Air Plug

New generation of Cement Restrictor
Safer cement application

**Demonstrated clinical efficacy in preventing cardiovascular disorder**

The benefits of occluding the femoral shaft during a cemented total hip replacement are well documented. Sealing of the medullary canal leads to effective pressurization of the cement, which allows it to develop functional interdigitations with the bone tissue. (1)

However, the elevated intra-medullary pressure can have negative effects on the cardiovascular system: bone debris or bone marrow can cross the Haversian canals and enter into the circulation, inducing an embolism in the pulmonary venous bed. (2)

This can also occur when a conventional cement restrictor is placed into the medullary canal. The air and medullary tissues distal to the cement restrictor are trapped and compressed, which increases the risks of cardiovascular disorders. (3)

**Design and features**

- **Design**
  
  The “Air Plug” bioresorbable cement restrictor can conform to the irregularities of the medullary canal, because of its:
  - shape
  - composition

  A system of staggered vents prevents the air space and medullary tissues from being compressed beyond its distal end: diminished risk of onset of cardiovascular disorders. (5)

- **Features**
  
  Hole in the base for easier handling and placement into the medullary canal when using the cement restrictor holder.

  The shape and composition of the cement restrictor allows it to conform to the irregularities of the medullary canal.

  The slots make the cement restrictor permeable to gases, blood and irrigation fluid. The slots ensure that the intra-medullary pressure is maintained during the introduction of the cement restrictor into the medullary canal.

  The specific shape of the cement restrictor (slots and flanges) helps to block the cement flow between the flanges and provides optimal stability during the pressurization of the cement.

**Advantages**

- Provides containment of the acrylic bone cement when it is introduced into the medullary canal.
- Keeps the pressures in equilibrium when the cement is introduced into the femoral shaft.
- Allows the cement to be pressurized
- Biodegradable material which does not interfere with the removal of hardware during revision surgery.
- Simple to use.
- Minimizes embolism episodes during cemented total hip replacement. (5)

**Bibliography**

The Air Plug cement restrictor, flexible and resorbable, has staggered vents that make it permeable to gases, while ensuring appropriate cementing.

A clinical study (5) has shown that there are no [cement] leaks and the restrictor is perfectly stable during pressurized cement application.

Furthermore, use of the Air Plug cement restrictor contributes to a reduction of perioperative femoral intermedullary pressure and reduces the risks of cardiovascular disorders associated with cement application.

### Materials
- Porcine gelatin, pharmaceutical glycerol (or glycerin), water and methylparaben.
- The components conform to the 3rd edition of the European Pharmacopoeia.
- The traceability of raw materials and veterinary monitoring of the animal source comply with the requirements of ISO 9002 and EEC approval for suppliers of materials to the pharmaceutical industry.

### Disposable holder
- 2 instruments (polypropylene) per unit:
  - One for implant size 8 and 10
  - One for implant size 12 and 14
- SAFETY (no risk of cross-contamination)
- A 2-in-1 INSTRUMENT, EASE-OF-USE
  - TRIAL INSERT: Insert into the femoral shaft to the desired depth and determine the appropriate size.
  - IMPLANT HOLDER AND IMPACTOR: Insert the implant onto the instrument and push the plug to its final position

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**Implants**

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**Biodegradable cement restrictor**

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