

C-Leg in limited community ambulators

Activity, Mobility, Activities of daily living (ADLs)

Major Findings

With C-Leg and C-Leg Compact compared to NMPKs:

→ Improvements in daily activity performance

Standing activities requiring adequate balance were performed 11% faster with C-Leg and 7.7% faster with C-Leg Compact

Difficulty of performing activities requiring sitting down and standing up decreased by 33% with C-Leg

Difficulty of performing activities depending heavily on patient's prosthesis-related skills decreased by 30% with C-Leg

→ Improvements in mobility

90% of subjects improved in perceived safety

90% of subjects improved in variation of waking velocities

74% of subjects improved in cognitive tasks

68% of subjects reduced their effort to walk

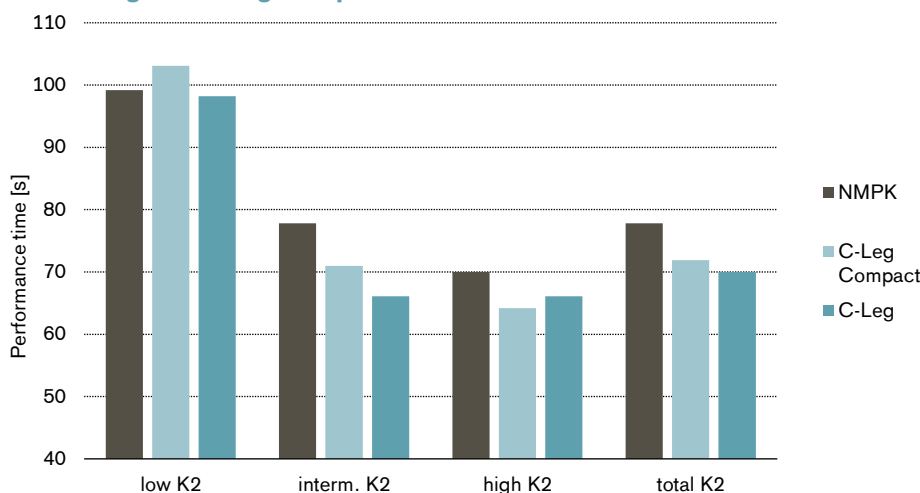
58% of subjects improved in unloading of the intact limb

→ About 50% of subjects improved to MFCL K3

→ Activity

Subjects spent significantly less time sitting ($p = 0.01$) and increased the amount of upright activity ($p = 0.02$).

Time required to complete standing activities decreased with C-Leg and C-Leg Compact



Standing activities requiring an adequate degree of balance included supermarket (easy, moderate, difficult), shopping bags, kitchen cabinets and hanging laundry. The subgroups low, intermediate and high were determined based on self-selected walking speed, total activity level and additional clinical information about the participant (e.g. past medical history, psychosocial status and current physical condition). (Theeven et al. 2011)

Clinical Relevance

Activity and mobility are assessed to get an insight into general independence of amputees. An increased grade of mobility is crucial to reach a satisfying quality of life. Activities of daily living (ADLs) include self-care activities such as functional

mobility, dressing, eating and personal hygiene as well as activities to individual live independently in a community as shopping, housework and transportation. Tools such as step monitors may be used to measure overall activity of study participants. The MFCL (Medicare Functional Classification Level) gives information about the ambulation skills of a patient and can be assessed subjectively.

Summary

The assessment of daily activity performance in transfemoral amputees test (ADAPT) is divided in three subsets: standing activities, activities requiring sitting down and standing up, and activities depending heavily on patient's prosthesis-related skills. Theeven et al. investigated activities of daily living (ADLs) by applying the ADAPT. K2 subjects were split in three groups (low, intermediate and high) depending on the self-selected walking speed, total activity level and additional clinical information about the participant. Regarding the transition from NMPKs to C-Leg, the highest improvements were found in intermediate K2 subjects; time to complete standing activities decreased by 14% and time to complete activities requiring sitting down and standing up decreased by 8.3%. High K2 subjects reduced the time required to complete standing activities with C-Leg compared to NMPKs by 6.4%. Regarding the total K2 group, the perceived difficulty to perform activities requiring sitting down and standing decreased by 33% and difficulty to perform activities depending heavily on patient's prosthesis related skills decreased by 30% with C-Leg compared to NMPKs. Furthermore, time required to complete standing activities decreased with C-Leg by 11%. Regarding C-Leg Compact, high K2 subjects profited the most from the transition from NMPKs to C-Leg Compact. Time to complete standing activities decreased by 8.5% and time to complete activities depending heavily on patient's prosthesis-related skills decreased by 12% with C-Leg Compact compared to NMPKs in high K2 subjects. For the total K2 group, time required to complete standing activities decreased by 7.7% with C-Leg Compact compared to NMPKs (Theeven et al. 2011).

Changes in mobility due to transition from NMPKs to C-Leg were assessed by patient interviews. It was found that the major improvements differ between mobility grades. K2 subjects profit mainly in the domains safety, unloading of the intact limb, cognitive tasks and reduced effort to walk (Wetz et al. 2005). A similar study was published by Drerup et al. (2008). They confirmed that the major benefit of C-Leg for K2 subjects is found in perceived safety (improved in 90% of subjects). Additionally, 90% of K2 subjects profit from C-Leg compared to NMPKs regarding improved variation of walking velocity.

44% to 50% of subjects improved their mobility grade from K2 to K3 due to transition from a NMPK to C-Leg (Kahle et al. 2008, Hafner et al. 2009, Kannenberg et al. 2014, Hahn et al. 2015, Jayamaran et al. 2021, Hahn et al. 2021).

Kaufman et al. investigated that the time sitting decreased significantly while the time being active increased simultaneously for users changing from an NMPK to an MPK like C-leg. (Kaufman et al. 2018) In addition the Amputee Mobility Predictor was significantly increased in MPK users (C-Leg and other MPKs) compared to NMPK users. (Davie-Smith et Carse 2021) Overall the activity of subjects (PEQ values) improved in 78% of subjects while using C-Leg (Jayamaran et al. 2021)

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