MIOCENE SHARK TEETH

From Around the Chesapeake Bay

Fossil shark teeth found on some beaches around the Chesapeake Bay have eroded from the cliffs and bay bottom sediments. These sediments accumulated beneath a vast arm of the Atlantic Ocean during the Miocene Epoch, some 23.8 - 5.3 million years ago, when, at times, its waters extended west to the present-day location of Washington, D.C.

More than 600 species of fossil marine organisms, including mollusks, fish, turtles, dolphins, whales, and sharks have been identified from the cliffs. Local Miocene fossil shark teeth are known from angel, basking, bramble, cow, giant white, gray, great white, hammerhead, lemon, mackerel, mako, nurse, sand tiger, sharpnose, snaggletooth, thresher, tiger, and whale sharks. A census of Chesapeake Bay beach-collected fossil shark teeth has shown that some species make up less than 1% of the total and therefore, for lack of space, are not included on this poster. The percentages listed for all sharks (except stingrays) represent the relative frequency one would expect to find in a large, beach-collected sample.

Warning! Digging in the cliffs is **dangerous**. It is **prohibited** on state and federal lands. Digging on private land **requires advance permission** from the landowners.

Shark tooth size and shape vary widely with the kind of shark, its maturity, and position of the tooth within the mouth. Only the most common tooth forms are included. All teeth are shown slightly larger than natural size. The form, relative size, and color of the shark body drawings are based on the appearance of closely related living species.

Mako Shark, *Isurus hastalis*
(Approximately 4%)
Several species are present but, the most common, *Isurus hastalis*, has teeth that lack serrations and typically take the shape of an isosceles triangle.

Galeocerdo contortus *Galeocerdo aduncus*

Tiger Sharks, *Galeocerdo contortus* and *Galeocerdo aduncus*
(Approximately 20% combined)
Both species exhibit an evenly serrated asymmetrical crown.
The teeth of *Galeocerdo contortus* exhibit a gently sinuous (twisted) crown, and are not as flattened as are the teeth of *Galeocerdo aduncus*.

A barbed stingray tail spine.

Aetobatus sp. *Myliobatis sp.*

Stingrays, *Aetobatus sp.* and *Myliobatis sp.*
(Percentage data unavailable)
A linear series of conjoined tooth plates form the large upper and lower crushing dentitions in stingrays. Complete dental batteries are rare; however, individual and broken segments are common. Straight segments are likely those of *Myliobatis*, whereas chevron or V-shaped segments are from *Aetobatus*. The roots of the tooth correspond to the corrugated surfaces.

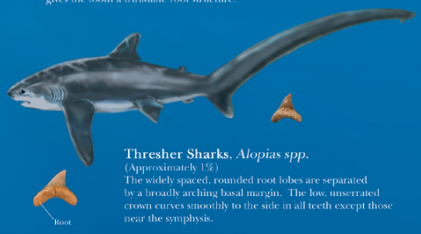
Cusplet

Sand Tiger Sharks, *Carcharias spp.*
(Approximately 5%)
Slender roots and crown characterize these graceful teeth. Well-preserved teeth exhibit at least one tiny, sharply pointed cusplet on each shoulder of the tooth's root. The slender cutting edges of these teeth are unserrated.

Hammerhead Sharks, *Sphyrna laevissima*
(Approximately 1%)
The low crown of these smooth-edged teeth forms an acute angle with the root lobes, resulting in a strongly notched distal margin.

Angel Sharks, *Squatina spp.*
(Approximately 1%)
The erect, slender crown of each tooth lacks serrations. The enameloid cutting edges extend out onto the wide shoulders of these bilaterally symmetrical teeth. Angel shark teeth also exhibit a so-called apron on each tooth – a central tongue-like extension of the enamel on the tooth's labial (lip) side. On the inside of each tooth (as seen in a side view shown above), a long projection of the root gives the tooth a triradiate root structure.

Lemon Shark, *Negaprion eurybathrodon*
(Approximately 2%)
Tooth crowns are narrow and unserrated. The tooth shoulder may be weakly serrated. Worn, lower gray shark teeth look very much like those of the lemon shark.



Root

Thresher Sharks, *Alopias spp.*
(Approximately 1%)
The widely spaced, rounded root lobes are separated by a broadly arching basal margin. The low, unserrated crown curves smoothly to the side in all teeth except those near the symphysis.

Cusplet

Cow Shark, *Notorynchus primigenius*
(Approximately 1%)
In spite of their rarity, their distinctive multicusped morphology facilitates identification. Upper teeth usually have far fewer cusplets than the lower teeth.

Gray Sharks, *Carcharhinus spp.*
(Over 45%)
Modern gray sharks are the most successful near-shore sharks, both in numbers of individuals and species. Five species have been identified in Miocene sediments from the Chesapeake Bay area. Unfortunately, isolated and water-worn teeth are difficult to identify to species. Unlike lemon shark teeth, those of Miocene gray sharks are almost always serrated.

Snaggletooth Shark, *Hemipristis serra*
(Approximately 15%)
The upper teeth are coarsely serrated. Upper lateral teeth have a long base and a gentle laterally curving crown. Although the lower anterior teeth are superficially similar to those of the sand tiger, they are more robust and lack the slender elongate root lobes.

Foramen

Disk-shaped shark vertebral centra from gray sharks, *Carcharhinus spp.*, are far more common than those of any other shark. Large paired dorsal and ventral openings (foramina) characterize this type of backbone segment.

Chevron
(Beaulette)

Giant White Shark, *Carcharodon megalodon*
(Approximately 3%)
Many shark-tooth experts prefer the name *Carcharocles megalodon* believing that this shark is not closely related to the living Great White Shark. A dark-colored chevron-shaped area on the inside surface of the tooth marks the boundary between the massive root and the enameled crown. Small, even-sized serrations also characterize these teeth. Large, well-preserved teeth are exceedingly rare.

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