Rehabilitative Care Best Practices Guidance for Patients post Shoulder Arthroplasty

Rehabilitative Care Alliance
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Background and Introduction

In April 2019, the Ministry of Health launched a bundled care funding model for shoulder arthroplasty, including total anatomic shoulder arthroplasty, shoulder hemi-arthroplasty and reverse shoulder arthroplasty. This new funding model was built on the existing Quality-Based Procedures acute care funding model for shoulder surgery, with the addition of a post-acute rehabilitative care component. Hospitals participating in the bundled care model are expected to ensure that all their patients undergoing shoulder replacement receive high quality post-acute rehabilitation services, either through providing these services within their own organization (such as through a hospital outpatient physiotherapy clinic) or by arranging for rehabilitation services with external organizations, such as community-based physiotherapy clinics.

The introduction of the shoulder replacement bundled care model has spurred a number of Ontario health care organizations involved in care for shoulder arthroplasty patients to take a close look at their care pathways, with an interest in ensuring they are applying best practices in rehabilitative care for shoulder arthroplasty. There is currently a best practice guidance gap in this area in Ontario. While providing recommendations on perioperative care for shoulder surgery, the *Quality-Based Procedures Clinical Handbook for Degenerative Disorders of the Shoulder*[1] ("Clinical Handbook") offers relatively little guidance on best practices in rehabilitation for shoulder surgery patients and specifically, those undergoing shoulder arthroplasty.

In order to address this gap, the Rehabilitative Care Alliance (RCA) and Health Quality Ontario (HQO) developed this *Rehabilitative Care Best Practice Guidance Document for Patients post Shoulder Arthroplasty* to guide organizations seeking to implement best practices for shoulder arthroplasty rehabilitative care.

This document is intended for health care professionals in Ontario involved in care for patients undergoing shoulder arthroplasty, whether or not they are currently participating in the shoulder arthroplasty bundled care model.

The Rehabilitative Care Best Practice Guidance Document for Patients post Shoulder Arthroplasty ("Guidance Document") is intended to:

- Guide best practices for shoulder arthroplasty rehabilitative care across the province;
- Provide a knowledge basis for informing and evaluating quality rehabilitative care for the shoulder arthroplasty bundled care model; and
- Inform bundled care service planning around optimal models and locations for shoulder arthroplasty rehabilitative care.

Methods and Evidence Informing Development of the Guidance Document

The recommendations in this document were developed by the RCA-HQO Shoulder Arthroplasty Task Group ("Task Group"), a provincial group consisting of stakeholders with clinical and system-level expertise from a cross-section of hospitals performing higher volumes of shoulder and reverse arthroplasties (see Appendix A).

The work of this group was informed by several sources. As previously noted, the Clinical Handbook[2] offers relatively little in the way of guidance on rehabilitative care, limited to the following:

- A supervised outpatient postoperative physiotherapy program, supplemented by home exercise provided by the hospital at discharge, is recommended for patients who have undergone rotator cuff surgery or shoulder arthroplasty. (p.47)

No evidence reviews were conducted on rehabilitation-related topics in the development of the Clinical Handbook. The guidelines on various shoulder disorders used as an evidence basis for the document offered little on the subject of rehabilitation.

Literature Review

Accordingly, in order to inform the Task Group, a scan of the literature was conducted to identify existing guidelines and studies containing evidence-based recommendations on best practices for rehabilitative care post shoulder arthroplasty. The scan identified several existing reviews of shoulder arthroplasty guidelines, studies and protocols, with some covering all types of shoulder arthroplasty[3] [4] and others focusing specifically on reverse shoulder arthroplasty.[5] [6]

Several consistent themes emerged from these reviews. Most notably, there are very few published trials comparing the effectiveness of different shoulder replacement rehabilitation interventions or protocols. A 2019 systematic review of shoulder arthroplasty guidance documents by Bullock et al.[3] found only one randomized trial out of 16 articles reviewed, with 12 based solely on expert opinion. These are typically descriptive reports of rehabilitation protocols or pathways used in a particular institution, informed by biomechanical principles; sometimes, these studies report data on patient outcomes, but seldom include comparator interventions or control groups. Hence, existing guidance on rehabilitation best practices for shoulder replacement is nearly entirely consensus, rather than evidence-based.

Between rehabilitation protocols, recommendations vary in areas such as the suggested timing of introducing various activities, the degree of shoulder motion permitted in the first few weeks post-surgery and suggestions for other types of precautions. There are also some common elements found across studies. Protocols typically divide the rehabilitation pathway into either 3 or 4 sequential "phases" of rehabilitation. Suggestive timeframes are typically provided for each phase—varying in duration across protocols—with the caveat that these are not to be used as strict time limits; rather, patients should be progressed from one phase to the next upon achieving specific functional goals in terms of range of motion and tolerance for activity.

In all protocols, there is an initial 4-6 week phase of post-operative recovery and immobilization of the shoulder joint that includes guidance on wound healing, pain management, cryotherapy, continuous use of a

sling for 2-6 weeks (depending on the protocol), proper techniques for positioning and protecting the joint and a gradual introduction of passive range of motion exercises and pendulum exercises on the affected shoulder while maintaining active range of motion in the elbow, wrist and neck joints. Varying degrees of limitation are recommended for shoulder flexion, external rotation and internal rotation during this phase. Bullock et al.[3] emphasize the importance of protecting against subscapularis failure in the first few weeks following surgery.

In the next phase (typically commencing between 6 and 12 weeks after surgery), patients begin active range of motion exercises while correcting for posture, followed by a phase of progressive strengthening and building functional tolerance through isometrics and other exercises. In the final phase (commencing 12-16 weeks after surgery and extending for a year or more), the rehabilitation pathway concludes with return to more challenging functional activities, discharge from formal therapy and continuing with an ongoing home exercise program. Some studies recommend particular lifelong limitations on the amount of weight patients lift with the affected arm.

Several articles note specific nuances throughout these phases for patients undergoing reverse shoulder arthroplasty: compared with total anatomic arthroplasty, patients with reverse arthroplasty are advised to take specific precautions to protect their shoulder from dislocation, such as avoiding the combination of shoulder adduction and internal rotation. Reverse arthroplasty patients also require intensive education and training on the newly expanded role of their deltoid muscles. Similarly, some articles note additional considerations for specific conditions such as rotator cuff pathology and fractures, where full achievement of certain goals may not be possible, or in cases where the patient undergoes revision surgery.

All rehabilitation programs also emphasize the importance of providing pre- and post-operative education to patients, family members and caregivers in a variety of formats, and in using validated functional outcome measures to assess patients' pre- and post-surgical function up to a year or more after surgery.

Approach for Developing and Reviewing Best Practice Recommendations

Given that the clinical evidence base for rehabilitative care following shoulder arthroplasty is relatively sparse, the development of best practice statements for the Guidance Document relied heavily on recommendations based on expert consensus and existing rehabilitation protocols from Ontario hospitals, supplemented with available administrative data. A Modified Delphi Approach was utilized to identify practices for inclusion in the Guidance Document.

These best practice statements were developed by the group with the intent that they address the rehabilitative care needs for the majority of shoulder arthroplasty patients and, where feasible, considerations for shoulder arthroplasty patients with more complex needs are identified. It is recognized that the shoulder arthroplasty population is more heterogeneous than similar populations, such as those for total hip and knee replacement, and that a substantial proportion of patients might require modifications to the contents, goals and suggested timeframes of their rehabilitation protocols in order to maximize the outcomes they attain.

The best practice statements included in this Guidance Document were endorsed by the RCA-HQO Shoulder Arthroplasty Task Group and the RCA Bundled Care Advisory Group, and validated through consultation and

review by external provincial stakeholders. Stakeholders included the RCA Patient & Caregiver Advisory Group, the Shoulder Arthroplasty Bundled Care Working Group (see Appendix B), including orthopedic surgeons and clinicians who work in rehabilitative programs that provide care for patients post shoulder arthroplasty.

	General Guidance for Shoulder Arthroplasty Rehabilitative Care
Considerations	• The optimal location for community rehabilitative care following total and hemi shoulder and reverse arthroplasty is in an outpatient ambulatory setting. According to the Provision of Community Services under the Home Care and Community Services Act (2014): • In the case of physiotherapy services and medical supplies, dressings and treatment equipment necessary to the provision of physiotherapy services, if the services are provided in the patient's home in accordance with clause 3.5 (3) (a), the patient must be unable to access the services in a setting outside the home because of his or her condition[7] *For a patient to access in-home physiotherapy, at least one of the following criteria (based on subject matter expert consensus) should be met:* • *Home bound – patient did not leave the home previously and participating in an outpatient rehabilitation program would negatively impact the patient's progress* • *Cognitive impairment such that participating in an outpatient rehabilitation program would negatively impact the patient's progress* • *Where the waitlist for an outpatient rehabilitation facility (which accepts shoulder arthroplasty patients) cannot provide timely access to rehabilitation as recommended by best practice* • *Other extenuating circumstances to be reviewed on an individual basis with the "Care Coordinator/Manager"* *Please note that difficulty in finding transportation will not, on its own, be considered a reason for authorizing in home services.* • Wherever rehabilitative care is provided, the best practices identified in this guidance document should be provided by regulated health professional(s) who work with patients and in consultation with their surgeons to progress them towards self-management of their own health and ongoing rehabilitation.
Preoperative Care	• Functional ability may be measured through self-administered questionnaires and/or through functional testing using valid outcome measures. These measures may be used to establish the benchmark for patient progress and achievement of functional outcomes. Examples of these measures are provided in the "Clinical Outcome Measures" section. • Post-operative rehabilitation needs should be identified and a referral to rehabilitation initiated. Where rehabilitation providers external to the hospital are involved, arrangements (including financial considerations) should be confirmed prior to the patient's surgery. • Mechanisms should be in place to communicate the date of the outpatient rehab appointment to the patient.

	• Transportation options for outpatient rehab should be discussed and provided to the patient including subsidized programs, if available. • For patients who are expected to receive their rehabilitation services at home due to risk or complexity issues, the interdisciplinary assessment results and care plan (as below) should be shared with the in-home provider, according to patient need/urgency.

Patient & Family Education	• Patients and families benefit from education on how to participate in a successful recovery. As patients have different learning styles, it is recommended that this education be provided through a number of media and that it includes the opportunity for patients and families to ask questions and to access materials according to their needs.[8]
	• Discuss with the patient all aspects of rehabilitative care following total or hemi-shoulder or reverse shoulder arthroplasty. This includes:
	  ○ The rehabilitation progression
	  ○ Maintaining integrity of the replaced joint
	  ○ Pain and swelling management to be coordinated with therapy/exercise program
	  ○ Proper removal and reapplication of the sling
	  ○ Information on positioning for sleeping
	  ○ Wound care as per surgeon protocol
	  ○ Information on assistive devices to support independence with ADLs, such as a reacher, electric can opener and electric toothbrush
	  ○ When to seek medical attention
	• This education should be provided during the preoperative phase of care and may be conducted via 1:1 or group format, where patient volumes permit. Video, handouts and other forms of media can be used to augment this discussion. Education should be repeated within the first 1-2 weeks post-operatively by the rehabilitative care team.
	• Patient education materials should be developed using plain language as a key strategy for improving health literacy and be compliant with the Accessibility for Ontarians with Disabilities Act (AODA) requirements for accessibility.[9]

Initiation, Frequency & Duration	<u>Initiation:</u> • Community rehabilitation is initiated as early as 1-2 weeks after the surgery <u>Frequency and Duration:</u> • *Usual progression:* most require 8-12 rehab visits extended over a duration of 16 weeks • *For those with higher functional demands/frail older adults/medical condition that would impact progression:* More than 12 rehab visits and/or a duration of more than 16 weeks may be required • *Independent progression:* a small cohort of high functioning patients may require fewer than 8 visits of rehabilitative care for instruction in an independent home exercise program, under guidance from their surgeons

	and/or rehabilitative care professionals. These patients should be monitored regularly to ensure they are achieving their goals. • Duration is based on the achievement of functional goals of independence or plateau in progression. • Discharge criteria include the ability to transition to an independent home exercise program.
Clinical Outcome Measures	• Upper Extremity Range of Motion (ROM) and Strength should be measured, along with Patient-Reported Outcome Measures (PROMs), such as the following: ○ Shoulder-Specific or Upper Extremity Patient Reported Outcome Measure. Examples: Upper Extremity Functional Index (UEFI)[10], QuickDASH[11] or the American Shoulder and Elbow Surgeons Form (ASES)[12] ○ Global Quality of Life Patient Reported Outcome Measure. Example: EQ-5D-5L[13] ○ Pain Rating Scale. Example: Numeric Pain Rating Scale (NPRS)[14]

	Total & Hemi-Shoulder Arthroplasty Rehabilitative Care
General Precautions	• No external rotation beyond 20-40 degrees for 6 weeks • No extension for 6 weeks • No internal rotation (Hand Behind Back) for 8 weeks • Limited pushing, pulling or heavy lifting for 6-12 weeks, as guided by the therapist working with the patient.
0-2 Weeks Post-Op	• The following exercises are initiated (as per surgeons protocol): ○ Pendulum exercises ○ Postural exercises ○ Hand, wrist, elbow, neck AROM • Sling should be worn at all times except for bathing and under the direction of the physiotherapist
2-6 Weeks Post-Op	• The following exercises are initiated (as per surgeon protocol): ○ Progress shoulder Passive Range Of Motion (PROM) to Active Assisted Range Of Motion (AAROM) to Active Range Of Motion (AROM), as tolerated • Sling should be worn at all times up to 4-6 weeks, except under the direction of the physiotherapist and for bathing • Maintenance of general fitness would be beneficial, such as stationary bike or walking
6-8 Weeks Post-Op	• Sling is no longer required • The following exercises are initiated (as per surgeon protocol), except as directed in the general precautions: ○ Progress to rotator cuff isometric strengthening ○ Shoulder AROM in all directions ○ Manual therapy such as stretching and mobilizations, if functional ROM is lacking
8-12 Weeks Post-Op	• Initiate light functional activities, including modified occupational duties • The following exercises are initiated (as per surgeon protocol): ○ Subscapularis exercises (isometric and subsequent resistive internal rotation) ○ Strengthening of hand, wrist, elbow and shoulder (for example: Theraband™) ○ Shoulder girdle stabilization • Progress general fitness activities
12+ Weeks Post-Op	• Transition from supervised therapy to independent home exercise program • Progress strengthening, including sport specific and resistive strength training • Return to moderately challenging functional and recreational activities

	Reverse Shoulder Arthroplasty Rehabilitative Care
General Precautions	• No pushing, pulling or lifting greater than 0.5 Kg (weight of a coffee cup) for 6-12 weeks • Repetitive lifting is discouraged • Lifting limit of 5-7 Kg indefinitely, or as recommended by the surgeon • No internal rotation (hand behind back) for 12 weeks • No extension for 12 weeks • Avoid combined movements of extension, adduction and internal rotation
0-2 Weeks Post-Op	• The following exercises are initiated (as per surgeons protocols): ○ Pendulum exercises ○ Postural exercises ○ Hand, wrist, elbow, neck AROM • Sling should be worn at all times except for bathing and under the direction of the physiotherapist
2-6 Weeks Post-Op	• The following exercises are initiated (as per surgeon protocols): ○ Progress shoulder PROM to AAROM to AROM, as tolerated ○ Periscapular muscle strengthening ○ Progress to submaximal pain-free deltoid isometric strengthening • Sling should be worn at all times up to 4-6 weeks, except for bathing and under the direction of the physiotherapist • Maintenance of general fitness would be beneficial, such as stationary bike or walking
6-8 Weeks Post-Op	• Sling is no longer required • The following exercises are initiated (as per surgeons protocols), except as directed in the general precautions: ○ Progress to rotator cuff isometric strengthening ○ Shoulder AROM in all directions
8-12 Weeks Post-Op	• Initiate light functional activities, including modified occupational duties • The following exercises are initiated (as per surgeon protocols): ○ Strengthening of hand, wrist, elbow ○ Shoulder girdle stabilization ○ Progress general fitness activities
12-16 Weeks Post-Op	• Progress to shoulder resistive strengthening exercises, as tolerated • Functional exercises based on work and/or functional demands • Advancement of proprioception exercises
16+ Weeks Post-Op	• Transition from supervised therapy to independent home exercise program

	• Progression toward return to functional and recreational activities within limits, as identified by progress made during rehabilitation and outlined by surgeon and physical therapist

Appendix A: RCA-HQO Shoulder Arthroplasty Task Group

Committee Chairs: Erik Hellsten, Manager
Health Quality Ontario

Charissa Levy, Executive Director
Rehabilitative Care Alliance

RCA Project Manager: Gabrielle Sadler

Name	Title	Organization	LHIN
Joanna Armatys	Outpatient Physiotherapist	William Osler Health System	CW
Debbie Barclay	Physiotherapist	Health Sciences North	NE
Josh Black	Outpatient Physiotherapist	Bluewater Health	ESC
Tiffany Chow	Occupational Therapist	Sunnybrook Health Sciences Centre	TC
Christina Daly	Outpatient Physiotherapist	Halton Healthcare	HNHB
Vera Fung	Physiotherapist	Sunnybrook Health Sciences Centre	TC
Nicole Graham	Bundled Care Coordinator	Health Sciences North	NE
Catherine Lane	Outpatient Physiotherapist	St. Joseph's Health Care London	SW
Lauren Meschino	PT & KDH Site Manager, Altum Health	University Health Network	TC
Cathy Pasternak	Outpatient Physiotherapist	St. Joseph's Health Care London	SW
Kinny Quan Velanoski	Advanced Practice Clinician, Orthopaedic Physiotherapy	Unity Health Toronto - St. Joseph's Health Centre	TC
Helen Razmjou	Associate Scientist	Sunnybrook Health Sciences Centre	TC
Cecilia Robinson	Advanced Practice Physiotherapist	Royal Victoria Regional Health Centre	NSM
Jennifer Rowe	Community Physiotherapist	CBI Home Health	WW
Linda Ryan	Senior Physiotherapist/PPL	Queensway-Carlton Hospital	CH
Lara Saganowich	Physiotherapist	Providence Care	SE
Jennifer Santos	Clinical Services Manager, Rehabilitation & Complex Continuing Care	William Osler Health System	CW
Lynn Stewart	Coordinator Ambulatory Surgery	St. Joseph's Health Care - London	SW
Amy Wainwright	Manager, Rehabilitation & Bone and Joint Program Development	Sunnybrook Health Sciences Centre	TC
Jenna Weck	Physiotherapist	Royal Victoria Regional Health Centre	NSM

Appendix B: Shoulder Arthroplasty Bundled Care Working Group

Name	Title
Dr. Stephen Gallay	Surgeon (Chair)
Dr. Darren Drosdewech	Surgeon
Dr. Christian Veillette	Surgeon
Dr. J. Pollock	Surgeon
Dr Ryan Bicknell	Surgeon
Dr. Krishan Rajaratnam	Surgeon
Dr. Kirit Patel	Anesthesiologist
Dr. Helen Razmjou	Rehabilitation Researcher
Lynn Stewart	Rehabilitation Administrator
Charissa Levy	Rehab Care Alliance Executive Director

Appendix C: Total & Hemi-Shoulder and Reverse Shoulder Arthroplasty Process Indicators

To inform identification of indicators to support the monitoring and evaluation of the Shoulder Arthroplasty Bundle, the RCA-HQO Shoulder Arthroplasty Task Group conducted a review of indicators. The following process indicators were identified as key components of care, throughout the pathway, that will optimize outcomes following Shoulder Arthroplasty:

1) Patient volumes stratified by procedure type (total, hemi, reverse) and most responsible diagnosis
2) Proportion of patients discharged to each post-acute setting (home care, outpatient/community rehab, inpatient rehab, home with no recorded services)
3) Mean and median # of home care/outpatient/community rehab visits per episode
4) Mean and median duration of post-acute service episode
5) 90th percentile Wait 1 and Wait 2 times
6) Proportion with admission or ED visit for surgery-related adverse event within 120 days of acute discharge
7) Percentage of cases completed as same day surgery
8) Mean / median LOS for inpatient cases
9) Patient experience
10) Measure of shoulder-specific function captured at pre-op, 3 months and 6 months post-op with validated scale
11) Global quality of life captured at pre-op, 3 month and 6 months post-op with a validated QoL scale
12) Total cost of episode and cost by each care type

[1] Health Quality Ontario (2015). Clinical Handbook for Degenerative Disorders of the Shoulder. Accessed: http://www.health.gov.on.ca/en/pro/programs/ecfa/docs/hb_shoulder.pdf

[2] ibid

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[4] Kraus, M., Krischak, G., & Tepohl, L. (2014). Postoperative Rehabilitation of Patients with Shoulder Arthroplasty–A Review on the Standard of Care. Int J Phys Med Rehabil S, 5, 2.

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