

Editorial

Research Applications of Plastination

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The organizers of the recent conference on Plastination that was held in Brisbane, Australia during July of 1996, asked the author to deliver a paper on Research Applications of Plastination. The idea behind the request was to address something which several people have found to be a problem. That is the fact that plastination activity world-wide to date, has been predominantly either developments of a technique or preparation and use of specimens for educational uses.

In most places in the world, university staff have their performance assessed mainly on the basis of research output and when one is seeking grant support for one's activities, there are very few agencies which give grants for developing educational materials. This is certainly creating difficulties for plastinators all over the world.

The following paper was prepared and delivered with the above as prompt.

Chairperson, Ladies and Gentleman

I would like to start off by thanking Peter Bore and other organizers of this conference, for inviting me to deliver this paper.

As you all know, the process of Plastination has, since its inception, taken giant strides and have been applied in a variety of fields. It has been used in the field of teaching; it has been used to create examples for display purposes; the past week we have seen several new applications where the process of plastination is used; and of course plastination

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has been used as a tool in **research**, and not only as a tool in teaching.

If we look at the latter - In preparing this talk, I obtained as many publications on plastination as I could lay my hands on. I can recommend this to anyone. It makes excellent reading to see how wide plastination has been used, and how diverse the process can be applied when researchers set their mind to a problem.

I would like to list some of the papers in which the process of Plastination has been mentioned over the years. I hasten to say that this is by no means a complete list. It was compiled with the sole purpose of giving an overall view of the application of the process of plastination and should not be seen as a complete list of all publications that were ever published on plastination. At the time of preparation of this talk I was not yet in possession of a copy of the excellent work done by Gilles Grondin and R6gis Olry and which they published as the Current Plastination Index. If I had had a copy at the time, it would have made my job much easier.

I start off in 1987, not in an effort to degrade any earlier publications on plastination, but only due to the fact that I think a timespan of nine years covers enough publications to enable anyone to reach a conclusion on the diversity of application of plastination, especially in research.

Publications on plastination are as follows:

1987:

Bickley and his co-workers on the preservation of Pathology specimens for teaching purposes.

Sloka and Schilt on the utilization of the postmortem examination with emphasis on audiovisual aids for teaching purposes.

Cooper and co-workers on the preservation of dissected anatomical detail in the human temporal bone, a teaching use of plastination.

In this year von Hagens, Tiedemann and Kriz published a paper on the current (at that time) potential of plastination. In that paper they refer to (amongst others) where plastination was (up to then) used in the field of **research**.

1988:

Fritsch on developmental changes in the retrorectal region of the human fetus. **Research** use for plastination.

1989:

Müller and co-workers on plastination of breast cancer growths for *teaching* purposes.

Bachert and Ganzer on experimental studies done on the relationship between the maxillary sinus ventilation and various obstructions of the nose and nasopharynx. A **research** use of plastination.

1990:

Dawson and co-workers on the use of plastination in the *teaching* of Pathology.

Ulfig and Wuttke on plastinating stained sections of the human brain for *teaching* purposes.

1991:

Use of plastinated specimens in the *teaching* of Forensic Pathology, Odontology and Anthropology was the subject under discussion in two papers by Hawley and co-workers.

1992:

Pond and co-workers on preservation of tissues for use in Anatomy and Histology *teaching*.

1993:

Eckel and co-workers shed some light on a new approach to morphological **research** with excised larynges.

Fritsch published a paper on the development and organization of the pelvic connective tissue in the human fetus where plastination was used in **research**.

1994:

Brizzi and co-workers on the organization of subperitoneal connective tissue in the female pelvis. Plastination was used here as a **research** tool to determine the basic Anatomy and Histology.

Several papers on plastinated fetal elbow joints by Reidenbach and Schmidt. Plastination was here used for

L purposes.

The same year produced a paper by Grondin, Grondin and Talbot on the use of plastinated specimens for light and electron microscopy. **Research**.

1995:

Fritsch and Hotzinger reported on the tomographical anatomy of the pelvis, visceral pelvic connective tissue and its compartments that they worked on while using plastination as a tool. **Research** use of plastination.

O'Sullivan and Mitchell on plastination for gross anatomy *teaching* (low cost equipment).

Reidenbach on using plastination for determining the normal topography of the conus elasticus in order to determine the anatomical bases for the spread of laryngeal cancer. Thus a **research** use for plastination.

Satyapal also used the process of plastination in his study of the drainage patterns of the renal veins. A **research** use of plastination.

As can be seen from the few examples that I refer to here, the application of the process of plastination is very diverse and covers a wide spectrum of applications, mostly of course in the field of medical *teaching*. This inevitably leads one to ask " *Where and how else can the process of plastination be used as a tool ?* "

As we all know, it is very difficult to obtain money nowadays for anything else but for research. To me it therefore seems of utmost importance that the application of plastination as a **research tool** must be developed further.

In order to make this happen, the time is ripe to give structure to plastination as a separate field of research on its own.

We need to obtain answers to the following questions in as far as plastination is concerned:

1. Which fields of research have up to now been utilized? (e.g. Anatomical, Biological, Pathological, etc.).
2. What types of research is obtainable? (e.g. Basic, Developmental, Applied, etc.).
3. What are the possibilities of application of plastination in research?
4. What has been done up to now?
5. What research are we suppose to do?

Due to the fact that **research** has so many facets, it would be presumptuous of me to present a preconceived framework here today. In this respect it would be appropriate for a group of people, such as we are here today, (that is experts, not so experts, and users of plastination) to put our

minds together and come up with a development plan for research in the field of the use of plastination as a research tool.

I would therefore like to ask you to participate in small group discussions (think tanks) so that we can pool our thoughts on this issue.

All attendants at the conference were divided up into four groups and each group was asked to address the following and to come up with suggestions.

Questions 1 and 2 were included with the sole purpose of starting the thinking process going, and no answers were expected. Question 3 took up so much time that not a single group really got round to answering question 4. The answers to question 5 were combined with the answers to question 3 in the answers given by the rapporteurs.

WITHIN THE ALOTTED TIME, PLEASE DISCUSS THE FOLLOWING AND COME UP WITH SUGGESTIONS.

*In as far as the use of (the process of) plastination as a **research** tool is concerned:*

1. Which fields of research have up to now been utilised? (Biological, Pathological, etc.).
2. What types of research are obtainable? (Basic, Developmental, etc.).
3. What are the possibilities of application of plastination in **RESEARCH**?
4. What has been done up to now?
5. Areas in which you would like to see plastination being used as a research tool.
6. What is the importance of the question of how and where can Plastination be used as a research tool?

POSSIBLE USE OF PLASTINATION IN RESEARCH:

The following suggestions regarding the possible use of the process of plastination in research, have been made by delegates at the International Conference on Plastination held in Brisbane, Australia during July 1996.

Delegates were of the opinion that the process of plastination can be a very useful tool in the following fields. During report back time each rapporteur gave some information on how their group actually thought that plastination could play a useful role in research. The following fields were identified as possible areas of application:

Anthropology

Archeological preservation

Developmental anatomy

- embryos: human and veterinary

Comparative analysis (study)

Developmental techniques - attachment of muscles

Degenerative Anatomy/Pathology

- muscular degeneration of prostate

Document preservation

Forensic science - soft tissue injuries

Geological research

Identification purposes for research

Lower back injury - sections can show disc injury

Orthopaedic research

- functional relationships

- changes in articular cartilage

- vascularisation of bone

Preservation of cells for later research

Preservation of textiles

Surgical research

Surgical techniques

Three dimensional reconstruction

- blood vessels of the brain

Transport of tissue for research

Trauma research

Variation of topography of organs

Volume analysis Water-proofing

agent

It became quite clear that the process of plastination has the potential to be used in a very wide field of interest.

It is (and will become increasingly so) the responsibility of each and every plastinator to ensure that the process of plastination becomes known and is used in areas other than just Anatomy. The future (and survival) of plastination does not lie only in the bettering of the process itself, but will mainly be based on the use of the process in other fields of interest.

If we as plastinators do not become disciples for the use of plastination, the process itself will fall back into the category of being "just another means of preserving biological material" (as for instance the process of embalming has become).

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