Establishing a Weight Specific Prehabilitation Program in Elective Hip and Knee Arthroplasty

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BACKGROUND

- Hip and knee osteoarthritis (OA) are highly prevalent and disabling. Affecting 1 in 8 Canadians.[1]
- Obesity represents one of the most important risk factors for both the incidence and progression of osteoarthritis at weight bearing joints like the hip and knee[1]
- Prehabilitation prior to orthopedic surgery has shown improved functional outcomes among patients who have undergone total hip arthroplasty (THA) and total knee arthroplasty (TKA).[2]
- The aim of the Alberta Obesity Center (AOC) weight specific prehabilitation program in collaboration with the Edmonton Bone and Joint patients was to improve post-operative outcomes in TKA and THA patients.
- The purpose of this study was to determine effectiveness of this prehabilitation program in achieving clinically significant weight loss.

METHODS

- Through an expedited referral program, preoperative patients from the Edmonton Bone and Joint clinic were referred to Alberta Obesity Centre (AOC) for weight specific prehabilitation.
- Once referred, AOC provided appointments with bariatricians, dieticians/nutritionists, exercise medicine and behavioral medicine at least every 6 months targeting nutrition, pharmacological, lifestyle and psychological treatment of obesity developed in accordance with the Canadian Adult Obesity Clinical Practice Guidelines.[3]
- Patients enrolled in 2022 with a minimum of 6 months of follow up with AOC undergoing elective TKA or THA were included. Patients with prior bariatric surgery were excluded.
- Weight loss at 6 months and 1 year was analyzed for the entire cohort along with two subgroups, a pilot subgroup of the first 50 patients enrolled and an established subgroup of the most recent 50 patients enrolled.



CONCLUSIONS

- This program through the Alberta Obesity Centre facilitates weight specific prehabilitation in patients undergoing elective TKA or THA.
- **Clinically significant weight loss, defined as >5% reduction in body weight[4] was demonstrated in 56% and 69% of patients at 6 months and 1 year, respectively.**
- Further reduction in body weight from 6 months to 1 year highlights a sustained, safe and gradual weight reduction program.
- **Better weight specific outcomes and reduced attrition are demonstrated by a more established program**.
- This prehabilitation program allows for **improved patient health and satisfaction while on operative waitlists.**
- Further studies should be conducted to explore the benefits of prehabilitation on postoperative outcomes including pain and quality of life for patients undergoing THA and TKA.

RESULTS

Number of patients screened	502
Included	259
Average age (years)	64.9
Male : Female	87 (44%) : 172 (66%)
Average initial BMI (kg/m^2)	44.8
Hip arthroplasty (THA) : Knee arthroplasty (TKA)	55 (21%) : 204 (79%)
Number of patients who have had their TKA or THA	157 (61%)
Number of patients who did a very low-calorie diet (optifast)	22 (14% of surgical patients)
Number of patients with AOM treatment	187 (72%)
Patients with 1 year follow-up	160 (62%)
Patients with 1.5 year follow-up	90 (35%)
Average time to surgery (months)	9.7

Table 1. Demographics of patients referred to AOC by EB&J

Excluded (n=243)	**Overall**	**Pilot subgroup (n=42)**	**Established subgroup (n=27)**
Lost to follow-up	58% (142 of 243)	45% (19 of 42)	67% (18 of 27)
Self-discharge	21% (52 of 243)	33% (14 of 42)	33% (9 of 27)
Not hip/knee surgical candidate	12% (29 of 243)	10% (4 of 42)	0% (0 of 27)
Previous Bariatric Surgery	7% (16 of 243)	7% (3 of 42)	0% (0 of 27)
Deceased	2% (4 of 243)	5% (2 of 42)	0% (0 of 27)

Table 2. Number of patients excluded from analysis and reasons for exclusion.

6 MONTHS	**Overall (n=259)**	**Pilot subgroup (n=50)**	**Established subgroup (n=50)**
Average body weight reduction at 6 months	6.3%	4.9%	6.5%
Number of patients with >5% weight loss at 6 months	144 (56%)	21 (42%)	31 (62%)
Number of patients with >10% weight loss at 6 months	60 (23%)	5 (10%)	8 (16%)
Number patients with >15% weight loss at 6 months	15 (6%)	1 (2%)	4 (8%)
1 YEAR	**Overall (n=160)**	**Pilot subgroup (n=32)**	**Established subgroup (n=25)**
Average body weight reduction at 1 year	8.6%	6.8%	9.8%
Number of patients with >5% weight loss at 1 year	110 (69%)	18 (56%)	19 (76%)
Number of patients with >10% weight loss at 1 year	61 (38%)	10 (31%)	10 (40%)
Number of patients with >15% weight loss at 1 year	26 (16%)	4 (12.5%)	6 (24%)

Table 3. Weight loss achieved by patients enrolled in the AOC prehabilitation program at 6 moths and 1 year, subgroup analysis comparing the first 50 patients enrolled in the program (pilot) to the most recent 50 patients (established).

REFERENCES

1. Baghbaninaghadehi, F. (2021). Effects of obesity, physical activity, and nutrient intake on knee osteoarthritis.
2. Moyer, R., Ikert, K., Long, K., & Marsh, J. (2017). The value of preoperative exercise and education for patients undergoing total hip and knee arthroplasty. JBJS Reviews, 5(12), e2-e2. https://doi.org/10.2106/jbjs.rvw.17.0001
3. Wharton S, Lau DCW, Vallis M, et al. Obesity in adults: A clinical practice guideline. Canadian Medical Association Journal. 2020;192(31):E875-E891. Doi: https://doi.org/10.1503/cmaj.191707 Accessed 04/01/2024.
4. Horn, D. B., Almandoz, J. P., & Look, M. (2022). What is clinically relevant weight loss for your patients and how can it be achieved? A narrative review. Postgraduate Medicine, 134(4), 359-375. https://doi.org/10.1080/00325481.2022.2051366

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