

Does the Injection Plane Matter in Autologous Fat Transplantation?

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Breast augmentation techniques using autologous fat transplantation vary significantly with regard to type of liposuction, processing to obtain the injectable fat graft, and graft injection. To date, however, the injection plane has not been comprehensively addressed in this regard.

In 1895, Czerny [2] was among the first to publish his experience with fat grafting to the breast, calling it replacement of the mammary gland by a lipoma. With the injection of lipoaspirate, many small lipomas are created. In 1996, Guerrerosantos et al. [5] performed experimental studies on injection of fat into muscle tissue, demonstrating both clinical and microscopic success. A few years later Peren et al. [6] presented their experience with gluteus augmentation using autologous fat grafts. Recently, Coleman [1] described autologous fat transplantation into the pectoralis major muscle for breast augmentation, followed by infiltration into the retropectoral and prepectoral spaces.

In addition to autologous fat transplantation, stem cell-enriched fat transplantation has been introduced recently. Yoshimura et al. [7] reported on approximately 40 women receiving cell-assisted fat transplantation for cosmetic breast augmentation. For these patients, the fat was injected in several layers and directions into the fatty layers surrounding the mammary glands and also into the pectoral

muscles to obtain a diffuse distribution of the graft material.

One rationale for injecting the fat graft into the muscle is that the survival of the transplanted fat depends on its simple diffusion before it becomes vascularized. The diffusion limit is given at a distance of 100 μm [3]. This fact might promote the use of muscles as target tissue because they are more vascularized than fat as a matrix for fat transfer [4].

To date, however, no quantitative measure is routinely applicable to determine the fate of the autologous fat transplant for breast augmentation in its given environment. It is conceivable that fat transplants injected into the well-vascularized pectoral muscle may have different survival rates in the mid and long term than fat transplants injected into the subcutaneous tissue or other muscles. Besides the safety issues raised concerning autologous fat transfer, with magnetic resonance imaging (MRI) being one possible solution in this regard, we believe that serial MRI might detect and quantify in more detail the transplanted autologous fat in its given plane. In the future, at best, randomized controlled trials are necessary to elucidate in more detail the importance of the injection plane in autologous fat transplantation.

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