

Boat strike wound healing in *Carcharodon carcharias*



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2.3 m TL GWS with fresh propeller wound, 27 Nov 2008

Introduction

Injuries to marine animals caused by boat strikes is problematic worldwide and the ability of different animals to survive such injuries varies markedly between species.

This study reports on wound healing in a wild great white shark struck by a boat's propeller.

The study site was Gansbaai, 95 km southwest of Cape Town South Africa.



Healed 2.3m GWS 1-11-09

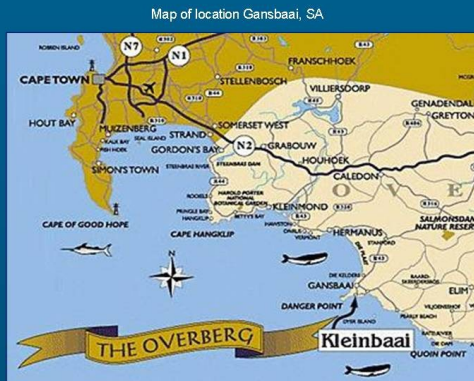
Methods

The great white shark was struck in November 2008 and was observed on 8 occasions in the austral summer of 2008/9 and on its return to the area 10 months later in November 2009.

Wound sizes were estimated by still and video photography when the shark was next to measured reference points on a dive cage.

Muscle thickness was estimated from CT scans of a 1.1 m PCL GWS and direct measurements of 2.1m PCL GWS

Gansbaai is a popular site for marine ecotourism boating and shark cage diving.



Map of location Gansbaai, SA

Results

The study shark '**Prop**' was struck by the propeller of a whale watching vessel on the 27-11-08. It made a deep gash on the dorsum anterior to the first dorsal fin and included a cut up the right side of the first dorsal fin.

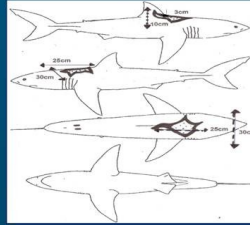
The wound was estimated at 25 cm long, 30 cm wide and 8.7cm deep.

Percentage healing calculations were applied based on the methods of *Alimohammad Alizadeh et al 2009* and a curve plotted.

First stages of healing in 2.3m male GWS



Estimated prop wound dimensions



CT scan of a 1.1 m PCL white shark



Intermediate and final stages of wound healing in GWS



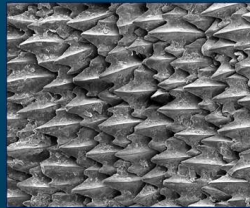
Results ctd.

Photographs were ordered chronologically to reveal the stages of wound healing. Wound healing has been categorised in four keys phases: haemostasis, inflammation, granulation and remodelling.

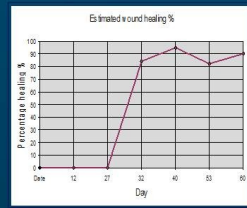
The wound gaped initially as the muscles and tissue were deeply incised. The wound was already in its secondary proliferative phase 35 days after collision. The remodelling phase appears to have begun after 63 days. The formation of repair denticles was not observed in Gansbaai and probably happened during its 10 month absence.

Repair denticles of captive leopard and nurse sharks form at polar angles to the other dermal denticles (Reif 1975).

Dermal denticles of GWS through SEM



Percentage healing curve of GWS



The wound continued up the right side of the dorsal fin.



Dorsal 1 view of 2.3m GWS prop wound healed 1-11-09

Conclusion

The shark survived at least a year and seemed little impeded by the wound.

To have survived so long, it must have successfully eaten and avoided predators.

Body condition was lower on its return, suggesting a significant metabolic cost, as has been noted with ensnared sharks off South Africa and Florida.

The process of wound healing followed that described in other studies allowing it to survive severe injuries.

The injury was close to the vertebral column and had the neural arch been severed, it would have been fatal.