

University of Groningen

## Adaptive control of dynamic balance in human walking

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DOI:  
[10.33612/diss.108473590](https://doi.org/10.33612/diss.108473590)

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*Document Version*  
Publisher's PDF, also known as Version of record

*Publication date:*  
2020

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*

Buurke, T. J. W. (2020). *Adaptive control of dynamic balance in human walking*. [Thesis fully internal (DIV), University of Groningen]. University of Groningen. <https://doi.org/10.33612/diss.108473590>

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# PROPOSITIONS

Belonging to the thesis

## ADAPTIVE CONTROL OF DYNAMIC BALANCE IN HUMAN WALKING

Tom J.W. Buurke

Groningen, 20 January 2020

1. Learning to walk is learning to adaptively control dynamic balance. (this thesis)
2. Exploitation of the passive properties of the human body allows for simple and efficient control of dynamic balance during unperturbed walking. (this thesis)
3. Temporal regulation of dynamic balance control is ignored in literature. (this thesis)
4. Although balance assistance may increase short-term walking performance, it may decrease long-term locomotor learning. (this thesis)
5. In experimental setting, problems with adaptive control of dynamic balance during walking may only emerge when participants are challenged or perturbed. (this thesis)
6. Pathologic gait asymmetries may enhance rather than reduce adaptive control of dynamic balance. (this thesis)
7. Given the potential computational power of the human brain, individual muscle control during walking may not be a computational problem at all.
8. *'Build a rocket boys!'* (♪ Elbow – Lippy Kids)

# STELLINGEN

Behorende bij het proefschrift

## ADAPTIVE CONTROL OF DYNAMIC BALANCE IN HUMAN WALKING

Tom J.W. Buurke

Groningen, 20 januari 2020

1. Leren lopen is leren om de dynamische balans adaptief te controleren. (dit proefschrift)
2. Efficiënte en simpele controle van de dynamische balans tijdens onverstoorde lopen is mogelijk door exploitatie van de passieve eigenschappen van het lichaam. (dit proefschrift)
3. Temporele regulatie van dynamische balans controle wordt genegeerd in de literatuur. (dit proefschrift)
4. Hoewel balansondersteuning op korte termijn de loopvaardigheid kan verbeteren, kan het op lange termijn het locomotorisch leren verminderen. (dit proefschrift)
5. In experimentele setting komen problemen met de adaptieve controle van dynamische balans tijdens lopen mogelijk pas naar voren als de proefpersoon wordt uitgedaagd of verstoord. (dit proefschrift)
6. Een asymmetrisch pathologisch looppatroon komt wellicht de adaptieve controle van de dynamische balans ten goede en niet ten slechte. (dit proefschrift)
7. Gezien de potentiële rekenkracht van het menselijk brein vormt individuele aansturing van spieren tijdens lopen wellicht überhaupt geen computationeel probleem.
8. *'Build a rocket boys!'* (♪ Elbow – Lippy kids)