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Gait laboratory analysis has not yet been recognized by third party payors as an essential tool in rehabilitation practice although there is great potential for gait laboratory analysis to become this. It is already recognized for orthopedic surgical planning in patients with cerebral palsy affecting their gait. For the same reasons that gait laboratory analysis is useful in surgical planning, it could also be extremely useful for routine rehabilitation practice. It can be used to evaluate from a dynamic perspective which particular muscle group is weak or overly active or which muscle tendon group is tight. Traditional static evaluation of muscle weakness, spasticity, and tightness is often not adequate insofar as the findings on static evaluation commonly do not correspond to findings obtained from gait laboratory analysis. This point is important since most of our rehabilitation interventions are based on accurately determining which muscle/tendon groups are functionally weak, overly active or tight. For instance, strengthening functional electrical stimulation, or bracing are prescribed to improve or substitute for strength and stretching, modalities, or nerve or motor point blocks with localized medications are prescribed to improve overactive muscle activity or range of motion. Gait laboratory analysis thus can be an essential tool in evaluating and providing recommendations for treatment in gait disability secondary not only to cerebral palsy, but to any upper motor neuron diagnosis.

Gait laboratory analysis could be useful not only for rehabilitation management, but for further rehabilitation treatment development as well. It is difficult to evaluate the effect of a particular rehabilitation intervention if the problem is not adequately assessed at the beginning and evaluated at follow-up. For instance, the effect of a functional electrical stimulation program or of a particular brace may be impossible to evaluate if the underlying weakness is not adequately assessed. Additionally, information can be obtained about the mechanism of the electrical stimulation program if gait laboratory analysis is used as an evaluation tool at follow-up. In some instances, gait laboratory evaluation may be the only manner in which to assess an impairment. For example, individuals with gait disability often have different patterns of muscle activity which can be assessed only with dynamic electromyographic evaluation. A gait laboratory evaluation may show inappropriate timing of muscle activity which can be treated with electromyographic biofeedback. Electromyographic biofeedback as a potential treatment is optimally evaluated using gait laboratory evaluations. Essentially, any treatment which aims to improve walking through improving strength, range of motion, spasticity, or timing of muscle activity is best assessed with gait laboratory evaluation. Thus, gait laboratory assessment can be an important tool in evaluating the effects of current commonly prescribed rehabilitation interventions as well as in evaluating and developing possible new interventions.

Research Recommendations:

1. There needs to be a demonstration of the benefits of gait laboratory evaluation improving rehabilitation management.

2. It needs to be shown that gait laboratory analysis provides useful clinical information which is not present per routine clinical evaluation, in particular, research demonstrating the discrepancy between static and dynamic findings is important.

3. Research is needed which develops gait laboratory analysis as an evaluation tool to assess the dynamic relevance of impairments such as strength, spasticity, range of motion, etc.