The family Syngnathidae (Gasterosteiformes) encompasses pipefishes and seahorses, which are characterized by an elongated snout with small terminal jaws. These fishes are extremely fast suction feeders, with a feeding strike consisting of a rapid neurocranial elevation accompanied by an equally rapid retraction of the hyoid. Within the family, there is a large diversity in snout phenotype, with variation in both snout length and diameter. A long and narrow snout is thought to increase the flow rate of the incoming water and should allow prey to be captured from a greater distance. However, it also limits prey size, increases the moment of inertia during snout rotation and probably results in higher friction because of viscous forces becoming more important. It can be expected that there will also be some variation in cranial anatomy between long and short snouted syngnathid species. The snout elongation will have an effect on the working line of the jaw opening and closing muscles and this could be related to altered attachment sites of these muscles to ensure optimal performance. Additionally, the articularions of the lower jaw and the hyoid with the suspensorium are expected to be firmer in long snouted species as higher forces are necessary. We test these hypotheses by giving a detailed morphological description of the feeding apparatus of some seahorse and pipefish species with varying snout lengths. Special attention is paid to the lever systems involved in suction feeding, such as the ligament and tendon attachments and articularions between the moveable units.