Top 5 papers for performance

Tong TK, Fu FH, Chung PK, Eston R, Lu K, Quach B, Nie J & So R. (2008). **The effect of inspiratory muscle training on high-intensity, intermittent running performance to exhaustion**. *Appl Physiol Nutr Metab* **33,** 671-681.

The effects of inspiratory muscle (IM) training on maximal 20 m shuttle run performance (Ex) during Yo-Yo intermittent recovery test and on the physiological and perceptual responses to the running test were examined. Thirty men were randomly allocated to 1 of 3 groups. The experimental group underwent a 6 week pressure threshold IM training program by performing 30 inspiratory efforts twice daily, 6 d/week, against a load equivalent to 50% maximal static inspiratory pressure. The placebo group performed the same training procedure but with a minimal inspiratory load. The control group received no training. In post-intervention assessments, IM function was enhanced by >30% in the experimental group. The Ex was improved by 16.3% +/- 3.9%, while the rate of increase in intensity of breathlessness (RPB/4i) was reduced by 11.0% +/- 6.2%. Further, the whole-body metabolic stress reflected by the accumulations of plasma ammonia, uric acid, and blood lactate during the Yo-Yo test at the same absolute intensity was attenuated. For the control and placebo groups, no significant change in these variables was observed. In comparison with previous observations that the reduced RPB/4i resulting from IM warm-up was the major reason for improved Ex, the reduced RPB/4i resulting from the IM training program was lower despite the greater enhancement of IM function, whereas improvement in Ex was similar. Such findings suggest that although both IM training and warm-up improve the tolerance of intense intermittent exercise, the underlying mechanisms may be different.

Griffiths LA & McConnell AK. (2007). **The influence of inspiratory and expiratory muscle training upon rowing performance.** *Eur J Appl Physiol* **99,** 457-466.

We investigated the effect of 4 week of inspiratory (IMT) or expiratory muscle training (EMT), as well as the effect of a subsequent 6 week period of combined IMT/EMT on rowing performance in club-level oarsmen. Seventeen male rowers were allocated to either an IMT (n = 10) or EMT (n = 7) group. The groups underwent a 4 week IMT or EMT program; after interim testing, both groups subsequently performed a 6 week program of combined IMT/EMT. Exercise performance and physiological responses to exercise were measured at 4 and 10 week during an incremental rowing ergometer 'step-test' and a 6 min all-out (6MAO) effort. Pressure threshold respiratory muscle training was undertaken at the 30 repetition maximum load (approximately 50% of the peak inspiratory and expiratory mouth pressure, P (Imax) or P (Emax), respectively). P (Imax) increased during the IMT phase of the training in the IMT group (26%, $P < 0.001$) and was accompanied by an improvement in mean power during the 6MAO (2.7%, $P = 0.015$). Despite an increase in P (Emax) by the end of the intervention (31%, $P = 0.03$), the EMT group showed no significant changes in any performance parameters during

either the 'step-test' or 6MAO. There were no significant changes in breathing pattern or the metabolic response to the 6MAO test in either group, but the IMT group showed a small decrease in HR (2-5%, P = 0.001). We conclude that there were no significant additional changes following combined IMT/EMT. IMT improved rowing performance, but EMT and subsequent combined IMT/EMT did not.

Downey AE, Chenoweth LM, Townsend DK, Ranum JD, Ferguson CS & Harms CA. (2007). **Effects of inspiratory muscle training on exercise responses in normoxia and hypoxia.** *Respir Physiol Neurobiol* **156,** 137-146.

The purpose of this study was to determine the effects of inspiratory muscle training (IMT) on exercise in hypoxia (H) and normoxia (N). A 4-week IMT program was implemented with 12 healthy subjects using an inspiratory muscle trainer set at either 15% (C; n=5) or 50% (IMT; n=7) maximal inspiratory mouth pressure (PImax). Two treadmill tests (85% VO2max) to exhaustion and measures of diaphragm thickness (Tdi) and function were completed before and after training in H and N. Significant increases of 8-12% and 24.5+/-3.1% in Tdi and PImax, respectively, were seen in the IMT group. Time to exhaustion remained unchanged in all conditions. Inspiratory muscle fatigue (reduction of PImax) following exercise was reduced approximately 10% (P<0.05) in IMT after both N and H. During H, IMT reduced (P<0.05) VO2 by 8-12%, cardiac output by 14+/-2%, ventilation by 25+/-3%; and increased arterial oxygen saturation by 4+/-1% and lung diffusing capacity by 22+/-3%. Ratings of perceived exertion and dyspnea were also significantly reduced. These data suggest that IMT significantly improves structural and functional physiologic measures in hypoxic exercise.

Romer LM, McConnell AK & Jones DA. (2002). **Effects of inspiratory muscle training upon time trial performance in trained cyclists**. *J Sports Sci* **20,** 547-562.

We evaluated the effects of specific inspiratory muscle training on simulated time-trial performance in trained cyclists. Using a double-blind, placebo-controlled design, 16 male cyclists (VO2max = 64 +/- 2 ml x kg(-1) x min(-1); mean +/- s(x)) were assigned at random to either an experimental (pressure-threshold inspiratory muscle training) or sham-training control (placebo) group. Pulmonary function, maximum dynamic inspiratory muscle function and the physiological and perceptual responses to maximal incremental cycling were assessed. Simulated time-trial performance (20 and 40 km) was quantified as the time to complete pre-set amounts of work. Pulmonary function was unchanged after the intervention, but dynamic inspiratory muscle function improved in the inspiratory muscle training group (P < or = 0.05). After the intervention, the inspiratory muscle training group experienced a reduction in the perception of respiratory and peripheral effort (Borg CR10: 16 +/- 4% and 18 +/- 4% respectively; compared with placebo, P < or = 0.01) and completed the simulated 20 and 40 km time-trials faster than the placebo group [66 +/- 30 and 115 +/- 38 s (3.8 +/- 1.7% and 4.6 +/-1.9%) faster respectively; P = 0.025 and 0.009]. These results support evidence that

specific inspiratory muscle training attenuates the perceptual response to maximal incremental exercise. Furthermore, they provide evidence of performance enhancements in competitive cyclists after inspiratory muscle training.

Volianitis S, McConnell AK, Koutedakis Y, McNaughton L, Backx K & Jones DA. (2001). **Inspiratory muscle training improves rowing performance**. *Med Sci Sports Exerc* **33,** 803-809.

PURPOSE: To investigate the effects of a period of resistive inspiratory muscle training (IMT) upon rowing performance. METHODS: Performance was appraised in 14 female competitive rowers at the commencement and after 11 wk of inspiratory muscle training on a rowing ergometer by using a 6-min all-out effort and a 5000-m trial. IMT consisted of 30 inspiratory efforts twice daily. Each effort required the subject to inspire against a resistance equivalent to 50% peak inspiratory mouth pressure (PImax) by using an inspiratory muscle training device. Seven of the rowers, who formed the placebo group, used the same device but performed 60 breaths once daily with an inspiratory resistance equivalent to 15% PImax. RESULTS: The inspiratory muscle strength of the training group increased by 44 +/- 25 cm H2O (45.3 +/- 29.7%) compared with only 6 +/- 11 cm H2O (5.3 +/- 9.8%) of the placebo group ($P < 0.05$ within and between groups). The distance covered in the 6-min all-out effort increased by 3.5 +/- 1.2% in the training group compared with 1.6 +/- 1.0% in the placebo group ($P < 0.05$). The time in the 5000-m trial decreased by 36 +/- 9 s (3.1 +/- 0.8%) in the training group compared with only 11 +/- 8 s (0.9 +/- 0.6%) in the placebo group ($P < 0.05$). Furthermore, the resistance of the training group to inspiratory muscle fatigue after the 6-min all- out effort was improved from an 11.2 +/- 4.3% deficit in PImax to only 3.0 +/- 1.6% ($P < 0.05$) pre- and post-intervention, respectively. CONCLUSIONS: IMT improves rowing performance on the 6-min all-out effort and the 5000-m trial.

Top 5 papers for COPD

O'Brien K, Geddes EL, Reid WD, Brooks D & Crowe J. (2008). **Inspiratory muscle training compared with other rehabilitation interventions in chronic obstructive pulmonary disease: a systematic review update.** *J Cardiopulm Rehabil Prev* **28,** 128-141.

PURPOSE: To determine the effect of inspiratory muscle training (IMT) (alone or combined with exercise and/or pulmonary rehabilitation) and compare with other rehabilitation interventions among adults with chronic obstructive pulmonary disease (COPD). METHODS: We conducted a systematic review, using Cochrane Collaboration protocol. We included randomized controlled trials, published in English, comparing IMT or combined IMT and exercise/pulmonary rehabilitation with other rehabilitation interventions among adults with COPD. Abstracts were reviewed independently by 2 investigators to determine study

eligibility up to December 2005. Data were abstracted and methodological quality of included studies was assessed. RESULTS: A total of 156 additional articles were retrieved. Two new studies met the inclusion criteria and were included with 16 studies in the original review. Results highlight updated subgroup analyses comparing (1) IMT versus exercise and (2) combined IMT and exercise versus exercise alone. Fourteen meta-analyses were performed for outcomes of inspiratory muscle strength, exercise tolerance, and quality of life. Results showed significant improvements in maximum inspiratory pressure and maximum exercise tidal volume favoring combined IMT and exercise compared with exercise alone. CONCLUSIONS: Performing a combination of IMT plus exercise may lead to significant improvements in inspiratory muscle strength and one outcome of exercise tolerance for individuals with COPD.

Geddes EL, O'Brien K, Reid WD, Brooks D & Crowe J. (2008). **Inspiratory muscle training in adults with chronic obstructive pulmonary disease: An update of a systematic review**. *Respir Med* **102,** 1715-1729.

The purpose was to update an original systematic review to determine the effect of inspiratory muscle training (IMT) on inspiratory muscle strength and endurance, exercise capacity, dyspnea and quality of life for adults with chronic obstructive pulmonary disease (COPD). The original MEDLINE and CINAHL search to August 2003 was updated to January 2007 and EMBASE was searched from inception to January 2007. Randomized controlled trials, published in English, with adults with stable COPD, comparing IMT to sham IMT or no intervention, low versus high intensity IMT, and different modes of IMT were included. Nineteen of 274 articles in the original search met the inclusion criteria. The updated search revealed 17 additional articles; 6 met the inclusion criteria, all of which compared targeted, threshold or normocapneic hyperventilation IMT to sham IMT. An update of the sub-group analysis comparing IMT versus sham IMT was performed with 10 studies from original review and 6 from the update. Sixteen meta-analyses are reported. Results demonstrated significant improvements in inspiratory muscle strength (PI(max), PI(max) % predicted, peak inspiratory flow rate), inspiratory muscle endurance (RMET, inspiratory threshold loading, MVV), exercise capacity (Ve(max), Borg Score for Respiratory Effort, 6MWT), Transitional Dyspnea Index (focal score, functional impairment, magnitude of task, magnitude of effort), and the Chronic Respiratory Disease Questionnaire (quality of life). Results suggest that targeted, threshold or normocapneic hyperventilation IMT significantly increases inspiratory muscle strength and endurance, improves outcomes of exercise capacity and one measure of quality of life, and decreases dyspnea for adults with stable COPD.

Beckerman M, Magadle R, Weiner M & Weiner P. (2005). **The effects of 1 year of specific inspiratory muscle training in patients with COPD**. *Chest* **128,** 3177-3182.

AIM: We assessed the long-term benefits of inspiratory muscle training (IMT) on inspiratory muscle strength, exercise capacity, the perception of dyspnea, quality of life, primary care use, and hospitalizations in patients with significant COPD. PATIENTS: Forty-two consecutive COPD patients with FEV(1) < 50% of predicted were randomized into a group that received IMT for 1 year, and a control group that received training with a very low load. RESULTS: There was a statistically significant increase in inspiratory muscle strength (at the end of the third month of training) as assessed by maximal inspiratory pressure (from 71 +/- 4.9 to 90 +/- 5.1 cm H(2)O [+/- SEM], $p < 0.005$) and 6-min walk distance (at the end of the third month of training; from 256 +/- 41 to 312 +/- 54 m; $p < 0.005$), a decrease in the mean Borg score during breathing against resistance (at the end of the ninth month of training), improvement in the health-related quality-of-life scores (at the end of the sixth month of training) in the training group but not in the control group. At the end of the training year, these changes were maintained; in addition, a decrease in primary health-care use and hospitalization days was observed. CONCLUSIONS: Our study shows that during IMT in patients with significant COPD, there is an increase in exercise capacity, improvement in quality of life, and decrease in dyspnea. Our study also provides evidence that long-term IMT can decrease the use of health services and hospitalization days.

Ramirez-Sarmiento A, Orozco-Levi M, Guell R, Barreiro E, Hernandez N, Mota S, Sangenis M, Broquetas JM, Casan P & Gea J. (2002). **Inspiratory muscle training in patients with chronic obstructive pulmonary disease: structural adaptation and physiologic outcomes.** *Am J Respir Crit Care Med* **166,** 1491-1497.

The present study was aimed at evaluating the effects of a specific inspiratory muscle training protocol on the structure of inspiratory muscles in patients with chronic obstructive pulmonary disease. Fourteen patients (males, FEV1, 24 +/- 7% predicted) were randomized to either inspiratory muscle or sham training groups. Supervised breathing using a threshold inspiratory device was performed 30 minutes per day, five times a week, for 5 consecutive weeks. The inspiratory training group was subjected to inspiratory loading equivalent to 40 to 50% of their maximal inspiratory pressure. Biopsies from external intercostal muscles and vastus lateralis (control muscle) were taken before and after the training period. Muscle samples were processed for morphometric analyses using monoclonal antibodies against myosin heavy chain isoforms I and II. Increases in both the strength and endurance of the inspiratory muscles were observed in the inspiratory training group. This improvement was associated with increases in the proportion of type I fibers (by approximately 38%, $p < 0.05$) and in the size of type II fibers (by approximately 21%, $p < 0.05$) in the external intercostal

muscles. No changes were observed in the control muscle. The study demonstrates that inspiratory training induces a specific functional improvement of the inspiratory muscles and adaptive changes in the structure of external intercostal muscles.

Weiner P, Magadle R, Berar-Yanay N, Davidovich A & Weiner M. (2000). **The cumulative effect of long-acting bronchodilators, exercise, and inspiratory muscle training on the perception of dyspnea in patients with advanced COPD**. *Chest* **118,** 672-678.

BACKGROUND: Dyspnea is a common complaint during daily activities in patients with advanced COPD. The mechanisms underlying dyspnea and the appropriate treatment strategies to relieve it are still not totally understood. We hypothesized that the perception of dyspnea (POD) may be modified by the accumulative effect of bronchodilator therapy, exercise, and inspiratory muscle training (IMT). METHODS: Spirometry, submaximal exercise performance, inspiratory muscle strength and endurance, and the POD were assessed before and following three consecutive 6-week periods of therapy with a long-acting bronchodilator (LABD), the LABD plus exercise, and the LABD plus exercise plus IMT in 30 patients with moderate-to-severe COPD. RESULTS: There was a small, statistically insignificant, increase in FEV(1) in the study group (mean [+/- SEM] increase, 1.42+/-0.3 to 1.49+/-0.4 L) following the LABD therapy period, and no additional increase following the two other periods of therapy. There was a significant increase ($p<0.05$) in the 6- min walk distance following the therapy period with the LABD plus exercise (mean increase, 252+/-41 to 294+/-47 m) and an additional small increase following the therapy period with the LABD plus exercise plus IMT period (mean increase, 252+/-41 to 302+/-49 m). The decrease in the POD was small and statistically not significant following the therapy periods with the LABD and the LABD plus exercise. The major and statistically significant decrease in the POD was noted following the therapy period with the LABD plus exercise plus IMT. CONCLUSIONS: In patients with moderate-to-severe COPD, following sequential periods of therapy with the LABD, the LABD plus exercise, and the LABD plus exercise plus IMT, there is a cumulative benefit in the POD. The most significant improvement was associated with IMT and not with the LABD and exercise training. The FEV(1) was moderately increased following the therapy period with the LABD, and the addition of exercise has most affected the 6-min walk distance.

Top 5 papers for mechanisms

Bailey SJ, Romer LM, Kelly J, Wilkerson DP, Dimenna FJ & Jones AM. (2010). **Inspiratory muscle training enhances pulmonary O2 uptake kinetics and high-intensity exercise tolerance in humans.** *J Appl Physiol* **109,** 457-468.

Fatigue of the respiratory muscles during intense exercise might compromise leg blood flow, thereby constraining oxygen uptake (V(O2)) and limiting exercise tolerance. We

tested the hypothesis that inspiratory muscle training (IMT) would reduce inspiratory muscle fatigue, speed V(O2) kinetics and enhance exercise tolerance. Sixteen recreationally-active subjects (mean +/- SD, age 22 +/- 4 yr) were randomly assigned to complete four weeks of either pressure threshold IMT (30 breaths twice daily at ~50% of maximum inspiratory pressure, MIP) or SHAM (60 breaths once daily at ~15% of MIP). The subjects completed moderate-, severe- and maximal-intensity 'step' exercise transitions on a cycle ergometer before and after the four week intervention period for determination of V(O2) kinetics and exercise tolerance. There were no significant changes in the physiological variables of interest following SHAM. Following IMT, baseline MIP was significantly increased (Pre: 155+/-22 vs. Post: 181+/-21 cmH(2)O; P<0.001) and the degree of inspiratory muscle fatigue was reduced during and following severe- and maximal-intensity exercise. During severe exercise, the V(O2) slow component was reduced (Pre: 0.60+/-0.20 vs. Post: 0.53+/-0.24 L(.)min(-1); P<0.05) and exercise tolerance was enhanced (Pre: 765+/-249 vs. Post: 1061+/-304 s; P<0.01). Similarly, during maximal exercise, the V(O2) slow component was reduced (Pre: 0.28+/-0.14 vs. Post: 0.18+/-0.07 L(.)min(-1); P<0.05) and exercise tolerance was enhanced (Pre: 177+/-24 vs. Post: 208+/-37 s; P<0.01). Four weeks of IMT, which reduced inspiratory muscle fatigue, resulted in a reduced V(O2) slow component amplitude and an improved exercise tolerance during severe and maximal intensity exercise. The results indicate that the enhanced exercise tolerance that has been observed following IMT might be related, at least in part, to improved V(O2) dynamics, presumably as a consequence of increased blood flow to the exercising limbs.

Brown PI, Sharpe GR & Johnson MA. (2009). **Loading Of Trained Inspiratory Muscles Speeds Lactate Recovery Kinetics.** *Med Sci Sports Exerc*.

PURPOSE: To investigate the effects of inspiratory muscle loading (ITL) and inspiratory muscle training (IMT) upon blood lactate concentration ([lac]B) and acid-base balance following maximal incremental cycling. METHODS:: 18 subjects were divided into a control (n=9) or IMT group (n=9). Prior to and following a 6 wk intervention subjects completed two maximal incremental cycling tests followed by 20 min of recovery with (ITL) or without (passive recovery; PR) a constant inspiratory resistance (15 cmH2O). The IMT group performed 6 wk pressure threshold IMT at 50% maximal inspiratory mouth pressure (MIP). Throughout recovery, acid-base balance was quantified using the physicochemical approach by measuring the strong ion difference ([SID])=[Na]+[K]-[Cl]+[lac]), the total concentration of weak acids ([Atot]) and the partial pressure of carbon dioxide (PCO2). RESULTS:: Following the intervention MIP increased in the IMT group only (+34%). No differences in lactate clearance were observed between PR and ITL before the intervention in both groups and following the intervention in the control group. Following IMT, relative to PR, [lac]B was reduced throughout ITL (min 2 to 20) by 0.66 +/- 1.28 mmol.L-1 (P<0.05) and both the fast (lactate exchange) and slow (lactate clearance) velocity constants of the lactate recovery kinetics were increased (P<0.05). Relative to pre-IMT, ITL reduced plasma [H] which was accounted for by an IMT-mediated increase in [SID] due almost exclusively to a 1.7 mmol.L reduction in

[lac]B. CONCLUSIONS:: Following maximal exercise ITL affected lactate recovery kinetics only after IMT. Our data support the notion that the inspiratory muscles are capable of lactate clearance which increases [SID] and reduces [H]. These effects may facilitate subsequent bouts of high-intensity exercise.

Chiappa GR, Roseguini BT, Vieira PJ, Alves CN, Tavares A, Winkelmann ER, Ferlin EL, Stein R & Ribeiro JP. (2008). **Inspiratory muscle training improves blood flow to resting and exercising limbs in patients with chronic heart failure**. *J Am Coll Cardiol* **51,** 1663-1671.

OBJECTIVES: We tested the hypothesis that inspiratory muscle loading could result in exaggerated peripheral vasoconstriction in resting and exercising limbs and that inspiratory muscle training (IMT) could attenuate this effect in patients with chronic heart failure (CHF) and inspiratory muscle weakness. BACKGROUND: Inspiratory muscle training improves functional capacity of patients with CHF, but the mechanisms of this effect are unknown. METHODS: Eighteen patients with CHF and inspiratory muscle weakness (maximal inspiratory pressure <70% of predicted) and 10 healthy volunteers participated in the study. Inspiratory muscle loading was induced by the addition of inspiratory resistance of 60% of maximal inspiratory pressure, while blood flow to the resting calf (CBF) and exercising forearm (FBF) were measured by venous occlusion plethysmography. For the patients with CHF, blood flow measurements as well as ultrasound determination of diaphragm thickness were made before and after a 4-week program of IMT. RESULTS: With inspiratory muscle loading, CHF patients demonstrated a more marked reduction in resting CBF and showed an attenuated rise in exercising FBF when compared with control subjects. After 4 weeks of IMT, CHF patients presented hypertrophy of the diaphragm and improved resting CBF and exercise FBF with inspiratory muscle loading. CONCLUSIONS: In patients with CHF and inspiratory muscle weakness, inspiratory muscle loading results in marked reduction of blood flow to resting and exercising limbs. Inspiratory muscle training improves limb blood flow under inspiratory loading in these patients.

Witt JD, Guenette JA, Rupert JL, McKenzie DC & Sheel AW. (2007). **Inspiratory muscle training attenuates the human respiratory muscle metaboreflex.** *J Physiol* **584,** 1019-1028.

We hypothesized that inspiratory muscle training (IMT) would attenuate the sympathetically mediated heart rate (HR) and mean arterial pressure (MAP) increases normally observed during fatiguing inspiratory muscle work. An experimental group (Exp, n = 8) performed IMT 6 days per week for 5 weeks at 50% of maximal inspiratory pressure (MIP), while a control group (Sham, n = 8) performed IMT at 10% MIP. Pre- and post-training, subjects underwent a eucapnic resistive breathing task (RBT) (breathing frequency = 15 breaths min(-1), duty cycle = 0.70) while HR and MAP were continuously monitored. Following IMT, MIP increased significantly ($P < 0.05$) in the Exp group (-125 +/- 10 to -146

+/- 12 cmH(2)O; mean +/- s.e.m.) but not in the Sham group (-141 +/- 11 to -148 +/- 11 cmH(2)O). Prior to IMT, the RBT resulted in significant increases in HR (Sham: 59 +/- 2 to 83 +/- 4 beats min(-1); Exp: 62 +/- 3 to 83 +/- 4 beats min(-1)) and MAP (Sham: 88 +/- 2 to 106 +/- 3 mmHg; Exp: 84 +/- 1 to 99 +/- 3 mmHg) in both groups relative to rest. Following IMT, the Sham group observed similar HR and MAP responses to the RBT while the Exp group failed to increase HR and MAP to the same extent as before (HR: 59 +/- 3 to 74 +/- 2 beats min(-1); MAP: 84 +/- 1 to 89 +/- 2 mmHg). This attenuated cardiovascular response suggests a blunted sympatho-excitation to resistive inspiratory work. We attribute our findings to a reduced activity of chemosensitive afferents within the inspiratory muscles and may provide a mechanism for some of the whole-body exercise endurance improvements associated with IMT.

McConnell AK & Lomax M. (2006). **The influence of inspiratory muscle work history and specific inspiratory muscle training upon human limb muscle fatigue**. *J Physiol* **577,** 445-457.

The purpose of this study was to assess the influence of the work history of the inspiratory muscles upon the fatigue characteristics of the plantar flexors (PF). We hypothesized that under conditions where the inspiratory muscle metaboreflex has been elicited, PF fatigue would be hastened due to peripheral vasoconstriction. Eight volunteers undertook seven test conditions, two of which followed 4 week of inspiratory muscle training (IMT). The inspiratory metaboreflex was induced by inspiring against a calibrated flow resistor. We measured torque and EMG during isometric PF exercise at 85% of maximal voluntary contraction (MVC) torque. Supramaximal twitches were superimposed upon MVC efforts at 1 min intervals (MVC(TI)); twitch interpolation assessed the level of central activation. PF was terminated (T(lim)) when MVC(TI) was <50% of baseline MVC. PF T(lim) was significantly shorter than control (9.93 +/- 1.95 min) in the presence of a leg cuff inflated to 140 mmHg (4.89 +/- 1.78 min; P = 0.006), as well as when PF was preceded immediately by fatiguing inspiratory muscle work (6.28 +/- 2.24 min; P = 0.009). Resting the inspiratory muscles for 30 min restored the PF T(lim) to control. After 4 weeks, IMT, inspiratory muscle work at the same absolute intensity did not influence PF T(lim), but T(lim) was significantly shorter at the same relative intensity. The data are the first to provide evidence that the inspiratory muscle metaboreflex accelerates the rate of calf fatigue during PF, and that IMT attenuates this effect.