Gait and functional evaluation of a patient submitted to Bernese Osteotomy in early and late rehabilitation: A Case Report

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Summary

This study evaluated the gait and quality of life of a patient with bilateral Developmental Dysplasia of the Hip (DDH) submitted to right hip surgical treatment followed by rehabilitation regimen. Increased range of motion of the right hip, decreased pelvis bend and improved quality of life were observed.

Introduction

Developmental Dysplasia of the Hip is characterized by the insufficient coverage of the femoral head by the acetabulum, causing increased stress on the cartilage matrix [1, 2]. It is prevalent in 2.3% of the general population, more frequently in females [2]. DDH is estimated to be the cause of 20 to 40% of cases of hip Osteoarthritis which can be avoided or delayed through early surgical treatment [2].

The Bernese Periacetabular Osteotomy (PAO) is a triplanar pelvic osteotomy that maintains the posterior column of the acetabulum intact. It permits a larger level of correction, while providing increased stability. At long-term follow-up, this procedure shows good to excellent results in the majority of cases [3].

Methods

This is a descriptive, observational case study. It assessed gait in a female patient with severe bilateral DDH, with a lateral center-edge border angle (LCEA) of -15º and Tönnis of 40º, as well as groin localized pain with a Visual Analogue Scale (VAS) of 7.

The patient was submitted to right hip PAO followed by strict structured rehabilitation. Gait analysis was conducted at 10 and 18 months, HAGOS (The Copenhagen Hip and Groin Outcome Score) and questionnaire was applied at 10 months.

Gait analysis was performed using a 12-camera Vero Vicon motion capture system (Vicon, Oxford, United Kingdom) at 100 Hz. Three-dimensional (3D) reconstruction and data analysis were performed using The Motion Monitor xGen system (Innovative Sports Training Inc., Chicago, IL, USA). Seven four-marker sensor clusters were used for collection and a stylus was used to digitize anatomical landmarks for the 3D reconstruction. The participant was then asked to walk at a comfortable pace over the 10 meter fixed walkway for 60 seconds.

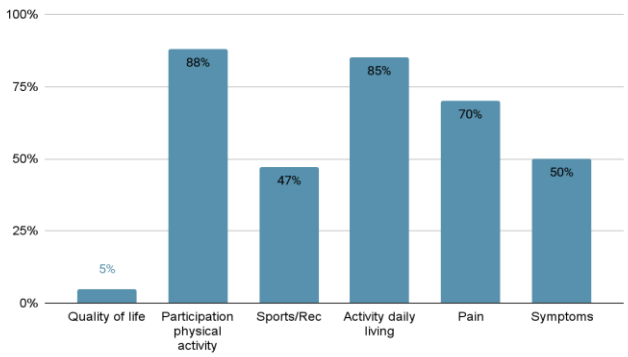
Results and Discussion

Eighteen months after right side POA and rehabilitation, the patient presented with statistically significant increased right hip flexion and internal rotation as well as reduced right side pelvic bend as demonstrated in Table 1.

Movement	10 months		18 months	
	R	L	R	L
Pelvic Bend	11,6º	4,2	9,9º*	3,8º
Flexion	39,2º	28,6º	45,3º*	31,7º
Extension	39,7º	15º	29,8º	12,6º
Abduction	5,9º	10,4º	6,9º	12,9º
Adduction	5,6º	10,9º	7,5º	10,9º
Internal Rotation	1,4º	6,7º	8,3º*	6,9º
External Rotation	7,7º	4,0º	8,7º	5,1º

Table 1: Range of Motion (RoM) for the right (R) and left (L) hips at 10 and 18 months post-POA. * Statistical significance - p<0,05.

For the 18-month analysis, the patient presented with a gait speed of 1,09 m/s (±0,42) and cadence of 98,8, while maintaining a symmetrical percentage of stance and swing phase for both limbs.



Graph 1: HAGOS questionnaire results.

Conclusions

The patient presented improved quality of life and pain parameters, as well as increased right hip RoM and reduced pelvic right side bend, which may indicate a good postoperative and rehabilitation result.

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