Arthroplasty

PERSPECTIVE

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A 10-point preoperative checklist: selecting patients for outpatient joint replacement surgery

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Abstract

Background With advancements in perioperative care, joint replacement (JR) surgery is undergoing a transition from opacified in-patient institutions to nimble out-patient Ambulatory Surgical Centers (ASC). The goal of JR in ASC setting is safe patient discharge with subsequent rehabilitation without readmission. Multi-modal preoperative rehabilitation (MMPR) is a novel field of perioperative care, encompassing comprehensive parameters to ensure smooth transition from fitness for surgery to JR in outpatient setting. At present, there are no open-access schemes for selecting patients qualified for JR in the ASC setting. In this article, we propose an evidence-based, 10-point systematic evaluation of patients with target endpoints for MMPR to qualify patients for JR as an outpatient procedure. This checklist is a non-proprietary scheme serving as an initial framework for surgeons exploring surgery in the ASC setting.

Body We introduce factors for a prehabilitation scheme, called Checklist Outpatient-Joint Replacement (CO-JR) to qualify patients for outpatient JR surgery. These factors have been developed based on an extensive literature review and the significant experience of authors to incorporate variables that drive a successful outpatient JR procedure. The factors include patient education, psychiatric & cognitive ability, medical fitness, musculoskeletal capability, financial ability, transportation access, patient motivation, information technology (IT) capabilities, along with ability to recover independently at home postoperatively. The CO-JR scheme is under the process of validation at multiple institutions. We introduce this as a starting point for collaborative development of an open-access scheme for all surgeons to learn and adapt as needed for their respective global region.

Conclusion We established a non-proprietary 10-point CO-JR scheme, serving as a framework for surgeons to successfully select patients for JR surgery in the ASC setting. We encourage concomitant validation of this scheme globally. Our goal is to reach an international consensus on an open-access scheme, available for all surgeons to enrol patients for JR in the ASC setting, but modifiable to accommodate regional needs.

Keywords Outpatient Surgery, Ambulatory Surgical Centre (ASC), Knee Replacement, Hip Replacement, Scoring Profile

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Background

Joint Replacement (JR) Surgery offers significant improvement in pain, functional outcomes and quality of life [1–3]. With the increasing volume of procedures performed globally, there is concern about rising healthcare costs [4–11]. Advancements in preoperative patient assessment and discharge logistics are allowing for a shift in JR procedures away from opacified in-patient institutions to nimble out-patient Ambulatory Surgical Centers (ASC) [12–16]. Multi-Modal Preoperative Rehabilitation (MMPR), also known as prehabilitation, is a novel field of perioperative care facilitating this transition.

Traditional preoperative care in JR involves education regarding surgical logistics and medical clearance. These discussions are generic and not patient-tailored. In contrast, MMPR encompasses comprehensive parameters to ensure that the patient will be fit to undergo JR in the outpatient setting. The goal of JR in the ASC setting is safe discharge and subsequent rehabilitation without readmission. MMPR scheme identifies parameters that require optimization. These include lifestyle modifications, optimization of medical comorbidities, patient education in the surgical process, psychological conditioning, physiotherapy and nutrition [17, 18]. The scheme is personalized for each patient to ensure a safe procedure and recovery in an ambulatory setting. It offers benefits to patients as well as the healthcare systems in efficiency of care. For patients, prehabilitation aims to improve postoperative functional outcomes and reduce the need for ancillary resources. For the healthcare system, prehabilitation offers a better delivery of value-based care by allowing for ambulatory discharge to home and completion of rehabilitation in an outpatient setting.

At present, there are no comprehensive, open-access schemes for selecting patients qualified for JR in the ASC setting. This article proposes a 10-point systematic evaluation of patients with target endpoints for MMPR to qualify patients for JR as an outpatient procedure. This checklist is a non-proprietary scheme, which we would like to be modifiable, to address differences in regional needs. Table 1 outlines our proposed Checklist Outpatient-Joint Replacement (CO-JR), qualifying patients for hip and knee replacement surgery in the ambulatory setting. The score range is from 0 to 10. To be qualified for outpatient JR surgery, we believe patients should have a score > 8, with a mandatory score of 1 (Yes) on Factors 1, 3, and 4. These factors were developed based on an extensive literature review and significant experience to incorporate all factors that drive a successful outpatient JR procedure. The factors include patient education, psychiatric and cognitive ability, medical fitness, musculoskeletal capability, financial ability, transportation access, patient motivation, information technology (IT) capabilities, along with ability to recover independently at home postoperatively (Tables 1 and 2).

One specific area in MMPR that we wish to emphasize is preoperative musculoskeletal training, which is in debate. The assumption is that preoperative musculoskeletal training will confer better postoperative recovery. Training methods include muscle resistance exercises, joint flexibility and step training [40]. The duration as well as frequency varies. However, in recent North American hip and knee national meetings, experts raised concerns regarding overzealous preoperative musculoskeletal training, which can cause polyarticular joint inflammation and excess musculoskeletal pain. Preoperative edema and pain adversely affect postoperative recovery. Hence, we recommend emphasis on keeping the joint "calm" and focusing on balance and gait training.

We acknowledge the 10-point CO-JR scoring system is yet to be validated in clinical trials. However, we introduced this as a starting point for the collaborative development of an open-access scheme for all surgeons to learn and adapt as needed for their respective global regions. Our future goal is to validate the scheme locally, but we encourage concomitant validation at other global centers. The goal is to continuously modify this scheme to maximize the outcomes for the ASC setting. We encourage input from all disciplines that interact with patient care in the ASC setting (nursing care, counsellors, physical/occupational therapists, psychiatrists/psychologists, primary care physicians, and orthopaedists).

Conclusion

Our goal is to develop a non-proprietary, open access 10-point CO-JR scheme, developed by the collaborative effort of surgeons across the world, serving as a framework for successfully selecting patients for JR surgery in the ASC setting. We acknowledge that the needs of global populations vary, and the available medical resources are not alike. In the future, we envision a Modified CO-JR for various countries requiring different needs suiting their local ethnic and demographic variances, e.g., Modified CO-JR India, Modified CO-JR Nigeria, Modified CO-JR New Zealand, Modified CO-JR USA etc. The proposed scheme is

Table 1 Proposed 10-point checklist for surgeons to enrol patients for joint replacement surgery in an outpatient setting

Checklist Outpatient-Joint Replacement (CO-JR)						
No	**Parameter**	**Optimal Value**	**Assessment Instruments**		**Score**	**Patient Remediation Plan (Evaluator to complete)**
					Patient score	
1	**Patient Education: Illness Coherence and Procedure Awareness**	Patient understands all aspects of JR Procedure, Recovery and his/her individual responsibility in this process Patient is evaluated for baseline psychological distress [19, 20], perception of illness (illness coherence) [21] and expectations of 24-h discharge following surgery [22–24]	Video tutorials or telemedicine class Final coordinator interview/1-on-1 session with patient		Yes = 1 No = 0	
2	**Patient Motivation**	Patient acknowledges the need for self-improvement and commitment to rehabilitation. The goal is to return to independent living [25–27] Patient articulates willingness to participate in Outpatient surgery protocol [23]	Reading a standardized script and assessing willingness to participate via a 10-point Modified Likert Scale (with 0 = unmotivated, unwilling and 10 = highly motivated, highly willing). A score of ≥ 5 would be sufficient to proceed with the surgery [26]		Yes = 1 No = 0	
3	**Medical Fitness, Habits, Nutrition**	Optimization of all medical comorbidities [28, 29] Normal albumin [30–33] and vitamin levels Negative Cotinine levels No Opiates/Tramadol within 4 months of surgery Initiate starting an anti-inflammatory diet [30, 34] Full capability to withstand surgical stress and postoperative anaemia & engage in rehabilitation (home and clinic)	Comprehensive Serum Laboratory testing and BMI ≤ 32	WNL	Yes = 1 All six categories are fulfilled	
			Serum albumin [31–33]	≥ 3.5 g/dL		
			HbA1C levels	≤ 7%		
			Serum Cotinine [35, 36]	< 8 ng/dL	No = 0	
			STOP-Bang Index (Sleep Apnoea survey) [37]	0–2		
			UCLA Patient Medical Risk Stratification	< 3		
4	**Physical Musculoskeletal Capability**	Maximize preoperative strength, balance, agility **without** causing debilitating pain and joint inflammation Minimising postoperative fall risk Preoperative pain and inflammation must be kept at a minimum to avoid postoperative edema and excess pain cycle	6 Minute Walk Test (with/without aid) [38]	Yes	Yes = 1 Both categories were fulfilled	
			CMT (Table 2): ≥ 7 sit-to-stand repetitions in 30 s	Yes	No = 0	
5	**Computer & Internet Capability**	Able to engage in Telemedicine Visits Independently	Interview & in-home assessment for telemedicine		Yes (able) = 1 No (Not able) = 0	

Table 1 (continued)

Checklist Outpatient-Joint Replacement (CO-JR)

No	Parameter	Optimal Value	Assessment Instruments	Score		Patient Remediation Plan (Evaluator to complete)
					Patient score	
6	**Perioperative In-Home Support**	Designated, on-demand, 24 × 7 (home-aid/family member) support available for 8 weeks post-op	Interview with patient, family & PCP to ensure such availability	Yes (arranged) = 1 No (Not arranged) = 0		
7	**Transportation**	On-demand access in a timely fashion for scheduled and unscheduled healthcare visits	Interview with patient & preoperative transportation status evaluation	Yes (available) = 1 No (Not available) = 0		
8	**Financial Ability**	Ability to cover all expected and unexpected charges related to joint recovery Ability to pre-pay down payment for surgical procedure	Occupational "time off" benefits (to include designated family helper) Interview with a financial coordinator	Yes (Can cover) = 1 No (Cannot cover) = 0		
9	**Postoperative Self Sufficiency**	Patient is self-sufficient and willing to engage during the recovery phase	Interview with patient, family & PCP In-home assessment for food stores and hygiene	Yes (Capable) = 1 No (Not capable) = 0		
10	**Perioperative Cognitive Ability**	Low likelihood to become confused and/or disoriented after going home from surgery No history of postoperative delirium No dementia & fully engaged in preoperative evaluation process	CAM (Confusion Assessment Method) < 2 [39] by Nurse navigator	Yes (Pass) = 1 No (Fail) = 0		

1. *PCP* Primary Care Physician, *WNL* Within Normal Limits, *CMT* Chowdhry McPherson Test (In review), *ADL* Activity of Daily Living

MMPR Rules for CO-JR:

✓ Items 1, 3 & 4 must be = 1 (Yes); Score > 8 required to qualify for JR in ASC

Table 2 Chowdhry-McPherson Test (CMT) for preoperative musculoskeletal capability assessment in joint replacement surgery

Chowdhry McPherson Test (CMT)[a] explanation
Rationale: 1. The patient must be able to get out of bed, onto & out of the toilet, and into & out of the couch at home without becoming encumbered
Test Description: 1. Patient sits on a chair with knees at 90 degrees, feet flat on the floor. The chair should have no side arms 2. The patient is asked to perform repetitive sit-to-stand as many times as possible in 30 s. The patient is timed by the examiner 3. A passing grade is $\geq$ 7 repetitions/30 s

[a] Testing is in validation at the present time

aimed to serve as a benchmark and is currently under the process of validation. With this initial proposal, we encourage concomitant input and validation to create a common, global platform for JR in the ASC setting. In the future, we would encourage an in-person consensus meeting to further expand this grading system.

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Authors' contributions
Both M.C. and E.J.M. have contributed equally to the development of this checklist. Both authors have contributed majorly to writing and editing the manuscript. Both authors have read and approved the final manuscript.

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Declarations

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Consent for publication
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Competing interests
The authors have no competing interests to mention relevant to this manuscript.

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