

The Uses of Soft Embalming for Cadaver-Based Dissection, Instruction in Gross Anatomy, and Training of Physicians

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Soft embalming (Thiel, *W. Annals of Anatomy* (1992) 174:185-195; (2002) 184:267-269) is a technique which relies on a mixture of salt compounds and very low amounts of volatile formaldehyde and formalin to effect fixation of tissue with a number of unique properties. Cadavers preserved with the Thiel Method have no detectable odor, a lifelike flexibility of body parts, excellent color preservation of muscle, viscera, and vasculature, and superior antimicrobial preservation properties. Introduction of embalming fluid through the external iliac artery and drainage from the superior sagittal sinus spares the inferior neck and femoral triangle regions from damage during the embalming procedure. This procedure presents a number of significant didactic advantages over traditional methods of embalming. Because of the more lifelike texture and color of structures students' dissections are of high quality, improving learning in the laboratory. Appreciating the actions of muscles at joints, especially in the extremities, is facilitated by the flexibility of the cadaver. Soft-embalmed cadavers offer advantages over unembalmed cadavers or simulators in teaching clinical procedures, such as intubation, lumbar puncture, central line placement, thoracocentesis, and surgery. The flexibility of the peritoneal membrane and internal viscera allows soft-embalmed cadavers to be especially useful in teaching laparoscopic surgical anatomy. Soft embalming holds much promise for further innovative educational uses in cadaver-based anatomical and clinical instruction.

The Thiel Method



Canula is set in superior sagittal sinus for infusion of 3 liters of Intestine Formula



With body on the right side, dissect external iliac artery and place two canulae in the artery



Infusion pressure is 0.2- 0.4 bar

Didactic Advantages

- No odor
- Natural color
- Flexibility and natural texture
- Gloveless dissection if desired
- Elimination of high formalin levels
- Can replace use of fresh specimens
- Improved quality of student dissections
- Antimicrobial and antifungal efficacy

Novel Instructional Uses



Greatly facilitated dissections of extremities for basic and surgical anatomy instruction



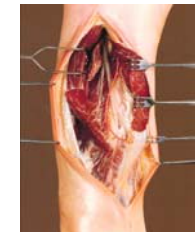
Natural joint flexibility facilitates orthopedic surgical training



Normal distensibility of peritoneum allows effective laparoscopic surgical training



Realism in invasive procedure training superior to simulators



Clear differentiation of nerves, vasculature, and muscle and fascial planes advantageous for vascular, maxillofacial, and plastic surgical training