Uses and abuses of the word "Plastination"

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Dear Editor,

The term "plastination" appeared for the first time in scientific literature in two manuscripts published in the German journal Der Präparator in 1979 (von Hagens, 1979a; Knebel, 1979). A manuscript published in The Anatomical Record did not use the word plastination but gave a precise description of the impregnation process that is the key to the plastination technique (von Hagens, 1979b). In these papers, plastination is described as, "a new method of impregnating perishable specimens with resins...by utilizing the difference between the last intermedium's high vapor tension...and the polymer's low vapor tension". This description was confirmed later as, "...a method for the impregnation of biological specimens with curable polymers...This method is called "plastination." (Bickley et al., 1981). The plastination technique has since been widely recognized and used around the world for describing various preparations for teaching and research purposes (Grondin, 2004).

It is generally accepted that the plastination technique involves four steps: fixation, dehydration, impregnation and curing. Even if fixation can be avoided in some specific cases, generally when one uses epoxy polymer, the remaining three steps are the constituent parts of the technique with the impregnation step being the most important of all. My research to produce and update the plastination index brought me to at least three papers in which the word "plastination" is used in an improper if not abusive manner.

The first instance occurs in a paper published in 2002 by Fickert et al. The abstract states, "The biliary tract was studied by plastination.". The materials and methods section states, "Plastination of the Bile Duct System:...After hepatectomy, the bile duct system was filled with a colored methacrylate polymer mixture...the liver was submerged in 30% potassium nitrate solution and macerated". This description is nothing more than a description of the casting of bile ducts. These casts are falsely described as plastinated specimens.

The second misuse of the word plastination occurs in the summary of a paper by Eckstein et al. (2003). It states, "The degree of ICA diameter stenosis was determined by ex-vivo plastination of the surgically removed...". The patients and methods section states, "The eversion specimens...filled with a liquid acrylat,...After the acrylat had hardened, the specimens were incisioned and removed....We measured the minimal diameter of the surface print of the acrylic specimen." These are the acrylic casts that were measured and used for the study. We have here another example where the production of an acrylic cast is presented as plastination.

For many years, casts have been presented along with plastinated specimens as these two types of preparations represent a valuable complement to one another. Over the years, plastination polymers have been presented as good material to prepare excellent casts (Henry, 1992a; Henry 1992b; Pretorius and Geyer, 1995). Vascular casts (Graf et al., 1991, Durand 1998) or casts of cavities within plastinated specimens (Grondin et al., 2000) or in association with these (Henry et al., 1997) were also presented many times. However, in each of these articles, the casts were never presented as plastinated specimens. Additionally, the production of these anatomical casts was never called plastination of specimens.

The third incorrect use of the word plastination occurs in paper published by Ronel et al. in 2004. The abstract states, "...performing detailed anatomical dissections on 10 embalmed and plastinated cadavers." Again, when referring to the methods section we read, "Two of the arms were fresh specimens: These were injected with red silicone and then mildly plastinated". After verification with the authors to gain further insight into the so called "mild plastination", I was told that they, "arterially flushed out the two extremities, injected first with disinfecting
solution (no formalin) in the brachial artery, then some of the Corcoran Silicone (very thin viscosity/watery) with a small amount of catalyst to saturate tissue and finally casted the artery with red silicone". In this case, the arms were simply perfused with silicone until saturation. They were not dehydrated nor impregnated. Should this type of procedure be called plastination? I do not believe it should.

These are three examples of improper uses of the term plastination. Why would someone call a technique that is not plastination, plastination? Could it be that plastination has reached a certain degree of notoriety that using it's name is being used merely to impress others? Is it possible that presenting plastination as a casting method or a perfusion method could eventually lead to the perception that the plastination technique is nothing but a banal and extremely simplistic technique? What could and should the ISP do to prevent such improper use of the word plastination?

**Literature cited**


