Adverse events have been reported with acrylic bone cements. However, current test standards for acrylic materials fail to characterize the potentially harmful monomers released during the curing stage. In clinical applications, materials are implanted into the human body during this phase. Silicone may be a safer alternative to acrylic cements. Silicone is used in medical applications for its biocompatibility and stability characteristics. Previously, no study has been completed which compares silicone to acrylic cements. In this study, both materials were injected into the cell medium during the curing process which more accurately reflects clinical use of material. Initially, cell cultures followed ASTM standard F813-07 which fails to capture the effects of monomer released during curing. Subsequently, a modified cell culture method was employed which evaluated cytotoxicity while the materials cured. The objective of this study was to capture toxicity data during curing phase. Thus, the test method employed measured and excluded the impact of the exothermic reaction temperature of polymethyl methacrylate (PMMA) on cell growth. The concentration of PMMA monomer was measured at 1 and 24 h after injecting PMMA into culture plates in a manner consistent with established cell growth methodologies. Our results indicate current in vitro cytotoxicity assays recommended by ASTM standards are unable to reveal the real cytotoxic effect caused by methyl methacrylate monomers during polymerization. Our modified experiment can more accurately illustrate the true nature of the toxicity of materials and improve assay results. In these tests, silicone based elastomeric polymers showed excellent cytocompatibility [1].

Bone cement chemically is nothing more than Plexiglas (i.e. polymethylmethacrylate or PMMA). PMMA was used clinically for the first time in the 1940s in plastic surgery to close gaps in the skull. Comprehensive clinical tests of the compatibility of bone cements with the body were conducted before their use in surgery. The excellent tissue compatibility of PMMA allowed bone cements to be used for anchorage of head prostheses in the 1950s.

Solid screws with retrograde cement pre-filling offer improved initial fixation strength when compared to that of cannulated screws with cement injection through perforation for both the conically and cylindrically shaped screw. The results also suggest that the fixation screws can be backed out by 360 degrees for intra-operative adjustment without the loss of fixation strength [2].

The technique of cannulated pedicle screws with PMMA augmentation can be an option for osteoporotic patients with various spinal diseases who require spinal instrumentation [3].

Park et al. report on an easy, safe, and economical technique for bone cement augmentation using a bone biopsy needle inserted into the disc space in 2 osteoporotic patients who were treated with posterior interbody fusion and percutaneous pedicle screw fixation.

Two elderly patients who complained of back pain and intermittent neurological claudication underwent posterior interbody fusion with percutaneous pedicle screw fixation. After routinely assembling rods on the screws, a bone biopsy needle was inserted into the disc space via the operative field; the needle was then placed around the tips of the screws using fluoroscopic radiography for guidance. Bone cement was injected through the bone biopsy needle, also under fluoroscopic radiography guidance.

Both patients' symptoms improved after the operation, and there was no evidence of cage subsidence or screw loosening at the 4-month follow-up.

The indirect technique of bone cement augmentation via the disc space for percutaneous screw fixation could be an easy, safe, and economical method [4].

1)
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