



## LECTURE ABSTRACT

### “Principles of Plastination”

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The polymers used in plastination today are silicone, epoxy and polyester. Every single polymer has its own field of application, but the use of the different polymers is done by the same principle. Epoxy and polyester are used for thin (<5 mm) sections, where silicone is used for whole (3D) specimen and thick sections.

The consecutive steps in all techniques are:

1. Fixation and preparing (dissecting) the specimen;
2. Dehydration of the specimen;
3. Impregnation of the specimen with the polymer of choice
4. Curing of the impregnated specimen

Fixation is best done with a solution of formalin, 3-6 pbv of a commercially available 37% solution of formaldehyde in water, in 97-94 pbv tap water, giving a 3-6% formalin solution. The fixative can be administered by submerging, infusion or vascular transfusing. Preparing sections can be done using a bandsaw for specimen containing bone, or a deli slicer for specimen containing only soft tissues. After sawing the saw dust must be removed carefully. 3D specimen need to be dissected as careful as possible, skin and subcutaneous and other fat must be removed as much as possible.

Dehydration is performed by submerging in consecutive baths of acetone at -200 C, acetone vs specimen ratio is best 10:1. The acetone baths are stirred every day. When dehydration is complete the specimen can be kept in the acetone at RT for defatting.

The acetone in the specimen is exchanged with the polymer of choice by submerging the specimen in the polymer, and gradually applying vacuum, thus boiling the acetone out of

the specimen and dragging the polymer into the specimen. Impregnation is considered to be complete when acetone bubbles cease to rise to the surface of the impregnation bath.

Curing of epoxy impregnated specimen start as soon as the impregnation mixture is mixes, so impregnation need to be performed quickly and curing needs to be done within hours after impregnation is stopped. Curing is finished by applying heat (40-450 C) for 2-3 days.

Curing of polyester is done by applying UV-A light to the specimen in absence of oxygen, here for the specimen is "packed" in a flat chamber of 2 glass plates.

Curing of silicone impregnated specimen is done by exposing the impregnated specimen to a gaseous cross-linker that will cure the specimen from the outside to the center, while the surface is regularly wiped clean to prevent the formation of silicone dimples on the surface of the specimen. Once the surface is dry and cured no further care has to be taken. Exposure to water (vapor) has to be avoided as this will form white crystals on the surface.

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