

The emerging clinical and scientific role of the physiotherapist in haemophilia care

The predominance of joint and muscle bleeding in people with haemophilia means that the consequences of the disorder are mainly musculoskeletal.¹ These consequences impact on physical function of upper and lower limbs which in turn limits an individual's ability to perform daily tasks as well as participate fully in all areas of life. In the past decade, there has been a rapid and unprecedented increase in the available medical treatment options for haemophilia, including extended half-life clotting factor concentrates, non-replacement therapies such as Emicizumab and gene therapy.² These advances are likely to enable people with haemophilia with and without inhibitor the potential to lead a more active lifestyle with enhanced physical function as well as lowering bleeding frequency. The subsequent reduction in bleeding frequency may result in more subtle and less clinically evident early signs of arthropathic change. As a consequence, it is very likely that the measurement of the annual bleeding rate will no longer be a sensitive tool for measuring the effectiveness of treatments.

Due to the complexity of managing haemophilia, guidelines on the care of the condition recommend that those with the disorder should have ready access to a range of services provided by a multidisciplinary team of specialists including availability of a physiotherapy service.³⁻⁵ Appropriate haemophilia management and assessment requires great expertise equally covering both haemostasis and musculoskeletal assessment. This is why combined management of haemophilia by both specialized haematologists and physiotherapists is crucial for effective care. Much more than a simple shared expertise, a real collaboration between these two experts should ideally take place during the same consultation time and assessment of each patient. With the arrival of new therapies, the physiotherapist must now have a good understanding of the administration of new treatment options, their mechanisms of action, their pharmacokinetics, their practical advantages and weaknesses.

Physiotherapy is directed towards the movement needs and potential of individuals. They provide rehabilitation to develop, maintain and restore maximum movement and functional ability and prevent musculoskeletal impairment throughout the lifespan.⁶ Due to their specialized knowledge of the musculoskeletal system and its rehabilitation, the physiotherapist plays an important role in ensuring people with haemophilia achieve and maintain optimum functioning and prevent and slow the rate of functional loss. A recent pan-European survey by the European Association for Haemophilia and Allied Disorders (EAHAD) Physiotherapy Committee found a wide range of assessment methods and therapeutic treatments

utilized by physiotherapists.⁷ This is supported by the increase in peer-reviewed publications reporting either musculoskeletal impairments or interventions to improve or maintain optimum functioning in people with haemophilia.

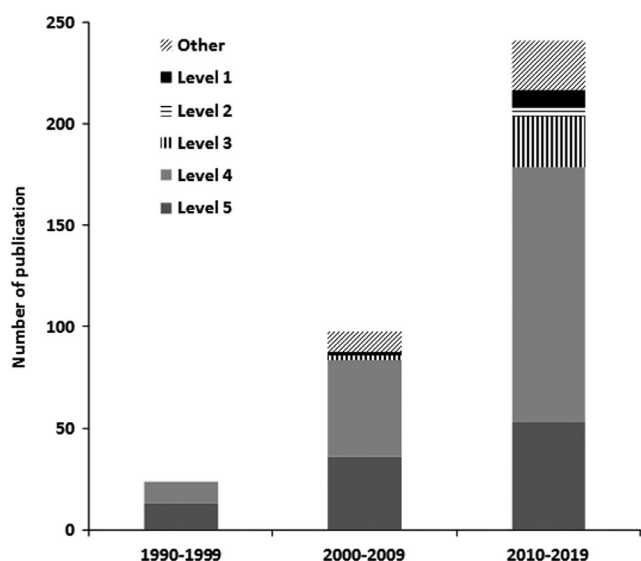
A search of the MEDLINE/PubMed, EMBASE and CINAHL search engines for the physical function impairments of the musculoskeletal system over the past 30 years found an exponential increase in publications relating to the impact of haemophilia on musculoskeletal function. Utilizing the search terms listed in Search 1 of Figure 1, 241 peer-reviewed papers were published in the past 10 years, 2010-2019 (See Figure 2). This was an exponential increase from the previous two decades when 24 (1990-1999) and 98 (2000-2009) were published. Not only has there been an increase in the quantity of publications, the quality of papers also improved when assessed using the Oxford Centre for Evidence-Based Medicine, 2011 Levels of Evidence.⁸ From 1990-1999, more than half the publications were mechanism-based reasoning or opinion papers (level 5) with no systematic reviews, randomized or robust cohort follow-up studies (levels 1-3). However, in the past ten years, mechanism-based reasoning or opinion papers accounted for 20% of publications with a focus on exercise, sport and outcome measurements. One in six publications comprised Level 1-3 evidence and a further 10% evaluated psychometric properties of various outcome measures.

To date, evidence for the musculoskeletal benefits of new treatment options for haemophilia is yet to be determined. A better understanding of the impact of haemophilia on musculoskeletal function provides a basis for addressing key challenges faced by clinicians monitoring musculoskeletal outcomes of people with haemophilia, in particular those treated with new treatment options. The integration of emerging tools and technology such as gait and motion analysis, performance-based function tests, physical activity devices, patient-reported activity and patient-reported participation scores it is often conducted by physiotherapists trained in these new technologies and assessment methods.

Optimizing or maintaining healthy joints and muscles can be achieved with a major input from physiotherapist. A search of the MEDLINE/PubMed, EMBASE and CINAHL search engines for studies evaluating the effect of physiotherapy and rehabilitation on musculoskeletal function over the past 30 years also found an exponential increase in publications. Utilizing the search terms listed in search 2 of Figure 1, 84 papers published in the past 10 years, 2010-2019 (See Figure 3) were found. This was an exponential increase from the previous two decades when only 8 (1990-1999)

FIGURE 1 Search strategy of terms for all databases

Search 1	Search 2
#1 (exp. Hemophilia A).ti,ab,me	#1 (exp. Hemophilia A).ti,ab,me
#2 (exp. Hemophilia B).ti,ab,me	#2 (exp. Hemophilia B).ti,ab,me
#3 (exp. von Willebrand Diseases).ti,ab,me	#3 (exp. von Willebrand Diseases).ti,ab,me
#4 (haemoph*).ti,ab	#4 (haemoph*).ti,ab
#5 (hemoph*).ti,ab	#5 (hemoph*).ti,ab
#6 1 OR 2 OR 3 OR 4 OR 5	#6 1 OR 2 OR 3 OR 4 OR 5
#7 (exp. Musculoskeletal and Neural Physiological Phenomena).ti,ab,me	#7 (exp. physical therapy modalities).ti,ab,me
#8 (exp. Physical examination). ti,ab,me	#8 (rehabilitation).ti,ab,me
#9 (exp. Sensation).ti,ab,me	#9 (exercis*).ti,ab,me
#10 (exp. human activities). ti,ab,me	#10 (cryotherapy).ti,ab,me
#11 (movement).ti,ab	#11 (pain).ti,ab,me
#12 (locomotion).ti,ab	#12 (laser therapy).ti,ab,me
#13 (motor activity).ti,ab	#13 (magnetic therapy).ti,ab,me
#14 (biomech*).ti,ab	#14 (patient education).ti,ab,me
#15 (muscle*).ti,ab	#15 (physical*).ti,ab
#16 (musculoskeletal*).ti,ab	#16 (physio*).ti,ab
#17 (physical*).ti,ab	#17 (therap*).ti,ab
#18 (gait*).ti,ab	#18 (rehab*).ti,ab
#19 (walk*).ti,ab	#19 (hydro*).ti,ab
#20 (postur*).ti,ab	#20 (electric*).ti,ab
#21 (range of motion).ti,ab	#21 (manipulation).ti,ab
#22 (pain*).ti,ab	#22 (musc*).ti,ab
#23 (arthralgia).ti,ab	#23 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20 OR 21 OR 22
#24 (proprioception).ti,ab	#24 6 AND 23
#25 (kinesthesia).ti,ab	
#26 (exerc*).ti,ab	
#27 (psychomotor).ti,ab	
#28 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20 OR 21 OR 22 OR 23 OR 24 OR 25 OR 26 OR 27	Other search limitations 1990-1999, 2000-2009, 2010-2019 English language only No conference abstracts
#29 6 AND 28	
Other search limitations 1990-1999, 2000-2009, 2010-2019 English language only No conference abstracts	

**FIGURE 2** Number of publications relating to the impact of haemophilia on musculoskeletal function in the past 30 y

and 22 (2000-2009) were published. During 1990-2010, almost all publications were Level four or five evidence. In the past 10 years, nearly a quarter of publications have been categorized as level one

or two evidence with 18 randomized controlled trials, one Cochrane systematic review and one umbrella review. Efficacy of electrotherapy modalities (three studies), manual therapy (three studies), sports therapy and exercise (eight studies) and patient education (three studies) has been evaluated in randomized controlled trials suggesting an increasing evidence base for inclusion of physiotherapy in the comprehensive care of people with haemophilia. Despite the recent increase in evidence for clinical efficacy of physiotherapy interventions and rehabilitation, there is a need for more well-designed randomized clinical studies with larger numbers of participants. As individuals do not have uniform outcomes, randomized trials utilizing a concurrent control group and the random assignment of treatments are critical to drawing valid conclusions about treatment effects. As transfer of knowledge of evidence-based clinical practice to physiotherapists appears best achieved through face-to-face multi-session training, inclusive of case studies and practical tools,⁹ collaborative networks like the European Association for Haemophilia and Allied Disorders Physiotherapy Network will be important in facilitating the emerging clinical and scientific role of the physiotherapist in haemophilia care.

The purpose of this letter is to draw attention to the emerging role of physiotherapists in haemophilia musculoskeletal care and

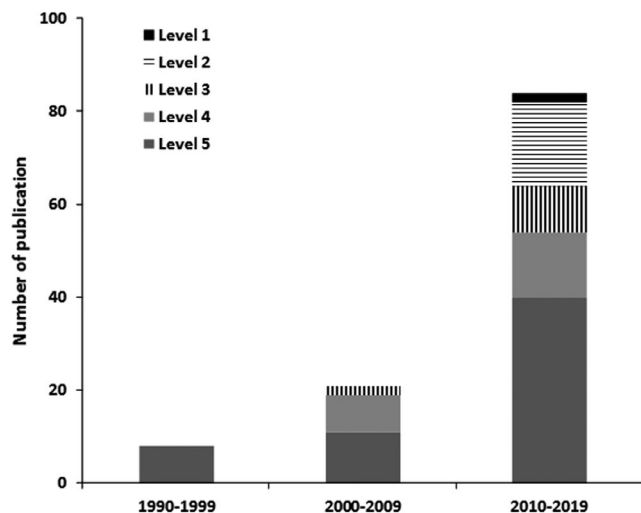


FIGURE 3 Number of publications evaluating the effect of physiotherapy or rehabilitation on musculoskeletal function over the past 30 y

research. Physiotherapists undoubtedly play a crucial role in haemophilia care, providing key contributions to standardized musculoskeletal assessment, rehabilitation and treatment for patients with established arthropathy, as well as following surgery and major musculoskeletal bleeding. Furthermore, physiotherapists educate patients and parents regarding non-haematological treatment of bleeding episodes, provide advice about physical activities and sport practice, advise orthotic prescription, contribute to research, and work in close collaboration with orthopaedic surgeons to identify ideal candidates for surgical interventions.

In spite of increasingly effective treatments providing a better bleeding control and possibly a cure of haemophilia, the need for expert physiotherapist will remain. Physiotherapists will indeed keep supporting current generation of patients with established arthropathy to transition to new treatments. For the next generations of haemophilia patients, physiotherapists will provide valuable guidance to preserve the joints and conduct regular assessment to demonstrate their integrity.

Given these specialized skills, a combined haemophilia-physiotherapy approach should be highly encouraged, along with international networks like the European Association for Haemophilia and Allied Disorders Physiotherapy Committee and the World Federation of Haemophilia Musculoskeletal Committee to support collaboration, research and education for physiotherapists working in haemophilia.

DISCLOSURES

The authors stated that they had no interests which might be perceived as posing a conflict or bias.

Sébastien Lobet^{1,2,3}
 Cedric Hermans¹
 David Stephensen⁴

¹Service d'hématologie, Cliniques universitaires saint-Luc, UCLouvain, Bruxelles, Belgium

²Service de kinésithérapie, Cliniques Universitaires Saint-Luc, Brussels, Belgium

³Université catholique de Louvain, Secteur des Sciences de la Santé, Institut de Recherche Expérimentale et Clinique, Neuromusculoskeletal Lab (NMSK), Brussels, Belgium

⁴Kent Haemophilia Centre, Kent and Canterbury Hospital, Canterbury, UK

Correspondence

Sébastien Lobet, Service d'hématologie, Cliniques Universitaires Saint-Luc, Université catholique de Louvain, Bruxelles, Belgium, Belgium.
 Email: sebastien.lobet@uclouvain.be

ORCID

Sébastien Lobet <https://orcid.org/0000-0002-3829-6850>

Cedric Hermans <https://orcid.org/0000-0001-5429-8437>

David Stephensen <https://orcid.org/0000-0002-6175-3343>

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