Musculoskeletal diseases are the second leading cause of disability globally and the leading cause in the United States for people over 50 years of age. One of the current gold standards for orthopedic surgical materials is poly(methyl methacrylate) (PMMA), which has a significantly higher compressive strength than native bone and does not facilitate tissue regeneration. Degradable bioactive materials are a desirable alternative to promote native bone regeneration which will help decrease the need for secondary surgeries. Our lab has developed a complex hydrogel that incorporates osteoinductive calcium (Ca^{2+}) and phosphate (P_i) ionic signaling molecules to help promote bone regeneration. Materials-associated local ion delivery has been found to facilitate mesenchymal stem cell (MSC) osteoblastic differentiation while providing mechanical stability closer to native bone tissue than PMMA. In order to implant these hydrogels *in vivo*, a safe sterilization procedure must be established. Using autoclaved chitosan and sterile filtered hydrogel cross-linking solution, complex hydrogels were created and evaluated by mechanical testing (uniaxial compression and swelling assessment). Mechanical characteristics were not significantly altered with sterilization. With the mechanical characteristics unaltered, the hydrogel sterilization can proceed to a cell study to determine efficacy of sterilization. After cell studies, the complex hydrogels can move forward into animal models for immunology/toxicity studies and surgical experiments and eventually utilized in human medicine to promote a faster and stronger bone regeneration than currently available options.