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Durable Preservation of Feline Cardiac Structures Via Plastination Methods

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Plastinated semi-transparent slices of cat cardiac structures were obtained. The slices processed according to the E12 plastination technique, are with dark-yellow to light-brown colour, whereas those plastinated with Biodur S10 — light-yellow with clear details. P40 plates are nearly completely transparent, but with a light yellowish taint.

Key words: plastination, Biodur, sheet, slices, heart.

Introduction

This experiment is part of a complex research of cardiac structures in the cat and represent a coordination approach for comparison and control of the correct interpretation of data obtained by other experimental techniques. Plastination is a method for a preservation of perishable biological specimens — whole organs or parts of them [8, 9]. These techniques use silicone Biodur S10 for plastination of whole organs [3, 4], epoxy resin Biodur E12 for preparation of body slices [1, 6, 7, 11] and polyester resin P40 — for brain sheet plastination [2, 5, 10] to obtain durable preparations that are safe for human health and are practically permanent [8].

The **aim** of the study was the visualization of cardiac structures by means of plastination technologies. The following **tasks** were performed with regard to achieve our aim: **1.** To specify the type of necessary anatomical structures; **2.** To determine the plastination method for processing of anatomical specimens; **3.** To select the protective material that should be used for obtaining durable results.

Material and Methods

The experiment was performed with four male cats conforming to all animal welfare regulations. After perfusion with 10% formalin and freezing at —35°C, the thorax of

animals was sectioned with a band saw to 0.6-0.8 mm thick slices (transverse sections). The slices were dehydrated and impregnated according to S10, E12 and P40 techniques.

Results

After the processing and the gas-curing phase of plastination, elastic semi-transparent slices with a thickness of 0.6-0.8 mm were obtained. The slices processed according to the E12 plastination technique, are with dark-yellow to light-brown colour (Fig. 1), whereas those plastinated with Biodur S10 — light-yellow with clear details (Fig. 2). P40 plates are nearly completely transparent, but with a light yellowish taint (Fig. 3).

Discussion

The analysis of this three plastination methods (Table 1) showed that the best optical results were obtained by the P40 plastination technique. These anatomical preparations are completely transparent and give the most complete image for anatomical

Fig. 1. A E12 plastination technique slice

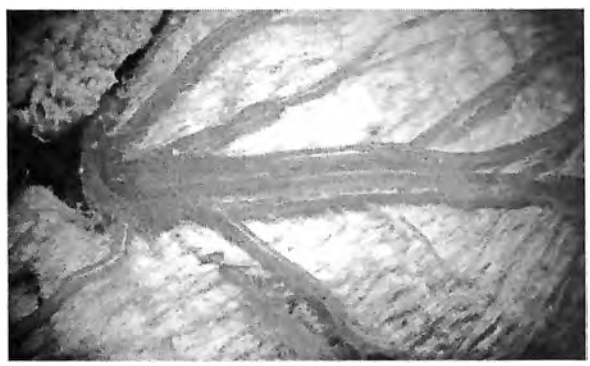

Fig. 2. A S10 plastination technique slice

Fig. 3. A P40 plastination technique slice

T a b l e 1. Differences in the quality of anatomical preparations, obtained via three plastination techniques (using a 5-grade score system)

E12	Transparency ++	Elasticity +	Rigidity +++++	Strengths ++++	Durability +++++
S10	Transparency +++	Elasticity ++++	Rigidity +	Strengths ++++	Durability +++++
P40	Transparency ++++	Elasticity +	Rigidity +++++	Strengths ++++	Durability +++++

Strengths = tensile and compressive strengths.

details simultaneously with an adequate strength of preparations. They are suitable for study of fine cardiac details for a long time without risk of slice damage.

The slices prepared by the E12 plastination technique are with the least transparency and altered colour (the protective medium is dark-yellow to light-brown and the cardiac structures are dark brown that reduces the potential for observation of their structure). These slices are harder and stronger, but less elastic. They are appropriate for observation under any conditions, and the time of their use decreased under mechanical stress.

The S10 preparations are with the greatest elasticity, but are less transparent than both E12 and P40 slices. Relatively fewer details could be observed on them, they endure sharp mechanical stresses, for instance, falling on the floor, but are not resistant to tension — they are easily sheared at excessive stretching. Absolutely, they are the least expensive — from points of view of equipment and technology, but their relatively low mechanical strength and low durability makes them relatively costly.

Conclusions

1. Human and animal morphological preparations, made by plastination techniques, provide a very accurate view about the anatomical structure of processed organs. **2.** Depending on the applied plastination method, the optical and mechanical properties of preparations are different. **3.** The choice of a plastination method is determined by the purpose of ready preparations, the mode of their use and the

resources of the respective plastination laboratory. 4. Plastination technologies are very promising in the field of morphology as an alternative for elaboration of durable anatomical preparations.

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