Study Guide – Rheumatoid Arthritis

Rheumatoid arthritis is a systemic inflammatory disease that commonly affects the wrists, metacarpophalangeal (MCP) joints and proximal interphalangeal (PIP) joints. Synovitis can damage cartilage, weaken joint restraints and alter tendon tracking. Deformity may therefore reflect failure at more than one level of the hand.

Early disease control and timely surgical assessment work together. Operative planning should identify the mechanical failure, the remaining passive motion, the condition of the joint surfaces and the function the patient wants to regain.

Examine the wrist, MCP joints, interphalangeal joints and tendons together; a distal deformity may have a proximal driver.

Compare active and passive movement. New loss of extension may reflect rupture, tendon subluxation or nerve dysfunction.

Flexible deformity with preserved cartilage may permit splinting or soft tissue reconstruction. Fixed deformity and articular destruction may require joint reconstruction or fusion.

Tendon reconstruction must also address the synovitis or bony attrition that caused failure.

Coordinate systemic disease control, perioperative medication decisions and rehabilitation with rheumatology, anesthesia and hand therapy.

Differential diagnosis

Use the history, distribution, examination, laboratory findings and imaging together. A deformity pattern alone does not establish the diagnosis.

Condition	Useful distinguishing features
Rheumatoid arthritis	Morning stiffness, swelling and often symmetric wrist, MCP and PIP involvement. Nodules may occur. Radiographs may show marginal erosions, periarticular osteopenia and joint-space loss; distribution and severity vary.
Juvenile idiopathic arthritis	A heterogeneous group of childhood arthritides. Joint distribution depends on subtype; polyarticular disease can involve the small hand joints. Wrist damage and ankylosis can occur. Temporomandibular joint involvement may restrict opening or affect mandibular growth. MCP involvement varies by subtype.
Psoriatic arthritis	Look for psoriasis, nail pitting, dactylitis and enthesitis. DIP involvement is a useful clue, but peripheral polyarthritis and axial disease also occur. Severe destructive disease may produce pencil-in-cup changes or telescoping digits.
Systemic lupus erythematosus	Hand deformity may resemble RA through tendon and ligament laxity. Classic Jaccoud arthropathy is often nonerosive on plain films, but erosions can occur, including in RA–lupus overlap or on sensitive imaging. Assess systemic features.

Condition	Useful distinguishing features
Systemic sclerosis	Tight skin, digital ulcers, Raynaud phenomenon, PIP flexion and MCP extension contractures, calcinosis and distal phalangeal resorption may dominate. Inflammatory joint disease can coexist; do not use a universal nonerosive label to exclude it.
Reactive arthritis	A spondyloarthritis pattern that may include asymmetric lower-limb arthritis, enthesitis, urethritis, eye inflammation and mucocutaneous lesions. The complete traditional symptom constellation is not required.
Enteropathic arthritis	Associated with Crohn disease or ulcerative colitis; peripheral arthritis and axial disease can occur.
Ankylosing spondylitis	Axial symptoms and sacroiliitis predominate, with possible peripheral arthritis. HLA-B27 is an association rather than a stand-alone diagnosis.
Mixed connective tissue disease	Overlap features of connective tissue diseases may include inflammatory arthritis, ulnar deviation and swan-neck deformities. Erosive disease can occur; presentation and severity vary.
Crystal arthropathy	Gout and calcium pyrophosphate deposition disease can produce acute arthritis or tenosynovitis and chronic destructive disease. Monosodium urate crystals are typically needle-shaped and negatively birefringent; calcium pyrophosphate crystals are often rhomboid and weakly positively birefringent. Chondrocalcinosis supports CPPD but is not diagnostic by itself.

How synovitis creates deformity

Synovial proliferation distends the capsule and damages capsuloligamentous restraints. Tendons then track along altered paths and exert abnormal forces. Cartilage loss and tendon rupture add to instability, while neighboring joints compensate with reciprocal deformity.

This is a mechanical framework, not an inevitable sequence in every patient. Determine which structures are failing before selecting a reconstruction.

Finger swan-neck deformity

The pattern is PIP hyperextension with DIP flexion. Potential drivers include volar plate attenuation, flexor digitorum superficialis (FDS) failure, intrinsic tightness, MCP volar subluxation and chronic mallet deformity. More than one may coexist.

For the Bunnell intrinsic tightness test, compare passive PIP flexion with the MCP extended and then flexed. Improvement when the MCP is flexed supports intrinsic tightness; a fixed joint contracture must also be considered.

Nalebuff pattern	Assessment and treatment direction
Type I: flexible PIP without intrinsic tightness	A ring splint can block PIP hyperextension while allowing flexion. If symptoms justify surgery, options depend on the driver: DIP fusion for selected mallet-driven deformity, FDS tenodesis or spiral oblique retinacular ligament reconstruction.

Nalebuff pattern	Assessment and treatment direction
Type II: flexible PIP with MCP subluxation and intrinsic tightness	Blocking PIP hyperextension alone may be insufficient. Consider intrinsic release and correction of MCP malalignment; MCP arthroplasty may be needed when joint condition warrants it.
Type III: limited PIP motion with preserved joint surfaces	Extensor mechanism tethering may require lateral-band mobilization, with selective capsular or extensor release. Assess passive correction and articular preservation before reconstruction.
Type IV: stiff PIP with articular destruction	PIP fusion is often favored for a stable functional position; selected cases may be considered for arthroplasty.

Finger boutonniere deformity

The defining pattern is PIP flexion with DIP hyperextension. MCP hyperextension may accompany it. PIP synovitis can weaken the central slip and triangular ligament; lateral bands migrate volar to the PIP axis, contributing to PIP flexion and increased terminal tendon tension.

Assess passive correctability, DIP mobility and articular damage. A radiographic deformity alone does not dictate the operation.

Stage	Treatment direction
Stage I: mild, passively correctable PIP extension lag	PIP extension splinting should permit DIP motion. Selected patients with terminal extensor tightness may benefit from distal extensor tenotomy.
Stage II: moderate deformity	The Nalebuff description uses PIP flexion greater than forty degrees, which may or may not be passively correctable. Treatment may include restoring passive extension, releasing transverse retinacular restraints, reefing the central slip and relocating lateral bands dorsally. Active testing under local anesthesia can guide tensioning. Postoperative protection and motion are individualized.
Stage III: fixed deformity with joint destruction	PIP arthrodesis is commonly favored.

Thumb deformities

Boutonniere pattern: MCP synovitis and extensor mechanism attenuation permit ulnar and volar displacement of extensor pollicis longus (EPL), producing MCP flexion with IP hyperextension.

Swan-neck pattern: carpometacarpal (CMC) subluxation may combine with MCP hyperextension and IP flexion.

Lateral MCP instability may reflect collateral ligament insufficiency and coexist with contracture.

Flexible deformity may permit tendon rerouting or ligament reconstruction. Fixed deformity or joint destruction may favor arthrodesis. Evaluate CMC and IP function before sacrificing MCP motion; CMC stability is not assumed in every rheumatoid thumb.

For collateral instability, reconstruction and treatment of associated web-space or adductor contracture are selected according to the deformity and remaining tissue quality.

MCP ulnar drift and volar subluxation

Wrist malalignment, radial sagittal-band attenuation, altered flexor vectors and intrinsic tightness can combine to produce ulnar drift and volar subluxation. The extensor tendon may displace into the ulnar intermetacarpal valley.

Assess clinically important wrist malalignment before MCP reconstruction. Correcting a contributing wrist deformity may improve distal mechanics, but operative sequence is individualized rather than automatically wrist-first.

Preserved cartilage and a reducible deformity may permit synovectomy, extensor centralization, sagittal-band repair and selective intrinsic release or transfer.

Advanced joint destruction or severe instability may favor silicone MCP arthroplasty with soft tissue balancing. Rehabilitation and maintenance of tendon alignment are integral to the result.

Discuss useful function rather than promising stronger grip. In the seven-year SARA cohort, silicone MCP arthroplasty improved alignment and patient-reported outcomes without improvement in grip or pinch strength.

Recurrent deformity, implant fracture and other complications can occur. Revision may improve pain or satisfaction, but scarring and bone loss make reconstruction harder; results should not be promised to equal primary surgery.

Other implants require adequate bone stock and soft tissue support and are not interchangeable solutions for a severely unstable rheumatoid MCP joint.

Wrist and distal radioulnar joint

Carpal ligament failure can produce collapse, volar and ulnar translation, and supination. In caput ulnae deformity, the displaced carpus makes the distal ulna appear dorsally prominent. Extensor carpi ulnaris may subluxate volarly and contribute to deformity.

Caput ulnae describes the structural deformity. Vaughan-Jackson describes progressive attritional extensor tendon rupture; the terms are related but not interchangeable.

Option	Selection and limits
Limited radioscapholunate fusion	Consider when disease is chiefly radiocarpal and the midcarpal articulation is sufficiently preserved to provide useful motion. Assess the remaining joint rather than assuming a limited fusion will prevent all future arthritis.
Total wrist arthrodesis	A common option for painful widespread destruction. It can provide pain relief and a stable platform for grip, at the cost of wrist flexion and extension. Residual pain, nonunion or hardware problems remain possible; complete pain relief is not guaranteed. Position and fixation depend on bone, skin, adjacent joints and patient goals.
Darrach procedure	Resection of the distal ulnar head. Often considered for lower-demand patients; evaluate ulnar stump stability and carpal translation. Significant translation may require additional stabilization rather than isolated resection.

Option	Selection and limits
Sauvé-Kapandji procedure	DRUJ arthrodesis with resection of a more proximal ulnar segment to create a pseudarthrosis for forearm rotation. It retains the distal ulnar head; it is not another name for distal ulnar head resection. Selection depends on stability, bone quality and demand, and progression of translation can still occur.
Ulnar head replacement	A selected option requiring adequate soft tissue support; ligament insufficiency can limit suitability.

Attritional tendon rupture: recognition and reconstruction

Inflamed synovium can invade tendon tissue, while exposed bone can abrade tendons. Corticosteroid exposure may also contribute to tendon vulnerability. New functional loss warrants prompt assessment, especially when neighboring tendons may remain at risk.

Use active and passive motion, tendon palpation and tracking, motor examination, tenodesis and, when needed, imaging together. With intact tendons, passive wrist flexion normally produces digital extension, while passive wrist extension produces digital flexion. An abnormal response supports a mechanical problem but is not a stand-alone diagnosis.

An extensor tendon displaced at the MCP may fail to initiate extension from flexion yet hold the digit extended once it is passively placed there. This is a useful clue to tendon subluxation, not an infallible test.

Vaughan-Jackson pattern

Attrition near the distal ulna may first affect the little-finger extensors and progress radially. Determine the number of ruptured tendons, donor availability and the underlying distal radioulnar pathology.

Diseased ends often cannot hold a direct repair. A single rupture may be connected side-to-side to an adjacent intact extensor tendon. Multiple ruptures may require an extensor indicis proprius (EIP) or other tendon transfer. Choice of donor and routing depends on the remaining functional tendons.

Reconstruction also addresses the attritional environment through appropriate DRUJ treatment, synovectomy and tendon protection. Darrach resection and Sauvé-Kapandji reconstruction are distinct options, not mandatory interchangeable steps. A flexor donor such as flexor carpi radialis may be considered for extensive loss as a formal tendon transfer; that is different from connecting to an adjacent intact extensor.

Mannerfelt pattern

Flexor pollicis longus (FPL) may rupture over a sharp scaphoid prominence in the carpal tunnel, causing loss of active thumb IP flexion. Other flexor tendons can also become threatened.

Address the bony prominence and provide a smooth protective surface. Reconstruction may use grafting or transfer; thumb IP fusion is an option when the joint is already damaged or functional priorities favor stability. Selected FDP ruptures may be connected to an adjacent intact FDP.

EPL rupture

Attrition near Lister’s tubercle can cause loss of active thumb IP extension and impaired thumb retropulsion; MCP extension can also be affected.

Frayed ends and a tendon gap often preclude direct repair. EIP-to-EPL transfer is a common reconstruction, with grafting or alternatives selected according to tendon quality and donor function.

Medical treatment and perioperative planning

Disease control

The 2021 ACR guideline favors initial methotrexate monotherapy for most DMARD-naive adults with moderate-to-high activity. Low activity, contraindications and comorbidities can change drug selection. Treatment is adjusted toward remission or low disease activity.

Glucocorticoids are minimized; when required, use the lowest effective dose for the shortest feasible duration. They are not an automatic bridging step for every patient.

Tapering may be considered only after at least six months at target, meaning low disease activity or remission. Continued therapy is preferred over reduction; the guideline assumes retention of at least one DMARD. Decisions require shared assessment of flare risk and patient goals.

Medication around surgery: preserve guideline scope

For elective total hip or total knee arthroplasty, the 2022 ACR/AAHKS guideline recommends continuing methotrexate. It recommends withholding biologics according to agent and dosing interval and restarting withheld therapy after satisfactory wound healing with no infection, typically around fourteen days in that context.

These are hip and knee arthroplasty recommendations, not a universal schedule for all orthopedic or hand procedures. The hand surgeon and rheumatologist should agree on a procedure-specific plan that balances infection, wound healing and inflammatory flare.

Airway and systemic assessment

Assess cervical symptoms, neurologic findings, neck mobility and known instability. Cervical imaging and airway precautions are selected with anesthesia according to the findings and planned procedure; no single device is mandatory for every patient.

TMJ disease and limited mouth opening can complicate airway management. Evaluate opening and mandibular anatomy, particularly with childhood-onset disease.

Review pulmonary disease, cardiovascular risk, blood counts and other systemic manifestations as clinically indicated. Felty syndrome combines RA, neutropenia and splenomegaly.

Assess associated nerve compression, including carpal tunnel syndrome from flexor tenosynovitis; decompression or synovectomy may be part of a coordinated treatment plan.

Practical decision sequence

Define the patient’s limiting task and establish systemic disease control.

Localize the failing structure; compare active with passive movement and examine neighboring joints.

Decide whether the deformity is flexible and whether the articular surface is usable.

Match splinting, tendon balancing, transfer, arthroplasty or fusion to the mechanical problem.

Address ongoing attrition and plan protection, therapy and realistic functional goals.