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Study of the relationship between asthma, asthma medications and performance

Submission date
15/11/2024

Recruitment status
Recruiting

Registration date
02/01/2025

Overall study status
Ongoing

Last Edited
02/01/2025

Condition category
Respiratory

[ ] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[ ] Results
[ ] Individual participant data
[X] Record updated in last year

Plain English summary of protocol

Background and study aims
Asthma is common among elite winter athletes and often seems to arise for the first time during an athlete's competitive career. For this reason, the use of asthma medication is also commonplace in these sports. Asthma medication is effective at relieving symptoms for most athletes and therefore an asthma diagnosis is not usually seen as a hindrance for development of high performance, although the evidence to support this assumption is relatively thin. In addition, while many research studies have shown no performance-enhancing effect of most asthma medications in an acute setting at normal therapeutic doses. very few studies have looked at the relationship between long-term use of asthma medication on performance. This study aims to take a more holistic look at breathing among athletes, from lung function before and after exercise, breathing patterns during exercise, asthma diagnosis and asthma medication use, to see if we can observe associations between lung function, asthma, medication use, and the development and optimisation of athletic performance. The study is observational in nature, studying athletes already performing at the elite level in winter sports.

Who can participate?
Swedish athletes, aged 16-45 years old, primarily competitive in cross-country skiing, biathlon, and alpine skiing, who have booked a physiological/performance test at the Swedish Winter Sports Research Centre. This will take place on the treadmill (running or roller-skiing) or cycle ergometer (cycling), where VO2max is to be determined.

What does the study involve?
The study will:
1. Obtain the data from the physiological test, including oxygen update, heart rate, blood lactate concentrations, respiratory data and performance test results, as well as demographic data provided such as sex, age, body height and weight.
In addition, participants will be asked to undertake the following extra measurements:
2. Complete three short questionnaires regarding: allergic/asthma status, respiratory symptoms, and possible use of prescription asthma medication.
3. Perform lung function tests (maximal exhalation) through a spirometer before and after the exercise testing.
Participants may be invited to a follow up test, five years from the first visit, if they are no longer

competing or no longer have access to tests at the NVC. Participation in the follow up visit is of course at the participants' discretion.

What are the possible benefits and risks of participating?
Participation in the study might give insight into participants' lung function and how it may affect performance. Participants will be invited to receive a copy of all data collected during the additional tests. While the study does not aim to diagnose asthma, it is not impossible that signs of potential clinical problems may be seen and in that case, the team may recommend that you follow these up with your own doctor.

The additional measurements are non-invasive and low-risk. Follow-up tests carry the same risks as other physiological testing, including a minor risk for injury and temporary pain/low infection risk during blood lactate sampling at the fingertip.

Where is the study run from?
The Swedish Winter Sports Research Centre

When is the study starting and how long is it expected to run for?
August 2022 to December 2024. Pilot tests took place with a small group of athletes during October 2024. Data collection on the main study is expected to begin in April 2025.

Who is funding the study?
The Rolf and Gunilla Enström's Foundation for Research and Development. Further funding will be sought during the coming years.

Who is the main contact?
Dr Helen Hanstock, Associate Professor in Sports Science, helen.hanstock@miun.se

Contact information

Type(s)
Public, Scientific, Principal investigator

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Additional identifiers

Clinical Trials Information System (CTIS)

Nil known

ClinicalTrials.gov (NCT)
Nil known

Protocol serial number
Nil known

Study information

Scientific Title
Association of asthma, lung function and medication use with performance among elite athletes: A prospective cohort study

Acronym
ASPE-P

Study objectives
The project aims to determine prospectively whether asthma diagnosis, lung and ventilatory function and use of asthma medication are associated with exercise performance among elite athletes.

The null hypothesis is that a) self-reported physician-diagnosed asthma and b) use of asthma medication are not independent predictors of performance in winter sports.

Research questions as of Nov 2024 include:
1. Is asthma independently associated with physical performance indicators?
2. Is the use of asthma medication (including subcategories of specific medicines) independently associated with physical performance indicators?
3. Is lung function associated with physical performance?
4. Is performance development affected by an asthma diagnosis?
5. Is lung function/asthma associated with ventilatory capacity and breathing patterns during maximal exercise testing?
6. Is ventilatory capacity/breathing patterns during exercise associated with maximal performance?

Ethics approval required
Ethics approval required

Ethics approval(s)
approved 20/10/2022, Swedish Ethical Review Authority (Etikprövningsmyndigheten, Uppsala, 75002, Sweden; +46 0104750800; registrator@etikprovning.se), ref: 2022-0558-01-319266

Study design
Cross-sectional and prospective cohort study

Primary study design
Observational

Study type(s)

Other

Health condition(s) or problem(s) studied
Asthma

Interventions
In addition to a planned physiological test, athletes will be invited to:
Complete two questionnaires (Allergy Questionnaire for Athletes, AQUA, and a subset of questions from the ECHRS III questionnaire).
For participants with physician-diagnosed asthma, provide information about their current and recent medication.
Perform lung function testing before and after exercise using dynamic spirometry and report any respiratory symptoms that arise during the test.

Intervention Type
Other

Primary outcome(s)
VO2max measured using dynamic spirometry in laboratory testing before and after exercise

Key secondary outcome(s))
The following secondary outcome measures are assessed during submaximal and maximal exercise testing:
1. Physiological and performance-related measurements are as follows:
1.1. Oxygen uptake, ventilation, expired O2 and CO2, tidal volume, and breathing frequency, measured using ergospirometry
1.2. Heart rate measured using electrocardiography
1.3. Cadence measured using manual counting or accelerometer/ergometer detection
1.4. Breathing patterns determined using linear and nonlinear analysis of ergospirometry variables
1.5. Treadmill speeds at submaximal and maximal workloads, measured using internal ergometer sensors
1.6. Test durations measured using a stopwatch
1.7. Blood lactate concentrations measured in the laboratory using a standard fingerprick blood test (Biosen S-Line, EKF diagnostics, Cardiff, UK)
2. Workload at given physiological thresholds measured in Watts
3. Perceived exertion measured using a Borg 6-20 RPE scale and perceived dyspnea using a Borg CR10 scale.
4. Ventilatory function (FEV1, FVC, PEF, FEV6, FEF25-75) measured using dynamic spirometry

Completion date
31/12/2030

Eligibility

Key inclusion criteria
1. Swedish elite senior (age 21+ years) and junior (age 16-20) athletes
2. Active in cross-country skiing, biathlon, alpine skiing or other relevant disciplines
3. With a planned physiological test at the Swedish Winter Sports Research Centre's test lab
4. Where VO2max is to be determined through a running, roller-skiing or cycling test

Participant type(s)
Healthy volunteer

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
16 years

Upper age limit
45 years

Sex
All

Key exclusion criteria
Incomplete tests or data (such as an aborted test) - usually a posteriori

Date of first enrolment
01/10/2024

Date of final enrolment
31/12/2027

Locations

Countries of recruitment
Sweden

Study participating centre
Swedish Winter Sports Research Centre, Mid Sweden University
Studentplan 4
Östersund
Sweden
831 40

Sponsor information

Organisation
Mid Sweden University

ROR

https://ror.org/019k1pd13

Funder(s)

Funder type
Charity

Funder Name
Rolf and Gunilla Enström's Foundation for Research and Development (2024)

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated during and/or analysed during the current study are not expected to be made available as the data concerns individual performance test results collected in part in service of Swedish national teams, which we have not asked permission from the Federation or Athletes to share on an individual level.

IPD sharing plan summary
Not expected to be made available

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes