

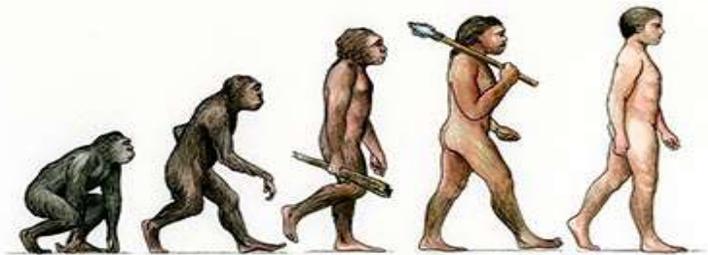
# THE BIG LITTLE NEWSLETTER FOR THE STUDY ON THE PREVENTION OF CARDIOVASCULAR DISEASE AND TYPE 2 DIABETES IN CHILDREN AND ADOLESCENTS

## Walking, not so easy!

At each visit, an accelerometer is given to participants of QUALITY. This accelerometer is put at the waist and measures the number of steps made in one day. This equipment allowed researchers to analyse the collected information and to measure the mean distance covered by a participant in one day. Before showing the results of the first two visits, here is a brief summary of walking, this activity perceived as so easy!

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Walking is a type of transportation used by all four-legged animals. However, the human is different since he is able to move with only his lower members which is called the bipedality. This has appeared several million years ago in a much more hostile environment. At that time, moving by using only his legs was not a priori efficient since it reduced the maximum speed that can be achieved in dangerous situations. Moreover, the stability was decreasing and the energy expenditure was increasing, with the consequence that more food was needed to survive.

The anthropologists who study this phenomenon do not agree on the reason that motivates ancestors to release their arms. Some of them think that these individuals have adopted the two-legged style in order to manipulate tools while walking. Nowadays, walking is almost as natural as breath or blink.



This facility to move with our legs is explained by million of years of practice and perfectionism. Walking can be seen as easy but it is in fact a very complicated activity.

When walking, the brain is constantly informed of environmental variations, be it the walk speed or the ground inclination. The sensors that are used are mainly the visual system (eyes), the vestibular system (located inside the ear) and the somatosensory system (skin). When the brain receives this information, it analyses it rapidly and sends back what is necessary to correct the posture, to control the speed or, if it detects a potential risk, to stop completely. Moreover, to keep balance, the brain must also analyse the gravity that is applied on the body and adjust the posture to avoid a fall.



## Our collaborators : Yannick Charron and Marie-Ève Mathieu



The content of this journal edition is provided by Yannick Charron, student in Kinesiology and Marie-Ève Mathieu, professor and researcher at the Department of Kinesiology of the University of Montreal. They present several data of the QUALITY study.

	Number of steps per day	Maximal number of steps per day	Step length	Total distance per day
Visit 1	13 091	27 458	50.2 cm	6.6 km
Visit 2	11 849	31 321	52.5 cm	6.2 km

Here are the results of a typical day of the first two visits of the QUALITY study. At the first visit, participants were aged between 8 and 10 years and at the second visit, between 10 and 12 years. The mean number of steps has decreased between the two visits, from 13,091 to 11,849. Since the step length has increased, the effect of the number decrease does not affect much the total distance.

Some studies suggest that a number of steps equal or greater than 11,000 in girls and 13,000 in boys could promote their health. Since it is too early to conclude anything, the best strategy is to increase the number of steps by taking the stairs instead of escalator and walking instead of taking the bus, when it is possible. Moreover, it is important to practice sports and physical activities on a regular basis.



### Do you know that?

Specialists of biomechanics are experts in body movement. During their work, they are involved in different areas such as robotics, dance and high performance sport such as diving, martial arts or synchronized swimming.

### Do you know that?

Since many years, scientists have tried to conceive robots able to walk and run like humans. Although science evolves very quickly, they still have difficulty to design robots running more than 9 km/h because of too complicated calculations!



## Transportation history within generation

Have you ever thought of the distance easy to cover by yourself? And when you were 8 years old, how long were you able to walk by yourself? In 2007, the journal Daily Mail has illustrated the distance covered by each member of a family at 8 years old.



By looking at this picture, you easily conclude that the distance covered by the members of this family is decreasing from generation to generation.

We have used the same approach with 2 members of the research team and their family.

### Family A :

**Grandfather:** Aged of 8 years in 1942, had the permission to walk up to 3 km on familial farm.

**Mother:** Aged of 8 years in 1969, had the permission to walk to school which is located at 800 m from home.

**Daughter:** Aged of 8 years in 1996, walked 350 m to school by herself.

### Family B :

**Great grandmother:** Aged of 8 years in 1932, could walk to the school located at 750 m from home.

**Grandmother:** Aged of 8 years in 1958, had the permission to walk to her grandmother at 2.2 km.

**Mother:** Aged of 8 years in 1985, walked 950 m by herself to her caretaker.

**Son:** Aged of 8 years in 2011, could walk by himself to the park located at 450 m from home.

**Is it the case in your family?** Do the test at home by comparing the habits of different generations of your family. Which is the distance that everyone had the permission to walk by himself at 8 years old? What are the reasons explaining the difference between the distance covered by each family member?

## Walking, an example of endurance!

As you can see, walking is not a simple activity. In certain cases, walking can be considered as a performance sport. In fact, walking is an official event of the Olympic Games and several international competitions are held worldwide.

Besides the Walking World Cup, which is held once every two years, a competition is particularly characterized by the total distance reached by participants that can exceed 450 kilometers in some years!

This is the Paris-Colmar event, held annually in France. In men, the winner in 2013 walked 436.4 km in 54 hours and 11 minutes. In women, the winner walked 308.1 km in 40 hours and 28 minutes. And you, do you think being able to walk (and not to run) at about 9 km per hour during two days non-stop?



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