Successful Return to Sport Following Distal Femoral Varus Osteotomy

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OBJECTIVES

- Valgus knee malalignment can lead to symptomatic lateral compartment overload, resulting in chondral and meniscal damage and further progression of angular deformity.1
- Distal femoral varus osteotomy (DFVO) can effectively correct valgus knee malalignment and unload the lateral compartment
- While several studies have established the effectiveness of DFVO in relieving pain and improving function, there is limited evidence on ability for patients to return to athletics following this procedure
- The purpose of this study is to report the functional outcomes and return to sport for patients that underwent DFVO for symptomatic lateral compartment overload in the setting of valgus malalignment

METHODS

- A consecutive series of athletic patients that had undergone distal femoral varus osteotomy were prospectively reviewed
- Only patients with minimum 2-year follow-up were included
- Patients were classified as athletes and included if they endorsed participating in sporting activity at least four days out of every week
- All patients had signs, symptoms, and imaging consistent with symptomatic lateral compartment overload and valgus malalignment
- Pre-operative and post-operative anteroposterior radiographs were evaluated to determine knee alignment using the tibiofemoral angle
- Details regarding sport of interest, ability to return to sport, and timing of return were obtained directly from the patients
- Return to sport was defined as returning prior to level of athletic activity at least four days out of every week
- Prospective institutional registries were utilized to collect Marx Activity Scale and International Knee Documentation Committee Subjective Knee Evaluation Form (IKDC) scores
- Comparisons between values before and after surgery were made using paired t-tests with p < 0.05 as the threshold for significance

RESULTS

Demographic Information:

- 13 patients were included: 7 males, 6 females
- Mean age at time of surgery: 24 ± 6 years (range: 17-35)
- Sport of interest: 4 soccer, 2 softball, 2 running, 1 football, 1 basketball, 1 ice hockey, 1 volleyball, 1 rowing
- Mean post-operative follow-up time: 43 ± 19 months (range: 24-74)

Surgical Details:

- DFVO technique:
  - 6 medial closing wedge osteotomies
  - 7 lateral opening wedge osteotomies
  - 9 patients underwent one or more concomitant procedures:
    - 6 lateral femoral condyle osteochondral allografts
    - 2 partial lateral menisectomies
    - 1 lateral meniscus allograft transplantation
    - 1 revision anterior cruciate ligament reconstruction

Radiographic Results:

- Mean pre-operative alignment: 7º valgus ± 2º (range: 5º-13º valgus)
- Mean post-operative alignment: 0º ± 1º (range: 1º valgus - 2º varus)
- Mean alignment correction: 8º ± 2º (range: 5º-13º)

Return to Sport:

- All patients were able to successfully return to their sport of interest
- Mean time to return: 11 ± 1 months (range: 9-13)

Functional Scores:

- All patients demonstrated an improvement in both Marx Activity Scale and IKDC scores after surgery:

<table>
<thead>
<tr>
<th>Pre-op</th>
<th>Post-op</th>
<th>Improvement</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marx Activity Scale</td>
<td>4 ± 3</td>
<td>11 ± 2</td>
<td>7 ± 2</td>
</tr>
<tr>
<td>IKDC Score</td>
<td>53 ± 11</td>
<td>89 ± 6</td>
<td>36 ± 8</td>
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</tbody>
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CONCLUSIONS

- Valgus knee malalignment predisposes to symptomatic lateral compartment overload and can severely limit one’s ability to participate in athletic activities
- Previous studies have demonstrated the effectiveness of DFVO in relieving pain and improving function
- In their series of patients undergoing DFVO, de Carvalho et al. reported that 58% resumed physical activities, such as hydrotherapy, swimming, and muscle building exercises, at preoperative levels 3
- However, none of the patients in their series had entered into physical competitions of any type either prior to or after surgery 3
- The present study demonstrates that correction of valgus knee malalignment through DFVO – either medial closing wedge or lateral opening wedge – can reliably result in improvement in function and return to sport, even in athletes who participate in sporting activity at least four days out of every week
- Concomitant chondral, meniscal, and ligamentous pathology should be addressed at the time of DFVO
- Therefore, distal femoral varus osteotomy should be considered in the athletic population for correction of symptomatic lateral compartment overload in the setting of valgus knee malalignment

REFERENCES