

Multilevel Surgery in Adults Gait-Analysis Gives Not the Full Picture

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Introduction

Multilevel surgery is an established treatment in children with gait disorders due to spastic cerebral palsy [1, 2]. The short and mid-term benefits of well planned and executed procedures are documented. However, we do not know how these patients function as adults. Furthermore there is almost no information on this sort of treatment in adults with cerebral palsy [3]. The purpose of this study was to evaluate whether multilevel surgery produced similar results, as it does in children and whether there are other factors that influence the surgical treatment.

Statement of Clinical Significance

The decision to operate adults who are employed and mostly adapted to their longstanding gait patterns and deformities, is obviously much more difficult than in children. Therefore more data concerning the effects of surgery in adults are required.

Methodology

Twenty-six adults with a mean age of 26.5 ± 9.1 years were included in this study (21 diplegic and 5 hemiplegic). All patients received multilevel surgeries (Strayer procedures, distal rectus femoris transfers, knee flexor lengthenings, hip flexor lengthenings and intertrochanteric derotation osteotomies). According to their gait pattern, 13 performed diplegic crouch gait, 6 diplegic equinus gait, 2 diplegic stiff gait and 5 hemiplegic equinus gait (Group III and IV) [4]. All patients had been examined before and at least 12 months after the surgery. The 3-D gait analysis was performed using Vicon 370 system. Furthermore a specific patient questionnaire about the pre- and post-operative condition was used.

Results

Comparing the pre- and post-operation, the analysis of the gait data revealed significant changes in the ankle and knee ROM in the sagittal plane during the stance and swing phase. Psoas surgery did not have any significant effect for the same variable. Anterior pelvic tilt increased significantly after the surgery. Transverse plane deformities could be significantly corrected by derotation osteotomies. The results of the questionnaire seemed even more important. Twenty-five of the 26 patients answered and according to their answers 92% of them had less laborious gait postoperatively, 72% had cosmetically improved gait and 60% reported diminished shoe wear. The postoperative rehabilitation program lasted up to 6 months for 20% of the patients, 6-12 months for 32% of them and more than 12 months for the rest. There was a slight improvement in the state of employment postoperatively and no patient lost his/her job.

Preoperatively 18 patients walked unsupported, 4 with crutches, 2 with a walker and 1 used mostly his wheelchair. Postoperatively, 14 walked unsupported, 9 used crutches and 2 used a walker. Four patients with a preoperative diplegic equinus gait pattern changed from unsupported to crutch walking. Nevertheless, they were satisfied with the result.

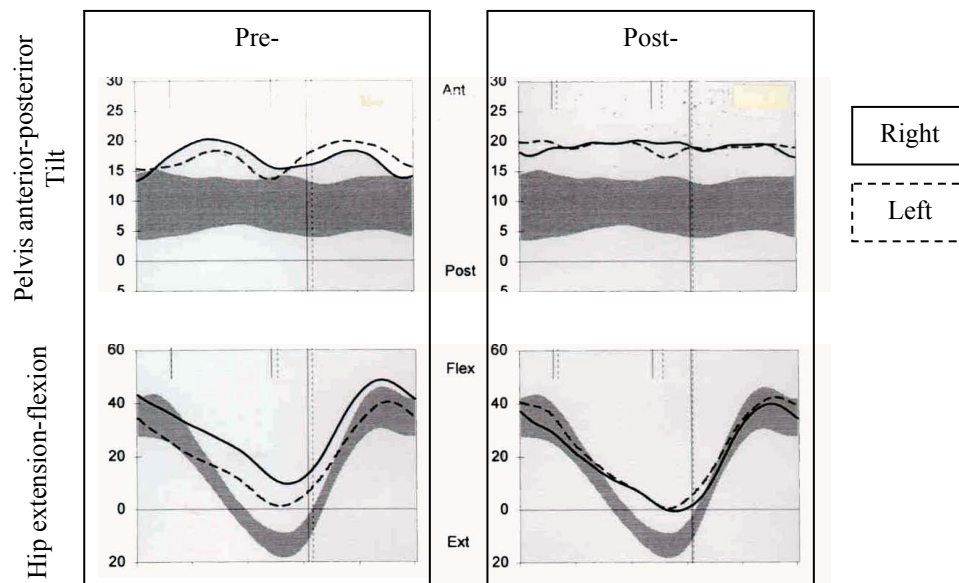


Figure 1: Sagittal pelvis and hip kinematics of a diplegic adult pre- and post-operatively. Increased anterior tilt after psoas and hamstrings lengthening can be seen.

Discussion

Surgical decision making in adults with cerebral palsy seems extremely difficult. Longstanding deformities would need extensive corrections but economic burdens make this unrealistic. Patients have been accustomed to their deformities. Therefore, a new walking pattern will have to be learnt after surgery. A previous study showed only slight improvements in the gait data after multilevel surgery [3]. Our results demonstrated significant improvements in some but not all expected data. Subjective satisfaction however was achieved in all, although some patients changed from free to crutch walking. Additionally, the rehabilitation time was significantly longer in comparison to the children. It is suggested that besides the gait data, also subjective factors (i.e. cosmetics of gait, shoe wear) and the state of employment and the family conditions must be considered when surgery in adults is planned. Although a longer rehabilitation time must be expected, surgery in adults with cerebral palsy is worthwhile.

References

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