Age determination of sperm whales (Physeter macrocephalus) from the west coast of Jütland, Denmark
Pagh, Sussie; Chriél, Mariann; Hedayat, Abdi; Nielsen, Thorkild Alnor; Hansen, Mette Sif

Publication date:
2016

Citation for published version (APA):
Age determination of sperm whales (*Physeter macrocephalus*) from the west coast of Jutland, Denmark

Sussie Pagha, Mariann Chriél, Abdi Hedayatc, Thorkild Alnor Nielsen, Mette Sif Hansen

* Aalborg Zoo, Mølleparkvej 63, DK-9000 Aalborg, Denmark. a National Veterinary Institute, Technical University of Denmark, Bülowsvej 27, DK-1870 Frederiksberg C, Denmark. b National Veterinary Institute, Technical University of Denmark, Bülowsvej 27, DK-1870 Frederiksberg C, Denmark. c Danish Museum of Natural History, Universitetsparken 15, DK-2100 København Ø, Denmark. Bjergfyrvej 16, 8250 Egå.

**Introduction**

Age determination of sperm whales (*Physeter macrocephalus*) by counting growth layer groups (GLG’s) in the teeth is to some extent considered to be subjective and only relative, due to: 1) Limited validation of GLG counts to “known age” of the individual; 2) Variation in methods for preparation of teeth e.g. acid (pH) and duration of etching; 3) Difference in interpretations of GLG’s between readers1,2. Bearing in mind these challenges, the age of three sperm whales stranded in Denmark in 2012 and 2014 were determined by counts of GLG’s in the erupted teeth from the lower jaw and comparing these with the number of GLG’s obtained from rudimentary teeth in the upper jaw.

**Materials and methods**

Teeth were obtained from 3 adult male sperm whales; MCE 1642, stranded at Nr. Lyngby Strand, Denmark in 2012; and MCE 1644 and MCE 1645, who stranded at Henne Strand, Denmark in 2014. From each whale one non-erupted tooth from the maxilla and one erupted mandibular tooth was cut longitudinally in two half’s with a diamond blade saw and grained with sandpaper gain 800. One half of each tooth was etched in 10% acetic acid for 7 hours and the other half was etched in 15% acetic acid for 3.5 hours. The GLG’s were counted several times by two readers.

**Results**

Based on counting of GLG’s the average estimated ages of the three sperm whales were between 29 and 39 years. However, some deviation due to intra- and inter reader differences was observed. The number of GLG’s in the rudimentary teeth did not differ significantly from the GLG’s of the mandibular teeth. Pulp stones were seen in both erupted and non-erupted teeth from all three whales.

**Conclusion**

Further studies are needed to develop the current preparation techniques to make clear and more easily readable GLG’s to obtain more accurate age determination of sperm whales.

<table>
<thead>
<tr>
<th>Whale ID and length</th>
<th>Tooth</th>
<th>GLG’s reader 1</th>
<th>GLG’s reader 2</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCE 1642 12.8 m</td>
<td>Rudimentary non-erupted maxillary tooth</td>
<td>36</td>
<td>31</td>
<td>Pulp stones</td>
</tr>
<tr>
<td></td>
<td>Erupted mandibular tooth</td>
<td>27</td>
<td>31</td>
<td>Enamel and outer dentine layers worn</td>
</tr>
<tr>
<td></td>
<td>Average GLG’s: 33.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCE 1644 14.5 m</td>
<td>Rudimentary non-erupted maxillary tooth</td>
<td>34</td>
<td>33</td>
<td>Average GLG’s: 33.5</td>
</tr>
<tr>
<td></td>
<td>Erupted mandibular tooth</td>
<td>37</td>
<td>33</td>
<td>Enamel and outer dentine layers worn</td>
</tr>
<tr>
<td></td>
<td>Average GLG’s: 28.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCE 1645 12.8 m</td>
<td>Rudimentary non-erupted maxillary tooth</td>
<td>38</td>
<td>38</td>
<td>Pulp stones</td>
</tr>
<tr>
<td></td>
<td>Erupted mandibular tooth</td>
<td>41</td>
<td>38</td>
<td>Average GLG’s: 39</td>
</tr>
</tbody>
</table>

Figure 1
Sperm whale (MCE 1644) stranded at Henne Strand, Denmark 2014. Photo: Mette Sif Hansen

Figure 2
The jaws of MCE 1645, stranded at Henne Strand 2014. Sperm whales usually only have lower teeth, albeit rudimentary upper teeth (insert) can exist like in this whale. Photo: Jørgen H. Hansen

**References**