Suggested Reading: KNEE TOPICS

1) Non-Arthroplasty Management of OA

1. Orthopaedic Knowledge Update 5, Chapter 22: Non-arthroplasty Management of Knee Arthritis

2. American Academy of Orthopaedic Surgeons Treatment of Osteoarthritis of the Knee Evidence-Based Clinical Practice Guideline (2nd Edition). https://www.aaos.org/globalassets/quality-and-practice-resources/osteoarthritis-of-the-knee/osteoarthritis-of-the-knee-2nd-editiion-clinical-practice-guideline.pdf Published May 18, 2013.

    This resource includes official recommendations, interactive decision-making tool, and supportive evidence for conservative management of knee osteoarthritis.

3. Recommendations: https://www.orthoguidelines.org/topic?id=1005

4. Interactive tool: https://www.orthoguidelines.org/go/auc/auc.cfm?auc_id=224791

5. Presentation and Evaluation of Evidence-based Research: https://aaos.webauthor.com/go/peer/

2) TKA Implant Design

1. Evolution of TKA Design (PMID 28657559)

    Review Article Examining History and Recent Innovations in TKA Implant Design

2. Constraint in Total Knee Arthroplasty (PMID 16330513)

    Yellow Journal Review discussing the use of constraint in total knee arthroplasty

3. All-Polyethylene Tibial Components: An Analysis of Long-Term Outcomes and Infection (PMID 27067171)

    Long term data from Mayo supporting the use of all-polyethylene tibial components

4. Current Evidence-based Indications for Modern Non-cemented Total Knee Arthroplasty (PMID 32694321)

    Yellow Journal Review from 2020 discussing current indications for cementless TKA

3) Complex TKA: Prior HTO, Severe Valgus, Bilateral TKA

1. Management of Extra-articular Deformity in the Setting of Total Knee Arthroplasty (PMID: 30624304)

2. Simultaneous versus staged bilateral total knee arthroplasty: a meta-analysis evaluating mortality, peri-operative complications and infection rates (PMID: 24426845)

3. Prior High Tibial Osteotomy Does Not Affect the Survival of Total Knee Arthroplasties: Results From the Danish Knee Arthroplasty Registry (PMID: 29573914)

4. Total Knee Arthroplasty in the Valgus Knee (PMID: 24366186)

Suggested Reading: **KNEE TOPICS**

4) Failed TKA due to Instability and Stiffness

1. Orthopaedic Knowledge Update 5: Chapter 21, Revision Total Knee Arthroplasty

2. Abdel MP, Pulido L, Severson EP, Hanssen AD: Stepwise surgical correction of instability in flexion after total knee replacement. Bone Joint J 2014;96-B(12):1644-1648.

> This article describes a systematic approach to correcting flexion instability, including reduction of tibial slope, correction of malalignment, and improvement of condylar offset.

3. J Arthroplasty. 2020 Oct;35(10):3046-3054. Risk Factors for Mid-Flexion Instability After Total Knee Arthroplasty: A Systematic Review. Sravya P Vajapey, Robert J Pettit, Mengnai Li, Antonia F Chen, Andrew I Spitzer, Andrew H Glassman.

> This study analyzed computational, cadaveric, and clinical studies for risk factors of mid-flexion instability after TKA. Of the six implant-related, six technique-related, and two patient-related factors, five were contradictory/inconclusive across studies. Overall, articular surface conformity and preoperative joint laxity emerged as important contributing factors.

4. Bone Joint J. 2016 Jan;98-B(1 Suppl A):116-9. Instability in total knee arthroplasty: assessment and solutions. J R Petrie, G J Haidukewych

> This article reviews strategies for pre- and intra-operative assessment, as well as surgical management of the unstable TKA.

5. Orthopedics. 2011 Sep 9;34(9):e519-21. Instability in primary total knee arthroplasty. Daniel J Del Gaizo, Craig J Della Valle

> This article reviews the types, causes, and treatments of instability after TKA.

6. J Knee Surg. 2015 Apr;28(2):119-26. Stiffness after total knee arthroplasty. Jorge Manrique, Miguel M Gomez, Javad Parvizi

> This article reviews risk factors, evaluation, and treatment for stiffness following TKA.

7. J Arthroplasty. 2018 Jul;33(7S):S177-S181. Epub 2018 Mar 23. Revision Total Knee Arthroplasty for Arthrofibrosis. Richard W Rutherford, Jason M Jennings, Daniel L Levy, Thomas J Parisi, J Ryan Martin, Douglas A Dennis

> This retrospective study describes the outcomes of revision for stiffness in 46 TKAs. Range of motion and Knee Society Scores improved significantly, but the complication and reoperation rates were high (28.2% and 17.4%, respectively).

8. J Arthroplasty. 2018 Sep;33(9):3049-3055. Epub 2018 Apr 30. Efficacy of Revision Surgery for the Treatment of Stiffness After Total Knee Arthroplasty: A Systematic Review. Jordan S Cohen, Alex Gu, Nicole S Lopez, Mindy S Park, Keith A Fehring, Peter K Sculco

> This article is a systematic review of 10 studies on stiffness following TKA. The authors identify the etiologies, including component malposition, malalignment, overstuffing, aseptic loosening, arthrofibrosis, patella baja, and heterotopic ossification. The majority of studies reported improved range of motion and functional scores, but data is insufficient to predict which patients are most likely to benefit from revision.

Suggested Reading: **KNEE TOPICS**

5) Conversion UKA to TKA

1. Why Do Medial Unicompartmental Knee Arthroplasties Fail Today? (PMID 26725134)

2. Effect of Surgical Caseload on Revision Rate Following Total and Unicompartmental Knee Replacement (PMID 26738897)

3. Conversion of a unicompartmental knee arthroplasty to a total knee arthroplasty: can we achieve a primary result? (PMID 28042121)

4. Management of the Failed Medial Unicompartmental Knee Arthroplasty (PMID 30113345)

5. Videos:

- Conversion UKA to TKA
  https://aahkszoom.s3.amazonaws.com/Focal/FOCAL+Session+3+-+OrthoCarolina_Dr.+Springer_.mp4

6) TKA Fixation Methods: Cement vs. Cementless

1. Journal of Arthroplasty Sept 2015 30 (9 Supp) 55-58 *PMID 26118567*

   To Cement or Not- 2 year results of prospective randomized study comparing cemented vs cementless TKA.

2. Bone and Joint Journal March 2013 95-B(3) 295-300 PMID 23450010

   Cementing techniques for the tibial component in primary total knee replacement.

7) Knee Periprosthetic Fractures

1. JOT. 2020 May 25;21(1):7. PMID: 32451839

2. JAAOS. 2019 Oct 1;27(19):e867-e875 PMID: 30939565

3. JAAOS. 2017 Sep;25(9):624-633 PMID: 28837455

4. JAAOS. 2018 Apr 15;26(8):e167-e172 PMID: 29528870

5. JAAOS. 2017 Apr;25(4):e63-e69. PMID: 28252475

Suggested Reading: **KNEE TOPICS**

8) Surgical Approaches

1. Orthopaedic Knowledge Update 5, Chapter 8: Minimally Invasive Surgical Approaches to Knee Arthroplasty

2. Kazarian GS, Siow MY, Chen AF, Deirmengian CA. Comparison of Quadriceps-Sparing and Medial Parapatellar Approaches in Total Knee Arthroplasty: A Meta-Analysis of Randomized Controlled Trials. J Arthroplasty. 2018 Jan;33(1):277-283. doi: 10.1016/j.arth.2017.08.025. Epub 2017 Aug 30.

   PMID: 28947369. Annotation: This study is a meta-analysis of randomized control trials comparing a quad-sparing approach to the knee versus a medial parapatellar approach. Primary outcome measure was long-term outcomes and short-term outcomes were a secondary measure. Eight randomized control trials including 579 TKAs were included. Quad-sparing approach had statistically increased outliers in mechanical axis and was found to have statistically significant increases in surgical and tourniquet time. Overall, the quad-sparing approach fails to demonstrate clinically significant advantage and has shown an increased incidence of implant malalignment.

3. Verburg H, Mathijssen NM, Niesten DD, Verhaar JA, Pilot P. Comparison of Mini-Midvastus and Conventional Total Knee Arthroplasty with Clinical and Radiographic Evaluation: A Prospective Randomized Clinical Trial with 5-Year Follow-up. J Bone Joint Surg Am. 2016 Jun 15;98(12):1014-22. doi: 10.2106/JBJS.15.00654.

   PMID: 27307362. Annotation: This study is a prospective randomized control trial evaluating radiographic and clinical outcomes of the mini-midvastus (MMV) approach vs. the conventional medial parapatellar. 100 TKA patients were randomly assigned to either MMV or conventional approach and were evaluated for KOOS, OKS, KSS, and SF-12 scores at 6 weeks, 1, 2, and 5 years post-op. A CT scan was done at 2 years post-op to assess mal-alignment. MMV group had 3 complications including two lateral femoral condyle fracture and a partial patella tendon laceration. Radiographs and CT scans showed no difference between MMV and conventional approach group. There was no different in KOOS, OKS, KSS, and SF-12 at any time period of follow up. This concluded that in the short term post-op period, there is no difference between MMV and conventional knee approach.

4. Chun KC, Kweon SH, Nam DJ, Kang HT, Chun CH. Tibial Tubercle Osteotomy vs the Extensile Medial Parapatellar Approach in Revision Total Knee Arthroplasty: Is Tibial Tubercle Osteotomy a Harmful Approach? J Arthroplasty. 2019 Dec;34(12):2999-3003. doi: 10.1016/j.arth.2019.07.015. Epub 2019 Jul 13.

   PMID: 31401038. Annotations: This study is a retrospective study that compared clinical and radiographic results between an extensive medial parapatellar (EMP) approach and a tibial tubercle osteotomy (TTO). 31 patients underwent a TTO and 35 patients underwent an EMP approach. Outcome measures include knee range of motion, KSS, Hospital for Special Surgery scores, radiographically measured femorotibial alignment and patellar height, and complication rates. There was no statisticaly difference in post-operative ROM, KSS, HSS scores, femorotibial angles, and Insall-Salvati ratios.

5. Videos:

- Surgical Approaches – MIS, Subvastus, Midvastus, Scott Sporer, MD – Rush University https://www.vumedi.com/video/surgical-approaches-mis-subvastus-midvastus/
- MIS Subvastus Surgical Technique for TKA, Zimmer Biomet https://www.vumedi.com/video/mis-subvastus-surgical-technique-for-total-knee-arthroplasty/
- Low Mid-Vastus Approach for Primary TKA, Thomas Vail, MD – UCSF https://www.vumedi.com/video/low-mid-vastus-approach-for-primary-tka/

Suggested Reading: **KNEE TOPICS**

9) Patella Resurfacing vs. Non-Resurfacing

1. Maradit-Kremers H, Haque OJ, Kremers WK, Berry DJ, Lewallen DG, Trousdale RT, Sierra RJ. Is Selectively Not Resurfacing the Patella an Acceptable Practice in Primary Total Knee Arthroplasty? J Arthroplasty. 2017 Apr;32(4):1143-1147. doi: 10.1016/j.arth.2016.10.014. Epub 2016 Oct 20.

PMID: 27876254.

> This study is a retrospective study at a single institution looking at 21,371 TKA procedures from 1985-2010. The purpose of the study was to assess long term outcomes associated with selectively not resurfacing the patella. Primary outcome measures were rates of complications and all cause revision. After adjusting for femoral component types and operative diagnosis, not resurfacing the patella had similar results compared to routine resurfacing. The one exception was groups with a thin patella after resurfacing had increased complications and revisions.

2. Longo UG, Ciuffreda M, Mannering N, D'Andrea V, Cimmino M, Denaro V. Patellar Resurfacing in Total Knee Arthroplasty: Systematic Review and Meta-Analysis. J Arthroplasty. 2018 Feb;33(2):620-632. doi: 10.1016/j.arth.2017.08.041. Epub 2017 Sep 6.

PMID: 29032861.

> This study is a systemic review and meta-analysis comparing studies in the literature regarding outcomes of resurfaced and non-resurfaced patellas. Only level 1 and 2 studies were included that were published in peer review journals. Primary outcome measures were complications, all cause revisions, Knee Society Scores (KSS) and Hospital for Special Surgery (HSS) knee scores.17 of 1636 TKA had patella resurfaced and 118 of 1699 TKA had unresurfaced were re-operated which was statistically significant ($p < 0.00001$). The resurfaced group had statistically significant higher KSS and HSS scores compared to the unresurfaced group.

3. Weeks CA, Marsh JD, MacDonald SJ, Graves S, Vasarhelyi EM. Patellar Resurfacing in Total Knee Arthroplasty: A Cost-Effectiveness Analysis. J Arthroplasty. 2018 Nov;33(11):3412-3415. doi: 10.1016/j.arth.2018.07.001. Epub 2018 Jul 10.

PMID: 30122432.

> This study is a cost-effectiveness analysis of patella resurfacing in a TKA. The study used a model of 3 post-operative states (1) well, (2) patellofemoral pain, and (3) serious adverse event. Effectiveness outcome was the quality adjusted life years. Unresurfaced patella result in roughly ~ $400 more in cost and lower quality adjusted life years (< 1 year) at 14 year follow up thus showing patella resurfacing is more cost effective mostly due to decreased revision rates.

4. Videos:

- The Rationale and Technique of Resurfacing the Patella, Denis Nam, MD
  https://www.vumedi.com/video/the-rationale-and-technique-of-resurfacing-the-patella/
- Should I resurface All, Select? What is the Data? Michael Meneghini, MD
  https://www.vumedi.com/video/should-i-resurface-all-select-what-is-the-data/

Suggested Reading: **KNEE TOPICS**

10) Infection; Knee Diagnosis

1. Orthopaedic Knowledge Update 6, Chapter 15: Infection, Pages 171-182

   Diagnosis on page 174.

2. Orthopaedic Knowledge Update 6, Chapter 27: Revision Total Knee Arthroplasty Pages 349-376

   Evaluation of the Problem TKA on pages 353-355.

3. The Knee- Reconstruction, Replacement and Revision (Parvizi et.al)

Section 5: Revision Knee Arthroplasty

- Chapter 101: Diagnosis of Periprosthetic Joint Infection: *Serology*
- Chapter 102: Diagnosis of Periprosthetic Joint Infection: *Molecular Techniques*
- Chapter 103: Diagnosis of Periprosthetic Joint Infection: *Culture*
- Chapter 104: Diagnosis of Periprosthetic Joint Infection: *Frozen Section*
- Chapter 105: Diagnosis of Periprosthetic Joint Infection: *Imaging*
- Chapter 106: Diagnosis of Periprosthetic Joint Infection: *Local Infusion Therapy*
- Chapter 107: Diagnosis of Periprosthetic Joint Infection: *Irrigation and Debridement*

4. Goswami K, Parvizi J, Maxwell Courtney P. Current Recommendations for the Diagnosis of Acute and Chronic PJI for Hip and Knee-Cell Counts, Alpha-Defensin, Leukocyte Esterase, Next-generation Sequencing. Curr Rev Musculoskelet Med. 2018 Sep;11(3):428-438. doi: 10.1007/s12178-018-9513-0. PMID: 30062484; PMCID: PMC6105482.

   The purpose of this review is to provide an update about the diagnostic recommendations for PJI and cover a selection of emerging diagnostic tools. There is increasing evidence to support the measurement of selected biomarkers in serum and synovial fluid, such as alpha-defensin, D-dimer, and interleukin-6. Finally, the emerging utility of next-generation sequencing for pathogen identification is discussed. This paper describes current recommendations and emerging tests for the diagnosis of PJI.

5. Parvizi J, Ghanem E, Sharkey P, Aggarwal A, Burnett RS, Barrack RL. Diagnosis of infected total knee: findings of a multicenter database. Clin Orthop Relat Res. 2008 Nov;466(11):2628-33. doi: 10.1007/s11999-008-0471-5. Epub 2008 Sep 10. PMID: 18781372; PMCID: PMC2565043.

   At the present time, diagnosis remains dependent on clinical judgment and reliance on standard clinical tests including serologic tests, analysis of aspirated joint fluid, and interpretation of intraoperative tissue and fluid test results. In view of the scope of this important problem and the limitations of previous reports, a large database was assembled of all revision TKA performed at three academic referral centers in order to determine the current status of diagnosis of the infected TKA utilizing commonly available tests. Intraoperative cultures should not be used as a gold standard for PJI owing to high percentages of false-negative and false-positive cases. When combined with clinical judgment, total white cell count and percentage of neutrophils in the synovial fluid more accurately reflects PJI and when combined with hematologic exams safely excludes or confirms infection.

Continued on next page…

Suggested Reading: **KNEE TOPICS**

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6. Kunutsor SK, Whitehouse MR, Blom AW, Beswick AD; INFORM Team. Patient-Related Risk Factors for Periprosthetic Joint Infection after Total Joint Arthroplasty: A Systematic Review and Meta-Analysis. PLoS One. 2016 Mar 3;11(3):e0150866. doi: 10.1371/journal.pone.0150866. PMID: 26938768; PMCID: PMC4777569.

This study was a systematic review and meta-analysis to assess the associations between several patient-related factors and PJI. It consisted of longitudinal studies with at least one-year of follow-up for PJIs after total joint arthroplasty. Several potentially modifiable patient-related factors are associated with the risk of developing PJIs. Identifying patients with these risk factors who are due to have arthroplasty surgery and modulating these risk factors might be essential in reducing the incidence of PJI.

7. Videos:

- *AAOS Guidelines on PJI: An Update*. Presented by Gregory Polkowski. International Congress for Joint Reconstruction (ICJR). February 26,2021. https://www.vumedi.com/video/aaos-guidelines-on-pji-an-update/
- *Prevention of PJI: What Strategies Are Proven to Work?* Presented by Ran Schwarzkopf. International Congress for Joint Reconstruction (ICJR). February 26,2021. https://www.vumedi.com/video/prevention-of-pji-what-strategies-are-proven-to-work/

11) Infection; Knee Management

1. J Bone Joint Surg Am. 2017 Jan 4;99(1):19-24. PMID: 28060229

2. J Bone Joint Surg Am. 2019 Jan 2;101(1):14-24. PMID: 30601412

3. J Bone Joint Surg Am. 2019 Jun 19;101(12):1061-1069. PMID: 31220022

4. JAAOS "Antibiotic Stewardship for TJA in 2020" PMID 32898359

12) Unicompartmental Knee Arthroplasty

1. J Bone Joint Surg Am. 2019. PMID: 31436656

2. J Bone Joint Surg Am. 2017 Jan 18;99(2):113-122. PMID: 28099301

3. JB JS Open Access. 2020. PMID: 33299963

Suggested Reading: KNEE TOPICS

13) Revision TKA: Approaches, Bone Loss, Fixation, Constraint, Megaprosthesis

1. J Bone Joint Surg Am. 2016. PMID: 27489319
2. J Bone Joint Surg Am. 2020. PMID: 32028316
3. J Bone Joint Surg Am. 2014 Apr 2;96(7):536-42. PMID: 24695919

14) Workup and Management of Painful TKA

1. J Bone Joint Surg Am. 2019 May 15;101(10): 879-887. PMID: 31094979
2. J Bone Joint Surg Am. 2016 Aug 17;98(16): 1340-50. PMID: 27535436
3. J Arthroplasty. 2021 Jan 22: S0883-5403(21)00080-2. PMID: 33583666

15) TKA Alignment and Ligament Balancing: Anatomic vs. Kinematic; Gap Balancing vs. Measured Resection

1. Orthopedic Knowledge Update 5. Chapter 9: Alignment and Kinematics of Knee Arthroplasty, pgs. 115-117.
2. CORR. 2017 Jan;475(1):9-20 PMID: 27113595
3. BJJ 2016 Oct;98-B(10):1360-1368 PMID: 27694590
4. CORR. 2020 Jun;478(6):1280-1282. PMID: 32118601
5. JAAOS. 2017 Jul;25(7):499-508. PMID: 28644188
6. Arch Orthop Trauma Surg . 2020 Sep;140(9):1245-1253. PMID: 32409905

Suggested Reading: **KNEE TOPICS**

16) Technology in TKA: Navigation, Robotics, Accelerometers

1. Orthopedic Knowledge Update 5. Chapter 14: Robotic-Assisted Knee Arthroplasty

2. Orthopedic Knowledge Update 5. Chapter 15: Computer-Assisted Knee Arthroplasty

3. BJJ. 2020 Apr;102-B(4):407-413 PMID: 32228069

4. CORR. 2020 Jun 8 PMID: 32530896

5. CORR. 2018 Jan;476(1):6-15 PMID: 29389753

6. JAAOS. 2018 Oct 15;26(20):709-716 PMID: 30134305

17) Patellofemoral Arthroplasty

1. JBJS 2006. Leadbetter, Wayne B. MD; Seyler, Thorsten M. MD; Ragland, Phillip S. MD; Mont, Michael A. MD Indications, Contraindications, and Pitfalls of Patellofemoral Arthroplasty, The Journal of Bone & Joint Surgery: December 2006 - Volume 88 - Issue suppl_4 - p 122-137 doi: 10.2106/JBJS.F.00856

2. Leadbetter, Wayne B MD; Ragland, Phillip S MD; Mont, Michael A MD The Appropriate Use of Patellofemoral Arthroplasty, Clinical Orthopaedics and Related Research: July 2005 - Volume 436 - Issue - p 91-99 doi: 10.1097/01.blo.0000172304.12533.41

3. Pisanu G, Rosso F, Bertolo C, et al. Patellofemoral Arthroplasty: Current Concepts and Review of the Literature. Joints. 2017;5(4):237-245. Published 2017 Oct 4. doi:10.1055/s-0037-1606618

4. Hans-Peter W. van Jonbergen, Dirk M. Werkman, Lex F. Barnaart, Albert van Kampen. Long-Term Outcomes of Patellofemoral Arthroplasty. The Journal of Arthroplasty. Volume 25, Issue 7,2010. Pages 1066-1071.ISSN 0883-5403. https://doi.org/10.1016/j.arth.2009.08.023.

5. Strickland, S. M., Bird, M. L., & Christ, A. B. (2018). Advances in Patellofemoral Arthroplasty. Current Reviews in Musculoskeletal Medicine, 11(2), 221–230. doi:10.1007/s12178-018-9477-0

6. Videos:

- Dr. Amendola: Indications and technique. https://www.vumedi.com/video/when-and-how-for-pf-arthroplasty/
- Dr. Campbell: Pearls https://www.vumedi.com/video/when-and-how-for-pf-arthroplasty/

Suggested Reading: **KNEE TOPICS**

18) Extensor Mechanism Complications

1. Nam, D., Abdel, M. P., Cross, M. B., LaMont, L. E., Reinhardt, K. R., McArthur, B. A., … Sculco, T. P. (2014). The Management of Extensor Mechanism Complications in Total Knee Arthroplasty. The Journal of Bone & Joint Surgery, 96(6), e47. doi:10.2106/jbjs.m.00949

2. Schoderbek, R. J., Brown, T. E., Mulhall, K. J., Mounasamy, V., Iorio, R., Krackow, K. A., … Saleh, K. J. (2006). Extensor Mechanism Disruption after Total Knee Arthroplasty. Clinical Orthopaedics and Related Research, 446, 176–185. doi:10.1097/01.blo.0000218726.06473.26

3. Vajapey, S., Blackwell, R., Maki, A., & Miller, T. L. (2019). Treatment of extensor tendon disruption after total knee arthroplasty: a systematic review. The Journal of Arthroplasty. doi:10.1016/j.arth.2019.02.046

4. Lim, C. T., Amanatullah, D. F., Huddleston, J. I., Harris, A. H. S., Hwang, K. L., Maloney, W. J., & Goodman, S. B. (2017). Reconstruction of Disrupted Extensor Mechanism After Total Knee Arthroplasty. The Journal of Arthroplasty, 32(10), 3134–3140. doi:10.1016/j.arth.2017.05.005

5. Shau, D., Patton, R., Patel, S., Ward, L., & Guild, G. (2018). Synthetic mesh vs. allograft extensor mechanism reconstruction in total knee arthroplasty — A systematic review of the literature and meta-analysis. The Knee, 25(1), 2–7. doi:10.1016/j.knee.2017.12.004

6. Maffulli, Nicola MD, MS, PhD, FRCS(Orth)1; Del Buono, Angelo MD2; Loppini, Mattia MD2; Denaro, Vincenzo MD2 Ipsilateral Hamstring Tendon Graft Reconstruction for Chronic Patellar Tendon Ruptures, The Journal of Bone & Joint Surgery: September 4, 2013 - Volume 95 - Issue 17 - p e123 doi: 10.2106/JBJS.L.01462

7. Videos:

- Dr. Browne: Options for rupture patellar tendon in setting of TKA revision for infection Articles https://www.vumedi.com/video/ruptured-patella-tendon/
- Dr. Boothe: Extensor mechanism disasters https://www.vumedi.com/video/extensor-mechanism-disastersrepair-and-reconstruction/