also exceeded historical controls in ROM and function and may not have provided a true low-intensity comparison.

Effectiveness of high-intensity resistance training may be limited by arthrogenic muscular inhibition of the quadriceps (muscle activation deficits) in the early postoperative period.[78] Patients with large muscle activation deficits may not experience sufficient muscle overload with resistance training to achieve comparable strength gains as those of patients without muscle activation deficits.

Potential benefits, risks, and harms of implementing this recommendation. Benefits are as follows:

- Improvement in muscle strength.
- Improvement in activities related to mobility (eg, getting into and out of a chair).
- Improvement in balance.
- Improvement in knee extension.

Risk, harm, and/or cost are as follows:

- Early postoperative high intensity resistance training after TKA, does not have harms or risks when the therapist follows appropriate progression criteria (eg, avoiding excessive swelling, pain, or prolonged soreness following intervention) and educates the patient accordingly.[78]
- In the absence of appropriate criteria, overly aggressive progression can exacerbate pain and swelling.
- Team members should be aware of potential complications after TKA that may affect exercise including incision healing, thromboembolism, and joint stiffness/arthrofibrosis.

Benefit-harm assessment: There is a preponderance of benefit for this recommendation.

Future research. Future studies should evaluate the impact of muscle activation deficits on the effectiveness of early progressive resistance exercise in terms of muscle strength gains and functional outcomes. Additional work should focus on the optimal timing of resistance training, potentially targeting later postoperative recovery when muscle activation deficits have resolved.

Value judgments. None were identified.

Intentional vagueness. High-intensity strength training should include the use of progression criteria such as described in Bade et al[78] to tailor speed of progression with individual responses to exercise (eg, excessive swelling, pain, or prolonged soreness following intervention). Given the varied nature of the study interventions, the work group cannot recommend a specific parameter for resistance and intensity; however, Molla et al[79] found that 6 weeks of progressive resistance training 3 times per week starting the day after surgery resulted in better balance outcomes on the Sharpened Romberg, Star Excursion, and Berg Balance Scale tests. Husby et al[80] found that resistance training 3 times per week for 8 weeks initiated 8 days after TKA resulted in better muscle strength and that gains persisted through 12 months after TKA.

Exclusions. None were identified.

Quality improvement. Organizations may use documentation of use of high-intensity strength training and exercise programs with appropriate progression criteria after TKA as a performance indicator.

Implementation and audit. Organizations may audit occurrence of use of high-intensity strength training and exercise programs with appropriate progression criteria after a TKA to optimize function.

Prognostic Factors: Body Mass Index (BMI), Depression, Preoperative ROM, Physical Function and Strength, Age, Diabetes, Comorbidities, and Sex ♦♦♦◊

Physical therapist management should take into consideration the following factors when determining prognosis, treatment, and informed decision making and expectation setting with patients undergoing TKA:

(a) Higher BMI is associated with more postoperative complications and worse postoperative outcomes.
(b) Depression is associated with worse postoperative outcomes.
(c) Preoperative ROM is positively associated with postoperative ROM but has minimal, if any, effect on physical function and quality of life.
(d) Preoperative physical function is positively associated with postoperative physical function.
(e) Preoperative strength is positively associated with postoperative physical function.
(f) Age is associated with mixed patient-reported, performance-based, and impairment-based outcomes.
(g) Diabetes is not associated with worse functional outcomes.
(h) A greater degree of comorbidity is associated with worse patient-reported outcomes.
(i) Sex is associated with both positive and negative effects on postoperative outcomes.

Evidence Quality: High; Recommendation Strength: Moderate.