Aesculap® Bicontact®

Hip Endoprosthesis System: Bone Preservation. For Years to Come.

25 years: 1987–2012
Surgical procedure. The Bicontact® principle.

Exploiting the adaptability of the bone to the new load situation: Selecting the appropriate prosthesis stem.

The proximal load transfer is today a well established anchoring principle in cementless hip endoprosthetics. This is the principle that we adopted with Bicontact®, straight from the beginning, and which is implemented consistently with the surgical technique.

One and the same procedure for all Bicontact® stem types. Cementless or cemented. With a stem shape selected in preoperative planning or with intraoperative stem selection in situations where the narrow conditions in the femoral stem necessitate the use of a smaller Bicontact® implant.

The modern Bicontact® implantation instrument combines many years of experience, safe methods and the support of correct intraoperative decisions for an optimal treatment of the hip joint.
**Surgical technique: Procedure**

The standard osteotomy plane for Bicontact is at 55 degrees. A cutting template is provided for determining the osteotomy. The femoral canal is opened with the Bicontact box osteotome. Opening the lateral femoral cortex is helpful in achieving sufficient lateralization and the correct antetorsion position of the A-Osteoprofilers to be used subsequently. The bone block, which is removed with the box osteotome, is preserved and can be used at a later stage.

**Note:**
The Bicontact box osteotome is unsuitable for the smallest prosthesis sizes 9 SD, 8 N and 9 N, since the prosthesis stems of these sizes are narrower than the osteotome window. For opening the femoral canal without using the box osteotome the tip of the smallest A-Osteoprofiler (for Bicontact S, SD or N) is applied on the osteotomy plane as far as possible towards the dorso-lateral side. Then the A-Osteoprofiler is introduced at the correct axial orientation and antetorsion position.
The A-Osteoprofilers are used for compressing the intertrochanteric cancellous bone and thus preserving the bone for anchoring the Bicontact® prosthesis stem.

A-Osteoprofilers of increasing sizes are applied, up to the size of the distal femoral canal. In doing this, tight cancellous structures and sclerotic bone regions must be worked on with particular care in order to prevent a bone fracture.

To achieve sufficient lateralisation and axis-true implantation, the proximal-lateral trochanter region can be prepared with the distal cutting part of an A-Osteoprofiler.

The correct insertion depth of the A-Osteoprofiler is marked in relation to the standard osteotomy plane at 55°.

Note:
For normal bone conditions, the size of the A-Osteoprofiler is usually limited by the conditions in the distal (not the proximal) femoral canal. Compared to the B-Osteoprofiler and the Bicontact® stem, the A-Osteoprofilers are cut free medially to compress the cancellous structures in this region.

In cases of narrow conditions at the distal bone and small implant sizes, the A-Osteoprofiler need to be hammered in and out alternately, so that the bone chips can loosen from the profiler teeth, in the distal region. The preparation of a very narrow proximal medullary canal has to be carried out with the smallest A- and B-profilers, alternately, until both can be inserted to the required depth. Use the Bicontact® stem shapes SD or N in such cases. Additional advice is given on page 15 of this document.
As soon as the selected size of the A-Osteoprofiler has been inserted into the medullary canal, the finishing work is done with the B-Osteoprofilers. Begin with the smallest B-Osteoprofiler or with a B-Osteoprofiler 3 sizes smaller than the A-Osteoprofiler that was used last.

With the B-Osteoprofilers you only prepare the proximal femur in the region of the medial prosthesis support surface, the region of the bilateral Bicontact® wings. The insertion depth and the selection of the size of the B-Osteoprofiler depend on the position you have planned, pre-operatively, for the Bicontact® stem. The insertion depth can be inspected for correctness at the osteotomy plane, the less trochanter and the greater trochanter. As a rule, the size of the B-Osteoprofiler corresponds to the size of the A-Osteoprofiler.

The position of the rotation wing in the trochanter major is only adjusted as a last step using the wing profiler, which is inserted above the underlying B-Osteoprofilers.

Note:
In cases of very narrow proximal bone conditions, the largest B-Osteoprofiler that can be used might have to be one size smaller than the A-Osteoprofiler last inserted into the bone. This choice of Osteoprofiler sizes used for the Bicontact® femur preparation ensures the best possible proximal load transmission for the Bicontact® prosthesis stem. It is a procedure that is characteristic for the Bicontact® surgical concept.

Caution:
Never use a larger B-Osteoprofiler as the last A-Osteoprofiler since this would lead to a distal bone fracture.

When applying this technique, the fit and stability of the B-Osteoprofiler and the Bicontact® stem always rest on the proximal bone region, not the distal one.
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Surgical technique: Trial reduction

The modular Bicontact® Osteoprofilers allow an intraoperative trial reduction with the B-Osteoprofiler in its final position.

To this end, the modular handle is removed and replaced with trial heads of various neck length. Then, the joint movement, muscle tension and leg length situation are inspected.

For the prosthesis cone 8/10 of the Bicontact® N stems, there is a special set of trial heads available.

Upon request, the Bicontact® Osteoprofilers are also available in a combined A/B serrated design.

Note:
It is possible, in principle, to carry out an inspection of the bone preparation (e.g. with an image intensifier) or of the trial reduction, especially in cases of difficult bone conditions, at any stage of the operation. You can also change intraoperatively from Bicontact® S to SD or from Bicontact® SD to N.
Surgical technique: Cementless implantation

Plasmapore®-coated Bicontact® stems are used for cementless implantation. For all Bicontact® stem types (S, H, SD and N), the size of the cementless Bicontact® stem corresponds to the size of B-Osteoprofiler last introduced in the optimum position. The stem is inserted manually and then tapped in, with the punch instrument, down to its final position. The stem has reached the correct insertion depth when the hole of the Bicontact® stem is in line with the osteotomy. Finally cancellous bone chips in the lateral region around the Bicontact® flanges and the trochanter wing are introduced. This can also be done, if necessary, at the osteotomy plane.

Note:
Please note that the osteotomy line, used for intraoperative orientation, may vary. The inspection of the prosthesis insertion depth by means of the greater trochanter or lesser is independent of how the osteotomy is performed.

Special care needs to be taken that the protective cover on the prosthesis cone remains in place during the implantation of the stem, in order to prevent any damage.

Before mounting the prosthesis head, following another trial reduction, the prosthesis cone must be cleaned and dried. The prosthesis head, too, must be installed with the inner cone dry.
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Surgical technique: Cemented implantation

For a cemented stem implantation, an uncoated Bicontact® prosthesis stem is used after an intermedullary plug has been inserted and the cement has been applied.

The size selection of the Bicontact® S prosthesis stems and the distal centraliser is summarized in the table below, and are also valid for Bicontact® H implants.

Selecting the right stem and centraliser

<table>
<thead>
<tr>
<th>B-Osteoprofiler</th>
<th>10-11</th>
<th>12-13</th>
<th>14-15</th>
<th>16-17</th>
<th>18-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bicontact® S/H stem</td>
<td>10*</td>
<td>12</td>
<td>14</td>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td>Centraliser</td>
<td>8 mm NK088</td>
<td>10 mm NK090</td>
<td>12 mm NK092</td>
<td>14 mm NK094</td>
<td>16 mm NK096</td>
</tr>
</tbody>
</table>

* Size 10 only available as S-stem.

The stems are inserted manually and kept in a correct rotational position by means of a handle. In the final prosthesis position, the hole is located above the osteotomy plane.

Note:
Large intramedullary bone conditions may make it necessary to use a larger centraliser (+ 2 mm) than the one suggested in the table.
Surgical technique: Narrow bone conditions

Contact between wing and posterior cortex
The correct fit of the bilateral flanges of the Bicontact® stem is crucial for the stability of the Bicontact® prosthesis stem. If the posterior flange touches the cortex, it may become necessary to widen it with a Luer instrument. In this way, fractures can be prevented.

Femoral step osteotomy
Narrow conditions in the medullary canal may make it necessary to perform a so-called step osteotomy, which will allow inserting the Osteoprofiler and the Bicontact® stem deeper into the cavity. If the osteotomy plane is changed, the intraoperative inspection of the insertion depth has to be performed with the lesser or greater trochanter as a reference level.

Note:
Please note that more of the bone is osteotomised in a femoral step osteotomy than in a standard osteotomy, and the force transmission area will be smaller.

Preparing the femoral canal with flexible reamers
In narrower medullary conditions, you can use flexible reamers of a smaller nominal diameter for preparing the distal implant bed. Following this, the preparation is carried out with the A- and B-Osteoprofilers.

<table>
<thead>
<tr>
<th>nominal size</th>
<th>distal (mm) ap</th>
<th>distal (mm) lateral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bicontact® S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>7.0</td>
<td>6.5</td>
</tr>
<tr>
<td>11</td>
<td>8.0</td>
<td>7.0</td>
</tr>
<tr>
<td>12</td>
<td>9.0</td>
<td>7.5</td>
</tr>
<tr>
<td>Bicontact® SD and N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>7.0</td>
<td>6.0</td>
</tr>
<tr>
<td>10</td>
<td>8.0</td>
<td>6.5</td>
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<tr>
<td>11</td>
<td>9.0</td>
<td>7.0</td>
</tr>
<tr>
<td>12</td>
<td>10.0</td>
<td>7.5</td>
</tr>
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</table>

Distal dimensions of the Bicontact® stems for narrow medullary conditions