Development of Continuum of Care for McArdle disease: A practical tool for clinicians and patients

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Introduction

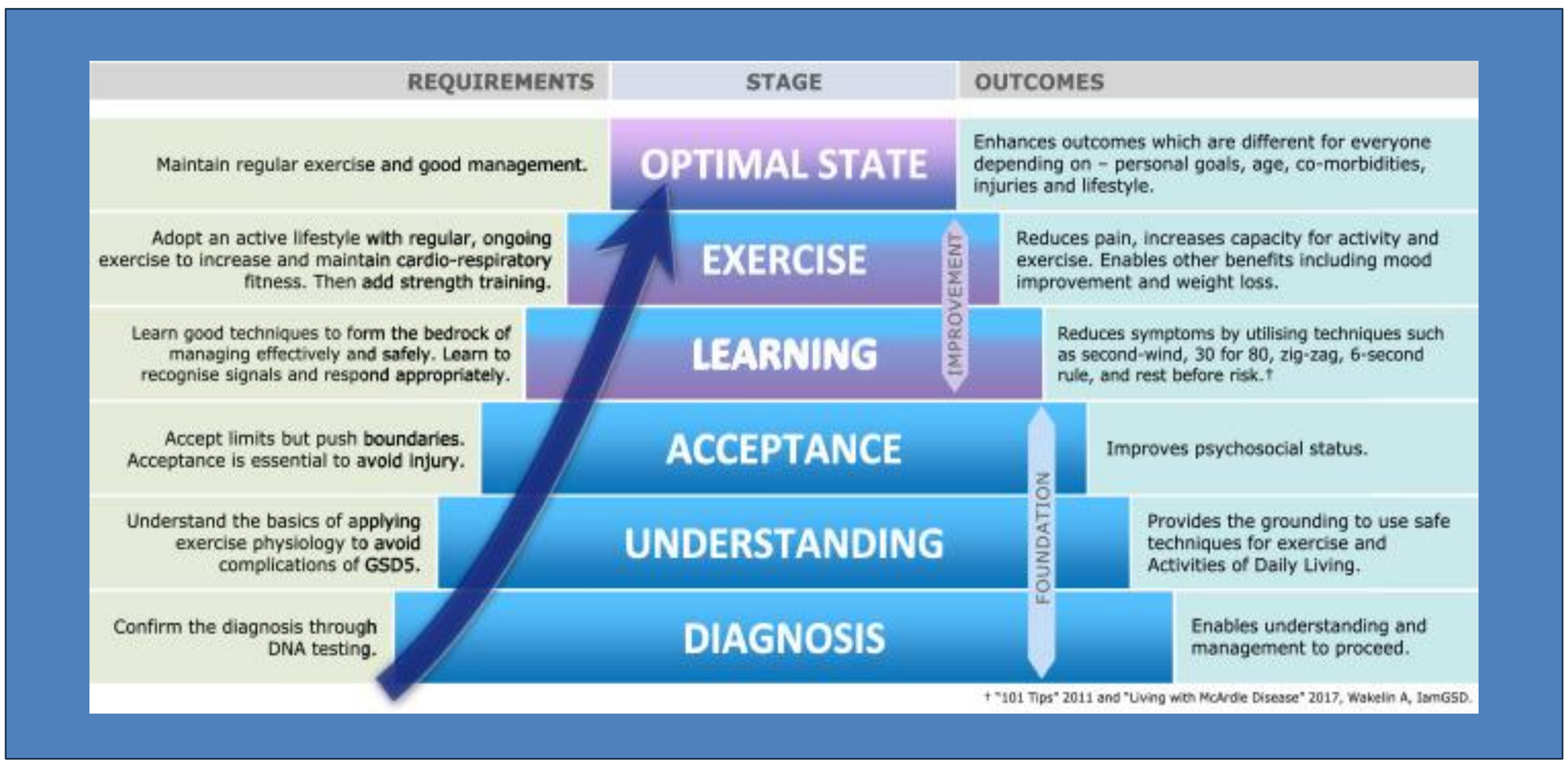
McArdle disease (GSDV) is a rare genetic disease caused by inability to break down glycogen in skeletal muscle fibers and is caused by biallelic pathogenic variants in the gene for the muscle isoform of glycogen phosphorylase (*myophosphorylase*). A deficiency of this enzyme disables the breakdown of muscle glycogen into glucose-1-phosphate, resulting in a block in glycogenolysis in this tissue. However, glycolysis is only partially blocked in GSDV, as muscle fibres can take up circulating glucose and convert it to glucose-6-phosphate downstream of the metabolic block.

Because skeletal muscle predominantly relies on anaerobic energy during the first few minutes of transition from rest to activity, and throughout more intense activities, individuals with GSDV experience muscle fatigue and pain, tachypnoea, and tachycardia during these activities. If these warning signs are not heeded, a muscle contracture may occur rapidly, and if significant, may lead to acute rhabdomyolysis. Almost unique to GSDV is a phenomenon called 'second wind', which typically occurs approximately 6 to 10 minutes into physical activity.

Background

Without access to efficacious clinical support, people with GSDV do not learn appropriate day-to-day management skills and continue to regard physical activity as a trigger for symptom recurrence rather than a safe and effective treatment option. This in turn further impairs the clinical course of this condition and overall health, impacting both activities of daily living and quality of life. To better support people with GSDV and the clinicians that care for them, the Patient Advocacy Organization, The *International Association for Muscle Glycogen Storage Disease* (IamGSD) established a collaborative working group of medical experts and patient representatives with the intent to identify key areas that must be addressed for individuals with GSDV to achieve an optimal state.

Here we present a *Continuum of Care* model that has been developed to streamline assessments and more succinctly assist clinicians in determining patient-specific learning needs. Each step of the continuum builds on the subsequent one. Individuals with GSDV must *learn* proper techniques; including how to recognize warning signals.



Diagnosis

- Diagnosis ideally takes place during early childhood to facilitate effective management.
- Incorrect and delayed diagnosis hampers the ability of individuals with GSDV to learn and manage appropriately.

Understanding

- Misinterpretation or lack of understanding limits the ability for upstream learning.
- By providing an explanation of how GSDV affects muscle metabolism, individuals are more likely to understand how regular moderate aerobic exercise and proper techniques can improve their symptoms.

Acceptance

- Acceptance is imperative, as day-to-day management requires self-awareness, motivation, and consistency..
- Multidisciplinary support, including psychology/social work, can help individuals accept their diagnosis of GSDV.

Learning

- To facilitate proper learning, regular (annual) follow-up is recommended, ideally at a Centre of Expertise.
- Regular follow-up will help individuals with GSDV learn how to properly self-manage and provide clinicians with the opportunity to conduct regular assessments.

Exercise

- Regular low-moderate aerobic exercise has been a long-standing recommendation for individuals with GSDV.
- To improve physical activity tolerance in people with GSDV, a personalized, professionally supervised exercise program is required.

Optimal State

- An optimal state is not a universal metric, but rather a bespoke level defined by each individual person with GSDV and the clinician supporting them.
- Consideration of age, co-morbidities, non-GSDV injuries, personal goals, and lifestyle must be made.

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