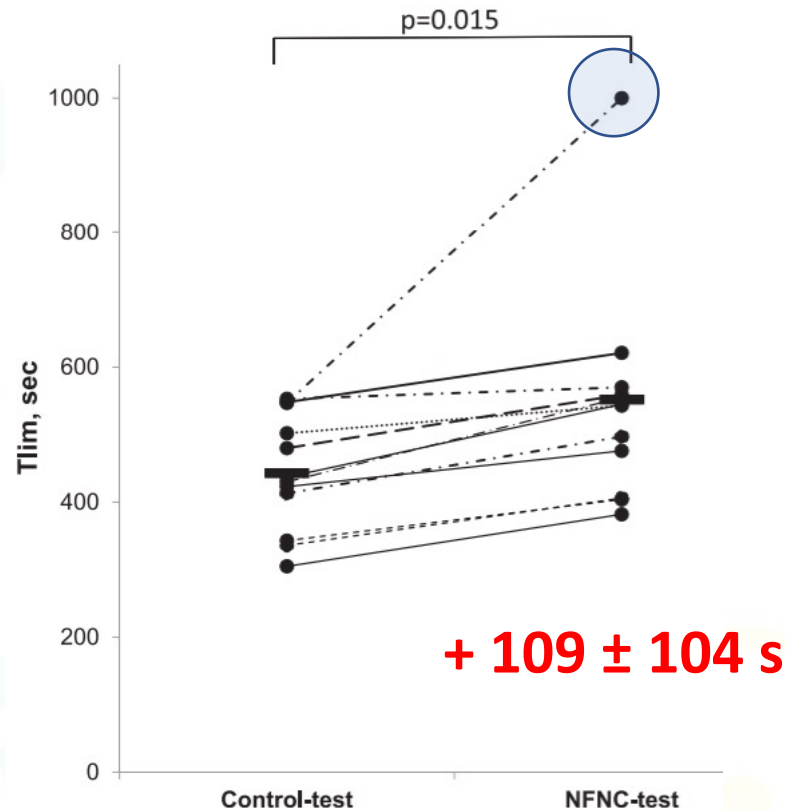
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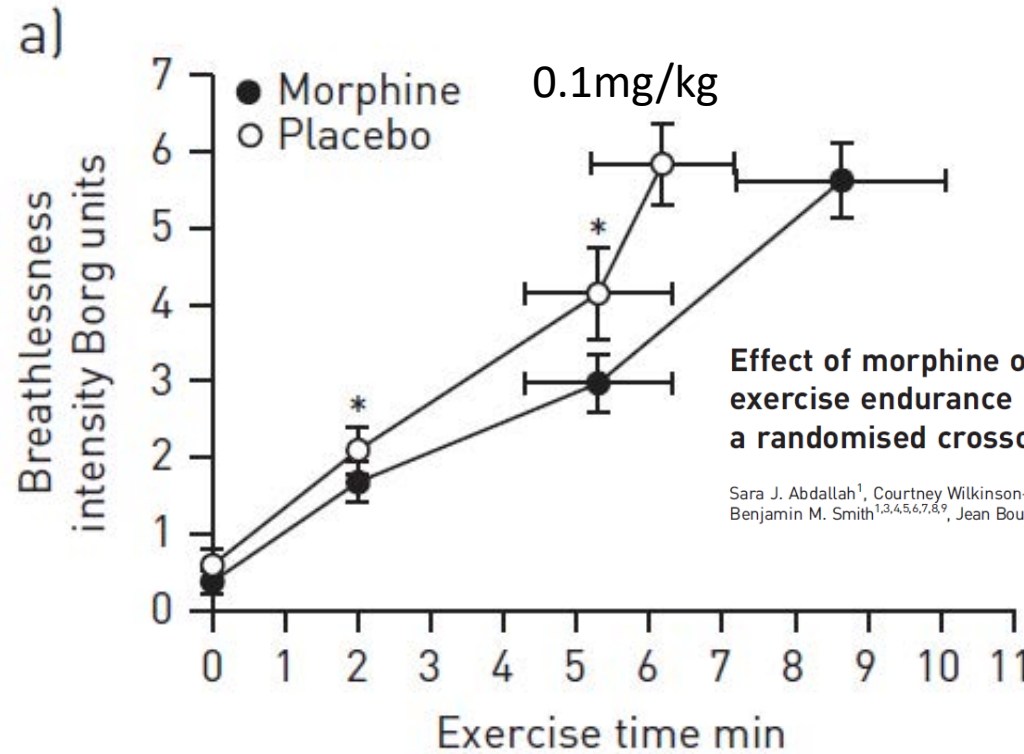
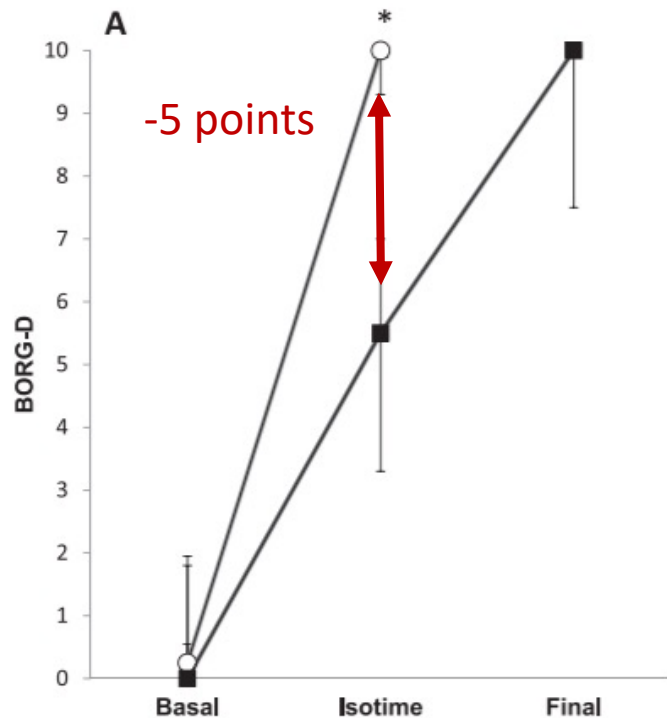


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Effect of morphine on breathlessness and exercise endurance in advanced COPD: a randomised crossover trial

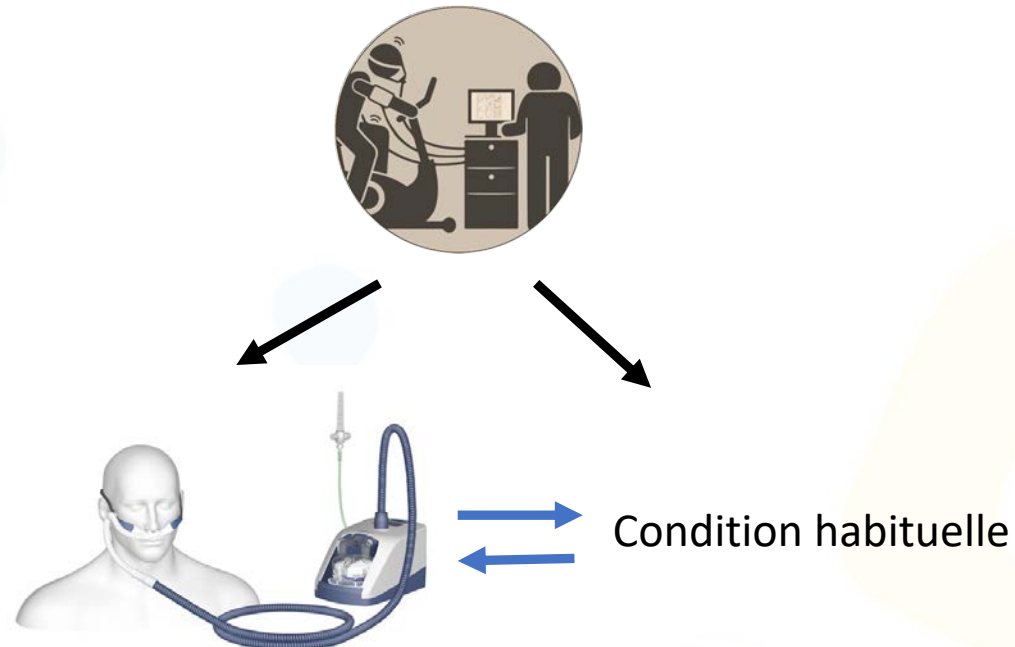
Sara J. Abdallah¹, Courtney Wilkinson-Maitland¹, Nathalie Saad^{2,3}, Pei Zhi Li⁴, Benjamin M. Smith^{1,3,4,5,6,7,8,9}, Jean Bourbeau^{3,4,5,6,7,8,9} and Dennis Jensen^{1,3,4,5,6,7,8,9}

On a vérifié par nous même

Respirology

Nasal high flow does not improve exercise tolerance in COPD patients recovering from acute exacerbation: A randomized crossover study

GUILLAUME PRIEUR,^{1,2,3,4} CLEMENT MEDRINAL,^{2,3,4} YANN COMBRET,^{1,5} ELISE DUPUIS LOZERON,⁶
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JEAN-CHRISTIAN BOREL^{8,9} AND GREGORY REYCHLER^{1,10}



19 patients BPCO post-exacerbation

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Débit 60 L/min

SpO₂ > 90 %

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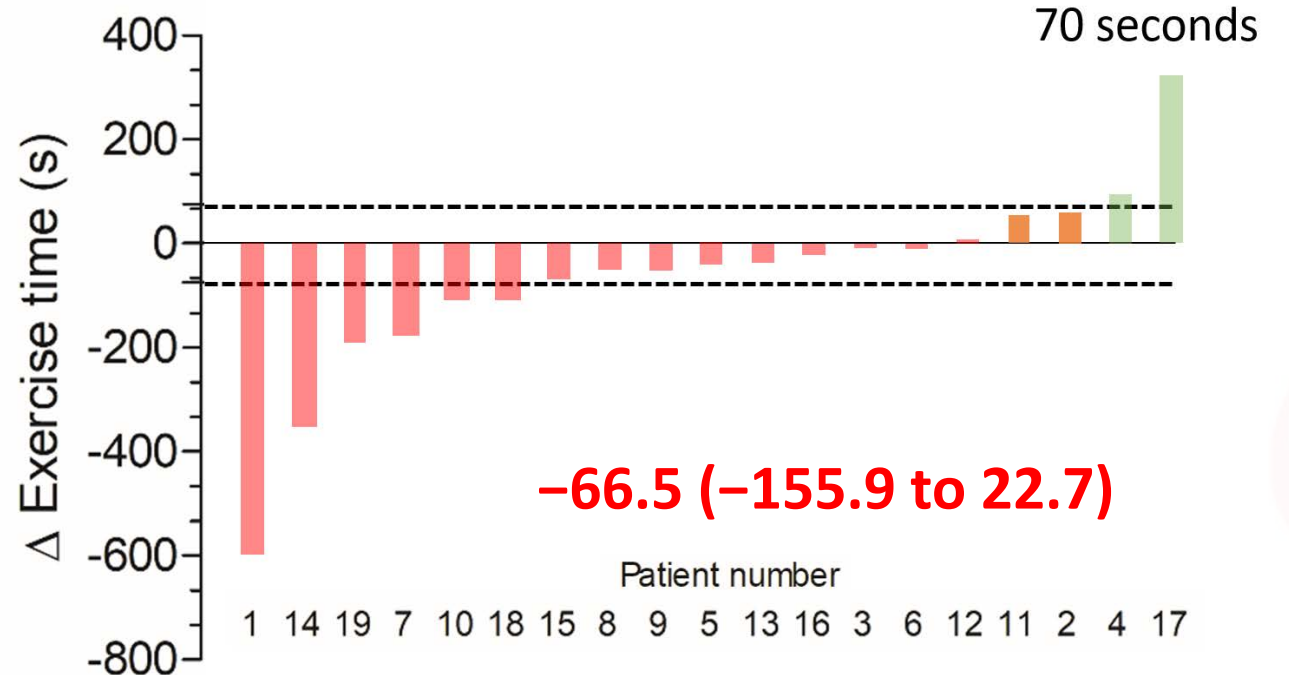
Condition habituelle

19 patients BPCO post-exacerbation

VEMS 28 %

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SpO₂ > 90 %



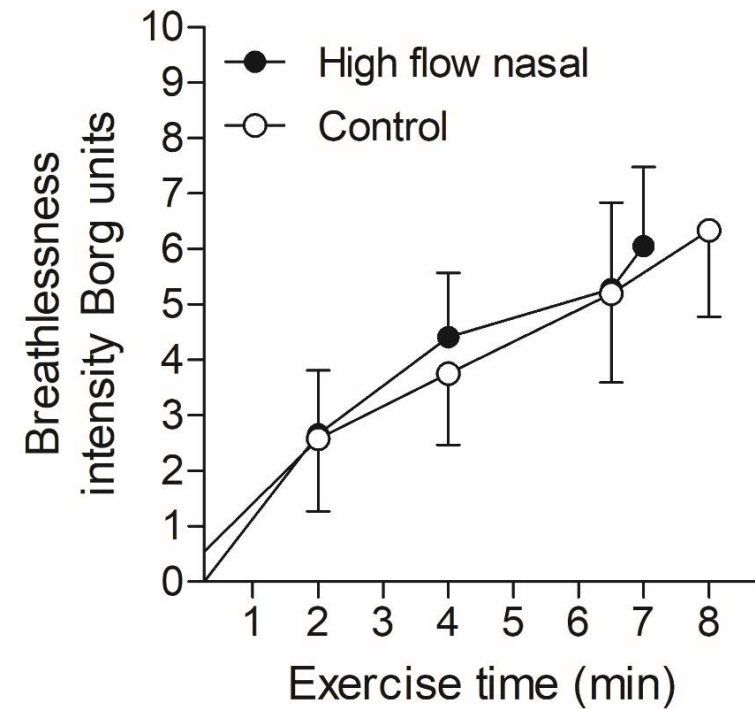
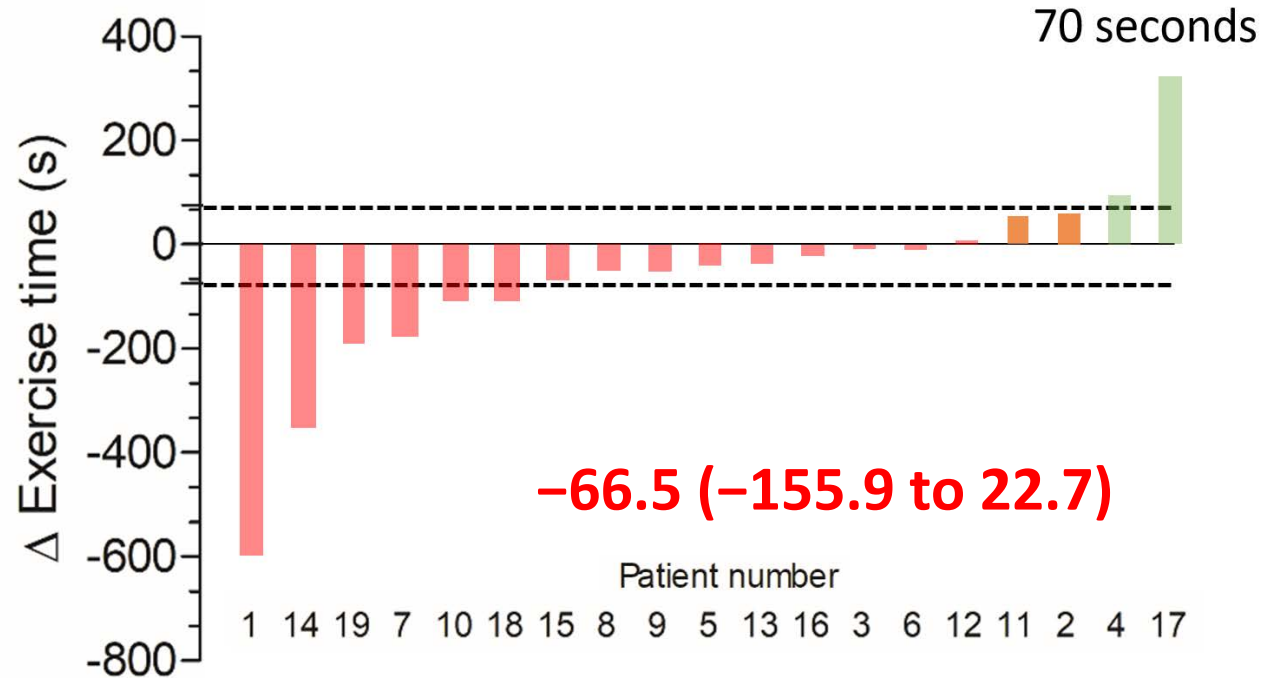
-66.5 (-155.9 to 22.7)

On a vérifié par nous même

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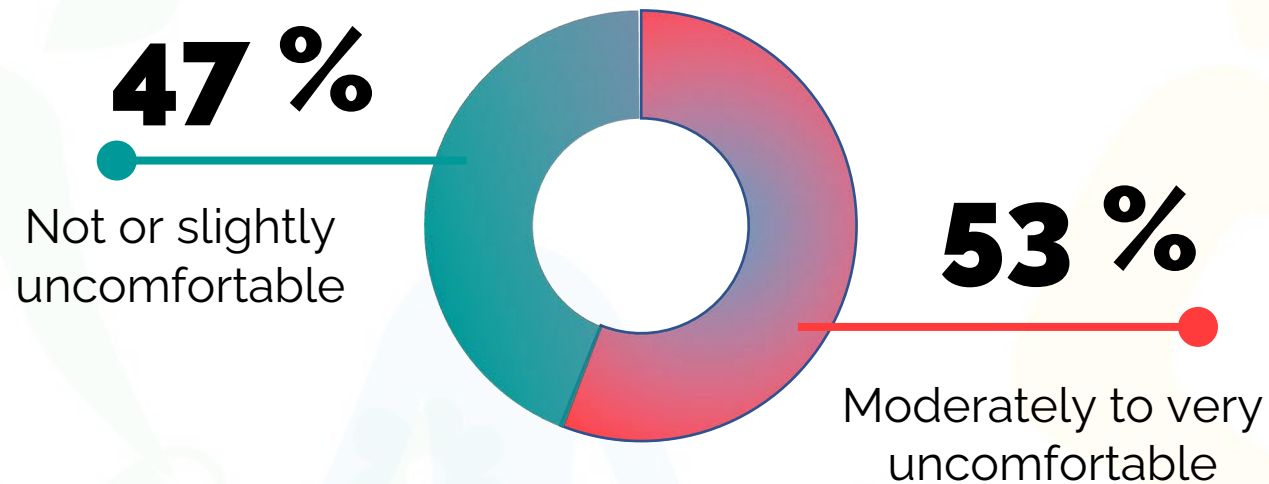


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Que se passe-t-il ?

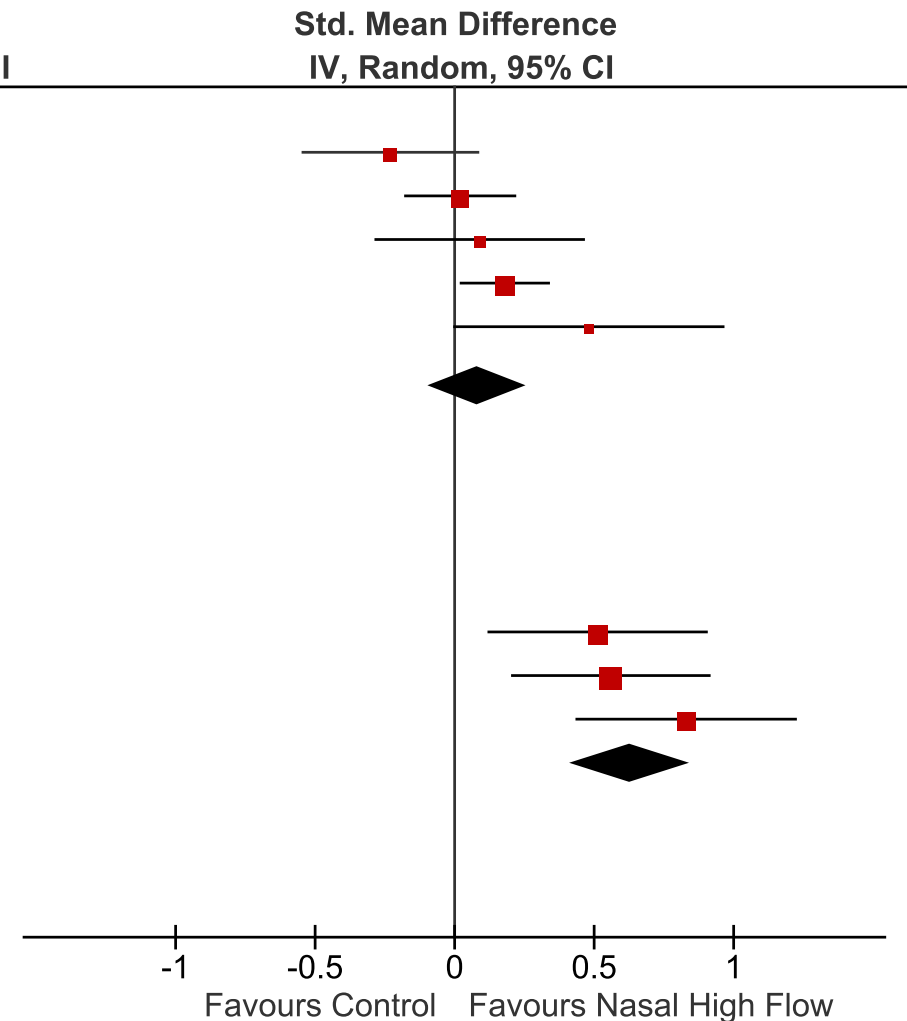
Study or Subgroup	Std. Mean Difference	SE	Weight	Std. Mean Difference IV, Random, 95% CI
1.12.1 Usual condition (room air or conventional oxygen)				
Prieur 2020	-0.23	0.16	17.6%	-0.23 [-0.54, 0.08]
Kelly 2018	0.02	0.1	27.2%	0.02 [-0.18, 0.22]
Sanguanwong 2020	0.09	0.19	14.2%	0.09 [-0.28, 0.46]
Bitos 2020	0.18	0.08	31.1%	0.18 [0.02, 0.34]
Chen 2021	0.4813	0.2456	9.9%	0.48 [-0.00, 0.96]
Subtotal (95% CI)			100.0%	0.08 [-0.09, 0.25]

Heterogeneity: $\tau^2 = 0.02$; $\chi^2 = 8.29$, $df = 4$ ($P = 0.08$); $I^2 = 52\%$
 Test for overall effect: $Z = 0.92$ ($P = 0.36$)

1.12.2 Venturi-Mask

Rossi 2018	0.5127	0.199	31.1%	0.51 [0.12, 0.90]
Dell'Era 2019	0.56	0.18	38.0%	0.56 [0.21, 0.91]
Cirio 2016	0.83	0.2	30.8%	0.83 [0.44, 1.22]
Subtotal (95% CI)			100.0%	0.63 [0.41, 0.85]

Heterogeneity: $\tau^2 = 0.00$; $\chi^2 = 1.50$, $df = 2$ ($P = 0.47$); $I^2 = 0\%$
 Test for overall effect: $Z = 5.66$ ($P < 0.00001$)



Que se passe-t-il ?

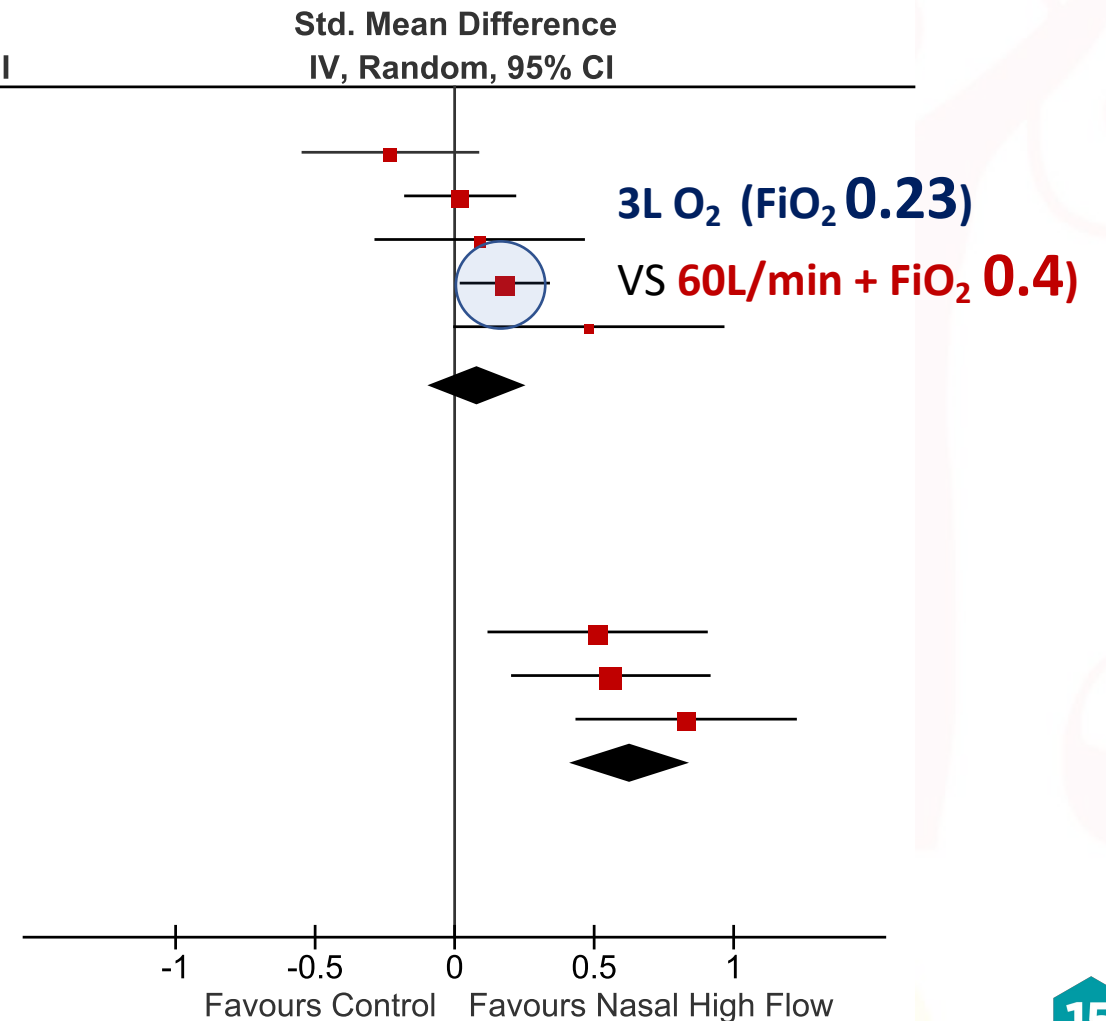
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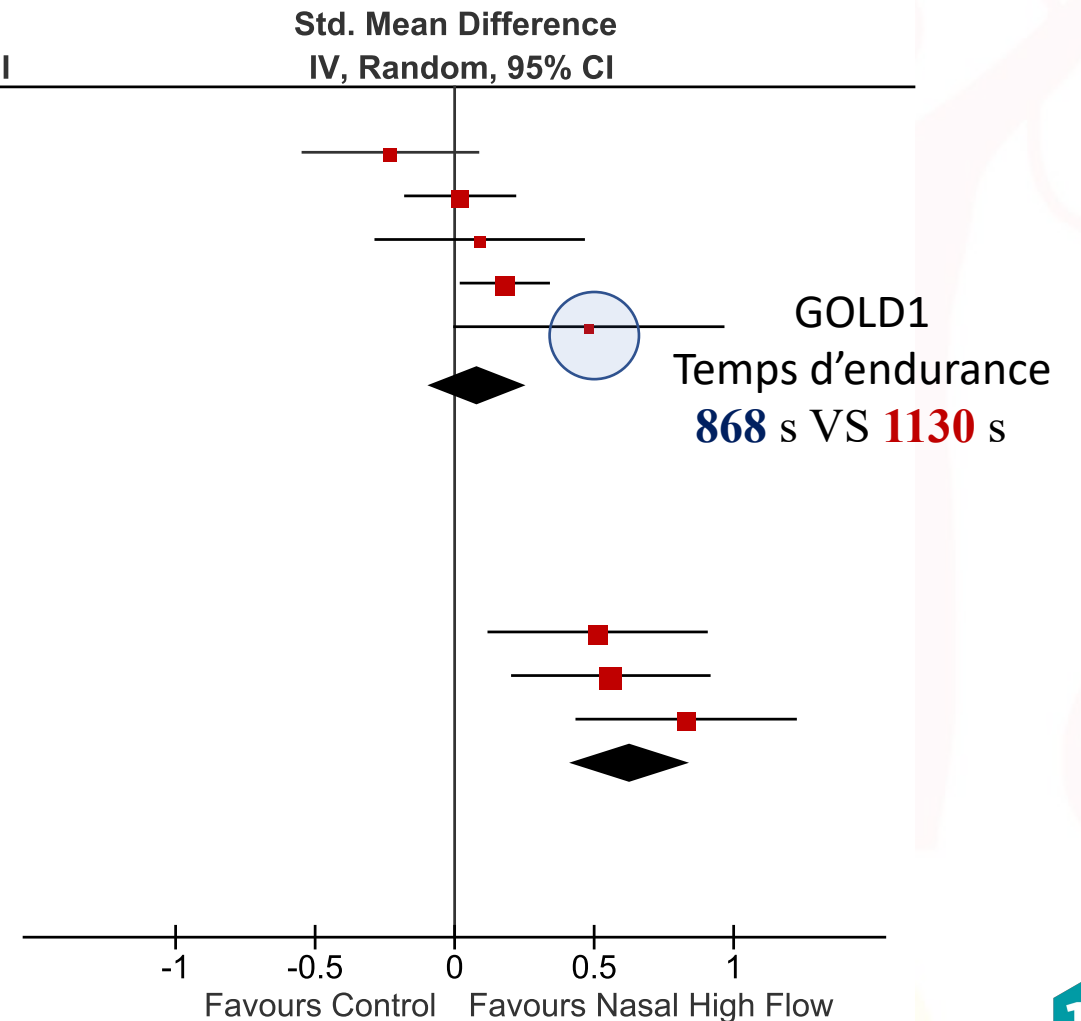
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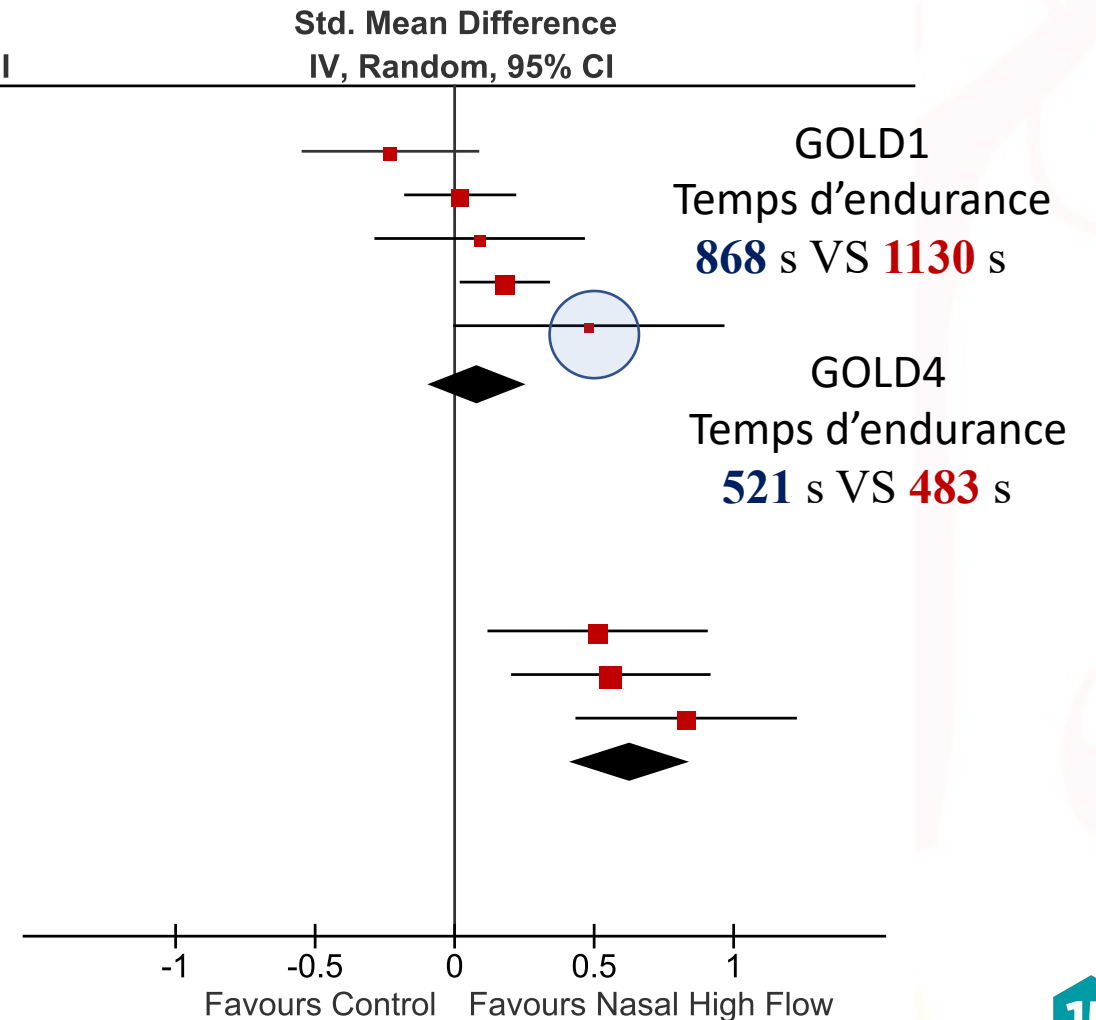
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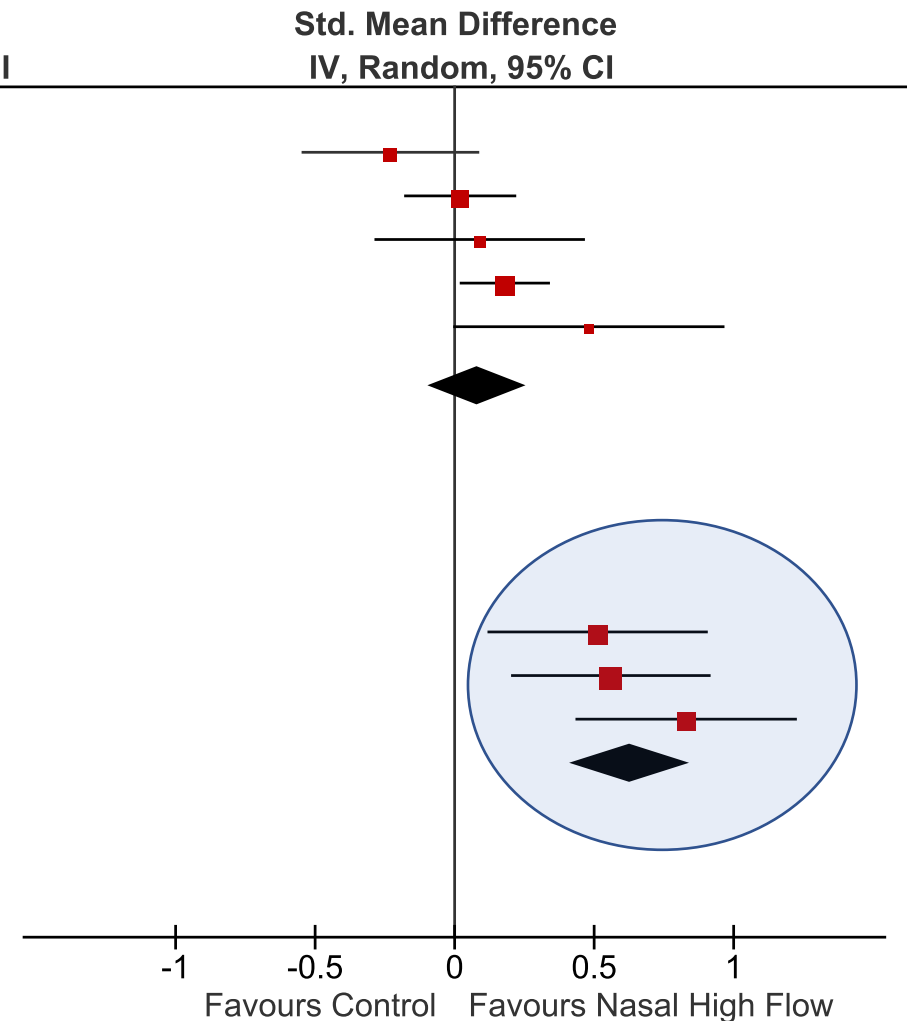
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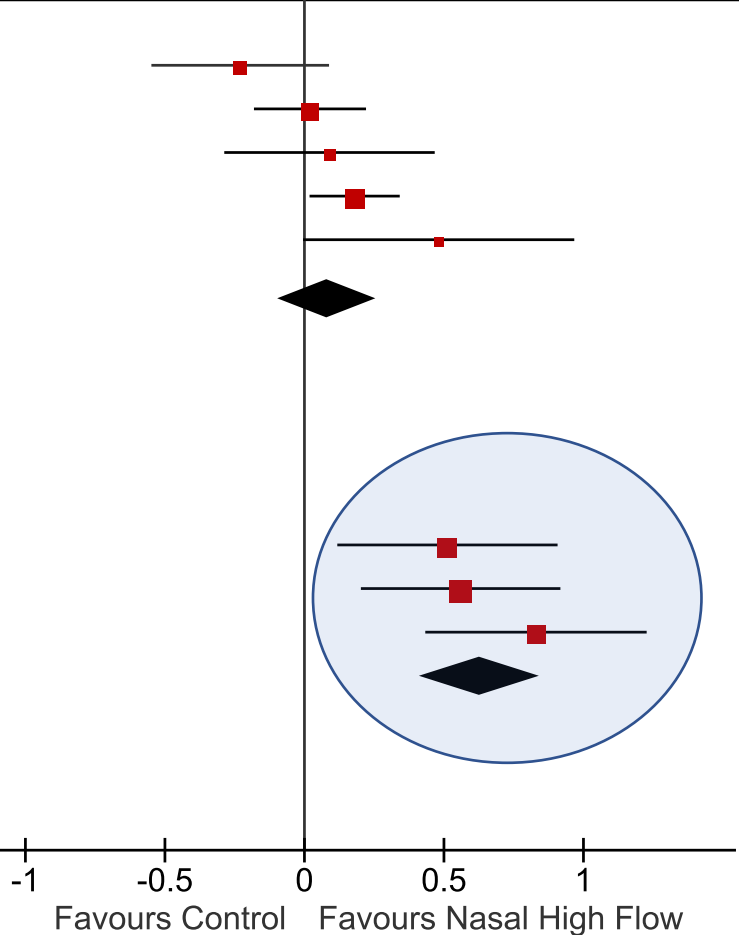
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Que se passe-t-il ?

Std. Mean Difference
IV, Random, 95% CI



Study or Subgroup

1.15.2 End-exercise

Prieur 2020

Chen 2021

Kelly 2018

Rossi 2018

Dell'Era 2019

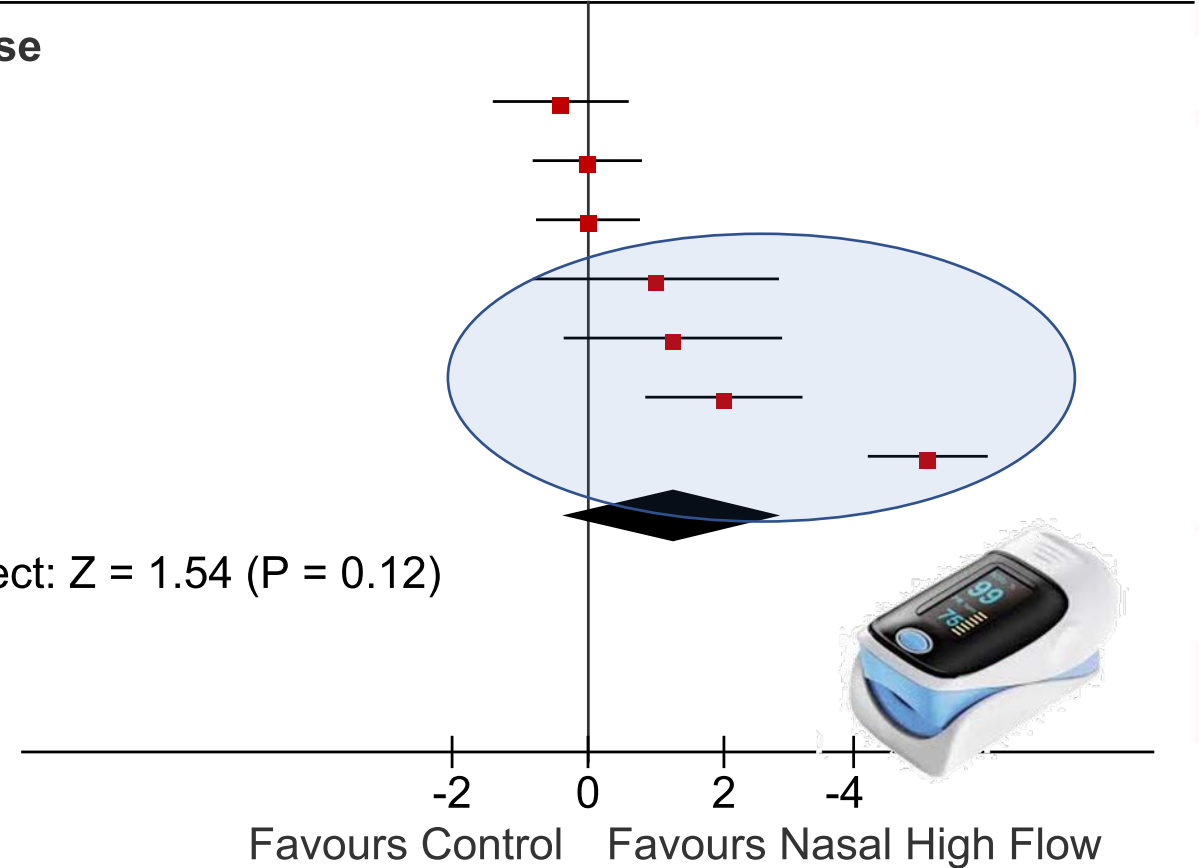
Bitos 2020

Cirio 2016

Subtotal (95% CI)

Test for overall effect: $Z = 1.54$ ($P = 0.12$)

Mean Difference
IV, Random, 95% CI



Merci Frédéric !

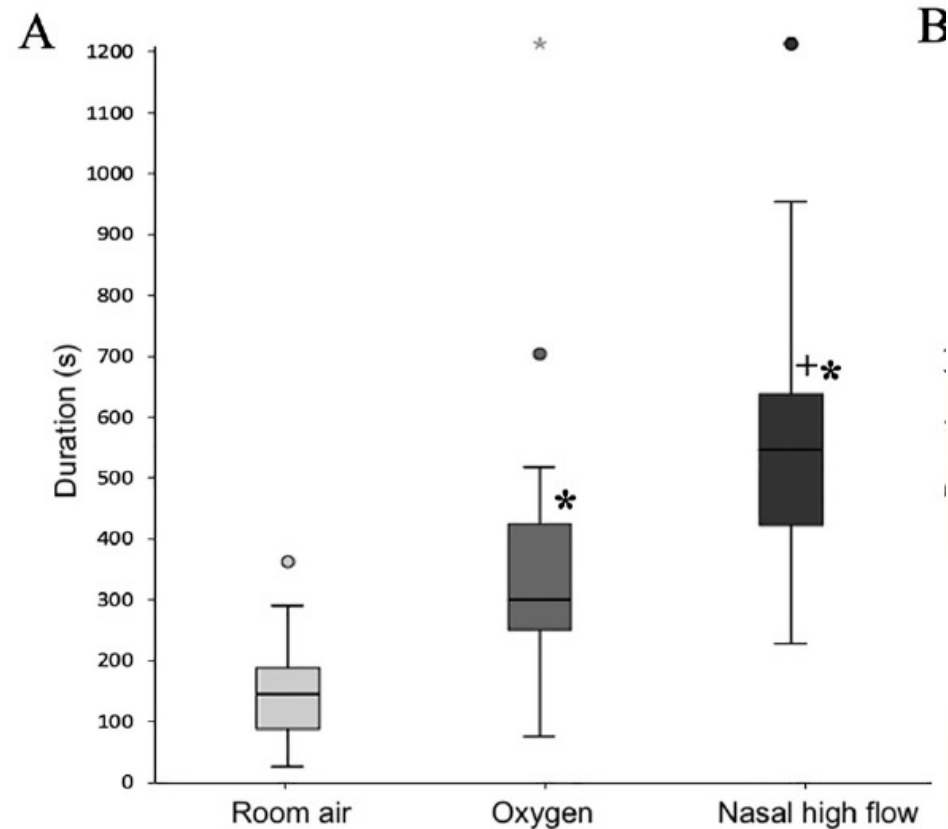
Original Research

The effect of heated humidified nasal high flow oxygen supply on exercise tolerance in patients with interstitial lung disease: A pilot study

Yara Al Chikhanie ^{a,b}, Daniel Veale ^{a,b}, Samuel Verges ^{b,1,*}, Frédéric Hérent ^{a,b,1}

^a *Cardiopulmonary Rehabilitation Centre Diculefit Santé, Diculefit, Rhône-Alpes, France*

^b *HP2 Laboratory, INSERM U11042, Grenoble Alps University, Grenoble, France*



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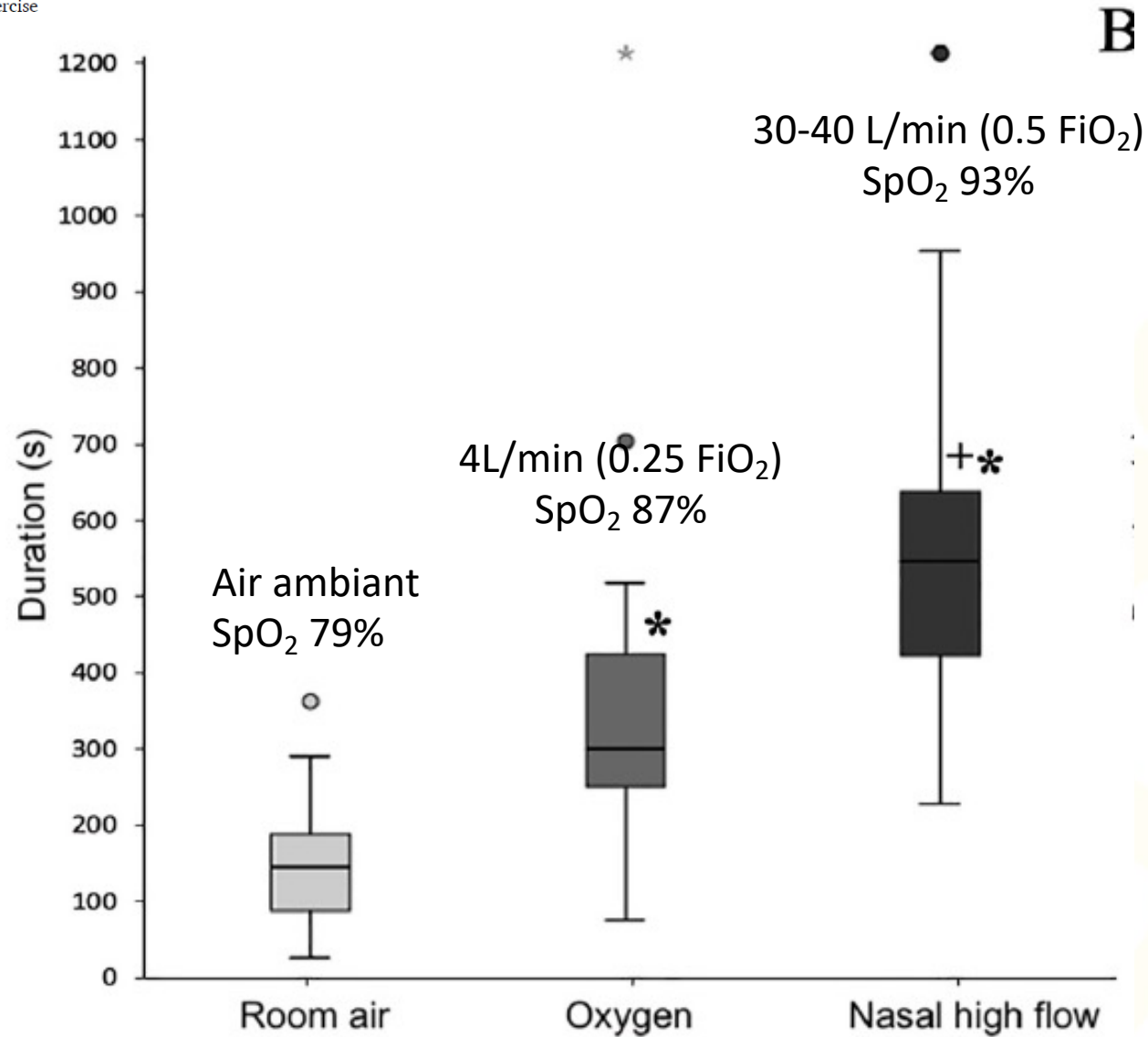
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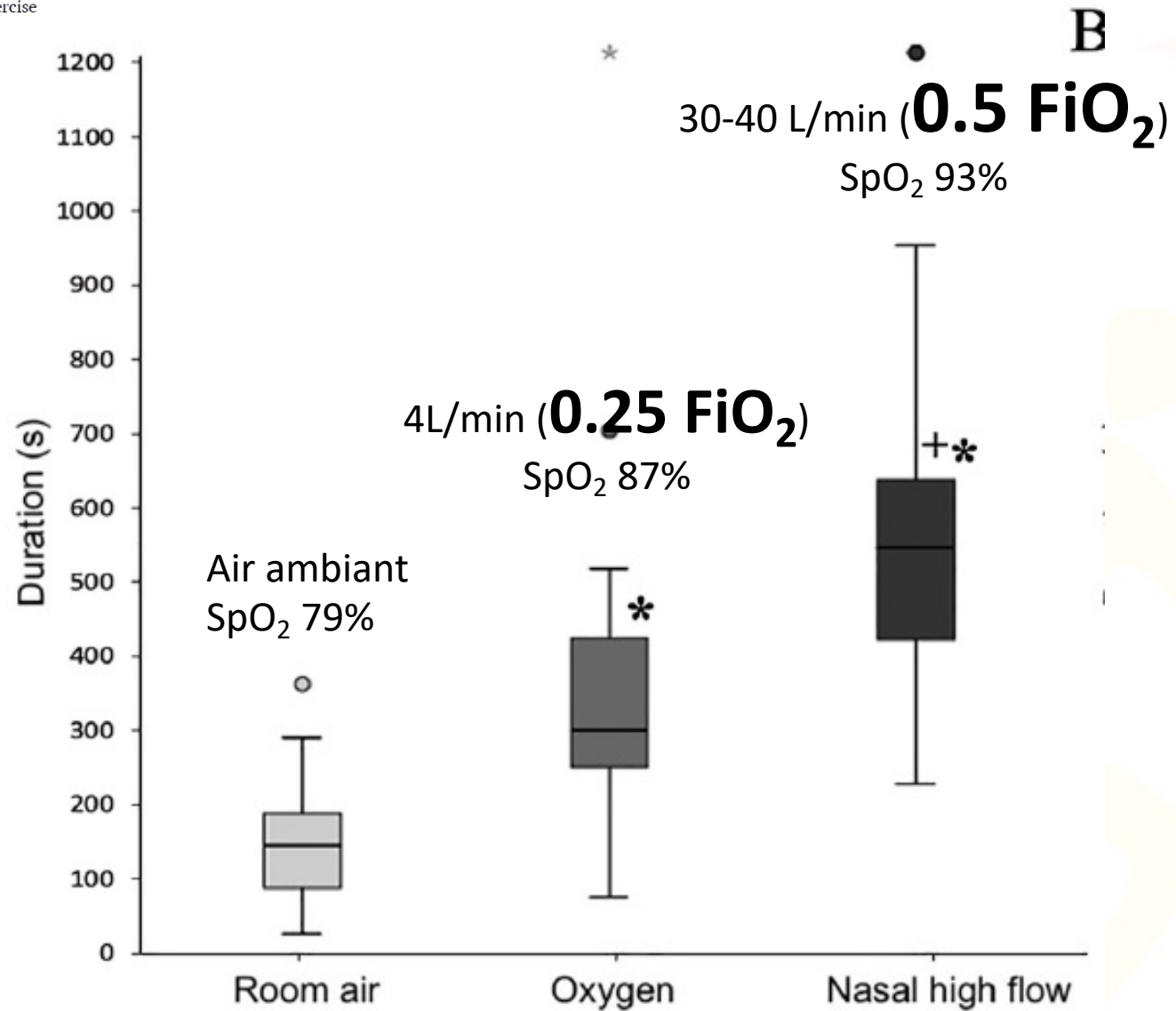
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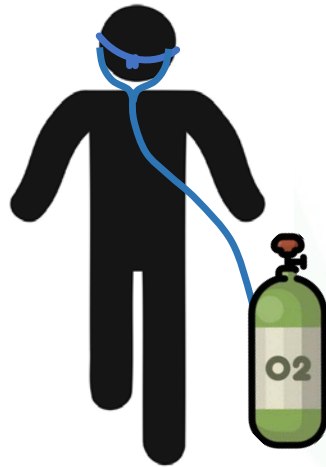


Que se passe-t-il ?

Automated O₂ Titration Alone or With High-Flow Nasal Cannula During Walking Exercise in Chronic Lung Diseases

Felix-Antoine Vézina, Pierre-Alexandre Bouchard, Émilie Breton-Gagnon, Geneviève Dion, Damien Viglino, Pascal Roy, Lara Bilodeau, Steeve Provencher, Marie-Hélène Denault, Didier Saey, François Lellouche, and François Maltais

30 patients IRCO Endurance Shuttle walk test



Oxygène (2.3 ± 0.6 L/min)



FreeO₂ + O₂ (9.7 ± 3.8 L/min)

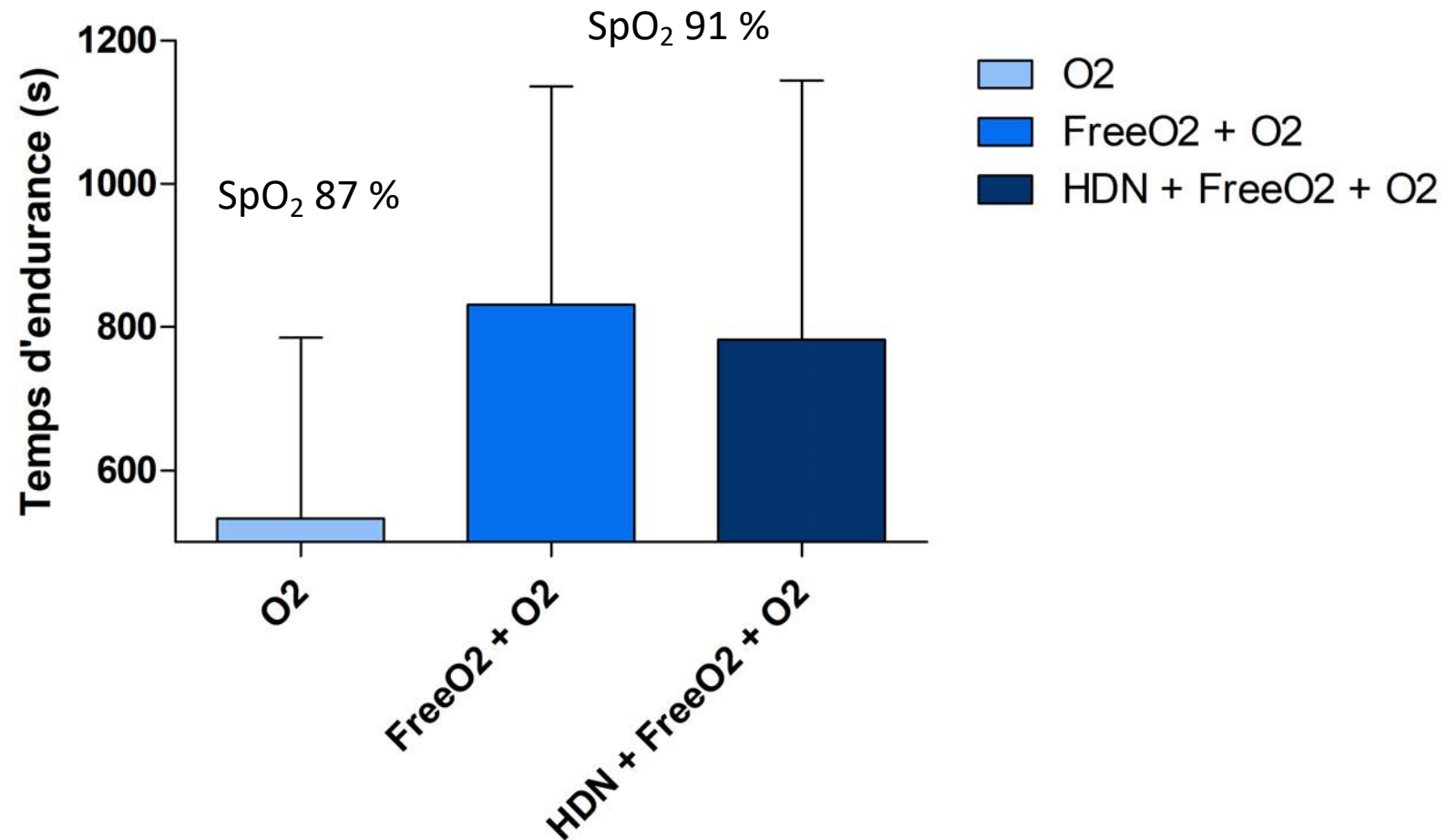


HFN + FreeO₂ + O₂
(10.9 ± 4.8 L/min)^e

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En résumé



patients reported better comfort with HFNO. Patients on LTOT showed a significantly lower improvement in 6MWT between control test and HFNO test than patients without the LTOT (7.01 ± 21.9 vs. 33.1 ± 33.3 , respectively).

Carlucci, Respiration 2021

En résumé



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Carlucci, Respiration 2021

Pour augmenter l'endurance des patients, pas besoin de s'encombrer, **tournez le manomètre !**

En résumé



patients reported better comfort with HFNO. Patients on LTOT showed a significantly lower improvement in 6MWT between control test and HFNO test than patients without the LTOT (7.01 ± 21.9 vs. 33.1 ± 33.3 , respectively).

Carlucci, Respiration 2021

Pour augmenter l'endurance des patients, pas besoin de s'encombrer, **tournez le manomètre !**

L'intérêt du haut débit nasal à l'effort peut se discuter pour des patients ayant des besoins très élevés en oxygène à l'effort (humidification de l'O₂)

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