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Intersite variations of the Gillette Gait Index

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Abstract

The Gillette Gait Index (GGI) is a tool used to measure pathologic gait severity and assess outcomes. The purpose of this study is to assess the variation in calculated GGI values with different sets of control data. Five able bodied control sets from four labs were used to establish the basis of the GGI. Gait data from three pediatric patients seen pre- and post-operatively at one lab and one adult control subject that visited each lab were input to calculate GGI values. Differences in underlying control data created large differences in computed GGI values for both pathologic and able bodied subjects. Initial pre-operative GGI values calculated for the three patients with cerebral palsy using different control data sets varied widely with differences as large as 1129 and had magnitudes of improvement differing by as much as 800 (or 21%). GGI value differences greater than 250 were determined from an able bodied control subject seen at each lab, both when examining a single trial with different control sets, and when examining different trials of the same individual collected from different labs using a single control set. These results highlight the importance of the underlying control set for establishing mean values and variance in the GGI and suggest that if GGI values are compared longitudinally or between sites these comparisons should be based on a single control dataset.

Keywords: Gillette Gait Index; Principle component analysis; Gait analysis

1. Introduction

The Gillette Gait Index (GGI) is a tool used to measure pathologic gait severity and assess outcomes [1–6]. The GGI is a multivariate index combining 16 gait variables including temporal distance and pelvic, hip, knee, and ankle kinematic parameters to derive a single measure of overall gait function. This tool requires an able bodied gait data set to establish control means and variance in each of the variables. These data are used in a principle component analysis to create a set of eigen values and eigen vectors needed to calculate the GGI. Control data sets vary between labs for many reasons including differences in marker alignment techniques, software, data reduction (*e.g.* reconstruction and filtering), processing (*e.g.* identifying gait events), and natural variations between control subjects. It has been suggested that GGI values of clinical subjects be computed from the able bodied control set collected in the same lab to reflect these inherent variations.

While the GGI has been shown to be reliable within a single control dataset [3,4], the extent that GGI values may differ when using different underlying control sets is unknown. It is important to establish the magnitude of this variance if the GGI is to be used in multicenter studies, when informally comparing patients between labs, or when comparing to published values.

The purpose of this study is to assess the variation in calculated GGI values when different sets of control data are used to establish the basis of the GGI. First, the GGI is calculated for the same patients with pathologic gait, but using different sets of control data as the foundations. Second, the variation is assessed by calculated GGI values of the same single able bodied subject seen at multiple sites when sets of control data from those same sites are used to establish the basis of the GGI.

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