

INFOGRAPHIC: Changes in locomotor performance and postural control in people with hemophilia

FRANCISCO A. TCHONGA¹ | RYAN M. BERNARDES² | NATALIA M. RINALDI²

¹ Eduardo Mondlane University (UEM), Higher School of Sports Sciences, Maputo, Mozambique

² Biomechanical Analysis of Movement Lab (Bio.Mov), Center of Physical Education and Sports, Federal University of Espírito Santo, Vitória, ES, Brazil

Correspondence to: Natalia Madalena Rinaldi
Federal University of Espírito Santo (UFES), Department of Physical Activity, Vitória, ES, Brazil
<https://orcid.org/0000-0001-6125-3843>
email: natalia.rinaldi@ufes.br
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HIGHLIGHTS

- The variables of locomotor performance and postural control are related.
- Prolonged joint and muscle bleeding that develops arthropathy that causes changes in postural control and locomotor performance.
- Rehabilitation prevents bleeding, and improves postural control and performance during walking.

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SUMMARY

Hemophilia is an inherited bleeding disorder characterized by a deficiency of one of the blood clotting factors VIII (hemophilia A) and factor IX (hemophilia B). This disease causes prolonged joint and muscle bleeding that develops arthropathy causes changes, due to degeneration caused by bleeding within the joints. Arthropathy can cause changes in movement control that can compromise the performance of daily activities, compromising the quality of life of these individuals ¹. Therefore, the objective of this article is to describe the main changes in locomotor performance and postural control in people with hemophilia.

Individuals with hemophilia have an altered locomotor pattern, caused by changes in the distribution of force and power during gait, with less propulsion and greater load on the affected joints ¹. Furthermore, there may be a decrease in range of joint movement, especially in the knees and ankles, causing short steps, imbalance and instability that leads the individual to limp while walking due to pain and joint stiffness (claudication) ². These factors are associated with lower muscle activation, inefficient recruitment patterns and/or greater muscle fatigue ^{2,3}.

Postural control involves active control of body alignment in relation to gravity, support surface, visual environment, and internal references. In people with hemophilia, these factors have a greater impact on performance variables, with an increase in the area of oscillation and the speed of the center of pressure, due to proprioceptive losses and automatism ^{2,4}. These changes indicate a reduction in balance control that can impair the performance of daily activities.

Furthermore, hemophiliacs present skeletal misalignments that impact postural changes, causing lordosis (increased curvature of the lumbar spine), kyphosis (increased curvature of the thoracic spine) and shoulder misalignment (asymmetry in the position of the shoulders) ⁴.

In conclusion, rehabilitation, in addition to preventing bleeding, minimizing joint damage and improving locomotor pattern, is also recommended to improve balance and motor coordination during walking ³. Therefore, this process includes specific physical exercises to improve flexibility and proprioception, aiming to improve postural control, locomotor pattern and quality of life.

REFERENCES

1. Putz, P, Durstberger S, Kaufmann C, Klinger M, Plessl K, Rejtö J, et al. 3D gait analysis, haemophilia joint health score, leg muscle laterality and biomarkers of joint damage: A cross-sectional comparative assessment of haemophilic arthropathy. *Haemophilia*. 2020;26(6). doi: 10.1111/hae.14154
2. Cruz-Montecinos C, Carrasco JJ, Guzmán-González B, Soto-Arellano V, Calatayud J, Chimeno-Hernández A, et al. Effects of performing dual tasks on postural sway and postural control complexity in people with haemophilic arthropathy. *Haemophilia*. 2020;26(3). doi: 10.1111/hae.13955
3. Cruz-Montecinos C, Núñez-Cortés R, Vasconcello-Castillo L, Solís-Navarro L, Carrasco-Alonso B, Calatayud J, et al. Exercise capacity in people with haemophilia: A systematic review. *Haemophilia*. 2022;28(6):891–901. doi: 10.1111/hae.14646
4. Santos RS, Figueirôa GR, Machado BA, Mamede CAGS, Gois LML, Silva Junior MCM. Frequency of postural changes in hemophiliacs. *Physiotherapy Research Magazine*. 2018;8(1):24–36. doi: 10.17267/2238-2704rpf.v8i1.1601.

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