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THE IMPACT OF BODY MASS INDEX ON TIME TO FULL FUNCTIONAL RECOVERY FOLLOWING TOTAL HIP ARTHROPLASTY: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

Obesity represents a growing global health challenge with significant implications for orthopedic surgery outcomes. Total hip arthroplasty (THA) is one of the most common and successful procedures for treating end-stage hip osteoarthritis. The influence of high body mass index (BMI) on postoperative functional recovery requires our attention due to the seriousness of this issue. This systematic literature review aimed to evaluate the impact of BMI on time to full functional recovery following primary total hip arthroplasty, examining evidence from Polish and international studies. Outcomes assessed included Harris Hip Score (HHS), Hip disability and Osteoarthritis Outcome Score (HOOS), gait analysis parameters, complication rates, and time to functional independence. Based on the studies analyzed, it can be observed that elevated BMI primarily contributes to an increased risk of perioperative complications and revision surgeries. Short-term functional recovery (<6 months) showed small differences favoring non-obese patients, but these differences remained below minimal clinically important difference thresholds. By 6-12 months post-surgery, functional gains were comparable between obese (BMI ≥30 kg/m²) and non-obese patients. Obese patients demonstrated significant improvements in gait speed and hip range of motion, with functional gains comparable irrespective of BMI. However, morbidly obese patients (BMI ≥35 kg/m²) experienced higher revision rates (7.99% vs 2.75%, $p<0.0001$) and increased complication rates. Postoperative complications including surgical site infections (11.83% vs 4.30%, $p=0.05$) and prolonged hospital stays (7.6±2.1 vs 5.4±1.7 days, $p<0.001$) were significantly elevated in obese patients.

KEYWORDS

Body Mass Index, Obesity, Total Hip Arthroplasty, Functional Recovery, Rehabilitation Outcomes, Harris Hip Score

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Introduction

The global prevalence of obesity has reached epidemic proportions. One can say that obesity has become the disease of the 21st century – unfortunately, a body mass index (BMI) ≥30 kg/m² now affects an estimated 650 million adults worldwide. This dramatic increase in obesity rates has profound implications for orthopedic surgery, particularly for total hip arthroplasty (THA), one of the most commonly performed elective procedures globally. In Poland, recent epidemiological data indicate that 38% of the population aged 15 and older is overweight, with 18.5% classified as obese, reflecting trends observed internationally. Obesity exerts multifactorial effects on joint health through both mechanical and inflammatory pathways. Increased mechanical loading on weight-bearing joints accelerates articular cartilage degradation. Moreover, inflammatory mediators derived from adipose tissue contribute to low-grade systemic inflammation, which further compromises joint integrity. Consequently, obese individuals require hip replacement surgery significantly earlier than their normal-weight counterparts—studies report obese patients (BMI ≥30 kg/m²) requiring THA approximately 1.7 years earlier, with morbidly obese patients (BMI ≥35 kg/m²) requiring surgery 3.4 years earlier than individuals with normal BMI. The relationship between elevated BMI and THA outcomes remains controversial in the orthopedic literature. Some studies report increased perioperative complications, prolonged rehabilitation, and inferior functional outcomes in obese patients, leading some healthcare systems to implement BMI-based restrictions for elective joint replacement surgery. Conversely, other investigations demonstrate comparable functional improvements between obese and non-obese patients following THA, questioning the appropriateness of blanket BMI cutoff policies.

Despite the clinical importance of this topic, considerable heterogeneity exists in the literature regarding the specific impact of obesity on time to functional recovery after THA. Previous reviews have examined complication rates and long-term implant survival, but few have systematically analyzed the temporal dynamics of functional recovery across different BMI categories. Understanding whether obesity genuinely

delays return to functional independence—and if so, to what extent—has critical implications for patient counseling, surgical decision-making, and resource allocation.

This systematic literature review aims to:

1. Evaluate the impact of BMI on time to full functional recovery following primary total hip arthroplasty.
2. Compare functional outcomes between obese (BMI ≥30 kg/m²) and non-obese (BMI <30 kg/m²) patients across short-term (<6 months), medium-term (6-12 months), and long-term (>12 months) follow-up periods.
3. Assess the clinical significance of any differences in recovery trajectories.
4. Examine complication rates and their impact on functional recovery timelines

By addressing these objectives, this review seeks to provide evidence-based guidance for clinicians managing obese patients undergoing THA and to inform policy decisions regarding surgical eligibility criteria.

Methodology

Literature Selection and Search Strategy

A comprehensive systematic literature search was conducted across multiple databases for studies published between 2007 and 2025. The search strategy was designed to maximize sensitivity while maintaining adequate specificity for studies examining the effects of body mass index (BMI) and obesity on functional recovery following total hip arthroplasty (THA). Study selection prioritized rigorous clinical research providing empirical data on BMI/obesity, total hip arthroplasty, functional recovery and rehabilitation outcomes, including measures such as the Harris Hip Score.

Inclusion Criteria

Studies were selected based on the following criteria:

1. Investigated primary total hip arthroplasty in adult patients (≥18 years)
2. Examined the relationship between BMI/obesity and functional recovery outcomes
3. Reported quantitative functional outcome measures (e.g., Harris Hip Score, HOOS, WOMAC, gait parameters, Functional Independence Measure)
4. Included comparative analysis between different BMI categories or correlation analysis with BMI
5. Provided sufficient methodological detail to assess study quality

Quality Assessment

Study quality was assessed considering:

- Sample size adequacy
- Follow-up duration and completeness
- Use of validated outcome measures
- Control for confounding variables
- Statistical analysis appropriateness
- Risk of bias assessment

Data Synthesis

Given the heterogeneity in outcome measures, follow-up periods, and BMI categorizations across studies, a narrative synthesis approach was employed rather than quantitative meta-analysis. Results were organized according to:

1. Time periods (short-term <6 months, medium-term 6-12 months, long-term >12 months)
2. BMI categories (normal weight BMI <25, overweight BMI 25-29.9, obese class I BMI 30-34.9, obese class II BMI 35-39.9, morbid obesity BMI ≥40)
3. Outcome domains (functional scores, gait parameters, complications, revision rates)

Results

I. Functional Recovery Outcomes

Short-Term Recovery (<6 Months)

The systematic review by Courtine et al. (2023), including 34,955 THR patients from 26 studies, showed a small short-term (<6 months) difference in functional recovery in favor of non-obese patients. Importantly, this difference did not exceed the minimal clinically important difference (MCID), indicating that, although statistically detectable, it was not clinically meaningful for patients.

Gait analysis at 6 months post-THA demonstrated that both obese and non-obese groups achieved significant functional improvements from baseline, with no correlation found between gait velocity, hip range of motion, and BMI at this timepoint. All patients, including obese patients, demonstrated significant functional improvement after THA as objectively assessed by gait speed, although neither group fully recovered to the level of healthy control persons.

A study examining inpatient rehabilitation found that FIM (Functional Independence Measure) scores improved similarly across all BMI groups from admission to discharge, with gains of 25 to 29.5 points. Interestingly, FIM efficiency was highest in the obese class II category (3.65), followed by obese class III (3.60), with significant differences in FIM efficiency between normal and obese class I groups favoring the obese group ($p=0.024$).

Medium-Term Recovery (6-12 Months)

By 6-12 months post-surgery, the functional recovery gap between obese and non-obese patients narrowed considerably. Courtine et al. (2023) reported that functional recovery differences that existed in the short term disappeared in the medium term for THR patients. The gait analysis study confirmed this finding, with biomechanical and clinical gains comparable between obese and non-obese groups at 6 months, leading to the conclusion that functional gain is comparable irrespective of BMI.

Patient-reported outcomes demonstrated substantial improvements in both groups. A study examining HOOS Junior scores found that Class III obese patients reported increases of 33.7 ± 15.6 points at 90 days compared to 26.1 ± 17.1 in healthy weight individuals ($p=0.002$). Fewer healthy weight patients achieved the minimal clinically important difference (87.4%) for HOOS JR compared to Class II obesity (96.5%) and Class III obesity groups (94.7%) at 90 days postoperatively.

Long-Term Recovery (>12 Months)

Long-term functional outcomes showed continued convergence between BMI groups. The systematic review by Barrett et al. (2018) examining morbidly obese patients (BMI ≥35) found that Harris Hip Score improvements were at least comparable between morbidly obese and non-obese groups. Median pre-operative HHS was 36.5 in morbidly obese vs 45.5 in non-obese patients, with post-operative scores of 82.1 vs 90.2 respectively—yielding similar improvement magnitudes (45.6 vs 44.8 points).

At 12-month follow-up, Rahman et al. (2025) documented persistent differences in absolute mobility scores (5.0 ± 1.1 in obese vs 6.1 ± 0.9 in non-obese, $p<0.001$), but substantial improvements from baseline in both groups. Quality of life improvements were reported by 66.67% of obese patients compared to 83.87% of non-obese patients ($p=0.006$).

II. Harris Hip Score Analysis

Harris Hip Score (HHS), the most widely utilized outcome measure, was reported in multiple studies with consistent findings. Four studies in the Barrett systematic review documented HHS improvements across BMI categories:

Table 1. Harris Hip Score outcomes in morbidly obese patients across studies

Study	Morbidly Obese Pre-op	Morbidly Obese Post-op	Improvement
Arsoy et al.	33.9	74.9	39.7
Issa et al.	39.0	82.0	43.0
McCalden et al.	35.7	86.4	49.2
Chee et al.	37.3	85.4	48.1
Mean	**36.5**	**82.1**	**45.0**

These improvements of 39.7-49.2 points represent substantial functional gains, with all studies confirming that the magnitude of HHS improvement in morbidly obese patients was at least comparable to non-obese controls. The clinical significance of these improvements is underscored by all patients achieving HHS scores above 75, typically considered the threshold for "good" outcomes.

III. Gait and Mobility Parameters

Objective gait analysis provided quantitative evidence of functional recovery trajectories. The prospective study by Martz et al. (2019) employed 3D gait analysis to assess 76 THA patients (37 obese, 39 non-obese) with 6-month follow-up. Key findings included:

Preoperative status:

- Gait speed: Obese 0.64 ± 0.23 m/s vs Non-obese 0.81 ± 0.22 m/s (p=0.004)
- Hip flexion ROM: Obese 21.4° ± 6.6 vs Non-obese 26.1° ± 7.3 (p=0.005)

Six-month postoperative status:

- Both groups showed significant improvements from baseline
- Gait speed remained lower than healthy controls for all patients
- No correlation between BMI and functional gains (gait velocity or hip ROM)

The study concluded that "all patients, including obese patients, have significant functional improvement after THA, objectively assessed by gait speed. Even if patients did not fully recover to the level of a healthy control person after THA, functional gain is comparable irrespective of BMI".

IV. Complications and Revision Rates

While functional recovery proved comparable across BMI categories, complication profiles differed significantly. The systematic review by Barrett et al. (2018) examining 771,857 THAs found substantially elevated revision rates in morbidly obese patients:

- Morbidly obese (BMI ≥35): 7.99% revision rate
- Non-obese (BMI <30): 2.75% revision rate
- Largest study (Werner et al.): 6.88% vs 3.40% (p<0.0001)[3]

The prospective study by Rahman et al. (2025) documented specific complication rates at 12-month follow-up:

Table 2. Complication rates in obese vs non-obese THA patients

Complication	Obese (n=93)	Non-obese (n=93)	p-value
Surgical Site Infection	11.83%	4.30%	0.05
Delayed Wound Healing	9.68%	3.23%	0.04
Prosthetic Loosening	6.45%	2.15%	0.15
Revision Surgery Required	5.38%	1.08%	0.04

Morbidly obese patients undergoing revision THA for periprosthetic joint infection experienced markedly elevated risks of reinfection (18% vs 2%, p<0.005), reoperation (61% vs 12%, p<0.001), and component resection (42% vs 11%, p<0.001) compared to non-obese patients.

V. Hospital Length of Stay and Rehabilitation Efficiency

Obesity significantly impacted healthcare resource utilization. Rahman et al. (2025) found hospital stays averaged 7.6 ± 2.1 days for obese patients compared to 5.4 ± 1.7 days for non-obese patients (p<0.001), representing a 41% increase in length of stay.

An inpatient rehabilitation study found that while FIM gains were similar across BMI categories, FIM efficiency (functional gain per day), length of stay, and total hospital charges demonstrated curvilinear relationships with BMI. Severely obese patients achieved physical improvements but at lower efficiency and greater cost. Total hospital charges were highest in the severely obese group compared to the overweight group (p<0.05).

VI. Impact of Comorbidities

Multivariate analysis by Rahman et al. (2025) identified independent predictors of postoperative outcomes:

- Obesity (BMI ≥30): OR 2.40 (95% CI 1.30-4.50, p=0.005)
- Diabetes mellitus: OR 1.80 (95% CI 1.00-3.20, p=0.04)
- Higher preoperative mobility score: OR 0.70 (95% CI 0.50-0.90, p=0.01)

Notably, age, gender, and hypertension were not significant predictors of postoperative outcomes in multivariate models. The combination of obesity and diabetes appeared particularly deleterious, with obese diabetic patients experiencing elevated infection rates and delayed functional recovery.

VII. Preoperative Weight Loss Interventions

The role of preoperative weight loss in improving THA outcomes has received increasing attention. Studies examining bariatric surgery prior to THA demonstrated decreased operative time and length of stay among patients who underwent THA after versus before bariatric surgery, with lower BMI maintained at 1-year follow-up. **Nevertheless**, postoperative complication rates were similar regardless of bariatric surgery timing, suggesting that benefits of weight loss should be considered but optimal timing remains uncertain.

If we consider non-surgical preoperative weight loss interventions, the situation tends to fluctuate. The preoperative period represents a critical window for lifestyle interventions, as scheduled surgery may motivate patients to lose weight. However, many practices adopted a BMI cutoff of 40 kg/m² following 2013 AAHKS recommendations to delay THA above this threshold. Recent evidence questioning the clinical significance of functional differences challenges the appropriateness of such blanket restrictions.

Discussion

Primary Findings: Functional Recovery is Comparable

The most significant finding is that while obese patients consistently present with lower preoperative functional status and achieve lower absolute postoperative scores, the magnitude of functional improvement and time to functional recovery do not differ clinically significantly from non-obese patients. The systematic review by Courtine et al. (2023) definitively demonstrated that differences in functional recovery between obese and non-obese patients remain below MCID thresholds in short-term follow-up and disappear entirely in medium to long-term follow-up. This finding challenges the notion that obesity fundamentally impairs the body's capacity for functional recovery after THA. Instead, it suggests that obesity affects baseline functional capacity, but the restorative potential of THA remains intact across BMI categories. The gait analysis study providing objective biomechanical data reinforces this conclusion—while absolute gait parameters remain lower in obese patients, improvements from baseline are comparable.

The Obesity Paradox in Rehabilitation

Several studies identified an intriguing "obesity paradox" wherein some functional recovery metrics favored obese patients. The FIM efficiency study found that obese class I patients achieved significantly better functional gains per day than normal weight patients (p=0.024), with obese class II and III also showing high efficiency ratings. Similarly, patient-reported outcomes demonstrated that higher BMI classes reported greater improvements following THA, with fewer patients achieving MCID in the healthy weight category compared to obese groups.

This paradox may reflect several mechanisms:

1. **Floor effect**: Obese patients starting from lower baseline functional status have greater potential for absolute improvement.
2. **Expectation effects**: Patients with lower preoperative function may have lower expectations, leading to higher satisfaction with modest improvements.
3. **Pain relief predominance**: The primary benefit of THA—pain relief—may be more pronounced in obese patients who experience greater preoperative pain.
4. **Reduced activity demands**: More sedentary lifestyles in morbidly obese patients may result in lower functional demands, making achieved improvements more subjectively satisfying.

Complications vs Functional Recovery: A Critical Distinction

This review highlights a critical distinction often conflated in discussions of obesity and THA: complication risk versus functional recovery capacity. Obese patients unequivocally experience elevated complication rates, including:

- 2.9-fold higher revision rates in morbidly obese patients
- 2.7-fold higher surgical site infection risk
- 3-fold higher delayed wound healing rates
- 41% longer hospital stays

Despite higher complication rates, this does not result in proportionally worse functional outcomes among patients whose postoperative course remains uncomplicated. Most obese patients undergo THA without major complications and achieve functional gains comparable to those of non-obese individuals. The systematic review by Barrett et al. (2018) showed that, despite increased revision rates, improvements in pain and quality of life after THA are similar to those observed in patients with a normal BMI. This distinction has important implications for patient counseling and shared decision-making. Obese patients should be informed of elevated complication risks, but should not be counseled that obesity will prevent functional improvement. The appropriate question is not "Will I recover?" but rather "What are my risks during recovery?"

Clinical Significance vs Statistical Significance

A recurring theme in this review is the divergence between statistical significance and clinical significance. Multiple studies reported statistically significant differences in postoperative functional scores between BMI groups ($p<0.05$), but these differences frequently fell below established MCID thresholds. For Harris Hip Score, MCID values range from 6-10 points depending on the baseline score; observed differences between obese and non-obese groups typically ranged from 3-7 points, suggesting statistical but not clinical significance. The emphasis on MCID-based interpretation represents a methodological strength of recent studies and should inform future research. Reporting p-values alone without consideration of effect size and clinical meaningfulness can lead to misinterpretation of findings and inappropriate translation into clinical practice.

Timing of Functional Milestones

While overall functional improvement magnitude is comparable, the temporal dynamics of recovery may differ subtly between BMI groups. Short-term recovery (<6 months) shows small advantages for non-obese patients, potentially reflecting:

- Faster wound healing and tissue recovery in non-obese patients
- Earlier mobilization and weight-bearing capacity
- Reduced pain and inflammation in early postoperative period
- Greater ease of physical therapy participation

By 6-12 months, these early advantages dissipate as obese patients catch up in functional recovery. This pattern suggests that obesity may delay but not diminish ultimate functional outcomes. From a rehabilitation perspective, this finding supports extended or intensified rehabilitation protocols for obese patients in the early postoperative period to accelerate achievement of functional milestones.

The Role of Comorbidities

Multivariate analyses from the included studies indicate that obesity functions as an independent predictor of adverse outcomes, while diabetes mellitus emerges as an additional, clinically relevant determinant of postoperative recovery. The frequent clustering of obesity with metabolic comorbidities appears to exert a synergistic effect, amplifying overall complication risk rather than acting as isolated risk factors. In this context, obese patients with well-controlled diabetes and optimized cardiovascular risk profiles can achieve outcomes that approximate those of non-obese individuals, whereas those with poorly controlled comorbidities remain at substantially higher risk of adverse events and suboptimal recovery. These findings emphasize that perioperative risk stratification and management should extend beyond a simplistic focus on BMI cut-off values. Instead, a comprehensive preoperative optimization strategy is warranted, incorporating strict glycemic control in diabetic patients (for example, targeting HbA1c <7.0%), aggressive blood pressure management, smoking cessation, nutritional optimization, and structured preoperative strength and conditioning programs. Such an approach may mitigate the excess risk associated with obesity and its metabolic sequelae and should be considered a core component of preoperative pathways for patients undergoing total hip arthroplasty.

Implications for Patient Selection in THA

The finding that functional recovery is comparable across BMI categories challenges BMI-based exclusion criteria for THA. Some healthcare systems have implemented policies refusing THA for patients with BMI ≥35 or ≥40 kg/m². While well-intentioned to reduce complications, such policies may deny clinically appropriate treatment to patients who would achieve substantial functional improvement. Evidence from this review supports individualized risk-benefit assessment rather than blanket BMI cutoffs.

Table 3. Comparison of factors favouring surgery versus factors suggesting delay/optimization.

Factor category	Favouring surgery	Suggesting delay/optimization
Symptoms	Severe pain and functional limitation	–
Prior treatment	Failed conservative management	–
Functional/rehab capacity	Reasonable activity demands and good rehabilitation engagement	Limited rehabilitation capacity
BMI and weight status	–	BMI ≥40 kg/m² (super-obesity) with suboptimal medical control
Medical comorbidities	Optimized medical comorbidities	Uncontrolled diabetes (HbA1c >8.0%) and other poorly controlled disease
Lifestyle factors	–	Active smoking
Nutritional status	Adequate nutritional status	Poor nutritional status
Surgical history	No or few prior orthopedic procedures	Multiple previous failed orthopedic procedures
Social support	Strong social support for postoperative recovery	Limited or absent social support

Future Research Directions

Based on identified gaps in current evidence, future research should focus on:

1. **Prospective cohort studies with standardized protocols**: Multi-center studies employing uniform BMI categorization, outcome measures, surgical techniques, and rehabilitation protocols.
2. **Time-to-event analyses**: Survival analysis methods to precisely quantify time to specific functional milestones (independent ambulation, stair climbing, return to work) across BMI categories.
3. **Cost-effectiveness analyses**: Economic evaluations comparing outcomes and costs of THA across BMI groups, including quality-adjusted life years (QALYs) gained.
4. **Preoperative optimization trials**: Randomized controlled trials of preoperative weight loss, exercise, and nutritional interventions on THA outcomes.
5. **Subgroup analyses**: Examination of outcomes in super-obese patients (BMI ≥50 kg/m²), who may represent a distinctly different risk profile.
6. **Rehabilitation protocol optimization**: Comparative effectiveness research on different rehabilitation intensities and durations for obese patients.
7. **Patient-reported experience measures**: Beyond functional outcomes, assessment of patient satisfaction, quality of life, and goal attainment across BMI categories.

Clinical Practice Recommendations

Based on this systematic review, the following recommendations emerge for clinical practice:

Preoperative Period:

✓ Conduct comprehensive risk-benefit assessment incorporating BMI, comorbidities, functional status, and patient goals.

✓ Avoid blanket BMI-based exclusion criteria; employ individualized decision-making.

✓ Optimize modifiable risk factors (glycemic control, smoking cessation, nutritional status).

✓ Consider preoperative weight loss for BMI ≥40 kg/m², but do not indefinitely delay surgery for patients unable to achieve weight loss targets.

✓ Implement prehabilitation programs emphasizing hip strengthening and cardiovascular conditioning.

Perioperative Period:

✓ Employ meticulous surgical technique with attention to soft tissue handling in obese patients.
✓ Consider extended antibiotic prophylaxis dosing based on body weight.
✓ Intensify thromboembolic prophylaxis protocols.
✓ Plan for longer operative times and potential need for specialized equipment.
✓ Utilize wound closure techniques minimizing dead space and tension.

Postoperative Period:

✓ Implement early mobilization protocols regardless of BMI.
✓ Provide intensified physical therapy in early postoperative period for obese patients to accelerate achievement of functional milestones.
✓ Extend rehabilitation duration recognizing potentially slower early recovery.
✓ Monitor closely for wound complications and infections.
✓ Set realistic functional expectations based on preoperative status rather than BMI alone.

Conclusions

This systematic literature review provides robust evidence that obesity increases perioperative complication risks but does not significantly impair functional recovery capacity following total hip arthroplasty. While short-term functional recovery shows small statistical advantages for non-obese patients, these differences remain below clinically important thresholds and disappear by 6-12 months post-surgery. Obese patients, including those with morbid obesity, achieve substantial improvements in pain, mobility, and quality of life comparable to non-obese patients.

The distinction between perioperative complication risk and postoperative recovery capacity is crucial for guiding patient counseling and healthcare policy. Although obese patients demonstrate higher rates of revision (7.99% vs 2.75%), infection (11.83% vs 4.30%), and hospital resource utilization (mean length of stay 7.6 vs 5.4 days), these challenges underscore the importance of careful preoperative risk assessment and perioperative optimization rather than serving as grounds for surgical exclusion. Comparable functional recovery outcomes across BMI categories challenge restrictive policies denying total hip arthroplasty to obese patients and instead advocate for personalized approaches that align with patient goals, address comorbidities, and integrate tailored rehabilitation strategies.

Future research should focus on standardized prospective studies with time-to-event analyses, cost-effectiveness evaluations, and optimization of preoperative and rehabilitation interventions specifically for obese patients. The goal should be enhancing safety and efficiency of care for obese patients undergoing THA rather than restricting access to this highly effective intervention. For obese patients with end-stage hip osteoarthritis experiencing significant pain and functional limitation, total hip arthroplasty remains an appropriate and effective treatment option. With comprehensive risk assessment, medical optimization, meticulous surgical technique, and personalized rehabilitation protocols, substantial functional recovery and quality of life improvement can be achieved across the BMI spectrum.

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REFERENCES

1. Courtine, M., Bourredjem, A., Gouteron, A., Fournel, I., Bartolone, P., Baulot, E., Ornetti, P., & Martz, P. (2023). Functional recovery after total hip/knee replacement in obese people: A systematic review. *Annals of Physical and Rehabilitation Medicine, 66*(1), Article 101710. https://doi.org/10.1016/j.rehab.2022.101710
2. Martz, P., Bourredjem, A., Maillefert, J. F., Binquet, C., & Baulot, E. (2019). Influence of body mass index on sagittal hip range of motion and gait speed recovery six months after total hip arthroplasty. *International Orthopaedics, 43*(11), 2447–2453. https://doi.org/10.1007/s00264-018-4250-y
3. Barrett, M., Prasad, A., Boyce, L., Dawson-Bowling, S., Achan, P., Millington, S., & Hanna, S. A. (2018). Total hip arthroplasty outcomes in morbidly obese patients: A systematic review. *EFORT Open Reviews, 3*(9), 507–512. https://doi.org/10.1302/2058-5241.3.180011
4. Rahman, A., Hasan, H. M. A., Ali, R., Ullah, H., Ahmad, S., & Saqib, M. (2025). Impact of obesity on joint replacement surgery outcomes: A comparative study. *Cureus, 17*(3), e80623. https://doi.org/10.7759/cureus.80623
5. Haynes, J., Nam, D., & Barrack, R. L. (2017). Obesity in total hip arthroplasty: Does it make a difference? *Bone & Joint Journal, 99-B*(4 Suppl. A), 31–36. https://doi.org/10.1302/0301-620X.99B1.BJJ-2016-0346.R1
6. Abdulla, I., Mahdavi, S., Khong, H., Gill, R., Powell, J., & Johnston, K. D. (2020). Does body mass index affect the rate of adverse outcomes in total hip and knee arthroplasty? A retrospective review of a total joint replacement database. *Canadian Journal of Surgery, 63*(2), E142–E149. https://doi.org/10.1503/cjs.006719
7. Skalski, M., Socha-Kania, M., Kozioł-Montewka, M., & Pańczuk, A. (2019). Personalized rehabilitation therapy in obese and elderly patients undergoing hip replacement surgery. *Health Problems of Civilization, 13*(2), 157–165. https://doi.org/10.5114/hpc.2018.80597
8. Vincent, H. K., Vincent, K. R., & Weng, J. P. (2007). Effect of obesity on inpatient rehabilitation outcomes after total hip arthroplasty. *Obesity, 15*(2), 522–530. https://doi.org/10.1038/oby.2007.551
9. Burke, D. T., Burke, D., Al-Adawi, S., Bell, R. B., McCargo, T., & Panchatcharam, S. M. (2020). The effect of body mass index on the functional outcome of patients with hip replacement. *Journal of the International Society of Physical and Rehabilitation Medicine, 3*(4), 116–120. https://doi.org/10.4103/jisprm.jisprm_18_20
10. Huffman, N., Pasqualini, I., Beck, E. C., Plate, J. F., Higuera-Rueda, C. A., Piuzzi, N. S., & Dombrowski, M. E. (2024). Patient satisfaction and patient-reported outcomes do not vary by BMI class in total hip arthroplasty. *European Journal of Orthopaedic Surgery & Traumatology, 34*(4), 1979–1985. https://doi.org/10.1007/s00590-024-03894-x
11. Yeung, E., Jackson, M., Sexton, S., Walter, W., Zicat, B., & Walter, W. K. (2010). The effect of obesity on the outcome of hip and knee arthroplasty. *International Orthopaedics, 35*(6), 929–934. https://doi.org/10.1007/s00264-010-1051-3
12. Houdek, M. T., Wagner, E. R., Watts, C. D., Osmon, D. R., Hanssen, A. D., Lewallen, D. G., & Mabry, T. M. (2015). Morbid obesity: A significant risk factor for failure of two-stage revision total hip arthroplasty for infection. *The Journal of Bone and Joint Surgery, 97*(4), 326–332. https://doi.org/10.2106/JBJS.N.00515
13. Yang, Y., Zhao, X., & Xu, S. (2023). Impact of wound complications in obese versus non-obese patients undergoing total hip arthroplasty: A meta-analysis. *International Wound Journal, 20*(6), 2134–2146. https://doi.org/10.1111/iwj.14318
14. Nearing, E. E., II, Santos, T. M., Topolski, M. S., Borget, A. J., Kallies, K. J., & Kothari, S. N. (2017). Benefits of bariatric surgery before elective total joint arthroplasty: Is there a role for weight loss optimization? *Surgery for Obesity and Related Diseases, 13*(3), 457–462. https://doi.org/10.1016/j.soard.2016.11.005
15. Seward, M. W., & Chen, A. F. (2022). Obesity, preoperative weight loss, and telemedicine before total joint arthroplasty. *The Journal of Arthroplasty, 37*(1), 1–5. https://doi.org/10.1186/s42836-021-00102-7