Pelvic support osteotomy: an effective treatment for unstable hip

Mohamed Osama Hegazy

Department of Orthopaedic, Benha University Hospital, Benha Faculty of Medicine, Benha, Egypt

Correspondence to Mohamed Osama Hegazy, Department of Orthopaedic, Benha University Hospital, Benha Faculty of Medicine, Benha, Egypt
Tel: +002 012 2217 7034; fax: +002 02 393 0054; e-mail: osamahegazy.48@hotmail.com

Egypt Orthop J 47:335–338

1110-1148

Egyptian Orthopedic Journal 2012, 47:335–338

Introduction

The treatment of unstable hip disorders in adolescent and young adults is challenging for surgeons. Pelvic support osteotomy is a salvage surgical procedure for nonconstructible unstable hips, when hip reconstruction, arthrodesis, or hip arthroplasty are inappropriate.

Pathomechanics of unstable hip joint

The unstable hip joint leads to proximal migration of the femur on weight bearing. This position weakens the gluteal abductors through a shortening of the lever arm, with subsequent Trendelenburg gait.

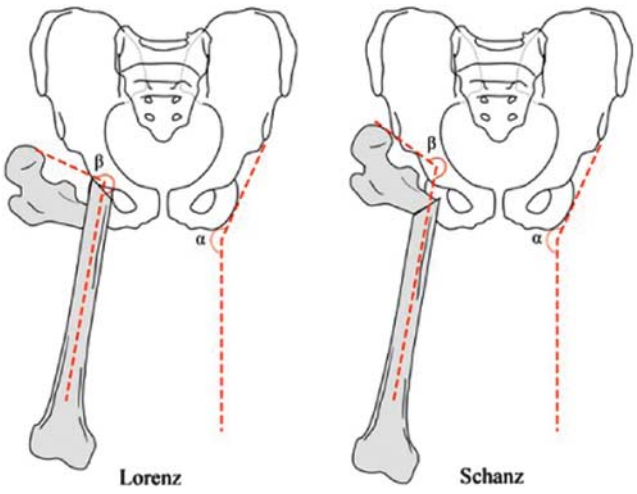
These unstable hips may be associated with hip adduction flexion contracture as well as limb-length discrepancy (LLD). The hip flexion contracture results in compensatory lumbar lordosis and may cause low back pain [1].

Rationale of pelvic support osteotomy

Pelvic support osteotomy was developed to solve problems of hip instability by supporting the pelvis on the upper end of an osteotomized femur. Pelvic support osteotomy was provided by Lorenz [2], Schanz [3], and Ilizarov [4].

Pelvic support osteotomy eliminates the Trendelenburg gait by tightening the hip abductors, and restoring lower limb alignment and LLD in young patients with severe hip joint destruction.

Figure 1



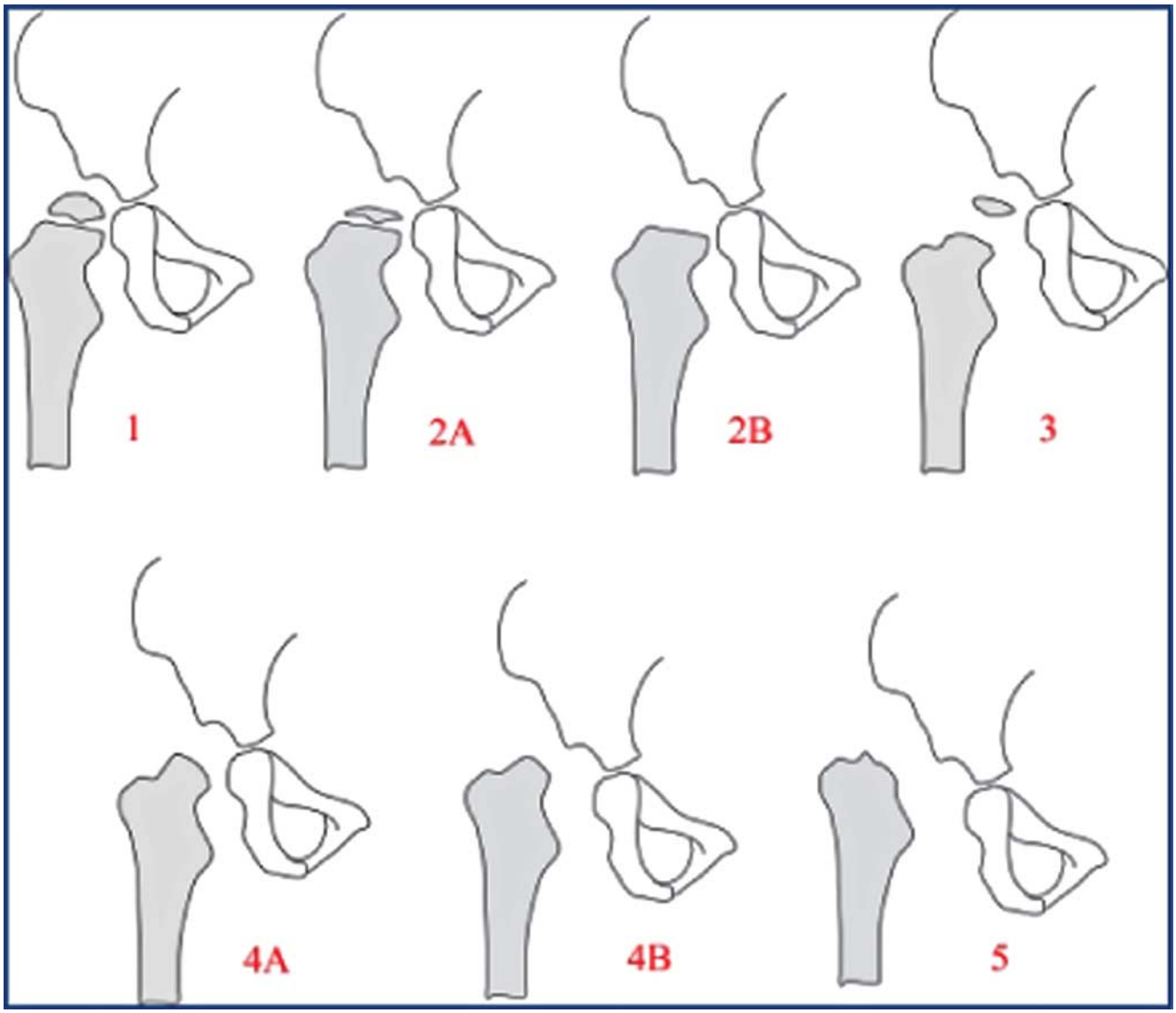
Lorenz and Schanz osteotomies.

Figure 2

Ilizarov double-level osteotomy.

 DOI: 10.7123/01.EOJ.0000423869.70459.e4

Figure 3



Hunka described five types of sequelae for neonatal septic arthritis of the femur. (1) Minimal or no femoral head changes. (2A) Femoral head deformity but physis intact; (2B) femoral head deformity with the physis closed. (3) Femoral neck pseudoarthrosis. (4A) Complete destruction of the femoral head, but stable neck; (4B) complete destruction of the femoral head but unstable neck. (5) Complete destruction of the head and neck with dislocation.

The subtrochanteric osteotomy designed by Lorenz was a valgus osteotomy coupled to a medial and proximal displacement of the shaft of the femur (Fig. 1). Schanz osteotomy was performed by introducing a valgus with or without an extension position to the distal femoral segment, but without the proximal displacement of the Lorenz procedure.

Ilizarov developed a second distal varus/lengthening osteotomy (Fig. 2). The significance of the distal osteotomy is to realign the mechanical axis of the lower limb as well as to equalize the LLD.

Indications

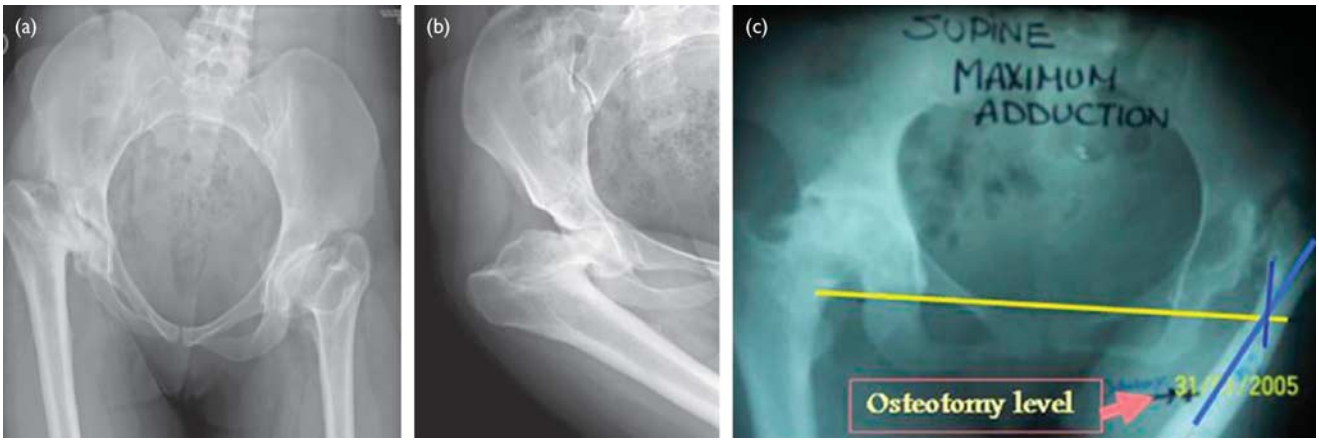
The best candidate for pelvic support osteotomy is a painless unstable hip Fig. 3.

(1) Neonatal septic arthritis type 4B; 5 as described by Hunka *et al.* [5] (Fig. 3).
(2) Unsuccessfully treated or neglected cases of developmental dislocation of the hip where hip reconstruction is difficult.
(3) Hip dislocation associated with neuromuscular conditions.
(4) Infected arthroplasty.

Limitations and relative contraindications

(1) Nonambulatory patients.
(2) Young children, as rapid remodeling at the proximal femoral osteotomy site should be anticipated with the loss of pelvic support [6].

Figure 4



Radiographs required for planning of proximal osteotomy. (a) AP view of the pelvis with the leg in full abduction. (b) AP view of maximum adduction. (c) Proximal osteotomy level. AP, antero posterior.

Surgical technique

Preoperative planning

Preoperative planning is based on data obtained from clinical examination and radiographs.

Complete physical examination of the affected with a special focus on LLD, hip flexion contracture using Thomas' test, hip range of motion, and patient's gait.

These data should provide answers to the following questions:

(1) Where is the level of the proximal osteotomy?
(2) What is the amount of valgus, extension, and derotation at the proximal osteotomy?
(3) Where is the level of the distal osteotomy?
(4) What is the amount of varus and lengthening at the distal osteotomy?

Proximal femoral osteotomy: level, degree, and direction of osteotomy

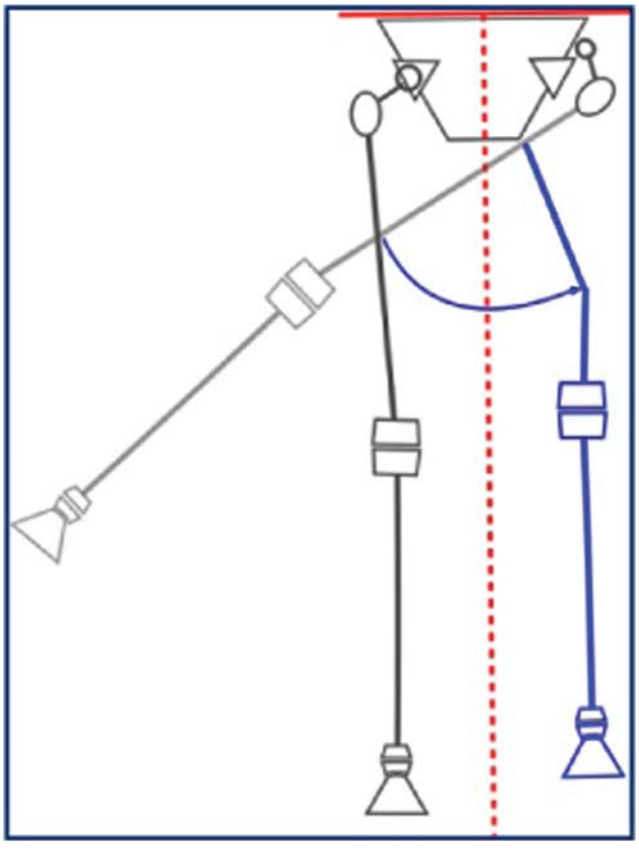
Antero posterior (AP) view of the pelvis with the hip maximally adducted to measure the degree of valgus correction at the proximal femoral osteotomy, which is the sum of the adduction contracture and the amount of maximum adduction [7] (Fig. 4).

Distal femoral osteotomy: level, degree, and direction of osteotomy

The level of the distal osteotomy can be detected as follows:

(1) Distance of the center of the contralateral knee to the midline axis of the body detected from standing AP film of both lower limbs.
(2) Distance of the proposed proximal osteotomy site from the midline axis of the body detected from an AP film of the pelvis with the hip in maximum adduction.

Figure 5



Distal osteotomy level.

(3) Proposed overcorrection by adding 30° of extra valgus to the sum of the adduction range and measured adduction contracture. Nine degrees of this overcorrection will bring the femur parallel to the vertical axis, and the remaining 21° will take the femur away from the midline (Fig. 5).

Fixation devices

The choice of fixation method depends on the planned goals of surgery. A monolateral frame or ring external fixators can be used. The external fixators have the advantage of lengthening and realignment of the mechanical axis. Internal fixation with a plate can be used in selected patients who cannot tolerate external fixators; however, the plate cannot realign the mechanical axis.

Future conversion for hip arthroplasty

The valgus and/extension orientation of the proximal femur may result in difficulties in conversion for total hip replacement. The conversion can be performed through one or two stages depending on the degree of angulation of the proximal femur. In case of severe angulation of the proximal femur, reosteotomy of the proximal femur should be performed before total hip replacement.

Outcome of surgery

This table summarizes the literature review of pelvic support osteotomy reported from different centers worldwide.

Conclusion

Pelvic support osteotomy is a good treatment option to overcome hip instability as it eliminates Trendelenburg gait, improves pain, and equalizes limb length.

Acknowledgements

Conflicts of interest

There are no conflicts of interest.

References

1 Schiltenwolf M, Carstens C, Bernd L, Lukoschek M. Late results after subtrochanteric angulation osteotomy in young patients. J Pediatr Orthop B 1996; 5:259–267.

2 Lorenz A. Ueber die Behandlung der irreponiblen angeborenen Huftluxationen und der Schenkelhalspseudoarthrosen mittels Gabelung (Bifurkation des oberen Femurendes). Wien Klin Wchnschr 1919; XXXII:997.

3 Schanz A. Zur Behandlung der veralteten angeborenen Huftverrenkung. Munch Med Wchnschr 1922; IXIX:930.

4 Ilizarov GA, Samchukov ML. Reconstruction of the femur by the Ilizarov method in the treatment of arthrosis deformans of the hip joint. Ortop Travmatol Protez 1988; 6:10–13.

5 Hunka L, Said SE, MacKenzie DA, Rogala EJ, Cruess RL, *et al*. Classification and surgical management of the severe sequelae of septic hips in children. Clin Orthop Relat Res 1982; 171:30–36.

6 Aksoy MC, Musdal Y. Subtrochanteric valgus-extension osteotomy for neglected congenital dislocation of the hip in young adults. Acta Orthop Belg 2000; 66:181–186.

7 Inan M, Bowen RJ. A pelvic support osteotomy and femoral lengthening with monolateral fixator. Clin Orthop 2005; 440:192–198.