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Editorial A SCITECHNOL JOURNAL

Is it Yet Time to Throw Away the Old Recipe Book and Consider High Intensity Intermittent Exercise in Clinical Populations?

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The first epidemiological exercise studies in the 1950's established a cause-effect relationship between levels of physical inactivity and cardiovascular disease. In the interim other longitudinal, cross-sectional, retrospective and prospective analyses have confirmed that physical activity is cardio-protective and also an inverse relationship exists between mortality rates and leisure time physical activity intensity. As such physical activity guidelines have emerged in the last 20 years, not only for sub-clinical, but also clinical populations. For example the American Heart Association (AHA) published 2009 exercise guidelines for people with type II diabetes [1]. The AHA publication is especially interesting as it was perhaps the first to make recommendations adjusting for both moderate- and vigorous-intensity exercise. Guidelines such as this have been primarily, but not exclusively, developed upon the relatively large volume of data from clinical exercise training trials of moderate intensity continuous exercise (MICE).

There seem to be three pillars, or established reasons, why there exists a historical preference for MICE therapy in people considered to be medium to high risk for cardiovascular events. First, the stimulus from MICE is considered sufficient to stimulate health benefits. Second, the risk of serious medical events from MICE is considered acceptable, while intuitively high intensity exercise is considered by many to carry a higher risk of serious illness. Third, MICE is well tolerated by most people and is not likely to detract from exercise adherence. In the sections below emerging knowledge will 'test' these three concepts that have been pillars of invincibility for over 50 years.

Recently there have been a notable number of high intensity, intermittent exercise (HIIE) studies and study protocols published in the scientific literature. A notable study of HIIE for clinical populations was Wisloff's work in heart failure patients [2], which produced unsurpassed clinical improvements. These improvements included 46% improvements in peak VO_2, which is regarded as the best predictor of prognosis in these patients. Wisloff's study was conducted in only a small sample size of three groups of 9 patients, so many clinicians remain unconvinced of the potential benefits of HIIE. Moreover many clinicians remain reticent that HIIE programs are safe and well tolerated.

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While HIIE is well established as a highly effective conditioning tool in athletes and low risk populations, it remains relatively novel for sub-clinical and clinical populations, but interest in clinical HIIE programs is growing. Wisloff is currently part of the SMARTEX group that has grant funding for a larger HIIE program for heart failure patients [3]. In Australia our group has recently registered a HIIE program as a clinical trial, which is likely to involve centres in Italy [4]. Moreover the American Heart Association scientific sessions 2012 devoted almost an entire session to three HIIE studies presented as conference papers [5-7]. The data from these abstracts and other published works suggest that HIIE is at least as effective as MICE. One study clearly states that HIIE is superior to MICE for improving myocardial mass [7]. This knowledge puts into question pillar number 1 as potential gains seem to be greater in HIIE.

We recently conducted a preliminary, unpublished, analysis of all clinical exercise trials in heart failure patients and stratified the trials by exercise intensity according to recognized guidelines [8]. Our analysis suggests that not only are the gains in cardio-respiratory fitness much greater as exercise intensity rises, but also the number of events does not rise and exercise adherence improves in this high-risk patient group. It has been suggested that higher intensity equates to higher risk of serious events, this opinion may well be intuitive, but perhaps not evidence-based at this point in time.

Despite the intuitive opinion that HIIE programs are unsafe and poorly tolerated by patients, one recent study has suggested that high intensity interval exercise is even more enjoyable than continuous exercise at lower intensity, which has clear implications for exercise adherence [9]. Additional data from recent studies suggests that HIIE is no worse and perhaps better tolerated [7]. Moreover the exercise session time required to complete the same volume of energy expended has been reported to be less for HIIE than that of MICE sessions [2]. In addition required weekly exercise session frequency is also likely to be lower as the stimulus is greater with HIIE compared to MICE. The resultant smaller time commitment required from patients is likely to equate to better exercise adherence, this puts into question pillar number 3.

One recent editorial paper has already called for high-intensity-aerobic interval training to become the clinical standard in exercise therapy for heart failure patients [10]. Moreover a Pub Med search of the literature using the search term "high intensity interval exercise", identifies clinical trials in obese children [11], those with coronary artery disease [12], stroke [13], overweight young women [14] and heart failure patients [15]. Clinical improvements, safety and adherence with HIIE all seem to be comparable or superior to those observed with MICE. Perhaps it is still too early to throw away the 50 year old MICE recipe as the information so far on HIIE in clinical populations has been gleaned from only a relatively small number of clinical trials, but perhaps the future will consolidate HIIE as the first-line exercise therapy for sub-clinical and clinical populations.

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