Bio-inspired Shape Memory Alloy Pedicle Screw to Compensate for Bone Degradation

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Technology description

Background:
Treatments of spinal diseases such as degenerative disorders, spinal trauma, spinal tumor, and spinal deformity and the like, presently use a method of the transpediclular internal fixation with satisfactory results. The use of fixation assemblies in some patients is often complicated by the problem of hardware pull-out or loosening, especially in osteoporotic patients. Pull-out or loosening may occur during surgery while manipulating the instrumentation or at any time after surgery. The existing solution is to use bone cement to affix the spinal instrumentation. The use of cement could cause damage to the bone and spinal cord, and provides permanent fixation.
Invention Description:
Novel bio-inspired shape memory alloy device which expands into the areas of bone loss to maintain consistent mechanical contact to compensate for bone degradation. In addition, the responsiveness characteristic of these bone fixation assemblies allows the surgeon to both insert and/or remove the fixation assembly screw as needed during and after the surgery. Thus, the problem of pedicle screw loosening and back-out due to osteoporosis is substantially alleviated

Application area

Solution for biomechanical issues encountered in orthopedics

Advantages

1.Consistent mechanical contact for improved retention
2.Substantially alleviates pedicle screw loosening and back-out due
3.Easily inserted and/or removed as needed during and after surgery
4.Adaptable to meet diverse applications

Institution

University of Toledo

Inventors

Vijay Goel
Professor
Bioengineering
Mohammad Elahinia
Associate Professor
MIME