LINK®

Partial Pelvis Replacement Endo-Model

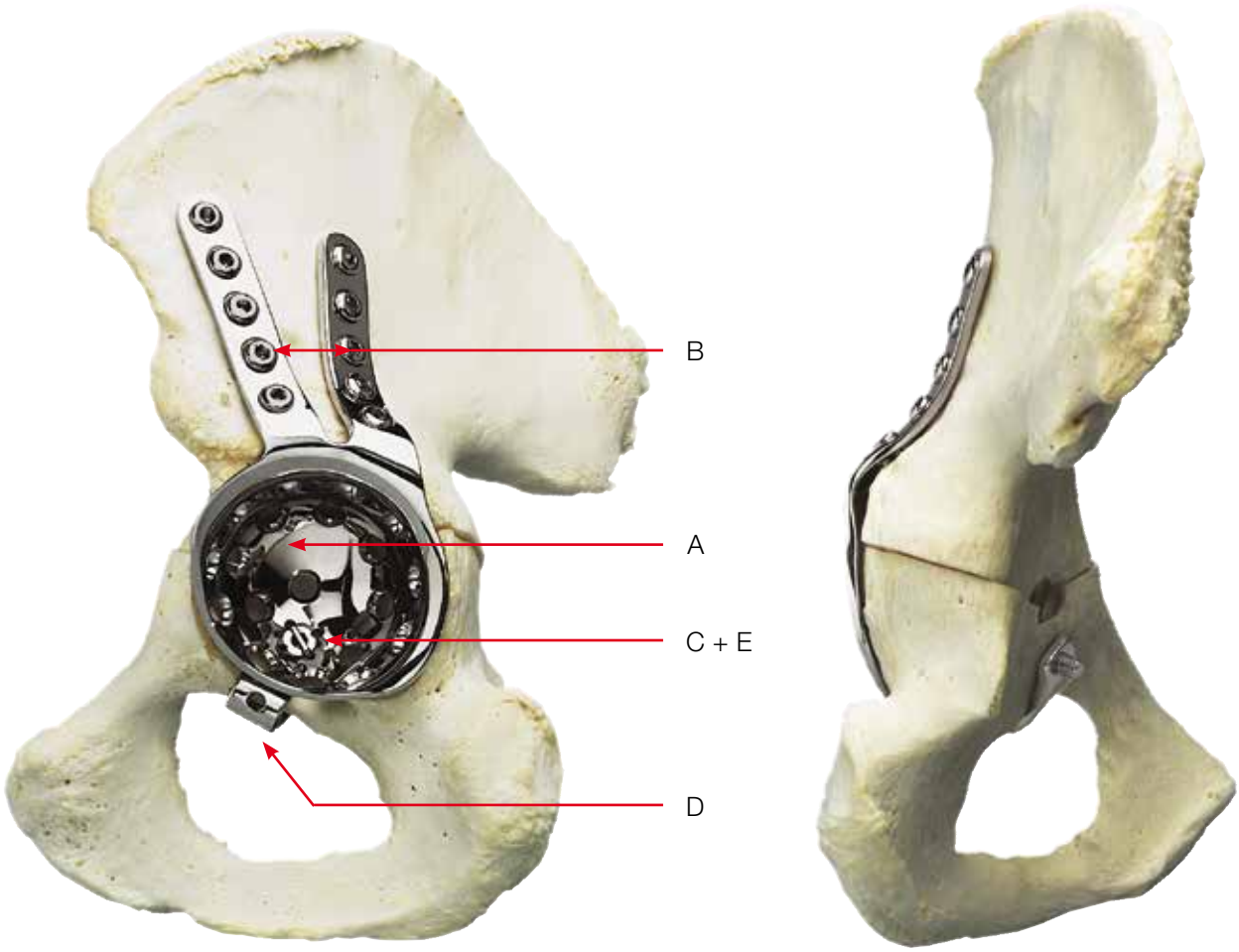
Surgical Technique

CE 0482

Explanation of Pictograms			
	Manufacturer	REF	Article number
MAT	Material (number)	CE	Product meets the applicable requirements, which are regulated in the EU harmonization legislation for the affixing of the CE marking.

Partial Pelvis Replacement
Endo-Model

System Description



First, the partial pelvis replacement (A) is fixed to the pelvis cranially with bone screws (B). Then the screw (C) is screwed through the caudal section of the partial pelvis replacement (A) from the inside. The obturator hook (D) is positioned on the margin of the obturator foramen, using the hook-holding clamp, and secured tightly with the screw (C).
Subsequently, the screw lock (E) is placed over the head of the screw (C) into the body of the pelvis replacement (A).
After the fixation of the partial pelvis replacement has been completed, a polyethylene acetabular component is cemented in the usual manner.

Surgical Technique

For **LINK Endo-Model Partial Pelvis Replacement** after acetabular cup revision, in case of extensive osseous destruction.

Protrusion type
In these cases, there is usually extensive destruction of the floor, medial convexity and roof area of the acetabulum, with preservation of the outer margin craniolaterally, laterally and/or caudally. Occasionally, however, the acetabular area itself is so defective that the bony connection from cranial to caudal is inadequate.

The severely loosened acetabular cup will then have migrated craniomedially with extensive bone loss. Depending on the protrusion, the operation can be performed with dorsal entry. If the head of the prosthesis is well into the pelvis, access will be lateral, with a semi-obliquely sidelying patient, since the leg has to be adducted for luxation of the head.

With dorsal entry, the junction between the vastus lateralis and the gluteus medius is preserved. This junction can often be preserved with the lateral entry also. Beneath it, the artificial joint is luxated dorsally by bringing the leg into adduction.

If extensive cranial bone defects of the lateral acetabular margin appear, it may be that the incision cannot be performed in the usual way. Instead of passing from lateral femur by way of the trochanter tip, angling dorsally, it will then go from lateral femur by way of the trochanter tip toward the anterior iliac spine at 1 cm distance at the alar crest dorsally. In this form of access, the junction between vastus lateralis and gluteus medius attachment must be parted after preparation of a trochanter lamella.

When preparing the gluteus medius at the ala of the illium, provision must be made for refixation. Also, care must be taken not to interfere with the neural and vascular supply in the direction of the coccyx.

In the protrusion type, the roof of the acetabulum, notably the ventral convexity, must be restored as third point of support. After removal of the loosened acetabular cup and cleaning of the inside of the bone, while sparing the open pelvic floor, a piece of bone must be prepared so as to match the interior shape of the pelvis part to be reconstructed with a good fit. Chips of spongiosa - prepared with a bone mill - are placed between the inside of the pelvic ala and the piece of bone to be transplanted. This piece must be stably fixed. It is then drawn into the roof from the outside of the ala of the illium by means of two cancellous screws.

The location of the screws should be chosen so that they will not interfere with the milling of an acetabular mold with a grater reamer. Also, the bone transplant must be able to withstand this operation in unchanged position. Before molding with the reamer, rough preshaping with an oscillating saw is often helpful, especially in sclerotic bone.

The partial pelvis replacement, with suitable basket diameter and appropriate length of flanges, is fitted into the prepared acetabular lodgment. In so doing, it can be observed whether, and into what position, the flanges may require adjustment to achieve a well-fitting contact with the pelvis, the metal basket being correctly seated.

The partial pelvis replacement, as finally adapted, is placed in position. The metal basket receives complete support by way of the reconstructed roof of the acetabulum. After drilling holes in the bone with a 3.2 mm diameter drill (no tap), the flanges are secured with cancellous screws; the distal ends of the screws should reach into any implanted piece of bone also. The cranial screws engage the pelvic ala only. 25 mm cancellous screws with full thread are usually used.

If there is only a narrow acetabular margin dorsally and caudally, the metal basket will have no support on the ischial and the pubic ramus. In that case a metal basket with caudal flange should be selected, to be screwed onto the ischial ramus. Alternatively, however, caudal support is feasible by inserting a cortical screw, in the manner of a post screw, from the inside of the metal basket into the medullar cavity of the ischial ramus. Simultaneous support at

the pubic ramus is desirable but not always possible. If there is a posterior transverse fracture of the acetabular margin, or if no sufficient bony connection remains from cranial to caudal, a traction hook will be required, passed through the obturator foramen. The gaping fracture can be reduced by tightening the connecting screw.

The metal basket can be fixed with one or more screws to the bone implant used to reconstruct the roof of the acetabulum. These screws and the fixation of the flanges lend stability by countertraction. With the projecting screw heads in the metal basket, the polyethylene acetabular cup should be grooved in these areas so that it can be fitted stably. A mode-rate projection of the UHMWPE acetabular cup to be implanted is tolerable, especially in the dorsal area. Before applying the metal basket, resorbable gauze may be placed behind the basket so that when the acetabular cup is introduced, the cement will not emerge too sharp and too far medially through the openings of the basket.

Dysplasia type

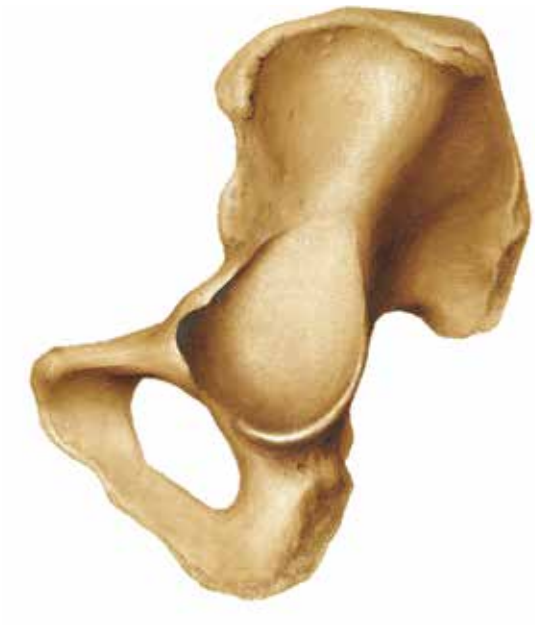


Fig. 1
Secondary bone loss of acetabular roof and convexity.

Dysplasia type
This indication is distinguished by an extensive defect of the acetabular lodgment in the roof area, with loss of the outer convexity. Often a defect of the floor, with posterior marginal defect is also present. In that case, homologous osteoplasty unaided will not afford sufficient stability.

Approach is as previously described. First the acetabular lodgment is cleaned. Then the bony apposition of the external pelvis in the acetabular area is cleaned, and a piece of bone is prepared for reconstruction of the roof of the acetabulum with the exterior convexity.

In this procedure also, spongiosa prepared in the bone mill is underlaid. The prepared piece of bone is then fixed with cancellous screws. After grooving the bone implant with the oscillating saw and acetabular reamers, the selected partial pelvic replacement is inserted in the reconstructed acetabular lodgment. Now the flanges of the basket are bent so that they come into craniodorsal position over the homologous bone. After selection of the appropriate screw lengths, the screws are screwed into the homologous bone piece and the pelvic ala.

The remaining steps are as described for the protrusion type.

Protrusion type

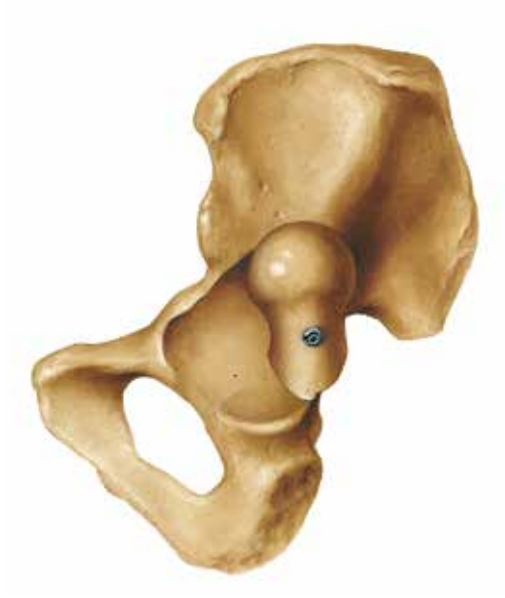


Fig. 2
Bony reconstruction of the acetabular roof and convexity with a homologous head-neck segment, screwed to the pelvic bone.

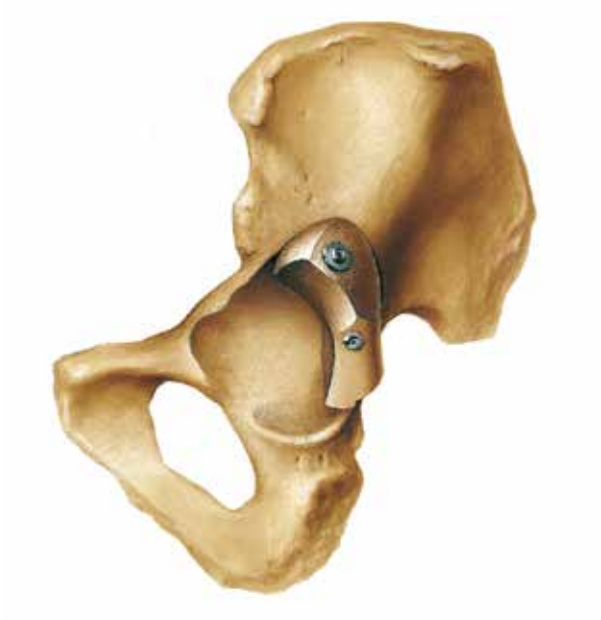


Fig. 3
Reconstructed and prepared acetabular roof. The transplant is fixed with two cancellous screws; the acetabular volume is reamed to shape.

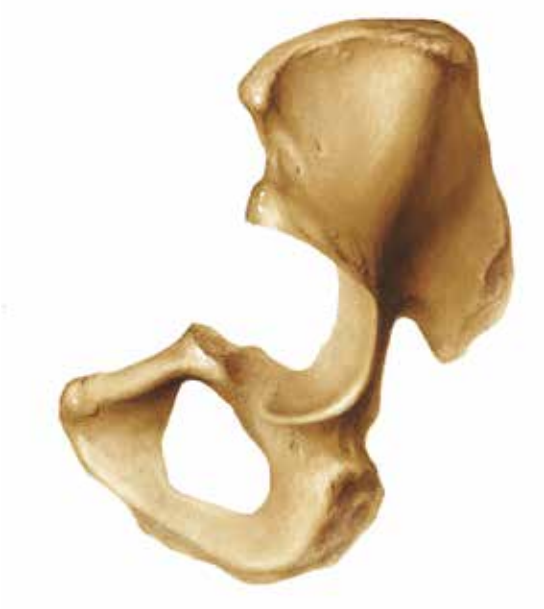


Fig. 4
Secondary bone loss of the ventral circumference and the acetabular floor.

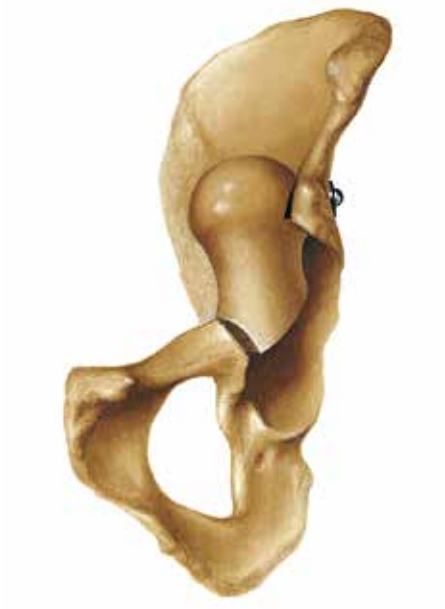


Fig. 5
Reconstruction of ventral acetabular circumference by use of a screw-fixed head-neck segment. Frontal view of pelvis.

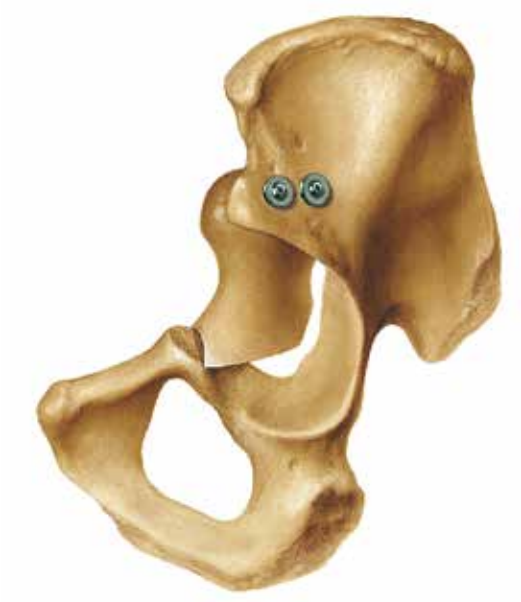


Fig. 6
Pelvis reconstruction like Fig. 5, lateral view.

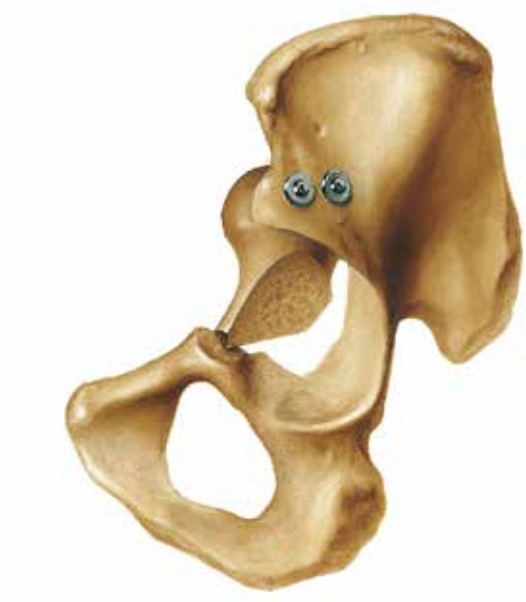


Fig. 7
Bone transplant trimmed with acetabular reamer.

Pseudarthrosis

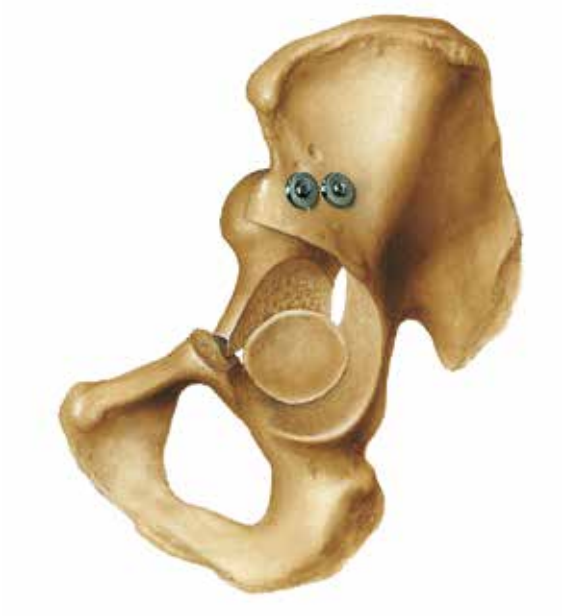


Fig. 8
Closure of the remaining central acetabular defect with a molded homologous large bone chip.

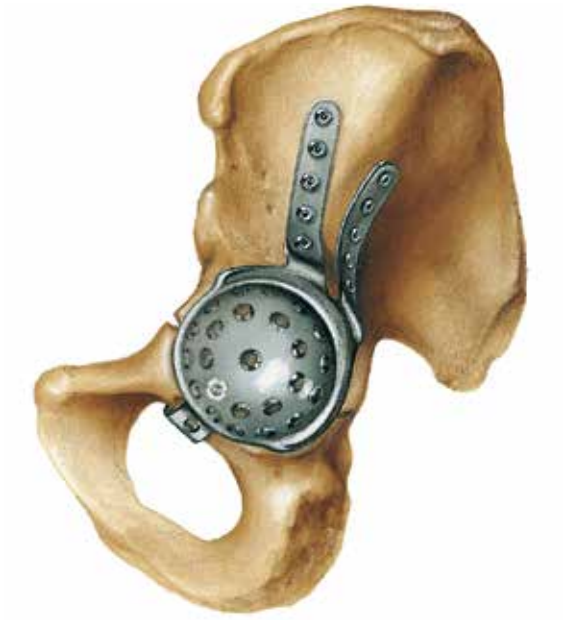
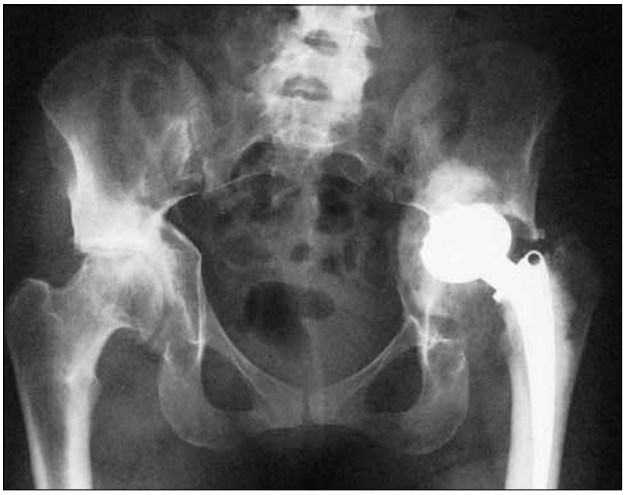
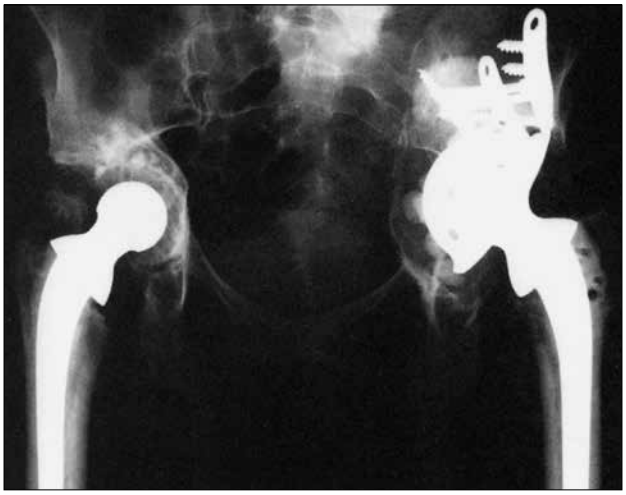


Fig. 9
Partial pelvis replacement with attached obturator foramen hook in crosswise pseudarthrotic acetabulum.

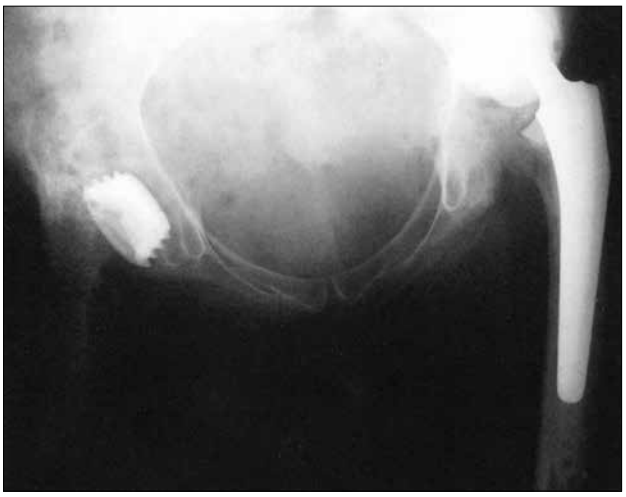
Case Reports



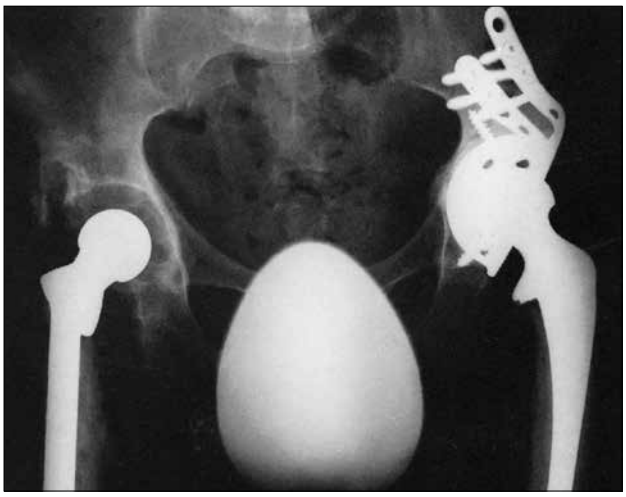
Loosening of artificial acetabular cup after attempted reconstruction of the open floor of the acetabulum and the cranioventral convexity with homologous spongiosa chips, the outer margin of the acetabulum being enlarged but preserved.



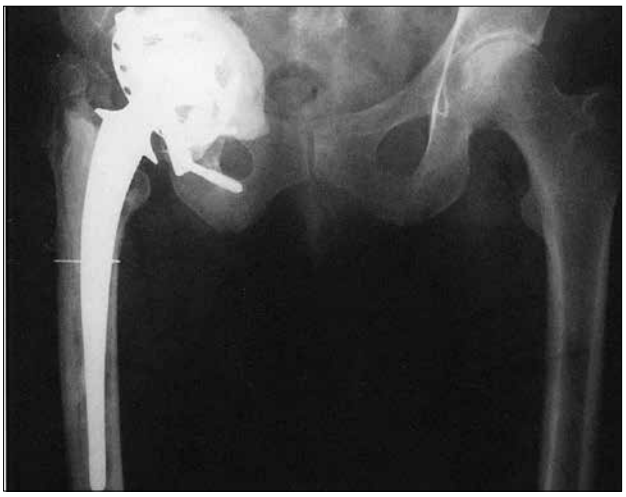
Reconstruction of the craniomedial roof of the acetabulum with homologous block of bone for bearing support of the partial pelvic replacement.



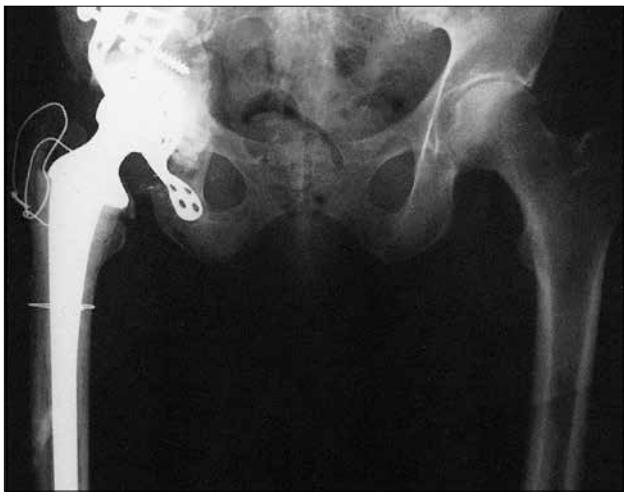
Periprosthetic Staphylococcus aureus infection bilaterally. Remaining ceramic socket after attempted total explantation dextrally.



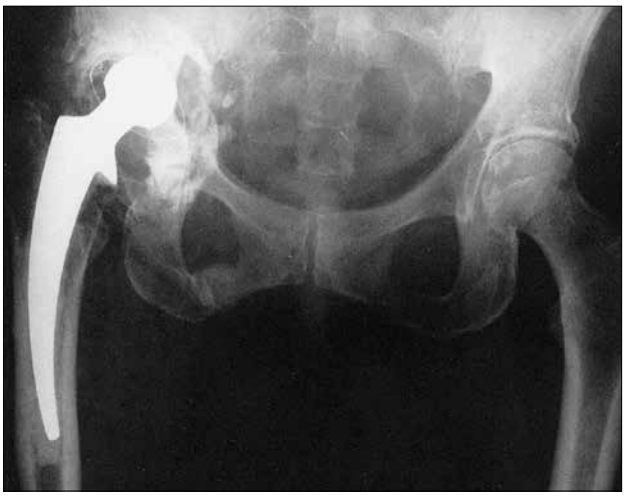
Removal of right ceramic acetabular cup and left THR and single-stage implantation of a THR using Refobacin - Palacos with 3 g lincomycin and 0.5 g gentamycin added per 40 g bone cement. Use of left partial pelvic replacement because of total loss of dorsal margin of acetabulum.



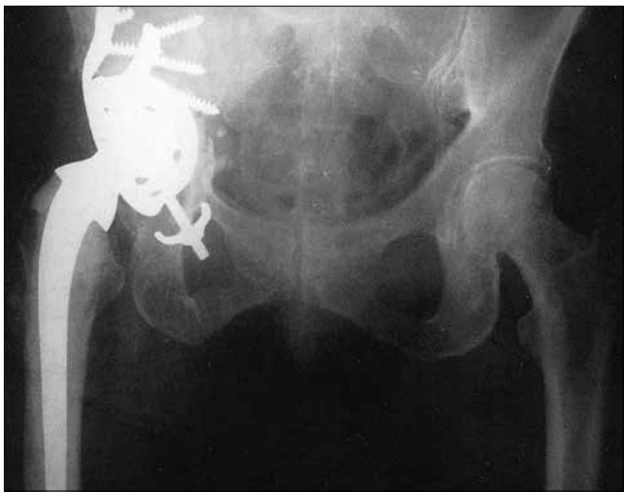
Loosening of artificial acetabular cup after replacement using a metal ring and AO plate applied to dorsal region of acetabulum because of loss of dorsal margin, medial convexity and floor. Attempted reconstruction of destroyed acetabulum with autologous bone chips. Absent primary bony bearing support of implants.



Roof of acetabulum reconstructed and stable under load, in view of craniomedial support with block of homologous bone. Artificial socket secured by partial pelvic replacement with caudal support in the ischium because of loss of dorsal margin of acetabulum.

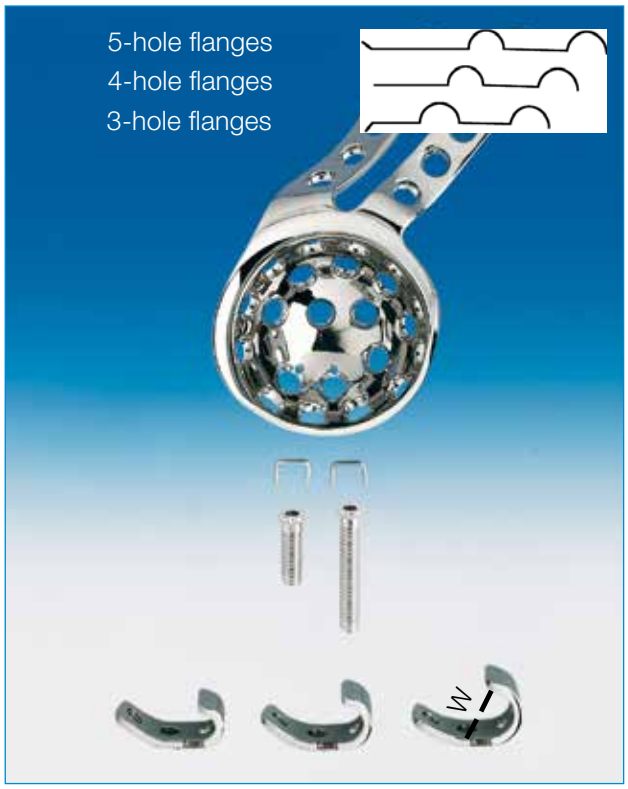


Loosening of acetabular cup with loss of dorsal and ventral margin of acetabulum. Gross destruction of craniomedial roof. Transverse fracture of residual socket abutment.



Cranial support of partial pelvic replacement after grooving of the bone. Stable fixation of partial pelvic replacement with cancellous screws and tension anchor caudally because of transverse pelvic fracture.

Partial Pelvis Replacement with Caudal Hook



Hook for obturator foramen

REF	Width mm
15-8220/06	6
15-8220/09	9
15-8220/12	12

Fixation screws for obturator foramen hook, including screw lock

REF	Length mm
15-8221/20	20
15-8221/25	25
15-8221/30	30
15-8221/35	35

Partial pelvis replacement (hook for obturator foramen and fixation screws are not included)

3-hole flanges 46 mm	4-hole flanges 58 mm	5-hole flanges 70 mm			
REF	REF	REF	Version	Inner-Ø mm	Outer-Ø mm
15-8203/48	15-8204/48	15-8205/48	right	42	48
15-8203/53	15-8204/53	15-8205/53	right	47	53
15-8203/55	15-8204/55	15-8205/55	right	49	55
15-8203/57	15-8204/57	15-8205/57	right	51	57
15-8203/63	15-8204/63	15-8205/63	right	57	63
15-8203/67	15-8204/67	15-8205/67	right	61	67
15-8213/48	15-8214/48	15-8215/48	left	42	48
15-8213/53	15-8214/53	15-8215/53	left	47	53
15-8213/55	15-8214/55	15-8215/55	left	49	55
15-8213/57	15-8214/57	15-8215/57	left	51	57
15-8213/63	15-8214/63	15-8215/63	left	57	63
15-8213/67	15-8214/67	15-8215/67	left	61	67

Partial Pelvis Replacement with Caudal Flange

Partial pelvis replacement with caudal flange

3-hole flanges 46 mm	4-hole flanges 58 mm	5-hole flanges 70 mm			
REF	REF	REF	Version	Inner-Ø mm	Outer-Ø mm
15-8223/48	15-8224/48	15-8225/48	right	42	48
15-8223/53	15-8224/53	15-8225/53	right	47	53
15-8223/55	15-8224/55	15-8225/55	right	49	55
15-8223/57	15-8224/57	15-8225/57	right	51	57
15-8223/63	15-8224/63	15-8225/63	right	57	63
15-8223/67	15-8224/67	15-8225/67	right	61	67
15-8233/48	15-8234/48	15-8235/48	left	42	48
15-8233/53	15-8234/53	15-8235/53	left	47	53
15-8233/55	15-8234/55	15-8235/55	left	49	55
15-8233/57	15-8234/57	15-8235/57	left	51	57
15-8233/63	15-8234/63	15-8235/63	left	57	63
15-8233/67	15-8234/67	15-8235/67	left	61	67

INFORMATION:
The Endo-Model partial pelvis replacement can be combined with cemented LINK UHMWPE acetabular cups whose outside diameter must be at least 2 mm smaller than the inside diameter of the partial pelvis replacement.

Fixation Screws

Cortical fixation screws, sterile
thread Ø 4.5 mm, head Ø 8.0 mm

Single screw		Single screw	
REF	Length mm	REF	Length mm
S64-8224	24	S64-8248	48
S64-8226	26	S64-8250	50
S64-8228	28	S64-8252	52
S64-8230	30	S64-8254	54
S64-8232	32	S64-8256	56
S64-8234	34	S64-8258	58
S64-8236	36	S64-8260	60
S64-8238	38	S64-8262	62
S64-8240	40	S64-8264	64
S64-8242	42	S64-8266	66
S64-8244	44	S64-8268	68
S64-8246	46	S64-8270	70

Cancellous screws for fixation of the bone-transplant, sterile
Thread Ø 6.5 mm, thread length 16 mm, head Ø 8.0 mm

Single screw		Single screw	
REF	Length mm	REF	Length mm
S64-8425	25	S64-8475	75
S64-8430	30	S64-8480	80
S64-8435	35	S64-8485	85
S64-8440	40	S64-8490	90
S64-8445	45	S64-8495	95
S64-8450	50	S64-8496	100
S64-8455	55	S64-8497	105
S64-8460	60	S64-8498	110
S64-8465	65	S64-8499	120
S64-8470	70		

Cancellous screws, full thread, sterile
Thread Ø 6.5 mm, head Ø 8.0 mm

Single screw		Single screw	
REF	Length mm	REF	Length mm
S64-8623	23	S64-8670	70
S64-8625	25	S64-8675	75
S64-8630	30	S64-8680	80
S64-8635	35	S64-8685	85
S64-8640	40	S64-8690	90
S64-8645	45	S64-8695	95
S64-8650	50	S64-8696	100
S64-8655	55	S64-8697	105
S64-8660	60	S64-8698	110
S64-8665	65		

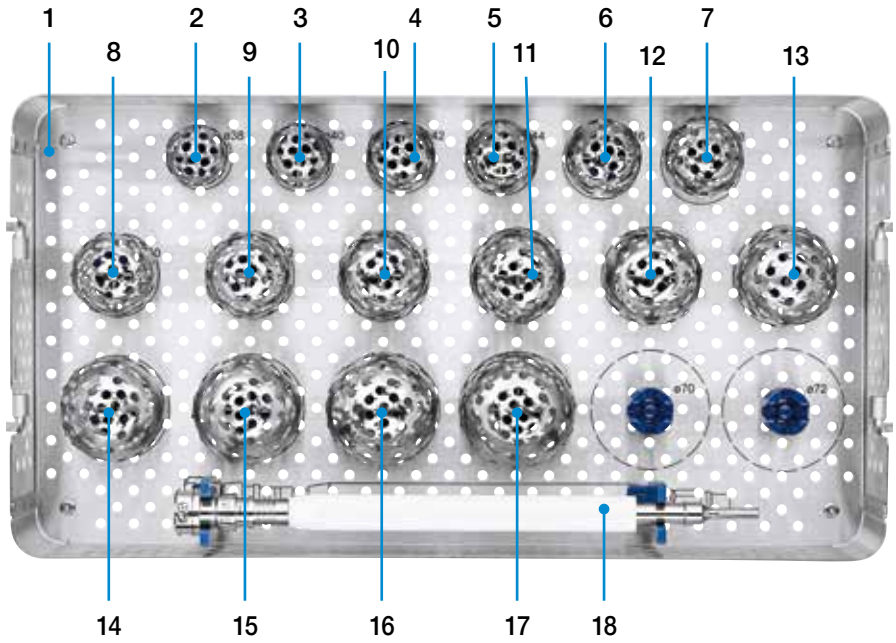
64-8008/02
Hex head screwdriver
for bone screws and fixation screws of obturator foramen hook, 250 mm

15-8262/01
Bending iron for flanges, 235 mm, (two are required)

131-609/03
Flexible screwdriver for bone screws and fixation screws of obturator foramen hook, 290 mm

15-8225
Hook-holding clamp,
125 mm

132-260/01 Complementary Instrument Set for LINK Acetabular Reamers

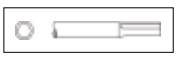


1	132-260/10	**Instrument Tray,** empty, perforated stainless steel, 550 x 265 x 50 mm
2	131-170/38	**Acetabular Reamer Head**, Reamer-Ø 38 mm
3	131-170/40	**Acetabular Reamer Head**, Reamer-Ø 40 mm
4	131-170/42	**Acetabular Reamer Head**, Reamer-Ø 42 mm
5	131-170/44	**Acetabular Reamer Head**, Reamer-Ø 44 mm
6	131-170/46	**Acetabular Reamer Head**, Reamer-Ø 46 mm
7	131-170/48	**Acetabular Reamer Head**, Reamer-Ø 48 mm
8	131-170/50	**Acetabular Reamer Head**, Reamer-Ø 50 mm
9	131-170/52	**Acetabular Reamer Head**, Reamer-Ø 52 mm
10	131-170/54	**Acetabular Reamer Head**, Reamer-Ø 54 mm
11	131-170/56	**Acetabular Reamer Head**, Reamer-Ø 56 mm
12	131-170/58	**Acetabular Reamer Head**, Reamer-Ø 58 mm
13	131-170/60	**Acetabular Reamer Head**, Reamer-Ø 60 mm
14	131-170/62	**Acetabular Reamer Head**, Reamer-Ø 62 mm
15	131-170/64	**Acetabular Reamer Head**, Reamer-Ø 64 mm
16	131-170/66	**Acetabular Reamer Head**, Reamer-Ø 66 mm
17	131-170/68	**Acetabular Reamer Head**, Reamer-Ø 68 mm
18	131-171B*	**Shaft with Handle** for acetabular reamer, 312 mm, fittings optional
	131-171/01	**Handle** for 131-171B, D, E

***How to order:** 131-171E = with Jacobs Chuck fitting

B
Hudson

D
AO



E
Jacobs Chuck

X-ray Templates

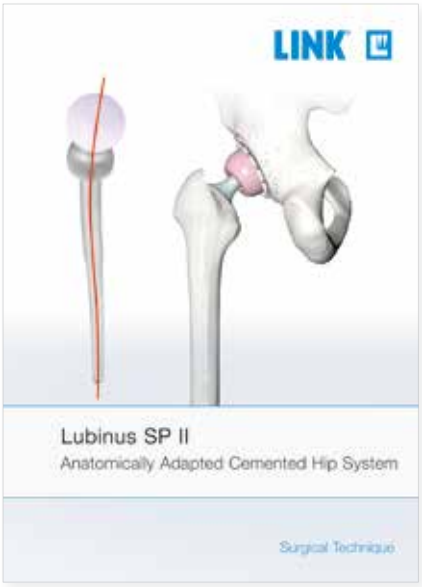
15-8280
X-ray templates for LINK Partial Pelvis Replacement, 110% of actual size, 2 sheets

Instructions for Cleaning and Maintenance

Specific instructions for instruments are available on request: E-mail customer@linkhh.de

Literature

Combinable with different LINK Hip Prosthesis Systems



For more information please register for our LINK Media Library (linkorthopaedics.com)

Indications/Contraindications

Partial Pelvis Replacement Endo-Model
General Indications
Mobility-limiting diseases, fractures or defects of the hip joint or proximal femur which cannot be treated by conservative or osteosynthetic procedures
Indications
Alloplastic replacement of part of the pelvis after destructive osteolytic processes or tumor indications
Palliative salvage care in the acetabular region
Contraindications
Poor general state of health
Acute or chronic infections, local and systemic, insofar as they compromise the successful implantation
Allergies to (implant) materials
Distinctive muscular, nerve, vascular or other diseases which put the affected limb at risk

INFORMATION:
The above indications and contraindications are based on standard cases. The final decision regarding an implant must be made by the surgeon for each patient on the basis of the surgeon's individual analysis and experience.

Important Information

Please note the following regarding the use of our implants:

1. **Choosing the right implant is very important.**
   The size and shape of the human bone determines the size and shape of the implant and also limits the load capacity. Implants are not designed to withstand unlimited physical stress. Demands should not exceed normal functional loads.

2. **Correct handling of the implant is very important.**
   Under no circumstances should the shape of a finished implant be altered, as this shortens its life span. Our implants must not be combined with implants from other manufacturers. The instruments indicated in the Surgical Technique must be used to ensure safe implantation of the components.

3. **Implants must not be reused.**
   Implants are supplied sterile and are intended for single use only. Used implants must not be used again.

4. **After-treatment is also very important.**
   The patient must be informed of the limitations of the implant. The load capacity of an implant cannot compare with that of healthy bone!

5. **Unless otherwise indicated, implants are supplied in sterile packaging.**
   Note the following conditions for storage of packaged implants:
- Avoid extreme or sudden changes in temperature.
- Sterile implants in their original, intact protective packaging may be stored in permanent buildings up until the “Use by” date indicated on the packaging.
- They must not be exposed to frost, dampness or direct sunlight, or mechanical damage.
- Implants may be stored in their original packaging for up to 5 years after the date of manufacture. The “Use by” date is indicated on the product label.
- Do not use an implant if the packaging is damaged.

6. **Traceability is important.**
   Please use the documentation stickers provided to ensure traceability.

7. **Further information** on the material composition is available on request from the manufacturer.

Follow the instructions for use!

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