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Gait Analysis Alters Decision-Making in Cerebral Palsy

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Summary: This study was designed to assess the impact of gait analysis on the treatment of patients with cerebral palsy. One hundred two ambulant patients with cerebral palsy were assessed clinically and with gait analysis. Separate treatment proposals for each patient were recorded after clinical examination and after gait analysis. The results of the two methods of assessment were compared. After clinical assessment, 71 of the 102 patients evaluated were recommended for a surgical procedure and 31 for nonoperative treatment. After gait analysis, the indications for treatment were confirmed in 91 cases (89%). Clinical assessment by the same orthopedic surgeon was in close agreement with gait analysis in identifying an indication for surgery. There was less agreement in the type or level of operation recommended. Gait analysis altered the decision in 106 of 267 operations (40%). There was good agreement for bone surgery, suggesting that clinical evaluation of torsional problems was fairly reliable. The poorer agreement seen for soft tissue operations probably reflects the difficulties in assessing tone-related problems in these patients clinically. This study confirms the value of gait analysis for decision-making in cerebral palsy. **Key Words:** Cerebral palsy—Decision making—Gait analysis.

There has been debate concerning the role of gait analysis in the overall assessment of patients with cerebral palsy (2,6). Proponents believe it is a valuable tool in the assessment of the dynamic and static functions of the musculoskeletal system. Others argue that it is little more than an expensive research tool of dubious clinical benefit.

At least two previous studies have considered the influence of gait analysis on surgical decision-making (1,4). The first, by DeLuca et al. (1), compared the surgical recommendations for patients with cerebral palsy assessed clinically and with video recordings before and after gait analysis. Surgical recommendations were changed in 52% of cases after gait analysis. The study involved numerous assessors, and this may have been a source of inconsistency. The second study, by Kay et al. (4), assessed the impact of preoperative gait analysis on the orthopaedic care of 97 pediatric patients with a variety of diagnoses. Eleven different physicians referred patients for gait analysis. The pre-gait analysis plan was available in only 70 of these patients. The surgical treatment plan was altered after gait analysis in 62 of these 70 patients (89%), and 39% of operations from the pre-gait analysis plan were not performed.

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A further study by Skaggs et al. (5) demonstrated that despite the objective nature of information from gait analysis, there is some subjectivity in its interpretation. The interobserver variability reported was similar to that found for established classification systems of various orthopaedic conditions. They also found differences between institutions in the interpretation of the data. To obviate these interobserver differences, we compared decision-making before and after gait analysis using the same orthopaedic surgeon and the same staff in the gait laboratory throughout.

MATERIALS AND METHODS

All new patients with cerebral palsy who were ambulant and had disorders affecting their lower limbs were seen and examined by the same orthopedic consultant. A treatment plan was formulated on the basis of this consultation. A decision was made as to the need for surgical intervention or nonsurgical treatment with physiotherapy or orthotics. If surgery was indicated, the level at which this surgery should be performed was recorded. The outcome and decisions made at this consultation will be referred to as the "clinical assessment."

After the clinical assessment, all patients were studied using three-dimensional gait analysis. Gait analysis was performed using a Vicon VX system (Oxford Metrics, Oxford, UK), five infrared cameras, a Kistler force plate (Kistler Instruments, AG Winthur, Switzerland), and real-time coronal and sagittal plane video recording. The results were analyzed by a team consisting of the same