One- to Six-Years Clinical and Radiological Outcome of Tibial Rotational Osteotomy and Tuberosity Transfer for Symptomatic Excessive External Tibial Torsion

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Disclosure

- Abilash Thimmegowda - No conflict
- Tomasz Kowalski - No conflict
- Martyn Snow
  - Consultant Smith and Nephew, Medical advisory board member Ortho RTI, Royalties Arthrex
Evidence or association with PFJ

• Winson et al - 70% of adolescents undergoing arthroscopy for anterior knee pain had increased Femoral Anteversion (FA) vs 33% for meniscal/ACL.

• Stroud - Patients Diagnosed with Tibial Torsion and FA reviewed at 24yr: 30% arthritis and instability vs 8% in control (P>0.0001).

• Fujikawa et al - if angular deformity and a torsional deformity coexist, the rotatory component causes the greater PF changes.

• Nylund et al found significant decrease in vastus medialis and gluteus medius EMG in athletes with clinically increased internal femoral torsion.
Clinical Presentation

- Can present with typical patellofemoral pain or instability.

- Commonly present following failed lateral release or MPFL.

- Can present following a traumatic injury/fracture, with failure to rehabilitate and recover.

- More rarely presents in association with MCL or ACL injury as torsion predisposes to value internal rotation injury.
Examination

- Static valgus or varus alignment.
- ‘Knee in gait’ causes a dynamic valgus deformity with increase in patella lateralisation.
- Lax MPFL - high MPFL load with increased FA.
- Associated with trochlea dysplasia and patella alta.
- Increased foot thigh angle.
Investigations

• In the presence of lateral displacement of patella or trochlea dysplasia rotational abnormalities can be difficult to detect clinically

• CT rotational profile the investigation of choice

• It is commonly assumed that tibial torsion and femoral ante-version result in alterations in TTTG - Anley and Snow, AJSM 2016. - no correlation with tibial torsion.
• Femoral anteversion
  Mean 17.8 +/- 10.2

• Knee joint rotation
  Mean 2.6 +/- 6.4

• Tibial torsion
  Mean 23.5 +/- 7.6
Indication

• From the literature indication for surgery is tibial torsion >30deg.
• Commonly rotational abnormalities are a combination of femoral and tibial with one dominating.
• Cumulative rotational deformity probably more important than absolute figures.
• Overall rotational alignment appears to be more important than any one segment.
• Study indication: Greater than 50deg of torsion from distal femur to ankle.
Surgical technique

• Mid-line incision

• Lateral compartment opened and tib-fib joint disrupted

• 6cm Tibial Tubercle osteotomy

• 1 x 3mm k-wire placed above and a second below proposed osteotomy at a 35 degree angle using goniometer.

• Transverse tibial osteotomy 2.5cm below joint line.
Surgical technique

- Perpendicular osteotomy created with use of TKR tibial guide. (MCL protected)
- Distal tibia internally rotated until K-wires are aligned
- Tibia stabilised with a step staple or locking plate.
- Tibial tubercle height adjusted accordingly and stabilised with 2 x 4.5mm cortical screws and washers.
- Tubercle bed often refashioned to optimum site.
- Anterior compartment left open and drained for 24hrs.
Results

- 55 knees in 48 patients (14 males and 34 females)
- 52% for instability, 48% for pain.
- Mean follow-up - 3.4 years (1-6)
- The TTTG distance was >20mm in 60% of patients and patella Alta was present in 50%.
- 2 with combined cartilage procedures (1 ACI, 1 BMAC on Hyaluronic membrane)
- The mean preoperative external tibial torsion was 55° (30-63).
Results

• Significant improvement (p <0.001) in Kajula score 48.6 (SD 18.7) pre-op to 79.3 (SD 20.13) post surgery.

• Significant improvement (p <0.001) in Oxford score 24.3 (SD 9.8) pre-op to 39 (SD 8.9) post surgery.

• 0% recurrence for instability

• Tibial tubercle nonunion - 2/55 (4%)

• Varus malunion. - 4/55 (7%)
Conclusion

• Rotational problem are a combination of femur, tibia and knee joint rotation.
• Incidence is underestimated and requires a high index of suspicion.
• Tibial osteotomy allows correction of rotation, TTTG and patella height.
• Rotational osteotomy produces good clinical outcome with low re-dislocation and complication rates.