Cortical activity underpinning natural walking is robust to effects of physical load carriage

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Physical load carriage in an essential duty in many occupations, such as firefighting, law enforcement and military. It is known that physical load carriage has psychological and physiological effects, but there is minimal research available on the cortical response of the brain under physical load carriage. The purpose of this research is to investigate the effect of load carriage on the brain during walking. This study uses a relatively novel ERP component, the gait related cortical potential (GRCP), to assess the impact of physical load carriage on the cortical response. For a duration of three minutes, participants walked at their own pace both without a physical load, and carrying a load of one-third their body weight while EEG was recorded with a SMARTING device. Results found a GRCP during natural walking and during load carriage, but there was no modulation in the GRCP across conditions. Behaviourally, walking speed was similar for walking with a load and without, but there was an effect of load carriage in self-reported measures of perceptions of effort and fatigue. It is concluded that load carriage has little additional impact on neural activity during walking over a very short duration.