

Commentary

Cochrane in context: Swimming training for asthma in children and adolescents aged 18 years and under

Cochrane Review: Swimming training for asthma in children and adolescents aged 18 years and under
Beggs S, Foong YC, Le HCT, Noor D, Wood-Baker R, Walters JAE. Swimming training for asthma in children and adolescents aged 18 years and under. Cochrane Database of Systematic Reviews 2013, Issue 4. Art. No.: CD009607. DOI: 10.1002/14651858.CD009607.pub2

This companion piece to the review, “Swimming training for asthma in children and adolescents aged 18 years and under,” contains the following pieces:

- The abstract of the review
- A commentary from one or more of the review authors, explaining why the review team felt the review as an important one to produce
- A review of clinical practice guidelines from the American Academy of Pediatrics, the Canadian Paediatric Society and the National Institute for Health and Care Excellence (NICE), United Kingdom
- Some other recently published references on this topic

Evidence-Based Child Health: a Cochrane Review Journal is now indexed by MEDLINE (<http://www.ncbi.nlm.nih.gov/pubmed>) and Scopus (<http://www.scopus.com>)

Abstract

Background Asthma is the most common chronic medical condition in children and a common reason for hospitalisation. Observational studies have suggested that swimming, in particular, is an ideal form of physical activity to improve fitness and decrease the burden of disease in asthma.

Objectives To determine the effectiveness and safety of swimming training as an intervention for asthma in children and adolescents aged 18 years and under.

Search methods We searched the Cochrane Airways Group’s Specialised Register of trials (CENTRAL), MEDLINE, EMBASE, CINAHL, in November 2011, and repeated the search of CENTRAL in July 2012. We also handsearched ongoing Clinical Trials Registers.

Selection criteria We included all randomised controlled trials (RCTs) and quasi-RCTs of children and adolescents comparing swimming training with usual care, a non-physical activity, or physical activity other than swimming.

Data collection and analysis We used standard methods specified in the *Cochrane Handbook for Systematic reviews of Interventions*. Two review authors used a standard template to independently assess trials for inclusion and extract data on study characteristics, risk

of bias elements and outcomes. We contacted trial authors to request data if not published fully. When required, we calculated correlation coefficients from studies with full outcome data to impute standard deviation of changes from baseline.

Main results Eight studies involving 262 participants were included in the review. Participants had stable asthma, with severity ranging from mild to severe. All studies were randomised trials, three studies had high withdrawal rates. Participants were between five to 18 years of age, and in seven studies swimming training varied from 30 to 90 minutes, two to three times a week, over six to 12 weeks. The programme in one study gave 30 minutes training six times per week. The comparison was usual care in seven studies and golf in one study. Chlorination status of swimming pool was unknown for four studies. Two studies used non-chlorinated pools, one study used an indoor chlorinated pool and one study used a chlorinated but well-ventilated pool.

No statistically significant effects were seen in studies comparing swimming training with usual care or another physical activity for the primary outcomes; quality of life, asthma control, asthma exacerbations or use of corticosteroids for asthma. Swimming training had a clinically meaningful effect on exercise capacity compared with usual care, measured as maximal oxygen consumption during a maximum effort exercise test (VO₂ max) (two studies, n = 32), with a mean increase of 9.67 mL/kg/min; 95% confidence interval

(CI) 5.84 to 13.51. A difference of equivalent magnitude was found when other measures of exercise capacity were also pooled (four studies, n = 74), giving a standardised mean difference (SMD) 1.34; 95% CI 0.82 to 1.86. Swimming training was associated with small increases in resting lung function parameters of varying statistical significance; mean difference (MD) for FEV1 % predicted 8.07; 95% CI 3.59 to 12.54. In sensitivity analyses, by risk of attrition bias or use of imputed standard deviations, there were no important changes on effect sizes. Unknown chlorination status of pools limited subgroup analyses.

Based on limited data, there were no adverse effects on asthma control or occurrence of exacerbations.

Authors' conclusions This review indicates that swimming training is well-tolerated in children and adolescents with stable asthma, and increases lung function (moderate strength evidence) and cardio-pulmonary fitness (high strength evidence). There was no evidence that swimming training caused adverse effects on asthma control in young people 18 years and under with stable asthma of any severity. However whether swimming is better than other forms of physical activity cannot be determined from this review. Further adequately powered trials with longer follow-up periods are needed to better assess the long-term benefits of swimming.

Authors' Commentary

Sean Beggs^{1,2*} and Julia A. E. Walters²

¹Department of Paediatrics, Royal Hobart Hospital, Hobart, Australia

²School of Medicine, University of Tasmania, Hobart, Australia

*Correspondence to: Sean Beggs, School of Medicine, University of Tasmania, Hobart, Australia. E-mail: Sean.Beggs@dhhs.tas.gov.au

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Swimming is an exercise that has traditionally been widely recommended as beneficial for asthmatic children, however, when we examined the basis for its recommendation we found a lack of explicit evidence and differing viewpoints on its benefits. Some authors believed that it improved physical fitness and alleviated symptoms but others raised concerns that swimming could cause bronchoconstriction. Therefore, we felt it was crucial to undertake and provide a critical appraisal of the relevant literature and summarise the evidence in a meta-analysis. The studies in our review show that swimming training has positive impacts on cardio-pulmonary fitness and lung function in children and adolescents with stable asthma and it appears to be safe and well tolerated.

Guidelines

<p>Canadian Paediatric Society (1)</p>	<p>Physical and/or psychological benefits of exercise are evident. Bronchial hyper-responsiveness increases with decreasing hours of exercise per week. Swimming can increase aerobic fitness and decrease asthma morbidity. Exercise training can improve aerobic capacity; however, pulmonary function tests do not change significantly. Exercise may decrease exercise-induced bronchospasm severity by increasing the threshold for triggering bronchospasm. Recommendations for children with asthma:</p> <ul style="list-style-type: none"> • Swimming is less likely to trigger exercise-induced bronchospasm than running. • Should take inhaled beta-2 agonists 15–30 min before exercise. • Should not scuba dive if they have asthma symptoms or abnormal pulmonary function tests. • Those who compete nationally or internationally require a therapeutic use exemption with confirmation of asthma and/or exercise-induced bronchospasm to use certain medications. Consultation with a sport medicine physician is suggested.
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Some other recent systematic reviews and guidelines on this topic

1. Philpott J, Houghton K, Luke A, Canadian Paediatric Society. Physical activity recommendations for children with specific chronic health conditions: juvenile idiopathic arthritis, hemophilia, asthma and cystic fibrosis (Position Statement). *Paediatr Child Health* 2010; **15**: 213–218 Epub April 1, 2010.

If you would like to make a comment on the above article, you are invited to submit a letter to the Editor by email (child@ualberta.ca). Selected letters may be edited and published in future issues of the journal.