Thermoplastic materials in Additive Manufacturing assisted Tissue Engineering - A Review

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Thermoplastic polymers, especially PLA, PLGA, PCL and their co-polymers, belong to the most widespread materials currently used in Additive Manufacturing assisted Tissue Engineering research. Besides their most well-known use in technical 3D printing technologies, like FDM, for prototyping and surgical planning, thermoplasts have been used with 3D bioprinters for Bone Regeneration as well as Cartilage Regeneration in combination with other materials to optimize their mechanical properties to the application's requirements. Additionally, researchers have increasingly used biodegradable polymers as reinforcement of hydrogel scaffolds, a type of hybrid scaffolds, to provide both flexibility as well as mechanical strength to cell laden implants. Lastly, thermoplastic polymers remain the gold standard for controlled drug releasing applications, which can be combined with scaffold fabrication processes.

This presentation will review the use of thermoplastic materials in Additive Manufacturing assisted Tissue Engineering using different manufacturing practices during the last 15 years.