PHYSICAL TRAINING AND ASTHMA

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Background
You see a 10-year-old boy with asthma. His mother is concerned about the upcoming soccer fun day at school in which all children have been asked to participate. She is worried about the effect of physical activity on her son’s asthma. You have recently attended a short course on evidence-based health care and you decide to hone your new-found skills by checking the evidence.

So what is the question?
It is essential to start the process with the right question. One question may be: what are the effects of physical training on a 10-year-old asthmatic patient’s respiratory and general health? A guideline to the right phrasing of the question is to use the PICO principle (Table I).1

The type of evidence to look for, and where to look for it
The best evidence regarding the effects of interventions will come from randomised controlled trials (RCTs). If more than one trial has been conducted, the most reliable evidence, if available, is a well-conducted up to date systematic review* of all relevant RCTs. The Cochrane Collaboration (www.cochrane.org) conducts systematic reviews of the effects of healthcare interventions using rigorous methods and processes to reduce bias. Therefore, when searching for the evidence, a first port of call would be The Cochrane Library (http://www.thecochranelibrary.com).

What was found?
You found a recent Cochrane review* which assessed the effects of physical training in asthma.2

Methods and results
The authors conducted a comprehensive search for RCTs. Two authors then worked independently to select relevant studies for inclusion, assess risk of bias and perform data extraction. Thirteen RCTs (455 participants) of asthmatic subjects undertaking physical training (whole body aerobic exercise lasting 20-30 minutes undertaken 2-3 times a week with a minimum duration of 4 weeks) were included. The majority of the trials did not describe the method of randomisation* and did not describe whether blinding* was used. The included studies also assessed different outcome measures, at different baseline measures, and were conducted for varying lengths of time. Missing data, especially related to the risk of bias of the included studies, undermine the validity of the findings.

Physical training had no effect on resting lung function or the number of days of wheeze. Lung function and wheeze were not worsened by physical training in patients with asthma. Physical training also improved cardiopulmonary fitness as measured by an increase in maximum oxygen uptake of 5.4 ml/kg/min (95% confidence interval 4.2 to 6.6) and maximum expiratory ventilation 6.0 l/min (95% confidence interval 1.5 to 10.4). There were no data concerning quality of life measurements.

How does one consider applicability of the findings to one’s own setting?
Results reported do not automatically apply to your own patient and setting. You therefore need to assess and consider the applicability (also called generalisability) of research findings. One approach is to consider the following questions:

1. Were the study patients similar to the patient in your practice?
   a. Does your patient match the study inclusion criteria?
   b. If not, are there compelling reasons why the results should not apply to your patient?
2. Were all clinically important outcomes considered?
3. Are the benefits worth the costs and potential risks?
   a. What is the number needed to treat to prevent one adverse outcome or produce one positive outcome?
   b. Is the reduction of clinical endpoint worth the increase of cost and/or risk of harm?

Conclusion
What would you tell the concerned mother? There are concerns about the validity of the included studies. As with many choices in clinical practice, one needs to...
weigh up the benefits and harms. The review found no adverse effect of physical training on lung function and wheeze in patients with asthma. Therefore, you can advise the mother that it is fine for her son to participate in the soccer fun day. It is important to give her guidance about the appropriate prevention and treatment of exercise-induced asthma.

REFERENCES

*Some terms explained*

**Systematic review:** This is a review in which bias has been reduced by the systematic identification, appraisal, synthesis, and, if relevant, statistical aggregation of all relevant studies on a specific topic according to a predetermined and explicit method.

**Cochrane review:** A Cochrane review is a systematic review performed under the auspices of an international collaboration called The Cochrane Collaboration, www.cochrane.org. One advantage of Cochrane reviews is that they are regularly updated. A new electronic version of The Cochrane Library is published monthly, and individual reviews are updated regularly.

**Randomisation:** Randomisation refers to the process of assigning study participants to experimental or control groups at random such that each participant has an equal probability of being assigned to any given group. The main purpose of randomisation is to eliminate selection bias and balance known and unknown confounding factors in order to create a control group that is as similar as possible to the treatment group.3

**Blinding (masking):** The process of preventing those involved in a trial from knowing to which comparison group a particular participant belongs. The risk of bias is minimised when as few people as possible know who is receiving the experimental intervention and who the control intervention. Participants, caregivers, outcome assessors, and analysts are all candidates for being blinded. Blinding of certain groups is not always possible, for example surgeons in surgical trials. The terms single blind, double blind and triple blind are in common use, but are not used consistently and are therefore ambiguous unless the specific people who are blinded are listed.3