

Triple Pelvic Osteotomy and Double Pelvic Osteotomy

Francisco Guevara, DVM, Samuel P. Franklin, MS, DVM, PhD*

KEYWORDS

- TPO • Triple pelvic osteotomy • DPO • Double pelvic osteotomy • Hip dysplasia • Dog

KEY POINTS

- Corrective osteotomies of the pelvis have been used for decades as an early intervention for dysplastic hips in young canine patients.
- Multiple variations of the procedure are in clinical use, and the two most commonly used are the triple pelvic osteotomy (TPO) and the double pelvic osteotomy (DPO).
- Both the TPO and DPO are designed to improve acetabular ventro-version and femoral head coverage.
- Improvements in technique and implants over the last several years seem to have resulted in decreasing prevalence of complications.
- The data suggest that pelvic osteotomies commonly improve clinical function but that osteoarthritis is typically progressive.

Canine hip dysplasia (CHD) is a complex orthopedic condition characterized by hip laxity with concurrent or consequent maldevelopment of the osseous joint structures. These abnormalities often result in varying degrees of joint instability, femoral head subluxation, pain, lameness, and osteoarthritis (OA). Pelvic osteotomies are elective orthopedic procedures designed to increase acetabular ventro-version and minimize femoral head subluxation in dogs with excess hip laxity. In addition to increased dorsal acetabular coverage, immediate technical aims of pelvic osteotomy techniques may include improved congruency between the central acetabulum and femoral head and more favorable loading of the articular cartilage. These concepts were originally introduced in the early 1960s for the treatment of children with congenital dislocations of the hip,¹⁻³ and Hohn and Janes⁴ described the first veterinary application of pelvic

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Department of Small Animal Medicine and Surgery, University of Georgia College of Veterinary Medicine, 2200 College Station Road, Athens, GA 30602, USA

* Corresponding author.

E-mail address: spfrank@uga.edu

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osteotomies for the treatment of CHD in 1969. The initial surgical techniques have been modified over the ensuing decades, but all current pelvic osteotomy techniques retain the same mechanical goal of increasing dorsal acetabular coverage of the femoral head via axial rotation of the acetabular segment.

PROCEDURE CLINICAL OBJECTIVES

Although all variations of the pelvic osteotomy procedure share the same mechanical objectives, there are disparate clinical objectives that are surgeon dependent and in turn affect both patient selection and whether one considers these surgeries to be commonly successful or not. During the time of its introduction to veterinary surgery, the objectives described for triple pelvic osteotomy (TPO) were to increase dorsal acetabular coverage of the femoral head, provide stability, and to provide pain relief and restoration of function to dysplastic canine patients.⁵ Furthermore, pelvic osteotomy was suggested as potentially preventing the onset or progression of OA, particularly when performed in young patients before the initiation of OA.⁵ The goals of eliminating any subluxation and preventing OA are lofty objectives and certainly not obtainable in all patients. Conversely, more recent studies have focused on mitigating, rather than eliminating, subluxation and improving function rather than completely preventing inception or progression of OA.⁶ These points are important to consider, as the desired goals influence patient selection and categorizations of successful or unsuccessful outcomes.

Evaluation and Selection of Surgical Candidates

Numerous patient characteristics are often considered in selecting candidates for pelvic osteotomy. The most frequently considered criteria are the severity of lameness, signalment, osseous conformation, degree of hip laxity, and the severity of secondary changes already present, including damage to the acetabular labrum, ligament of the head of the femur, and articular cartilage. In addition, the desired goals of the procedure must be considered in conjunction with patients' characteristics to determine how likely pelvic osteotomy is to achieve a successful result in each individual.

LAMENESS

A relevant question is whether pelvic osteotomy should be performed exclusively in dogs with clinical signs of pain and lameness or whether it is appropriate to include dogs without clinical signs of lameness but with suboptimal hip laxity. Some surgeons do not recommend performing pelvic osteotomy on dogs without current clinical signs, citing uncertainty as to whether such dogs will ever develop clinical signs associated with hip dysplasia or the severity of such clinical signs if they arise. Conversely, some surgeons perform pelvic osteotomies on dogs with excess hip laxity with the goals of preventing the onset of lameness and/or preventing secondary OA and osseous remodeling. The rationale for the latter approach is based in part on the fact that there is no cure for OA. Therefore, prevention of lameness and OA, at least theoretically, is preferable to clinical management of lameness and OA after they are present. This vantage point is particularly appealing if one thinks that treatment with pelvic osteotomy is superior to the treatments available for dogs with hip OA, which are currently limited to nonsurgical management, femoral head and neck excision (FHNE), or total hip replacement (THR). However, the uncertainty that lameness or OA will ever occur, along with the likelihood that pelvic osteotomy could prevent lameness and/or OA development, and the associated costs and risk associated with the

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