

Double Pelvic Osteotomy (DPO) as Treatment Option for Hip Dysplasia in Growing Dogs: Preliminary Results

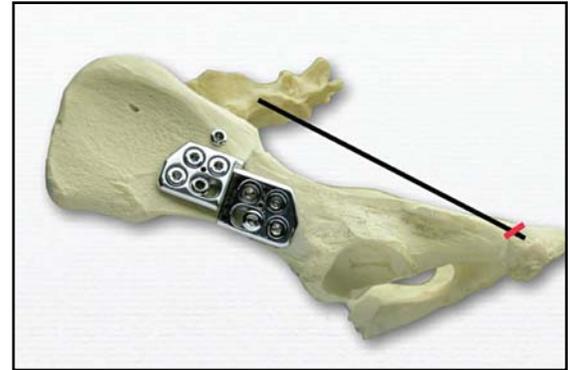
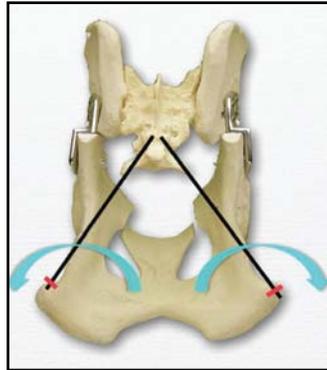
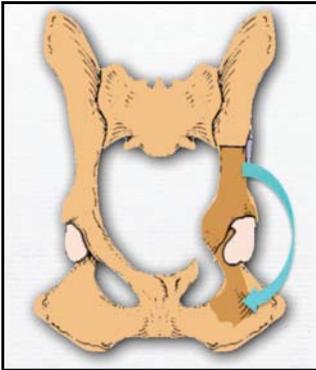
Vezzoni A., Boiocchi S., Vezzoni L., Bohorquez Vanelli A.,
Corbari A., DeLorenzi M.

Clinica Veterinaria Vezzoni, Cremona, Italy



Introduction

The purpose of this retrospective study was to describe preliminary results of DPO as treatment option for hip dysplasia in growing dogs instead of TPO (Triple Pelvic Osteotomy). The DPO was presented first as an in vitro study by P. Haudiquet at the ESVOT Congress in 2006, where osteotomies of the ilium and pubis were performed, leaving the ischium intact. Haudiquet's results were encouraging, suggesting 25° DPO appeared to have the same radiographic effect as 20° TPO, as far as acetabular coverage of femoral head was concerned. The rotation of the acetabular segment was dependent on a deformation of the ischiatic table and the acetabular rotation appeared to be about 5° less than the amount of the rotation obtained at the level of the ilium osteotomy.



Deformation of the ischiatic table in DPO; release of the sacro-tuberous ligament can make manipulation of the ischiatic table easier.

Material and Methods

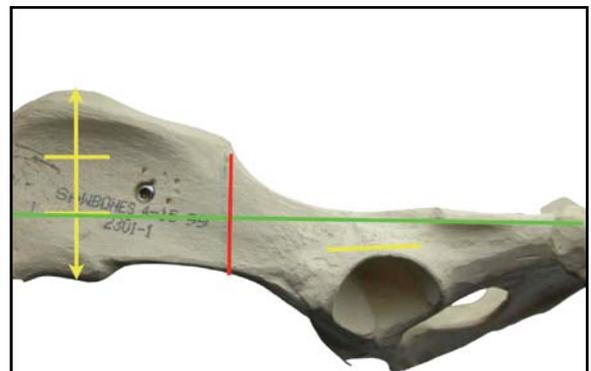
Medical records for unilateral and bilateral DPO performed from September 2006 to September 2008 were reviewed. Dogs underwent preoperative and postoperative functional hip assessment in deep sedation. Preoperative data included: positive Ortolani's test, measurement of angle of reduction (AR) and angle of subluxation (AS), radiographic assessment of hip joints in ventrodorsal view with measurement of the Norberg angle (NA), frog view, DAR view and distraction view with distraction index measurement. Inclusion criteria were joint subluxation and laxity, suggestive of future severe HD development as published in our study in VCOT 2008, absence of OA and acetabular filling, preserved lateral border of DAR, $AS < 20^\circ$ and $DI < 1.0$. DPO cases were divided in 3 groups according to the degree of the selected plate, A for 20°, B for 25° and C for 30°. The degree of the plate was chosen according to the AS ($5^\circ > AS$) and tested intraoperatively. Pubic and ilium osteotomies were performed as for TPO, while the ischium was left intact. To facilitate the rotation of the ilium, in more resistant cases a sacrotuberous ligament distal release was done. The iliac osteotomies were stabilized with different types of bone plates designed for TPO. Follow up were performed at 1, 2 and >6 months; cases with a minimum FU of 2 months were included in the study.



Pubic osteotomy



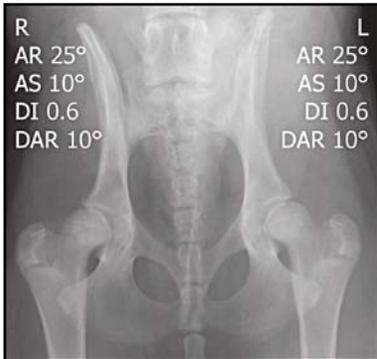
Sacro-tuberous ligament release



Planning of osteotomy line



Golden Retriever, F, 1 year of age, 6 mo. after simultaneous bilateral DFO



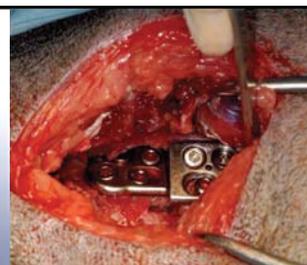
Pre-op, 6 mo. of age



Post-op



FU 2 mo.



New DFO plate with two dorsal divergent locking screws and 5° elevated extremities. Produced by NGD®

Results

47 DPOs performed in 30 dogs were reviewed, 18 males, 12 females, mean age 6.7 months, mean weight 25.6 kg. Negative Ortolani's test was achieved in 20 hips and a significant decrease of AR and AS in 19 hips. Persistent subluxation was seen in 8 hips. In the group A, 6 hips, the mean preoperative AR was 31.8°, AS 11.1° and NA 90.8°. At 2 months FU, Ortolani's sign was negative in 3 hips and in the remaining hips the mean AR was 15°, AS 1.6°; mean NA 103.6°. We observed one partial distal plate avulsion and one broken plate. FU >6 months was done in 5 cases with similar results. In the group B, 25 hips, mean preoperative AR was 29.7°, AS 14.2° and NA 94.7°. At 2 months FU, Ortolani's sign was negative in 6 hips and in the remaining the mean AR was 15.8°, AS 2.1°; mean NA 114.6°. We observed one incomplete ischiatic fracture, 3 loose screws, one partial distal plate pull out, 2 cases of transient neuropraxia. FU >6 months was performed in 10 cases, with similar results; Ortolani's test became negative in 3 more cases. In the group C, 16 hips, the mean preoperative AR was 33.8°, AS 17.8° and NA 89.3°. At 2 months FU, Ortolani's sign was negative in 7 hips and in the remaining the mean AR was 17.4°, AS 3°; mean NA 107°. We observed one iliac fracture caudal to the plate, 1 broken screw, 5 loose screws, 3 plates pull out and one incomplete ischiatic fracture. FU >4 months was performed in 8 cases, with similar results; Ortolani's test became negative in one more case.

Discussion

AR, AS and NA values at follow-ups did not show a significant difference in the three groups. Implant failure was the most frequent complication with increased incidence in group C, where higher acetabular rotation was performed. Higher rotation increased the stress on bone and implants because of the intact ischium. Stronger fixation appeared to be required after DPO until bone remodeling of the twisted ischium. Most implant failures didn't require revision surgeries because acetabular orientation was preserved. Revision surgery was performed in two cases, one to remove the loose implants and one to perform a THR because the iliac fracture caudal to the plate caused persistent subluxation. Incomplete fracture of the ischiatic table was seen in two cases of group B and C with spontaneous healing. Compared to TPO, DPO did not result in pelvis collapse, neither in excessive head coverage. Postoperative morbidity resulted much diminished, allowing bilateral procedure to be performed simultaneously when indicated.

References

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