Effect of a neoprene wetsuit on pulmonary function

Published: 15-01-2025 Last updated: 31-01-2025

To establish whether the decrease in pulmonary function as a result of wearing a neoprene suit is caused by restriction or obstruction, and which effect is has on pulmonary volumes.

Ethical review	Approved WMO
Status	Pending
Health condition type	Other condition
Study type	Observational non invasive

Summary

ID

NL-OMON57268

Source ToetsingOnline

Brief title Pulmonary function wetsuit

Condition

• Other condition

Synonym limited breathing, restrictive pulmonary function

Health condition

ademhalingsstelsel, niet zijnde een aandoening

Research involving Human

Sponsors and support

Primary sponsor: Ministerie van Defensie Source(s) of monetary or material Support: Ministerie van Defensie

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Intervention

Keyword: Bodyplethysmography, Forced oscillation technique, Spirometry

Outcome measures

Primary outcome

This study aims to establish whether the expected decrease in vital capacity

when wearing a neoprene diving suit is the result from a decrease in

inspiratory capacity (VC) or an increase in residual volume (RV).

Secondary outcome

Airway resistance with or without a neoprene diving suit.

Study description

Background summary

Divers wear protective suits to enable working under water: ether a neoprene 'wetsuit' or a 'drysuit'. A wetsuit provides more comfort than a drysuit, therefore, divers often prefer this over wearing a drysuit.

Recent studies (1, 2) have shown that a neoprene suit can reduce the vital capacity of the lung up to 7%. Aside from a few methodological shortcomings of these studies, both have not investigated the cause of this reduction. This can either be restrictive - the suit making it difficult to perform full breath excursions or increasing residual volume - or obstructive - increased airway resistance.

This is relevant, because it affects the physiological adaptations the lung has to make to function under water. With this knowledge, we can better advise divers which protective suits to wear under which circumstances.

References:

 Schellart NAM, Sterk W. Influence of the diving wetsuit on standard spirometry. Diving Hyperb Med. 2016 Sep;46(3):138-141.
Stevens GC, Smart D. The influence of wet suit thickness (7 mm and over) on pulmonary function in scuba divers. Diving Hyperb Med. In review.

Study objective

To establish whether the decrease in pulmonary function as a result of wearing a neoprene suit is caused by restriction or obstruction, and which effect is has on pulmonary volumes.

Study design

A randomised cross-over trial, in which subjects twice perform pulmonary function tests and bodyplethysmography (i.e., bodybox) and forced oscillation technique. Once under regular conditions and once wearing a neoprene diving suit (thickness: 7 mm). The order in which these are performed is determined randomly.

Study burden and risks

Participation in this study will approximately take 30 minutes (twice 10 minutes of testing, with overhead associated with getting into the neoprene diving suit). Measurements shall be performed according to international standards. (3, 4) Risks of these procedures are negligible.

The subject will wear his or her 'own' diving suit.

Referenties:

Graham BL, Steenbruggen I, et al. Standardization of Spirometry 2019 Update.
An Official American Thoracic Society and European Respiratory Society
Technical Statement. Am J Respir Crit Care Med. 2019; 200(8):e70-e88.
King GG, Bates KI, et al. Technical Standards for Respiratory Oscillometry.
Eur Resp J. 2020; 55: 1900753.

Contacts

Public Ministerie van Defensie

Rijkszee en Marinehaven 1 Den Helder 1780CA NL **Scientific** Ministerie van Defensie

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age Adults (18-64 years)

Inclusion criteria

Divemedically fit personnel of the Royal Netherlands Navy

Exclusion criteria

Recent (<6 weeks) upper or lower respiratory tract infection

Study design

Design

Study type:	Observational non invasive	
Intervention model:	Crossover	
Masking:	Open (masking not used)	
Control:	Uncontrolled	
Primary purpose:	Other	

Recruitment

NL	
Recruitment status:	Pending
Start date (anticipated):	01-04-2025
Enrollment:	61

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Type:

Anticipated

Ethics review

Approved WMODate:15-01-2025Application type:First submissionReview commission:METC NedMec

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register CCMO ID NL87993.041.24