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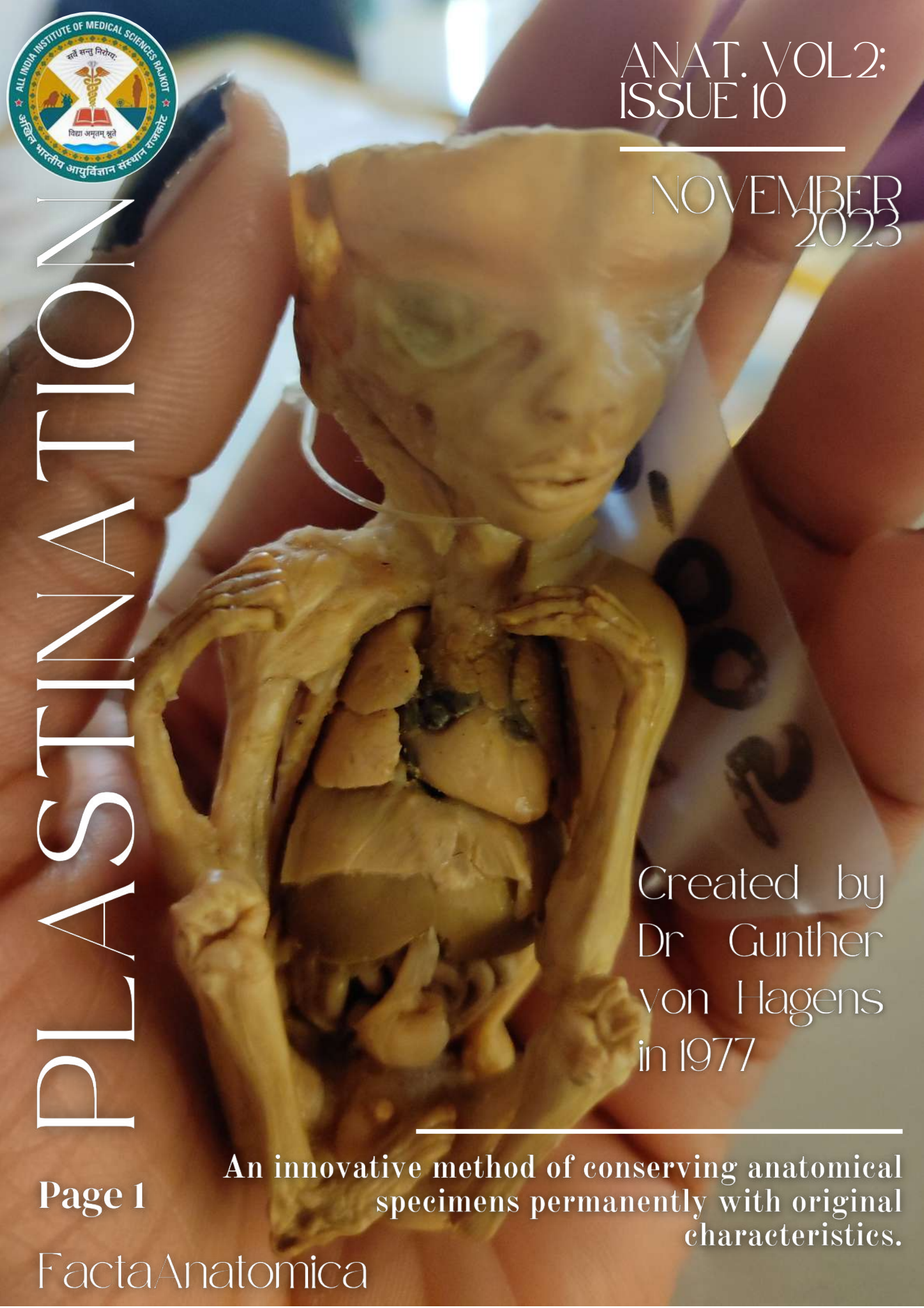
PLASTINATION



Created by Dr Gunther von Hagens in 1977

An innovative method of conserving anatomical specimens permanently with original characteristics.

Professor Gunther Von Hagen, a German Physicist and Anatomists, created, named and developed the process of plastination technique in 1977. The term PLASTINATION itself has its origin from a Greek word "plassein" meaning "to shape or to form."

PLASTINATION

It is an innovative method of conserving anatomical specimens, where all bodily fluids are exchanged with a polymer, which can be hardened. Through this revolutionary plastination process, the specimens are odorless, obtain no health risks and are permanently fixed with original characteristics

In this process, water and lipids in biological tissues are replaced by curable polymers mostly silicone, epoxy, and polyester which then will harden and finally result in natural looking, dry, odorless, mouldable and durable specimens. Many applications of plastinated specimens have been prepared by the standard techniques of plastination. These specimens are considered as an important tool for teaching and lifelong preserving anatomical variations.

Process of Plastination

STEP 1- FIXATION.

Formaldehyde or other preservation solutions are pumped through the arteries to kill all bacteria and to prevent the decomposition of the tissues. This process takes about 3-4 hours.

Dissection and Plastination of an entire body requires about 1,500 working hours and normally takes about one year to complete

STEP 2-ANATOMICAL DISSECTION

Skin, fatty and connective tissues are removed in order to prepare the individual anatomical structures and elements.

STEP 3-REMOVAL OF BODY FAT AND WATER

When the necessary dissection is completed, the actual process of Plastination begins. In the first step, the water and soluble fats are dissolved from the body in a bath of acetone. Under freezing conditions, the acetone draws out all the water and replaces it inside the cells

STEP 4-FORCED IMPREGNATION

Specimen is placed in a bath of liquid polymer, such as silicone rubber, polyester or epoxy resin. By creating a vacuum, the acetone boils at a low temperature. As the acetone vaporizes and leaves the cells, it draws the liquid polymer in so that the polymer can penetrate every last cell. This process lasts 2-5 weeks.

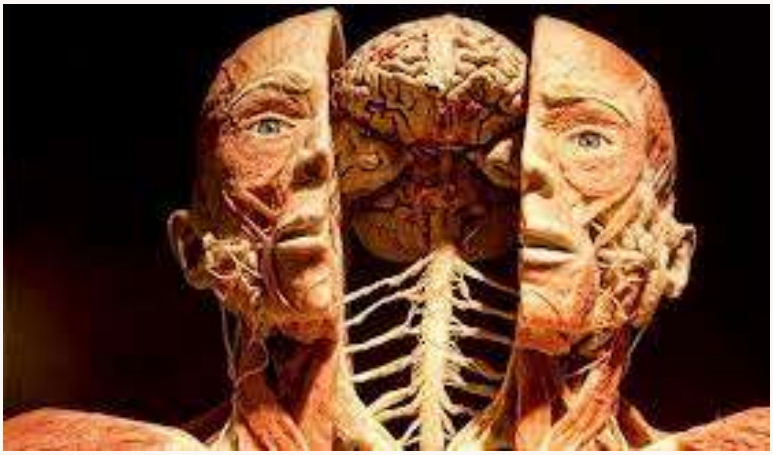
STEP 5-POSITIONING

After vacuum impregnation, the body is still flexible and can be positioned as desired. Every single anatomical structure is properly aligned and fixed with the help of wires, needles, clamps, and foam blocks. Positioning requires a lot of anatomical knowledge and a defined sense of aesthetics. This step can take weeks or even months.

STEP-6 CURING (HARDENING)

In the final step, the specimen is hardened. Depending on the polymer used, this is done with gas, UV light or heat. Curing protects the plastinate against decomposition and decay.

TYPES OF PLASTINATION



WHOLE ORGAN OR BODY PLASTINATION

SHEET PLASTINATION

Sheet plastinates are 1-5 millimeter thick plastinated body slices from real human bodies. All bodily liquids of the specimens have been replaced by polymers. In comparison to CT and MRI images, sheet plastinates illustrate anatomical structures either in colour or transparent

LUMINAL CAST PLASTINATION

The main principle of this technique is filling up the lumen of the specimen with commonly available Rubber silicone and dissolving the tissue surrounding it. This technique is used on lungs, cerebral ventricles; bony labyrinth; vascular patterns of kidney, liver, lung, spleen, coronary vessels, etc

According to the Polymer Material used

1. Silicone polymer (S10) is used for the preservation of the whole cadaver or only limb or viscera.
2. Epoxy polymer technique (E12) to create transparent sections of the body at different levels or sections of tissue.
3. Polyester polymer technique (P40) to create sections of the brain.
4. Light-weight plastination employing xylene and silicone.
5. The Quickfix® Procedure to produce plastinated cadaveric hearts by using Quickfix® and amyl acetate in equal proportion for impregnation.
6. Melamyne procedure: Melamyne (polymer) and xylene(intermediary volatile solvent) for plastination.
7. Thermocol

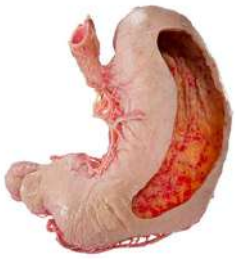
Based on Nature and Dimension of Tissue

1. Plastination of whole organ or body.
2. Luminal cast plastination of hollow organs.
3. Sheet plastination for sectional plastinates.

Facta Anatomica: Plastination

The Benefits of Plastination

Plastinates are accurate representations of preserved bodies illustrating all functional structures perfectly and are visually appealing, that cannot be shown with three-dimensional models



Plastinates being non-toxic, can help limit or completely exclude formaldehyde fume exposure by reducing the time spent dissecting and then studying wet specimens.

Every medical colleges may not be able to maintain their own body donation programs,wet specimen dissection programs or may need to severely limit them. Additionally, due to religious and cultural restrictions, institutions in some countries may not have any access to body donors. Aside from problems with availability, wet specimens are difficult to transport and can only be used and stored in specific, approved locations. Plastinates, however, can be used wherever needed and can easily be transferred between teaching locations.

Because plastinates guarantee visibly clear anatomical structures or specific abnormalities, teaching with them is very effective and results oriented.

Wet dissection programs require costly and regular maintenance, plastinates need almost nothing in terms of maintenance. Simple dusting and color touch-ups (occasionally needed after 5 years) are the extent of maintenance needed for plastinates. Due to their durability, plastinates can be reused year after year.

1

The Alternative to Artificial Models

2

The Alternative to Formalin Specimens and Wet Specimen Dissection

3

Health Aspects

4

Effective Curriculum

5

Practical Aspects

6

Economic Aspects

REFERENCES

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- Ravi SB, Bhat VM, Plastination: A novel, innovative teaching adjunct in oral pathology. Journal of Oral and Maxillofacial Pathology : JOMFP. 2011;15(2):133-137.

- Von Hagens Plastination https://www.vonhagens-plastination.com

MESSAGE FROM EXECUTIVE DIRECTOR
PROF.DR. (COL.) CDS KATOCH,
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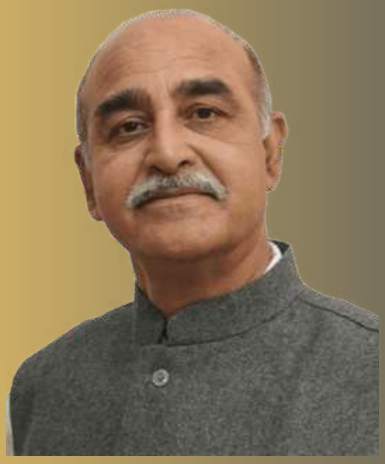

"I heartily congratulate the Department of Anatomy for bringing this informative newsletter on the anatomical explanation of the PLASTINATION. My best wishes to the entire team."

Dr Simmi Mehra, Professor & Head

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