DEPARTMENT OF PHYSIOTHERAPY

COURSE NAME : BPT

COURSE FACULTY : EZHILARASU T

PUZZLES QUESTION BANK - Exercise Therapy I

UNIT III - Basic Strengthening Principles

Case 1: Early Post-Op Quadriceps Weakness You are a physiotherapy intern in an orthopedic ward seeing Mr. Rahman, a 62-year-old man on day 2 after total knee replacement. He demonstrates poor quadriceps activation with only a flicker of contraction and slight patellar movement during attempted straight leg raises. Pain is controlled (3/10), and swelling is moderate. The surgeon emphasizes early isometric strengthening to counteract inhibition and promote effusion resolution without stressing the new joint. Mr. Rahman is motivated but frustrated by the lack of visible movement. You must select the initial strengthening approach that respects tissue healing while building neuromuscular control.

Options: A. Begin with multiple-angle isometrics (0°, 30°, 60° flexion) using maximal effort. B. Start with low-intensity quadriceps sets in full extension, focusing on sustained holds. C. Progress directly to straight leg raises with ankle weights for overload. D. Use electrical stimulation superimposed on voluntary contraction.

Structured Reasoning : B. Low-intensity sustained quadriceps sets in extension effectively combat inhibition post-TKR, are pain-free, and promote effusion control per early strengthening evidence. A multiple angles premature; C dynamic overload risks joint stress; D stimulation useful but voluntary activation preferred first.

Case 2: Shoulder Weakness After Immobilization As a junior clinician in an outpatient clinic, you evaluate Ms. Torres, a 48-year-old librarian 4 weeks post-rotator cuff repair. She has been cleared for active ROM but shows marked deltoid and supraspinatus weakness (3/5). Pain is minimal at rest but increases with resistance. Basic strengthening principles stress submaximal loading and scapular stability. She fears re-tearing the repair.

Options: A. Initiate supine wand-assisted active exercises with light resistance bands. B. Begin with side-lying external rotation isometrics against a towel. C. Prescribe prone horizontal abduction with 1 kg weight for immediate overload. D. Start with standing scapular retraction using heavy theraband.

Structured Reasoning : B. Side-lying external rotation isometrics in a deloaded position protect the repair while targeting supraspinatus safely. A adds unwanted elevation; C prone loading too aggressive; D neglects rotator priority.

Case 3: Elderly Hip Abductor Weakness In a community falls-prevention program, as an intern, you assess Mrs. Ivanov, a 78-year-old with bilateral hip abductor weakness contributing

to Trendelenburg gait and poor balance. She can stand unaided but fatigues quickly. Strengthening must prioritize safety and functional carryover while respecting age-related sarcopenia.

Options: A. Begin with standing side-leg raises holding onto parallel bars. B. Use side-lying clam exercises with no resistance for isolated activation. C. Initiate weighted hip abduction machine at moderate load. D. Prescribe bridging with theraband around knees for dynamic control.

Structured Reasoning : B. Side-lying clams isolate abductors without balance demand, ideal for elderly fall-risk patients before progressing to functional standing. A risks falls; C machine unsuitable early; D bridges target extensors primarily.

Case 4: Post-Ankle Sprain Calf Weakness You are a student in a sports clinic guiding Jake, a 20-year-old basketball player 3 weeks post-grade II ankle sprain. Peroneal and gastrocnemius strength is reduced, affecting push-off. Swelling is resolved, and he is partial weight-bearing. Principles emphasize concentric/eccentric balance and proprioceptive integration.

Options: A. Start with seated calf raises using body weight only. B. Begin with double-leg heel raises progressing to single-leg quickly. C. Use resisted dorsiflexion bands to strengthen antagonists first. D. Initiate eccentric lowering on a step for immediate power gains.

Structured Reasoning : B. Double-leg heel raises allow controlled loading and proprioception integration post-sprain before single-leg demands. A seated limits function; C antagonists secondary; D eccentric too advanced.

Case 5: Core Weakness in Chronic Low Back Pain As a junior clinician, you treat Mr. Gupta, a 40-year-old driver with chronic non-specific low back pain and poor transversus abdominis recruitment. He reports pain with prolonged sitting. Basic strengthening focuses on local stabilizer activation before global movers.

Options: A. Teach abdominal drawing-in maneuver in supine with biofeedback cues. B. Begin with full sit-ups to build overall endurance. C. Prescribe plank holds for 30 seconds from the start. D. Use Russian twists with medicine ball for rotational strength.

Structured Reasoning : A. Drawing-in maneuver targets local stabilizers first per core hierarchy, essential in chronic LBP. B/C/D recruit global muscles prematurely, risking compensation.

Case 6: Wrist Extensor Weakness Post-Fracture In hand therapy, you assess Sarah, a 35-year-old typist 6 weeks post-distal radius fracture removal. Grip is weak, and extensors grade 3+/5. She needs to return to keyboard work soon. Strengthening must address tendon gliding and grip integration safely.

Options: A. Start with putty squeezing for composite grip strength. B. Begin with isometric wrist extension against a table edge. C. Use dumbbell wrist curls with 2 kg immediately. D. Initiate dynamic theraband resistance in all planes.

Structured Reasoning : B. Isometric table pushes provide safe, graded loading post-radius fracture without dynamic strain. A grip may irritate; C/D too heavy early.

Case 7: Gluteal Weakness in Runner You are shadowing in a sports rehab facility with Lisa, a 29-year-old distance runner with gluteus medius weakness contributing to ITB syndrome. She is pain-free at rest. Strengthening principles stress single-leg stability and endurance.

Options: A. Prescribe single-leg bridges with 10-second holds. B. Begin with double-leg bridges only to ensure form. C. Use lateral band walks at high resistance from day one. D. Initiate heavy hip thrusts for maximal strength.

Structured Reasoning : A. Single-leg bridges challenge gluteus medius functionally with controlled progression for runners. B too easy; C high resistance risks form break; D power-focused later.

Case 8: Neck Extensor Weakness and Poor Posture In a corporate wellness session, you guide Mr. Lee, a 38-year-old analyst with forward head posture and weak deep neck extensors. He reports mild neck fatigue. Basic principles involve endurance over power.

Options: A. Teach prone head lifts with chin tuck and 10-second holds. B. Begin with resisted neck extension using heavy theraband. C. Prescribe upright rowing to strengthen upper back broadly. D. Use isometric pushes against a wall in standing.

Structured Reasoning : A. Prone head lifts with holds build extensor endurance while maintaining craniocervical flexion. B heavy resistance inappropriate; C broad but less specific; D standing less targeted.

Case 9: Hamstring Weakness Post-ACL Reconstruction As an intern, you see Alex, a 24-year-old soccer player 8 weeks post-ACL reconstruction with hamstring graft. Hamstring strength is 4-/5 with inhibition. Strengthening must balance graft protection and quadriceps dominance avoidance.

Options: A. Start with prone hamstring curls at light resistance. B. Begin with isometric hamstring holds at 90° flexion. C. Use Nordic hamstring lowers eccentrically from the start. D. Focus only on quadriceps closed-chain exercises initially.

Structured Reasoning : B. Isometric holds at 90° minimize graft stress while re-educating hamstrings early post-ACL. A concentric may strain; C Nordic too aggressive; D ignores hamstring need.

Case 10: Respiratory Muscle Weakness in COPD You are a junior clinician introducing strengthening for Ms. Patel, a 72-year-old with COPD and reduced inspiratory muscle strength affecting daily activities. Basic principles prioritize low-load endurance.

Options: A. Use threshold inspiratory muscle trainer at 30% maximal pressure. B. Begin with unresisted diaphragmatic breathing only. C. Prescribe pursed-lip breathing with maximal effort holds. D. Initiate incentive spirometry at high volumes immediately.

Structured Reasoning : A. Threshold IMT at moderate intensity provides specific, evidence-based overload for respiratory muscles in COPD. B no resistance; C/D lack progressive loading.

Answers for Unit III

Case 1: B

Case 2: B

Case 3: B

Case 4: B

Case 5: A

Case 6: B

Case 7: A

Case 8: A

Case 9: B

Case 10: A