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# EVALUATION OF ALGINATE GEL SYSTEM FOR THEREPAIR OF COMPLEX DEFECTS IN ARTICULAR CARTILAGE

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Tissue engineering involves the fabrication of three dimensional interconnected matrixes that provide the frameworks for the seeded cells to be organized into a functioning tissue. These scaffolds should be similar to the native extra cellular matrices (ECM) in terms of both physical and biomechanical properties in order to provide appropriate environment for cell growth and differentiation. A variety of natural and synthetic materials have been examined as the potential cell carriers for cartilage tissue engineering [1-3], among these hydrogels are the most promising materials since they can provide a temporary structure during the repair process and can be utilized in the form of injectable liquid/paste in minimally invasive surgical procedure[4, 5].

In the present work, an in situ polymerized alginate hydrogels was prepared by inducing gelation of a 2% (w/v) solution of alginate with a 100 mM solution of $CaCl_2$.adequate amount of KCl and NaCl were added to both alginate and crosslinking agent solutions to achieve a uniform structure. The gel was shown to have proper physical and biomechanical properties which make it suitable for the injection through a 22-gauge needle. In vitro study of MSCs seeded constructs indicated that the developed gel system can successfully support the cells viability and guide them to express cartilage specific genes during the culture period. Finally, it seems that the developed gel can be used as a successful cell delivery system due to its rapid curing nature, its ability to fill complex defects and minimally invasive and more cost effective mode of treatment.