



**Hansson Pin[®]
System**



Swemac

Hansson Pin[®] System

Strong stable fixation, through simple precise procedure with minimal surgical trauma

The Hansson Pin system was designed by Professor Lars Ingvar Hansson at the University of Lund in Sweden. It was developed based on research concerning the effects of implants on the blood supply to the femoral head. The Hansson Pin system has been designed to minimize surgical trauma to the patient and offer secure, stable fixation with reduced risk of healing complications. Twenty years of successful clinical use have led the Hansson Pin System to its current form. Until 2011, more than 250.000 patients suffering from femoral neck fractures or slipped capital femoral epiphyses have been operated.



The late Professor
Lars-Ingvar Hansson

The Hansson Pin consists of two parts, an outer Pin and an inner sliding tongue.

Fixation in the femoral head is achieved by pushing the inner sliding tongue out through the window of the outer Pin.

All implants are available sterile packaged for immediate use and made from stainless steel 316 LVM.

Two world patents

Patent no: 0002855-5

Patent no: 0201058-5



Femoral Neck Fracture

The principle



This simple and precise procedure is used for fixation of femoral neck fracture. After reduction of the fracture, two cylindrical Pins are inserted through a drilled hole and atraumatically advanced into the femoral head. After deployment of the hook, strong and stable fixation is achieved.

The inferior Pin

- Enters the lateral femoral cortex at a point opposite the lesser trochanter or just below.
- Touches the internal surface of the medial cortex in the femoral neck below the fracture.
- Reaches the subchondral bone in the femoral head just below the centre.

The posterior Pin

The posterior Pin is placed parallel to the inferior Pin.

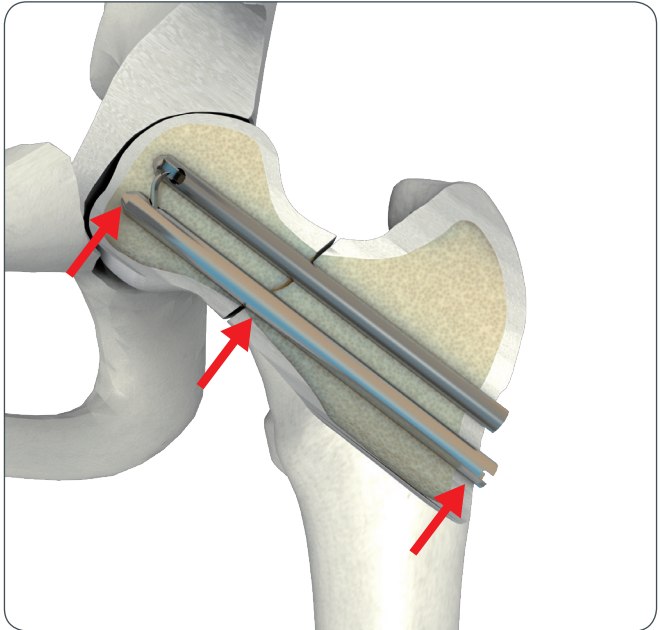
- Enters the lateral femoral cortex.
- Touches the internal surface of the posterior cortex of the femoral neck below the fracture.
- Reaches the subchondral bone of the femoral head.

In the lateral projection the Pin is placed slightly posteriorly to the central femoral axis line.

Strong stable fixation

Provides secure fixation

- **Strong resistance to rotation.** Peripheral Pin placement within the neck provides strong resistance to rotation.
- **Use of cortical bone for buttressing.** Each Pin contacts strong cortical bone in three places to provide maximum stability. The Hansson Pin System does not rely on soft cancellous bone for support and the risk of displacement is thereby minimized.
- **Large contact area.** It is important to have a large contact area at the fracture site in order to stabilize the fracture. The shaft diameter of the Hansson Pin is 6.5 mm. The most common screws used for femoral neck fractures have a shaft diameter of only 4.5-4.8 mm.
- **Firm anchorage.** The hook of each Pin engages in subchondral bone to provide secure anchorage and prevent migration or backing out.



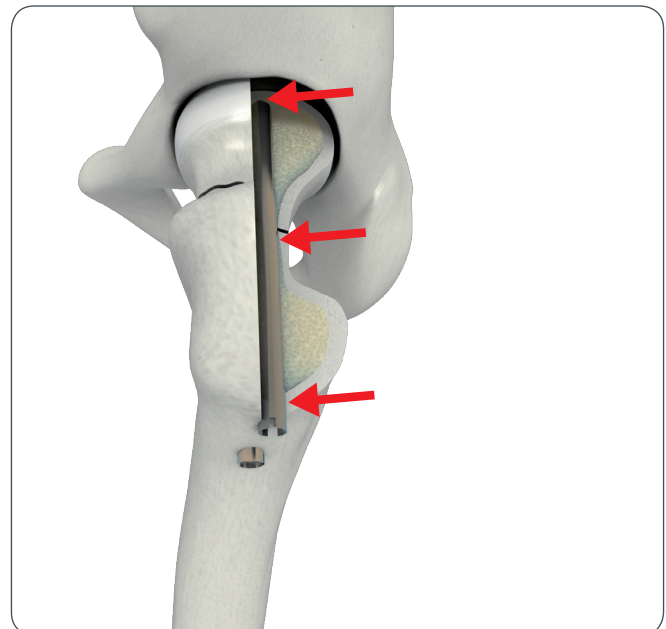
Three point contact with cortical bone provides maximum stability. Inferior Pin contacts inferior cortex of the femoral neck.

“Two Hansson Pins placed more than 8 mm apart have better rotational resistance than three cannulated screws (ACE-CHS)”

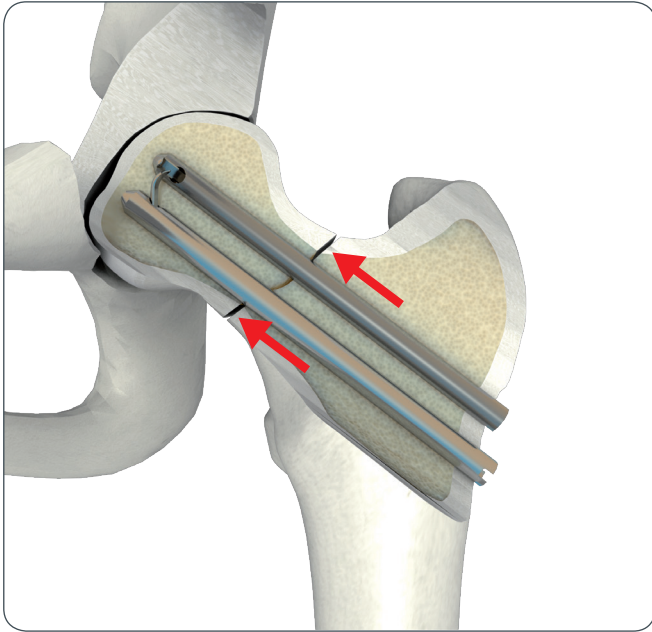
“Two Hansson Pins have greater fixation strength of the femoral head than three cannulated screws (ACE-CHS)”

Treatment of femoral neck fracture with Hansson Pins
A Biomechanical Study.

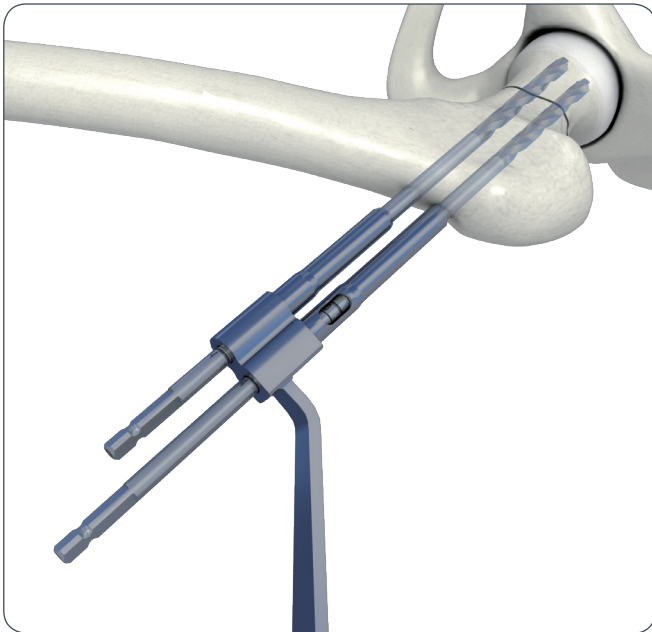
Souichi Uta, Yukio Inoue, Kazuo Kaneko, Hideaki Iwase
Jyuntendo University, Izunagaoka Hospital
Journal of Musculoskeletal System Vol. 13 No.5 May 2000



Posterior Pin contacts posterior cortex of the femoral neck.



Parallel placement of the Pins ensure continuous compression at the fracture site.



Simple instrumentation ensures precise parallel placement. The parallel placement of the Pins does not depend on thin Guide Wires. 6.7 mm Drills are introduced through deep parallel drill tubes ensuring parallel placement of the Pins.

Maintains contact with bone

- **Precise parallel placement.** Precise parallel placement allows for fracture dynamization thus ensuring continuous contact with bone, even during resorption.

“Convergence has been reported to increase the incidence of non-union. Therefore, placement of peripheral pins, is considered ideal”

The Displaced Femoral Neck Fracture

Bray TJ, Smith-Hoeffler E, Hooper A, Timmerman L. 1998 Clin Orthop 230:127-140.

“The positioning of the osteosynthesis material was significantly ($P=0.042$) better for the hook-pins”

“The hook pin was considered easier to use by the surgeons due to more easy handling and better guide instrument”

A randomised study in all cervical hip fractures Osteosynthesis with Hansson hook-pins versus AO-screws in 199 consecutive patients followed for two years

J. Mjørud, O. Skaro, J. H. Solhaug and K-G Thorngren
Department of Surgery Diakonhjemmet Hospital, Oslo, Norway
Injury, Int. J. Care Injured (2006) 37, 768 – 777

Allows early mobilisation

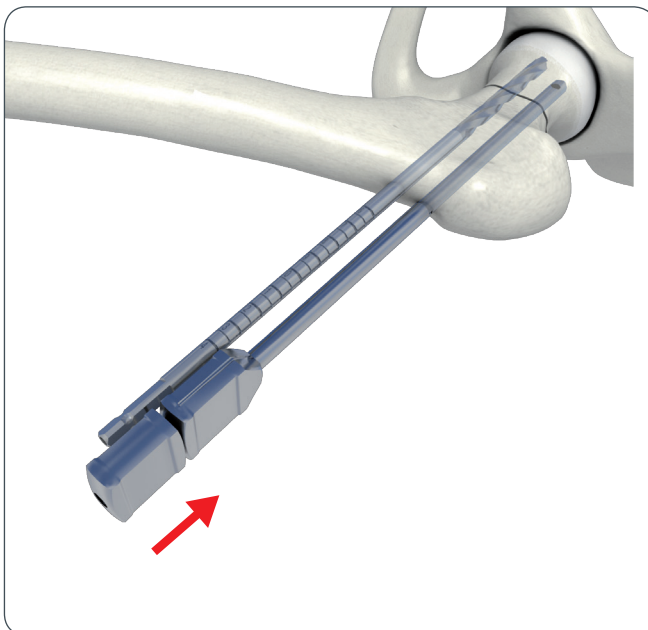
- The security and stability of the fixation allow most patients to be mobilized during their first postoperative day and discharged early.

Minimal surgical trauma

Preserves the blood supply

- **Minimum surgical trauma.** The smooth profile of the Hansson Pins allows for sliding into final positioning without applying torque forces or hammering. This minimizes disruption to the blood supply and the consequent danger of avascular necrosis.
- **Preserves the lateral epiphyseal arteries.** The posterior Pin is placed just above the central axis of the femoral neck, avoiding the area where the lateral epiphyseal arteries enters the femoral head.

“The difference in the incidence of necrosis of the femoral head was significantly lower in the Hook Pin group for displaced fractures (odds ratio 3.5 $p = 0.036$).”

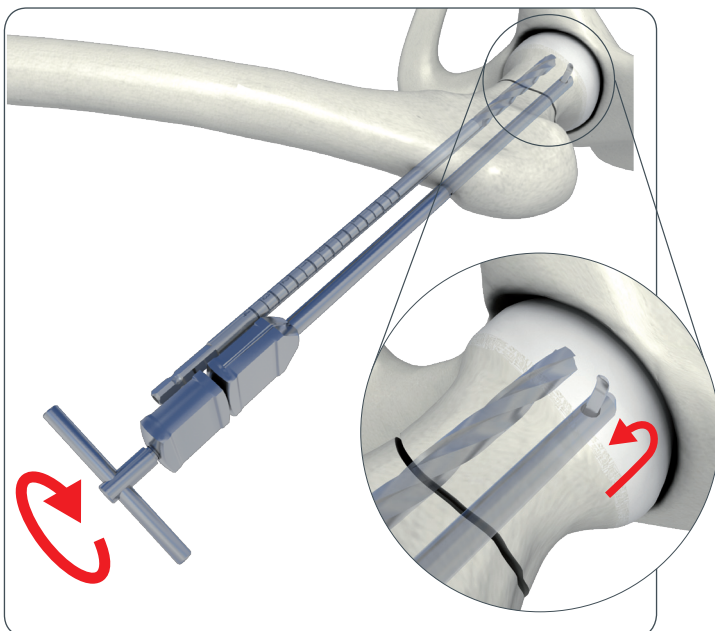


A cylindrical Pin is inserted through a drilled hole and atraumatically advanced into the femoral head.

Fixation of fractures of the femoral neck.
A prospective, randomised trial of three Ullevaal hip screws versus two Hansson hook-pins.

J Bone Joint Surg (Br) 2003;85-B:426-30
N. Lykke, P. J. Lerud, K. Strømsø, K-G Thorngren
Aker University Hospital, Oslo, Norway

“Too much metal is biologically unfavourable regarding the viability of the femoral head.”



The hook is activated by turning the introducer handle clockwise whilst gently pushing medially on the introducer assembly. This minimizes disruption to the blood supply and the consequent danger of avascular necrosis.

Implant / bone constructs in femoral neck osteotomy

J.G. Benterud, A. Alho, A. Hoiseth
Arch Orthop Trauma surg 1994, 113:97-100.



Two 6.5 mm Hansson Pins destroys 47% less bone than three 7.3 mm cannulated screws.

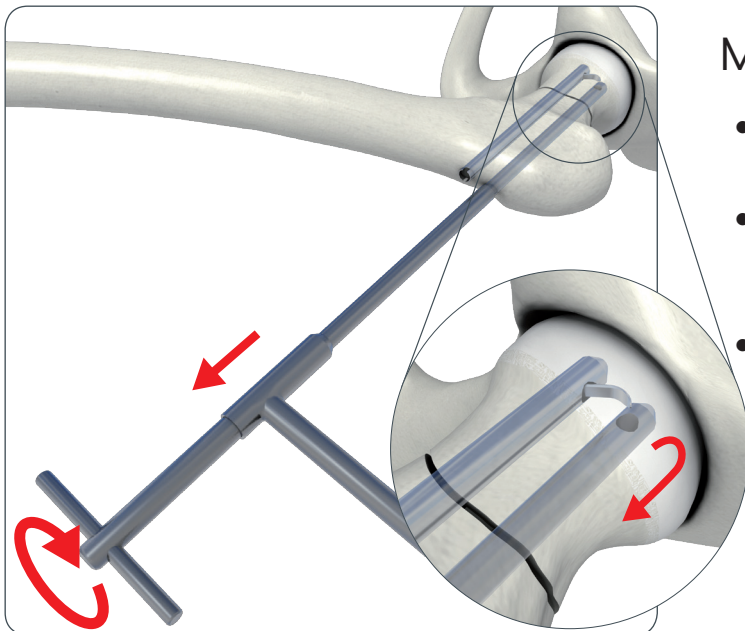
Preserves bone integrity

- **Reduced bone disruption.** By using only two 6.5 mm Hansson Pins to treat a femoral neck fracture, cancellous bone within the femoral head and neck is preserved. Furthermore, no additional fixation points are required in the femoral shaft, reducing the risk of subtrochanteric hip fractures.

“Strength is a function of implant and bone properties. Too much metal may destroy too much of the bone trabeculae. Three or more screws doesn’t necessarily give a better stability than two.”

Implant / bone constructs in femoral neck osteotomy

J.G. Benterud, A. Alho, A. Hoiseth
Arch Orthop Trauma surg 1994, 113:97-100.



The Hansson Pins can be removed without further disruption to bone. No forces are applied to the femoral head.

Minimal invasive surgery

- **Small incisions.** The complete procedure is carried out through two percutaneous skin incisions.
- **Short procedure.** Simple instrumentation and a reproducible procedure allows fixation to be achieved within an adequate time frame.
- **Easy extraction.** The procedure for Pin removal is quick and straightforward. The risk of the Pin being trapped in the bone is reduced as the Pin surface is smooth. The hook is easily withdrawn into the body of the Pin, which can then be pulled out.

Case 1



A patient suffering from a severe heart disease sustained a garden 4 fracture. She was successfully operated with the Hansson Pin System.

X-rays by Dr. Nonomia

Preoperatively



Two weeks postoperatively



One day postoperatively



Three weeks postoperatively. The fracture has settled in a stable configuration.

Three months later, the patient returned to the same functionality as before her injury.



One week postoperatively

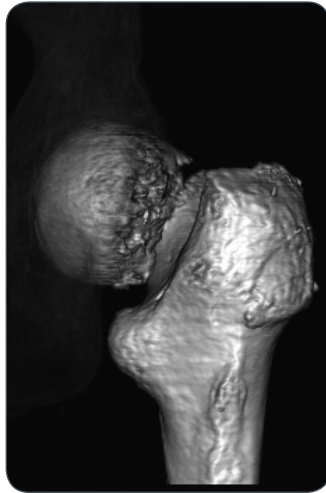
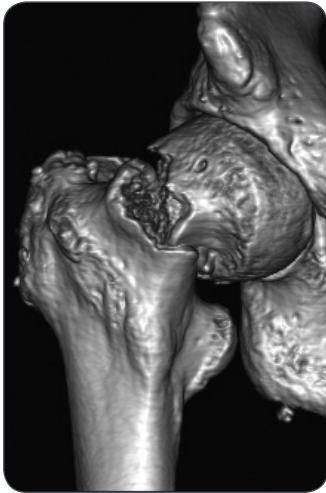
Case 2



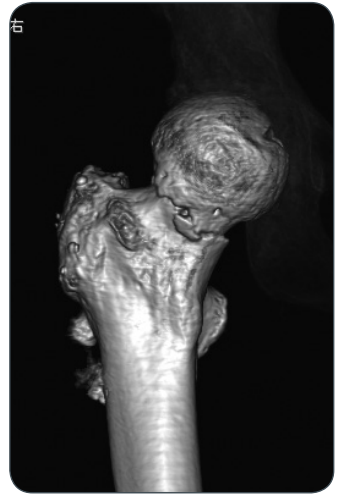
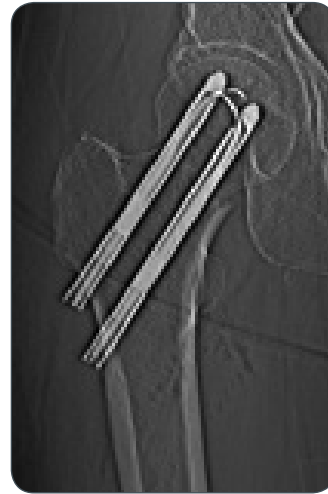
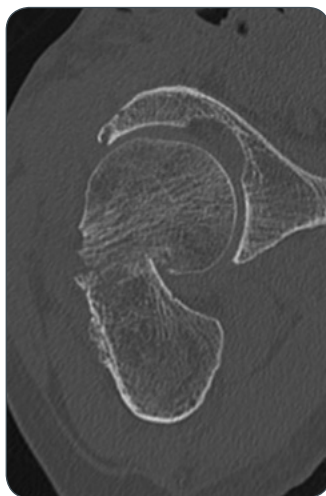
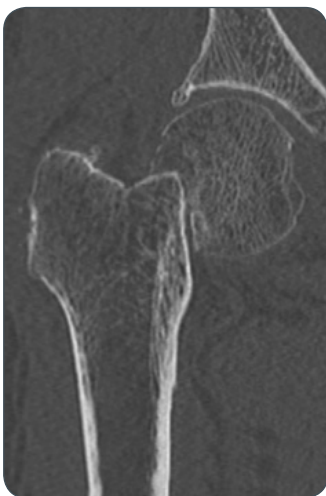
This patient sustained a garden 2 fracture with a dorsal angulation of 80°. The fracture was reduced and she was operated with the Hansson Pin System.

X-rays and CT-pictures by Dr. Nonomia

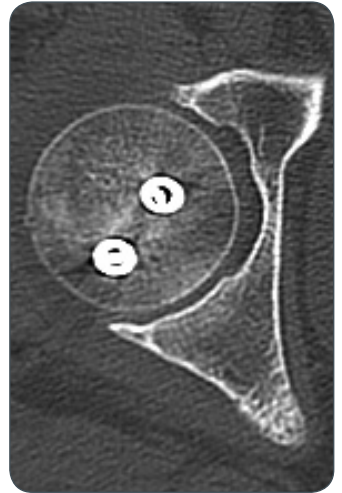
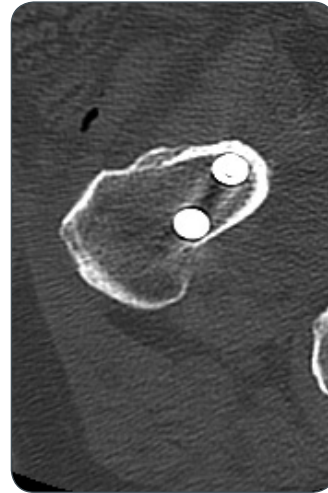
Preoperatively, X-ray



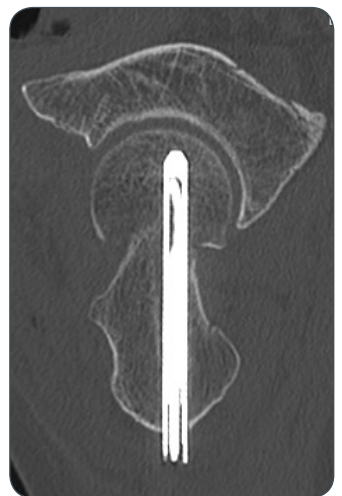
Preoperatively, CT



One day postoperatively



Inferior Pin contacts inferior cortex.



Posterior Pin contacts posterior cortex.

Results

Results of two year follow-up of 300 femoral neck fracture cases, treated with the Hansson Pin at the University Hospital of Lund, Sweden. Ref. 5.

Total number of cases	300
Average age of patient:	78 years
Ratio - female : male	2.6:1
Ratio – undisplaced : displaced	2.5:1
Incidence of perioperative mortality	0%
Incidence of mortality at two year follow-up	28%

Two year follow-up results for 216 surviving patients of the same study, by fracture type.

Result	Undisplaced	Displaced
	(64 cases)	(152 cases)
Incidence of deep infection	0%	0%
Complications (redisplacement/ non-union or segmental collapse)	5%	35%
Incidence of redisplacement /non-union	2%	25%
Incidence of segmental collapse	3%	9%
Incidence of reoperation		
THA	5%	21%
Pin extraction	0%	3%
Intertrochanteric osteotomy	0%	1%

“Reoperation in the form of THA was performed in 34 cases in the total series: i.e. 11%. The well vascularized femoral heads prone to uncomplicated healing will be saved.”

Femoral head vitality in femoral neck fracture
after hook pin internal fixation.

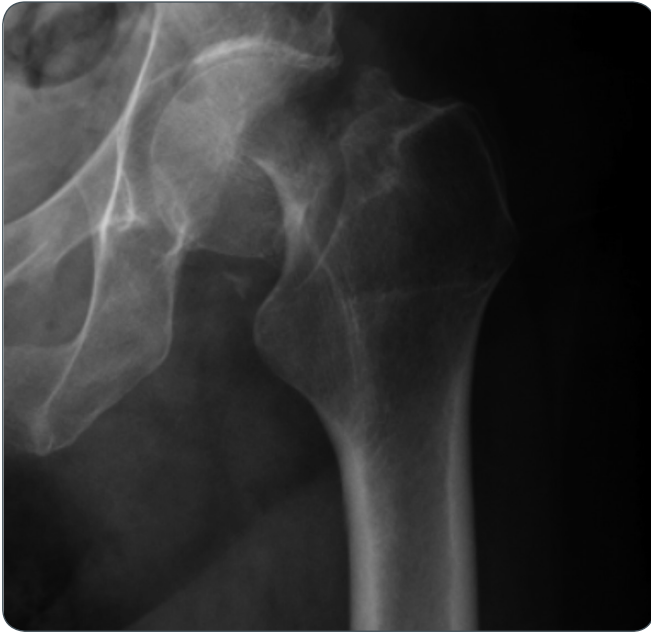
Strömqvist B., Hansson LI Clin Orthop
1984 Dec:(191):105-109

References

Extensive research has been carried out on The Hansson Pin System, 6 theses and more than 75 articles have been published (Another 50 articles have been published in Japanese).

1. A randomised study in all cervical hip fractures. Osteosynthesis with Hansson hook pins versus AO-screws in 199 consecutive patients followed for two years. *Mjorud J., Skaro O., Solhaug J.H., et Al. Injury 2006; 37:768-777*
2. Treatment of femoral neck fracture with Hansson Pins. A biomechanical study. *Uta S., Inoue Y., Kaneko K., Mogami A., Tobe M., Maeda M., Iwase H., Obayashi O. Japan Clinical Biomechanics 2000; 21:377-383*
3. Femoral neck fracture fixation with hook pins. 2-year results and learning curve in 626 prospective cases. *Strömqvist B., Nilsson L.T., Thorngren K.G. Acta Orthop. Scand. 1992; 63(3):282-7.*
4. The displaced femoral fracture. *Bray T.J., Smith-Hoeffler B., Hooper A., Timmerman L. (1988 Clin. Orthop. 230: 127-140*
5. Strömqvist B., Hansson L.I., Nilsson L.T., and Thorngren K.G. (1987): Hook Pin Fixation in femoral neck fractures. A two year follow-up study of 300 cases. *Clin. Orthop. 218: 58-62*
6. Femoral head vitality in femoral neck fracture after hook pin internal fixation. *Strömqvist B., Hansson LI Clin Orthop 1984 Dec:(191):105-109*
7. Implant / bone constructs in femoral neck osteotomy *J.G. Benterud, A. Alho, A. Hoiseth Arch Orthop Trauma surg 1994, 113:97-100.*
8. A prospective, randomized trial of 278 patients treated with two Hansson Hook Pins or three Ullevaal Hip Screws *J Bone Joint Surg (Br) 2003;85-B:426-30*
N. Lykke, P. J. Lerud, K. Strømsø, K-G Thorngren Aker University Hospital, Oslo, Norway

Indication



Adult femoral neck fractures.

Other indications

Slipped Capital Femoral Epiphysis in children.

Contraindications

The physician's education, training and professional judgment must be relied upon to choose the most appropriate device and treatment. Conditions presenting an increased risk of failure include:

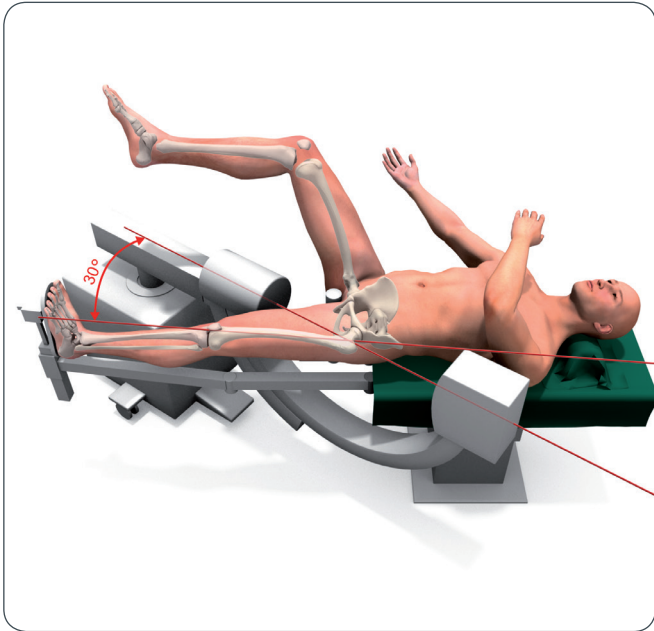
- Any active or suspected latent infection, sepsis or marked local inflammation in or around the surgical area.
- Severe osteoporosis, insufficient quantity or quality of bone/soft tissue.
- Material sensitivity documented or suspected.
- Physical interference with other implants during implantation or use.
- Compromised vascularity, inadequate skin or neurovascular status.
- Compromised bone stock that cannot provide adequate support and/or fixation of the device due to disease, infection or prior implantation.
- Patients who are unwilling or incapable of following post-operative care instructions.
- Other physical, medical or surgical conditions that would preclude the potential benefit of surgery.
- Previously implanted or extracted osteosynthesis implants of the diaphyseal or proximal femur increases the risk of secondary fracture.
- Obesity. An obese patient can produce loads on the implant that can lead to device/treatment failure.

See instructions for use insert for information about potential adverse effects.

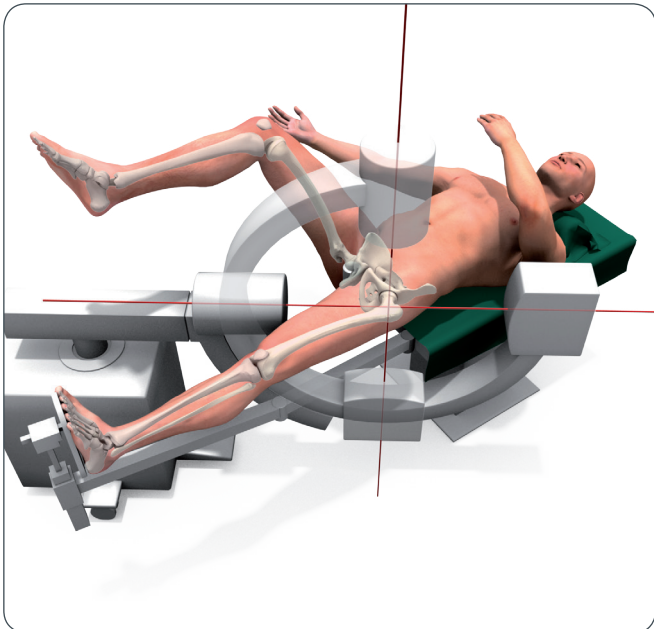
The surgeon must discuss all relevant risks, including the service life of the device and the need for postoperative protection of the implant with the patient, when necessary.

Surgical technique

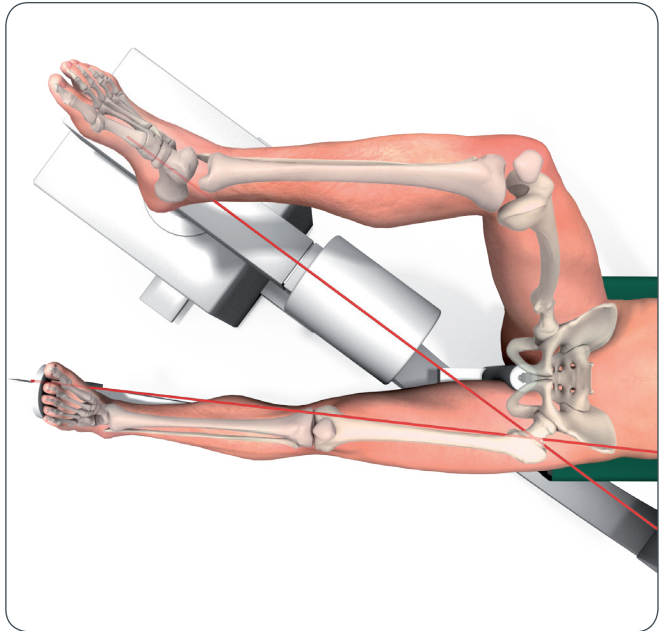
1. Patient positioning



Place the patient in supine position on the fracture operating table. Position the leg on the healthy side with the hip in flexion and adequate abduction so that the C-arm can be adjusted intraoperatively for both the anterior/posterior view, and the axial view which is necessary to obtain a true axial view of the femoral neck and head.



2. Reduction

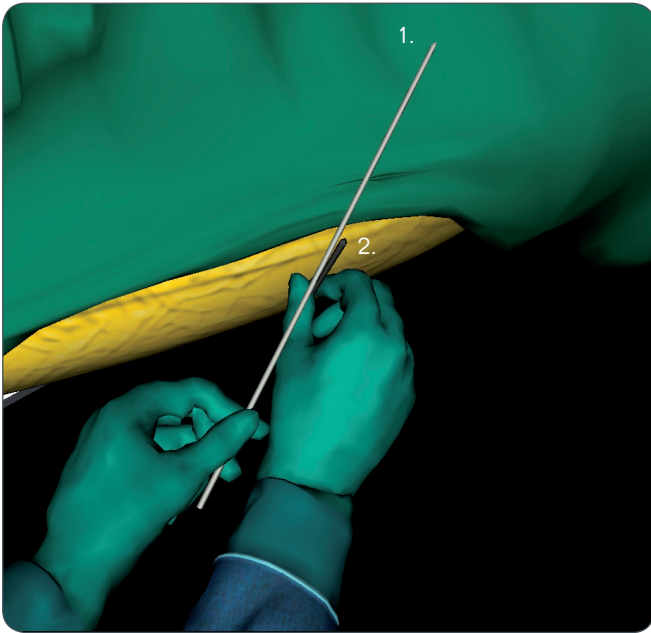


Reduction should be obtained by gentle manipulation according to the normal procedure for displaced fractures. The fracture position should be anatomical or with a slight valgus tilt and held by immobilization on a fracture operating table. The proximal femur should be positioned so that the head and neck are parallel to the floor.



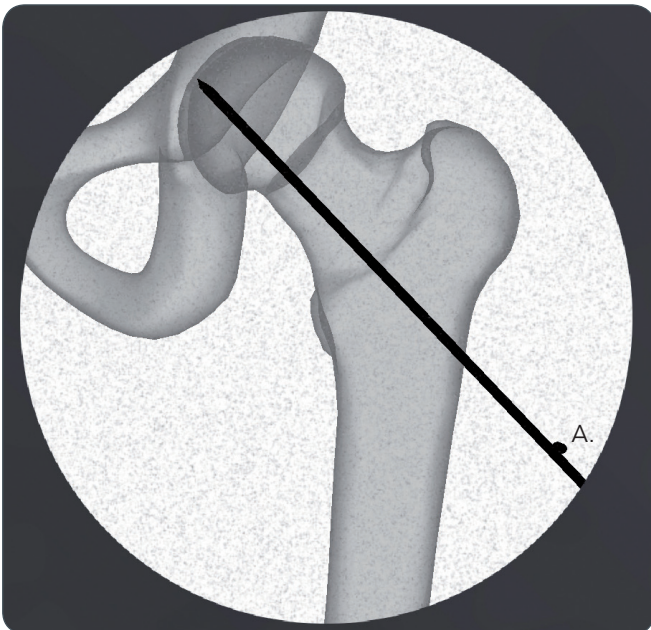
The foot should therefore be rotated inwards and fixed between 15° and 30° of internal rotation. The patella should have an either horizontally or slightly inward position. The patient is then prepared and draped.

3. Locate the optimal point for skin incision

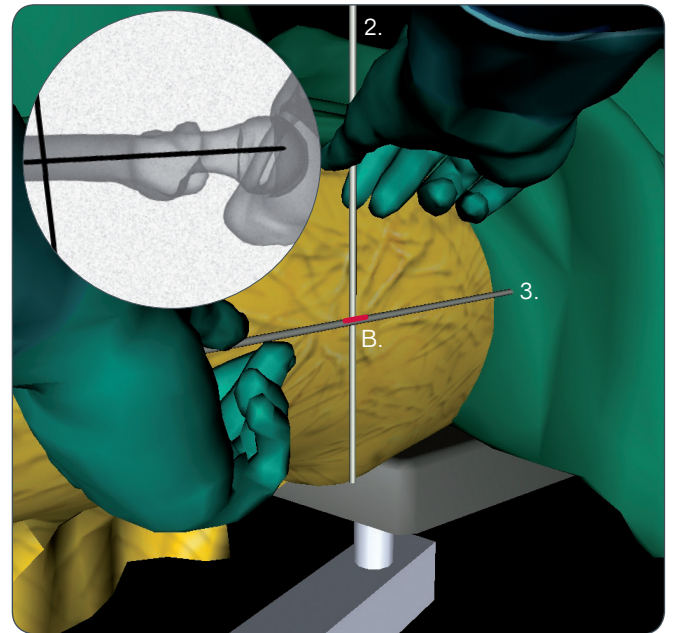


How to locate the optimal point for skin incision and entry point for the Guide Wire.

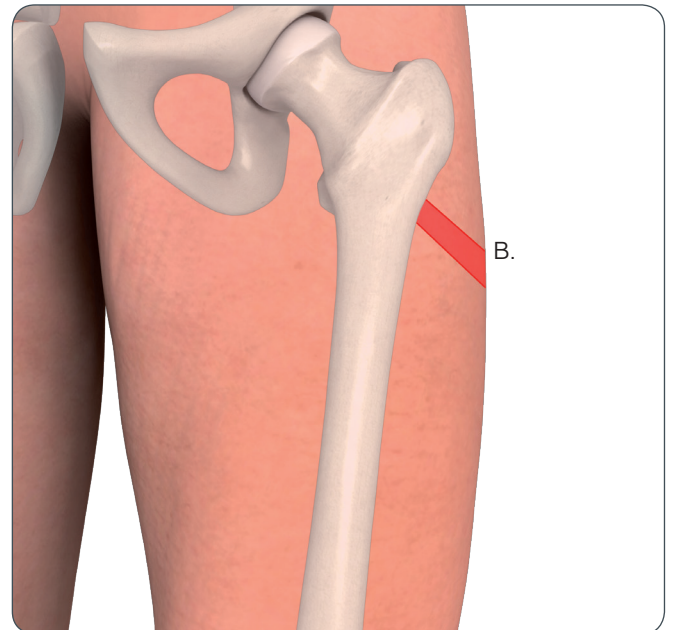
A Guide Wire, (1) is held under AP-view of the image intensifier, above the skin anterior to the hip joint and in line with the medial cortex of the femoral neck.



A second Guide Wire, (2), is held in a vertical position to the femoral shaft and directed against the point where the first Guide Wire and the skin meet, (A).

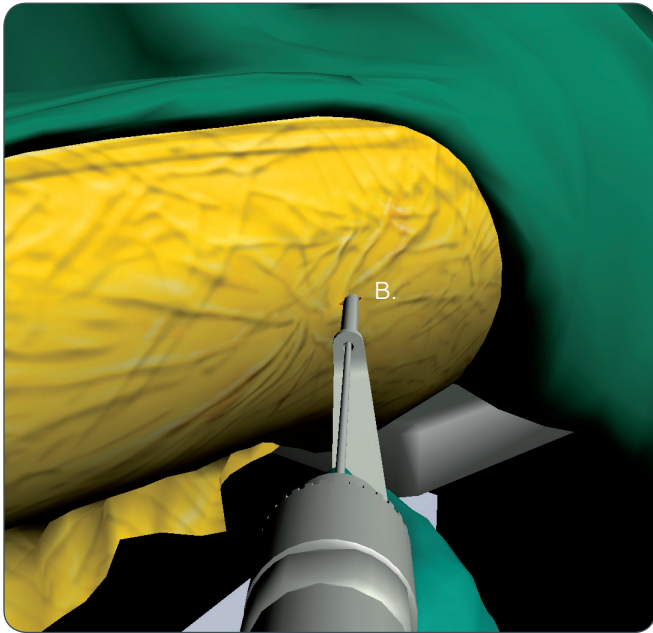


A third Guide Wire, (3) (the first Guide Wire can be used), is held under lateral view of the image intensifier. It is placed along the midline to the axis of the femoral shaft.



The point where the second and the third Guide Wires cross, (B), is the optimal starting point for the stab incision.

4. Incision



A percutaneous stab incision is made through the soft tissues down to the lateral cortex in about 130° to the long axis of the femoral shaft. The Guide Wire and Guide Wire Bush are then inserted through the incision.

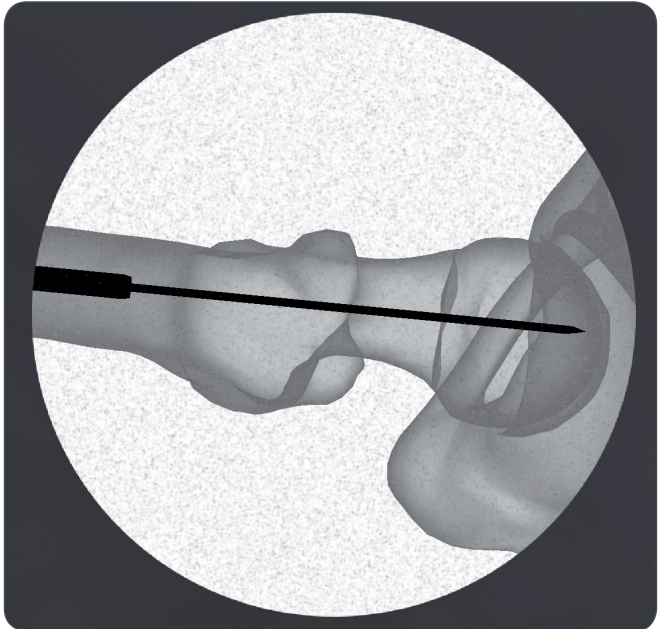
5. Inferior Guide Wire insertion



It is essential to have the Guide Wire close to the inner inferior cortex. Once the alignment of the Guide Wire is satisfactory, the Guide Wire is advanced to the subchondral bone of the femoral head. The Guide Wire Bush is then removed.

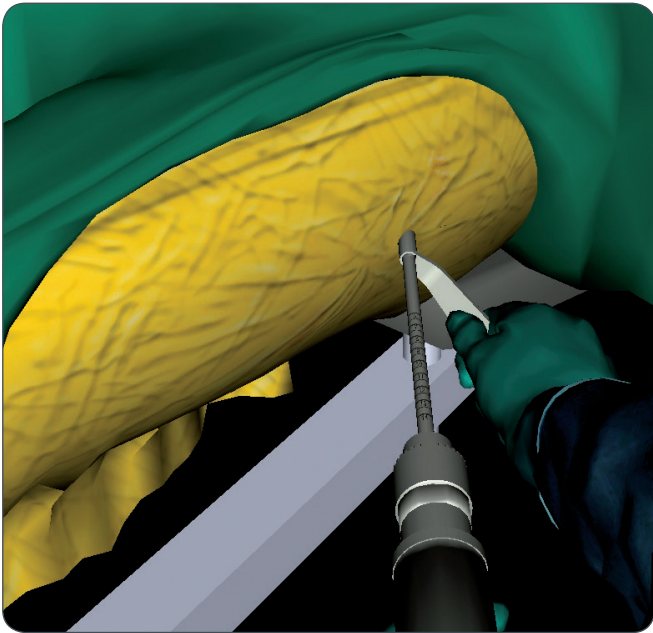


In the AP-view the tip of the Guide Wire should be at the level, but not below, the lower edge of the lesser trochanter.



In the lateral view it should be central in relation to the femoral head and neck.

6. Inferior drilling

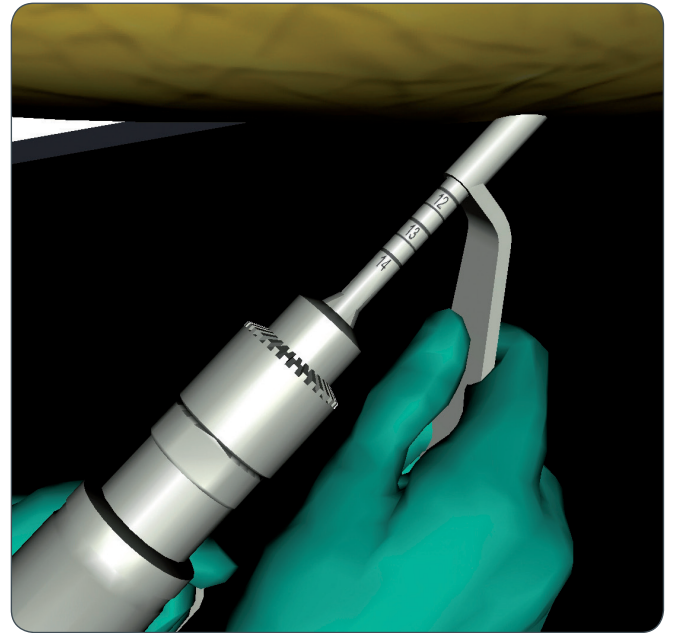


The short Cannulated Drill is inserted over the Guide Wire. The Protective Measuring Sleeve is maintained against the lateral cortex and drilling is carried out, using image intensification to ensure that the short Cannulated Drill follows the line of the Guide Wire accurately and does not cut through the calcar.

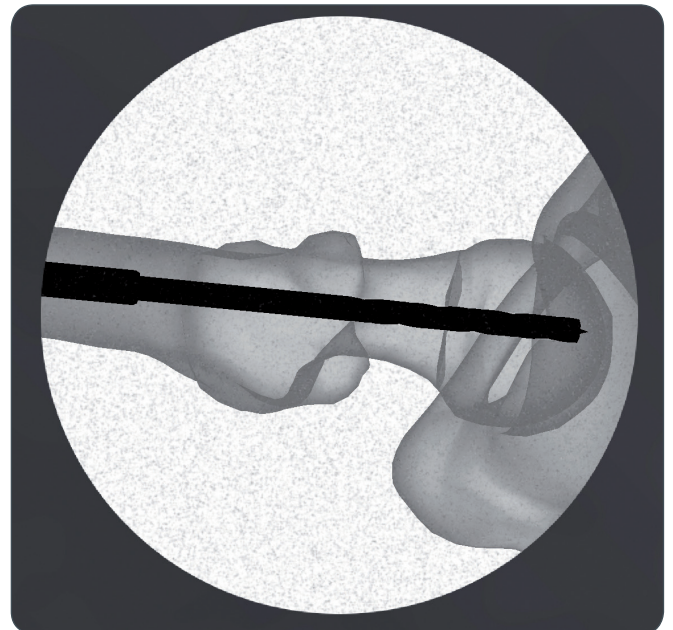


It is also important to ensure that the Guide Wire does not penetrate the hip joint.

7. Measuring

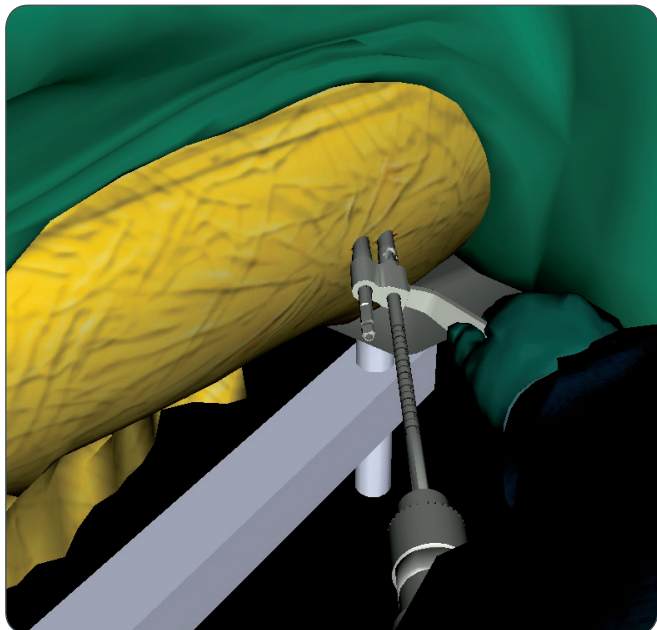


When the tip of the Short Cannulated Drill has reached the subchondral bone, the required Hansson Pin length is read off the scale on the short Cannulated Drill protruding from the Protective Measuring Sleeve.



Make sure that the Protective Measuring Sleeve is in contact with the bone when reading the scale. The Protective Measuring Sleeve and the Guide Wire are then removed.

8. Select a Drill Guide



The next step is to drill a hole for the posterior Hansson Pin position as close as possible to the posterior cortex of the femoral neck. This is achieved by selecting the Drill Guide (6, 8 or 10 mm) which gives the widest possible separation of the Pins without cutting through the posterior and superior cortex.



A stab incision is made for the posterior drill. The selected Drill Guide is then pushed over the Short Cannulated Drill located inferiorly and rotated, in order that the new channel is situated posteriorly and proximally. The teeth of the Drill Guide is pushed into the cortex to enhance stability.

9. Posterior drilling



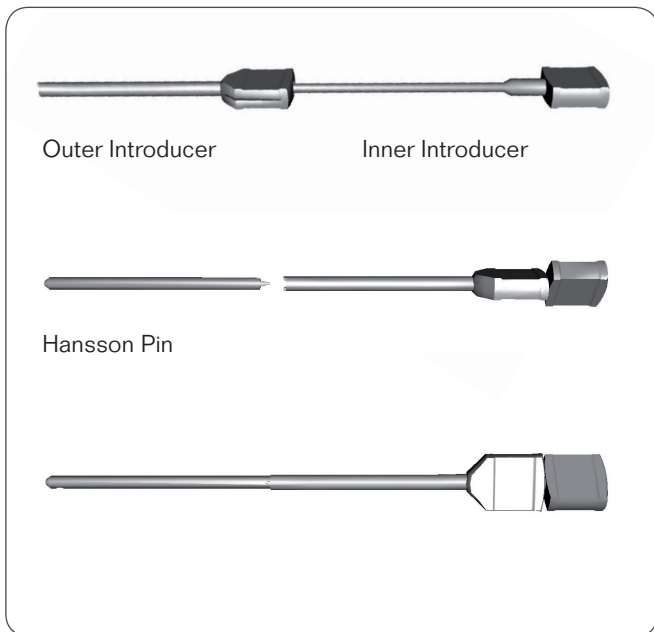
The long Solid Drill is used to prepare the second hole, using image intensification in both AP and lateral views to ensure that the long Solid Drill does not cut through the posterior cortex. The hole is drilled up to the subchondral bone of the femoral head.



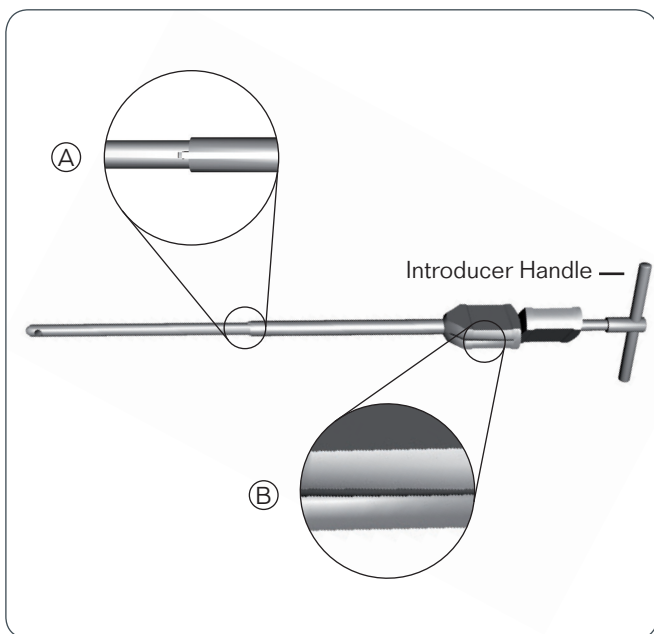
The required Hansson Pin length is again read off the scale on the long Solid Drill protruding from the Drill Guide. The long Solid Drill and the Drill Guide are then removed to allow for posterior Hansson Pin insertion.

NOTE: The Hansson Pin length may be read more accurately off the Protective Measurement Sleeve.

10. Instrument-to-Pin Assembly



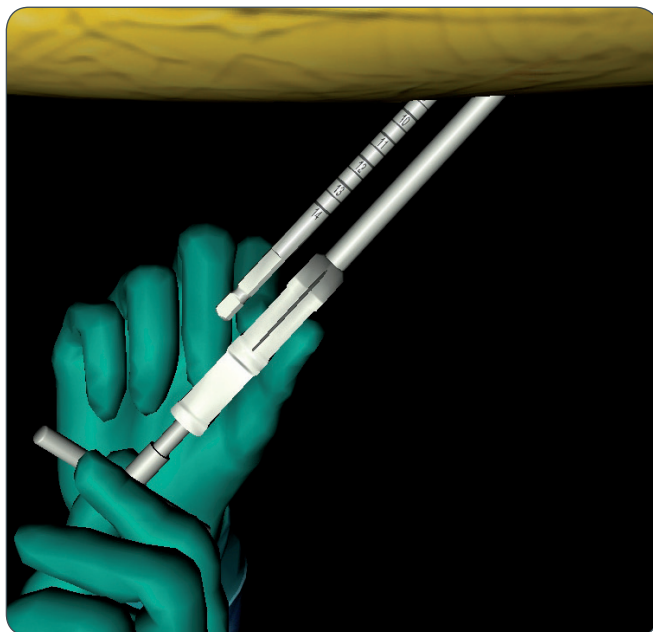
Verify that the Inner Pin does not protrude from the window of the Outer Body and is in correct position. Pass the Inner Introducer through the Outer Introducer and screw it into the Hansson Pin.



There are unequal tabs on the Outer Introducer which correspond with slots in the Hansson Pin; the tabs and slots shall securely mate when the introducer assembly is screwed onto the Hansson Pin (A).

The handles of the Inner and Outer Introducers does not need to be aligned. There is a guide line on the Outer Introducer, in line with the window of the Pin, indicating the direction in which the hook will be deployed (B).

11. Insertion of the posterior Hansson Pin

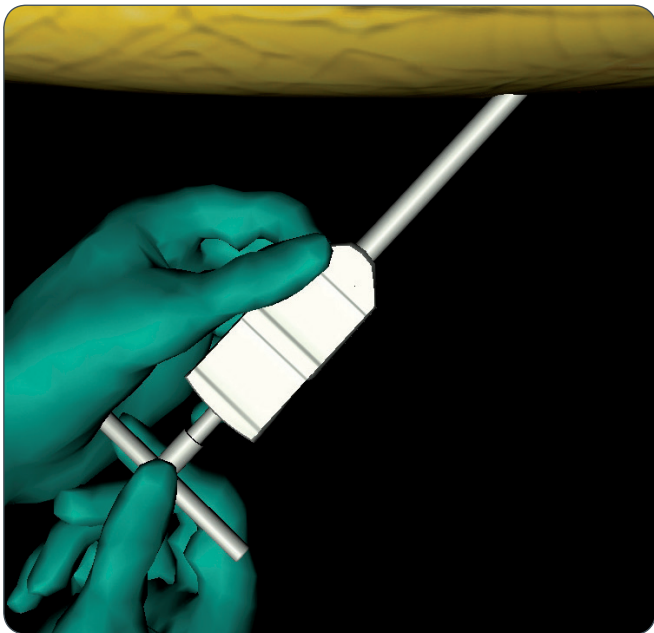


Insert the Hansson Pin with the introducer assembly into the proximal posterior channel. Ensure that the Pin is fully inserted and in good position using image intensification. The guide line on the handle of the Outer Introducer must point anteriorly, giving the direction in which the hook will point.



Insert the tip of the Introducer Handle through the hole in the Inner Introducer. Maintain both the Outer and Inner Introducers in position. The hook is activated by turning the Introducer Handle clockwise whilst gently pushing medially on the introducer assembly. Continue turning the Introducer Handle to completely deploy the hook using image intensification. A mechanical stop is provided by the Inner Introducer. After deployment of the hook, the Outer Introducer and the Inner Introducer shall be removed.

12. Insertion of the inferior Hansson Pin



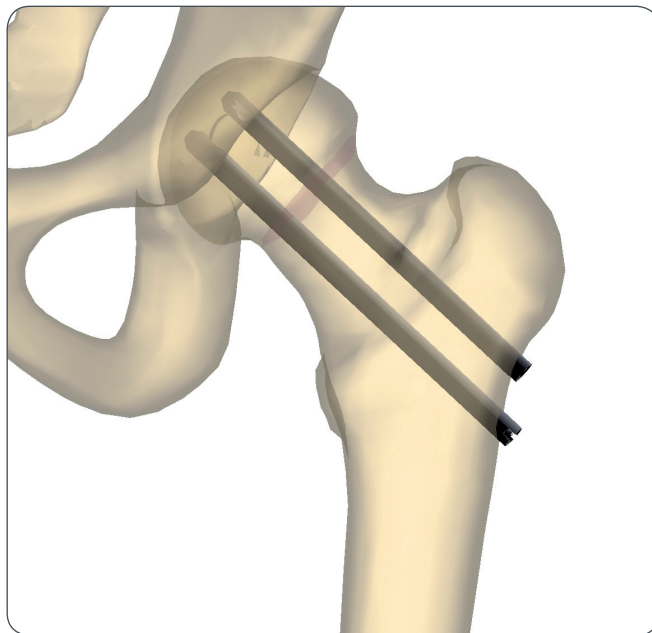
A Hansson Pin of the length required for the inferior hole (usually 10 mm longer than the posterior Hansson Pin) is mounted on the introducer assembly and inserted in the same way, but with the guideline on the Outer Introducer facing superiorly so that the hook will also emerge superiorly.



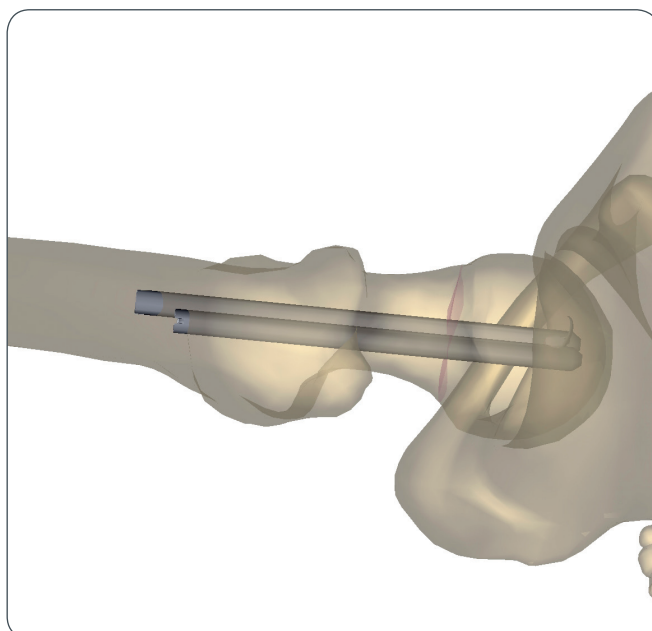
AP and lateral views imaging is used to ensure accurate placement.

Maintain the Outer Introducer in position. Unscrew and then remove the Introducer Handle followed by the Inner Introducer and the Outer Introducer. The wounds are sutured and closed in the normal manner.

13. Check the position of the Hansson Pins



Before closing the skin incisions, it is important to make sure that none of the Pins have penetrated the joint.



Post operative care

Full weight-bearing as tolerated by the patient may be allowed in elderly patient. In younger patients, partial weight-bearing is preferable.

Pin Removal

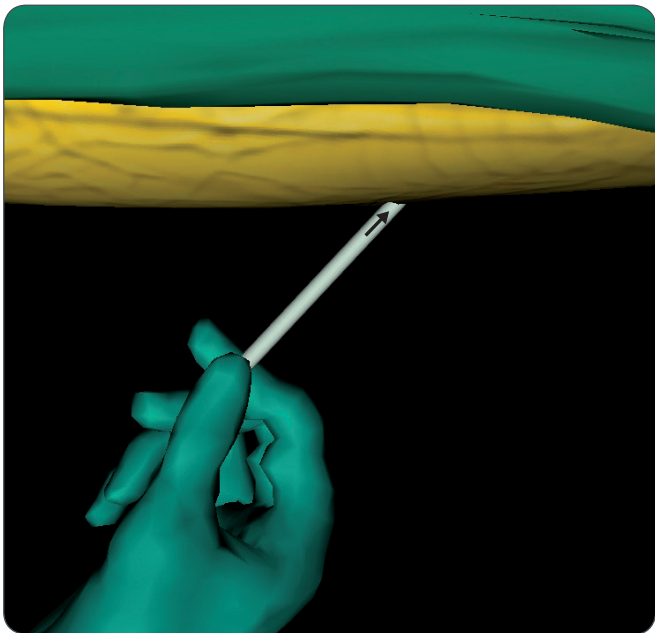
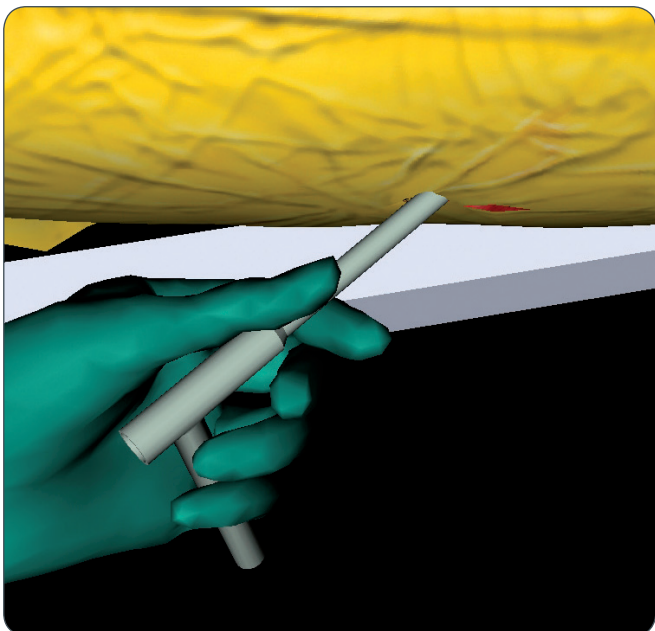
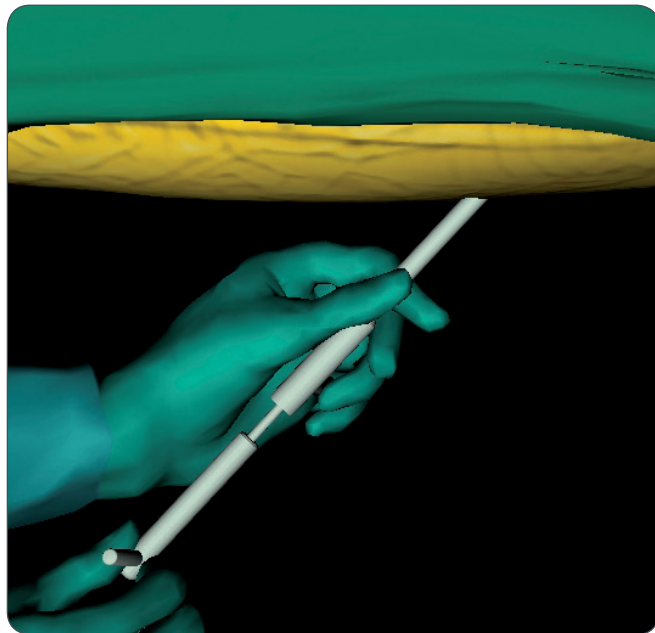


Image intensification is used to locate the end of the Pin and a stab incision is made. The arrowed end of the Inner Extractor is introduced and engaged with the inner Pin's thread and rotated clockwise until it stops.



The Outer Extractor is slid over the Inner Extractor. Rotate the Outer Extractor until it engages the flat sides of the Inner Extractor and push the handle gently until it touches the tip of the Outer Body. It is important not to exert any rotation on the Outer Extractor once the instrument is keyed by the flat sides of the Inner Extractor.



Maintain the Outer Extractor in place. Insert the threaded tip of the Extractor Handle into the Outer Extractor and turn it clockwise to engage the threaded part of the Inner Extractor. Continue to turn the Extractor Handle until a mechanical stop is felt.



Check under image intensification that the hook is fully retracted prior to pulling back the implant. Once the hook is fully retracted, remove the implant along with the extraction instruments. In case the hook is removed on its own, leaving behind the outer body of the Hansson Pin, the outer body is removed by assembling the Inner and Outer Introducers and removing the outer body from the bone.

Slipped capital femoral epiphyses

The principle



The methodology involves a cylindrical Pin inserted in a drill hole which attaches to the femoral head via a hook. The drill hole and Pin run at right angles to the growth zone and are, depending on the degree of slipping, relatively centrally located in the femoral neck and head. The Pin is 10-20 mm longer than the drill hole to allow continued growth in the length of the femoral neck. Slips of up to 60° can be stabilised by osteosynthesis.

Preventing diastasis and further displacement of the epiphysis

- The risk of further intraoperative displacement of the femoral head is reduced by drilling a channel for the Hansson Pin with the femoral head fixed with Guide Wires. The smooth outer Pin allows the surgeon to gently push the implant through the channel, reducing the risk of diastasis between the femoral neck and the head.

Reducing the risk of unequal bone length

- The continued growth of the femoral neck in cases with slipped capital femoral epiphysis is an indication of undisturbed intra- and postoperative vascularization, as the nutrition for the proliferating cells of the growth plate is provided by the epiphysial vessels. By preserving the blood supply, the Hansson Pin System reduces the risk of unequal bone length.

Lasting stable fixation

- The hook resists loosening of the fixation to the femoral head as the longitudinal growth of the femoral neck retracts the Pin in the channel thereby stabilizing the femoral head. Loosening of the implant is potentially reduced because of resorption and growth of the femoral neck under normal conditions.

Easy extraction

- The risk of the Pin being trapped in the bone is reduced as the Pin surface is smooth. The hook is easily withdrawn back into the body of the Pin, which can then be removed.

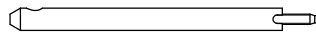
Product information

CAT. NR.

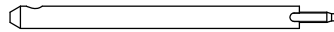
IMPLANTS

HANSSON PINS

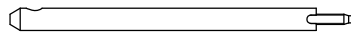
60-0080S Hansson Pin | length 80 mm



60-0085S Hansson Pin | length 85 mm



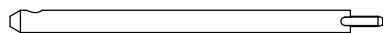
60-0090S Hansson Pin | length 90 mm



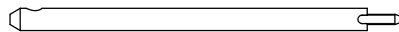
60-0095S Hansson Pin | length 95 mm



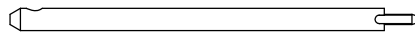
60-0100S Hansson Pin | length 100 mm



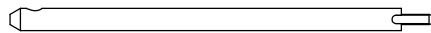
60-0105S Hansson Pin | length 105 mm



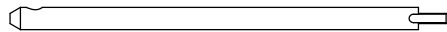
60-0110S Hansson Pin | length 110 mm



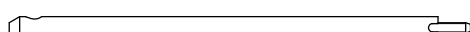
60-0115S Hansson Pin | length 115 mm



60-0120S Hansson Pin | length 120 mm



60-0125S Hansson Pin | length 125 mm



60-0130S Hansson Pin | length 130 mm

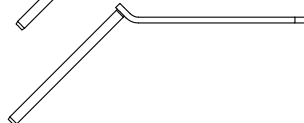


INSTRUMENTS

60-3724 Guide Wire Bush



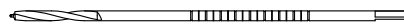
60-3725 Guide Wire Bush | long (optional)



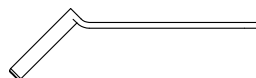
60-3740 Solid Drill | short (optional)



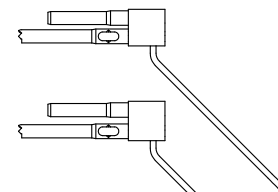
60-3741 Solid Drill | long



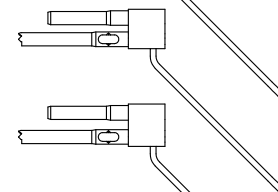
60-3759 Protective Measuring Sleeve



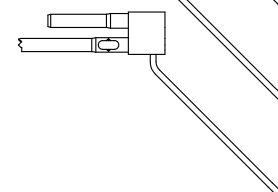
60-3786 Percutaneous Drill Guide | 6 mm



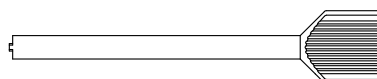
60-3787 Percutaneous Drill Guide | 8 mm



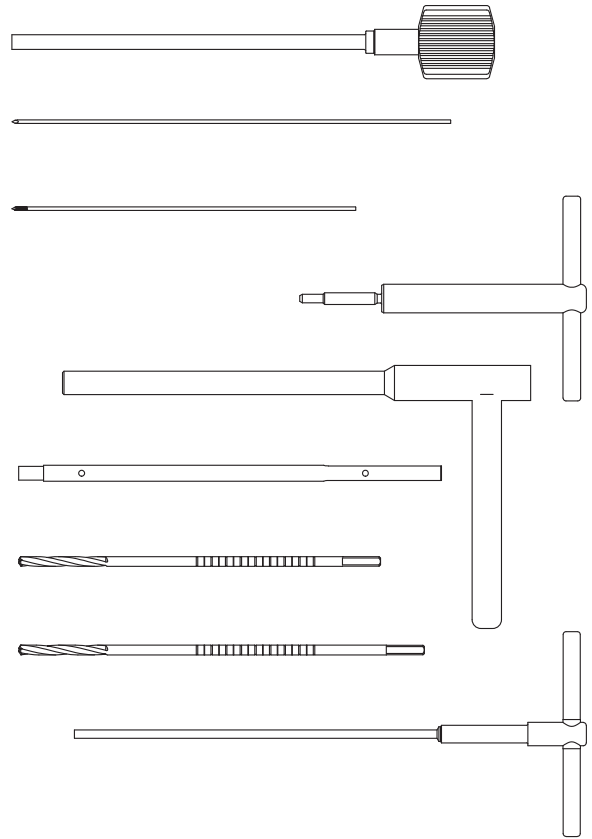
60-3788 Percutaneous Drill Guide | 10 mm



60-3791 Outer Introducer



60-3805	Inner Introducer
60-3822	Guide Wire Ø2.4 mm length 300 mm
60-3823	Guide Wire Ø2.4 mm length 235 mm (optional)
60-3841	Extractor Handle
60-3842	Outer Extractor
60-3843	Inner Extractor
60-3856	Cannulated Drill short
60-3857	Cannulated Drill long (optional)
L4-1626	Introducer Handle
60-1000	Instrument Tray




IFU

For the latest version of this Instruction For Use. Please visit:
<http://download.swemac.com/Hansson-Pin-System>

Swemac develops and promotes innovative solutions for fracture treatment and joint replacement. We create outstanding value for our clients and their patients by being a very competent and reliable partner.

Swemac

Hansson Pin System

Manufacturer: **Swemac Innovation AB**  **CE** 0413
Cobolgatan 1 • SE-583 35 Linköping • Sweden
+46 13 37 40 30 • info@swemac.com • www.swemac.com



STERILE R

P002-28-20180213
Print date: 2018-02-13