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Knee Osteoarthritis Rehabilitation

The following guidelines are intended for non-operative treatment for knee osteoarthritis. The progression is based on individual criteria and patient goals. Many patients may not be appropriate for linear progression through all the phases. Please refer to prescribing MD instructions for guidance as needed.

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PHASE I: Activity Modification (High Irritability)

PRECAUTIONS	▪ Avoid end range stretching if hard or empty end feel is present ▪ Avoid exercises and activities that are painful or increase swelling
TREATMENT RECOMMENDATIONS	▪ Activity modification to decrease or eliminate pain ▪ Movement strategies ▪ Management of pain and swelling ▪ Modalities (e.g., ice, compression, TENS) ▪ Soft tissue and low grade joint mobilization (e.g., patellar, proximal tibiofibular, tibiofemoral) ▪ Gentle knee P/AA/AROM without increasing irritability ▪ Knee isometric and open kinetic chain strengthening ▪ Core stabilization

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	▪ Proximal and distal strengthening ▪ Proximal and distal stretching ▪ Bike with low resistance ▪ Aquatic therapy if available ▪ Bracing or taping as needed ▪ Gait training with appropriate assistive device
EMPHASIZE	▪ Patient understanding of condition ▪ Control of pain and swelling ▪ Pain-free exercise and activities ▪ Gait normalization with appropriate assistive device
MINIMUM CRITERIA FOR ADVANCEMENT TO NEXT PHASE	▪ Active quadriceps contraction ▪ No gross swelling at knee ▪ No or minimal pain at rest ▪ Pain controlled with ambulation on level surfaces with appropriate assistive device ▪ If while following recommendations fails to improve in 4 visits or 2 weeks, refer to MD

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PHASE II: Addressing Impairments (Moderate Irritability)

PRECAUTIONS	▪ No end range stretching if hard or empty end feel is present ▪ Avoid exercises and activities that cause pain or swelling ▪ Avoid reciprocal stair climbing until strength and control is apparent ▪ Avoid premature discharge of assistive device ▪ Avoid premature increase in activity level
TREATMENT RECOMMENDATIONS	▪ Modalities to manage swelling as needed ▪ Patient education for activity modification and movement strategies to prevent provocation of symptoms ▪ Soft tissue and joint mobilizations to restore motion ▪ ROM and stretching exercises avoiding hard or empty end feel

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	▪ Incorporate foam rolling if indicated ▪ Progression of strengthening to include closed kinetic chain exercises in pain-free arc of motion ▪ Progression of core, proximal and distal strengthening ▪ NMES for quadriceps contraction if needed ▪ Balance training ▪ Low impact/low resistance activities to build endurance e.g. bike, swimming and/or aquatic therapy if available ▪ Forward step ups starting at 2" and progressing as tolerated ▪ Gait training, weaning off assistive device if indicated
EMPHASIZE	▪ Improve motion, strength and flexibility while decreasing irritability
MINIMUM CRITERIA FOR ADVANCEMENT TO NEXT PHASE	▪ Pain-free throughout available knee AROM ▪ No quadriceps lag

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	▪ Sit to stand with symmetrical weight bearing and control ▪ Single leg stance with good alignment and control

PHASE III: Restoration of Function (Low Irritability)

PRECAUTIONS	▪ Adjust interventions to meet demands of patient's ADLs ▪ Monitor joint and pain response to increasing loads ▪ Avoid rapid increase in activity volume
	▪ Continue patient education for pain-free activities without compensations

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TREATMENT RECOMMENDATIONS	▪ Functional training
	▪ Gait training, weaning off assistive device if indicated
	▪ Step up and step down progression
	▪ Advance phase 2 core, proximal and distal strengthening
	▪ Body weight strengthening with progression as tolerated from:
	  o Double to single leg activities
	  o Concentric to eccentric strengthening
	  o Static to dynamic activities
	▪ Continue stretching and foam rolling if indicated
	▪ Dynamic balance training and neuromuscular control
	▪ Progress endurance training

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TREATMENT RECOMMENDATIONS(CONT.)	○ Elliptical when can forward step up 6" with control and without pain ○ Run when demonstrates eccentric quad control with forward step down
EMPHASIZE	▪ Restoration of motion, flexibility and strength necessary for ADLs ▪ Normalization of gait on all surfaces ▪ Restoration of patient's ADLs with proper movement strategies
MINIMUM CRITERIA FOR ADVANCEMENT TO DISCHARGE (OR PHASE IV IF RETURNING TO SPORT)	▪ Sufficient strength, motion and flexibility for patient's ADLs ▪ Optimized stair negotiation with good control ▪ Achievement of functional goals ▪ Discharge with independent home exercise program or progress to phase 4 if patient is returning to sport

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PHASE IV: Return to Sport (if applicable)

PRECAUTIONS	▪ Avoid returning to sport if inadequate motion, strength and control, or persistent swelling
TREATMENT RECOMMENDATIONS	▪ Patient education regarding returning to sport ▪ Sport-specific activities and movement patterns, e.g.: o For golf- hip and trunk rotation and single leg exercises/activities (for ball placement) o For tennis- deceleration activities ▪ Soft tissue mobilization as needed ▪ Dynamic single leg balance activities ▪ Progressive cardiovascular endurance training ▪ Involve performance coach if appropriate

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	▪ Monitor volume of training with progressive loading, allowing for recovery time ▪ Bracing/taping if required ▪ Return to sport-specific interval training 2-3x/week
EMPHASIZE	▪ Sport-specific exercises and movement patterns ▪ Progressive return to sport
MINIMUM CRITERIA FOR RETURN TO SPORT	▪ Minimal to no swelling and pain ▪ Movement patterns, strength, flexibility and motion to meet demands of sport ▪ Independent home exercise program