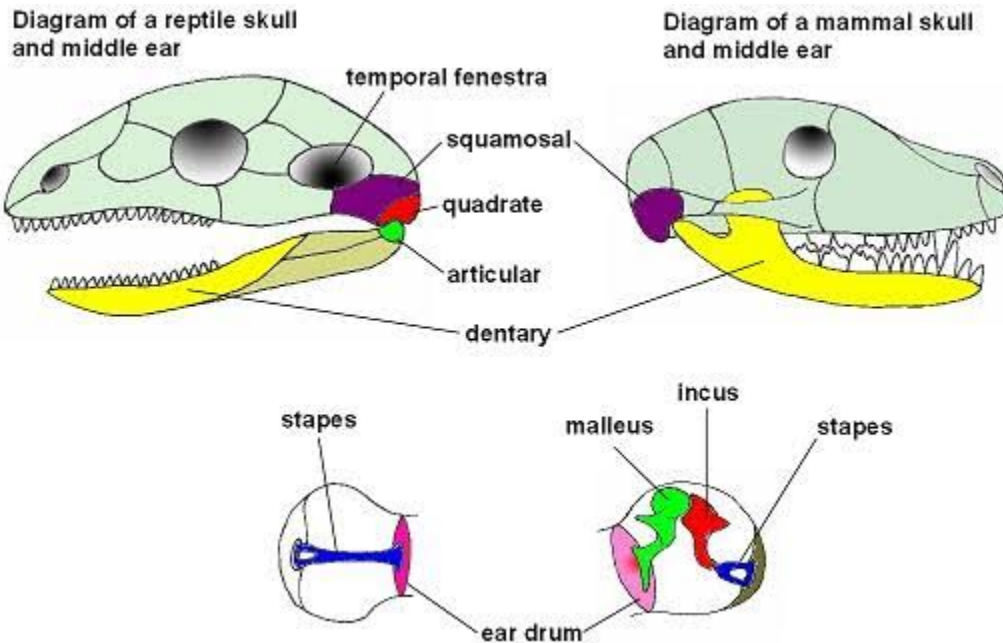


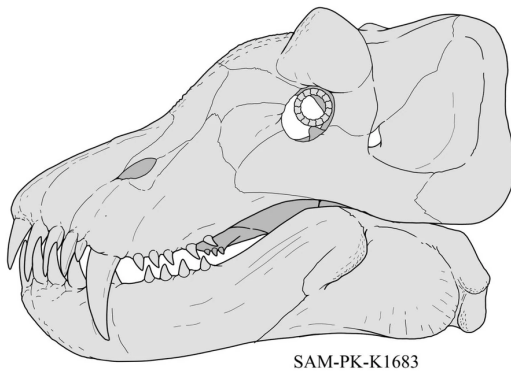
I think many early, non-mammalian synapsid traits are compatible with most theropod builds.

Why mammal jaws are usually incompatible with reptiles:



1. The Lower Jaw (pt. 1): The reptilian lower jaw is made of multiple bones. In mammals, 3 of these bones have migrated up the skull to become the ear bones, leaving only one lower jaw bone.
2. The Lower Jaw (pt. 2): Reptiles' lower jaws are flat and have a hinge-like joint. Mammals have a 'L' shaped lower jaw, and the joint is more like a lever.
3. Temporal Fenestra: Dinosaurs (and most other reptiles) have two openings in the skull behind the eye. Mammals have only one, heavily modified opening.
 - a. <https://fr.pensoft.net/article/137860/>
 - b. <https://courses.lumenlearning.com/wm-biology2/chapter/evolution-of-amniotes/>
4. Canines: Mammalian skulls are specialized to handle the bite stress that comes from canines at the front of the jaw. While some reptiles have caniniform teeth, their jaws are not designed to handle the stress that comes from canines at the front of the jaw like a mammal's.
5. Cheekbones: Many reptiles, like dinosaurs, have/had a jugal arch used for muscle attachment. Mammals have a heavily modified version called a zygomatic arch.
6. Shape: Reptile skulls are a very different shape from mammal skulls. For example, an enlarged sagittal crest in a mammal looks different from an enlarged sagittal crest in a reptile.

Why early, non-mammalian synapsid traits (specifically anteosaurus) can work on a reptile (specifically a T. rex base):



1. The Lower Jaw (pt. 1): Early, non mammalian synapsids had lower jaws made of the same bones as reptiles. They did not have the modified ear bones.
 - a. <https://evolution.berkeley.edu/what-are-evograms/jaws-to-ears-in-the-ancestors-of-mammals/>
2. The Lower Jaw (pt. 2): Early, non mammalian synapsids had a flat lower jaw with a more hinge-like joint, similar to reptiles. Early synapsid lower jaws had an increased surface area for muscle attachment, but the structure and function was basically the same.
 - a. <https://evolution.berkeley.edu/what-are-evograms/jaws-to-ears-in-the-ancestors-of-mammals/>
3. Temporal Fenestra: Early synapsids had temporal fenestrae that were not the heavily-modified versions we see in mammals today. They were very similar to the lower temporal fenestrae seen in reptiles. However, you don't even need to use anteosaurid temporal fenestrae. A T. rex's temporal fenestrae work perfectly fine.
4. Canines: Early synapsids had canines similar to the caniniform teeth seen in reptiles. Instead of pronounced canines located at the very front of the jaw, they were placed in positions similar to where caniniform teeth are found in pseudosuchians and spinosaurids.
 - a. <https://royalsocietypublishing.org/rsos/article/13/2/252042/480032/Filling-a-key-gap-in-growth-patterns-of>
5. Cheekbones: Synapsids had a different jugal arch structure to dinosaurs. You probably do not want to use a synapsid jugal arch on a dinosaur. However, a T. rex's jugal arch is plenty sturdy, and you can enhance it with other reptiles with large jugal arches (like a tuatara).
6. Shape: Anteosaurid specifically has a skull shape similar to theropods like T. rex. There are no studies directly comparing the two, but the structural similarities along with both being designed to crush bones make me think that it will be easier to use traits from one to enhance the other.