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Active Voice: HIIT the Heart Short-Term HIIT Improves Cardiac Autonomic Function

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Viewpoints presented in SMB commentaries reflect opinions of the authors and do not necessarily reflect positions or policies of ACSM.

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*This commentary presents Drs. Kiviniemi's and Kalliokoski's views on the topic related to a research article they authored with their colleagues and which appears in the October 2014 issue of *Medicine & Science in Sports & Exercise*® (MSSE).*

High intensity interval training (HIIT) is one of the hottest topics in sport science and it has reached wide popularity also in practice. Short-term low volume HIIT protocols, typically including short 30 second all-out efforts, [have resulted in at least similarly improved cardiorespiratory fitness, peripheral vascular function and whole body metabolism as aerobic exercise training](#). Despite the emerging positive findings of the effects of low volume HIIT protocols on health, there are still many open questions and, therefore, this training scheme is not yet included in the [current ACSM Position Stand on development of fitness and flexibility in healthy adults](#).

One of the key health benefits of aerobic exercise training is improved cardiac autonomic function, typically manifested as decreased heart rate at rest and during submaximal exercise due to increased parasympathetic and decreased sympathetic activity. The shift of cardiac autonomic balance toward parasympathetic dominance has an important antiarrhythmic effect, sustaining cardiac electrical stability during high sympathetic activity, such as during exercise-induced acute myocardial ischemia in coronary artery disease. However, the cardiac autonomic adaptation to low volume HIIT has been unclear. [Our study, reported in MSSE](#), showed that two weeks of low volume HIIT improved cardiac autonomic function by increasing cardiac parasympathetic activity more than moderate intensity aerobic training. This was observed by heart rate variability analyses of both clinical 24-hour ambulatory and daily home-based recordings. Based on the results of other recent studies of short-term low volume HIIT, this mode of training seems to not have major effects on cardiac performance that are typically observed in longer term aerobic training. Therefore, the mechanism for improved cardiac autonomic function with HIIT might be different and is needed to be established in the future. Also, it remains to be tested whether this positive trend observed in this short intervention can be continued with more prolonged training in healthy subjects and in patients with impaired autonomic function.

What are the practical implications from our study is busy exercise good for busy people? We know that HIIT training that acutely and strongly increases sympathetic activity may not necessarily be good for the already stressed businessman or woman. However, our results show that in longer perspective if we can say two weeks is long HIIT has more positive effects on sympathovagal balance than aerobic training. Therefore, although not directly shown, our data suggest that acutely stressful HIIT may even alleviate stress in the long term more than does protracted jogging. This hypothesis definitely warrants further studies. Having said that, we still believe that an optimal training regimen is presumably individualized, comprising a unique combination of moderate intensity aerobic, HIIT and strength training parts for each person.