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**Tissue engineering and 3D printing of meniscal, tendon and musculoskeletal structures****Wilson Wang**National University of Singapore, Singapore  
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Additive manufacturing and scaffold-building for tissue-engineered biological structures hold much potential promise for future therapeutic and clinical applications. Established techniques such as electrospinning, solvent-casting, salt leaching, solvent low temperature gelation and critical point drying have all been used in various ways to create bioscaffold structures that can potentially be used in tissue replacement situations. However such techniques mainly generate structures that are non-directional or randomly arranged in internal architecture, and they tend to lack anisotropic properties that are beneficial in specific clinical applications.

With the advent of additive manufacturing (AM) and 3-dimensional (3D) printing, a new range of possibilities has emerged, based on the technologies' capabilities in rapid prototyping, customizable morphology, specification of internal microstructures and enhanced resolutions. These new techniques however also have specific limitations with regards to range of printable materials, handling difficulties of solvents and other technical considerations. Early applications were thus limited to creation of structures for surgical guides, and tissue or organ models for complex surgical planning. More recent developments have enabled high resolution 3D printing of tissue scaffold structures using biocompatible materials, and viable cellular printing is now a reality in the laboratory setting. Musculoskeletal tissues such as cartilage, meniscus, tendons and bone are particularly suitable as targets of such technologies, due to their specific functions and structural properties, and examples of potential clinical applications for these novel techniques and approaches will be highlighted and discussed.

**Biography**

Wilson Wang is the Head of the Department of Orthopedic Surgery at the Yong Loo Lin School of Medicine, National University of Singapore (NUS) and also Head of Department and Head of Division of Hip and Knee Surgery at National University Hospital (NUH), Singapore. He specializes in a wide range of hip and knee treatments and operations, including primary, revision and complex total joint replacement surgery of the knee and hip; other lower limb joint reconstructive operations (e.g., osteotomies); arthroscopic surgery for hip and knee including labral repairs, ligament reconstructions, meniscal repairs and cartilage and scaffold reconstructions and complex and advanced joint surgery such as meniscal transplants, partial knee replacements and 3D/robotic guided surgery. He is the current Chairman of the Hip Section of Asia Pacific Orthopedic Association (APOA) and of the Asia Pacific Hip Society (APHS).

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