Lower limb amputation induces a reduction of patient’s autonomy in their everyday life activity. Even if prosthetic design and rehabilitation procedure are always in progress, the functional outcome for people with amputation should nevertheless be improved. Indeed, nowadays, an important number of patients find well-adapted solutions for level walking among the offer of prosthetic devices. But, they described some situations as limiting for their locomotion: stairs, slopes and cross slopes are often cited. Not only are these limitations due to the prosthetic components functionalities but also to difficulties in optimally using these prostheses lacking a specific rehabilitation process. Finally, it is clear that, dealing with gait biomechanics of people with amputation, the points of view of both the clinician and the engineer cannot be dissociated.

In the literature, an important number of authors investigated the gait of people with amputation but clinical and biomechanical analyses were not often confronted. Besides, a lot of studies were designed for level walking analysis. Studies on the locomotion in situations as stairs, slopes and cross slopes were often cited. Not only are these situations of particular interest in a domain where the progresses of the patients are due to both the technology and the rehabilitation contributions.

The present communication will aim at demonstrating that the biomechanical study of the locomotion of people with amputation necessitates taking into account simultaneously the different situations these people have to cope with in their daily living. We also want to show the importance of a permanent exchange between the clinician and the engineer in order to realize an efficient analysis of the biomechanical quantitative results of gait analysis. This is particularly true in a domain where the progresses of the patient are due to both the technology and the rehabilitation contributions.