Illustrated operative technique
for
SpineShape System IV

System-IV is an implant system, which relies on the pedicular fixation. The pedicular fixation (introduced by Prof. Raymond Roy-Camille in the 1960ies) belongs nowadays to the standard procedures in the spine surgery.

In this operative-technique only those steps are mentioned, which specifically refer to the System-IV. Regarding the approaches, two widely spread standard-techniques are known, namely the medial and the lateral approach. The medial approach is normally used when the spinal canal must be simultaneously opened, e.g. for treating a disc prolapse. The lateral approaches (acc. to Wiltse) are in so far advantageous as the pedicles can be accessed along their lateral axis and that muscular scars are thus minimized.

System-IV is basically suitable for the entire lumbar spine, i.e. from L1 to S1 (sacrum). For patients with small vertebral bodies it should previously be verified whether the upper vertebrae (e.g. L2, L1) allow accommodation of the provided pedicle screws and connection rods.

The cautionary measures listed in this operational technique originate from the risk analysis of these implants and instruments (acc. ISO 13485 / MDD 93/42/EWG).

Available rods

<table>
<thead>
<tr>
<th>Stiffness</th>
<th>Std-Rod straight</th>
<th>Std-Rod bent</th>
<th>Varistab straight</th>
<th>Varistab bent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>elastic / medium / stiff</td>
<td>medium / stiff</td>
<td>medium / stiff</td>
<td>medium / stiff</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stiffness</th>
<th>Standard</th>
<th>Varistab</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>straight</td>
<td>bent</td>
</tr>
<tr>
<td>elastic</td>
<td>21.012.21-200</td>
<td>21.015.21-200</td>
</tr>
<tr>
<td>medium</td>
<td>21.012.23-200</td>
<td>21.015.23-200</td>
</tr>
<tr>
<td>Stiff</td>
<td>21.012.25-200</td>
<td>21.015.25-200</td>
</tr>
</tbody>
</table>
### Selection guide for the correct rod stiffness

A *stiff* rod should be used when the patient requires a high degree of stabilization, and a later spontaneous (“slow”) fusion is desirable.

A *medium* rod should be used when the patient requires a medium degree of stabilization, e.g. after a decompression surgery with slight iatrogenic destabilization.

An *elastic* rod shall be used when the patient only requires a low degree of stabilization, e.g. to protect nerve roots, to limit motion in the facet joints or to avoid disc bulging. The *elastic* rod has control tasks rather than load carrying tasks.

<table>
<thead>
<tr>
<th>Condition</th>
<th>stiff</th>
<th>medium</th>
<th>elastic</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Dynamic) stenosis</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facet joint syndrome / Spondyloarthrosis</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Osteochondrosis Modic Type I or III</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discopathy (recurrent disc prolapse / herniation)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Late adjacent segment syndrome</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Complement to disc prosthesis</td>
<td></td>
<td></td>
<td>(X)</td>
</tr>
<tr>
<td>Osteochondrosis Modic Type II</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Degenerative spondylolisthesis (Meyerding &lt;1)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Degenerative) Scoliosis (early stage - non rigid)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instability *</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complement to cage</td>
<td></td>
<td></td>
<td>(X)</td>
</tr>
</tbody>
</table>

*) hypermobility with antelistsis / hypomobility with retrolistis when decompressed

Remark: Where two rod types are possible, also consider the rod's length: Take higher elasticity for shorter rods!

For the stiff and medium rod, as an option, a version with a stepped cross section (called *Varistab*) is available, which serves to connect and protect an adjacent segment with half (axial) stiffness. The same pedicle screws are used for the stepped region, however a longer intermediate piece (Art.-Nr. 21.016.31-100) and a longer clamping screw (21.019.11-100) are used for the **STD-System** and the **INI-System**, respectively.

**Caution:** If the surgeon by error would install a short clamping element instead of a long in the stepped region of a *Varistab*, it would still be rotatable without resistance down to its stop and the rod would still be slideable underneath the clamping element. In such case the clamping element must be removed and be replaced by the correct one (e.g. long).
Note: A long instead of a short clamping element over a standard rod does not represent a danger, because the clamping element could not be installed.

Caution: Should the surgeon have doubts about the selection of the adequate rod stiffness, he should contact the manufacturer for consultation, who will connect him, if necessary, with an experienced colleague. The same applies for concerns about the use and positioning of the Varistab.

Note: Having half the working distance of a rod (length between anchorages) would double its stiffness. An elastic rod would behave like the medium rod and the medium rod would behave like the stiff rod.

Note: The screw axis of neighbor screws should have a minimum distance from each other of not less than 20mm at the location of the clamping element (use x-ray for estimates). At 16mm or below, clamping elements can no longer be installed and an extension movement by the patient would be impaired.

### Preparation of seat for pedicle screw

**Option 1**

When there is room enough, the pedicle wire guide Ø24mm (20.011.01/W11-404) can be placed at the preferred pedicle entrance point and the blunt wire Ø1.6mm L370mm (20.010.04/ W90-037) can be driven in the pedicle.

Caution: The pedicle wire-guide must be securely held in place to avoid slipping away from the preferred entrance point. The blunt wire shall only be driven in under fluoroscopic or direct length control.

When there is not room enough for the pedicle wire guide Ø24mm, the smaller pedicle wire guide Ø16mm (20.011.00/W11-403) may be used (e.g. on S1).

Caution: The pedicle wire-guide must be securely hold in place to avoid slipping away from the preferred entrance point. The blunt wire shall only be driven in under fluoroscopic or direct length control.

Note: The Ø24mm wire guide warrants sufficient space for the later use of the screw retaining blades, whereas the Ø16mm wire guide does so for the nut mounting instruments.
Once the blunt wire Ø1.6mm L370mm inserted, the 3-lip cutter (20.012.03/W71-126) can be driven over it to prepare the entrance portal of the pedicle screw.

**Caution:** The blunt wire must be cleaned before the cannulated 3-lip-cutter passes over it, in order to avoid any uncontrolled push of the blunt wire. The 3-lip-cutter should only be driven in under fluoroscopic or direct length control with simultaneous control of the blunt wire.

**Caution:** Should the 3-lip cutter be bent during usage, it must be removed from service and be replaced by the distributor. Under no circumstances a bent 3-lip-cutter may be bent backwards.

In case of hard (sclerotic) bone, where tapping of the thread is desirable, the cannulated tap (20.100.35-38 - appropriate to the screw size) may be used by inserting it over the blunt wire.

**Caution:** The blunt wire must be cleaned before the cannulated tap passes over it, in order to avoid any uncontrolled push of the blunt wire. The tap should only be screwed-in under fluoroscopic or direct length control with simultaneous control of the blunt wire.

**Option 2**

The pedicle can be opened at the preferred entry point using the square pointer (20.012.00/W50-107).

**Caution:** The square pointer must only be hammered in, when it is securely seated and when sliding away from the preferred entrance point is prevented.

Once the pedicle is opened the seat can be prepared using the awl (20.012.01/W50-108).

**Caution:** The awl should only be inserted under fluoroscopic or direct length control.

**Caution:** Should the awl be bent during usage, it must be removed from service and be replaced by the distributor. Under no circumstances a bent awl may be bent backwards.
In case of hard (sclerotic) bone, where tapping of the thread is desirable, the **plain tap** (20.100.25÷28 - appropriate to the screw size) may be used.

**Caution:** The plain tap should only be screwed-in under fluoroscopic or direct length.

**Note:** If a multilevel implantation is performed, implant the most cranial and the most caudal screws first. Generally preferred screw axes are parallel to the cranial plateau. Choose the screw angles of the intermediate levels to aim for equidistance to their neighbors.

**Note:** If the sacrum is involved, place the screw laterally to the facet joint with a slightly more caudal entry point (see yellow circles) and slight tilt towards the promontory in order to provide appropriate clearance for the L5 screws (balanced screw distances). L5 screws should preferably be placed lateral of the facet joint with the tip as lateral as possible, i.e. with the head as medial as possible (aligned with L4 and S1 screw heads).

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**Placement of pedicle screws**

**Option 1**

The **blunt wire Ø1.6mm L370mm** still in place, the cannulated pedicle screw may be passed over it and screwed along the blunt wire in the pedicle.

**Caution:** The blunt wire must be cleaned before the cannulated pedicle screw passes over it, in order to avoid any uncontrolled push of the blunt wire. The pedicle screw should only be driven in under fluoroscopic or direct length control with simultaneous control of the blunt wire.
Option 2
To ascertain that the seat for the pedicle screw lies completely inside the bone (no perforation of bony surrounding), the seat should be palpated using the pedicle sounding probe (20.012.02/ W50-113). If a perforation is noticed, a new trajectory with a more appropriate orientation must be selected.

Note: If the screw is destined to replace a previously loosened screw (e.g. revision of a third-party implant-system) a careful and complete curettage of the seat should be carried out after removal and prior to insertion. The screw should be in closest possible contact with bone (preferably cancellous bone) without remaining connective tissue at the interface.

After determining the diameter and the length, the screw is being screwed on the screw turning shank with holding sleeve (20.001.00+02/W23-063) in the case of the STD-System or on the pedicle screw setter with holding sleeve (20.001.10) in case of the INI-System and screwed into the pedicle with the snap-on universal ratchet (20.013.00/W32-715) or T-handle ratchet (20.013.01/W32-716). The pedicle screw shall be only put in to a degree where the rod may be passed unhindered along the facet joints. The pedicle screws should thus be oriented towards their neighbouring screw according to the direction of rod insertion (from top down or bottom up). For this purpose an alignment wire Ø2.5mm (20.001.03/W90-029) may be put across the screw turning shank for achieving an optimal orientation (STD-System only).

Caution: If a pedicle screw can not be firmly placed ("hand-tight" torque), a longer or thicker screw should be considered.

Note: An appropriate alignment of the screw heads facilitates the insertion of the rod and allows the rod to optimally elongate under loading.

Caution: If a screw needs to be readjusted the screw turning shank with holding sleeve should be mounted again on the screw head in order to rotate it into the correct position. For time saving, screwing the instrument on the pedicle screw head can be skipped, provided that the screw turning shank with holding sleeve is completely advanced in the pedicle screw head down to its stop.

Note: For INI-System only, the pedicle screw may also be adjusted using the counter torque sleeve or the universal instrument with the rod left in place.
**Caution:** When the screw turning shank with holding sleeve cannot be easily retrieved, it may be loosened with small tilting movements with minimal force. Under no circumstances should it be retrieved forcefully with uncontrolled tilting movements. This may damage the screw flanges, requiring the replacement of the screw.

**Note:** The rod works best when it is implanted along a continuous line (i.e. without kinking) as well in the frontal as in the sagittal plane and when the screws are perpendicular to the rod's curvature.

For biomechanical reasons, the screws should be placed as much anteriorly and as close to the facet joints as practical.
Measuring and cutting the rod

After a first positioning of the vertebrae in the desired position the length of the rod must be determined in a way that its length exceeds the heads of the end screws by one half to one entire screw flank width. The **compass** (20.004.00W50-034) may be used for this measurement.

*Note: Should the rod further enter the screw head during clamping, because of pronounced Lordosis, additional length must be given to the rod to compensate for any shortening due to curvature.*

*Caution: The compass may be advanced only as far as a steady view on its points is given in order to avoid any injury of tissues.*

The rod is cut to the desired length using the **rod cutting instrument** (20.009.00/W01-20).

Placement of the rod

*Note: The rod shall be handled only with the original SpineShape instruments. These instruments are specially designed to provide a gentle interface with the rods. Under no circumstances may a rod be manipulated with a third-party instrument. A rod may especially not be pushed in with a sharp Cobb. Damages to the rod may compromise its longevity.*

It is strongly recommended to heat the rod (especially the *medium* and *stiff* versions) in a sterile bath in hot water (preferably at 60°C minimum), in order to make it temporarily flexible for easy placement.

This is of particular importance when the screw heads are not perfectly aligned.

*Note: When using a sterile protective foil over a non-sterile bowl, its compatibility with the heating system and its integrity must previously be checked. Damages to the sterile protective foil may compromise its sterile barrier.*
To foster an easy placement a **right rod holding plier with bent ends** (20.006.00/W05-014) and a **left rod holding plier with bent ends** (20.006.01/W05-015) are available.

**Caution:** The rod may only be pushed into a screw head when it is aligned with the rod holding pliers in a way as to slip forward without resistance and possible damage.

If the rod does not slide fully into the screw head notch and if it is being assured, that there is no conflicting bone or soft tissue preventing the rod from attaining that proper placement the **persuader** (20.006.02/W62-033) or the **universal instrument** (20.006.10) for the STD-System or INI-System respectively, may be used to push the rod into position. Otherwise, obstructing tissue has to be removed if possible or the screws are to be replaced. Replacement with same size is only allowed as long as the torque remains sufficiently high. Otherwise a larger or longer screw must be used, if possible.

**Note:** In order that the intermediate piece and the nut and the clamping element for the STD-System and the INI-System respectively, can afterwards correctly be mounted, it is important that the rod lies fully forward in the screw head.

**Caution:** When using the Varistab (stepped end) it must be ascertained that the transition of the rod's cross section lies outside the pedicle screw head.

**Clamping sequence for curved rods**

When the rod has to undergo curvature (e.g. Lodosis), the sequence of clamping is of upmost importance in order to avoid detrimental internal stress.

First the rod must be clamped into the screw which is furthest away, in order to let the rod slip through the neighbour screws. Of course the amount of slippage for perfect positioning must be foreseen by extra length on the rod when cut to length.
Providing clearance around the screw head

In order to provide sufficient clearance around the screw head the **muscle retaining lever** (20.008.00/W51-032) may be used.

Installing the intermediate piece **(STD-System only)**

With a good view on the screw head, the intermediate piece is inserted directly into the screw head using the **intermediate piece positioner** (20.005.00/W55-049).

**Caution:** *Do not use a hammer. If the intermediate piece does not easily slide in, then the orientation must be wrong and should be adjusted.*

Should the intermediate piece not advance enough in order to let the nut engage in the thread of the screw head, the intermediate piece may be pushed forward using the **pusher for intermediate piece positioner** (20.005.01/W31-846),
Installing the nut (STD-System only)

**Option 1**
In an easy environment the nut can be put directly with the nut installer (20.007.00/W24-311), using the positioner axis as a guide.

*Caution:* A jamming nut will manifest itself by an early sudden stop during rotation. In such case it will be appropriate to rotate the nut mounter by approx. 270° to the left (counter clockwise) and tighten again under light pressure. Should the nut jam again, option 2 shall be applied.

**Option 2**
In a more demanding environment the nut installer (20.007.00/W24-311) may be force-guided using the screw retaining blades (20.002.01/02/W07-1670/1) previously inserted into the modular spinal contractor with foldable handles (20.002.00/W06-064).

*Caution:* A jamming nut will manifest itself by an early sudden stop during rotation. In such case it will be appropriate to rotate the nut installer by approx. 270° to the left and tighten again under light pressure. Should the nut jam again, the procedure shall be repeated using another nut.

If for any reason the nut must be removed (with the intermediate piece already snapped in), the nut can then be extracted from the nut installer using the nut extractor (20.100.01).

The intermediate piece can be ejected from the nut using the intermediate piece ejector (20.100.02).

Installing the clamping screw (INI-System only)

First mount the clamping screw onto the clamping screw setter (20.007.10).

*Note:* For both following options (universal instrument and counter torque sleeve) it is of upmost importance that an unrestricted view on the pedicle’s screw head exists in order to ultimately prevent soft tissue to be trapped between the clamping screw and the pedicle screw head.

*Caution:* As well as the universal instrument as the counter-torque sleeve are ultimately required to assure the proper pedicle screw flanks width in order to allow the clamping screw to properly engage into its thread.
Option 1
Then install the **universal instrument** (20.006.10) on the pedicle screw head, where the width of the moveable hooks must be limited using the dedicated mechanism to get it automatically centred on the pedicle screw head.

The clamping screw setter is then pushed through the universal instrument to properly insert the clamping screw into the pedicle screw head.

Option 2
Then install the **counter torque sleeve** (20.005.10) on the pedicle screw head, adequately aligned to catch its flanges.

The clamping screw setter is then pushed through the counter torque sleeve to properly insert the clamping screw into the pedicle screw head.

Control of the relative endplate position
Depending upon the pathology of the patient, the surgeon may want to add lordosis or kyphosis to the segment(s). Generally it is preferable to position the whole patient into the desired curvature using the operating table. If this seems either not desirable or feasible, local correction may be done. For this, only one nut or clamping screw shall be tightened and the other shall remain loose, in order to allow the rod to slip underneath without damage.

Distracting / adding kyphosis
The **distracting plier** (20.003.10) may be put inside the nut or clamping element securely tightened to its stop and the **nut installer** (20.007.00) or **counter torque sleeve** (20.005.10) for the STD-System or INI-System respectively. The distracting plier has a scale with a 2mm spacing.

In case of narrow pedicle screws, in order to gain additional space, one arm of the distraction plier may lean on the **intermediate piece positioner** (20.005.00) or **clamping screw setter** (20.007.10) for the STD-System or INI-System respectively. In this case, extreme care must be exercised not to damage the instrument/-implant-interface.
Contracting / adding lordosis

The **contracting plier** (20.002.10) may be put outside the nut or clamping element securely tightened to its stop and the **nut installer** (20.007.00) or **counter torque sleeve** (20.005.10) for the **STD-System** or **INI-System** respectively. The contracting plier has a scale with a 2mm spacing.

**Caution:** A segmental compression or distraction with an already inserted rod may only be done as long as the nuts are not yet tightened and the clamping elements are not yet in contact with the rod, since otherwise the rod may be damaged.

Securing the rod in the pedicle screw

With the endplates in the desired relative position and with the rod ends still exceeding the screw heads by one half to one entire screw flank width, the nuts or clamping elements may be tightened. Because clamping of polymeric rods is dealt with, no tightening torque can be specified. The clamping of the rod is designed in a way that the nut or clamping element must simply be tightened until reaching its stop. In addition, the stop is designed to also serve as safeguard against loosening.

**Caution:** If a screw including the inserted rod is rotated away from the proper alignment, it must be turned back by simultaneously rotating the nut driver with ratchet and the internal/external countertorque or the clamping screw setter and the counter torque sleeve / universal instrument for the **STD-System** or **INI-System** respectively. After realignment the proper tightening must ultimately be checked and assured again.

**Caution:** The clamping element must absolutely be tightened until the stop is reached, since otherwise the rod may slip underneath in flexion and the safeguard against loosing would not be onset. The stop is reached when any further torque does no longer result in a rotation of the clamping element.

**Caution:** The proper seating of the camping screw on its stop also prevents the pedicle screw flanks from getting apart under loads in-situ (**INI-System** only).

Tightening the nut **[STD-System]**

The nut is basically tightened using the **nut driver with ratchet** (20.007.01/ W22-198). The tightening torque shall only be applied if the screw is properly held to counteract, in order to prevent the screw from rotating with the rod already installed. If the stop cannot be reached immediately a short break shall be made to let the material settle in place. Two options are available to neutralize the tightening torque, one for counteracting internally and one for counteracting externally.
**Option 1**
In easy circumstances and in particular when using an elastic or warmed-up medium or warmed-up stiff rod, the screw can be counteracted internally by using the intermediate piece retainer with T-handle (20.005.02 / W24-312 -2).

**Option 2**
In more demanding circumstances and in particular when using the medium or stiff rod, the rotation of the screw and a resulting “windshield wiper” effect can be counteracted externally using again the screw retaining blades (20.002.01/02/ W07-1670 /1) previously inserted into the modular spinal contractor with foldable handles (20.002.00/W06-064).

The proper seating of the nut on the pedicle screw head must be closely checked, by following mean:

The gap below the nut shall be equal on all installed nuts and shall be approx. one millimetre.

**Tightening the clamping screw (INI-System)**

The clamping screw is basically tightened using the clamping screw setter (20.007.10). The tightening torque shall only be applied if the screw is properly hold to counteract, in order to prevent the screw from rotating with the rod already installed. If the stop cannot be reached immediately a short break shall be made to let the material settle in place. Two options are
available to neutralize the tightening torque, one using the universal instrument and the other using the counter torque sleeve.

**Option 1**
In easy circumstances and in particular when using an elastic or warmed-up medium or warmed-up stiff rod, the clamping screw can be counteracted by using the counter torque sleeve (20.005.10).

**Option 2**
In more demanding circumstances and in particular when using the medium or stiff rod, which may need slightly more pressure for being positioned fully forward into the pedicle screw head, the clamping screw can be counteracted by using the universal instrument (20.006.10).

Once the clamping screw tightened, the moveable hooks must be opened to their maximum for removing the universal instrument from the pedicle screw head.

The universal instrument has several features: it allows slight rotations of the pedicle screw to properly align with the rod's path, it pushes the rod forward into place (provided a free room without obstructions by bone or soft tissue), it centres the clamping screw for proper alignment, it counter-torques the pedicle screw while tightening the camping screw.
The proper seating of the clamping screw on the pedicle screw head must be closely checked, by three means:

1) The clamping screw must be tightened until reaching a noticeably stop.

2) The clamping screw must be flush with the parallel flanks of the pedicle screw head. Only four edges may extend beyond the clamping screw.

2) The counter torque sleeve must be easily slideable and removable over the complete flank length of the pedicle screw head.

**Removal of the rod**

Should a rod need to be removed, the nuts and intermediate pieces or clamping screws are, naturally, removed first. Subsequently the rod is being pulled out of the screw heads using the **right and left rod holding pliers with bent ends** (20.006.00 / W05-014 and 20.006.01 / W05-015).

Should this not easily be possible to do, the rod may also be cut in-situ, using the **rod cutting instrument** (20.009.00/W01-20).

*Caution: The rod cutting instrument may only be used in-situ, when a steady view on the cutting blade is given and when it is assured that no tissue can be injured.*

The excess pieces can thereafter be individually removed from the screw heads using the **right and left rod holding pliers with bent ends** (20.006.00 / W05-014 and 20.006.01 / W05-015).
Removal of the screw

For removing the screw, the **screw turning shank with holding sleeve** (20.001.00-02/W23-063) or **pedicle screw setter with holding sleeve** (20.001.10), respectively, is mounted on the screw head with a **universal ratchet** (20.013.00/W32-715) or **T-handle ratchet** (20.013.01/W32-716) to turn the screw counter clockwise out of the pedicle.

Rehabilitation

During the first six weeks after surgery the patient should basically avoid uncontrolled rotation-al and bending movements, particularly with high loads on the vertebral column, in order not to compromise the proper in-growth of the pedicle screws. Movements with heavier loads should only be undertaken after six months.

In the first three weeks while regaining mobility the patient should regularly wear a brace to prevent uncontrolled motion. Crutches are generally not necessary in standard cases, yet walking aids may be advocated for special reasons (e.g. paresis, coordination problems, status after operative hip or knee joint replacement). In case L5/S1 is involved, sitting with flexion of the hips >90° should be prevented by seat wedges, toilet seat elevation, elevated chairs, and adapted bed height. Proper walking as well as climbing stairs should be demonstrated by a physiotherapist who needs to be informed about the implications of the procedure by the surgeon. In addition, the physiotherapist should also show the patient how to avoid unadvisable movements and give adequate recommendations for daily tasks. If considered necessary by the physicians, breathing exercises can be helpful. The trunk muscles and their proprioception should preferably be trained isometrically without large ROMs and force amplitudes.

After the first three weeks, after complete wound healing, exercises can also be done in water, yet only under close supervision of the physiotherapist. In this period of time limited flexion, lateral bending and rotation exercises may be begun with (max. 30° in every direction).

After three weeks the patient may begin, first temporarily and then increasingly often, weaning of the brace. The gradual entry into the activities of daily living can now be started.

Post-operative examinations and clinical documentation

See separate documentation sheets.

**Important**

Removed implants shall be returned to the manufacturer for investigation. They shall be packed and sealed air- and water-tight and for the protection of the employees, information about the state of contamination shall be included.

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