CHANGES IN LOCOMOTION PERFORMANCE AFTER TOTAL KNEE ARTHROPLASTY (TKA) – PRELIMINARY RESULTS
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Introduction
Knee osteoarthritis is one of the most common reasons for walking impairments. If conservative treatment is not successful, joint replacement may be required in order to reduce pain and enhance locomotion performance as well as quality of life. Functional outcome after TKA is usually assessed indirectly with questionnaires in which are known to cause subjective and cognitive limitations [1]. Thus, little is known about how the patients’ activity level develops after total knee arthroplasty.

Methods
Physical activity of 40 subjects suffering from knee osteoarthritis was monitored before surgery and 3, 6 and 12 months after knee replacement. Currently, six-month data is available for 18 subjects (mean age 67±7 years; we expect >25 subjects in 06.2007).

One device (DynaPort ADL-monitor) measured the time spent in locomotion, standing, sitting and lying as well as the movement intensity during the waking hours of one day [2]. The second device (Step-Activity-Monitor) collected the number of gait cycles for one week in 1-minute-intervals [3].

Results
The time spent in locomotion increased from 8.1% (pre-op, n=21) to 9.4% (n=18), 9.6% (n=14) and 11.5% (3, 6 and 12 months post-op, respectively).

Before surgery, the subjects took an average of 4783 gait cycles per day. At follow-up, the number of gait cycles per day developed from initially 4702 to 5336 and 6569 gait cycles per day (+37%, n=10).

Nearly 75% of the gait cycles were executed with a low intensity (between 1 – 20 gait cycles per minute). High intensity activities (>40 gait cycles/minute) were performed in 6% of the recording time.

Discussion
Six months after surgery, TKA patients already appeared slightly more active (1.95 million gait cycles per year) than patients with well-functioning hip replacements (1.9 million gait cycles/y, [3]). Twelve months after surgery, the patients reached a similar number of gait cycles per day (2.40 million) compared to healthy adults [4]. The time spent in locomotion was nearly identical to healthy adults, but patients walk with lower intensities than healthy adults. Thus, the recovery process after knee replacement takes six months to one year, considering normal values as an acceptable endpoint for rehabilitation. For wear testing of prostheses 2 million gait cycles should be considered as representative for overall loading during one year.

References

Keywords: Osteoarthritis, Physical Activity, Knee