Shear Properties of Bilaminar Polymethylmethacrylate Cement Mantles in Revision Hip Joint Arthroplasty

Reference


Abstract

Although cement-within-cement revision arthroplasty minimizes the complications associated with removal of secure PMMA, failure at the interfacial region between new and old cement mantles remains a theoretical concern. This article assesses the variability in shear properties of bilaminar cement mantles related to duration of postcure and the use of antibiotic cements.

Bilaminar cement mantles were 15% to 20% weaker than uniform mantles ($P < .001$) and demonstrated variability in shear strength related to duration of postcure of the freshly applied cement ($P < .001$). The use of Antibiotic Simplex did not significantly influence interfacial cement adhesion ($P = .52$). Interfacial adhesion by mechanisms other than mechanical interlock plays a significant role in the bond formed between new and old PMMA cements, with an important contribution by diffusion-based molecular interdigitation.

In the presence of a secure cement-bone interface, we recommend cement-within-cement revision techniques in suitable patients.

**Key Words:** Hip, Revision, Arthroplasty, Polymethylmethacrylate, Shear, Adhesion.