Hansson Pin®
Femoral neck fracture system

Swemac
The Hansson Pin system, designed by Professor Lars Ingvar Hansson at the University of Lund in Sweden, 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 for femoral neck fractures. Twenty years of successful clinical use have led the Hansson Pin System to its current form. Until this date, more than 250,000 patients have been operated.

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.
The principal

The distal 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 proximal pin
The proximal pin is placed parallel to the distal 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.
Features and benefits

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.

  Reduces the risks of segmental collapse and non-union.

  “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 prospective, randomized trial of 278 patients treated with two Hansson Hook Pins or three Ulleval 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

Preserves bone integrity

- Reduced bone disruption.
  
  By using only two 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.

  “Strenght 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.”

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

Implant / bone constructs in femoral neck osteotomy

J.G. Benterud, A. Alho, A. Hoiseth
Provides secure fixation

- Strong Resistance to Rotation.
  Peripheral pin placement within the neck provides strong resistance to rotation.

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

- Use of Cortical Bone for buttressing.
  Each pin contacts strong cortical bone in three places to provide stability.

- Firm Anchorage.
  The hook of each pin engages in subchondral bone to provide secure anchorage and prevent migration or backing out.
  The Hansson Pin System does not rely on soft cancellous bone for support and the risk of displacement is thereby minimized.

"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

CT - showing the position of The Hansson Pins at different levels in the axis of the femoral neck

Pictures: Dr. Nonomia
Maintains contact with bone
Reduces the risks of redisplacement and nonunion.

- Precise Parallel Placement.
  Precise parallel placement allows for fracture dynamization thus ensuring continuous contact with bone, even during resorption. Allows physiological compression at the fracture site.4

Reduces the risk of non-union.
Encourages bone healing.

“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.”

**Hansson Hook Pins versus AO screws in all cervical hip fractures**

J. Mjørud, O. Skaro, J. H. Solhaug and K-G Thorngren

*Department of Surgery Diakonhjemnets Hospital, Oslo, Norway*

*Injury, Int. J. Care Injured (2006) 37, 768 – 777*

“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-Hoeffer E, Hooper A, Timmerman L.

Minimal invasive surgery

- Small incision.
  The complete procedure is carried out through a 4-5 cm incision, which can be reduced when using the Percutaneous Drill Guide.
- Short procedure.
  Simple instrumentation and a reproducible procedure allows fixation to be achieved within an adequate time frame.

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 into the body of the pin, which can then be pulled out.

Allows early mobilisation

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

Garden 4 fracture.

Two weeks

One day

Three weeks

One week

Pictures: Dr. Nonomia
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 (64 cases) | Displaced (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”

References

Extensive research has been carried out on The Hansson Pin System, 6 theses and more than 75 articles have been published


N. Lykke, P. J. Lerud, K. Strømsø, K-G Thorngren Aker University Hospital, Oslo, Norway
Indications and contraindications

Indication

Adult femoral neck fractures.

Other indications

Slipped Capital Femoral Epiphysis.
Refer to the complete Hansson Pin, Slipped Capital Femoral Epiphysis.

Contraindications

Due to a lack of any supportive clinical experience, the Hansson Pin system is not recommended for use with pediatric hip fractures.

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

- Any active or suspected latent infection or marked local inflammation in or about the affected area.
- Compromised vascularity that would inhibit adequate blood supply to the fracture or the operative site.
- Bone stock compromised by disease, infection or prior implantation that can not provide adequate support and/or fixation of the devices.
- Material sensitivity, documented or suspected.
- Obesity. An obese patient can produce loads on the implant that can lead to failure of the fixation of the device or to failure of the device itself.

- Patients having inadequate tissue coverage over the operative site.
- Implant utilization that would interfere with anatomical structures or physiological performance.
- Any mental or neuromuscular disorder which would create an unacceptable risk of fixation failure or complications in postoperative care.
- Other medical or surgical conditions which would preclude the potential benefit of surgery.

Detailed information is included in the instructions for use being provided with each implant. See package insert for a complete list of potential adverse effects and contraindications. 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 transversely to the femoral shaft and directed against the point where the first guide wire and the lateral cortex meet, (A).

The second guide wire is then rotated around the femur until it is in a vertical position.

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 incision.

When an open technique is used, a 30-40 mm longitudinal incision is made distal from point (B).
4. Incision

When a percutaneous technique is used, a 10-20 mm incision is made 30-40 mm distal from point (B). The deep fascia is divided in the direction of the fibres. The lateral cortex of the femur may be approached either directly or posterior-laterally by lifting the vastus lateralis muscle.

5. Distal Guide Wire Insertion

The Guide Wire together with the Guide Wire Bush and the Protective Measuring Sleeve are inserted through soft tissues down to the lateral cortex. Starting point:

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

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

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.

NOTE. To prevent unintended Guide Wire advancement and penetration in the surrounding tissue, frequently check the position of the Guide Wire under image intensification.
6. Distal 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 proximal 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 proximal drill. The selected Drill Guide is then pushed over the Short Cannulated Drill located distally and rotated, in order that the new channel is situated posteriorly and proximally. The tip of the Drill Guide is pushed into the cortex to enhance stability.

9. Proximal drilling

The Long solid Drill is used to prepare the second hole, using image intensification in both AP and axial 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 lateral view alone indicates whether the Long solid Drill is advanced sufficiently in 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 proximal 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 should 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.

**Note. Do not excessively tighten the inner introducer, in order to facilitates further disassembly.**

11. Insertion of the proximal 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 fluoroscopy. 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, to avoid inadvertent lateralization of the pin position. Continue turning the Introducer Handle to completely deploy the hook using image intensification. A mechanical stop is provided by the Inner Introducer, at the point when the hook is fully deployed. After deployment of the hook, the Outer Introducer and the Inner Introducer should be removed. Maintain the Outer Introducer in position and unscrew counter clockwise, first the Introducer Handle and then the Inner Introducer.
12. Insertion of the distal Hansson Pin

A Hansson Pin of the length required for the distal hole (usually longer than the proximal 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 axial 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 wound is sutured and closed in the normal manner.

13. Check the position of the Hansson Pins

Before closing the skin incision, 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

The arrowed end of the Inner Extractor is engaged with the inner pin’s thread and rotated clockwise until it stops.

The Outer Extractor is slid over the Inner Extractor until it is in contact with the Outer Body of the Hansson Pin.

Note. If the Outer Extractor is not in contact with the outer body of the Hansson Pin, rotate the Outer Extractor only 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.

Do not rotate the Outer Extractor. Continue to turn the Extractor Handle until a mechanical stop is felt. This completely withdraws the hook into the Outer Body of the Hansson Pin.

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.

Repeat the procedure for the proximal Hansson Pin.
**Product information**

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<td>60-0130S</td>
<td>Hansson Pin, 130 mm</td>
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60-3822 Threaded Guide Wire Ø 2.4mm × 300mm  
(Single Use - Sterile Packed) (10 pcs./package)

**CAT. NR. | INSTRUMENTS**

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<td>Percutaneous Drill Guide, 8 mm</td>
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<td>Percutaneous Drill Guide, 10 mm</td>
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<td>60-3791</td>
<td>Outer Introducer</td>
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<td>60-3805</td>
<td>Inner Introducer</td>
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<td>Extractor Handle</td>
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<td>Outer Extractor</td>
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<td>60-3843</td>
<td>Inner Extractor</td>
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<td>60-3856</td>
<td>Short Cannulated Drill Ø 6.7 mm x 246mm with Jacobs fitting</td>
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<td>60-3857</td>
<td>Long Cannulated Drill Ø 6.7 mm x 246 with Jacobs fitting</td>
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<td>L4-1626</td>
<td>Introducer Handle</td>
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All implants are delivered sterile for immediate use and better inventory control.
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 Femoral Neck Fracture System

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