Reliability, Innovation, Versatility, Safety...
in the hands of the surgeon.
Prosthetic infection is one of the most serious complications in orthopedic surgery and is very difficult to treat.

The latest data available in the literature indicate that in the first two years after implanting hip or knee prosthesis, 1.6% will encounter some form of infection.(1-2)

In recent years, bacteria have developed resistance to classic antibiotics and the problem is now even more difficult to face.

Moreover, resistance to methicillin by Staphylococci (MRS) reaches peaks of 50% in Mediterranean Europe, UK and USA.(3-4)

The two-stage revision process is considered the standard for the treatment of prosthetic infections.

Tecres has successfully produced pre-formed spacers with antibiotic since 1996.

Advantages for surgeons:

- **Saving Time:** ready to use, with preformed shapes and different sizes. It makes faster both the first and the second stage.

- **Safety:** the devices have mechanical and pharmacological performances standardized and certified.

- **Effectiveness:** known, extended and long release of antibiotic.

- **Less responsibility:** using of an industrial device, not an hand-made one.

Advantages for patients

- **Better quality of life:** spacer allows deambulation with partial weight-bearing and permits to make some basic daily activities, this allows the patient to be independent.

- **Possibility to make physiotherapy.**

- **Reduction of functional recovery time:** faster discharge from hospital.
Excellent mechanical properties that allow the patient to deambulate with partial weight-bearing

The devices have been tested as permanent prosthesis to support full weight-bearing for 6 months.\textsuperscript{10-11} The device must be used at partial weight-bearing.\textsuperscript{10-11}

Effectiveness and extended release of antibiotics

At implantation

The release of gentamicin presents high local concentrations (range 40-100 mg/L) in the first 24-48 hours after spacer implant. The concentrations are largely above the susceptibility of bacteria. Serum levels are low (<0.2-0.8 mg/L).\textsuperscript{6}

At spacer removal

The median intra-articular gentamicin levels were 0.46 mg/L (0.24 to 2.36 mg/L) which would be considered therapeutic. The second stage revision occurred at a median of 99 days following spacer insertion.\textsuperscript{12}

After use

After 12-24 weeks in the hip, the removed spacers still released appreciable amounts (850-1800 µg) of gentamicin, representing 0.05%-0.09% of the initial total amount, and in the range 4.7-10.0 µg/cm\textsuperscript{2}.\textsuperscript{13}

Commercial cement loaded with antibiotic is unsuitable for spacers

For both the Cement A and Cement B spacers, there was hardly any additional release after the first week.\textsuperscript{14}

Increasing the dose of antibiotics in commercial cement:

- It only influences initial release
  Gentamicin release was most rapid during the first 6 h and continued at a much lower rate thereafter.\textsuperscript{15}

- It significantly reduces mechanical performances
  When gentamicin was added to unloaded cement (1-4 g), there was a significant reduction in the mechanical performance of the loaded cements compared to unloaded cement.\textsuperscript{15}

- It does not protect against bacterial adhesion
  The incorporation of additional gentamicin did result in an initial reduction in bacterial colonization but this beneficial effect was no longer apparent at 72 h, with the clinical strains forming biofilms on the cements despite the release of high levels of gentamicin.\textsuperscript{15}
### Versatility

**Spacer for Hip:**

**Spacer® G**
The Tecres spacer resembles a femoral prosthesis. It has a load-bearing structure in stainless steel coated with gentamicin bone cement.
Available in 6 sizes (3 head sizes with standard stem and 3 head sizes with XL stem).
The proximal cementation of the neck with bone cement is suggested if unstable and compulsory in case of XL use.

**Spacer® G Flat Stem**
Spacer G flat stem resembles Spacer G but has a thinner, flatter stem that fits more easily in the narrow femoral cavity. The top of the stem has been designed to preserve the greater trochanter.
Available in 6 sizes (3 head sizes with standard stem and 3 head sizes with long stem).
The proximal cementation of the neck with bone cement is compulsory.

**Vancogenx® Space Hip**
The exclusive line of spacers with gentamicin and vancomycin for the infections caused by resistant bacteria Gram+ such as S. epidermidis, MRS, CoNS or Enterococci.
Available in 6 sizes (3 head sizes with short stem and 3 head sizes with long stem) and 2 different stem shapes (round and flat stem). The proximal cementation of the neck with Vancogenx bone cement is suggested if unstable and compulsory in case of XL use.

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**Spacer for Knee:**

**Spacer® K - InterSpace Knee (USA)**
Spacer K resembles a knee prosthesis made in bone cement with gentamicin. It comprises two independent articulating elements. The tibial component has a flat base on which the femoral component articulates.
Available in 3 sizes.
The cementation of the components with antibiotic bone cement is compulsory.

**Vancogenx® Space Knee**
The exclusive line of spacers with gentamicin and vancomycin, for the infections caused by resistant bacteria Gram+ such as S. epidermidis, MRS, CoNS or Enterococci. Available in 4 sizes.
The cementation of the components with antibiotic bone cement is compulsory, we suggest to use vancogenx bone cement.

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**Surgical Technique**

**Remove the prosthesis.**

**1.** Clean the host site by aggressive debridment, removing all residues of cement, if present.

**2.** Bore the acetabulum in order to obtain an optimal shape.

**3.** Select the right size with the trial device (Trial).

**4.** Fit the stem into the diaphyseal canal.

We suggest a proximal cementation to avoid instability, rotation or dislocation of the spacer. The latter procedure is compulsory when using Spacer Flat Stem and XL.

**5.** Apply a coat of cement to the surface of the femoral part.

**6.** Fix the femoral part on the femoral condyles.

**7.** Apply the tibial part.

Reduce the joint before the polymerization of the cement in the tibial component.
Spacer for Shoulder:

Spacer® S - InterSpace Shoulder (USA)

Spacer S resembles a shoulder prosthesis, it has a load-bearing structure in stainless steel coated with gentamicin bone cement. Available in 2 sizes. The proximal cementation of the neck with antibiotic bone cement is suggested if unstable.

More than 95% of Two-Stage Exchange made with Tecres Spacer were free from infection at the latest follow-up

CLINICAL RESULTS

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<tr>
<th>Journal</th>
<th>1st Author</th>
<th>Type</th>
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<td>Corona P</td>
<td>Hip, Knee</td>
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<td>33 / 38</td>
<td>35 (12 - 65)</td>
<td>Barcelona-3 (SPA)</td>
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<td>Castelli CC</td>
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* septic arthritis