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What is intensity and how can it benefit exercise intervention in People with Stroke (PwS) - a rapid review of the literature

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Stroke is one of the major causes of chronic physical disability in the UK, typically characterised by unilateral weakness and a loss of muscle power and movement quality. When combined with pre-existing comorbidities such as cardiac and diabetic disease, it results in reductions in cardiovascular fitness, physical activity levels, functional capacity and levels of independence in day to day living. High intensity training protocols have shown promising improvements in fitness and function for People with Stroke (PwS). However, it remains unclear how intensity is defined, measured and prescribed in this population. Further, we do not know what the optical outcome measures are to capture the benefits of intensive exercise. A rapid review of the literature was undertaken to provide an evidence synthesis that would provide more timely information for decision making (compared with a standard systematic review). Electronic databases were searched (including Medline, PubMed, CINHAL and Embase for studies from 2015 to 2020. These were then screened by title and abstract for inclusion if they were a) specific to adult PwS and b) were high intensity exercise interventions. Eligible studies were critically appraised using the MMAT. Seventeen studies were selected for review, fifteen primary research studies and two literature reviews. Sixteen of the seventeen studies were high quality. Nine of the primary research studies used bodyweight supported treadmills to achieve the high intensity training threshold, four used static exercise bikes and two used isometric arm strengthening. Five of the primary research studies had the aim of increasing walking speed, five aimed to increase cardiovascular fitness, three aimed to improvement to brain activity and two investigated the changes in muscle strength. Although only one study gave a clear definition of intensity, all studies clearly defined the high intensity protocol used, with most (15 out of 17 studies) clearly describing threshold periods of high intensity activity, followed by a rest or active recovery periods (of varying times. All of the studies reviewed used outcomes specific to body structure and function (ICF domains), with fewer included outcomes relating to activity and only three outcomes relating to participation. There is a clear lack of definition and understanding about intensity and how thresholds of intensity in this population are used as an intervention. There is also an inconsistency into the appropriate methods to assess and provide a training protocol based on that assessment. It remains unclear if high intensity training impacts the desired body system, given the diverse issues PwS can present with, from a neurological, muscular, cardiovascular, functional and psychosocial perspective. Future work needs to establish a clearer understanding of intensity and its impact on exercise training on multiple body systems in PwS.

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