Identifying gait patterns in sub-acute stroke patients based on open access gait kinematics

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Aim

This study aims to **cluster** gait patterns in stroke patients to provide insights into the **pathology of gait** in stroke patients

Method

Kinematic data of the affected lower limb of **45 sub-acute stroke patients** during a **12-meter walk** were retrieved from an existing open access database [1]

Processing

1. Principal component analysis
2. K-means clustering
3. Knee point for optimal number of clusters



Results

- **Exclusion** of **frontal** and **transversal** plane joint angles of ankle and knee
- **8 gait pattern clusters** retrieved
- # of gait cycles ranged from 15 of 1 participant in cluster 6 to 82 from 14 participants in cluster 8
- **Eight clusters** rearranged into **four clinically meaningful groups**

Clinically meaningful groups

Groups could be used to identify the responsiveness to exoskeletons

Group 1

- Includes 2 clusters
- Least affected gait patterns

Group 2

- Includes 4 clusters
- Signs of rigid knee during whole gait cycle
- Decrease in active ankle control during whole gait cycle

Group 3

- Includes 1 cluster
- Knee (hyper)extension during stance phase
- Decrease in range of motion in sagittal plane of knee

Group 4

- Includes 1 cluster
- (Plantar) flexed position of the ankle, knee and hip during whole gait cycle
- Reverse loading response

References & Funding

[1] T. van Criekinge, W. Saeys, S. Truijen et al., “A full-body motion capture gait dataset of 138 able-bodied adults across the life span and 50 stroke survivors,” *Sci Data,* vol. 10, no. 1, pp. 852, 2023.

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