G79 Experimental Evaluation of Rigor Mortis: The Influence of the Breaking (Mechanical Solution) on the Development of Rigor Mortis

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The learning objective consists in presenting the influence of the breaking (mechanical solution) on the development of the intensity of rigor mortis

Although little is still known about its development over time, rigor mortis is routinely used to estimate the time since death. In order to further knowledge on this phenomenon the authors have developed a method for the objective measurement of the intensity of cadaver rigidity in rats.

The principle of the method is to determine the force required to cause a movement of small amplitude (4 mm) in the limb under examination. Since the movement doesn't break rigor mortis, serial measurements can be conducted. The apparatus measures the resistance caused by rigor mortis in the knee and hip joints of rats. This method was formerly used to evaluate the influence of several antemortem and postmortem factors (i.e. body weight, muscular mass, age, physical exercise, ambient temperature, various causes of death, electrocution) on the development of rigor mortis. Present investigations address a very poorly known phenomenon in the development of rigor mortis, which consists in the return of the rigidity after mechanical solution. In fact, observations on human cadavers have shown that if early rigor mortis is "broken" (by forcing a limb to bend), it may reappear. However information based on standardized experiments is lacking concerning this phenomenon. **Experimentation:**

Question addressed: - reappearance
- intensity after reappearance
- rapidity of reappearance
- time limit of reappearance
- rigor mortis time span after reappearance

Animals: male albinos rats, approx. 300 g Method to break rigor mortis: the paw is vigorously pulled twice in order to completely straighten the limb.
Breaking time points: 1, 2, 4, and 6 hours p ostmortem.
Measurement time points: 10 min, 1h, 2h, 3h, 4h, 5h, 6h, 8h, 12h, 16h, and 24 h postmortem.

Results: The maximal values of the intensity of rigor mortis are reached between 4 and 5 hours postmortem in the control group with a plateau of the intensity between 4 and 8 hours postmortem. If the breaking takes place at 1 hour postmortem, the curve representing the intensity of rigor mortis has the same shape, i.e., maximal values are attained at the same time, but values are significantly lower. A breaking point at 2 hours postmortem gives similar results: maximal values are obtained at the same time as in the control group but values are significantly lower. If breaking occurs after 4 or 6 hours no significant rigidity reappears.

Conclusion: Rigor mortis may reappear if it is broken during the early phase of its development, but its intensity is significantly lower. The time course of rigidity after breaking is the same as in the controls. If the breaking intervenes after the full development of rigor mortis, it doesn't reappear. These results offer a better understanding of the phenomenon of rigor mortis and, further, of the estimation of time since death, a fundamental element in forensic medicine.

Rigor Mortis, Breaking of Rigor Mortis, Development of Rigor Mortis

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