

**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**

Guideline Summary

Updated March 17, 2022

This updated guideline includes changes in the recommendations regarding rituximab and belimumab for patients with severe SLE, and now includes anifrolumab and voclosporin. For patients with spondyloarthritis, recommendations have been added on management of ixekizumab and guselkumab. The recommendations have changed for management of JAK inhibitors and suggest withholding for 3 days before surgery; tofacitinib, upadacitinib, and baricitinib are now included.

This updated guideline addresses the perioperative management of disease modifying medications for adults with rheumatic diseases, specifically inflammatory arthritis (IA) and systemic lupus erythematosus (SLE) undergoing elective total hip arthroplasty (THA) and total knee arthroplasty (TKA). A panel of rheumatologists, orthopaedic surgeons, and infectious disease specialists updated the systematic literature review and included currently available medications for the clinically relevant population, intervention, comparator, and outcomes (PICO) questions, updating the 2017 recommendations*. As patients with IA and SLE are at increased risk of infection after THA and TKA, these recommendations aim to balance the risk of perioperative infection and the risk of disease flares, recognizing that all flares have an impact on quality of life but a flare in a patient with severe SLE at risk for organ damage warrants unique considerations. This updated guideline includes recently introduced immunosuppressive medications to help decision-making by clinicians and patients regarding perioperative disease modifying medication management for patients with IA and SLE at the time of elective THA or TKA.

MEDICATIONS TO CONTINUE THROUGH SURGERY		
DMARDs: CONTINUE these medications through surgery. (All patients)	Dosing Interval	Recommended timing of surgery since last medication dose
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	Anytime
SEVERE SLE-SPECIFIC MEDICATIONS††: CONTINUE these medications in the perioperative period in consultation with the treating rheumatologist.	Dosing Interval	Recommended timing of surgery since last medication dose
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	Month 4-6
Belimumab (Benlysta)	Weekly SQ	Anytime
Belimumab (Benlysta)	Monthly IV	Week 4
Anifrolumab (Saphnelo)†	IV Every 4 weeks	Week 4
Voclosporin (Lupkynis)†	Twice daily	Continue

MEDICATIONS TO WITHHOLD PRIOR TO SURGERY***		
BIOLOGICS: WITHHOLD these medications through surgery		Recommended timing of surgery since last medication dose
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 (SQ)	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 (SQ) 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
<i>Ixekizumab (Taltz)†</i>	<i>Every 4 weeks</i>	<i>Week 5</i>
<i>IL-23 Guselkumab (Tremfya)†</i>	<i>Every 8 weeks</i>	<i>Week 9</i>
<i>JAK inhibitors WITHHOLD this medication 3 days prior to surgery**</i>		
<i>Tofacitinib (Xeljanz):</i>	<i>Daily or twice daily</i>	<i>Day 4</i>
<i>Baricitinib (Olumiant)†</i>	<i>Daily</i>	<i>Day 4</i>
<i>Upadacitinib (Rinvoq)†</i>	<i>Daily</i>	<i>Day 4</i>
<i>NOT-SEVERE SLE: WITHHOLD these medications 1 week prior to surgery</i>		
	Dosing Interval	1 week after last dose
Mycophenolate mofetil	Twice daily	1 week after last dose
Azathioprine	Daily or twice daily	1 week after last dose
Cyclosporine	Twice daily	1 week after last dose
Tacrolimus	Twice daily (IV and PO)	1 week after last dose
Rituximab (Rituxan)	Every 4-6 months	Month 7
<i>Belimumab IV (Benlysta)</i>	<i>Monthly</i>	<i>Week 5</i>
<i>Belimumab SQ (Benlysta)</i>	<i>Weekly</i>	<i>Week 2</i>
<i>Dosing intervals obtained from prescribing information provided online by pharmaceutical companies.</i>		
DMARDs = disease-modifying antirheumatic drugs; SQ = subcutaneous; IV = intravenous; SLE = systemic lupus erythematosus; PO = oral.		
*2017 American College of Rheumatology/American Association of Hip and Knee Surgeons Guideline for the Perioperative Management of Anti-rheumatic Medication in Patients with Rheumatic Diseases Undergoing Elective Total Hip or Total Knee Arthroplasty		
Shading with Bold italics indicates recommendation that has changed since 2017.		
† Drug added for 2022 update.		
†† Severe SLE indicates organ threatening disease.		
** Recommendation pertains to infection risk and does not account for risk of cardiac events or venous thromboembolism.		
***For patients with RA, AS, PsA, or all SLE for whom anti-rheumatic therapy was held prior to undergoing TJA, restarting the anti-rheumatic therapy 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 non-surgical site infection, which is typically about 14 days.		

This summary was approved by the ACR Board of Directors on February 24, 2022. These recommendations are included in a full manuscript, which will be submitted for publication in Arthritis & Rheumatology and Arthritis Care and Research.