

JOURNAL WATCH

Our expert highlights the most important research articles across the spectrum of topics relevant to the field of diabetes management.

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Umpierre D, Ribeiro PA, Schaan BD, Ribeiro JP. Volume of supervised exercise training impacts glycaemic control in patients with Type 2 diabetes: a systematic review with meta-regression analysis. *Diabetologia* doi: 10.1007/s00125-012-2774-z (2012) (Epub ahead of print).

It has been established that supervised exercise programs can improve glycemic control in Type 2 diabetes, but training characteristics associated with reduction in HbA1c still remain unclear. The authors of this study conducted a meta-regression analysis of randomized clinical trials (RCTs) assessing the association between intensity and volume of exercise training, and considered the HbA1c changes in patients with Type 2 diabetes. RCTs published between 1980 and 2012 were evaluated, these were sought from five electronic databases. Each of the trials was of at least 12 weeks' duration, consisted of supervised exercise training versus no intervention, and reported both HbA1c changes and exercise characteristics. Twenty-six RCTs met the above inclusion criteria, totalling 2253 patients. A multivariate analysis showed that baseline HbA1c and exercise could explain nearly 58% of the between-study variance. In aerobic training, exercise volume, which was represented by frequency of sessions, was associated with changes in HbA1c (weighted $r = -0.64$). No variables were correlated with glycemic control induced

by resistance training. In combined training, weekly volume of resistance exercise explained heterogeneity in multivariate analysis and was associated with changes in HbA1c levels (weighted $r = -0.70$). The authors found that reduction in HbA1c was associated with exercise frequency in supervised aerobic training, and with weekly volume of resistance exercise in supervised combined training. Therefore, they concluded that exercise volume is a major determinant of glycemic control in patients with Type 2 diabetes.

Tonoli C, Heyman E, Roelands B *et al.* Effects of different types of acute and chronic (training) exercise on glycaemic control in Type 1 diabetes mellitus: a meta-analysis. *Sports Med.* 42(12), 1059–1080 (2012).

Exercise is often recommended for the management of Type 1 diabetes as it has been found to improve the overall quality of life in affected individuals. This meta-analysis looked at acute bouts of exercise, and chronic exercise or training, in order to determine the effect on acute and chronic glycemic control in patients with Type 1 diabetes. It also considered the effects of different types of exercise on glycemic control and the conditions required to obtain these positive effects. Studies were identified using a search of the following databases; PubMed, ISI Web of Knowledge and SPORTDiscus™. A total of 937 studies was found, but only



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33 met the inclusion criteria. The effect size for exercise on acute glycemic control was found to be large, yet the effect size was small for chronic glycemic control. Aerobic exercise, resistance exercise, mixed exercise (i.e., aerobic combined with resistance training) and high-intensity exercise were found to acutely decrease blood glucose levels. Single bouts of sprints incorporated into an aerobic exercise were recommended to prevent late-onset hypoglycemic episodes. The authors found that a regular exercise training program has a significant effect

on acute and chronic glycemic control, although it should be noted that not all exercise forms showed significant results. For example, aerobic training seems an effective tool for decreasing chronic glycemic control, but resistance training mixed and high-intensity exercise did not significantly improve chronic glycemic control. The paper concludes that only regular aerobic training will improve the glycated hemoglobin level of a patient with Type 1 diabetes. However, the addition of brief bouts of high-intensity, sprint-type exercise into an aerobic exercise session

is recommended to minimize the risk of sustaining a hypoglycaemic episode.

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