H4 The Things You Find When Fishing: The Forensic Investigation of a Human Skull From the Sea

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After attending this presentation, attendees will understand the capabilities and limits of forensic pathology, anthropology, and zoology in order to determine the cause of death, the circumstances of death, and time since death associated with human remains found in the sea.

This presentation will impact the forensic science community by highlighting other marine invertebrates (muricids, a marine gastropod mollusk) that may have the potential of providing data that will be useful in estimating the overall duration of time that human remains have spent in the sea. As with other marine invertebrates, this could well be a vital component when determining the minimum time since death.

During April 2015, a human skull was found lacking its lower jaw, with only nine teeth of the superior arch present, no visible injuries on the skull cap, and covered by seaweed. The skull was recovered from a fishing net approximately three to four nautical miles offshore from Porto Tolle, Emilia-Romagna, Italy, in the northwestern Adriatic Sea. In the absence of any associated evidence, the Italian public prosecutor decided to forensically investigate the skull with the goal of gaining as much information as possible about the skull (e.g., human vs non-human, identity, cause of death, time spent in water). As a consequence, numerous experts in forensic pathology, anthropology, and zoology were invited to investigate the skull.

An analysis of the skull's anatomy, supported by X-rays, revealed it to be that of a young Caucasian male (23-35 years of age), with no injuries evident either ante- or postmortem. Suprisingly, the decomposition of the remains was not a consequence of being in the sea, as it lacked any abrasive marks usually associated with marine flora or fauna, and it was determined that it had spent only a short period of time in the sea.

The numerous brownish-yellow structures, each approximately 3mm-4mm that covered much of the skull and its interior, and initially considered to be seaweed, were identified as egg capsules of the marine gastropod *Ocinebrina* cf. *aciculata*. *Ocinebrina aciculata* is a representative of the Muricidae, a group of active predators that access their prey (gastropods, bivalves, and barnacles) by drilling a hole with their radula. This activity pierces the shells of their prey using a combination of chemical etching and mechanical abrasion. Muricid eggs are deposited in protective, chitinous capsules from which either crawling juveniles or planktonic larvae hatch.

X-rays of the skull also revealed the presence of an adult *O. aciculata* in the skull's left maxillary sinus where it layed its many egg capsules. It seems this adult lodged itself in the sinus by using its radula to pierce the the thin bones within the nasal cavity surrounding the sinus. The presence of unhatched egg capsules advocates a short colinization interval. Like many other marine invertebrates, further studies on Muricid biology, ecology, and development will help provide more information concerning how long a corpse may have spent in the sea.

Skull, Muricids, Marine Environment