

Promoting Health through Biking Programs for Youth with Developmental Disabilities

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Number of Articles: 8

Summary of Research Findings

Riding a bicycle is a leisure skill typically developed in childhood. However, many youth with developmental disabilities struggle and often fail to master this leisure skill. This is unfortunate since biking has been linked to a variety of positive health outcomes.

This literature review included a total of eight articles featuring research using both quantitative and qualitative methods. Subjects included youth ages 8 – 18 with diagnoses of cerebral palsy (Bryant, Pountney, Williams & Edelman, 2012), intellectual disabilities (Burt, Porretta & Klein, 2007; Vogt, Schneider, Anneken & Struder, 2013), Down syndrome (MacDonald, et al., 2012; Ringenbach, Albert, Chen & Alberts, 2014; Ulrich, Burghardt, Lloyd, Tiernan & Hornyak, 2011) and Autism Spectrum Disorder (Cameron, Shapiro & Ainsleigh, 2011; MacDonald et al., 2012; MacDonald, Jaszewski, Esposito & Ulrich, 2011).

In several of the studies reviewed, learning to independently ride a bicycle was the primary goal (Burt et al., 2007; Cameron et al., 2005; MacDonald et al., 2012; MacDonald et al., 2011; Ulrich et al., 2011). However, a variety of other positive physical, cognitive and social health outcomes were also documented.

Physical outcomes included improved mobility, increased gross motor functioning (Bryant et al., 2012), motor skills development (Burt et al., 2007), improved upper extremity movement, increased participation in physical activity (Ulrich et al., 2011), improved unimanual and bimanual dexterity (Rigenbach et al., 2014), weight loss (Ulrich et al., 2011) and improved balance. Cognitive outcomes included improved cortical functioning (Rigenbach et al., 2014; Vogt et al., 2013), decision making skills (Vogt et al., 2013), reaction times (Rigenbach et al., 2014; Vogt et al., 2013), and perception of exercise (Rigenbach et al., 2014). Social outcomes included greater self-confidence, social skills development, and strengthened peer and family relations (MacDonald et al., 2011).

A variety of bicycles were utilized for the interventions including stationary bicycles (Bryant et al., 2012; Cameron et al., 2005), adapted bicycles (Burt et al., 2007; MacDonald et al., 2012; MacDonald et al., 2011; Rigenbach et al., 2014), and standard two-wheel bicycles (Cameron et al., 2005; MacDonald et al., 2012). Duration of cycling interventions varied tremendously and included a single 10 minute session (Vogt et al., 2013), 30 minutes on three separate days (Rigenbach et al., 2014), 75 minutes for five consecutive days (MacDonald et al., 2012; Ulrich et al., 2011), and a more extended program involving 30 minute sessions offered three times weekly over six weeks (Bryant et al., 2012). Two studies focusing on skill development measured duration by number of trials or sessions necessary to master independent riding (Burt et al., 2007; Cameron et al., 2005).

Although there is limited research in this area, preliminary results indicate that youth with developmental disabilities can learn to ride bicycles when provided specialized training and individualized supports, and biking interventions can lead to a variety of health benefits in this population.

Knowledge Translation Plan

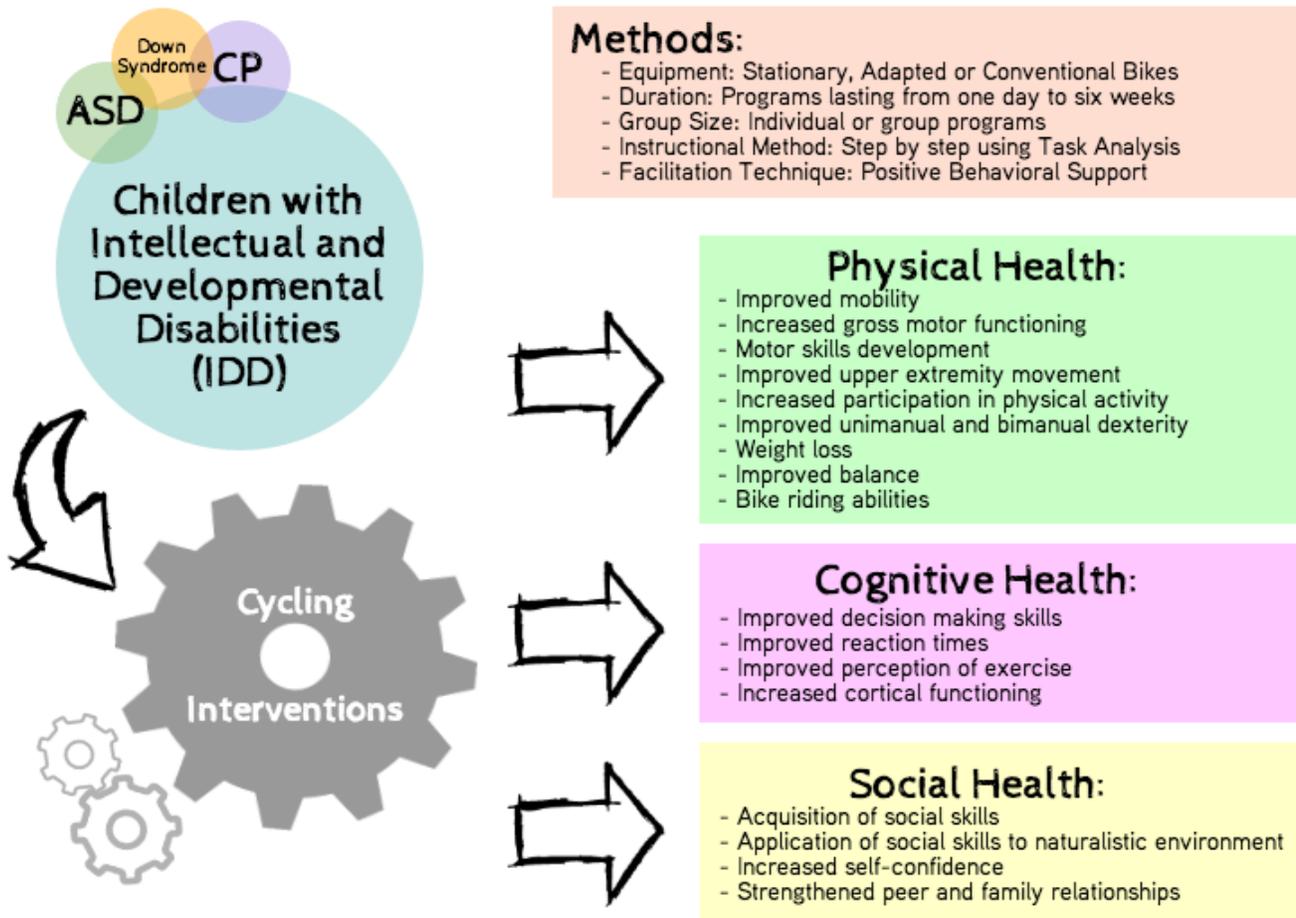
Since bicycle riding can play an important role in promoting overall health for youth with developmental disabilities, the Certified Therapeutic Recreation Specialist (CTRS®) should aim to provide evidence-based cycling interventions. Given the diversity of diagnoses and functional abilities present in youth with developmental disabilities, therapists should begin with a comprehensive assessment that will enable them to develop an individualized treatment plan based on each child's abilities, goals and recommended supports.

Equipment adaptations might include recumbent bicycles with a motor (Rigenbach et al., 2014), extra postural supports (Bryant, 2012), adapted roller bicycles that substitute rollers in lieu of conventional wheels (Burt et al., 2007; MacDonald et al., 2012; MacDonald et al., 2011; Ulrich et al., 2011), or "fat tire" bicycles (Burt et al., 2007). The Kurt Kinetic Trainer (Cameron et al., 2005) which enables children to train on a traditional two wheel bike in a supported,

stationary position can also be used to build basic cycling skills while simultaneously orienting the child to the bicycle that will eventually be used for independent riding.

Techniques such as assisted cycling using a motor (Rigenbach et al., 2014) can be considered, and since standardized curriculums and protocols exist, therapists should evaluate the appropriateness of the Lose the Training Wheels™ program (MacDonald et al., 2012; Ulrich et al., 2011) for their clients. Interventions structured by using step by step Task Analysis (Cameron et al., 2005) with individuals learning skills in a stepwise progression (Burt et al., 2007) are recommended, and therapists should facilitate by using Positive Behavioral Support (Cameron et al., 2005).

Given the variety of physical, cognitive and social outcomes that can be achieved through biking, once skill acquisition is obtained, the therapist can encourage maintenance and continued progress by altering the treatment focus. The CTRS® should also explore ways of involving family and friends in interventions to enhance opportunities for socialization and inclusion while promoting overall health and well-being.



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