

## Case Report

# Effectiveness of pelvic clock, Cat & Camel Exercises on Gait Performance in a 64 year old Female Patient with Sub-acute LT Sided Hemiplegia (Post Resection of Motor Cortex Glioma)- A Case Study

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## Abstract

**Background:** Motor cortex glioma affects planning, control, and execution of voluntary movements. A Patient with right hemisphere motor cortex glioma developed left sided hemiplegia. The patient underwent an Emergency Neurosurgery (Tumor resection) for prevention of further brain damage. Patient was referred for physiotherapy for retraining of motor activities after Neurosurgery.

**Purpose:** There was mild to moderate improvement in all motor capabilities in initial 4 months after surgery. Patient had expressed gait disturbance as primary complaint. I.e. the hemiplegic or circumductory gait of left side lower extremity. There are no reports in the literature which included Pelvic clock, Cat& Camel exercises in the management of hemiplegic gait. The purpose of this case report is to document the effect of 6 weeks of Pelvic clock, Cat& Camel exercises in gait performance of that patient.

**Key points of case:** A 64 year Old female who developed Lt Hemiplegia due to motor cortex glioma underwent surgical resection. After 4 months of physical therapy post resection, patient still had problems with gait performance. An initial gait performance was assessed using Wisconsin gait scale. The score was 29.05. In addition to the regular physical therapy, pelvic clock, cat & camel exercises were added for a period of 6 weeks. The exercises were found to be effective in improving the pelvic rotation, Hip and knee flexor activation and strength of intrinsic foot muscles. It was noticed that the gait performance using Wisconsin gait scale at the end of 6 weeks improved markedly with a score of 21.7.

**Conclusion:** Physical therapy intervention with Pelvic clock, cat& camel exercises was found to be more effective in improving the gait performance in a hemiplegic patient. Pelvic clock exercises improves the pelvic control, thereby helps in sequential activation of hip and knee flexors. As the exercise has to be performed in crook lying position it still improves gripping of foot on the ground. Similar to that the cat & camel exercises improved pelvic flexibility and pelvic tilt patterns; thereby it improves coordinated movements between lumbar spine pelvis and pelvis Femur complexes.

**Key words :** Motor cortex Glioma, Hemiplegic gait, Pelvic clock exercises, Cat & Camel Exercises, Wisconsin Gait scale.

## Introduction

The motor cortex (Brodmann Area 4, 6) is predisposed to gliomas. Approximately 25% of low-grade gliomas and 10% of high-grade gliomas occur in the motor cortex, and most motor cortex gliomas are low-grade. Gliomas of the frontal lobe grow along the white matter fiber bundles and form complex tumors with finger-like projections. This leads to respective structural damage and dysfunction.<sup>1, 2, 3</sup> Motor deficits like unilateral or bilateral weakness, plegia, ataxia, spasticity, and loss of complex movement execution, can occur in any

brain tumor illness. Tumor location, treatment effects, and medications contribute to these deficits. Motor dysfunction is associated with significant deterioration in health-related quality of life in patients with brain tumors. Motor deficits, especially gait impairment, contribute to symptom burden at end of life, and are the most common reasons for initiation of hospice care.<sup>4</sup> Spastic hemiparetic gait is characterized by unilateral leg extension and circumduction, in which the paretic leg performs a lateral motion (circumduction) during the swing phase.<sup>5, 6</sup> The pelvic clock exercise help to achieve flexibility and strength in the lower

back, pelvic floor, and core. The other benefits are improved circulation to the pelvic organs, decreased tightness and stiffness, increased pelvic flexibility, improved balance to give greater spinal stability.<sup>7, 8</sup> The Cat Camel stretch is a good, gentle mobilization of the spine and works on stretching and strengthening core muscles. It can help in reducing tightness and spasticity associated with lower back and pelvis.<sup>9</sup> So this study is intended to understand the effect of pelvic clock, cat & camel exercises on gait performance of tumor induced hemiplegic patient.

### Case description

History and examination: The patient was 64 year old female. She developed stroke hemiplegia on the left side of the body. Investigations revealed presence of motor cortex glioma. An emergency decompression surgery was performed to prevent further brain damage. Post-surgery the patient was referred to physiotherapy. There was mild to moderate improvement in all functional capabilities with the Muscle power of Upper extremity was 4/5 and lower extremity was also 3/5. Spasticity MASG1+, Memory, attention and other cognition was found to be good. Patient had mild difficulty in upper limb function and her major complaints was gait performance.

### Description of Outcomes

The Wisconsin Gait Scale (WGS) can be used to evaluate the gait problems experienced by a patient with hemiplegia following stroke. This can be used to monitor the effectiveness of rehabilitation training.

### Description of Intervention

Patient is made to repeat each exercise 10 times. The goal is to perform all of these exercises within a range of motion that does not cause pain and with the expectation that the device will help to gradually increase range of motion until pain free range.



Figure 1: Pelvic clock

#### 1. Exercise “3-9” with straight legs

Patient is made to stretch her legs, relax, and rock pelvis in side to side direction following the 3-9 pattern.

#### 2. Exercise “3-9” with bent legs:

Patient is made to bend her knees and press feet into the ground. Without moving knees, she was made to tilt her pelvis to the left towards the 3 o'clock marker. Then advised totake a breath and tilt pelvis over to her right side toward the 9 o'clock marker.

#### 3. Exercise “12-6”

Patient is made to bend her knees and press her feet into the ground. She is made to slowly tilt her pelvis back toward the 12 o'clock marker (in the direction of her head).Then advised to take a deep breath and tilt her pelvis forward toward the6 o'clock marker (in the direction of her feet).

#### 4. “Clockwise & Counterclockwise”

Patient is made to do Clockwise rotation follows the 12-3-6-9 pattern and then counterclockwise rotation follows the 12-9-6-3 pattern. Patient was told to imagine that the axis of the rotation extends from her navelthrough the center of the device. Then advised to move her pelvis and hips in a circular direction around that center of rotation.

#### 5. Cat and camel exercises

Step 1: Patient was made to assume in quadruped position, on all fours. Hands are under shoulders and knees are under hips. She was made to Drop her head down and contracting abdominal muscles, raise her belly button up towards the ceiling. She was made to hold the position for 10 seconds. Step 2: she was made to slowly raise her head up while dropping belly button as low to the mat as she can, arching her back. She was made to hold this position for 10 seconds. She was made to switch back and forth between these two positions in a slow and controlled manner.

Outcome	pre	post
Wisconsin gait scale	29.05	21.7

Table 1: Difference in the gait performance based on Wisconsin gait scale over a period of 4 weeks

## Result and Discussion

In our study, we have assessed the subject baseline and post intervention using the Winconsin gait scale and the mean value after the 4 weeks of intervention shows significant change in the gait performance of the subject (Table 1). Circumductory gait has reduced or absence of pelvic rotation, hip flexion and knee flexion and ankle dorsiflexion. Pelvic stability training was found to be beneficial in improving the trunk and lower extremity movement control, hip muscles strength, gait speed and daily activities in stroke.<sup>10, 11</sup> Pelvic clock exercise helps in improving the pelvic tilt as well as the lateral tilt which helps in initiation of pelvic rotation. The clock exercise towards 12-6 helps in increasing the hip and knee flexion, the fixed position of the foot strengthens the intrinsic foot muscles thereby dorsiflexors as well.<sup>16</sup> The clock exercise towards 3-9 helps in increasing the pelvic rotation, reciprocal movement initiation and intrinsic foot muscles thereby invertors and evertors as well.<sup>12</sup> Clockwise and counter clockwise improves the pelvic coordination and helps in reduction of abnormal tone across pelvic girdle.<sup>13, 14, 15</sup> Cat and camel exercises helps in improving the flexibility of lumbar and thoracic spine.<sup>16</sup> Increased flexibility at the higher level will lower the spasticity in the lower level. so there is reduction in spasticity and tightness at knee ankle and foot. As these exercises facilitate the components required for normal gait, there was a greater difference in gait performance.<sup>16</sup> This study suggests that the common exercises used in musculoskeletal physiotherapy has a beneficial effect in the management of hemiplegic gait. So this study recommends the use of these exercises in sub-acute stages of stroke hemiplegics

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## Conflicts of Interest

Nil

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