People with Parkinsonism (PD) are at an increased risk of falls due to instability during walking. Impaired interhemispheric communication has been suggested as a cause for decline in dynamic gait stability. Here, we studied the association of genu callosal integrity and measures of dynamic gait stability (Fling et al., 2016).

**Methods**

**Participants**
- 75 people with idiopathic PD (iPD)
  - 28 freezer (iPD+), 47 non-freezer (iPD-)
- 17 people with frontal gait disorder (FGD)
- 33 healthy controls (HC)

**Gait**
- 3 trials at preferred walking speed (8 meter)
- Center of pressure (CoP) was extracted from GAITRite
- Step width, and medio-lateral (ML) margin of stability

**Neuroimaging**
- 3T Siemens Magnetom Tim Trio with a 12-channel head coil
- Genu integrity - assessed via Fractional Anisotropy (FA)

**Figure 1** | Measures of dynamic stability of gait. Center of pressure (CoP), center of mass (CoM) and extrapolated (XcoM) at beginning of single leg support are highlighted as ●, ■, and ◆.

**Figure 2** | Increase in step width is associated with a wider ML margin of stability. People with FGD walk more stable with a larger stride width and increased margin of stability in ML. Marginal kernel density plots of step width and margin of stability ML grouped by participants.

**Figure 3** | Cross-correlation of ML margin of stability and step width. Correlations were strongest during the concurrent (zero-lag) and subsequent step for each of the groups. People with FGD had a more predictable ML stepping pattern, than iPD and HC.

**Figure 4** | Reduced microstructural integrity of the genu is associated with dynamic stability of gait in people with FGD, but not people with iPD and HC subjects.

**Conclusions**

By assuming a wide step width, people with FGD are more stable and less variable while walking than people with iPD or HC subjects with their normal gait width.

Our results highlight the importance of prefrontal interhemispheric communication for lower extremity control in patients with FGD, but not iPD, potentially indicating an increased reliance on cognitive control of gait in those with FGD.

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**Reference**