Customized tissue engineering for ear reconstruction.

Tissue engineering (TE) of cartilage for reconstructive surgery has proven to be a promising option for obtaining tissue for 3D structures that results in minimal donor site morbidity. Technological advances in this area are important since many defects can only be treated with customized implants. Most TE strategies rely on the use of resorbable 3D scaffolds to guide the growing tissue, with each tissue requiring a specific scaffold that has precisely defined properties depending on the physiological environment. Rapid prototyping (RP) technologies allow the fabrication of scaffolds of various geometric complexities from a variety of materials and as composites, while even allowing the inner architecture of the object to be varied in a defined manner at any given location. Scaffolds can be manufactured using RP techniques directly from computer aided design (CAD) data sources, e.g. via an STL file. The combination of TE and RP serves as the basis for the production of customized implants, for example the cartilage ear framework, and provides new perspectives for autologous ear reconstruction.