Periodic acceleration enhances release of nitric oxide in healthy adults.

周期性加速度提升健康成人體內一氧化氮的釋放。

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Periodic acceleration in the direction of the spinal axis through repetitive movements of a horizontal motion platform increases intravascular pulsatile shear stress. We hypothesized that periodic acceleration enhances release of nitric oxide (NO) in healthy subjects. We enrolled 8 healthy volunteers [39 +/- 10 (SD) years]. Periodic acceleration was applied with the motion platform at a frequency of 2-3 Hz with approximately +/-0.25 g for 45 minutes in the fasting state. The procedure was repeated 20 times over 31 +/- 10 days. Venous blood was sampled to determine plasma levels of NO, vascular endothelial growth factor (VEGF), tissue plasminogen activator (t-PA), and monocyte chemoattractant protein-1 (MCP-1) before and immediately after the first and 20th session. All the 8 subjects completed the 20 sessions without any adverse side effect. Periodic acceleration significantly increased the plasma end products of NO from 17 +/- 3 μmol/L at baseline and immediately after the first session to 24 μmol/L immediately after the 20th session (each $p < 0.05$). Treatment with the motion platform did not change significantly the plasma levels of VEGF, t-PA, and MCP-1. These findings provide new evidence that periodic acceleration with the motion platform enhances release of NO.

周期性加速度在脊柱軸的方向，透過水平平台的反覆移動，增加血管內的脈搏抗剪應力。我們假設，周期性加速度提升健康成人體內一氧化氮(NO)的釋放。我們登記 8 個健康的志願者[39 +/-（標準差）歲]。在空腹的狀態下，將周期性加速度運用在移動平台上，以 2-3 Hz 的頻率與大約 +/- 0.25g 的強度，運作 45 分鐘。此程序在 31 +/- 10 天當中反覆 20 次。在第一次及第 20 次療程之前及之後，立刻抽樣靜脈血以判定一氧化氮(NO)、血管內皮生長因子(VEGF)、組織型纖溶酶原活化劑(t-PA)、及單核細胞趨化蛋白(MCP-1)的血漿濃度。8 個受測者全數完成 20 個療程，沒有任何有害的副作用。周期性加速度治療讓一氧化氮的血漿最終產物從基線的 17+/-3 mol/L 顯著增加，並在第一個療程及第 20 個療程之後立刻增加到 24 mol/L（each $p<0.05$）。移動平台的治療沒有顯著改變 VEGF、t-PA 及 MCP-1 的血漿濃度。這些發現提供新的證據，以移動平台執行的周期性加速度治療提高一氧化氮的釋放。