



INSIGHTS

Science for Kids

Physical therapy and lung function in children with asthma: is it helpful?

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INTRODUCTION

This study looks at the way different physical therapies affect children with asthma. Asthma is a condition that affects children's airways. Across the world, there are 300 million people who have asthma including 5.5 million children. This is 7.5% of the number of children in the world. There are many different causes of asthma and these can include exposure to allergens, air pollution, smoke in the atmosphere, and genetics. The symptoms of asthma are wheezing, shortness of breath, and tightness in the chest. These symptoms are caused when people's airways react to something that irritates their lungs, and this results in airway narrowing and as a result, the lungs produce a mucus-like substance. The tubes in your lungs, called bronchi, react to the substance and tighten for people with asthma and this makes it harder to breathe.

Unfortunately, asthma cannot be cured; however, new studies have shown people how to control and help their asthma symptoms. For some children, asthma is quite restrictive with varying levels of severity. When asthma worsens, it can interfere with daily activities and sometimes even cause an asthma attack. An asthma attack is when the airways become swollen, narrow, and inflamed. With extra mucus already in the lungs, it can become hard to breathe. Children with asthma are sometimes prescribed inhalers. Inhalers deliver a medicine that directly treats the lungs. It is usually prescribed in a spray form. It helps the narrow airways open to allow oxygen into the lungs allowing breathing to become easier. Other than inhalers, physical therapy such as physical training, breathing exercises, and weight training is used for asthma treatment. The main aim of these physical therapies is to improve patient's lung function through strengthening muscles, reducing the inflammation of the airways, and increasing the bronchioles' ability to open.

WHAT IS A SYSTEMATIC REVIEW?

A systematic review is a study that calculates the average answer to a question. It is used often because it is believed to show the most accurate information in a non-biased way. To eliminate bias in a systematic review, it is important that researchers have certain criteria when selecting studies to include. For a systematic review to work, researchers collect lots of different research studies and try to find what answer comes up most often to get a clearer understanding of a topic. A systematic review and a meta-analysis were used in this study. A systematic review refers to the entire

process of selecting, evaluating, and making all the evidence available. The term meta-analysis refers to the statistical approach, which means combining all the data found from the systematic review. This data could include graphs, tables, and a range of different tests. There are many systematic reviews and meta-analyses looking at the effects of physical therapies on people with asthma but what makes this study different is that adults were excluded and contain the study of more than one physical therapy. After examining 6474 records, 18 articles met the criteria to be included in this study.

WHAT WERE THE MAIN FINDINGS IN THE REVIEW?

The three physical therapies that were focussed on in this study were physical training, breathing exercise, and inspiratory muscle training (IMT). Breathing exercises were used to try and improve asthma in kids. Since kids with asthma usually tend to breath faster and have a shorter pace, researchers thought that trying to focus on breathing heavier and deeper might benefit children with asthma. They believed that practicing these exercises daily could help kids with asthma. A good example of these exercises is the Buteyko method where you breathe in as deep as possible, which is believed to increase your breath intake.

IMT is the process of training the lungs in a course of therapy using breathing exercises. IMT mainly focusses on strengthening your lungs' respiratory muscles, which to make it easier to breathe and benefits kids with asthma. Some people without asthma also use IMT to maintain, improve, and benefit their fitness levels. When a normal person takes a breath, they usually use 10–15% of their lung capacity. However, when practicing IMT nearly all their lung capacity is used.

In the study, a meta-analysis was carried out for three measurements of the lungs.

1. The forced expiratory volume, which measures how much air a person can exhale during a deep forced breath.
2. The forced vital capacity, which is the amount of air that can be exhaled from your lungs after taking a very deep breath.
3. The peak expiratory flow, which is a person's maximum speed of breathing.

The analysis showed a big improvement in the forced vital capacity of the children in the experiment group. The main

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Fig. 1 The Process of Systematic Reviews. Our lungs are our tree.

physical therapy that improved this was physical training. Physical training is the process of exercising and improving fitness and health. Some examples of physical training are athletics training, swimming, and resistance training like free weights, using resistance bands, and using your own body weight to exercise.

CONCLUSION

The main findings of the study were that physical training improved the functioning of the lungs significantly in asthmatic children. Although the systematic review supports the fact that physical training can help the lung function of children, more research is needed regarding the duration and frequency of this physical training. There was not significant evidence to support the effects of breathing exercise and IMT among children so more trials should follow that focus on these. Of the 18 studies that were reviewed, 16 focussed on physical training and 2 related to breathing exercise and IMT. This is a clear indication that more studies need to be done on these therapies. The main positive outcome of the study is that physical therapy is now considered an effective treatment for asthma in children and this is now

recommended in the Global Initiative for Asthma guidelines. This organisation works with doctors and people across the world to increase awareness around asthma. Overall, the main benefits of physical training are not very clear in children as the results in some reviews are debatable. Other reviews have said that physical training did not improve lung function and one said swimming improved forced expiratory volume (Fig. 1).

Sources

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