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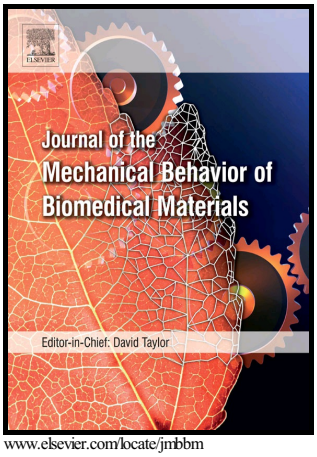

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Mechanical Properties and Failure Analysis of Visible Light Crosslinked Alginate-Based Tissue Sealants

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Abstract

Moderate to weak mechanical properties limit the use of naturally-derived tissue sealants for dynamic medical applications, e.g., sealing a lung leak. To overcome these limitations, we developed visible-light crosslinked alginate-based hydrogels, as either non-adhesive methacrylated alginate (Alg-MA) hydrogel controls, or oxidized Alg-MA (Alg-MA-Ox) tissue adhesive tissue sealants, which form covalent bonds with extracellular matrix (ECM) proteins. Our study investigated the potential for visible-light crosslinked Alg-MA-Ox hydrogels to serve as effective surgical tissue sealants for dynamic in vivo systems. The Alg-MA-Ox hydrogels were designed to be an injectable system, curable in situ. Burst pressure experiments were conducted on a custom-fabricated burst pressure device using constant air flow; burst pressure