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Review Article | Systematic Review

Effects of Inspiratory Muscle Training and High-Intensity Interval Training on Lung Function and Respiratory Muscle Function in Asthma

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Respiratory Care July 2022, respcare.09813; DOI: https://doi.org/10.4187/respcare.09813

Abstract

BACKGROUND: Asthma is a heterogeneous disease, usually characterized by chronic airway inflammation. Although inspiratory muscle training (IMT) and high-intensity interval training (HIIT) are beneficial for patients with asthma, controversies persist. Therefore, we aimed to investigate the effects of IMT and HIIT on lung function and respiratory muscle function of subjects with asthma.

METHODS: We searched PubMed, Embase, Web of Science, and the Cochrane Library databases up to May 2021. Inclusion criteria were randomized controlled trials (RCTs) of subjects with asthma who received either IMT or HIIT. The outcome measures were changes in lung function and respiratory muscle function.

RESULTS: A total of 13 RCTs (10 in IMT and 3 in HIIT) were included, with a total of 598 subjects. The meta-analysis showed a significantly improved FEV_1 of the expected value (FEV_1%pred) (mean difference [MD] 4.49% [95% CI 2.31–6.67],

$P < .001$; $I^2 = 13\%$), FVC of the expected value (FVC % pred) (MD 5.72% [95% CI 3.56–7.88], $P < .001$; $I^2 = 0\%$), FEV_1/FVC % (MD 5.01% [95% CI 2.45–7.58], $P < .001$; $I^2 = 25\%$), FVC (L) (MD 0.21 L [95% CI 0.03–0.40], $P = .02$; $I^2 = 0\%$), maximum inspiratory pressure (P_{Imax}) (MD 27.62 cm H_2O [95% CI 6.50–48.74], $P = .01$; $I^2 = 96\%$), and P_{Imax} (%pred) (MD 27.35% [95% CI 6.94–47.76], $P = .009$; $I^2 = 83.5\%$) in the IMT group. There was no statistical significance in maximum expiratory pressure.

CONCLUSIONS: IMT improved pulmonary function (FEV_1%pred, FVC) and inspiratory muscle strength in subjects with stable asthma. Due to the small number of RCT studies included and the limited outcome measures involving HIIT, we were unable to draw conclusions about whether HIIT was beneficial in this meta-analysis. Moreover, clinical heterogeneity exists in different areas such as population and training programs; the above conclusions still need to be confirmed in future studies.

asthma inspiratory muscle training high-intensity interval training pulmonary function meta-analysis

Footnotes

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Previous Next

Back to top

In this issue

Respiratory Care
Vol. 67, Issue 7
1 Jul 2022
Table of Contents
Table of Contents (PDF)
Cover (PDF)
Index by author

Keywords

asthma, inspiratory muscle training, high-intensity interval training, pulmonary function, meta-analysis

Print ISSN: 0020-1324 Online ISSN: 1943-3654