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Brief Communication

CURRENT REGULATIONS FOR KILLING OF SEALS EVALUATED BY ELECTROGRAPHIC RECORDINGS OF BRAIN AND HEART ACTIVITY

The persistent muscle activity often observed during slaughtering and flaying of seals has prompted the question of whether or not the present methods for seal slaughtering are really satisfactory.

Regulations for seal slaughtering are given in the Norwegian governmental resolution, passed 6th February 1970. The regulations prescribe that the seal should be struck with a blow to the head, first with the weapon's blunt edge in such a way that the skull is immediately broken. After this the weapon's spike should be driven deep into the brain. The seals should then be bled by cutting through the blood vessels to the forelimbs.

Previous investigations on the Common Seal (Phoca vitulina) indicate that the persistent muscle activity is due to the fact that seals, unlike most non-diving mammals, have a musculature which is well adapted to anaerobic metabolism (*Blix et al.* 1970).

The object of this study was to examine the changes in electrical activity in the brain and heart under normal killing conditions of the seals.

The investigations were performed on three bluebacks (Cystophora cristata) about three weeks old. The seals were fastened to a table, and electroencephalograms (EEG) and electrocardiograms (ECG) were recorded by means of an oscillograph. The ECG electrodes were placed subcutaneously and the EEG electrodes close to the skull roof during local anaesthetic (10 ml Xylocain — Exadrin 1 %).

The animals were killed by a blow to the head with a "blow-hook" ("slagkrok", 50 cm long, 800 g steel hook). One of them was also bled by cutting through the blood vessels to the forelimbs after the blow.

The blow produced an immediate disappearance of recorded brain activity and an instantaneous stopping of the somatic reflexes. Respiratory activity was observed 15 min. later in the two seals which had not been bled but stopped after about 27 min.

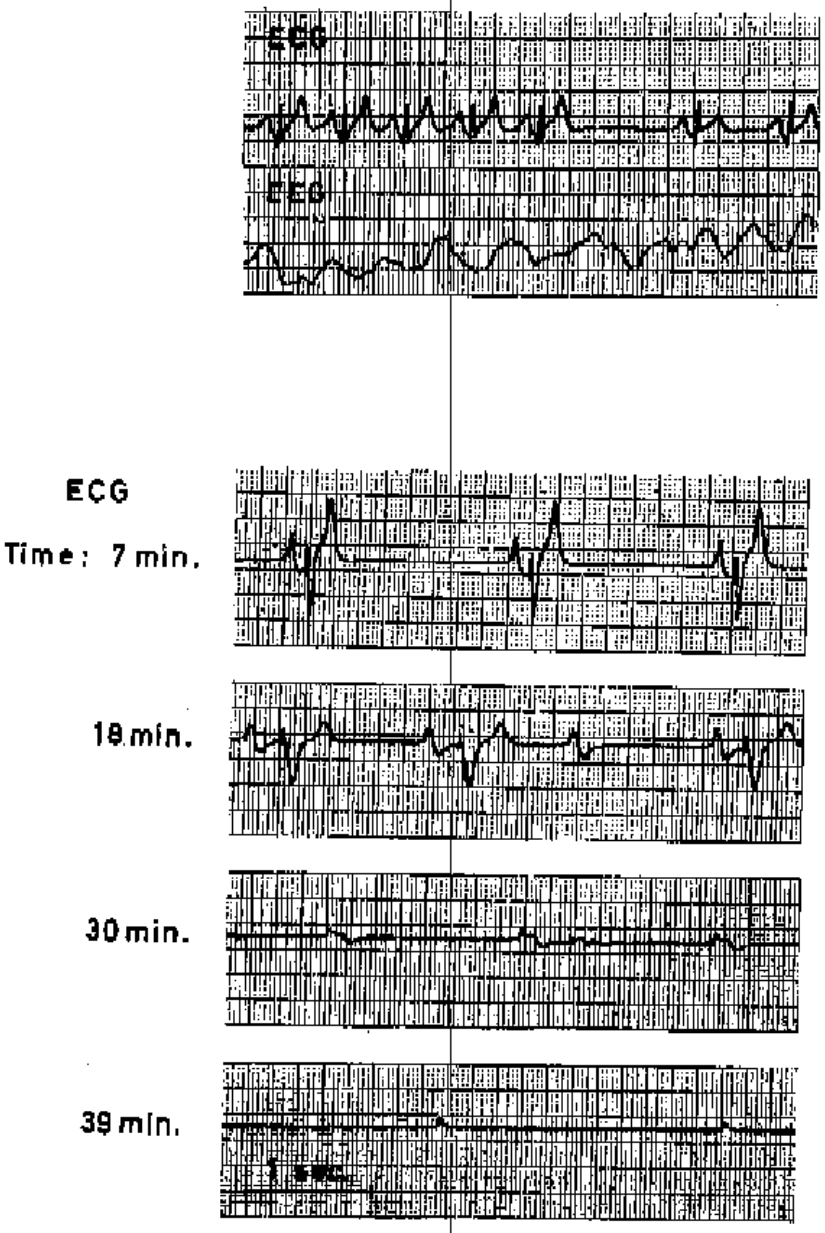

Figure 1. A. Heart (ECG, lead I) and brain (EEG) activity recordings from a normal, unanaesthetized seal pup.

B. Heart activity recorded in a period of 39 min. after slaughtering of the same animal. Brain activity was not traceable after the animal had been struck.

Heart activity was recorded up to 45 min. after killing of the one which had been bled, and 30 and 56 min. in the other two. EEG and ECG recordings from the seal which had been bled are shown in Fig. 1.

Examinations of a two weeks old domestic calf slaughtered after the same principle showed a stop in the electrical activity of the heart in less than 10 min.

The recordings of the brain's activity showed that killing by the above mentioned method produces immediate and irreversible loss of EEG. Bleeding, however, seems not to be a necessary factor for a satisfying slaughtering procedure but may be used as an extra precaution.

The persistent activity of the seal heart as compared with the calf's agree with the assumption that the seal musculature is adapted to anaerobic metabolism during diving.

The recurring respiratory activity is probably due to the fact that the respiratory center, located in pons and medulla oblongata, was not destroyed. Decrease in heart activity would cause a corresponding decrease in oxygen concentration and increase in carbondioxide concentration of the blood. The intact respiratory center would consequently be stimulated to continued respiratory activity for some time.

We have not yet been able to find indications for a connection between conscious life and the postmortal muscle activity observed during slaughtering and flaying of seals.

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