Appendix

Physical therapy guideline: active rehabilitation after reverse shoulder arthroplasty

Phase	Physical therapy	Aim	Remarks
1 (0 – 1 weeks)	Physical therapy starting day 1 postoperative, guided by pain, focus on: - Elbow, wrist and hand function - Scapula setting - Guided active shoulder movement (max. 90° anteflexion): raising arms over each other, swinging, external rotation with stick (in supine position) Advice: 1) pillow may be used under the upperarm/elbow while sleeping supine; and 2) cold packs may be used (2-3 times a day)	1. Decrease swelling and pain 2. End of 1st week: - ≥45° anteflexion - ≥45° abduction - passive, if possible active	Day 0-1 shoulder sling Day 2: no sling needed Sling only for short moments to relieve any pain Start outpatient physical therapy directly after hospital discharge
2 (2 – 4 weeks)	Start mobilizing the glenohumeral joint, no range of motion (ROM) restrictions: pain guided anteflexion, abduction and external rotation Exercise therapy focused on improving ROM and muscle activation: - Extend exercises from 1st week - Isometric exercises of deltoid muscle - (Guided) active exercises of deltoid muscle*	1. Decrease swelling and pain 2. ROM recovery and muscle activation 3. End of week 4: - ≥70° anteflexion - ≥70° abduction - passive, if possible active	No sling
3 (4 – 6 weeks)	Glenohumeral joint mobilization Exercise therapy focused on improving ROM and muscle activity: - Pulley, bench slides (later on wall slides)** - Strengthen deltoid muscle: start from a lying position, progress to (half) sitting and standing - Strengthen scapula-thoracal muscles to optimize scapula position - If the function of the cuff is still present, add exercises for cuff muscles	1. Obtain function and ROM 2. End of week 6: - ≥90° anteflexion - ≥80° abduction - passive, if possible active	Study follow up six weeks postoperative
4 (7 – 12 weeks)	Mobilizing glenohumeral joint, targeting preoperative values or contralateral side Exercise therapy focused on progressing ROM, muscle function, coordination and stability: - Strengthen deltoid muscle	1. Recovery to optimal ROM, muscle strength and endurance 2. End of week 12: - >90° anteflexion - >80° abduction - passive, if possible active	Resume mild physical work related activities, if applicable Study follow up three months postoperative

	- Strengthen scapula-thoracal muscles - Strengthen all other shoulder muscles - Activities of daily living (ADL) training	3.	Participate in ADL and back to work	*Focus on quality of movement*
5 (>12 weeks)	Improve ROM and optimize strength, start participating in ADL / work / sports			
Regime:	• Sling first day postoperative and if needed during the first week (daytime only) • Allowed to sleep on affected side if tolerated • Driving car and riding bicycle only with sufficient arm muscle control, in consultation with the physical therapist • Lifting close to body			
* Active exercise of deltoid muscle, gradual progression[6 13]	a) Supine position, bring arm to upright position (assisted by contralateral arm), try to keep this position (figure 3a) b) Keep arm straight and move with comfortable, short arc from upright position (figure 3b) Progression: - Amplitude of movement is, pain guided, gradually increased, if shoulder mobility and control increase - Same movement performed with a small weight (0.5 to 1 kg) - Moving the arm against gravity, starting in a semi-sitting position to a sitting position: first within a short amplitude and without any weights			
** Bench slides progressing to wall slides	a) Bilateral bench slide: patient sitting in front of bench, moving both hands (on a towel/ball) forward and back (anteflexion, figure 3c) Progression: - Patient sits alongside bench and performs unilateral bench slide; progressing with trunk forward flexion - Patient performs bench slides using elastic band for resistance - Bench placed in a sloping position, bench slides in a standing position - Wall slides, first by using both arms b) Wall slides with the operated arm using a towel/ball (figure 3d) Progression: - Movement amplitude gradually increasing - Use elastic band for resistance - Lift hand away from wall in elevated position			

Figure 3a. Arm upright

Figure 3b. Moving straight arm

Figure 3c. Bench slide

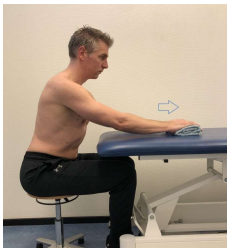
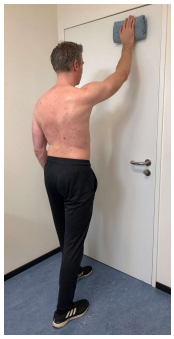
Figure 3d. Wall slide