Soft Tissue Releases in Valgus Knees

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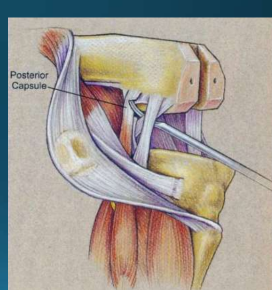
June 17, 2016

Background

- Valgus deformities make up 10-15% of all primary TKA's performed
- Restoration of the correct lower limb mechanical axis and soft tissue balance are important for the final outcome

Background

- Soft tissue abnormalities
  - Tight lateral structures
    - Iliotibial Band (ITB)
    - Posterior Cruciate Ligament (PCL)
    - Popliteus (POP)
    - Lateral Collateral Ligament (LCL)
    - Posterolateral Capsule (PLC)
    - Lateral Retinaculum
  - Attenuated medial structures

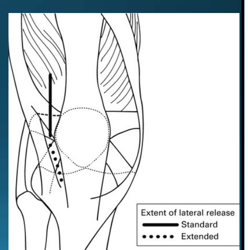


Complications

- **Tibiofemoral instability** (up to 20%)
- **Peroneal nerve palsy** (1-4%)
- **Recurrent valgus deformity** (up to 38%)
- **Stiffness** (up to 20%)
- **Patellofemoral maltracking** (2-10%)

Lateral Retinacular Release

- Necessary in around 3 to 45% of all primary TKA's
- Inconsistent views about its potential morbidity
  - Bleeding
  - Wound-healing problems
  - Avascular necrosis of the patella
  - Patellar fractures



Soft Tissue Release Technique

- Krackow (1991)- ITB and LCL first, then PLC and POP, medial plication.
- Whiteside (1999) - selective soft tissue release based on the presence of tightness in either flexion or extension
- Ranawat (2005)- described a technique with multiple "inside-out" stab incisions to release the ITB and LCL, while preserving POP
- Boettner (2016)- standard soft tissue release using a "cook book" approach where ITB and PLC were routinely released in all patients

J B&J S The Journal of Bone and Joint Surgery

J Bone Joint Surg Am. 2013 Oct 16; 95(20): e152. PMCID: PMC3798179
Published online 2013 Oct 16. doi: 10.2106/JBJS.L.01686

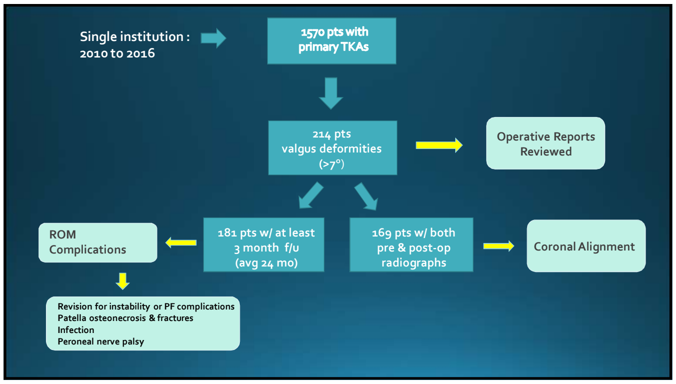
Lessons Learned from Selective Soft-Tissue Release for Gap Balancing in Primary Total Knee Arthroplasty: An Analysis of 1216 Consecutive Total Knee Arthroplasties

AAOS Exhibit Selection

Christopher L. Peters, MD,[1] Chris Jimenez, MD,[1] Jill Erickson, PA-C,[1] Mike B. Anderson, MSc, ATC,[1] and Christopher E. Pelt, MD[1]

Purpose

- The aim of this study includes:
  - Identify and quantify soft tissue releases in valgus knee deformities
  - To confirm the relationship between pre-operative coronal alignment and the number of soft tissue releases.
  - Is there a relationship between pre-operative coronal alignment and the need for LRR?
  - Do soft tissue releases/LRR increase post-operative complications?



Surgical Technique

- PCL was released routinely as part of the exposure
- Sel
- A p … e was util … ble liga

- If a full release was performed, the IT band and POP were transected near the joint line. The LCL was released completely from its origin

Surgical Technique

- Implant choice: CR femur with ultracongruent liner
- If instability resulted from soft tissue releases, then the next level of constrained knee was used
- Patellofemoral tracking was assessed after deflation of tourniquet.
  - If LRR was necessary, it was performed from outside-in using a bovie with the knee in flexion
  - Release was carried out in a stepwise fashion

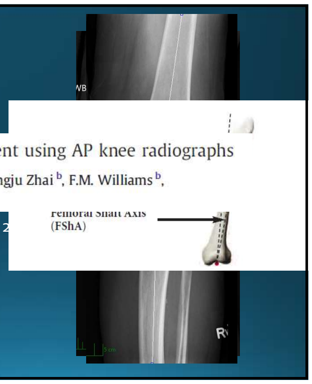
Coronal Alignment

Coronal Alignment

- Based on short standing AP radiographs of the knee
- N… v…
- Post –op radiographs were obtained at the 2… week, 6 week, 3 month, and annual visits
- The best quality radiographs were used to measure alignment

Effective measurement of knee alignment using AP knee radiographs

Alexandra N. Colebatch [a,*], Deborah J. Hart [b], Guangju Zhai [b], F.M. Williams [b], Tim D. Spector [b], Nigel K. Arden [a]

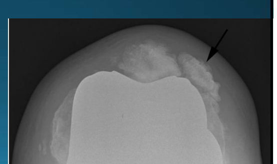


Ranawat Grade

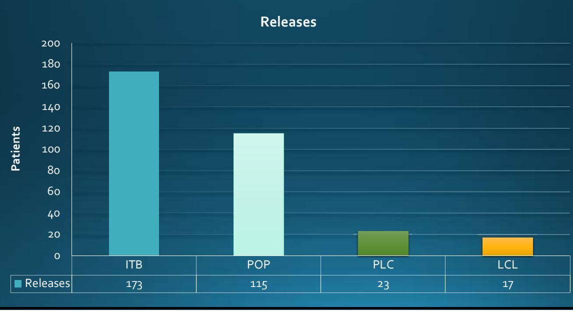
- Type I
  - minimal valgus deformity and minimal soft tissue stretching
- Type II
  - fixed deformity of >10° and soft tissue stretching
- Type III
  - severe osseous deformity with incompetent medial soft tissues, usually requiring hinged prosthesis

Patella

- The most recent radiographs were assessed for patella tracking on merchant view
- Examine for signs of patella osteonecrosis
  - Increased radiodensity
  - Subchondral radiolucency
  - Fragmentation



Results: Soft Tissue Releases



Results: Soft Tissue Releases

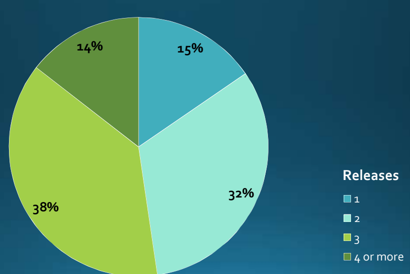


Figure 1

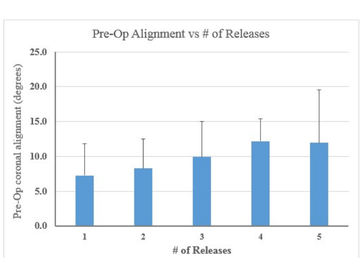
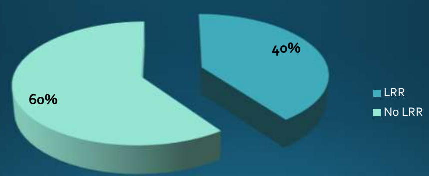


Figure 1: Pre-operative valgus angle using mechanical axis versus number of soft tissue releases.

p<0.0001

Results: Lateral Retinacular Release



Results: Lateral Retinacular Release

Table 1

	Pre-Op Valgus Angle	
	Mean	SD
LRR	9.6	4.8
No LRR	9.3	5.4
p-value	***0.701***	

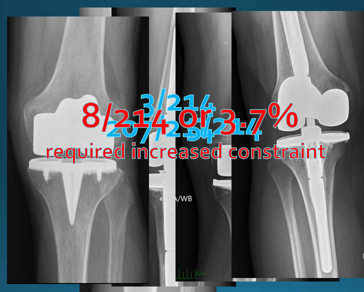
Table 1: Mean and SD of pre-op coronal alignment between patients who had LRR versus no LRR. The significance between the two means was calculated.

Results: Ranawat Grade

		# of releases	
Ranawat Grade	# of patients	Mean	SD
1	99	2.3	0.9
2	65	3.0	1.0
3	3	3.0	0.0

***p*<0.0001**

Implant Selection

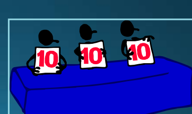


Results

- The average pre-op mechanical axis was 9.4° of valgus
- The average post-op mechanical axis was 0.13° of valgus
- With a goal of 0°, 139 knees (82%) were within +/-3° of the goal
- The average pre-op ROM was 3.0° to 112°
- The average post-op ROM was 0.4° to 124°

Complications

- There were a total of 5 major complications
  - There was one deep infection resulting from wound dehiscence sustained from a fall 2 wks after the initial surgery
  - Another patient had a fall resulting in liner dislocation requiring liner exchange
  - 3 knees required manipulation under anesthesia (MUA) for flexion less than 90 degrees at 6 weeks post-op
- NO PERONEAL NERVE PALSIES
- NO REVISIONS FOR INSTABILITY



Complications

- One patient sustained a non-displaced patella fracture from a fall and was treated with a knee immobilizer. The fracture went on to union by 8 weeks
- There was no radiographic evidence of patella dislocation, patella stress fractures or osteonecrosis
- No revisions were performed for patellofemoral complications

Limitations

- Retrospective, single surgeon
- Short term follow up of 24 months
- Only one author performed the radiographic measurements
- Coronal alignment were based on short standing AP radiographs

Conclusion

- Selective soft tissue release for valgus deformities is an effective technique in restoring limb alignment ***without*** increasing prosthetic constraint
- More releases were performed with increasing severity of deformity
- LRR was frequently required but did not show statistically significant correlation with the severity of valgus deformity

Conclusion

- No knees were revised for post-op instability or patellofemoral complications
- The techniques described can be both safe and reliable in managing valgus knee deformities