The Long Term Results of Femoral Varus Osteotomy in Patients with Legg-Calve-Perthes Disease

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Purpose: The purpose of this study was to evaluate the long term results of performing femoral varus osteotomy (FVO) for the treatment of Legg-Calve-Perthes disease (LCPD).

Materials and Methods: We selected 35 LCPD patients who received FVO and they were followed up to the time their skeletons’ matured. The inclusion criteria were patients in a fragmentation stage, the patients were in Catterall group III or IV, and the patients underwent a teleoroentgenographic examination at the time of full skeletal maturity.

Results: The radiological outcome at the time of skeletal maturity was assessed using Stulberg’s classification. The final results were 4 hips in class I, 17 hips in class II, 13 hips in class III, one hip in class IV and none in class V. The satisfactory results (good+fair hips) were 34 hips (97%). Significant shortening (>10 mm) was observed in 12 hips (34%). In 35 patients, 5 (14%) had same leg length (less than 2 mm difference), 27 (77%) had shortening of 2 mm or more, and 3 had lengthening of 2 mm or more in the operated limb. Of these 12 patients with significant shortening, only 3 patients (9%) showed shortening of 21 mm or more.

Conclusion: FVO is a reliable method for managing LCPD in patients who are in Catterall group III or IV and who are in the fragmentation stage of disease.

Key Words: Legg-Calve-Perthes disease, Femoral varus osteotomy

Introduction

Femoral varus osteotomy (FVO) has been widely used in the surgical treatment of Legg-Calve-Perthes disease (LCPD). Axer in 1965 reviewed FVO as a treatment of LCPD and reported a very favorable results comparing with those observed after conservative treatment. Since then, many authors have demonstrated that it can prevent femoral head deformity and restore spherical congruity, provided that the femoral head can be contained in the acetabulum.

The advantages of FVO are that the operation is done on the affected bone, it provides better lateral coverage than does innominate osteotomy, and it decreases the force across the joint. However, the disadvantages of FVO are also reported that it may shorten the limb and may create excessive varus angulation, leading to weakness of the abductors of the hip.

However, only few papers have been reported the long term results of FVO which followed up to the full skeletal maturity. We selected 35 patients who had clinical and radiological examinations at the full skeletal maturity and analyzed the results with special emphasis on the sphericity of femoral head and the leg length discrepancy (LLD).
Materials and Methods

We selected 35 LCPD patients who received FVO for the treatment of LCPD and followed up to the full skeletal maturity (Table 1). The inclusion criteria were unilateral involvement, patient in fragmentation stage, Catterall group III or IV, and patients who had the teleoroentgenographic examination at the full skeletal maturity (Table 1). The inclusion criteria were unilateral involvement, patient in fragmentation stage, Catterall group III or IV, and patients who had the teleoroentgenographic examination at the full skeletal maturity (Table 1).

Table 1. Patients Data.

<table>
<thead>
<tr>
<th>Patient Number</th>
<th>Gender (Male/Female)</th>
<th>Age at Disease Onset (05~11 Years)</th>
<th>Age at Surgery (Femoral Varus Osteotomy) (6.5~12 Years)</th>
<th>Age at Final Follow-up (18~34 Years)</th>
<th>Period of Follow-up (10~23 Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>32/3</td>
<td>7.3 Years</td>
<td>8.6 Years</td>
<td>24.9 Years</td>
<td>16.2 Years</td>
</tr>
</tbody>
</table>

Catterall Classification

- I+II: 0
- III: 23 Hips
- IV: 12 Hips

Herring Classification

- A: 0
- B: 24 Hips
- C: 11 Hips

Mode of Osteotomy

- Subtrochanteric Open Wedge Osteotomy: 11 Hips
- Lloyd-Roberts Intertrochanteric Osteotomy: 24 Hips

Fig. 1. (A) Anteroposterior radiograph of both hip in a 7-year-old boy shows LCPD of left hip. The disease is in stage of fragmentation with B grade involvement by lateral pillar classification. (B) Frog-leg lateral view shows head involvement of Catterall group 3. (C) Postoperative radiograph taken 3 months after FVO shows full containment of femoral head and radiological union of osteotomy site. (D) Radiograph taken 21 years after operation shows a good result of Stulberg class II. (E) Computed tomograph shows difference of sphericity between normal and affected femoral head. However, congruency between acetabulum and femoral head in LCPD side is very acceptable.