The Hansson Pin System

Strong, stable fixation through simple, precise procedure
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The Hansson Pin System is for the treatment of intracapsular fractures of the femoral neck, i.e. subcapital and transcervical fractures. It is also used for slipped capital femoral epiphysis in children – for this indication only one pin is used.

The designer
The Hansson Pin was designed by Dr Lars Ingvar Hansson, MD, whilst a consultant orthopaedic surgeon at the University Hospital of Lund in Sweden. In April 1983, Dr Hanson became a professor of orthopaedic surgery at the Department of Orthopaedic Surgery, University Hospital of Umeå in Sweden. Professor Hansson died in November 1987. Extensive research has been done on the Hansson Pin System, seven theses and more than 60 articles have been published.

The principle
The pins are 6.5 mm in diameter and are available in eight lengths (see ordering details). Each pin is in two parts: an outer sleeve and an inner sliding tongue.

Two pins are inserted in parallel drill holes through the neck and into the femoral head.

The lower pin is placed at an angle of 135° to the long axis of the femur.
- Enters the lateral femoral cortex at a point opposite or just below the lesser trochanter. (1)
- Touches the internal surface of the medial cortex in the femoral neck below the fracture (i.e. it runs along the femoral neck close to the calcar). (2)
- Reaches the subchondral bone in the femoral head just below the centre. (3)

The upper pin is placed parallel to the lower pin.
- Enters the lateral femoral cortex. (4)
- Touches the internal surface of the posterior cortex of the femoral neck below the fracture (i.e. runs along the femoral neck close to the cortex). (5)
- Reaches the subchondral bone of the femoral head. (6)

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

Fixation of the pin in the femoral head is achieved when the inner sliding tongue protrudes through the distal window and curls round into the sub-chondral bone by about 1 cm.
**The main features of the system**

**Three point support**
Each pin contacts strong cortical bone in three places to provide maximum stability.
- Pin 1 prevents varus angulation and pin 2 prevents dorsal angulation of the femoral head.

**Continuous physiological compression**
The two Hansson pins which are used in parallel maximise the natural physiological compressive forces about the hip. With the head and pins fixed together the femoral neck can slide on the pins, giving continuous compression on the fracture site.
This ensures that the fractured surfaces are in continuous contact. In addition, micro movement at the fracture site is encouraged.

**Minimal Operative Trauma**
The Hansson pin and the operative procedure are both designed to avoid per-operative trauma.
The pins are “slid” into position into prepared holes which are just oversize. No force is used. The tongues are extruded externally.

- No hammering is involved why separation of the fracture fragments at the fracture site and further vascular disruption cannot occur.

- No rotation is involved so the head cannot rotate and re-displace. Thus, the Hansson pin can greatly reduce the risk of disruption to the blood supply. It also reduces the risk of avascular necrosis of the head, segmental collapse and non-union of the fracture.

**Other features of the system**
- **Minimal Operative Exposure**
The incision site is around 5 cm long with a correspondingly small risk of complications.

- **No threads**
There are no risks of threads, stripping or overtightening as can occur when using cannulated screws.

- **No Pin Loosening**
The 1 cm tongue extrusion into suitable bone stock ensures no pin backout of the head.

- **Applicable to all Patients**
From children with a slipped capital femoral epiphysis to large adults with a hip fracture.

- **Immediate Weight Bearing**
The security and stability of fixation allow most patients to be mobilised during their first post-operative day.

- **Shorter rehabilitation time**
The risks associated with prolonged bed rest are minimised and the patient may be discharged early with potential financial savings to the hospital.

![Image of a drill guide ensuring precise parallel placement](image-url)
Insertion technique

1. 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 immobilisation 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 30° and 60° of internal rotation.

   View from the sole of the foot looking towards the hip.

2. How to locate the optimal point for skin incision and entry point for the drill (according to Dr. Ceder).

   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 transversally 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 entry point of the drill. A five cm longitudinal incision is made distal from this point through the skin. The deep fascia is divided in the direction of the fibres.

3. The drill is inserted through the fascia with the protective measuring sleeve which is pressed against the lateral cortex of the femur. In the AP-view the tip of the drill is directed at a right angle to the cortex, level with or just below the lower edge of the lesser trochanter. In the lateral view it should be central in relation to the femoral head and neck. After penetration of the lateral cortex the drill is angled to about 135° from the long axis of the femur and advanced under both AP and lateral image intensification. It is essential to have the drill very close to the inner medial cortex of the femoral neck. Once the alignment of the drill is satisfactory, it is advanced to the subchondral bone of the femoral head and the required length of pin is read off the scale on the drill protruding from the sleeve. The drill is left in position and the protective measuring sleeve is removed.

(A cannulated drill and the protective measuring sleeve can also be inserted over the end of a guide wire which has been advanced to the subchondral bone of the femoral head.)
4. Drill a channel for the second pin as close as possible to the posterior cortex of the femoral neck. This is achieved by selecting the drill guide, which gives the widest distance between the two pins, without cutting through the posterior cortex. The appropriate selected drill guide is then pushed over the first drill and rotated, so that the new channel will be situated posteriorly to the first drill. This involves turning the guide by about 45°. The sharp tip of the drill guide is pushed into the femoral cortex for greater stability during drilling.

5. The second drill, which is three cm longer than the first drill, is introduced through the unoccupied hole of the drill guide using image intensification in both AP and lateral views. Channel 2, is drilled into the subchondral bone of the head. The pin length for channel 2 is read off against the projecting part of the drill at the end of the guide.

6. The second drill and the drill guide are then removed. The first drill is left in position to aid stability during the placing of the first or proximal pin.

7. A pin of the selected length for channel 2 is fixed onto the triple introducer assembly. First, the outer introducer (top left) is passed over the inner introducer (top right) and is then screwed into the base of the pin. The window for the tongue will be situated on the same side as the mark on the outer introducer and indicates the direction, which the tongue will take when extruded.

The tip of the handle (centre) is inserted through the channel of the inner sleeve and rotated clockwise until it meets resistance, i.e. the tip touches the tongue.
8. The pin is introduced, ensuring that the guide-line on the outer introducer is pointing anteriorly. When the pin is seen to be in position, the hook is activated by turning the introducer handle clockwise as far as it will go. The position of the introducer ensures that the hook emerges anteriorly, maximising its fixation in good quality bone. The introducer assembly is then removed by unscrewing the inner introducer anti-clockwise while holding the outer introducer still. The first drill is removed.

9. A pin of the length required for the first channel is mounted on the introducer assembly and inserted under image intensification in the same way, but with the guide-line on the introducer facing superiorly, so that the hook will also emerge superiorly. Finally, as an extra security procedure you can release the foot at the traction table and rotate inwards and outwards under image intensification to make sure that your pin position is good. The wound is sutured.

Pin Removal
A small incision is made for pin removal. The end of the pin can be identified manually or using image intensification. The fibrous tissue which often surrounds the end of the pin is incised.

The outer introducer is located against the pin and the extractor inserted through it and screwed clockwise. This withdraws the hook back into the body of the pin, which can then be removed.
### Hansson Pin™ Ordering Information

<table>
<thead>
<tr>
<th>Pins</th>
<th>Description</th>
<th>Instruments</th>
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<tbody>
<tr>
<td>Cat. No.</td>
<td></td>
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<td></td>
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<tr>
<td>60-3600</td>
<td>Pin 8 cm</td>
<td>60-3740</td>
<td>Drill</td>
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<tr>
<td>60-3619</td>
<td>Pin 9 cm</td>
<td>60-3741</td>
<td>Drill (3 cm longer)</td>
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<td>Pin 10 cm</td>
<td>60-3856</td>
<td>Cannulated Drill</td>
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<td>60-3635</td>
<td>Pin 11 cm</td>
<td>60-3759</td>
<td>Protective Measuring Sleeve</td>
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<td>60-3643</td>
<td>Pin 12 cm</td>
<td>60-3767</td>
<td>Drill Guide 6 mm</td>
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<td>Pin 13 cm</td>
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<td>Drill Guide 8 mm</td>
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<td>60-3686</td>
<td>Pin 14 cm</td>
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<td>Drill Guide 10 mm</td>
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<td>60-3694</td>
<td>Pin 15 cm</td>
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<td>Pin Guide Wire Brush</td>
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<td><strong>End Cap</strong></td>
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<td>60-3821</td>
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<td>Guide Wire</td>
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