PURPOSE: The aim of this study was the development of a simple procedure to calculate functional kinetic parameters from the plantar pressure distribution measurement which is used in many orthopaedic practices and clinics as a standard measurement device. The special purpose is the comparison of functional parameters between datasets taken before and after a surgical operation, for example the correction of a hallux valgus.

METHOD: In the gait laboratory, pressure distribution measurements were recorded from healthy test subjects and patients with different foot diseases. The test subjects walked barefoot over the measurement plate which is integrated in a gangway. The device records a "movie" of the pressure distribution in the unrolling of the foot. It takes 72 pressure distribution pictures per second. By integrating the pressure over all segmental areas, i.e., pressure distribution picture for pressure distribution picture, the temporal progress of the total ground force can be calculated. By integration of the pressure only over a certain part of the foot, the ground force on that certain anatomic structure can be calculated, for example, the ground reaction force upon then hallux. By integration of the pressure over the same segmental areas considering their lever distance to the axes of the ankle joint, the external joint moment can be calculated. For this, the musculature of the lower leg must generate an internal moment, which
RESULTS: In the case of a correction of a hallux valgus, the percentage of the total external moment with regard to the upper ankle joint can be measured which is taken on by the hallux and metatarsal I. This allows us to verify a functional improvement through the operative treatment. With patients after one-sided injuries of the foot and ankle joints, the functional success of a treatment can be quantified by means of a comparison of sides, for example, after a fracture of the calcaneus. CONCLUSION: The determination of muscular ankle joint moments from the pressure distribution measurement improves the objectivity when reviewing the functional success of a therapy in different orthopaedic or surgical interventions at the foot and ankle joint.