Richard's Dynamic Hip Screw (DHS) – Surgical Technique

Indications:

1 Fractures in the trochanter region, simple pertrochanteric

- Along the intertrochanteric line
- Through the greater trochanter
- Extending distal to the lesser trochanter minor

2 Fractures of the trochanter region, comminuted pertrochanteric

- With one intermediate fragment
- With several intermediatefragments
- Fracture extending more than 1 cm below the lesser trochanter

3 Fractures of the trochanter region, intertrochanteric

- Simple, oblique
- Simple, transverse
- Comminuted

4 Femoral neck fractures

Femoral neck fractures are intra-articular in nature.

- Subcapital fractures with minimal displacement
- Displaced subcapital fractures

DHS Surgical Technique:

Positioning

Supine position: push the patient to the edge of the X-ray-permeable operating table with both legs on extension rails. Ensure that no excessive pressure or traction is exerted on any
part of the body.

The fracture is reduced by traction, abduction and internal rotation prior to disinfecting the patient.

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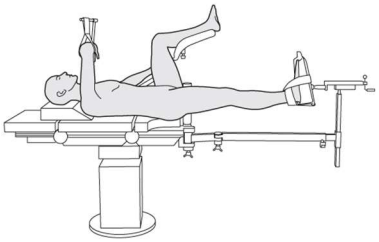
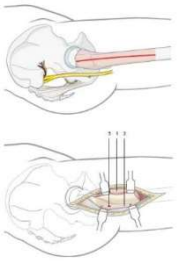


As intraoperative X-rays through the hip are required in both the a.p. and lateral planes, the surgeon must ensure before the operation that both views are possible and that the pictures are of acceptable quality.

Approach



Straight lateral skin incision about 15 cm long, beginning two finger breadths above the tip of the greater trochanter.
Split the iliotibial tract longitudinally from the tip of the trochanter distally.
Push the vastuslateralis muscle anteriorly, dividing it dorsally from the intermuscular membrane, if necessary cutting it slightly in the region of the innominate tubercle. Expose the proximal shaft of the femur with minimal elevation of theperiosteum.
The alternative L-shaped division of about 1 to 1.5 cm of the vastuslateralis proximal to the femur is also possible but is more traumatic. Insert Hohmann retractors anteriorly in the region of the proximal femur.

Further reduction and temporary fixation

Reduce the fracture by flexion, longitudinal traction, abduction and internal rotation. Carry out initial fixation with Kirschner wires as described below. The position of these wires must not interfere with the correct placement of the DHS/DCS screw and the DHS plate.

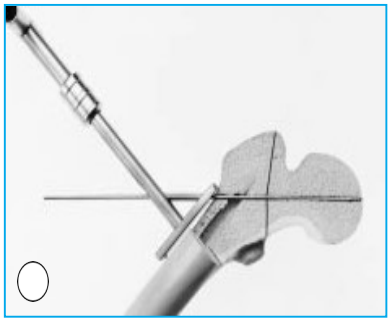
Inserting the Kirschner wires

To fix the antetorsion of the femoral neck, a Kirschner wire is advanced anteriorly through the femoral neck. Using the corresponding DHS angled guide with T handle,

the wire is hammered lightly into the femoral head. With unstable fractures, several Kirschner wires are inserted in the femoral head from lateral to medial for temporary stabilisation of the reduced (and valgusised) fragments. This allows an axial check with the image intensifier without loss of reduction. Before reaming the screw hole the Kirschner wires that lie in the probable radius of action of the DHS triple reamer are removed.

Determining the entry site of the DHS/DCS screw

The entry site depends on the position of the screw. Its angle can vary from 135° to 150° and can be located at a corresponding distance of 2.5 cm to about 6 cm from the innominatetubercle.

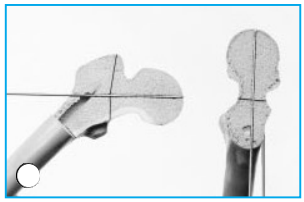


Attach the DHS angled guide. If the bone is hard, the lateral cortex is drilled with the 2.0 mm diameter spiral drill and the DHS/DCS guide wire with threaded tip is inserted into the subchondral bone. The guide wire runs about 6 mm proximal to Adam's line in the postero- inferior quadrants of the femoral head. The thread at the tip of the guide wire prevents it from sliding out accidentally. The guide wire remains in place throughout the entire internalfixation.

A = 2.0 mm diameter wire to determine the angle of anteversion B = 2.5 mm diameter guide wire with threaded tip

Image intensifier control

Check the position of the guide wire with the image intensifier in both the anteroposterior and mediolateral planes.



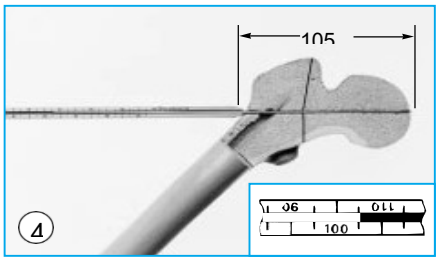
Richard's Dynamic Hip Screw (DHS) – Surgical Technique

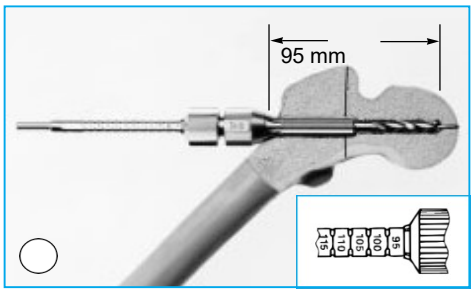
Measuring the length

Push the Direct measuring device over the guide wire. Read the length of the guide wire inserted in the bone directly (e.g. 105 mm).

Subtract 10 mm from the length measured with the Direct measuring device e.g. 105mm - 10 mm = 95mm and adjust the setting of the triple reamer to correspond.

Remove the antetorsionKirschner wire as soon as the guide wire is placed correctly.





Reaming with the DHS triple reamer

Attach the DHS triple reamer with Quick Coupling Handle or Power Drill chuck.

The hole produced in one operation has three different diameters: one for the screw, one for the plate cylinder and one for the junction of plate and cylinder. The depth of drilling can be adjusted in 5 mm steps. The three elements of the DHS triple reamer are so designed that incorrect assembly is notpossible.

Important:

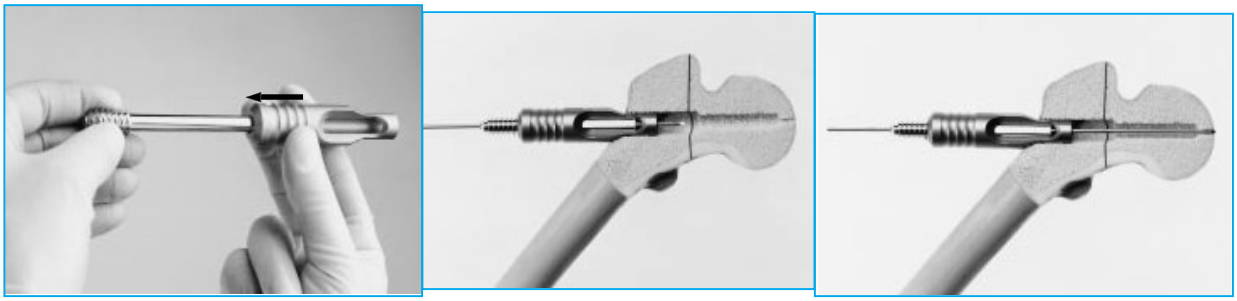
In order to avoid unintentional rotation of the femoral head during reaming, secure temporary fixation of the femoral head with wires is strongly recommended.

Richard's Dynamic Hip Screw (DHS) – Surgical Technique

Reinserting the guide wire:

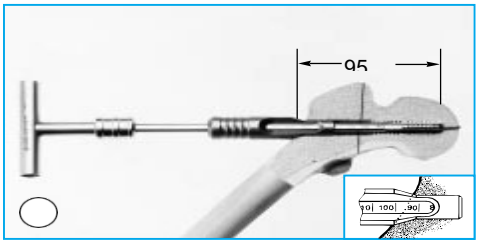
If the guide wire is removed by accident, it is essential to insert it again. Otherwise, it is easy to place the DHS/DCS screw incorrectly, particularly in osteoporotic bone.

To reinsert the wire, the DHS/DCS centering sleeve is pushed into the drill hole and a



DHS/DCS screw is placed backwards in the sleeve. The guide wire can now be placed in its original position again.

Tapping the thread



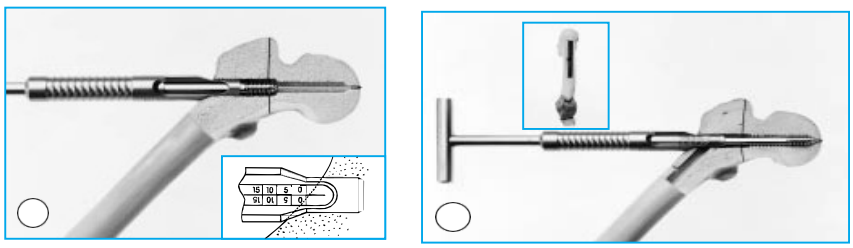
Remove the DHS triple reamer. Attach the DHS/DCS centering sleeve to the DHS/DCStap and mount the quick coupling handle on the tap.

Tap to the predetermined depth.

Caution:

Tap only in dense hard femoral bone. Do not tap in osteoporotic bone.

Inserting the DHS screw Assembly:



In order to be able to screw in the DHS screw, the Canuulated Tube Guide must first be coupled with the inner thread of the DHS screw. The cams and grooves on the

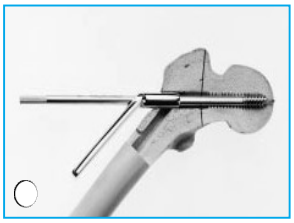
guide shaft and DHS screw must engage correctly. The DHS screw is screwed into the femoral head together with the coupling screw with the long centering sleeve over the DHS/DCS long wrench. When the zero marking in the window reaches the upper semicircular edge of the centering sleeve that points towards the femur, the end of the screw has reached the lateral cortex.

This means that the tip of the screw is still 10 mm from the joint. In osteoporotic bone the screw can be screwed in 5 mm further. The handle of the screw wrench must be parallel to the femoral shaft at the end of this procedure (vertical position).

Otherwise the DHS plate cannot be pushed over the screw.

The plate can be pushed over the laterally flattened shaft of the DHS screw only in this position. The DHS wrench must not be used for fracture reduction as it would not withstand these bending forces.

Attaching the DHS plate and then impacting it



Loosen and remove the DHS centering sleeveand DHS long wrench. Push the DHS plate onto the femoral shaft until it touches the lateral cortex over cannulated Tube Guide.

Loosen the coupling screw of Tube guide and remove the same.

Remove the guide wire with a reverse motor.

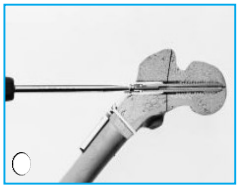
Drive the plate into the prereamed channel with the Nylon facedimpactor.

Screw the DHS plate to the femoral shaft.

Drill neutral holes through the plate holes with the drill and tap sleeve 4.5mm and the 3.2 mm diameter Drill Bits.

Measure the depth of the drill by Depth Gauge 4.5mm and Fix it with 4.5 mm cortical screws of appropriate length.

Using the DHS Top screw for extra compression:



Compression of the fragments can also be achieved with DHS Top screws. Particular caution is needed with osteoporotic bone to prevent the DHS screw thread in the femoral head from coming out.

Surgical features

Before reaming the femoral neck, it is essential to check that the 2.5 mm diameter guide wire for the DHS/DCS with threaded tip is in correct position as there is only a limited possibility of subsequent correction. Kirschner wires inserted to aid reduction should be removed from the immediate vicinity of the triple reamer before reaming. When reaming, ensure that the triple reamer slides easily over the guide wire and that no bending forces are transmitted through the triple reamer to the guide wire (ensure that the weight of the motor is carried). Bending the guide wire can result in an incorrect position of the hole in thelateral cortex and thus of the plate, which can lead to splitting of the greater trochanter when the plate is fixed. If the guide wire and triple reamer are bent, both the instrument and the guide wire can break. If the hole in the lateral cortex is not made with the correct angle it must be enlarged with a drill or rongeur so that the plate cylinder sits perfectly in order to prevent the lateral cortex from breaking. It is better if the plate cylinder has some play in the hole in the bone. If the guide wire becomes loose during reaming, it must immediately be inserted again carefully in the correctposition.

The commonest mistakes are poor fracture reduction and incorrect position of the DHSscrew, most often in the weak anterosuperior quadrants of the femoral head, with subsequent joint penetration, especially when the bone is osteoporotic.

Screwing in the screw repeatedly can lead to hollowing of the femoral head and unstable internal fixation. It should be noted that the screw makes up about 10% of the volume of the femoral head. Tightening the plate at the wrong angle leads to avulsion of the greater trochanter, which then has to be reattached (e.g. with the DHS trochanter stabilisation plate). If the guide wire is placed too close to the calcar, the subsequent reaming of Adam's line can destroy the medial support.

Implant removal:

The DHS Barrel Plate should first be removed by following screw removal technique of cortical screws with the help of Hexagonal Screw Driver 4.5mm. After removing the DHS plate, remove the top screw if applied and secure the DHS long wrench to the end of the DHS screw with the coupling screw of wrench. The following should be noted in order to

avoid damage to the instrument or implants: Never use the DHS long wrench for integrated insertion technique and the coupling screw of wrench to remove the implant.

The DHS wrench and the coupling screw must fit the DHS screw precisely. Tighten the coupling screw firmly and then turn anti clock wise to remove the DHS screw.

Note: The final decision of removing the implants shall be taken by the operating surgeon only. It is recommended that the implant used as an aid for healing should be removed once its service is over after proper consultation and examination by the operating surgeon in final follow up, particularly in younger and more active patients.

CAUTION:

Used Implants:

Used implants which appear un-damaged may have internal and/or external defects. It is possible that individual stress analysis of each part fail to reveal the accumulated stress on the metals as a result of use within the body. This may lead ultimately to implant failure after certain point of time due to metal fatigue. Therefore reuse of implants are strictly not recommended.

Disposal of Used Implants:

Every used or removed implant must be discarded after use and must never be re- used. It should be bent or scratched & then disposed of properly so that it becomes unfit for reuse. While disposing it off, it should be ensured that the discarded implant does not pose any threat to children, stray animals and environment. Dispose of the implants as per applicable medical practices and local, state and country specific regulatory requirement of Bio Medical Waste rules.

Packaging Materials Disposal: The packaging material of this device is made of LDPE and therefore if swallowed, may cause choking Hazards. Therefore, it should be disposed of in such a way that keep out of reach of children and stray animals.

Single Brand Usage: Implant components from one manufacture should not be used with those of another. Implants from each manufacture may have metal, dimensions and design differences so that the use in conjunction with different brands of devices may lead to inadequate fixation or adverse performances of the devices.

END OF SURGICAL TECHNIQUE

Richard's Dynamic Hip Screw (DHS) – Surgical Technique

Product Details:

CE

Others Implants

Richard's Screws (DHs) With Top Screw

Size	S.S.	Titanium
50 mm	131.050	232.050
55 mm	131.055	232.055
60 mm	131.060	232.060
65 mm	131.065	232.065
70 mm	131.070	232.070
75 mm	131.075	232.075
80 mm	131.080	232.080
85 mm	131.085	232.085
90 mm	131.090	232.090
95 mm	131.095	232.095
100 mm	131.100	232.100
105 mm	131.105	232.105
110 mm	131.110	232.110

Intended Use	For Trochanter Fracture Fixation with Barrel Plates
Profile	8mm Shaft dia. 12.5mm Thread dia, 22mm Thread Length, 2.5mm Cannulation Holes
Material	SS 316L & Titanium

Richard's Paediatric Screws (PDHS) With Top Screws

Size	S.S.	Titanium
40 mm	133.040	-
45 mm	133.045	-
50 mm	133.050	-
55 mm	133.055	-
60 mm	133.060	-
65 mm	133.065	-
70 mm	133.070	-
75 mm	133.075	-
80 mm	133.080	-
85 mm	133.085	-
90 mm	133.090	-
95 mm	133.095	-
100 mm	133.100	-

Intended Use	For Paediatric Trochanter Fracture Fixation with Barrel Plates
Profile	7mm Shaft dia. 10.5mm Thread dia, 19mm Thread Length, 2.5mm Cannulation Holes
Material	SS 316L

Richard's Barrel Plates DHS Type - Round Holes

Available Size	S.S.	Titanium
120° To 145° x 2 Holes	135.1202 To 135.1452	-
120° To 145° x 3 Holes	135.1203 To 135.1453	-
115° To 150° x 4 Holes	135.1154 To 135.1504	-
120° To 145° x 5 Holes	135.1205 To 135.1455	-
120° To 145° x 6 Holes	135.1206 To 135.1456	-
130° & 135° x 7 Holes	135.1307 & 135.1357	-
130° & 135° x 8 Holes	135.1308 & 135.1358	-
130° & 135° x 9 Holes	135.1309 & 135.1359	-
130° & 135° x 10 Holes	135.13010 & 135.13510	-
135° x 12 Holes	135.13512	-
135° x 14 Holes	135.13514	-
135° x 16 Holes	135.13516	-

Intended Use	For Trochanter Fracture Fixation with Hip Screws
Profile	19mm x 6mm, 32mm Barrel Length, 12.5mm Barrel Dia, 4.5mm Screws Compatible
Material	SS 316L

Richard's Dynamic Hip Screw (DHS) – Surgical Technique

Others Implants

CE

Richard's Barrel Plates DHS Type - Round Holes
Short Neck

Available Size	S.S.	Titanium
130° & 135° x 2 Holes	136.1302 & 136.1352	-
130° & 135° x 3 Holes	136.1303 & 136.1353	-
130° & 135° x 4 Holes	136.1304 & 136.1354	-
130° & 135° x 5 Holes	136.1305 & 136.1355	-
130° & 135° x 6 Holes	136.1306 & 136.1356	-

Intended Use	For Trochanter Fracture Fixation with Hip Screws
Profile	19mm x 6mm, 25mm Barrel Length, 12.5mm Barrel Dia, 4.5mm Screws Compatible
Material	SS 316L

Richard's Barrel Plates Dhs Type - D.C. Holes

Available Size	S.S.	Titanium
120° To 145° x 2 Holes	137.1202 To 137.1452	233.1302 & 233.1352
120° To 145° x 3 Holes	137.1203 To 137.1453	233.1303 & 233.1353
115° To 150° x 4 Holes	137.1154 To 137.1504	233.1304 & 233.1354
120° To 145° x 5 Holes	137.1205 To 137.1455	233.1305 & 233.1355
120° To 145° x 6 Holes	137.1206 To 137.1456	233.1306 & 233.1356
130° & 135° x 7 Holes	137.1307 & 137.1357	233.1307 & 233.1357
130° & 135° x 8 Holes	137.1308 & 137.1358	233.1308 & 233.1358
130° & 135° x 9 Holes	137.1309 & 137.1359	233.1309 & 233.1359
130° & 135° x 10 Holes	137.13010 & 137.13510	233.13010 & 233.13510
135° x 12 Holes	137.13512	137.13512
135° x 14 Holes	137.13514	233.13514
135° x 16 Holes	137.13516	233.13516

Intended Use	For Trochanter Fracture Fixation with Hip Screws
Profile	19mm x 6mm, 32mm Barrel Length, 12.5mm Barrel Dia, 4.5mm Screws Compatible
Material	SS 316L & Titanium

Richard's Barrel Plates Dhs Type - D.C. Holes
Short Neck

Available Size	S.S.	Titanium
130° & 135° x 2 Holes	138.1302 & 138.1352	-
130° & 135° x 3 Holes	138.1303 & 138.1353	-
130° & 135° x 4 Holes	138.1304 & 138.1354	-
130° & 135° x 5 Holes	138.1305 & 138.1355	-
130° & 135° x 6 Holes	138.1306 & 138.1356	-

Intended Use	For Trochanter Fracture Fixation with Hip Screws
Profile	19mm x 6mm, 25mm Barrel Length, 12.5mm Barrel Dia, 4.5mm Screws Compatible
Material	SS 316L

Richard's Dynamic Hip Screw (DHS) – Surgical Technique

CE

Others Implants

Richard's Paediatric Barrel Plates - Round Holes

Available Size	S.S.	Titanium
130° & 135° x 2 Holes	139.1302 & 139.1352	-
130° & 135° x 3 Holes	139.1303 & 139.1353	-
130° & 135° x 4 Holes	139.1304 & 139.1354	-
130° & 135° x 5 Holes	139.1305 & 139.1355	-

Intended Use	For Paediatric Trochanter Fracture Fixation with Hip Screws
Profile	16mm x 6mm, 14mm Barrel Length, 10.5mm Barrel Dia, 4.5mm Screws Compatible
Material	SS 316L

95* DCS Barrel Plates DHS Type - D.C. Holes

Size	S.S.	Titanium
5 Holes	142.9505	-
6 Holes	142.9506	-
7 Holes	142.9507	-
8 Holes	142.9508	-
9 Holes	142.9509	-
10 Holes	142.9510	-
12 Holes	142.9512	-
14 Holes	142.9514	-
16 Holes	142.9516	-

Intended Use	For Condylar Fracture Fixation of Lower End Femur with Hip Screws
Profile	16mm x 6mm, 25mm Barrel Length, 12.5mm Barrel Dia, 4.5mm Screws Compatible
Material	SS 316L

Richard's Dynamic Hip Screw (DHS) – Surgical Technique

INSTRUMENTS FOR DYNAMIC HIP SCREW & PLATE (DHS)

Quick Coupling 'T' Handle

Reference
591.001

DHS Triple Reamer with Coupling End

Reference	Size
592.001	Standard
594.001	Short

DHS Tap with Coupling End

Reference
593.001

DHS Triple Reamer for Electric Reaming Handpiece

Reference
599.001

Centering Sleeve

Reference	Size
596.001	For Tap
596.002	For Wrench (Spanner)

Angle Guide with Coupling End

Reference	Size
595.1095	95°
595.1135	135°

Angle Guide Adjustable

Reference
605.001

Compression Handle

Reference
601.001

Richard's Dynamic Hip Screw (DHS) – Surgical Technique

DHS Wrench (Spanner)/ Extractor with Coupler

Reference	Size
597.001	Regular
597.002	Long

DHS Triple Reamer with "T" Handle

Reference
598.001

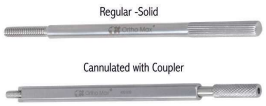
DHS Tap with "T" Handle

Reference
600.001

Barrel Punch - Nylon Faced

Reference
607.001

Tube Guide



Reference	Size
602.001	Regular - Solid
602.002	Cannulated with Coupler

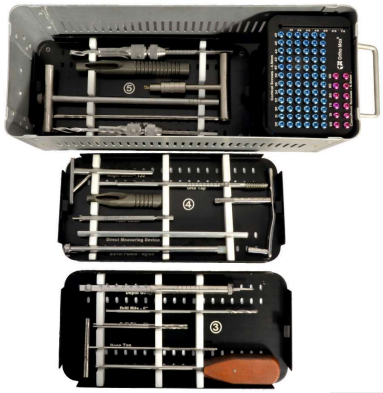
Guide Wire - Threaded

Reference	Size
606.259	2.5mm x 9"

Direct Measuring Device

Reference
608.001

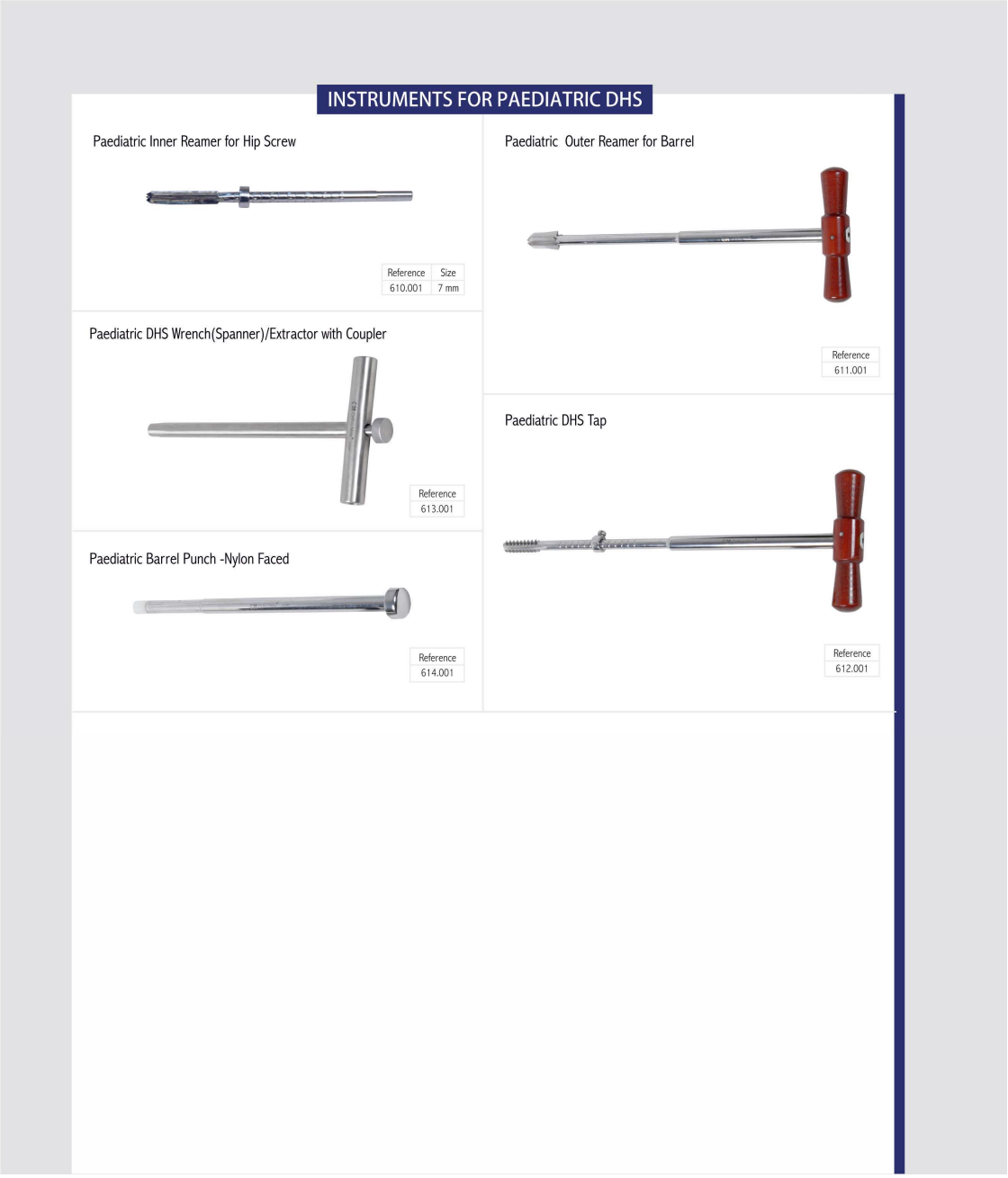
Container for DHS Implants & Instruments Set



Reference
797.001

- Contents are for illustration only

Richard's Dynamic Hip Screw (DHS) – Surgical Technique



MFG. UNIT & REGD. OFFICE
C-1-B/886/4, G.I.D.C. ESTATE
MAKARPURA,
VADODARA – 390 010 GUJ. INDIA

Tel : +91-89800 15555
+91-89800 25555

E-mail : info@orthomaxindia.net
admin@orthomaxindia.net