

**運動実施のタイミングの違いが1日の血糖変動に与える影響
1日を通して行う細切れ運動は、24時間血糖コントロールに有効か？
- 24時間の持続血糖モニタリングによる検証 -**

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**The Effect of Different Exercise Timing on Lowering
Postprandial Glucose Elevation.
- Is Interrupting Exercise Throughout the Day Effectiveness in Glycemic Control? -**

by

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ABSTRACT

Introduction: Postprandial abnormal glucose elevation (PPGE) is one of the risk factors of cardiovascular disease (CVD) in both diabetes and nondiabetes groups. Effective control of PPGE might prevent the chronic diseases such as CVD. However, there is no consensus on optimal exercise timing to reduce PPGE. The purpose of this study was to determine the most effective timing of exercise.

Method: Six participants completed the 4 different exercise patterns in random order,

which were 1) no exercise, 2) pre-meal exercise (jogging), 3) post-meal exercise (jogging), 4) breaking up sitting time (3sets of 1min jog+30sec rest, every 30min, BST). Pre and post-meal exercise pattern was 20 sets of interval exercise: 1min jogging and 30 second rest at the lactate threshold intensity of running ($62.4 \pm 12.9\% \dot{V}O_2\max$). Blood glucose concentration was measured continuously during each of the patterns. Heart rate (HR) was measured after the first bout of exercise in a day. Timing, order and composition of the meals was the same in each test

Result: Heart rate was significantly lower for BST than pre-and post-exercise patterns. Peak blood glucose concentration attenuated in BST after breakfast was lower compared with pre ($p=0.072$) and post-exercise ($p<0.05$). After lunch BST glucose concentration was lower than for post-exercise ($p<0.05$). After dinner was no significant differences between patterns. Area under curves of glucose concentration during 24 hours and 2 h postprandial was not different for each pattern.

Conclusion: The results of the study suggest that BST was more effective than pre-exercise and post exercise in preventing PPGE, especially in the morning.

要 旨

食後の急激な血糖上昇は、糖尿病・非糖尿病患者に関わらず心血管疾患のリスク要因となる。本研究では、食前運動・食後運動・短時間の運動を頻回行う小分け運動が食後の血糖動態に及ぼす影響について24時間持続的に血糖値を測定し、食後の血糖上昇の抑制に最適な運動タイミングを明らかにすることを目的とした。

6名の対象者は、①運動なし、②食後運動（毎食摂取開始30分後に1分運動+30秒休憩×20セット）、③食前運動（毎食事前に1分運動+30秒休憩×20セット）、④小分け運動（1日を通して、1分運動+30秒休憩×3セットを30分おきに行う）、の4条件を行った。それぞれの運動方法は、トレッドミルによる乳酸閾値強度のジョギングとした。

小分け運動は、朝食において、食前・食後運動に比べ食後最高血糖値が低い値を示した（VS食前、 $p=0.072$, VS食後、 $p<0.05$ ）。従って、食後

の血糖上昇抑制には、食前・食後運動に比べ小分けに行う運動方法が効果的である可能性が示された。