Orthopaedics & Traumatology: Surgery & Research 100 (2014) 329–332

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Technical note

Percutaneous pelvic osteotomy in non-ambulatory cerebral palsy patients

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ARTICLE INFO

Article history:
Accepted 10 January 2014

Keywords:
Percutaneous pelvic osteotomy
Cerebral palsy
Dysplasia
Dislocation
Hip

ABSTRACT

The aim of this study was to describe the surgical technique of and indications for percutaneous pelvic osteotomy in patients with severe cerebral palsy. Forty non-ambulatory children and adolescents (47 hips) were consecutively treated with percutaneous pelvic osteotomy. The mean preoperative Reimers' migration percentage improved from 66.2% to 4.9% at the final follow-up. The mean preoperative acetabular angle (AA) improved from 32.4° to 13.2° at last follow-up. Percutaneous pelvic osteotomy is a less invasive surgical approach and appears to be a valid option with similar outcomes to standard techniques.This method results in less muscle stripping and blood loss and a shorter operating time.

1. Introduction

Subluxations and dislocations of the hip are frequent in children with cerebral palsy (CP). The goal of surgical techniques that reshape, redirect or deepen the acetabulum is to obtain a reduced, stable, mobile and painless hip [1–4].

This study presents an original percutaneous pelvic osteotomy (PPO) technique in patients with grade IV and V cerebral palsy on the Gross Motor Function Classification System (GMFCS), and whose preliminary results have already been published in the *Journal of Pediatric Orthopaedics B* by Canavese et al. [1]. This technique was combined with a varus derotational, shortening proximal femoral osteotomy.

Based on the good results of this pilot study, the authors have continued to practice this surgical technique in their different hospitals.

The aim of this paper was to describe the surgical technique in detail and present the results of all of the patients operated on by this method.

2. Surgical technique

The surgical procedure is performed with the patient under general anesthesia. The patient is placed in the supine position with a pillow under the gluteal area of the operated side. Before beginning surgery, hip range of motion is tested under fluoroscopic guidance. The fluoroscope is placed in front of the surgeon opposite the operated side.

The varus, derotational and shortening proximal osteotomy begins with a lateral approach to the proximal femur. The bone obtained from the femoral shortening can be used for the PPO.

The PPO is performed once the femoral osteotomy has been completed, without changing the patient's position.

2.1. Incision

A vertical line is drawn under fluoroscopic guidance 5–10 mm proximal to the roof of the acetabulum and corresponding the axis of the roof of the acetabulum. A second horizontal line is drawn beginning at the tip of the greater trochanter between the anterior superior iliac spine (ASIS) and the posterior iliac spine (PIS). The intersection between these two lines indicates where the incision should be made, measuring between 2–3.5 cm long and parallel to the axis of the femoral shaft (Fig. 1).

2.2. Superficial and deep dissection

Dissection through the subcutaneous fat is performed with surgical scissors. The proximal part of the tensor fascia lata muscle must be opened to reach the deep muscles, in particular the gluteus mimimus and gluteus medius. The deep muscular plane is dissected to the outer table of the iliac bone using a Cobb

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http://dx.doi.org/10.1016/j.otsr.2014.01.004
1877-0568/

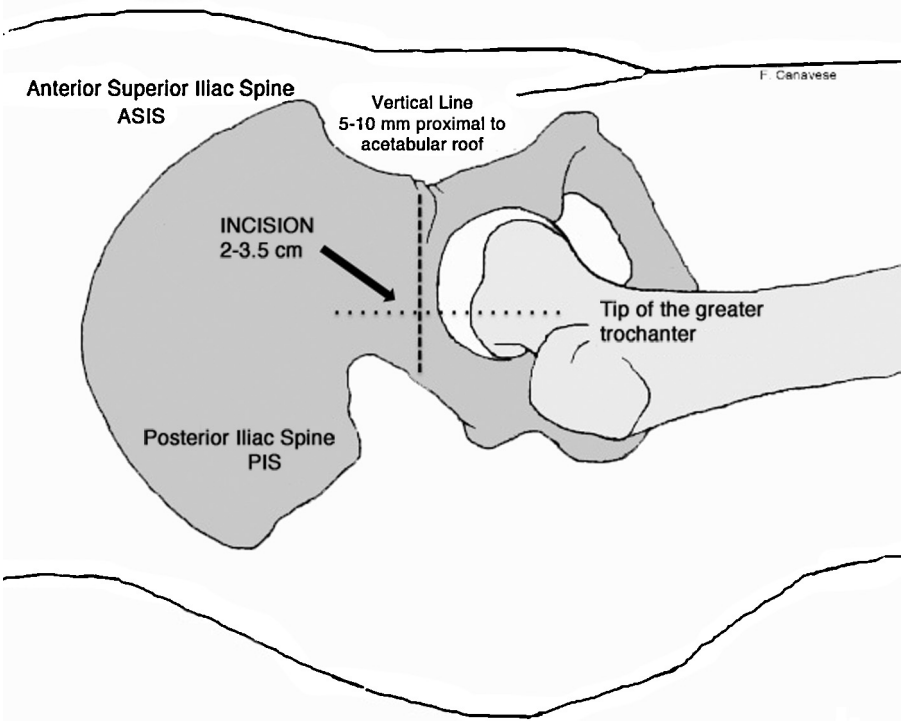

Fig. 1. Reference points for the incision.

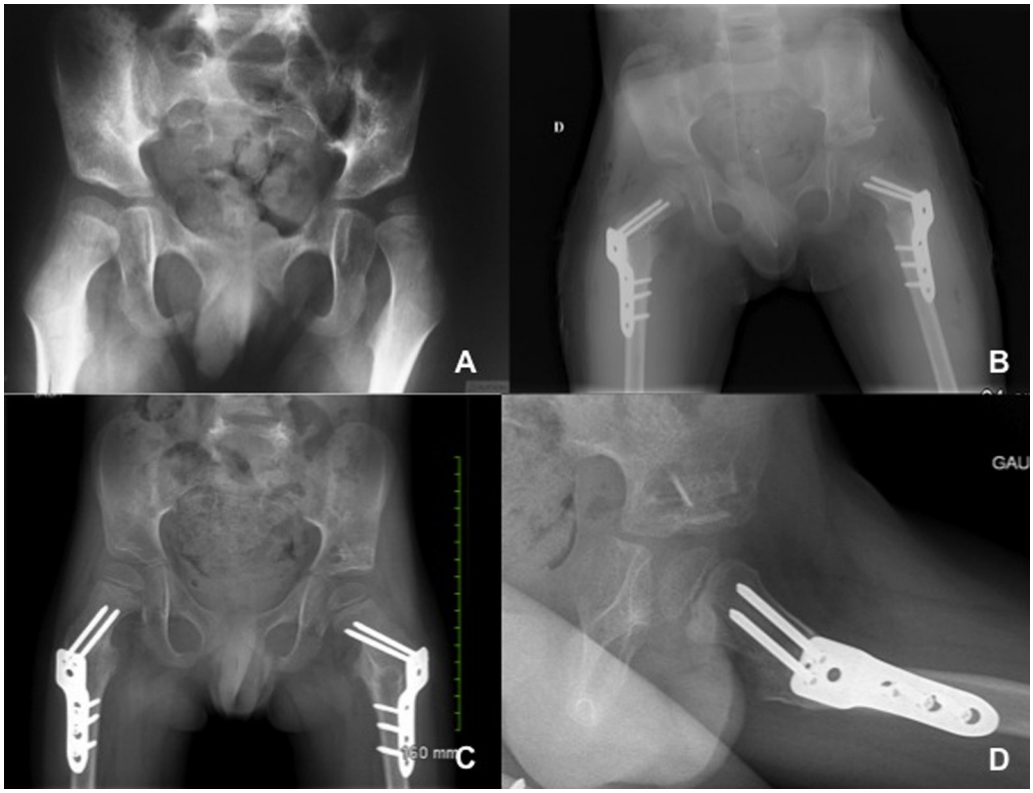

Fig. 2. Eight-year-old patient, Gross Motor Function Classification System (GMFCS) V, open triradiate cartilage. Preoperative (A) and postoperative (B) X-rays and at 18 months (C, D).

dissector and the muscle tissue is scraped off the iliac notch to the ASIS. A smooth dissector is slid under the periosteum to the sciatic notch to push apart the soft tissues and protect the nerves.

2.3. Pelvic osteotomy

The pelvic osteotomy is performed 5–10 mm proximal to the acetabular roof. Under fluroscopic control, the osteotomy chisel