# PLASTINATION MODEL IN ORAL AND MAXILLOFACIAL SURGERY

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Plastinated cadaveric material has been used for medical teaching purposes for over fourteen years. The literary search in oral and maxillofacial surgery and head and neck surgery has shown little work in a plastinated model. The process of plastination was developed by Dr. Gunther von Hagens in Germany in 1978 and has been modified many times since. The basic process involves the extraction of lipids and water from fresh cadaveric specimens and replacing the lipids and water with a silicon-type material.

The use of plastinated specimens in teaching head and neck anatomy has several advantages over embalmed specimens. The plastinated specimens are non-toxic, non-lipidic, and odorless. Multiple sections of these specimens can reveal the three dimensional aspects of anatomy and whole specimens can be used for demonstration of surgical techniques such as arthroscopic surgery.

The process of plastination begins with fresh, frozen, whole or 5mm sections of the head which are placed in a 20% formalin solution for a period of one week. The 5mm sections were obtained in the three anatomical planes using separate specimens. A "freeze substitution" dehydration method is utilized that impedes rapid dehydration and produces less tissue shrinkage and distortion. The water in the tissues was replaced by an acetone solvent. After fixation the specimens were transferred into several cold acetone baths, which were pre-cooled at -25 degrees centigrade over the course of three weeks. By the end of the third week, the acetone was measured at 99%. The container with specimens was left under the hood for three days to allow for the removal of some lipid content of the specimens and returned to the dehydration freezer for pre-cboling in preparation for silicon impregnation.

The impregnation is performed using a dedicated ultra-cold, chest-like, explosion safe freezer which is maintained at a temperature of -28 degrees centigrade. This freezer has been specifically designed with built-in ports for vacuum lines and has a full length frost free viewing window in the lid. Inside the freezer is a large stainless vacuum chamber which contains Biodur S-10 (silicon) of sufficient quantity to allow for immersion of the specimens being impregnated. After forced impregnation of the silicon material, the specimens are cured for several days to allow for hardening under a fume hood.

The sectioned material can give a three dimensional view of facial anatomy which is now preserved for future study and examination. The whole material can be used for demonstration of surgical procedures or for teaching Temporo-mandibular Joint arthroscopy.

**REFERENCES**

**1.** von Hagens, G. Heidelberg Plastination Folder. Anatomisches Institut, Universitat Heidelberg. April 1985.

2. von Hagens, G. The Current potential for plastination. Anat. Embryol. 175:411-421, 1987.