Evolution, Ecology, and Body Size of

Otodus megalodon

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Calvert Marine Museum
Solomons, Maryland
A quick introduction...
➢ What?
New exhibit on Maryland sharks

➢ Where?
Calvert Marine Museum
Solomons, MD

➢ When?
July 2021 – December 2022
Outline

1. Who did Megalodon evolve from?
2. What did Megalodon eat?
3. How big was Megalodon?
Who did Megalodon evolve from?

The different names proposed for the genus of Megalodon refer to different theories about its evolutionary relationships.
Megalodon vs. Great White

Otodus megalodon

Carcharodon carcharias
**Megalodon vs. Great White**

1. **Deep basal root margin**
   - *Otodus megalodon*
   - Bourlette present
   - Fine, even serrations
   - Dispersed nutrient pores

2. **Central nutrient pore**
   - *Carcharodon carcharias*
   - Bourlette absent
   - Coarse, uneven serrations

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**Otodus megalodon**

**Carcharodon carcharias**
Megalodon Evolution: Megatooth Shark Lineage

- *Otodus obliquus*: 60 Ma
- *Carcharocles auriculatus*: 45 Ma
- *Carcharocles angustidens*: 30 Ma
- *Carcharocles chubutensis*: 20 Ma
- *Carcharocles megalodon*: 15 Ma
Great White Evolution: White Shark Lineage

Serrations absent
*Carcharodon hastalis*

Developing serrations ~8-5 m.y.a.
*Carcharodon hubbelli*

Full serrations
*Carcharodon carcharias*
Evolutionary Relationship

➢ Megalodon and the Great White are in two separate taxonomic families
➢ Their last common ancestor was in the Cretaceous (>65 million years ago)
Relevant Publications


TRACING THE ANCESTRY OF THE GREAT WHITE SHARK, CARCHARODON CARCARIUS, USING MORPHOMETRIC ANALYSES OF FOSSIL TEETH
KEVIN G. HOBBS, JOHN C. MACPHERSON, and C. LUCA R. MOSQUIC
Department of Biology, Duke University, Durham, NC 27708, USA.
Department of Biological Sciences, University of Alabama, Tuscaloosa, AL 35487, USA.
Department of Geology, State University of New York at Stony Brook, Stony Brook, NY 11794, USA.

ABSTRACT—The morphometric age of Carcharodon carcharias is well known, with fossils attri-
buted to a number of different species of extinct species across the world. However, it is not well
understood how these species differ from one another. In this study, we measured 200 teeth
from 10 species of C. carcharias. We found that teeth from different species within the genus
have different patterns within the dentition. The differences between species include the
number of teeth, the length of the tooth, and the number of teeth in each section of the tooth.
In addition, the shape of the teeth varies between species, with some species having
longer teeth than others. Further, the number of teeth in each section of the tooth also
varies between species, with some species having more teeth in each section than others.
These differences suggest that C. carcharias is a highly polymorphic species, with different
patterns within the dentition. The results of this study have implications for understanding
the evolution of C. carcharias and its adaptive radiation.

INTRODUCTION

Despite the recent study of Carcharodon carcharias, the evolutionary history of the
great white shark, Carcharodon carcharias, is still largely unknown. The leading
hypothesis suggests that the modern species evolved from the extinct species Carcharodon
longimanus, but the exact number of teeth is unclear. In this study, we measured 200 teeth
from 10 species of C. carcharias. We found that teeth from different species within the
genus have different patterns within the dentition. The differences between species include
the number of teeth, the length of the tooth, and the number of teeth in each section of the
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patterns within the dentition. The results of this study have implications for understanding
the evolution of C. carcharias and its adaptive radiation.

ORIGIN OF THE WHITE SHARK CARCHARODON (LAMNIFORMES: LAMNIDAE) ON RECALIBRATION OF THE UPPER NEogene PISCO FORMATION OF PERU

by DANI A. EHRENN, BRUCE J. MACPADDEN, DOUGLAS S. JONES, THOMAS J. DEVRIES, DAVID A. FOSTER, and RODOLFO SALAS-GIMÉNEZ

ABSTRACT—This study presents new data on the age of the Pisco Formation, a well-studied
area of the Neogene South American record, which is important for understanding the
evolution of marine mammals. We used a combination of biostratigraphic and geochronologic
methods to refine the age of the Pisco Formation. Our results indicate that the Pisco
Formation is older than previously thought, and that the K/Pg boundary is located within
the early Pisco Formation. This has implications for understanding the evolution of marine
mammals and the impact of the K/Pg boundary on marine ecosystems.

INTRODUCTION

The K/Pg boundary is a critical event in the evolution of marine mammals. The extinction
of many marine mammal lineages at the K/Pg boundary has been well documented, with
the genus Carcharodon carcharias believed to have evolved from the extinct species
Carcharodon longimanus. However, the exact dating of the K/Pg boundary is still
controversial, with some studies placing it in the early Pisco Formation, while others
suggest it is located in the late Pisco Formation. In this study, we present new data on
the age of the Pisco Formation to help resolve this controversy.

METHODS

We used a combination of biostratigraphic and geochronologic methods to study the age
of the Pisco Formation. Biostratigraphic data were obtained from the Pisco Formation
itself, while geochronologic data were obtained from the surrounding area. We used
two main approaches to determine the age of the Pisco Formation: (1) biostratigraphic
analysis of fossil assemblages and (2) geochronologic analysis of volcanic rocks.

RESULTS

Our results indicate that the Pisco Formation is older than previously thought, and that the
K/Pg boundary is located within the early Pisco Formation. This has implications for
understanding the evolution of marine mammals and the impact of the K/Pg boundary on
marine ecosystems.

KEY WORDS—Carcharodon, Pisco Formation, Peru, mammalian evolution, marine mammals.

One of the most debated issues within the paleontological community is the age of the K/Pg
boundary. This boundary marks the end of the Cenozoic Era and the beginning of the
Paleogene Epoch. It is widely accepted that the K/Pg boundary is marked by a mass
extinction event that caused the extinction of many marine mammal lineages, including
Carcharodon carcharias. However, the exact dating of this event is still controversial,
with some studies placing it in the early Pisco Formation, while others suggest it is located
in the late Pisco Formation. In this study, we present new data on the age of the Pisco
Formation to help resolve this controversy.

ACKNOWLEDGEMENTS

This work was supported by the National Science Foundation (Grant No. EAR-1020981) and
the Academy of Sciences of Peru. We would also like to thank the Peruvian Institute of
Marine Sciences (INPE) for providing access to the Pisco Formation.

REFERENCES

extinctions. Geology, 43, 515–518.
Mammalia and the fall of the dinosaurs. In: D. G. Varricchio (ed.), The Rise of

This work was supported by the National Science Foundation (Grant No. EAR-1020981) and
the Academy of Sciences of Peru.
What did Megalodon eat?

<table>
<thead>
<tr>
<th>Megalodon’s Menu Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>❑ Marine mammals</td>
</tr>
<tr>
<td>- whales, dolphins, seals, manatees</td>
</tr>
<tr>
<td>❑ Large bony fish</td>
</tr>
<tr>
<td>❑ Other sharks</td>
</tr>
<tr>
<td>❑ Marine reptiles</td>
</tr>
<tr>
<td>- turtles and crocodiles</td>
</tr>
</tbody>
</table>

Megalodon has cutting-type teeth, which help to dismember prey!
Direct Evidence of Predation
Megalodon Daily Diet

It was estimated that Megalodon would require 2500 pounds of food per day to support its large size!
Interpreting Diet from Teeth

![Cutting-Type Tooth Image]

<table>
<thead>
<tr>
<th>Tooth Shape</th>
<th>Tooth Function</th>
<th>Diet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutting</td>
<td>Type</td>
<td></td>
</tr>
</tbody>
</table>
Chondrichthyan Tooth Functions

**Cutting**
- Large, fleshy prey

**Grasping**
- Small, swift prey

**Crushing**
- Hard-bodied prey
Evolution and Ecology

Did Megalodon’s ancestors have the same diet?

Otodus obliquus 60 Ma
Carcharocles auriculatus 45 Ma
Carcharocles angustidens 30 Ma
Carcharocles chubutensis 20 Ma
Carcharocles megalodon 15 Ma
Megalodon Evolution along the Calvert Cliffs
Local Megalodon Evolution

Carcharocles spp. Cusp-Presence/Absence Through Time

Perez et al. (2019)
How big was Megalodon?

Calvert Marine Museum
Solomons, MD

Smithsonian
Washington, DC

Western Australian Museum
Perth, AU
Megalodon Fossil Record

Known fossils of *C. megalodon*

Approximate ratio of known *C. megalodon* teeth to vertebrae fossils.

© www.prehistoric-wildlife.com 28-08-2014
Body Size Myth

Every inch of tooth equates to 10 ft of length

Associated Dentition – multiple teeth found together that came from one individual
The relationship between the tooth size and total body length in the white shark, *Carcharodon carcharias* (Lamniformes: Lamnidae)

**SHIMADA, Kenji**

**Abstract**

The relationship between the height of teeth versus TL and total body length (TL) in the eastern blue shark, *Carcharodon carcharias* (Lamniformes: Lamnidae) is measured using regression analyses.

The results suggest:
1. that an increase in the CH of each tooth through replacement is proportional to the increase in the TL
2. that the CH can be used to predict the TL, and
3. that distally located tooth development lags behind that of more proximal teeth.

A comparison with prior data suggests the "crowd size" between the crown and root is not peduncular constant. These data can be applied to palaeontological research.

**Introduction**

The presence of intraspecific variation in tooth morphology is known in various chondrichthyans. Common conceptions hold that palaeontological or morphological taxa (e.g., Orectolobus, 1875) include ones owned by sexual differences (e.g., *Spilodus*, 1899). "Sauropsid Priacanthus" has been catalogued by various sources (e.g., *Myltelus*, 1970; *Shimada*, 1970). However, data on morphological variation are still scarce for most chondrichthyans. Some have examined intraspecific variation of one or a few selected teeth quantitatively, but none of them considered the total morphology entirely (e.g., *Acanthias*, 1961; *Rudzki*, 1971). Indeed, the individual recognition homogenous teeth across a species is remarkable to conducting rigorous statistics.

**Figure 1**

Representative upper and lower dental series of modern great white shark, *Carcharodon carcharias* (also included in the left lateral view). Tooth types: 1. upper marginal tooth, 2. lower marginal tooth, 3. upper intermarginal tooth, 4. lower intermarginal tooth, 5. upper central tooth, 6. lower central tooth, 7. lower mental teeth, 8. rhinophoral horn from *Shimada* and *Kumamoto* (1970), 9. tooth crown formation (based on Williams, 1992).

**Graphs**

- **Graph L1**: *y* = 1.916 + 50.205x
- **Graph L2**: *y* = 4.911 + 13.433x
- **Graph L6**: *y* = 5.234 + 11.522x

Shimada (2002)
Ancient Nursery Area for the Extinct Giant Shark Megalodon from the Miocene of Panama

Catalina Pimiento 1,2*, Dania J. Bhatia 1, Bruce J. MacFadden 3, Gordon Hubbell 4

1Department of Biology, University of Costa Rica, San José, Costa Rica. 2Department of Vertebrate Paleontology, Florida Museum of Natural History, University of Florida, Gainesville, Florida, United States. 3Museum of Paleontology and Anthropology, Smithsonian Tropical Research Institute, Panama, Republic of Panama, A. 4Museum of Natural Sciences, Charlotte, North Carolina, United States.

ABSTRACT

Background: Are you new to modern species? nursery areas are essential shelter habitats for vulnerable young sharks. Many species are typically highly protected, shallow-water habitats that are characterized by the presence of juveniles and invertebrates. The recently discovered nursery areas have been described by the study of juvenile giant sharks from the Miocene of Panama. From the study of juvenile giant sharks from the Miocene of Panama, we know that the extinct Carcassshark megalodon was the biggest shark that ever lived. However, preserved palaeontological data is not enough to describe the habitat of the giant sharks from the Miocene of Panama.

Methodological/Practical Findings: We collected and measured fossil shark teeth from the Miocene of Panama, specifically, and in contrast to other fossil shark teeth, the majority of the teeth are found in different environments, which we value the total length of the individuals from different localities. In addition, we can obtain the total length of the individuals from different localities, which we value the total length of the individuals from different localities. In addition, we can obtain the total length of the individuals from different localities, which we value the total length of the individuals from different localities. In addition, we can obtain the total length of the individuals from different localities, which we value the total length of the individuals from different localities.

Conclusions/Significance: We propose that the Miocene Carcassshark megalodon represents the first documented paleo-nursery area for C. megalodon from the Miocene and one of the few known in the fossil record as we present the scientific value and importance of this study.

Keywords: Megalodon, sharks, paleo-nursery areas, Miocene, Panama.

INTRODUCTION

Sharks, especially large species, are highly mobile predators with a complex life history and wide distribution. However, as a group, many species are not tolerant of the presence of adult females and immature individuals. In modern species, nursery areas have been previously identified in the majority of species of various orders, but particularly in the Carcharhiniformes. These nursery areas are typically characterized by relatively shallow-water habitats with a high diversity of invertebrates and other small organisms, which provide shelter and protection for the young sharks. The identification of nursery areas in the Miocene fossil record provides important insights into the life history and ecology of these ancient sharks.

The Miocene fossil record is relatively well-known in the region, particularly in the Caribbean Sea and the Gulf of Mexico. However, the preservation of juvenile sharks and their nursery areas in the fossil record is limited, and the identification of such areas is crucial for understanding the life history and ecology of these ancient sharks.

Key words: Megalodon, sharks, paleo-nursery areas, Miocene, Panama.

1. INTRODUCTION

Otolus megalodon is the largest known species of shark, with adult males reaching lengths of up to 20 meters. The species is known from the Miocene and Pliocene of various regions worldwide, including the Caribbean Sea, the Gulf of Mexico, and the western Pacific Ocean. The identification of nursery areas in the Miocene fossil record provides important insights into the life history and ecology of these ancient sharks. The study of nursery areas in the Miocene fossil record is crucial for understanding the paleoecology and paleo-environment of the period, and for reconstructing the history of marine ecosystems. The identification of nursery areas in the Miocene fossil record is crucial for understanding the life history and ecology of these ancient sharks. The study of nursery areas in the Miocene fossil record is crucial for understanding the life history and ecology of these ancient sharks. The study of nursery areas in the Miocene fossil record is crucial for understanding the life history and ecology of these ancient sharks.

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Testing the Method
**Results:** How big was Megalodon?

<table>
<thead>
<tr>
<th>Jaw Position</th>
<th>Tooth Position</th>
<th>TL Range (ft)</th>
<th>TL Mean (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior</td>
<td>A1-A3; a1-a3</td>
<td>40.3 – 52.3</td>
<td>44</td>
</tr>
<tr>
<td>Lateral</td>
<td>L1-L5; l1-l5</td>
<td>44.2 – 108.2</td>
<td>64</td>
</tr>
<tr>
<td>Posterior</td>
<td>L6-L9; l6-l8</td>
<td>87.1 – 147.6</td>
<td>110</td>
</tr>
</tbody>
</table>

![Jaw positions and Tooth positions of Megalodon with TL range and mean lengths]

*Gordon Hubbell collection C. megalodon associated (95) Jim Bourdon © 2004*
3-D FOSSILS FOR K-12 EDUCATION: A CASE EXAMPLE USING THE GIANT EXTINCT SHARK CARCHAROCLES MEGALODON

Claudia A. Grant1,2, Bruce J. MacFadden1, Pavel Antonenko3, and Victor J. Perez3,1

1University of Florida, Florida Museum of Natural History, Gainesville, Florida 32611 USA
2University of Florida, College of Education, Gainesville, Florida 32611 USA
3University of Florida, Department of Geological Sciences, Gainesville, Florida 32611 USA

ABSTRACT.—Fossils and the science of paleontology provide a charismatic gateway to integrate STEM teaching and learning. With the new Next Generation Science Standards (NGSS), as well as the exponentially increasing use of three-dimensional (3-D) printing and scanning technology, it is a particularly opportune time to integrate a wider variety of fossils and paleontology into K-12 curricula. We describe a curricular prototype that integrates all four components of STEM (Science, Technology, Engineering, Math) into authentic research using leftovers of the Neogene giant shark Megalodon (Carcharocles megalodon Agassiz, 1843). This prototype has been implemented in two middle and two high schools in California and Florida. Consistent with prior evidence-based research, student engagement increases when they have hands-on experiences with fossils, particularly with a charismatic species such as Megalodon. Access to museum specimens helps students understand big ideas in ‘Deep Time.’ In addition to engaging students in authentic STEM practices and scaffolding development of content knowledge, paleontology is an integrative science that connects and informs socially relevant topics, including long-term (macro-) evolution and climate change. The application of 3-D printing and scanning to develop curricula using fossils has immense potential in K-12 schools in the U.S.

INTRODUCTION

The rapidly increasing need for an adequately prepared science, technology, engineering, and mathematics (STEM) workforce in the twenty-first century requires meaningful integration of STEM disciplines in K-12 education. It is widely recognized that this is an important, but highly challenging, goal (Honey et al., 2014). Historically, students in the U.S. have learned individual STEM disciplines in isolation, which is counter to the common practices in the professional STEM fields today (Roehrig et al., 2012), and STEM teaching in the U.S. has not succeeded in integrating underrepresented groups (Meyer et al., 2012). In this paper, we describe our work to expand and extend understanding of integrated STEM learning with fossils and paleontology while exploring the associated benefits and challenges. Specifically, we propose a novel curricular model for integrating all four STEM domains in K-12 education. This is being done through the lens of using three-dimensional (3-D) scanning and printing technologies that are increasingly finding their way into K-12 schools (Thornburg et al., 2014). This integration can be achieved in the context of a highly relevant, but hitherto unexplored, educational pathway to STEM in K-12 education using fossils and paleontology.

The relevant background on STEM learning, 3-D scanning and printing technologies, and paleontology as they relate to the goal of advancing integrated STEM education in K-12 is reviewed, and we
New Method

\[
\frac{a}{b} = \frac{c}{x} \quad \Leftrightarrow \quad x = \frac{b \cdot c}{a}
\]
New Method

**A**  
**Linear Function**  
\[ y = 0.0159(x) - 0.0448 \]  
\[ R^2 = 0.9326 \]

**B**  
**Power Function**  
\[ y = 0.0113(x)^{1.0578} \]  
\[ R^2 = 0.9697 \]

**C**  
**Linear Function**  
\[ y = 0.0256(x) - 0.1754 \]  
\[ R^2 = 0.8977 \]

**D**  
**Power Function**  
\[ y = 0.0137(x)^{1.1115} \]  
\[ R^2 = 0.952 \]
Megalodon vs. Great White

Carcharodon carcharias
- Upper Jaw = 24 teeth
- Lower Jaw = 24 teeth
- Intermediate tooth present

Otodus megalodon
- Upper Jaw = 24 teeth
- Lower Jaw = 22 teeth
- Intermediate tooth absent
Carcharodon spp.
Accounting for Missing Teeth

(A) Portion of SCW

(B) Portion of SCW

(C) Portion of SCW

(D) Portion of SCW
### Range and Mean Sizes

<table>
<thead>
<tr>
<th></th>
<th>Upper (U)</th>
<th>Lower (L)</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>15.1 – 20.3 m</td>
<td>17.3 m</td>
</tr>
<tr>
<td>B</td>
<td>17.6 – 26.2 m</td>
<td>20.8 m</td>
</tr>
<tr>
<td>C</td>
<td>15.2 – 20.3 m</td>
<td>17.3 m</td>
</tr>
<tr>
<td>D</td>
<td>16.2 – 24.9 m</td>
<td>19.8 m</td>
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<tr>
<td></td>
<td>10.8 – 14.7 m</td>
<td>12.4 m</td>
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<tr>
<td></td>
<td>12.6 – 18.8 m</td>
<td>15.0 m</td>
</tr>
<tr>
<td></td>
<td>9.4 – 12.9 m</td>
<td>10.9 m</td>
</tr>
<tr>
<td></td>
<td>11.2 – 16.8 m</td>
<td>13.3 m</td>
</tr>
</tbody>
</table>

*Otodus megalodon*
Otodus chubutensis

Range and Mean:

<table>
<thead>
<tr>
<th></th>
<th>Range</th>
<th>Mean</th>
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<tbody>
<tr>
<td>U:</td>
<td>9.4 – 12.9 m</td>
<td>11.0 m</td>
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<tr>
<td>L:</td>
<td>11.0 – 16.3 m</td>
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<tr>
<td>U:</td>
<td>9.5 – 13.1 m</td>
<td>10.9 m</td>
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<tr>
<td>L:</td>
<td>10.3 – 16.7 m</td>
<td>13.3 m</td>
</tr>
<tr>
<td>U:</td>
<td>7.5 – 10.6 m</td>
<td>9.0 m</td>
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<tr>
<td>L:</td>
<td>8.9 – 13.9 m</td>
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<tr>
<td>U:</td>
<td>5.2 – 7.0 m</td>
<td>5.9 m</td>
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<tr>
<td>L:</td>
<td>6.3 – 10.3 m</td>
<td>8.2 m</td>
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<tr>
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<td>Range</td>
<td>Mean</td>
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<tr>
<td><strong>Carcharodon carcharias</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U:</td>
<td>3.5 – 4.8 m</td>
<td>4.0 m</td>
</tr>
<tr>
<td>L:</td>
<td>3.9 – 6.0 m</td>
<td>4.8 m</td>
</tr>
<tr>
<td><strong>Carcharodon hastalis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U:</td>
<td>4.6 – 6.2 m</td>
<td>5.3 m</td>
</tr>
<tr>
<td>L:</td>
<td>4.5 – 7.8 m</td>
<td>6.2 m</td>
</tr>
</tbody>
</table>
Vertebral estimates ranged from 4.7 to 5.2 m, with an average estimate of 4.9 m.

<table>
<thead>
<tr>
<th></th>
<th>Range</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>U:</td>
<td>4.1 – 5.8 m</td>
<td>4.9 m</td>
</tr>
<tr>
<td>L:</td>
<td>4.5 – 6.8 m</td>
<td>5.6 m</td>
</tr>
</tbody>
</table>

*Carcharodon hubbelli*
Summed Crown Width vs. Crown Height

**Highlights**

- SCW offers more constraint than CH
- Lower teeth result in overestimates and greater uncertainty
- There is greater uncertainty with larger individuals
Extrapolating the Method

Body Length Calculation
- Tooth Position: L1
- Portion of SCW: 10.5%
- Crown Width = 133 mm
- SCW = \frac{133 \text{ mm}}{(1 - 0.895)} = 1266.7 \text{ mm}
- TL = \frac{(1266.7 \text{ mm}) \times (17.3 \text{ m})}{1093.7 \text{ mm}} = 20.0 \text{ m}

17.3 m  20.0 m
Body length estimation of Neogene macrophagous lamniform sharks (Carcharodon and Otoodus) derived from associated fossil dentitions

Victor J. Perez, Ronny M. Leder, and Teddy Badaut

ABSTRACT

The megalodon shark, *Otoodus megalodon*, is widely accepted as the largest macrophagous shark that ever lived, and yet, despite over a century of research, its size is still debated. The great white shark, *Carcharodon carcharias*, is regarded as the best living ecological analog to the extinct megalodon shark and has been the basis for all body length estimates to date. The most widely accepted and applied method for estimating body size of *O. megalodon* was based upon a linear relationship between tooth crown height and total body length in *C. carcharias*. However, when applying this method to an associated dentition of *O. megalodon* (UF-VP-312000), the estimates for this single individual ranged from 11.4 to 41.1 m. These widely variable estimates showed a distinct pattern in which anterior teeth resulted in lower estimates than posterior teeth. Consequently, previous paleontological analyses based on body size estimates of *O. megalodon* may be subject to misinterpretation. Herein, we describe a novel method based on the summed crown width of associated fossil dentitions, which indicates the variability associated with different tooth positions. The method assumes direct proportionality between the ratio of summed crown width to body length in ecologically and taxonomically related fossil and modern species. Total body lengths were estimated from 11 individuals, representing five lamniform species, *Otoodus megalodon*, *O. crumeniferus*, *Carcharodon carcharias*, *Carcharodon vaalensis*, and *Carcharodon ferox*. The method was extrapolated for the largest known isolated upper tooth of *C. megalodon*, resulting in a maximum body length estimate of 20 m.


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Summary

1. Megalodon evolved from *Otodus obliquus* and is not directly related to the modern Great White Shark.

2. Megalodon fed on large fleshy prey, such as marine mammals and large fish.

3. Megalodon likely reached a maximum body size of 65 ft (=20 m).
What? New exhibit on Maryland sharks

Where? Calvert Marine Museum
Solomons, MD

When? July 2021 – December 2022