

fréquents étaient le confort, l'efficacité, la solidité et la facilité d'utilisation. L'analyse vidéo montre que la correction du recurvatum est meilleure avec l'attelle dynamique comparativement à l'orthèse préformée.

Conclusion.– Dans une population de patients hémiparétiques marchant au stade chronique, avec recurvatum du genou, l'orthèse dynamique surbaissée améliore la qualité de la marche comparativement à une orthèse préformée et est associée à une satisfaction élevée des patients.

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English version

CO31-001-e

Gait analysis of amputee people

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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 slopes, stairs or cross slopes were not so frequent. More and more teams have now been interested in the locomotion in these situations but often have taken only one situation isolated from the others.

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.

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The bouncing mechanism of running in a transfemoral amputee wearing a blade prosthesis

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Standing posture and gait initiation of hip-disarticulated amputee

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Keywords: Amputee; Hip-disarticulation; Posture; Gait initiation; Prosthesis
Objective.– To assess, for the first time, postural and gait initiation strategies of hip-disarticulated amputees (HDA) using a Canadian-type prosthesis, in order to better understand the rehabilitation difficulties for this population.

Material and methods.– Three HDA wearing a prosthesis composed of a C-Leg knee and a 7E7 exoprosthetic hip and independent for daily living activities, and 19 healthy adults performed a standing postural task and a gait initiation task with the right and left limb moving forward first. The main outcome measures obtained with an AMTI force platform were the center of foot pressure sway during posture, the duration of the gait initiation phases, and the maximal ground reaction forces during gait initiation.

Results.– As compared to healthy participants HDA showed an altered balance in the anteroposterior direction but not in the mediolateral direction. HDA initiated gait more slowly than healthy participants, mainly due to a reduced forward propulsion during the postural adjustments phase. The maximal lateral peak at toe-off was greater in HDA than in healthy subjects, mainly when moving the sound limb forward first. During gait initiation, HDA spent more time in one-leg balance on the sound limb as compared to the prosthesis and the healthy participant.

Discussion.– Gait initiation is the transition from standing posture to steady-speed walking and requires effective postural and propulsive skills. The present results were consistent with previous studies in below- and above-knee amputees and underlined the critical role of the ankle in these two tasks for controlling body motion and for force production during standing posture and gait initiation. The absence of hip muscles in HDA led to an increased and dangerous lateral body-weight transfer when initiating gait with the sound limb and to difficulties for one-leg standing and forward displacement of the prosthesis. As a result, initiating gait with the prosthesis moving forward first is safer for the HDA even though this strategy is slower than when moving forward the sound limb first. These first results show that the gait initiation with prosthesis is a complex task for hip-disarticulated patients.

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Foot biomechanical modeling to study orthoses influence

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Mechanical assessment of knee orthoses: Finite element modeling. Preliminary data

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