An appreciation of the usefulness of reptiles as model organisms to study regulatory physiology of the gastrointestinal system is increasing. In contrast to most mammals, that generally eat relatively small meals at frequent intervals, many carnivorous reptiles consume extremely large meals infrequently. Thus, the regulatory responses to feeding can be very pronounced in reptiles compared to mammals. Furthermore, reptiles do not provoke the same level of controversy surrounding animal research that mammals do. Recent research on the reptilian gastrointestinal system has focused on responses to feeding that occur in the lower gastrointestinal tract. Relatively little recent work has examined the upper GI tract. For these reasons, we undertook a study of esophageal structure and function in the American alligator. Five juvenile American alligators, (Alligator mississippiensis) weighing 0.431 + 0.09 kg (S.E.M.) were studied. Pressure was measured at 22 C along the esophagus. Peristaltic waves had a speed of 206.815 + 4.1 (S.E.M.) (by the equation v = d/t). Furthermore, we found a high-pressure zone of the esophagus located cephalad to the stomach, which indicated the presence of a lower esophageal sphincter. Histology analyses of the longitudinal sections of the esophagus revealed the presence of cilia, similar to that of the respiratory of mammals. There was no striated muscle present, but we did see the expected muscularis mucosa, a myenteric nerve plexus, mucus secreting goblet cells, a cuboidal epithelial layer and evidence of an enteric nervous system.