The recent improvements in treatment outcomes of childhood acute lymphoblastic leukemia (ALL) has led to survival rate as high as 85 %. However, the treatment contains neurotoxic agents that may interfere with neuromuscular health causing muscle atrophy and peripheral neuropathy mostly in lower limbs. These impairments may interfere walking, the fundamental of human locomotion.

The aim of the study was to describe the characteristics of gait pattern and plantar pressure of the childhood ALL survivors and to test the feasibility of computer aided clinical gait analysis as a measure for physical function. Three computer aided gait analysis instruments were used to assess seven (n =7) eligible childhood ALL survivors aged 10–15 years, after the cessation of cancer therapy. The spatiotemporal variables of gait were detected using the GAITRite system. Two distal lower leg muscles were selected for surface electromyography to indicate the timing and intensity of muscle activation during walking. The plantar pressure was detected in upright standing position using RSScan FootScan system. The data was compared with normative reference values of the age group.

The ALL survivors’ spatiotemporary gait variables were different from the age matched reference values in the area of gait phases. The stance phase was 5.7 % shorter and double support phases were 26 % shorter from the age matched reference values. There were no differences in the other tested spatiotemporary gait variables. The electromyography of ankle muscles showed incorrect activation timing and high variability of the intensity. Some of the total contact areas of plantar pressure were enlarged and plantar pressure was high in the heel and on the medial area of midfoot at standing.

These findings suggest that computer aided gait analysis and plantar pressure measurement are feasible and informative as measures for physical function of young ALL survivors. The findings may refer to foot pathologies and ankle dysfunction that can cause difficulties in basic physical function and may lead to further musculoskeletal disorders. The importance of function of lower limb and feet should be paid respect in the multidiscipline aftercare of ALL survivors.

Keywords: childhood cancer, acute lymphoblastic leukemia, physical function, gait analysis, plantar pressure