

SHARK AND RAY

THE EVIDENCE



Retrieved from: http://www.phschool.com/science/science_news/articles/fishy_therapy.html

Shark skeleton

Shark and ray skeletons are made of cartilage



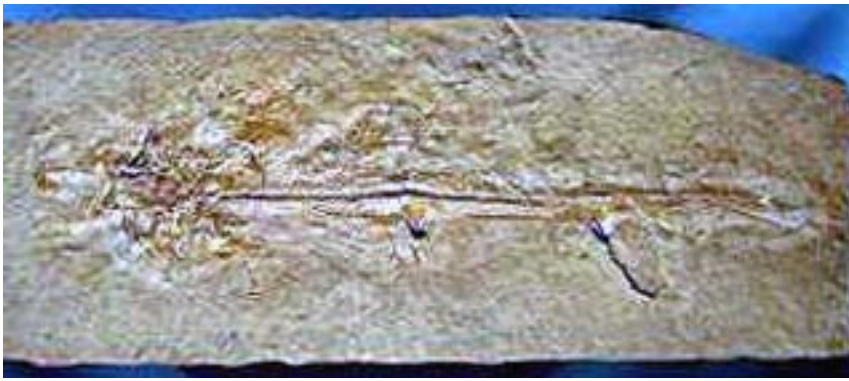
Retrieved from: <http://www.abc.net.au/schoolstv/animals/SHARKS.htm>

Sharks have 5-7 gills



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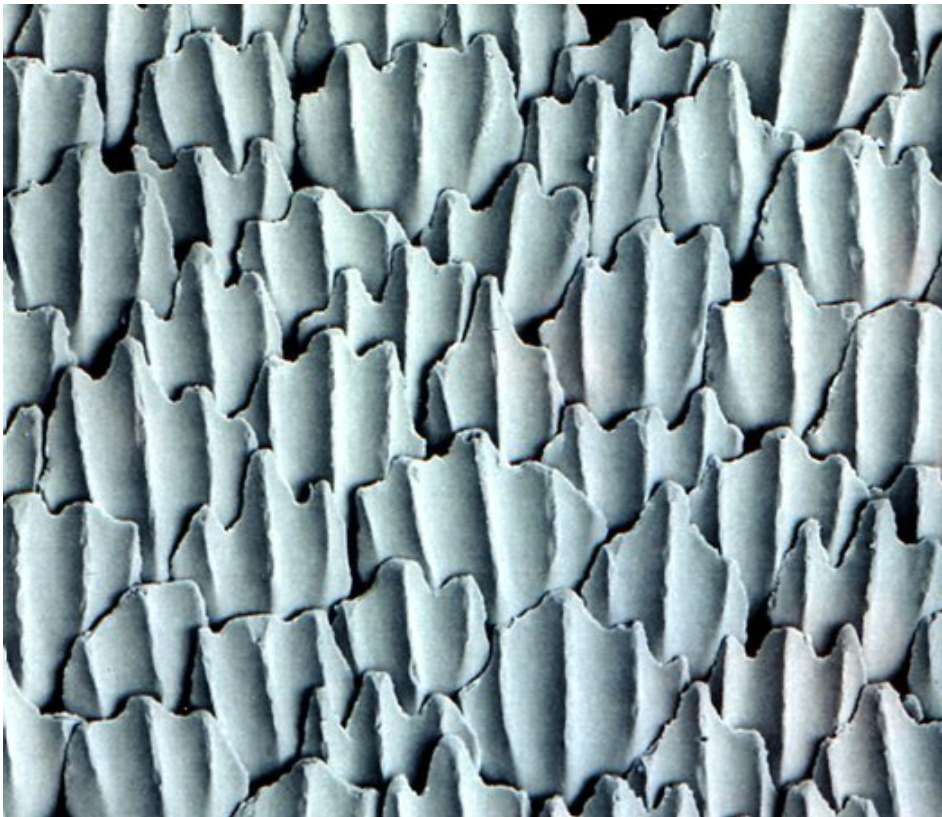
Rays have 5 gills



(Carvalho, n.d.)

Protospinax (150 million years ago)

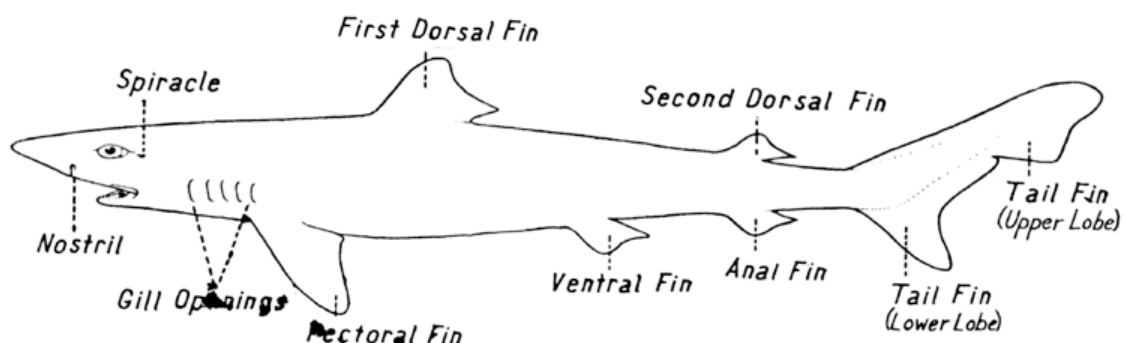
Fossil is a shark and the relative of modern rays.



Retrieved from: <http://australianmuseum.net.au/image/Scanning-electron-micrograph-of-the-scales-of-a-Thresher-Shark>

Sharks and rays both have placoid scales that feel rough like sandpaper.

ILLUSTRATIONS OF ANATOMICAL TERMS



Drawing from Starks, 1921.

FIG. 8. Example of a shark.

(Walford, 1935)

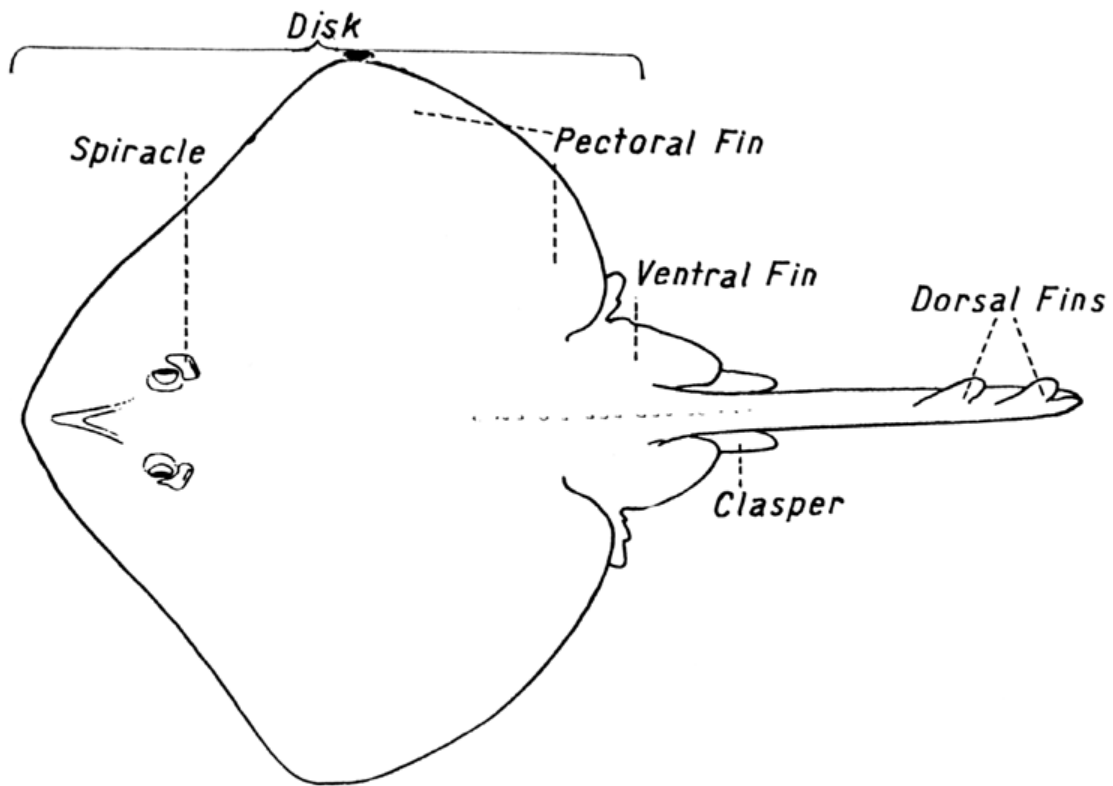


FIG. 9. Example of a ray.

Drawing from Starks, 1921

(Walford, 1935)

Geologic Timeline:

First sharks appear 545-244 million years ago

First ray teeth appear 206-180 million years ago

First ray skeletons appear 159-144 million years ago

What does the evidence tell us?

- ✓ Using **comparative anatomy** you can see that modern sharks and rays both have skeletons made of cartilage; 5-7 gills; placoid scales; and dorsal, ventral and pectoral fins that suggest a close common ancestor.
- ✓ The **fossil** of *Protospinax* is shark that likely was the ancestor of modern rays.
- ✓ The **geologic** time scale of when fossils of sharks and rays were found help us to understand how sharks and rays are related.
- ✓ Because cartilage breaks down quickly, it is very hard to find fossils of shark and ray skeletons. There are many more shark and ray tooth fossils.