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# A Device For Mixing Bone Cement By Shaking

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## OTHER INFORMATION

### KEYWORDS

bone cement

### CATEGORIZED AS

- » **Biotechnology**
  - » Other
- » **Materials & Chemicals**
  - » Other
- » **Medical**
  - » Other
- » **Research Tools**
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## BRIEF DESCRIPTION

The invention is a compact and simple system for mixing bone cement. In the case of radioactive bone cement, this mixing device minimizes personnel exposure to radioactivity and airborne hazardous materials because the user can be relatively far away from the container with radioactivity, the device can incorporate shielding, and the container is completely sealed. The mixing takes place in a container in which the components to be mixed have already been placed.

## FULL DESCRIPTION

The invention is a compact and simple system for mixing bone cement. In the case of radioactive bone cement, this mixing device minimizes personnel exposure to radioactivity and airborne hazardous materials because the user can be relatively far away from the container with radioactivity, the device can incorporate shielding, and the container is completely sealed. The mixing takes place in a container in which the components to be mixed have already been placed.

Standard bone cement mixers usually mix the cement with blades or the cement can even be mixed with a spoon or paddle. The cement can also be placed in a container and shaken. However, it is not possible to mix a cement that contains a radioactive powder with standard devices due to the associated hazards.

Smith & Nephew makes a device called the Vortex Vacuum Mixer which mixes the cement in a bowl and then requires the cement to be transferred into another chamber for injection. This transfer process would be inconvenient and potentially hazardous if the cement were radioactive. DePuy developed the Ultramix Vacuum Mixing System that uses a design that protects the user from monomer fumes and glass shards (which come from breaking the glass ampule in which the liquid monomer is supplied) during loading and mixing. However, there is no shielding for mixing radioactive cement. Stryker Corporation makes the Revolution which mixes and mechanically injects all types of bone cement. However, there is no shielding for mixing radioactive cement.

The problems of the existing cement mixers become apparent when one considers mixing radioactive bone cement. This cement has unique features that would cause use of such a mixer to expose the staff to radioactivity. A device for mixing radioactive cement must provide shielding and must contain the radioactive cement powder while meeting the more conventional requirement of containing methylmethacrylate fumes.

University of CA researchers have developed an invention that mixes the cement but does not require access to the contents of the cement cartridge. Thus, the cement components remain untouched inside the cement cartridge while they are mixed. The advantage of not accessing the contents of the cartridge is that there is no risk of spilling any of the material and there is no exposure of personnel to cement components, which may include toxic fumes and/or radioactive materials. These hazardous materials can be in the form of powders, gases, airborne particles or aerosols.

This design can be implemented with essentially any cement container, regardless of the type of cement. An additional advantage of this device is that it is reusable, can be sterilized repeatedly (via autoclaving or other techniques) and does not require electrical power. Electrical power in existing devices is usually provided via batteries, which are not environmentally friendly.

An additional advantage of this system is that it does not require the cement to be contacted with blades or other mixing devices. The cement container is not breached at any time, and there are no extraneous components inside the cement mixing volume. This provides for greater efficiency (no wasted cement on cement blades) and provides for greater safety.

## SUGGESTED USES

## ADVANTAGES

