

BAYER HEMOPHILIA **AWARDS** PROGRAM



2012/2013 AWARDS CYCLE **APPLICATION GUIDE** HOW TO APPLY TO THE BAYER HEMOPHILIA AWARDS PROGRAM

Early Career Investigator Award: Functional Assessment of Hemophilic Ankle Arthropathy in Children



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Hemophilia is characterized by recurrent joint bleeding episodes, leading to irreversible chronic arthropathy. Advances in replacement therapy have resulted in reduced bleeding frequency and preservation of almost clinically normal joints in children with hemophilia.

However, the ankle joint seems to be an exception to that rule since children with hemophilia still exhibit onset of ankle arthropathy despite regular prophylaxis administration of coagulation factor concentrates. As a consequence the ankle is now the paramount joint affected in patients under 20 years of age suffering from severe hemophilia. The reasons for this reluctant bleeding pattern affecting the ankles are still not understood and should be investigated.

Musculoskeletal outcomes of hemophilic arthropathy have been assessed using clinical and radiological assessment methods. However, as these scores are based on the status of individual joints, they do not integrate the inter-related impact of multiple-joint arthropathy on musculoskeletal function. Furthermore, these scores are generally assessed in a supine position and do not integrate the pain induced by a weight-bearing activity.

In this context, three-dimensional gait analysis (3DGA) allows the objective quantification of motion in patients with hemophilia. It consists of simultaneous analysis of joint kinematic (modelling of joint active movements), kinetic (study of the force interactions of the foot with the ground) and metabolic measurements (calculation of energy consumption) during walking.

I started a PhD thesis in 2008 at the Catholic University of Louvain with the research topic the functional assessment of hemophilic arthropathy by 3DGA. During the past 4 years of combined research and clinical work, I have accumulated data showing that 3DGA is a reproducible

and powerful tool to assess abnormal gait patterns and the effects of disease progression in adult patients with hemophilia but also the impact of conservative orthopedic treatment in patients suffering of ankle arthropathy.

With respect to the pediatric population, preliminary data from our group suggest that specific gait variables are impaired in clinically asymptomatic children with previous history of joint bleeds. In a second project, our observations of alterations of the rheological properties of muscles in children with hemophilia support the hypothesis that despite intensive replacement treatment,

subclinical changes may affect not only the joint itself but also the surrounding soft tissues.

In this context, development of sensitive assessment tools appears critical to evaluate the integrity of not only articular but also extra-articular structures in patients with hemophilia. To further complement this research work, we intend to conduct an ambitious multicentric study to better understand the biomechanical consequences and adaptations of ankle

arthropathy in children. This project aims to explore several aspects of ankle function (visco-elastic properties of muscles as well as motion of the small joints of the foot) that have never been explored before. We also intend to compare this functional assessment with a thorough radiological evaluation by magnetic resonance imaging and ultrasound.

This project will be conducted in the frame of a post-doctoral fellowship at the Faculty of Human Movement Sciences of the Katholiek University of Leuven, Belgium.

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