In addition to social communication difficulties, individuals with an autism spectrum disorder (ASD) frequently experience problems in other domains such as motor control and learning. The goal of the current study was to better understand ASD-related differences in motor learning. We isolated and examined the ballistic and corrective submovements associated with learning of a rapid aimed limb movement in a sample of children with ASD and a matched comparison group of typically developing children without ASD. The overall rate of motor learning did not differ significantly between groups. Analysis of movement subcomponents, however, revealed significant group differences. These findings support the hypothesis that, while motor learning per se is not impaired in ASD, individuals with ASD utilized different strategies in motor learning.