

## CT 3D reconstruction of the arterial network of anatomic specimens: development of a new contrast medium

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**Introduction:** The development of autologous tissue transfer techniques in plastic surgery has encouraged the research into cutaneous vascularization. This has resulted in the revival of interest in ancient techniques and in the development of new and more effective techniques. Riolo was the first to carry out studies of vascular injection [1]. Various substances have been used to fill blood vessels to facilitate dissection. The discovery of X rays revolutionized the field of vascular anatomy [2]. Barium sulfate was soon replaced by lead oxide as the standard contrast agent for injection studies. However, the toxicity of lead oxide limits the application of these techniques and exposes the operator to risks and raises the issue of its disposal. [3]. Two-dimensional contrast radiography has been the standard for investigating the vascular anatomy of surgical flaps. Today, new imaging techniques are available. Static CT angiography enables to evaluate vascular anatomy in 3D and high detail. The aim of this study is to propose a new contrast formula to visualize the vessels in TC 3D studies [4].

**Materials and methods:** A new contrast agent for CT injection studies has been developed. First the substance must be evaluated with standard radiography to confirm the X-ray blocking properties. Then, various anatomical, human and animal, specimens have been injected, and subjected to CT scan. The data have been processed with Osirix software for 3D reconstruction.

**Results:** the radiopacity was confirmed. CT scan 3D reconstruction showed a good level of detail.

**Conclusion:** our new formula appears to be effective. The radiopacity of the medium can be adapted to tissue characteristics. Our formula allows an easier dissection and a detailed reconstruction of the vessels. Moreover the final polymer is non-toxic.

### References

- [1] Paweletz, N., *Nat Rev Mol Cell Biol*, 2001. 2(11): p. 857-63.
- [2] Dutto, U., *Rendic Reale Acad Lincei*, 1896. 5: 129.
- [3] Bergeron, L., *Plast Reconstr Surg*, 2006. 117(6): p. 2050-7.
- [4] Tregaskiss, A.P., et al., *Clin Anat*, 2007. 20(2): p. 116-23.

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