

Misericordia University

## Misericordia Digital Commons

---

Student Research Poster Presentations 2022

Student Research Poster Presentations

---

2022

### Effects of Quadruped Movement in an Individual with Chronic Stroke: A Case Study

Maureen Romanow Pascal  
Misericordia University, mpascal@misericordia.edu

Emily Connell  
econnell2016@gmail.com

Alyssa Pratti  
prattia@misericordia.edu

Kristina Russell  
russellk@misericordia.edu

Follow this and additional works at: [https://digitalcommons.misericordia.edu/research\\_posters2022](https://digitalcommons.misericordia.edu/research_posters2022)



Part of the [Physical Therapy Commons](#), and the [Physiotherapy Commons](#)

---

#### Recommended Citation

Pascal, Maureen Romanow; Connell, Emily; Pratti, Alyssa; and Russell, Kristina, "Effects of Quadruped Movement in an Individual with Chronic Stroke: A Case Study" (2022). *Student Research Poster Presentations 2022*. 36.

[https://digitalcommons.misericordia.edu/research\\_posters2022/36](https://digitalcommons.misericordia.edu/research_posters2022/36)

This Poster is brought to you for free and open access by the Student Research Poster Presentations at Misericordia Digital Commons. It has been accepted for inclusion in Student Research Poster Presentations 2022 by an authorized administrator of Misericordia Digital Commons. For more information, please contact [jluksa@misericordia.edu](mailto:jluksa@misericordia.edu), [mcech@misericordia.edu](mailto:mcech@misericordia.edu).

# Effects of Quadruped Movement in an Individual with Chronic Stroke: A Case Study

Maureen Pascal, Emily Connell, Alyssa Pratti, Kristina Russell

Numerous functional parameters improved in an individual with chronic stroke following a quadruped based intervention program.

**Phase 1 of Intervention: Sessions 1 - 8**  
Focus: Set the foundation with wrist mobility, dynamic stretches, static and dynamic activation exercises to increase strength and endurance

**Phase 2 of Intervention: Sessions 9 - 16**  
Focus: Increase the difficulty, increase dynamic exercises and introduce more challenging exercises, circuits and flows

## Subject Characteristics

- 57 year old male sustained a left middle cerebral artery stroke in 2011
- At baseline:
  - Impaired balance
  - Utilizes a right ankle-foot orthosis
  - Ambulates with a rollator or quad cane
  - Right-sided weakness with upper extremity involvement greater than lower extremity involvement

## Big Picture

### Where do we come in?

1. Identify Animal Flow as an existing form of exercise that may be beneficial for use in stroke rehabilitation
2. Recognize the qualities of Animal Flow that limit its feasibility for direct use in patients with neuromuscular dysfunction
3. Develop a modified quadruped-based program that tailors the principles of Animal Flow towards the deficits seen in an individual with chronic stroke

## Our program

- A form of constraint-induced therapy that forces use of the hemiplegic side of the body by having the patient work in variations of the quadruped position.

## Why Does Our Research Matter?

### Neuroplasticity continues to occur well beyond initial injury

- With purposeful interventions, guided by the principles of neuroplasticity, improvements noted 11 years following stroke

### Task specificity promotes the greatest percent change

- All patient impairments and limitations should be considered when designing treatments

### Patient specificity is crucial to patient participation

- Equipment modifications to account for reduced mobility
- Intensity was reduced for safety, but remained challenging enough to promote neuroplasticity and functional improvements

### Implications for other diagnoses

- Osteoporosis and Cerebral Palsy
  - Weight bearing promotes increase in bone mineral density
- Nonspecific Low Back Pain
  - Traveling movement in quadruped promotes greatest muscle fiber activation of transversus abdominis and lumbar multifidus
  - Improves postural control and balance
- Spinal Cord Injuries
  - Improves strength, postural control, endurance, motor control and proprioception

**Modified quadruped based movement would be beneficial to incorporate into physical therapy practice.**

## Timed Bear Crawl

- ⚡ 41.8% improvement in timed forward crawl
- ⚡ 24.82% improvement in timed reverse crawl

## Grip Strength

- ⚡ 19.5% increase in left hand strength

## Six-Minute Walk Test

- ⚡ 3.35% increase in distance ambulated
- ⚡ Increase in distance without quad cane

## Posture

- ⚡ 53.9% improvement in effective head weight
- ⚡ Improvement observed in trunk extension

## Patient Specific Functional Scale

- ⚡ No significant changes noted

## Gait

Velocity (cm/sec)	Left Step Length (cm)	Step Length Ratio (L/R)	% Right SL Support	% SL Support Ratio (L/R)	Integrated Pressure Ratio (L/R)
<i>With Quad Cane: Normal Speed</i>					
4%	1%	< 1%	6%	6%	10%
<i>With Quad Cane: Fast Speed</i>					
12%	1%	2%	8%	8%	4%
<i>Without Quad Cane: Normal Speed</i>					
4%	1%	2%	8%	8%	4%
<i>Without Quad Cane: Fast Speed</i>					
5%	1%	8%	3%	11%	4%

