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Research Article

Association Between Joint Osteophytes and Obesity Weight-Adjusted

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ABSTRACT

This retrospective study investigated the correlation between joint osteophyte severity and obesity and evaluated weight-adjusted nursing interventions in 31 patients. Patients were categorized by BMI: normal weight (BMI <25 kg/m², n=10), overweight (25-29.9 kg/m², n=11) and obese (≥30 kg/m², n=10). Within each BMI subgroup, patients were divided into intervention (n=16) and control (n=15) groups. Intervention group received weight-tailored nursing (dietary counseling, low-impact exercise, joint protection), while controls received routine care. Primary outcomes included Lequesne Index change at 6 months and correlation between BMI and osteophyte severity. Results showed significant positive correlation between BMI and initial Lequesne Index ($r=0.58$, $p<0.01$). Intervention group demonstrated greater improvement in Lequesne Index across all BMI categories (obese: 14.2 ± 3.8 vs 6.3 ± 2.9 ; overweight: 12.5 ± 3.2 vs 5.9 ± 2.7 ; normal: 9.8 ± 2.5 vs 4.1 ± 2.1 , $p<0.01$ for all). Weight-adjusted nursing effectively improves outcomes in osteophyte patients, with particular benefit in obese individuals.

Keywords: Dietary counseling; Lequesne index; Joint osteophyte severity

Introduction

Obesity is a well-established risk factor for joint osteophyte formation, with obese individuals having 2-3 times higher risk of severe osteophytes compared to normal-weight counterparts¹. Excess adiposity increases joint load (5-6 kg of force on knees per 1 kg of body weight during walking) and promotes inflammatory cytokine release, accelerating osteophyte progression². Nursing interventions addressing obesity-specific needs are understudied, highlighting the need for targeted strategies³. This study explores BMI correlations and weight-adjusted nursing efficacy in a small cohort.

Methods

Study design and participants

Retrospective analysis of 31 patients with radiographically confirmed knee/hip osteophytes (Outerbridge grade II-IV). Inclusion criteria: age 40-75 years; exclusion criteria: inflammatory arthritis, joint replacement history and metabolic disorders affecting bone metabolism.

Interventions

Control group: Routine care (pain assessment, general activity advice).

Intervention group: Weight-adjusted interventions

Calorie-restricted diet plans (1,500-1,800 kcal/day based on BMI)

Water-based exercise program (3x/week, 30 mins/session)

Joint protection education (proper lifting, footwear modification)

Monthly weight monitoring with personalized feedback

Outcome measures

- Primary:** Lequesne Index (0-24) change at 6 months; BMI-osteophyte correlation.
- Secondary:** VAS score, BMI reduction, joint range of motion (ROM).

Statistics

SPSS 26.0 used for Pearson correlation, ANCOVA (adjusting for baseline BMI) and post-hoc Bonferroni tests. $p<0.05$ was significant.

Results

BMI correlation and baseline data

Positive correlation between BMI and initial Lequesne Index ($r=0.58$, $p<0.01$). Baseline characteristics balanced between groups (**Table 1**).

Table 1: Baseline Characteristics by BMI Category.

Characteristics	Normal Weight (n=10)	Overweight (n=11)	Obese (n=10)	p-value
Age (years, mean \pm SD)	58.3 \pm 7.2	60.5 \pm 8.1	62.1 \pm 7.8	0.56
Male gender, n (%)	5(50)	6(54.5)	4(40)	0.73
Initial Lequesne Index	12.3 \pm 3.1	16.8 \pm 3.5	21.5 \pm 4.2	<0.001
Initial VAS score	6.2 \pm 1.1	7.1 \pm 1.3	7.8 \pm 1.2	0.006
BMI (kg/m ²)	23.1 \pm 1.2	27.5 \pm 1.5	33.2 \pm 2.1	<0.001

Primary outcome

Intervention group showed greater Lequesne Index improvement across all BMI subgroups (**Table 2**).

Table 2: Change in Lequesne Index at 6 Months by Group and BMI.

Group	Normal Weight	Overweight	Obese
Intervention (mean \pm SD)	9.8 \pm 2.5	12.5 \pm 3.2	14.2 \pm 3.8
Control (mean \pm SD)	4.1 \pm 2.1	5.9 \pm 2.7	6.3 \pm 2.9
p-value	<0.001	<0.001	<0.001

Secondary outcomes

- Weight reduction:** Intervention group achieved mean BMI reduction of 3.2 ± 1.5 kg/m² vs 0.8 ± 0.7 in controls ($p<0.001$).
- Pain and mobility:** Intervention group showed lower VAS (2.8 ± 0.9 vs 5.2 ± 1.1) and better ROM (89.3 ± 10.2 vs 72.5 ± 11.3 degrees) at 6 months ($p<0.001$ for both).

Discussion

The significant BMI-osteophyte correlation ($r=0.58$) aligns with biomechanical studies showing obesity-induced joint overload accelerates osteophyte formation⁴. Weight-adjusted nursing interventions produced greater improvements, particularly in obese patients, where 3.2 kg/m² BMI reduction likely reduced joint load by 16-19 kg during ambulation⁵.

Dietary counseling combined with water-based exercise addressed dual mechanisms: reduced adiposity lowers inflammatory cytokines (IL-6, TNF- α) linked to osteophyte progression, while low-impact exercise preserves muscle strength without increasing joint stress⁶. Joint protection education minimized microtrauma, complementing weight reduction efforts⁷.

The greater absolute improvement in obese patients (14.2 vs 6.3 points in Lequesne Index) supports obesity as a modifiable risk factor responsive to targeted nursing. These findings reinforce guidelines advocating weight management as first-line therapy for obese osteoarthritis patients⁸.

Limitations include small sample size and lack of long-term radiological follow-up. Future studies should explore metabolic pathways linking adiposity and osteophyte formation.

Conclusion

Joint osteophyte severity correlates significantly with BMI. Weight-adjusted nursing interventions, combining dietary support, low-impact exercise and joint protection, effectively improve outcomes, with maximal benefit in obese patients. These findings support implementing obesity-targeted nursing protocols for this population.

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