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RESEARCH ARTICLE

THE POLYESTER RESIN PLASTINATION AS A TOOL FOR MAKING PERMANENT DRY SPECIMENS FOR TEACHING GYNAECOLOGY

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ABSTRACT

Plastinated specimens make significant and quick references for the understanding of Gross Anatomy. The reproductive organs were collected from the slaughter house in Namakkal, Tamil Nadu and are fixed in Keiser ling I solution. Dehydration was done by a number of changes in acetone followed by xylene. The air drying of the specimen in the following step permits substitution of xylene by air. The organs are treated with polyester resin followed by curing with a mixture of resin and catalyst. The completely cured specimens are labeled and the labels are again coated with resin catalyst mixture, so as to make the labels permanent. Thus, the resulting specimens become a three dimensional model of original which do not require wet preservation.

INTRODUCTION

Plastination is a unique technique of tissue preservation where bodily fluids and fat are replaced by reactive polymers such as silicone rubber, epoxy or polyester resins. Plastinated specimens are dry and odorless they retain their natural surface and are identical with their state prior to preservation. The exotic method of plastination using Silicone resins are very expensive. So indigenous plastination technique using General purpose Polyester resin was done in the reproductive organs of different domestic animals. This indigenous plastination process is cheaper and resulted in good quality dry, odourless and solid specimens which can be used for teaching Gynaecology. The class of polymer used determines the mechanical and optical properties of the preserved specimen (Hagens et. al., 1987). Plastination technology has obtained great acceptance, particularly because of the high quality of the preservation as well as the durability and the teaching value of the specimen

MATERIALS AND METHODS

The Indigenous plastination technique was conducted on male and female reproductive organs of various domestic animals. The specimen are collected from slaughter house in Namakkal. The specimens are initially fixed with Keiserling I solution that contain formalin, potassium acetate and potassium nitrate in order to maintain the original colour of the organs. Fixation was done for five days, after which they are thoroughly washed in tap water for six hours. Then the specimens are dehydrated in three changes of acetone for three weeks. Then the specimens are impregnated with general purpose resin which is nothing but indigenous polyester resin. Curing was done by coating a mixture of general-purpose resin, 5% catalyst and 2% accelerator.

RESULTS AND DISCUSSION

After plastination, the resulting tissue is safe to handle (i.e., toxic fixatives are eliminated), the tissue has no odour and it is extremely durable (Hagens et. al., 1987). Keiserling solution is found to be the best fixative for plastination process (Oostrom 1987) because it maintains the original colour of the organ. The plastination process involves two exchange phases. In the first exchange phase, acetone replaces bodily fluids and fat through diffusion. In the second exchange phase, the acetone is replaced with polyester resin. Henry (1992) used "BIODUR" S-10 curable polyester resin for plastination. Since such special quality resins are not available in India, this study was conducted by using indigenous polyester resin and catalyst which are less expensive. The dehydrated and defatted specimen is placed into a resin solution. The evaporating solvent (acetone) creates a volume deficit within the specimen, which gradually draws the resin into the tissue. The size of the organ determined the time of impregnation. In this study it took six days for complete impregnation.

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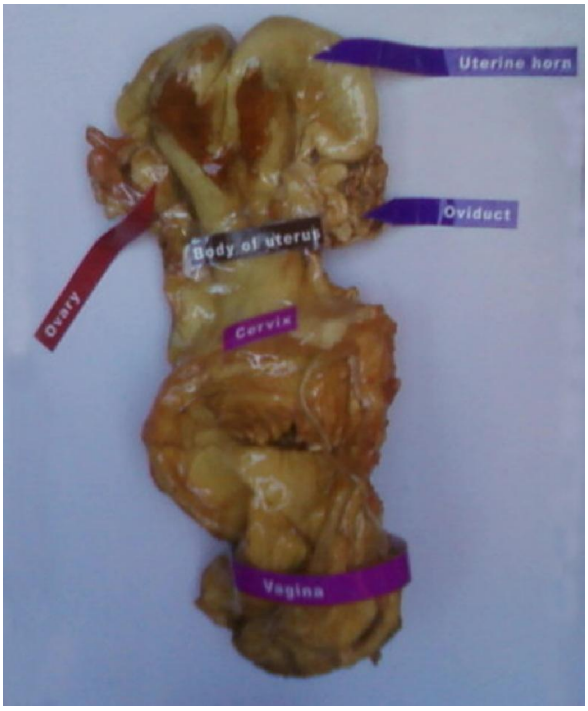

POLYESTER PLASTINATE OF ADULT BOVINE UTERU

According to Hagens et. al., (1987) the silicone resin impregnated specimen is hardened by exposing it to a gaseous hardener and polyester or epoxy resin impregnated specimen is hardened by exposing it to light and heat. In this study the impregnated specimen was cured with the commercially available catalyst and the process is fastened by the addition of accelerator. Hardening was done successfully by coating the impregnated organ with a mixture of general-purpose resin, 5%catalyst and 2%accelerator, which completed the curing process within an hour. Care should be taken to remove the organ from the hardening medium before the completion of hardening process. Plastination is carried out in many institutions worldwide and has obtained great acceptance particularly because of the durability, the possibility for direct comparison to CT- and MR-images. Plastinated specimens can be repeatedly handled by students without causing any body reactions of chemicals (Ramakrishna et. al., 2002) and can be stored as would any inert object.

Conclusions

This study has established the fact that we can produce indigenous plastinates of cheaper cost which are highly durable and user friendly, requires no wet preservation and can be best used for teaching gross anatomy.

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