I. Protocol Content

a. **Perioperative/optimization:**

1- **Medical optimization:**

A- BMI:

1. BMI > 45 Referral to weight loss clinic
2. BMI > 45 Hold on surgery (exception- Structural bone loss)

***Please do not measure Patient Height in the Pre-Anesthesia Area. Please use the measured height from clinic only.

B- Smoking

1. Preferable to stop completely or at least cut down amount by ½, 4 weeks before and 4 weeks after
2. Sasha will reiterate importance during preoperative education session of negative impact on wound healing and insurance denial of surgery.

C- Hgb: refer to hematology anemia clinic for workup and treatment.

1. Males <12.5
2. Females <12

D. Platelets <50K: refer to hematology for workup.

E. Nutrition:

1. Albumin<3.5 and/or Prealbumin<15: hold on surgery and refer to Nutrition Specialist (Ginger Meyer)

2. Albumin 3.5-4 and/or Prealbumin 15-20: encourage the patient to drink protein shakes with each meal prior to surgery

F. HbA1C: refer to Endocrinology (Kim Matthews, ANP)

1. Goal is for HbA1C <7.5

2. In long standing DM cases, goal maybe 7.5-8 if the endocrinologist deems they have plateaued in their management/treatment

G. Skin integrity

1. defer surgery until ulcers and skin breakdown are healed

2. refer to OT for edema control

*** In case one or more of the above criteria are needing optimization, please contact the surgeon and their nurse to discuss plan of action.**

2- Special medical cases

A- CAD: refer to patient's cardiologist for clearance note

1- Coordinate with cardiologist timing of stopping and resuming blood thinners (warfarin, Eliquis, Xarelto, Plavix, etc..).

2- Please refer to Adult Recon protocol for preferred preoperative and postoperative timing recommendations.

3- If there is a discrepancy between preferred orthopedic recommendation and the medical specialist recommendations, please notify the attending for final decision/input

4- Elective TJA delayed for 3-6 months from time of recent MI

B- Dialysis: consult the patient's nephrologist

1- Peritoneal dialysis: can proceed with elective TJA

2- Hemodialysis: patient should wait till after they receive kidney transplant. In cases of severe debilitation or structural bone loss or fracture, this is left to the surgeon's discretion to do an arthroplasty or other procedures such as a functional spacer.

C- CVA: consult neurology for clearance

1- Coordinate with neurologist recommendations for timing of surgery and blood thinners.

2- Please refer to Adult Recon protocol for preferred preoperative and postoperative timing recommendations.

3- If there is a discrepancy between preferred orthopedic recommendation and the medical specialist recommendations, please notify the attending for final decision/input

4- Delay elective TJA 9 months from time of CVA

D- Hep C: consult ID clinic for treatment and clearance for surgery

1- Negative viral load of 3 months prior to TJA

E- HIV: consult ID for treatment and clearance for surgery

1- CD4 count > 200 for 1 year stable without fluctuations

2- Negative viral load for 1 year stable without fluctuations

F- Rheumatological diseases

1- Coordinate with the Rheumatology specialist the timing of stopping and restarting their medications

2- Please use the ACR-AAHKS Guidelines as reference for timing of medications

3- If there is a discrepancy between the guidelines and the Rheumatology specialist recommendations, please notify the attending for final decision/input

3- Holding medications preoperatively

A- <u>Anticoagulation Medications (to hold before surgery)</u>

Plavix (Clopidogrel) ; Aspirin (325 mg or more/day) 7 Days

Coumadin (Warfarin) 5 Days

Factor Xa Inhibitors (Eliquis, Pradaxa, Xarelto) 3 Days

* Bridging Coumadin, and Factor Xa inhibitors with Enoxaparin 40 mg qd only in specific cases as recommended by their PCP, cardiologist, or specialist

B- Nutrition Supplements 7 Days

C- Weight loss medications (Ozempic, Jardiance, other GLP-1 agonists)

See Anesthesia Protocol as they are dependent on the medication

*** ACR-AAHKS Guidelines

Table 2
Medications included in this 2022 guideline update[a]

	Dosing interval	Recommended timing of surgery since last medication dose
Medications to continue through surgery		
DMARDs: continue these medications through surgery (all patients)		
Methotrexate	Weekly	Anytime
Sulfasalazine	Once or twice daily	Anytime
Hydroxychloroquine	Once or twice daily	Anytime
Leflunomide (Arava)	Daily	Anytime
Doxycycline	Daily	Anytime
Apremilast (Otezla)	Twice daily[b]	Anytime[b]
Severe SLE-specific medications: continue these medications in the perioperative period in consultation with the treating rheumatologist[c]		
Mycophenolate mofetil	Twice daily	Anytime
Azathioprine	Daily or twice daily	Anytime
Cyclosporine	Twice daily	Anytime
Tacrolimus	Twice daily (IV and PO)	Anytime
Rituximab (Rituxan)	IV every 4–6 months[b]	Month 4–6[b]
Belimumab SC (Benlysta)	Weekly [b]	Anytime[b]
Belimumab IV (Benlysta)	Monthly [b]	Week 4[b]
Anifrolumab (Saphnelo)[d]	IV every 4 weeks[b]	Week 4[b]
Voclosporin (Lupkynis)[d]	Twice daily[b]	Continue[b]
Medications to withhold prior to surgery[e]		
Biologics: withhold these medications through surgery		
Infliximab (Remicade)	Every 4, 6, or 8 weeks	Week 5, 7, or 9
Adalimumab (Humira)	Every 2 weeks	Week 3
Etanercept (Enbrel)	Every week	Week 2
Abatacept (Orencia)	Monthly (IV) or weekly (SC)	Week 5; week 2
Certolizumab (Cimzia)	Every 2 or 4 weeks	Week 3 or 5
Rituximab (Rituxan)	2 doses 2 weeks apart every 4–6 months	Month 7
Tocilizumab (Actemra)	Every week (SC) or every 4 weeks (IV)	Week 2; week 5
Anakinra (Kineret)	Daily	Day 2
IL-17 secukinumab (Cosentyx)	Every 4 weeks	Week 5
Ustekinumab (Stelara)	Every 12 weeks	Week 13
Ixekizumab (Taltz)[d]	Every 4 weeks[b]	Week 5[b]
IL-23 guselkumab (Tremfya)[d]	Every 8 weeks[b]	Week 9[b]
JAK inhibitors: withhold this medication 3 days prior to surgery[f]		
Tofacitinib (Xeljanz)	Daily or twice daily[b]	Day 4[b]
Baricitinib (Olumiant)[d]	Daily[b]	Day 4[b]
Upadacitinib (Rinvoq)[d]	Daily[b]	Day 4[b]
Not severe SLE: withhold these medications 1 week prior to surgery		
Mycophenolate mofetil	Twice daily	1 week after last dose[b]
Azathioprine	Daily or twice daily	1 week after last dose
Cyclosporine	Twice daily	1 week after last dose[b]
Tacrolimus	Twice daily (IV and PO)	1 week after last dose[b]
Rituximab (Rituxan)	Every 4–6 months	Month 7
Belimumab IV (Benlysta)	Monthly[b]	Week 5[b]
Belimumab SC (Benlysta)	Weekly[b]	Week 2[b]

DMARDs = disease-modifying antirheumatic drugs; SLE = systemic lupus erythematosus; IV = intravenous; PO = by mouth; SC = subcutaneous; IL = interleukin.

[a] Dosing intervals obtained from prescribing information provided online by pharmaceutical companies.

[b] Recommendation that has changed since 2017.

[c] Severe SLE indicates organ-threatening disease.

[d] Drug added for 2022 update.

[e] For patients with rheumatoid arthritis, ankylosing spondylitis, psoriatic arthritis, or all SLE for whom antirheumatic therapy was withheld prior to undergoing total joint arthroplasty, antirheumatic therapy should be restarted once the wound shows evidence of healing, any sutures/staples are out, there is no significant swelling, erythema, or drainage, and there is no ongoing nonsurgical site infection, which is typically ~14 days.

b. **Procedural:**

i. Perioperative IV Antibiotics (Elective Surgical Procedures)

1. No antibiotic Allergies
    a. Ancef Weight based: <120kg = 2g; ≥120 = 3g; 1 dose(s) 30 minutes prior to initial incision On call to OR
2. PCN (severe only) OR Cephalosporin Allergy (light or severe)
    a. Vancomycin 1 gm prior to surgical incision only plus 2g aztreonam
3. Add Vancomycin to Ancef for patient with known history of MRSA infection/colonization-Vancomycin 1g or concern for infection/colonization, institutionalized or coming from nursing home/long term facility.

ii. Postoperative IV Antibiotics (Elective Surgical Procedures)**

1. Ancef Weight based: <120kg = 2g; ≥120 = 3g; 3 dose(s) over 24 hours
2. PCN (severe only) OR Cephalosporin Allergy (light or severe)
    a. Vancomycin 1 gm q12hr for 24 hours plus 2gm aztreonam q8hr. ***Only give aztreonam x2 after surgery

** patient can discharge prior to completion of 24 hours antibiotics if met all discharge requirements.

iii. Perioperative Antibiotics (Revision Surgery for Patients with Infection History/Concerns)

1. Patients who may have a prosthesis implanted or retained should receive pre-incision antibiotics.
2. Patients with positive preoperative cultures should receive pre-incision antibiotics even if they have components removed and no permanent prosthesis placed.
3. Patients with no preoperative cultures and no plan for a permanent prosthesis to be placed or retained may have antibiotics held until intraoperative cultures have been obtained.

iv. Empiric Antibiotic Protocol for Infection Cases

1. Stable, Chronic Infection
    a. Vancomycin 1 gm q 12 hours + ceftriaxone 2 g IV daily
2. If the patient has history of one of the following: *Enterobacter cloacae, Citrobacter freundii, Klebsiella aerogenes, or immunocompromised patient*
    a. Vancomycin 1 gm q 8 hours + cefepime 1gr q8h

3. If the patient has history of *Pseudomonas aeruginosa*

    a. Vancomycin 1 gm q 8 hours + cefepime 2gr q8h

4. If the patient has a PCN allergy:

    a. Vancomycin 1 gm q 12 hours + ciprofloxacin 400mg IV q12h

v. Antibiotic Cement
    1. Cement without Antibiotics is the standard approach for most patients undergoing primary TKA.
    2. Pre-mixed Antibiotic Cement is FDA on label use during Revision TKA. May also be used for high-risk patients (diabetes, inflammatory arthritis, morbid obesity).
    3. Standard Abx for Staged Revision Static/Dynamic Spacers- Vancomycin 3 g/ Tobramycin 2.4 g for each 40g cement. Voriconazole 300mg for each 40g cement can be added for fungal infection**
    ** do not load up antibiotics in more than 3 bags of cement
vi. Irrigation Fluids
    1. Irrigation Fluid- - No additional antibiotics.
    2. Surgiphor – all cases
vii. Regional Blocks
        a. Adductor canal blocks for TKA
            i. All TKA, revisions, NOT Bilateral
        b. Fascia Iliaca for THA's under GA only
            i. NOT for Dr. Aggarwal
    2. Periarticular Injection
        a. Ropivacaine/Toradol/Epinephrine (pharmacy pre-mixed)
viii. Tranexamic Acid:
    1. 1000 mg IV To be administered by anesthesia at the opening incision and at closing of wound
    or
    2. Topical version: 1g txa vial mixed with 90cc of saline on the surgical field by surgeon.
ix. Corticosteroids
    1. Dexamethasone
        a. 10 mg injection IV push to be administered by anesthesia**
        **do not use in diabetic patients

c. **Post-Operative:**
    i. DVT prophylaxis: ALL patients
        1. Ambulatory Compression Device
        2. 4-week Pharmacotherapy.
            a. Standard risk patients (no family i.e 1st order relative/personal hx of thrombotic disorders or VTE, no active cancer, reasonable mobility)
                i. Aspirin 81 mg po BID.
            b. High risk patients (prior personal/family hx of thrombotic disorders, active cancer, expected low mobility, preoperative D-Dimer lab result greater or equal to 0.5)
                i. Eliquis 2.5 mg po bid
                    1. Normal Kidney Function
                    2. Pre-Authorization Needed

ii. Warfarin (If Eliquis is contraindicated or not pre-approved)
    1. Pharmacy Dosing
    2. Recommended INR 1.8-2.2 (VTE prophylaxis)
    3. Recommended INR 2.2-2.7 (A fib/other conditions requiring anticoagulation)
iii. Patients on Coumadin before surgery
    1. VTE/Mechanical Heart Valves- Bridging needed (Lovenox 40 mg q day) with home coumadin dose to start night of surgery.
    2. Therapeutic Lovenox/Heparin dosing OK if directed by cardiology/CT surgeon.
    3. Atrial Fibrillation- Restart home Coumadin dose the night of surgery with one dose of Lovenox 40mg.
iv. Patients returning to the OR for additional procedures
    1. Lovenox Bridging (40 mg q day) until all surgeries are completed.
    2. Warfarin or Factor Xa Inhibitor (e.g. Xarelto) starting the night of the final surgery.
v. Patients already on a Factor Xa Inhibitor (Eliquis, Xarelto, Pradaxa) post-op dosing regimen is:
    a. Prophylactic dose for 3 days (i.e Eliquis 2.5 mg Po bid / Xarelto 10mg q daily/Pradaxa 75mg Po bid)
    b. Full dose resumed on post-op day 4

ii. Plavix taken preoperatively

Patients can restart Plavix on POD 3. The patients can be given ASA 81mg bid with Plavix for DVT prophylaxis, but no other anticoagulants should be given including Xarelto or Eliquis. If there is an allergy to ASA please discuss with the attending surgeon plan for postop prophylaxis.

iii. Postoperative Medications (Inpatient)
    1. Pain Management
        a. Ketorolac 15 mg IV q 8 hours x 3 doses
            i. Hold if GRF <60
        b. Tramadol 50 mg tablet oral q6h PRN for mild pain (1-4)
        c. Oxycodone 5mg tablet oral q6h PRN for moderate pain (5-7)
        d. Oxycodone 10 mg tablet oral q6h PRN for severe pain (8-10)
        e. Acetaminophen 1000 mg tablet oral q8 hrs scheduled
        f. Meloxicam 15 mg tablet oral w/Breakfast
            i. Hold if GFR <60
        g. Cyclobenzaprine 10 mg Daily PRN for spasms
iv. Postoperative Medications for geriatrics (>70 yoa) (Inpatient)

1. Pain Management
    a. Ketorolac 15 mg IV q 8 hours x 3 doses
        i. Hold if GRF <60
    b. Tramadol 50 mg tablet oral q6h PRN for mild pain (1-4)
    c. Oxycodone 2.5mg tablet oral q6h PRN for moderate pain (5-7)
    d. Oxycodone 5 mg tablet oral q6h PRN for severe pain (8-10)
    e. Acetaminophen 1000 mg q8 hrs scheduled
    f. Meloxicam 15 mg tablet oral w/Breakfast
        i. Hold if GFR <60
    g. Cyclobenzaprine 5 mg Daily PRN for spasms
    h. Acetaminophen 1000 mg every 8 hours

*** Hold ALL NSAIDs if history of a single kidney and/or gastric bypass surgery history***

*** Patients on chronic pain medications (>10mg of oxycodone/norco/Lortab or Fentanyl patches) need to have their home pain medications ordered as standing orders and the PRN medications above added to them

2. Other Medications (Inpatient)
    a. Multi-Vitamin 1 tablet daily
    b. Ferrous sulfate 325 mg tablet BID
    c. Vitamin D3 5000IU daily
    d. Bisacodyl 5 mg daily
    e. Pantoprazole (Protonix) 40 mg, daily x 7 days
        i. If allergy to Protonix, Lansoprazole (Prevacid) 30 mg, daily x 7 days.
        ii. If allergy to PPI's, Famotidine (Pepcid) 20 mg BID or 40 mg daily x 7 days.
    f. Flomax 0.4 mg po q day

v. **Discharge medications (Standard)**
1. Acetaminophen 1000 mg tablet oral q8 hrs for 14 days #42 tablets
2. Aspirin 81 mg oral delayed release tablet BID for 4 weeks #56 tablets
3. Tramadol 50 mg tablet oral q6h PRN for mild pain 1 week #28 tablets
4. Oxycodone 5 mg tablet oral q6h (1 tablet PRN for moderate pain or 2 tablets PRN for severe pain) for 1 week #30 tablets (reduce by 50% dosage for geriatric patients >70)
5. Meloxicam 15 mg tablet oral daily w/Breakfast for 2 weeks #14 tablets
    a. Hold if GFR <60
6. Cyclobenzaprine 10 mg oral TID PRN for spasms for 2 weeks #42 tablets (reduce by 50% dosage for geriatric patients >70)
7. Bisacodyl 5 mg oral delayed release tablet daily for 30 days #30 tablets
8. Calcium-vitamin D 315 mg-6.25 mcg tablet 2 tablets daily for 30 days #60 tablets
9. Pantoprazole 40 mg delayed release tablet for 30 days #30 tablets
10. Ferrous sulfate 325 mg oral delayed release tablet BID for 30 days #60 tablets

11. OPTION TO CHOOSE: Apixaban 2.5 mg tablet oral BID for 28 days #56 tablets
12. OPTION TO CHOOSE: enoxaparin 40 mg/0.4 mL subcutaneous daily for 4 weeks #28 each

vi. Wound Closures (Wound Closure will be directed by the attending surgeon). Below is a general description.

1. Hips (Primary Posterior Approaches)

a. Crist:

#5 ethibond for short external rotators and capsule, #1 Stratafix for fascia and deep subq then 2-0 vicryl for subq and 3-0 monocryl subucticular and steris for skin

b. Ghanem

#5 ethibond for short external rotators and capsule, #1 Vicryl and Stratafix for fascia, then 2-0 vicryl for subq and 3-0 monocryl subcuticular. No skin steris or reinforcement

c. Aggarwal

Fascia - #2 stratafix (will supplement with #2 vicryl occasionally), Subcut – 2-0 vicryl and 2-0 stratafix, Skin – 3-0 stratafix. Prineo for skin

***** Revisions are similar but attending may choose nylons on the skin. For infections, vicryl sutures may be replaced with PDS. Discuss closure of complex cases and revisions with attending prior to closure.

2. Hips (Primary Anterior Approaches)

a. Crist

#1PDS for capsule, #1 Stratafix for fascia and deep subq then 2-0 vicryl for subq and 3-0 monocryl subucticular and steris for skin

b. Ghanem

#1 Vicryl and Stratafix for fascia, then 2-0 vicryl for subq and 3-0 monocryl subcuticular. No skin steris or reinforcement

***** Revisions are similar but attending may choose nylons on the skin. For infections, vicryl sutures may be replaced with PDS. Discuss closure of complex cases and revisions with attending prior to closure.

3. Knees (Primary)

a. Ghanem

#1 Vicryl and Stratafix for fascia, then 2-0 vicryl for subq and 3-0 monocryl subcuticular. No skin steris or reinforcement. No drain

b. Aggarwal

Fascia - #2 stratafix (will supplement with #2 vicryl occasionally), Subcut – 2-0 vicryl and 2-0 stratafix, Skin – 3-0 stratafix, Dressings – prineo, hemovac drain

c. Kfuri

Fascia- Number 1 Stratafix, Subcut- 0 Vicryl and 2.0 Vicryl, Skin- 3.0 Monocryl for the derm, Steri strips for the skin. No drain

***** Revisions are similar but attending may choose nylons on the skin. For infections, vicryl sutures may be replaced with PDS. Discuss closure of complex cases and revisions with attending prior to closure

vii. Dressing Changes

a. Primary/Revision hip

Aggarwal:

Primary Adaptic, 4X4'S, ABD, secured with Medipore tape (in OR). Dressing change on POD 2 then daily for 7 days. Patients sent home with 6 Medipore/bordered gauze dressings.

Revision Same as above

Ghanem:

Primary Mepilex is applied in the OR, patient can take one home as reserve if gets bloody and takes it off on POD 7 open to air unless the incision is leaking.

Revision 4x4/ABD/tape is applied in the OR, dressing is removed on POD1 and Mepilex is applied, patient can take one home as reserve if gets bloody and takes it off on POD 7 open to air unless the incision is leaking.

Crist:

Primary Mepilex is applied in the OR, patient can take one home as reserve if gets bloody and takes it off on POD 7 open to air unless the incision is leaking.

b. Primary/Revision knee

Aggarwal:

Primary Adaptic, 4X4'S, ABD, Webril, ACE Wrap- Dressing change on POD 2 (*all patients regardless of short stay or in-patient*), then on POD 4. Patients sent home with 6 ABDS's.

Revision Same as above

Ghanem:

Primary Mepilex silver border is applied in the OR, patient can take one home as reserve if gets bloody and takes it off on POD 7 open to air unless the incision is leaking.

Revision 4x4/ABD/Ace wrap is applied in the OR, dressing is removed on POD1 and Mepilex is applied, patient can take one home as reserve if gets bloody and takes it off on POD 7 open to air unless the incision is leaking.

<u>Kfuri:</u>

Primary Steri strips/xeroform, gauze, ABD, cast padding, Ace wrap. Dressing change prior to discharge- gauze, ABD , cast padding, then Ace wrap. Patients told they can remove the dressing at POD 5 to make sure incision looks ok only if they have concerns. Told to recover with same dressing and leave it covered until they are seen at 2wk pop appt. Pt's told they can change dressing if loose, slides down, or soiled. Otherwise, if not concerns post discharge, patient should keep original dressings until seen at 2wk postop aptt. Patient's sent home with an extra ABD, package of gauze, and extra cast padding.

Revision Same as above

<u>Nuelle:</u>

Primary Steri strips covered with Mepilex. Remove on POD 7 and leave open to air. Steri strips stay on until postop appt @ 2wks. Extra Mepilex not given at discharge.

viii. Blood Transfusion
    1. Hgb < 7 (absolute threshold- OK to transfuse below this level)
    2. Hgb< 8 (document symptoms in the medical record along with transfusion)
        a. Symptomatic tachycardia or hypotension
        b. Planned Second Surgery Ahead

ix. Same-Day Discharge
    1. Patients flagged as same day discharge need to have a discharge order checked off at time of placing the postop order set
    2. Discharge pain medications should be sent to pharmacy to prevent delays

d. **Rehabilitation**
    i. Preoperative Rehabilitation
        1. Prehabilitation is recommended
            a. Strength, ROM, mobility, social setting, social supports, handrails, mobilization to outpatient physical therapy
        2. In-Hospital Rehabilitation
            a. Evaluation and ambulation to occur within 1-2 hours of arrival to the floor if possible. If unable to evaluate and ambulate, staff will reattempt. If evaluation and ambulation do not occur prior to the

end shift of therapy, the therapist is responsible to give a handoff to the nursing staff.

b. Ambulation distance and safe performance of stairs are dependent on the patient's home set up.
c. Patient is able to perform necessary transfers at a functional capacity that meets the level of assistance available at home.
d. No limitations in weight bearing activity (knees/hips)- unless specified by surgeon.
e. A home exercise program is provided to each patient depending on their procedure.
f. TED hose: may be applied for patient with lower extremity swelling (Aggarwal)
g. Hip Dislocation Precautions: None for primary THA unless specified by the attending physician.
    i. Traditional Hip Precautions for Revision THA based on surgical approach.

3. Post-discharge Rehabilitation
    a. Knee replacements
        i. Standard discharge instruction for outpatient physical therapy to start within 5 days of discharge.
        ii. Home health therapy: 2-3 visits x 2 weeks if recommended by hospital physical therapy. Default is not to order home health unless PT deems it necessary for patient safety and recovery
    b. Hip Replacements
        i. Per surgeon discretion

II. Reference Documents or Attachments

a. **Venous Thromboembolism Prophyylaxis**

i. Colwell CW Jr, Froimson MI, Anseth SD, Giori NJ, Hamilton WG, Barrack RL, Buehler KC, Mont MA, Padgett DE, Pulido PA, Barnes CL. A mobile compression device for thrombosis prevention in hip and knee arthroplasty. J Bone Joint Surg Am. 2014 Feb 5;96(3):177-83. doi: 10.2106/JBJS.L.01031.

ii. Nam D, Nunley RM, Johnson SR, Keeney JA, Clohisy JC, Barrack RL. The Effectiveness of a Risk Stratification Protocol for Thromboembolism Prophylaxis After Hip and Knee Arthroplasty. J Arthroplasty. 2016 Jun;31(6):1299-1306.

iii. Vulcano E, Gesell M, Esposito A, Ma Y, Memtsoudis SG, Gonzalez Della Valle A. Aspirin for elective hip and knee arthroplasty: a multimodal thromboprophylaxis protocol. Int Orthop. 2012 Oct;36(10):1995-2002. doi: 10.1007/s00264-012-1588-4. Epub 2012 Jun 12.
iv. Woon CYL, Shah RR, Pardi BM, Schwartz BE, Goldstein JM, Cipparrone NE, Goldstein WM. Aspirin Alone Is Not Enough to Prevent Deep Venous Thrombosis After Total Joint Arthroplasty. Orthopedics. 2019 Jan 1;42(1):48-55.

b. **Skin/Nasal Decolonization**

i. Baratz MD, Hallmark R, Odum SM, Springer BD. Twenty Percent of Patients May Remain Colonized With Methicillin-resistant Staphylococcus aureus Despite a Decolonization Protocol in Patients Undergoing Elective Total Joint Arthroplasty. Clin Orthop Relat Res. 2015 Jul;473(7):2283-90.
ii. Chen AF, Heyl AE, Xu PZ, Rao N, Klatt BA. Preoperative decolonization effective at reducing staphylococcal colonization in total joint arthroplasty patients. J Arthroplasty. 2013 Sep;28(8 Suppl):18-20.
iii. Sporer SM, Rogers T, Abella L. Methicillin-Resistant and Methicillin-Sensitive Staphylococcus aureus Screening and Decolonization to Reduce Surgical Site Infection in Elective Total Joint Arthroplasty. J Arthroplasty. 2016 Sep;31(9 Suppl):144-7.
iv. Stambough JB, Nam D, Warren DK, Keeney JA, Clohisy JC, Barrack RL, Nunley RM.Decreased Hospital Costs and Surgical Site Infection Incidence With a Universal Decolonization Protocol in Primary Total Joint Arthroplasty. J Arthroplasty. 2017 Mar;32(3):728-734.e1.

c. **Dual-Antibiotic Infection Prophylaxis**

i. Lamplot JD, Luther G, Mawdsley EL, Luu HH, Manning D. Modified Protocol Decreases Surgical Site Infections after Total Knee Arthroplasty. J Knee Surg. 2015 Oct;28(5):395-403.
ii. Harold RE, Butler BA, Lamplot J, Luu HH, Lawton CD, Manning D. Multifaceted aseptic protocol decreases surgical site infections following hip arthroplasty. Hip Int. 2018 Mar;28(2):182-188.
iii. Burger JR, Hansen BJ, Leary EV, Aggarwal A, Keeney JA. Dual-Agent Antibiotic Prophylaxis Using a Single Preoperative Vancomycin Dose Effectively Reduces Prosthetic Joint Infection Rates With Minimal Renal Toxicity Risk. J Arthroplasty. 2018 Jul;33(7S):S213-S218.

d. **Preoperative Rehabilitation**

i. Calatayud J, Casaña J, Ezzatvar Y, Jakobsen MD, Sundstrup E, Andersen LL. High-intensity preoperative training improves physical and functional

recovery in the early post-operative periods after total knee arthroplasty: a randomized controlled trial. Knee Surg Sports Traumatol Arthrosc. 2017 Sep;25(9):2864-2872.

ii. Chen H, Li S, Ruan T, Liu L, Fang L. Is it necessary to perform prehabilitation exercise for patients undergoing total knee arthroplasty: meta-analysis of randomized controlled trials. Phys Sportsmed. 2018 Feb;46(1):36-43.

iii. Swank AM, Kachelman JB, Bibeau W, Quesada PM, Nyland J, Malkani A, Topp RV. Prehabilitation before total knee arthroplasty increases strength and function in older adults with severe osteoarthritis. J Strength Cond Res. 2011 Feb;25(2):318-25.

e. **Preoperative Medical Risk Modification**

i. Edwards PK, Mears SC, Stambough JB, Foster SE, Barnes CL. Choices, Compromises, and Controversies in Total Knee and Total Hip Arthroplasty Modifiable Risk Factors: What You Need to Know. J Arthroplasty. 2018 Oct;33(10):3101-3106.

ii. Fu MC, McLawhorn AS, Padgett DE, Cross MB. Hypoalbuminemia Is a Better Predictor than Obesity of Complications After Total Knee Arthroplasty: a Propensity Score-Adjusted Observational Analysis. HSS J. 2017 Feb;13(1):66-74.

iii. Martin JR, Jennings JM, Dennis DA. Morbid Obesity and Total Knee Arthroplasty: A Growing Problem. J Am Acad Orthop Surg. 2017 Mar;25(3):188-194.

iv. Patel VP, Walsh M, Sehgal B, Preston C, DeWal H, Di Cesare PE. Factors associated with prolonged wound drainage after primary total hip and knee arthroplasty. J Bone Joint Surg Am. 2007 Jan;89(1):33-8.

v. Tarabichi M, Shohat N, Kheir MM, Adelani M, Brigati D, Kearns SM, Patel P, Clohisy JC, Higuera CA, Levine BR, Schwarzkopf R, Parvizi J, Jiranek WA. Determining the Threshold for HbA1c as a Predictor for Adverse Outcomes After Total Joint Arthroplasty: A Multicenter, Retrospective Study. J Arthroplasty. 2017 Sep;32(9S):S263-S267.e1. doi: 10.1016/j.arth.2017.04.065. Epub 2017 May 11.

f. **Rheumatology Medication Guideline and Recommendations**

i. Goodman, S. M., Springer, B.D, Chen, A. F., Davis, M., Fernandez, D.R, Figgie, M., Finlayson, H., George, M.D., Giles, J.T., Gililland, J., Klatt, B., MacKenzie, R., Michaud, K., …Singh J.A. (2022). 2022 American College of Rheumatology/American Association of Hip and Knee Surgeons Guideline for the Perioperative Management of Antirheumatic Medication in

Patients With Rheumatic Diseases Undergoing Elective Total Hip or Total Knee Arthroplasty. *Arthritis Care and Research*, *74*(9). https://doi.org/10.1002/art.42140