



Circadian rhythms and stride-to-stride fluctuations: is there a connection?

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INTRODUCTION

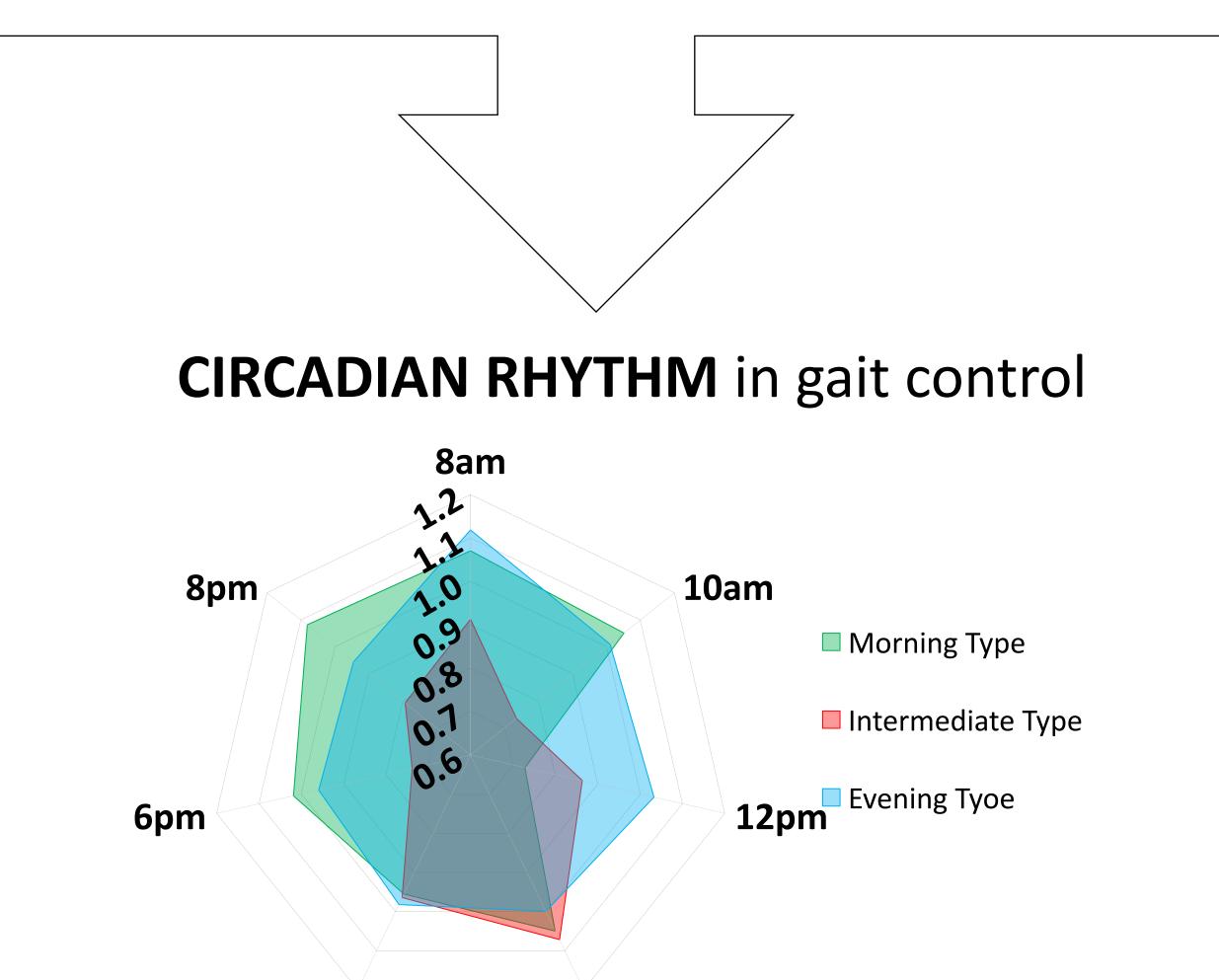
- Physiological systems exhibit rhythmic changes over the course of 24h¹ - Circadian Rhythms.
- A certain cycle emerges for daily fluctuations of the fractal scaling of the stride-to-stride fluctuations.
 (Fig 1, upper panel)
- Aging and neurological diseases have an increased likelihood of circadian disruption.
- Balance and gait exhibit diurnal variations^{2,3}.
- Gait is characterized by stride-to stride fluctuations⁴.
- A breakdown in the temporal structure of these fluctuations has been associated with aging and neurological diseases⁵.
- Circadian disruption may affect the stride-to-stride fluctuations over a 24h period.

The present study aims:

- 1) to investigate how stride-to-stride fluctuations vary throughout a day;
- 2) to examine the effects of chronotype in strideto-stride fluctuations.

METHODS

• Consistency of the linear measures of stride time throughout the day (Fig 1, lower panel)



<u>Subjects</u>:

• Three male participants (28.3±3.89yrs)

Data Collection:

- Chronotype (Morningness-Eveningness Questionnaire).
- 15min overground walking trials at 2h intervals (8am
 - 8pm), wearing insoles footswitches.

Data Analysis:

- Stride time was determined and we have calculated:
 - Mean.
 - Fractal scaling (i.e. temporal structure) was calculated through DFA⁶.

RESULTS & DISCUSSION

Figure 2. Individual daily pattern of α -value of stride time for three participants. Each chronotype seems to show a specific pattern of daily variations.

4pm

Individuals with different chronotypes seem to present a specific pattern of gait variability

2pm

CONCLUSIONS

- Stride-to-stride fluctuations in gait are likely to be influenced by circadian rhythms.
- New insights of a potential increased risk of falling in older adults at specific times of the day that can be targeted of interventions.

REFERENCES

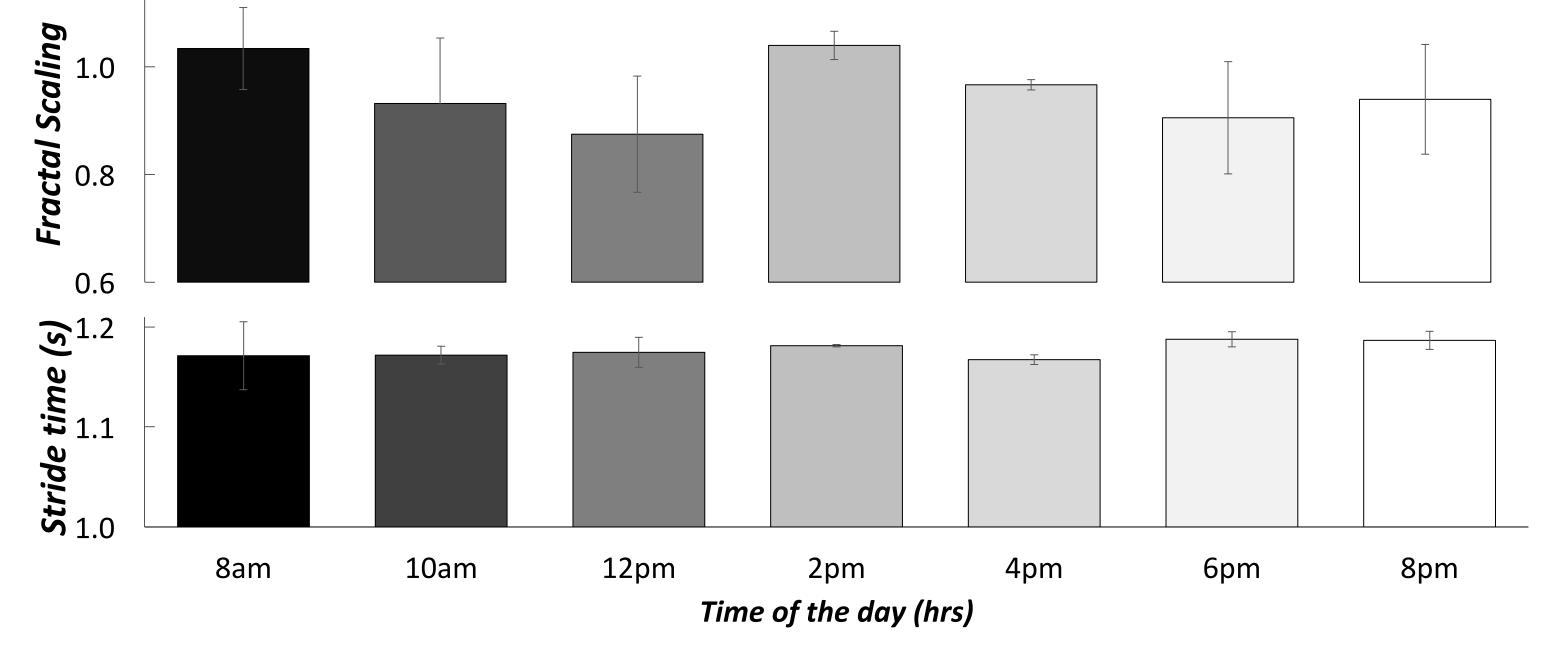


Figure 1. Mean group values of fractal scaling of inter-stride-intervals (upper panel) and stride time (lower panel) throughout the day.

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