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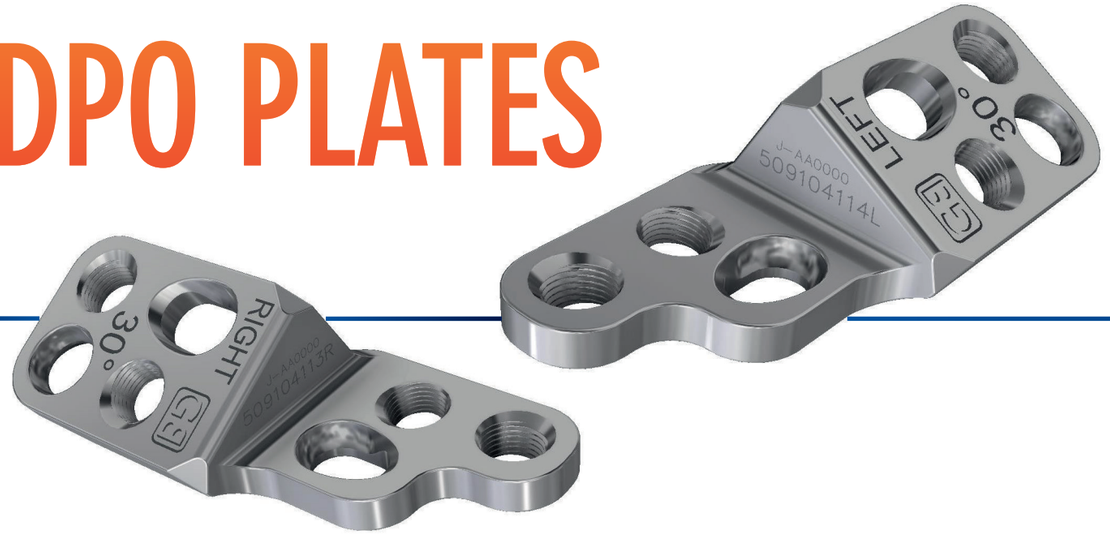
DPO PLATE

OPERATING TECHNIQUE

DPOVETLINE-OT-001 REV 00 2020

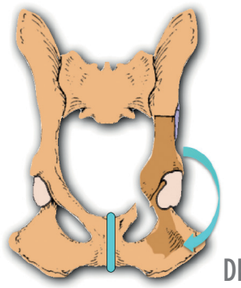
EN

DPO PLATES



The Double Pelvic Osteotomy is a corrective pelvis osteotomy designed to stop the dysplastic subluxation of the femoral head and the development of hip dysplasia. DPO provides only the osteotomy of the ileum and pubis: the rotation of the acetabulum occurs thanks to the elasticity of the ischial vault and the pubic symphysis.

The best age for the surgery is less than 8 months.
The best age for DPO surgery is from the 5th to the 6th month, when the pelvis is still malleable, the potential for bone and joint remodeling is greater and the healing of obstetomies is quick.



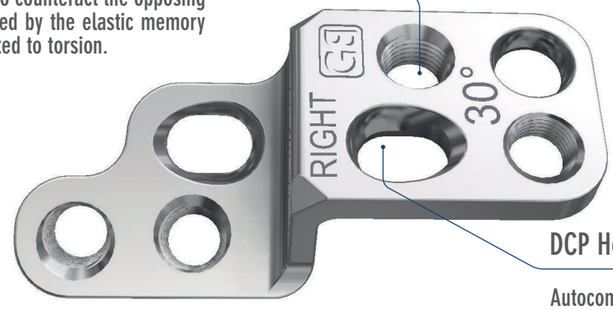
DPO

DPO 25° and 30° Plates

- DPO Plate 30° guarantees a 25° correction; DPO Plate 25° guarantees a 20° correction
- Standard screws: allow the compression of the plate on the ilium
- Locking screws oriented with 6° deviation to fix the osteotomy firmly

Threaded Holes

The threaded holes for locking screws allow to obtain an angle of the screws of 6°.
The screws stabilize the fixation because, being anchored to the plate and presenting a divergence between them, they offer the necessary resistance to counteract the opposing tensile forces exerted by the elastic memory of the ileum subjected to torsion.



DCP Holes

Autocompression holes for 3.5mm cortical self-tapping standard screws.
The standard self-tapping screws keep the plate adherent to the ilium and ensure effective rotation.

Anatomical countour

Rounded edges and anatomical design to perfectly adapt to the anatomical shape

Screws angulation

- Threaded holes: screw inclination up to 6°
- DCP Holes: screw inclination ≤ 15°

SCREWS OVERHANG
Head screw overhang from the plate: 0.2mm

PLATE THICKNESS
3mm
PLATE LENGHT
42mm

Materials

Plates: Stainless steal (ISO 5832-1)
Locking screws: Stainless steal (ISO 5832-1)
Standard cortical screws: Stainless steal (ISO 5832-1)

DPO PLATES

DOUBLE PELVIC OSTEOTOMY PLATES

OPERATING TECHNIQUE

SELECTION OF PATIENT CANDIDATE FOR DPO SURGICAL PLANNING

The DPO is a corrective osteotomy of the pelvis aimed at arresting the dysplastic subluxation of the femoral head and the consequent arthritic degeneration.
It is indicated in growing dogs with obvious signs of susceptibility to develop severe hip dysplasia, mainly based on the degree of joint laxity found with the Ortolani sign and measurable with the distraction index in the radiographic projection with distraction of the hips.
The physiological value of the distraction index varies according to the different races, and is considered normal up to 0.3 in constitutional dolichormorphic breeds and up to 0.45 in constitutional mesomorphic breeds.
Values of 0.6 - 0.7 or higher are associated with a high incidence of severe arthritic degeneration over the course of life and represent the indication of choice for this intervention.
The surgery can also be performed up to the 8th month of age, provided that the physis of the femoral head still appears fertile in order to allow the remodeling of the femoral head with the new acetabular ratios determined by the DPO, and provided that significant, detectable joint lesions have already developed radiographically, by palpation of the Ortolani sign (crepitus in causing subluxation, subluxation angle (AS) over 20°) or with arthroscopic inspection.
The measurement of the angles in which the Ortolani sign occurs then allows you to plan the degree of correction necessary to neutralize the tendency to subluxation.
Angles of AS up to 10° can be corrected with a plate of 25° (equivalent to an effective correction of 20°), while angles from 11° to 20° require a plate of 30°, equivalent to an effective correction of 25°.

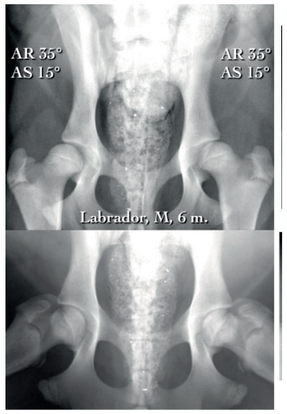
COMPLICATIONS

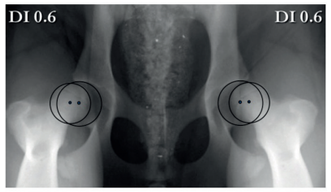
The complications of this surgery can also be very serious and therefore the surgery must be performed with the utmost care to avoid them. The most serious complications are iatrogenic lesions of the sciatic nerve, severe bleeding potentially fatal due to injury to the iliac vessels, complete failure of the fixation of the ileum, and fracture of the ileum distal to the plate.
Minor complications are those of the loosening of some screws, rather infrequent after DPO, and which generally have no consequences, and the green stick fracture of the sciatic board.
The latter can occur following marked bilateral correction, with greater stress on the ischium and the patient's hyperactivity; it generally heals spontaneously, but causes some shrinkage of the pelvis in case of overlapping of the fractured flaps.
The lack of effectiveness of the DPO with the development of arthrosis, due to an incorrect selection of the patient, out of indication for this surgery, or an insufficient correction, should also be considered as a complication.

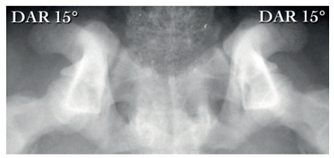
1 Pre-operative assessment

The radiographic study includes four projections:

- Ventrodorsal standard extended, with symmetrical pelvis, parallel femurs, rotulae centered in the condyles
- Frog-leg with femurs parallel to the column
- Distraction projection
- DAR projection





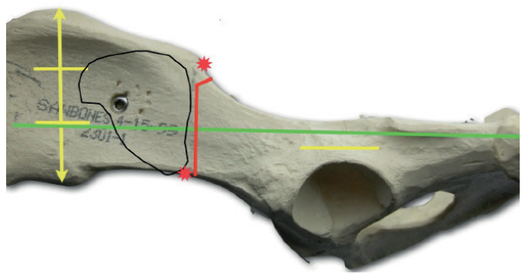


2 Pubic Osteotomy

The dog is in lateral recumbency: check the the Ortolani sign.
Keeping the limb in maximum abduction, cut the skin just caudally to the tendon of the pectineus muscle, and smooth away the tendon from the semimembranosus muscle, reaching the pubis.
With rectal periosteal skeletonize the pubic branch from the ileo-pettinic eminence, preserving the insertion of the pectineus muscle.
Perform the ostectomy of a bone segment of the pubis of 5-6 mm, using an osseous gripper with 2-3 holds. Highlight the medial periosteum, which has to be preserved to favor the subsequent bone fusion of the pubis.

3 Ilium Osteotomy

Touching the wing of the ilium, incise the skin, starting from the cranial margin of its ventral third by 5-7 cm in the direction of the great trochanter of the femur.
Identify and separate the tensor muscle fasciae latae and the gluteus medius muscle.Access the body of the ileum and engrave the origin of the gluteus medius muscle from the iliac crest for a third of its length.
Insert a Homann retractor (with a short tip, 5mm) at the beginning of the ischial notch of the ilium.
Undock the iliac muscle from the ventral margin of the ileum, the iliac muscle, palpate with a scoll of periosteum, bevel the ventral margin of the sacroiliac joint to have the ventral reference point of the osteotomy.
Draw the osteotomy line just caudally to the sacroiliac joint and perpendicular to the line that connects the distal third of the iliac wing and the ischial tuberosity.
Perform the osteotomy with a delicate oscillating saw until it affects 3/4 of the thickness of the ileum and saves the most dorsal part for about 6-7 mm.
Complete the osteotomy of the medial fourth of the ileum with a thin and well-sharpened osteotome. With the osteotome performe also the osteotomy of the dorsal tract, forming an inverted "L".
Lift the distal part of the ileum with a long lever inserted underneath for 5-10 mm, so as to be able to fix the distal part of the plate.

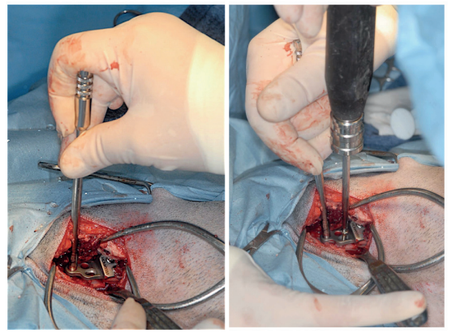


DPO PLATES | DOUBLE PELVIC OSTEOTOMY PLATES

OPERATING TECHNIQUE

4 Rotation of the ileum and fixation of the plate

After loosening the origin of the gluteus muscle for about two centimeters from the distal segment of the ileum, insert the plate, making its step adhere to the osteotomy and keeping its ventral border 1-2 mm from the ventral edge of the ileum body



5 Holes #1, #2

HOLE #1: Through the universal drill guide (Ref. 340085802) in loading position create the hole with a 2.5mm bit (Ref. Jacobs 340085056; Ref. AO 340085916). Measure the required screw length with the depth gauge (Ref. 340085138). Insert a standard 3.5mm self-tapping cortical screw (Ref. 200135510÷200135580): once tightened (Ref. 340085035) it will fix the plate adhering to the ileum and osteotomy.

HOLE #2: Drill the hole with a 2.5mm bit (Ref. Jacobs 340085056; Ref. AO 340085916), using the Drill sleeve (Ref. 340085802) in a neutral position (central) and orienting the hole caudally about 20-25°, towards the acetabulum, so the screw passes the line of possible post-operative ileum fracture, in a position just distal to the plate.

340085802

340085056

340085916

340085138

340085035

6 Holes #3 and #4

HOLE #3: Drill the hole with a 2.8mm bit (Ref. 509104004), after have screwed the drill guide for 3.5mm locking screws (Ref. 509104003). Measure the depth (Ref. 340085138)and insert the 3.5mm self-tapping locking screw Ref. 509104010÷ 509104060), tightening it down (Ref. 340085025).
HOLE #4: Same procedure as for position #3
Once the fixation of the distal part of the plate is complete, the distal segment must be rotated so that the proximal part of the plate adheres to the cranial iliac segment. It is safe and effective to perform the rotation using a threaded holding bar inserted in position #7 of the plate.

Manipulate the plate so as to align the distal segment of the ileum to the proximal segment, starting the ventral rotation of the distal ileum by exploiting the plate itself already well fixed to the distal segment.

509104004

509104003

340085138

340085035

OPERATING TECHNIQUE

7 Hole #5

HOLE #5: Through the Drill sleeve (Ref. 340085802) in loading position to compress the osteotomy, the hole is drilled with a 2.5 mm bit (Ref. Jacobs 340085056; Ref. AO 340085916), maintaining a constant force of rotation on the plate-holding bar, so as to start the torsion of the ileum, but without completing it.
Measured the screw length (Ref. 340085138), screw a standard 3.5mm self-tapping screw (Ref. 200135510÷200135580) and, while tightening the screw, complete the plate rotation with the plate-holding bar, so as to obtain a synergy between the traction force of the screw and the rotation performed with the bar. Once the proximal part of the plate is adhered to the cranial part of the ileum, the Ortolani test is performed to check its neutralization.

In case of persistent positivity, replace the 25 ° plate with the 30 ° one, using the same holes.

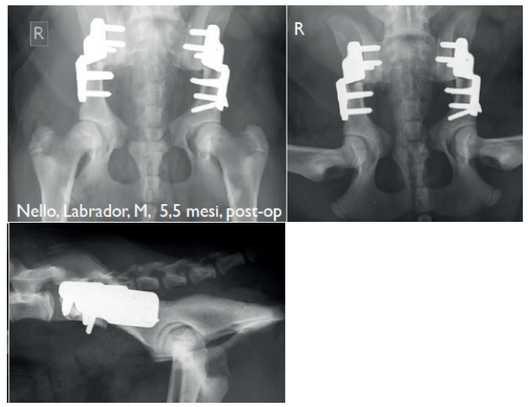
8 Holes #6 and #7

HOLES #6 and #7: The fixation of the cranial part of the plate is then stabilized with two locking screws.
Put the screw with a slight divergence to increase the bone grip. By making the holes for these two locking screws with a 2.8mm bit (Ref. 509104004) through the threaded bush, it is neither necessary nor indicated to penetrate into the sacrum.
Stop drilling once past the medial wall of the ileum.

Once the tightening of the screws is completed (Ref. 340085035), the reduced planes are sutured in several layers in order to avoid dead spaces.

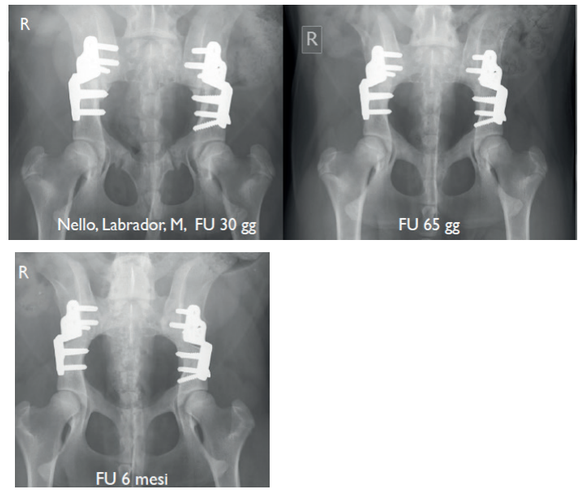
Post-op xray control

A ventro-dorsal projection is performed with extended limbs, a frog projection and a lateral-lateral projection.
In the first evaluates the restoration of joint congruence, even if in case of excessive joint laxity it can still be has some subluxation.
The frog projection, which is not affected by joint laxity, must instead show acetabular coverage of the femoral head from 50% to 80%.
The lateral-lateral view is indicated for check the position of the plate with respect to the ileum. In this phase, the Ortolani test is also performed, which may result negative in case of complete correction with reduced laxity, or still slightly positive; in this case it is measured the AR and the AS with the AS which must not be higher than 0°.



Clinical and radiographic follow up

After 30 days of surgery, an orthopedic and radiographic control under sedation is performed to repeat the Ortolani Test, and to check the tightness of the implants, the restoration of joint congruence and the beginning of bone consolidation.
The same investigation is repeated 60 days after surgery, when the bone consolidation should already appear complete, both in the ileum and in the pubis, while its remodeling will take a few more months.
At the age of 12-15 months, a definitive checkup is then performed after skeletal maturity to assess the appearance of the hips, their congruence, the absence of joint degenerative signs, and the remodeling of osteotomies. On this occasion, passive joint laxity is also assessed with the Ortolani test and with the distraction projection whose distraction index must be within physiological values (less than 0.3-0.4).



DPO PLATES

DOUBLE PELVIC OSTEOTOMY PLATES

INSTRUMENT CODES

	DESCRIPTION	DIAM	LENGTH	REF.
	Drill sleeve	2.5/3.5mm	-	340085802
	Drill bit AO shaft	2.5mm	-	340085916
	Drill bit Jacobs shaft	2.5mm	-	340085056
	Drill Bit	2.8mm	180mm	509104004
	Threaded Drill Guide for 3.5mm locking screw	2.8mm	-	509104003
	Depth gauge for screws 2.7/4.0 L.max 80mm	-	80mm	340085138
	Hexagonal screwdriver for 2.7/4.0mm screws	-	-	340085035

CODES

Self-tapping cortex screws Diam.3.5mm

LENGTH	REF.
10mm	200135510
12mm	200135512
14mm	200135514
16mm	200135516
18mm	200135518
20mm	200135520
22mm	200135522
24mm	200135524
26mm	200135526
28mm	200135528
30mm	200135530
32mm	200135532
34mm	200135534
36mm	200135536
38mm	200135538
40mm	200135540
45mm	200135545
50mm	200135550
55mm	200135555
60mm	200135560
65mm	200135565
70mm	200135570
75mm	200135575
80mm	200135580

Self-tapping locking screws Diam.3.5mm

LENGTH	REF.
10mm	509104010
12mm	509104012
14mm	509104014
16mm	509104016
18mm	509104018
20mm	509104020
22mm	509104022
24mm	509104024
26mm	509104026
28mm	509104028
30mm	509104030
32mm	509104032
34mm	509104034
36mm	509104036
38mm	509104038
40mm	509104040
42mm	509104042
44mm	509104044
46mm	509104046
48mm	509104048
50mm	509104050
52mm	509104052
60mm	509104060

DPO PLATES

REF	ANGLE	LENGTH	WIDTH	THICKNESS
509104111R	25°	42mm	16mm	3mm
509104112L	25°	42mm	16mm	3mm
509104113R	30°	42mm	16mm	3mm
509104114L	30°	42mm	16mm	3mm