Children with spastic cerebral palsy often have problems with walking. For example, excessive knee flexion in the stance phase of gait can increase the effort to walk. Ankle foot orthoses might improve this, but scientific evidence for their effectiveness is scarce and shows limited support. We hypothesized that this is partly caused by an inadequate match between the patient’s impairments and the ankle foot orthoses’ mechanical properties. The studies in this thesis aimed to evaluate factors that enable an individual optimization of ankle foot orthoses to match the patients’ impairments. To this respect, the effects of different ankle foot orthoses stiffness levels on gait were evaluated in children with cerebral palsy who walk with excessive knee flexion in stance. In addition, effects of the ankle foot orthosis’ alignment, and acclimatization to a newly prescribed orthosis were assessed. Results of our studies emphasize an individual approach to ankle foot orthosis prescription to maximize treatment efficacy.