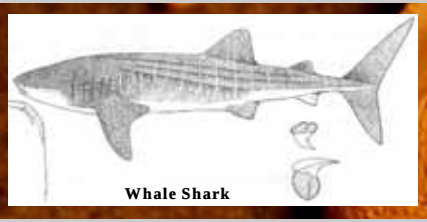
Modern Tooth Types

SHARKS ARE STEREOTYPED as being sharp-toothed killing machines. Although many shark species exhibit rows of razor sharp teeth with powerful jaws, there are still many others that have less spectacular dentition. Some sharks possess teeth that resemble corn kernels more than they do steak knives. Sharks have tremendous diversity in tooth type, and therefore also a variety of prey preference and feeding styles. In present-day sharks, there are nine main types of tooth types recognized.

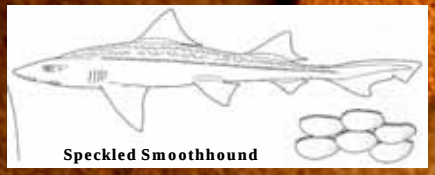
Vestigial- Vestigial dentition occurs in sharks specialized for filter feeding, although the teeth are not used for feeding. The teeth are small, homodont, and hook-shaped. **Homodont** means that the teeth all look the same in appearance, and may only differ in size because of their location on the jaw.

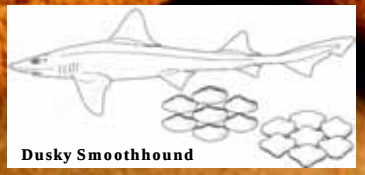
The **Whale Shark** (*Rhincodon typus*), the largest known shark species, is a good example of a shark with vestigial dentition. Other large sharks like the **Basking Shark** (*Cetorhinus maximus*) and **Megamouth Shark** (*Megachasma pelagios*) also possess vestigial teeth. The sharks that exhibit the vestigial tooth type feed exclusively on tiny organisms called plankton. Instead of using the teeth to feed, they use structures called gill rakers. Gill rakers collect food particles and organisms from the water that passes though the shark's mouth and out its gills. This is known as planktonic feeding style. Vestigial-toothed sharks demonstrates that vestigial-toothed sharks are thus located near the surface of the ocean, where plankton are most prevalent.


Whale Shark


Basking Shark

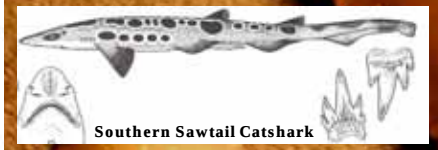
Crushing- Crushing type dentition occurs in a few shark species, but it is very distinguishing. Crushing teeth are asymmetrical, flattened, and homodont. Some species with crushing tooth type like the **Speckled Smoothhound** (*Mustelus mento*) have a very flattened tooth surface, while others such as the **Dusky Smoothhound** (*Mustelus canis*), have a highly rounded cusp on the flattened tooth surface. Smoothhound sharks are the major group exhibiting these bizarre teeth. The flattened teeth are well adapted for grabbing and crushing prey items with a hardened exoskeleton, including crustaceans such as shrimp, crabs, and lobsters. Because sharks with the crushing dentition feed on bottom-dwelling crustaceans, they are normally located close to the seabed and near shore.


Speckled Smoothhound


Dusky Smoothhound

Clutching- The clutching-type dentition is homodont and fairly common. The teeth are symmetrical and multi-cusped, with the largest cusp at the middle of the tooth and smaller points radiating out. The best example of this dentition is found in the **Nurse Shark** (*Ginglymostoma cirratum*). The teeth are well designed for grabbing and gripping hard-bodied prey, as well as breaking through hard shells and exoskeletons. The jaws of clutching-type sharks must be powerful in order support a diet including crabs, sea urchins, gastropods, bivalves, octopus, and sting rays. The clutching-type sharks are located close to the ocean floor, and usually live inshore to hunt their low-lying prey.

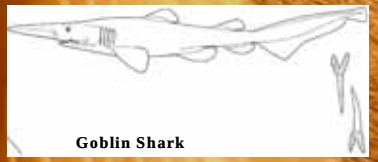

Nurse Shark


Southern Sawtail Catshark

Grasping- The grasping-type dentition consists of homodont teeth that are very slender and pointed. The long tip of the tooth resembles a nail, and the base of the tooth has two branches, giving the tooth a T-shaped appearance. The small surface area of the tip of the tooth allows it to be driven into soft flesh with ease. Some species with grasping dentition have small points on both sides of the long, central tip of the tooth.

The **Bigeye Sandtiger** (*Odontaspis noronhai*) has grasping-type teeth with small points on either side, while the **Goblin Shark** (*Mitsukurina owstoni*) exhibits the dentition with only the central tip. The grasping teeth are perfect for taking hold of small prey, which these sharks will generally swallow whole because they have no method of chewing or cutting. Grasping-type sharks primarily feed upon fish or squid in open water, and are usually in middle to deep water depths.


Bigeye Sandtiger

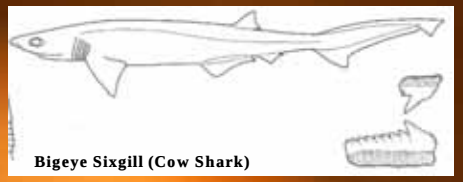

Goblin Shark

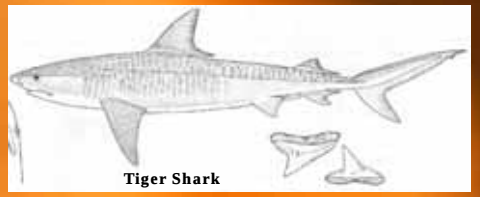
Illustrations by Mark Dando
* Not to Scale

Cutting- The homodont cutting-type teeth are those that typically associated with sharks. The teeth are generally triangular with a pointed tip and a wide base with two prongs, giving the tooth a heart-shaped appearance. A major exception to the triangular tooth shape is evident in the **Cow Sharks**. Its teeth can have multiple points in the same plane, the largest point being located at one end of the tooth, and the following points getting progressively smaller toward the other end.

Both edges cutting-type teeth are razor sharp, and in many cases they are also serrated on at least one side. The serrations function like a steak knife, adding to the cutting capability. Species such as the **Tiger Shark** (*Galeocerdo cuvier*) have highly serrated teeth which have more surface area on one side than the other. Although some sharks can rely solely on strength of their jaws, sharks with the cutting-type dentition also rely on their specialized dentition to catch prey.

Cutting teeth are specially adapted for slicing rather than grabbing. When swimming at a target prey item, the teeth will glance sideways rather than strictly puncture the skin. The bite will cause much more initial damage to the prey by inflicting deep gashes into the body cavity. These wounds cause prey to bleed out, die of shock, or have fatal internal injuries. The bite also allows the cutting-type sharks to cut off pieces from a prey item that is too large to swallow whole. Fish, turtles, and swimming mammals are likely prey for the cutting-type sharks. These types of sharks are usually found in open water and tend to be in middle to upper ocean depths.


Bigeye Sixgill (Cow Shark)


Tiger Shark

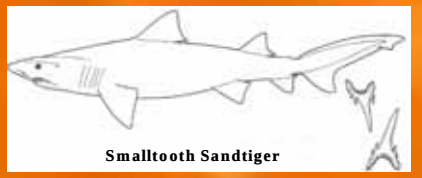
Cutting-grasping- One of the most common dentitions in sharks is the cutting-grasping form. This type of dentition is heterodont, which means that an individual has different types of teeth. In cutting-grasping dentition, the teeth on one jaw are cutting teeth, and the teeth on the opposing jaw are grasping teeth. Some examples of sharks with the cutting-grasping dentition are the **Snaggletooth Shark** (*Hemipristis elongates*), the **Galapagos Shark** (*Carcharhinus galapagensis*), and the **Night Shark** (*Carcharhinus signatus*). The dentition allows the shark to use the primary function of each tooth type—cutting teeth for slicing and grasping teeth for snagging prey—and also adds a new function to the shark's repertoire. The grasping teeth anchor the shark's bite into its prey, and the cutting teeth can slice off chunks of flesh. Sharks with the cutting-grasping dentition primarily feed upon fish, squid, and some aquatic mammals. Cutting-grasping sharks live in open ocean, nearshore when hunting for food.


Night Shark

Grasping-cutting- The grasping-cutting dentition is similar to the cutting-grasping dentition. The difference is that in the grasping-cutting dentition the grasping teeth are on the anterior (front) portion of the jaw two jaws, and the cutting teeth are on the posterior (back) of the jaws. Sharks such as the **Longfin Mako** (*Isurus paucus*) exhibit the heterodont grasping-cutting dentition. Each tooth type is used for its primary function, and the two tooth types can be used together. When the tooth types are used together, the grasping teeth snag and anchor the food while the cutting teeth can tear pieces of flesh from a carcass for easier swallowing. Fish and squid are the general diet for grasping-cutting sharks. Grasping-cutting sharks are normally found in open ocean.


Longfin Mako

Grasping-crushing- Another heterodont dentition in sharks is the grasping-crushing type. The grasping teeth are located on the anterior portion of the jaws, and the crushing teeth are located on the posterior part of the jaws. The **Smalltooth Sandtiger** (*Odontaspis ferox*) has this type of dentition. The front grasping teeth are used for grabbing prey, while the crushing teeth in the back of the jaws are for compressing and cracking tough-bodied prey. Grasping-crushing sharks can feed on a variety of fish, including stiff-scaled fish. Grasping-crushing sharks are found inshore in middle to low depths. sharks are found inshore in middle to low depths.


Smalltooth Sandtiger

Clutching-crushing- One of the most unique dentitions among sharks is the clutching-crushing type. This uncommon heterodont dentition exhibits clutching-type teeth in the front part of the jaws and crushing-type teeth in the back part of the jaws. The Bullhead Sharks have the clutching-crushing dentition, and more specifically the **Zebra Bullhead Shark** (*Heterodontus zebra*) and the **Crested Bullhead Shark** (*Heterodontus galeatus*). The clutching-crushing sharks use their anterior clutching teeth to clasp onto prey, and the posterior crushing teeth to pulverize hard-bodied prey with their powerful jaws. The clutching-crushing sharks will feed upon mollusks, crustaceans, and fish, and are located inshore near the seabed.


Zebra Bullhead

Illustrations by Mark Dando
* Not to Scale