# Index

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>2</td>
</tr>
<tr>
<td>Indications</td>
<td>3</td>
</tr>
<tr>
<td><strong>Features &amp; Benefits</strong></td>
<td></td>
</tr>
<tr>
<td>Slipped Capital Femoral Epiphysis</td>
<td>4</td>
</tr>
<tr>
<td>Intracapsular Femoral Neck Fracture</td>
<td>5</td>
</tr>
<tr>
<td><strong>Operative Technique</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Slipped Capital Femoral Epiphysis</strong></td>
<td></td>
</tr>
<tr>
<td>Introduction</td>
<td>8</td>
</tr>
<tr>
<td>1 Patient Positioning &amp; Reduction</td>
<td>8</td>
</tr>
<tr>
<td>2 Stabilization Guide-Wire Insertion</td>
<td>9</td>
</tr>
<tr>
<td>3 Incision</td>
<td>9</td>
</tr>
<tr>
<td>4 Guide-Wire Insertion</td>
<td>9</td>
</tr>
<tr>
<td>5 Drilling &amp; Measurement</td>
<td>10</td>
</tr>
<tr>
<td>6 Pin / Introducer Assembly</td>
<td>10</td>
</tr>
<tr>
<td>7 Pin Insertion</td>
<td>11</td>
</tr>
<tr>
<td>Case Report</td>
<td>12</td>
</tr>
<tr>
<td><strong>Femoral Neck Fracture</strong></td>
<td></td>
</tr>
<tr>
<td>1 Patient Positioning &amp; Reduction</td>
<td>14</td>
</tr>
<tr>
<td>2 Incision</td>
<td>14</td>
</tr>
<tr>
<td>3 Distal Guide-Wire Insertion</td>
<td>14</td>
</tr>
<tr>
<td>4 Distal Drilling</td>
<td>15</td>
</tr>
<tr>
<td>5 Proximal Drilling</td>
<td>15</td>
</tr>
<tr>
<td>6 Proximal Drilling (cont.)</td>
<td>16</td>
</tr>
<tr>
<td>7 Pin / Introducer Assembly</td>
<td>16</td>
</tr>
<tr>
<td>8 Proximal Pin Insertion</td>
<td>17</td>
</tr>
<tr>
<td>9 Distal Pin Insertion</td>
<td>17</td>
</tr>
<tr>
<td>Case Report</td>
<td>18</td>
</tr>
<tr>
<td><strong>Pin Removal</strong></td>
<td>19</td>
</tr>
<tr>
<td><strong>Ordering Information</strong></td>
<td>20</td>
</tr>
<tr>
<td><strong>References</strong></td>
<td></td>
</tr>
<tr>
<td>1 Slipped Capital Femoral Epipysis</td>
<td>21</td>
</tr>
<tr>
<td>2 Femoral Neck Fractures</td>
<td>21 &amp; 22</td>
</tr>
</tbody>
</table>
The Hansson™ Pin system, designed by Professor Lars Ingvar Hansson at the University of Lund in Sweden, was developed from research into the effects of osteosynthetic devices on the blood supply to the femoral head. Specifically developed for the treatment of intracapsular femoral neck fractures, the Hansson Pin system has been designed to minimise surgical trauma to the patient and offer secure, stable fixation with reduced risk of healing complications for all grades of fracture.

Twenty years of successful clinical studies carried out (6 theses and more than 70 published articles) has enhanced the Hansson™ Pin System to its current form.

References
INDICATIONS

PEDIATRIC:

Slipped Capital Femoral Epiphysis

ADULT:

Transcervical and Subcapital Neck Fractures

Basal Neck Fractures
**Features & Benefits**

**Preventing Diastasis and further displacement of the epiphysis**

The risk of further peroperative displacement of the femoral head is reduced by drilling a channel for the Hansson Pin with the femoral head fixed with kirschner 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.\(^1\)

**Lasting 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 osteosynthetic material is reduced because of resorption and growth of the femoral neck under normal conditions.\(^1\)

**Reducing the risk of unequal bone length**

The growth of the femoral neck in cases with Slipped Capital Femoral Epiphysis, is an indication of a lack of intra- and postoperative vascular disturbance, 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 is reducing the risk of unequal bone length.\(^1\)

**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.\(^1\)
FEATURES & BENEFITS

PRESERVES BONE INTEGRITY

• Minimum Bone Interference.
  Creates minimum disruption to cancellous bone, and no additional fixation points are required in the femoral shaft.
  Reduces the risk of avascular necrosis. Reduces the risk of secondary fracture.

PRESERVES THE BLOOD SUPPLY

• Minimum Surgical Trauma.
  Their smooth profile allows the pins to slide into place without turning or hammering. This minimises disruption to the blood supply and the consequent danger of avascular necrosis.
  Reduces the risks of segmental collapse and non-union.

REDUCES SURGERY

• Small Incision.
  The complete procedure is carried out through a 4-5cm incision.

• Short Procedure.
  Simple instrumentation and uncomplicated procedure allow fixation to be achieved within an average of 15 minutes. The procedure lends itself to spinal anaesthesia.

• Simple Implant Removal.
  The procedure for pin removal is quick and straightforward.
  Minimises anaesthetic related risks.

ALLOWS EARLY MOBILISATION

• Stable Fixation.
  The security and stability of fixation allow most patients to be mobilised during their first post-operative day and discharged early.
  Minimises the risks of prolonged bed rest following surgery. Offers potential cost savings to the hospital.
FEATURES & BENEFITS

PROVIDES SECURE FIXATION

• **Optimum Resistance to Rotation.**
  Peripheral pin placement within the neck provides maximum resistance to rotation.5

• **Maximum Use of Cortical Bone.**
  Each pin contacts strong cortical bone in three places to provide maximum 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 in either fragment and the risk of displacement is thereby minimised.

Reduces the risks of redisplacement and non-union.

MAINTAINS BONY CONTACT

• **Precise Parallel Placement.**
  Precise parallel placement enables the pins to slide within the main bone fragment to ensure continuous bony contact even during resorption.
  Allows physiological compression at the fracture site.5

Reduces the risk of non-union.
Positively encourages bone healing.
OPERATIVE TECHNIQUE

SLIPPED CAPITAL FEMORAL EPIPHYSES
STRONG, STABLE FIXATION THROUGH A SIMPLE AND PRECISE PROCEDURE

The osteosynthesis consists of a cylindrical pin inserted in a drill hole and attached to the femoral head. The drill hole and pin runs at right angles to the growth zone and is, 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 in order to permit growth in the length of the femoral neck. Slipping up to 60° can be stabilised by osteosynthesis.

1 Patient Positioning & Reduction

The degree of slipping should be thoroughly investigated by X-ray examination preoperatively. Reduction should only be performed if there is pronounced slipping without signs of corresponding periosteal bone formation in the femoral neck. Fluoroscopy is recommended during the operation. The image should include the head, neck and proximal femur down to the lesser trochanter. The proximal femur should be positioned so that the neck is parallel to the radiation beam in the lateral projection. The foot should therefore be rotated inwards and fixed in 30-60° inward rotation.
2 Stabilisation Guide-Wire Insertion
A guide wire is inserted percutaneously in the trochanteric region into the femoral neck and head for stabilisation during the operation.

3 Incision
A 10-20 mm longitudinal subtrochanteric incision is made and the fascia lata is divided in the direction of the fibres.

4 Guide-Wire Insertion
The guide wire is inserted through the fascia. In the AP-view the tip of the guide wire should be level with the lesser trochanter. In the lateral view it should be central in relation to the femoral head and neck. Once the alignment of the guide wire is satisfactory, it is advanced to the subchondral bone of the femoral head.

NOTE
To prevent unintended guide-wire advancement and penetration in the surrounding tissue, frequently check the position of the guide-wire under image intensification.
5 Drilling & Measurement
The cannulated drill and the protective measuring sleeve are inserted over the end of the guide wire. The protective sleeve is pressed against the lateral cortex and the drill is advanced to the subchondral bone of the femoral head. The length of the pin is read off the scale on the drill against the end of the protective measuring sleeve.

The drill, guide wire and protective measuring sleeve are removed.

NOTE
All Guide-wires are « single use » products and therefore must be discarded at the end of the surgical procedure.

6 Pin / Introducer Assembly
A pin of the length chosen for the proximal hole is prepared for introduction by passing the inner introducer through the outer introducer and screwing it into the base of the pin. The unequal lugs on the introducer correspond with slots in the pin. The tip of the handle is inserted through the hole in the inner introducer and rotated clockwise until it meets resistance (ie until the tip touches the base of the threaded inner portion of the pin).

A pin that is 10-20mm longer than the measured length is chosen in order to permit growth of the femoral neck.

NOTE
It is important to make sure that the inner pin is in correct position in the window of the outer pin prior to insertion.
Pin insertion
A pin of the selected length is introduced in the drill hole, ensuring that the guide-line on the outer introducer is pointing superiorly. 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 introducer assembly and the stabilisation guide-wire are then removed and the wound is closed.

NOTE
Bilateral Slipping
In view of the high rate of bilateral slipping, operation of the contralateral hip is recommended in cases of slipped capital femoral epiphysis.¹
CASE REPORT
SLIPPED CAPITAL FEMORAL EPIPHYSIS

X-RAY CASES

Fig. 1
A 15 year old boy with left-sided Slipped Capital Femoral Epiphysis, treated with a Hansson Pin

Fig.2
Both sides have been operated in the same anaesthesia to avoid the high risk of later slipping also on the unaffected side.

Fig.3
View at 3 years, showing attained size of the femoral neck

Fig.4
The physes are closed and the Hansson Pin seem retracted into the bone. The positioning of the hook is the same in the femoral head, showing the elongation of the femoral neck.
STRONG, STABLE FIXATION THROUGH A SIMPLE AND PRECISE PROCEDURE

1 Patient Positioning & Reduction
Reduction is obtained by gentle manipulation and held by immobilisation on a fracture operating table. If adequate reduction cannot be obtained, then arthroplasty should be undertaken.

Hold the drill or the guide-wire, over the hip joint over the skin surface, and angle under image intensification so that it is positioned in line with the femoral neck. With the guide-wire placed at 135° angle, the pin crosses the lateral cortex at the level of the lesser trochanter. The point at which this instrument crosses the skin line is the optimal point for skin incision.

2 Incision
A 10-20mm incision is made and the fascia lata is divided in the direction of the fibres.

3 Distal Guide-Wire Insertion
The guide-wire together with the guide-wire bush are inserted through the fascia to the lateral cortex. In the frontal view the tip of the guide-wire should be 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. It is essential to have the guide-wire very close to the inner medial 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 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**.
4 Distal Drilling
The short cannulated drill is inserted over the end of the guide-wire. The protective measuring sleeve is advanced to the lateral cortex and drilling is carried out, using image intensification to ensure that the 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 pelvis. When the drill is fully advanced in the femoral head, the **required length of pin is read off the scale** on the drill protruding from the sleeve. The **protective measuring sleeve** and the **guide-wire** are then removed.

**NOTE**
Make sure that the protective measuring sleeve is in contact with the bone.

5 Proximal Drilling
The next stage is to drill a hole for the proximal 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 possible separation of the pins without cutting through the posterior cortex. The incision is extended 20 to 30mm.

A check can be made, before drilling, to ensure the correct drill guide has been selected. The selected drill guide is then pushed over the distal drill and rotated, in order that the new channel is situated posteriorly to the distal drill. The sharp tip of the guide is pushed into the cortex to aid stability.
6 Proximal Drilling
Ensuring that the sharp tip of the drill guide is firmly located against the femoral cortex, the long solid drill is used to prepare the second hole, using image intensification in both AP and lateral views to ensure that the drill does not cut through the calcar. The hole is drilled up and into the subchondral bone of the head. The lateral view alone indicates whether the drill is advanced sufficiently in the femoral head. The length of pin required is again read off the scale on the drill protruding from the drill guide. The drill and drill guide are then removed.

NOTE
It is important to clean the channel by running the drill in forward motion as the drill is removed.

7 Pin / Introducer Assembly
A pin of the length chosen for the proximal hole is prepared for introduction by passing the inner introducer through the outer introducer and screwing it into the base of the pin. The unequal lugs on the introducer correspond with slots in the pin. The tip of the handle is inserted through the hole in the inner introducer and rotated clockwise until it meets resistance (ie until the tip touches the base of the threaded inner portion of the pin).

NOTE
It is important to make sure that the inner pin is in correct position in the window of the outer pin prior to insertion.
8 Proximal Pin Insertion
The proximal pin is introduced first, 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 distal drill and guide-wire are then removed.

NOTE
Before turning the handle, make sure that the guide wire has been removed.

9 Distal Pin Insertion
A pin of the length required for the distal hole (usually 10 mm longer than the proximal pin) is mounted on the introducer assembly and inserted in the same way, but with the guide-line on the introducer facing superiorly so that the hook will also emerge superiorly. Again, both AP and lateral image intensification is utilised to ensure accurate placement.

The wound is sutured and closed in the normal manner.

Post-Operative Care
Full weight-bearing may be allowed from the first post-operative day as tolerated by the patient, except in young patients with displaced fractures: these can be prescribed a six-week period of nonweight-bearing.
CASE REPORT
FEMORAL NECK FRACTURE

X-RAY CASES

Fig.1
Displaced cervical hip fracture
Garden IV

Fig.2
Displaced cervical hip fracture
after reposition and operation
with hook-pin osteosynthesis

Fig.3
Displaced cervical hip fracture
after reposition and operation
with hook-pin osteosynthesis

Fig.4
Healed cervical hip fracture
2 years after operation with
hook-pins

Fig.5
Healed cervical hip fracture
2 years after operation with
hook-pins
A 10-20mm skin 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 placed over the extractor and the extractor is screwed clockwise. Engage the lugs of the outer introducer into the pin. Continue to turn the extractor. This withdraws the hook back into the body of the pin, which can then be removed.

Occasionally, it may happen that the hook is removed on its own, leaving behind the body of the pin. In that case, the body of the pin can be removed by using the inner introducer.
## Hansson PINS

<table>
<thead>
<tr>
<th>Stainless Steel Ref</th>
<th>Pin Length mm</th>
<th>Titanium Ref</th>
</tr>
</thead>
<tbody>
<tr>
<td>394070S</td>
<td>70mm</td>
<td>694070S</td>
</tr>
<tr>
<td>394075S</td>
<td>75mm</td>
<td>694075S</td>
</tr>
<tr>
<td>394080S</td>
<td>80mm</td>
<td>694080S</td>
</tr>
<tr>
<td>394085S</td>
<td>85mm</td>
<td>694085S</td>
</tr>
<tr>
<td>394090S</td>
<td>90mm</td>
<td>694090S</td>
</tr>
<tr>
<td>394095S</td>
<td>95mm</td>
<td>694095S</td>
</tr>
<tr>
<td>394100S</td>
<td>100mm</td>
<td>694100S</td>
</tr>
<tr>
<td>394105S</td>
<td>105mm</td>
<td>694105S</td>
</tr>
<tr>
<td>394110S</td>
<td>110mm</td>
<td>694110S</td>
</tr>
<tr>
<td>394115S</td>
<td>115mm</td>
<td>694115S</td>
</tr>
<tr>
<td>394120S</td>
<td>120mm</td>
<td>694120S</td>
</tr>
<tr>
<td>394125S</td>
<td>125mm</td>
<td>694125S</td>
</tr>
<tr>
<td>394130S</td>
<td>130mm</td>
<td>694130S</td>
</tr>
<tr>
<td>394135S</td>
<td>135mm</td>
<td>694135S</td>
</tr>
<tr>
<td>394140S</td>
<td>140mm</td>
<td>694140S</td>
</tr>
</tbody>
</table>

| Special Order        | NOTE: All implants are sterile packed. |

## Instruments

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>704501</td>
<td>Short Cannulated Drill ø 6.7mm x 246mm with Jacobs fitting</td>
</tr>
<tr>
<td>704522</td>
<td>Long Solid Drill ø 6.7mm x 276mm with Jacobs fitting</td>
</tr>
<tr>
<td>704510</td>
<td>Protective Measuring Sleeve</td>
</tr>
<tr>
<td>704537</td>
<td>Drill Guide 6mm with Elastosil handle</td>
</tr>
<tr>
<td>704538</td>
<td>Drill Guide 8mm with Elastosil handle</td>
</tr>
<tr>
<td>704539</td>
<td>Drill Guide 10mm with Elastosil handle</td>
</tr>
<tr>
<td>704511</td>
<td>Guide-wire Bush</td>
</tr>
<tr>
<td>704515</td>
<td>Outer Introducer</td>
</tr>
<tr>
<td>704516</td>
<td>Inner Introducer</td>
</tr>
<tr>
<td>704517</td>
<td>Introducer Handle</td>
</tr>
<tr>
<td>704518</td>
<td>Extractor</td>
</tr>
<tr>
<td>704505S</td>
<td>Threaded Guide-wire ø 2.4mm x 300mm (Single Use - Sterile Packed)</td>
</tr>
<tr>
<td>901703</td>
<td>Sterilisation Tray for Instruments (Lid and Insert)</td>
</tr>
</tbody>
</table>
REFERENCES

Slipped Capital Femoral Epipysis

Clinical Studies:
   Acta Orthop. Scand. 53: 87-96
   Clinic. Orthop. 191: 82-94
   Clinic. Orthop. 210: 152-159
   Acta Orthop. Scand. 57: 510-512
   Clinic. Orthop. 217: 190-200
   J Bone Joint Surg (Br) 70: 845-46
   J Bone Joint Surg (Br) 72: 568-73

Thesis:

REFERENCES

Femoral Neck Fractures

Clinical Studies:
4. Femoral head vitality after intracapsular hip fracture, 490 cases studied by intravital tetracycline labelling and Tc-MDP radionuclide imaging. Strömquist B
   Clin Orthop 1984 Jan-Feb;(182):177-89
7. Femoral head vitality in femoral neck fracture after hook-pin internal fixation. Strömquist B, Hanson LI
   Clin Orthop 1984 Dec;(191):105-9
REFERENCES

Femoral Neck Fractures (cont.)

    Strömqvist B

11. External and biopsy determination of peroperative Tc-99m MDP femoral-head labelling in fracture of the femoral neck.
    Strömqvist B, Brismar J, Hansson LI

    Strömqvist B, Hansson LI, Nilsson LT

    Ceder L, Strömqvist B, Hansson LI
    Clin Orthop 1987;218:53-7

    Strömqvist B, Hansson LI, Nilsson LT

    Eliasson P, Hansson LI, Kärrholm J

    Strömqvist B, Kelly I, Lidgren L
    Clin Orthop 1988 Mar:(228):75-8

    Strömqvist B, Hansson LI, Ross H

18. Intracapsular pressures in undisplaced fractures of the femoral neck.
    Strömquist B, Nilsson LT, Egund N

    Nilsson LT, Strömqvist B, Thorngren KG

    Ragnarsson JJ, Hansson LI, Kärkholm J

    Londos E., Nilsson L.T., Strömqvist B.
    Acta Orthop Scand 1989; 60(6):682-685

    Ragnarsson JJ, Kärkholm J

23. Femoral neck fracture fixation with hook-pins. 2 years results and learning curve in 626 prospective cases.
    Nilsson LT, Fransen H, Strömqvist B, Thorngren K.G.

    Sjöstedt A., Zetterberg C., Hansson T., Hult E., Ekström L.

    Ragnarsson J.J., Kärkholm J.

26. Function of the hip after femoral neck fractures treated by fixation or secondary total hip replacement.
    Nilsson LT, Fransen H, Strömqvist B, Wiklund I

27. The effect of implant design and bone density on maximum torque and holding power for femoral neck fracture devices.
    Eriksson F., Mattsson P., Larsson S.
    Annales Chirurgiae et Gynaecologiae 2000; 89: 119-123

    Uta S., Inoue Y., Kaneko K., Mogami A., Tobe M., Maeda M., Iwase H., Obayashi O.

29. Quality of life is better after osteosynthesis than after hemiarthroplasty in femoral neck fractures.
    Nilsson LT, Jålavaara P, Fransen H, Virkkunen H, Strömqvist B
    Submitted.

Thesis:

1. Femoral head vitality after intracapsular hip fracture.
    Björn Strömqvist, 1983.

2. Primary osteosynthesis for femoral neck fracture.

3. Femoral neck fracture stability. Evaluation with roentgent stereophotogrammetric analysis, magnetic resonance imaging, scintimetry, radiography and histopathology.
The Trochanteric Gamma™ Nail is the latest development in Orthinox®, the continuing evolution of the Gamma Locking Nail family designed for rapid and secure fixation of intertrochanteric and pertrochanteric fractures. Combining strength and biomechanical advantages of the existing Gamma family it is the Golden standard for proximal femoral fractures.

The Long Gamma Nail is a specialised development of the original Gamma Locking Nail allowing surgeons to extend the benefits of the highly successful standard implant for trochanteric fractures. It has been designed to treat subtrochanteric, ipsilateral neck and shaft fractures as well as for prophylactic use.

The OMEGA PLUS Compression Hip Screw System integrates innovative features such as sideplate made of superstrong alloy material and improved instrumentation. OMEGA PLUS Plates and Lag Screws are available in Sterile or Non-Sterile packaging for customer preference and convenience.

This new generation of Cannulated Screws has been designed to optimise surgical outcomes while simplifying procedures. The ASNIS III System offers the surgeon a complete choice of implants, material and packaging combined with a new user-friendly instrumentation.

This innovative device has been developed for Femoral Neck Fracture and Slipped Capital Femoral Epiphysis treatments. The Hansson Pin System is a simple and precise instrumentation combined with a unique implant. This unthreaded pin with a spreading hook allows a strong and stable fixation through a simple and short procedure, thus preserving the blood supply and the bone integrity.