PLASTINATION OF THE BRAIN: DOES FREEZING PRIOR TO DISSECTION PROVIDE BETTER DISTINCTION BETWEEN NUCLEI AND FIBRE TRACTS?

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With the recent decline in the number of brains available for dissection, the use of pre-dissected, plastinated specimens has become increasingly important in the teaching of neuroanatomy. For the specimens to be of the most value, however, it must be possible to distinguish nuclei from fibre tracts. Since freeing of brain tissue prior to dissection generally increases the distinction between gray and white matter in unplastinated specimens, the following study was carried out to see if the freezing method resulted in better differentiation between nuclei and fibre tracts in plastinated specimens.

Brains previously fixed in 10% formaldehyde were washed overnight in cold, running water, then placed in a plastic bucket containing fresh 10% formaldehyde, and stored in a deep freeze, at -25YC, for 8 days. The brains were then thawed under cold, running water, for 24 hours. The freezing and thawing procedure was repeated twice more before dissection was performed. These dissected specimens, along with those of fixed ,brains that had not been previously frozen, were then plastinated together, using the standard S-10 method.

It was found that freezing the brains made the dissection of both nuclei and fibre tracts easier. However, the cortex of the "frozen" brains was more fragile and , therefore, more prone to damage during dissection. Nuclei and fibre tracts were equally distinctive in both "frozen" and "unfrozen" brains, suggesting that, for the purposes of plastination, freezing the brains does not enhance the distinction between nuclei and fibre tracts.

FIXATION RECIPES FOR THE PLASTINATOR

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The technique of plastination has proven to be a very forgiving process. Variances in technique can be instituted to fit one's equipment capabilities, time restraints, and even the occasional oversight. However, one thing plastination does not do is to miraculously improve the appearance of a fixed specimen. The time spent in preparation of a specimen, in both the detail of the prosection and the type of prefixation, greatly determines its esthetics value. With embalmed specimens one is limited to solutions that are efficacious enough to retard autolysis and mold throughout the study. Although Biodur FX-10, FX-20, and ethylene glycol have demonstrated very good color and tissue preservation as an embalming solution, the cost for these solutions is high. A greater degree of flexibility in preservative is available however with fresh specimens. Although the mechanics of the plastination process does not definitively demand that a specimen be fixed, time is often needed to provide the perfect anatomical prosection. Fixation qualities of 10 solutions were evaluated for short term preservation of fresh specimens. Considerations used in their evaluations were: hazardous material designation, cost, color preservation, texture maintenance, and overall fixation quality. The highest quality specimens were produced when fixation time was limited to 48 hours, followed by submersion in water until ready for dehydration. Shorter exposures times did not provide adequate fixation while extended times invoked severe color loss. The acetone and alcohol solutions failed to merit the classification of a preservative due to tissue degradation within 2 days after a 48 hour fixation. The environmentally safe fixatives, Streck Tissue Fixative (STF) and Histochoice, although suitable for fixation duration and texture maintenance, rated low in color preservation. The modified lore's solution provided the best color preservation while maintaining a reasonable degree of texture. However, for those specimens which require a more rigid fixation (Hollow organs) a 2 percent formalin solution would be preferred over the Jore's.

BI-PHASIC ACETONE RECLAMATION

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Through a bi-phasic program of reclamation, the collection of large volumes of acetone can be both simple and inexpensive. Phase I is a process of freeze vacuum distillation which reclaims 96-98% acetone from the waste acetone (contaminated to < 65% by water and fats) produced during specimen dehydration. Volatization is induced by the application of vacuum to acetone which has been heated by a warm water bath. Condensation is similarly enhanced by the cooling of the acetone vapor in the freezer and hence the liquid collection. Phase II is the reclamation of acetone that is being extracted from specimens during the impregnation stage of plastination. This volatized acetone is typically discharged into the laboratory atmosphere with the vacuum pump's exhaust. By directing the vacuum line to a collecting canister (at room temperature during lower levels of vacuum and in a freezer at higher vacuum levels), 1 1/2-4 liters of 99% acetone are reclaimed per 25 kilograms of tissue being plastinated. Operating expenses are reduced by both minimizing the production of hazardous wastes and the recycling of such an integral component of the plastination process.

COMPARISON OF BODY TISSUE LAYERS OF PLASTINATED SECTIONS WITH BODY TISSUE LAYERS OF MAGNETIC RESONANCE SCANS

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A steady growth and development in computer imaging modalities require a methodology for teaching, research and interpretation of cadaver sections and computer imaging scans. This paper adds to the guidelines already established for the

teaching of anatomy to correlate with the sectional scans depicted by computer imaging modalities. Enlarged (close up) photos were taken of sheet plastinated and in some cases S-10 sections of human cadavers to represent each class of layers.

The purpose of this paper is to explain and demonstrate four classes of body tissue layers as one guideline used for the teaching, research and interpretation of sectional anatomy. In order to do this the layers of plastinated sections are compared to similar layers of magnetic resonance images. Each of the four classes of tissue layers (Lane '95) are matched. That is, the somatic tissue layers of the plastinated section is compared to the somatic tissue layers of a similar MRI scan. Likewise, the extravisceral, intravisceral luminar and intravisceral nonluminar classes of tissue layers of plastinated sections are correlated with similar tissue layers of the MRI scans.

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