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Research Article

Relationship Between Osteoarthritis and Joint Stiffness Efficacy of Stiffness-Alleviating Nursing Interventions

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ABSTRACT

This retrospective study explored the relationship between osteoarthritis severity and joint stiffness and evaluated stiffness-alleviating nursing interventions in 30 patients with osteoarthritis. Patients were divided into intervention group (n=15) and control group (n=15). The control group received routine nursing care, while the intervention group received additional stiffness-alleviating nursing interventions including structured range-of-motion exercises, thermal therapy and activity pacing. Primary outcomes included the correlation between osteoarthritis severity (Kellgren-Lawrence grade) and stiffness duration (morning stiffness and total daily stiffness time) and the change in total daily stiffness time at 4 weeks. Results showed a significant positive correlation between Kellgren-Lawrence grade and initial total daily stiffness time ($r=0.72$, $p<0.01$). At 4 weeks, the intervention group had a significantly greater reduction in total daily stiffness time compared to the control group (56.8 ± 11.5 mins vs 24.3 ± 9.8 mins, $p<0.01$). The intervention group also showed better improvement in joint range of motion (ROM), Lequesne Index and Functional Impairment Questionnaire (FIQ) score ($p<0.05$ for all). Stiffness-alleviating nursing interventions effectively reduce joint stiffness in patients with osteoarthritis and improve functional status.

Keywords: Osteoarthritis; Lequesne index; Kellgren-Lawrence grade; Functional impairment questionnaire

Introduction

Joint stiffness is a cardinal symptom of osteoarthritis, affecting 70-80% of patients and significantly impairing daily activities¹. The pathophysiological link involves articular cartilage degradation, synovial inflammation and altered joint biomechanics, which restrict mobility and prolong stiffness duration². This study investigates the osteoarthritis-stiffness association and evaluates targeted nursing interventions, addressing the lack of stiffness-specific care protocols³.

Methods

Study design and participants

Retrospective analysis of 30 patients with radiographically confirmed osteoarthritis (knee: 22 cases, hip: 8 cases). Inclusion criteria: age 50-80 years; Kellgren-Lawrence grade I-IV; morning stiffness ≥ 30 mins or total daily stiffness ≥ 2 hrs. Exclusion criteria: inflammatory arthritis, joint contractures and neurological disorders affecting mobility.

Grouping & interventions

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

Intervention group: Added stiffness-alleviating interventions: Structured ROM exercises:

Gentle stretching sequences (3 sets/day) with progressive intensity, focusing on affected joints. **Thermal therapy protocol:** Warm compresses (40-42°C) for 15 mins pre-exercise, cold compresses post-activity. Activity pacing guidance: Scheduling activities during low-stiffness periods, with rest breaks to prevent stiffness exacerbation. **Self-management training:** Teaching patients to recognize early stiffness signs and perform preventive exercises. Primary: Correlation between Kellgren-Lawrence grade and initial stiffness duration (morning stiffness in mins; total daily stiffness time in mins); change in total daily stiffness time at 4 weeks. **Secondary:** Joint ROM (degrees), Lequesne Index, FIQ score (0-100, higher=worse).

Statistical analysis

SPSS 26.0 used for Pearson correlation, independent t-tests and paired t-tests. p<0.05 was significant.

Results

Osteoarthritis-stiffness relationship and baseline data

Significant positive correlation between Kellgren-Lawrence grade and initial total daily stiffness time (r=0.72, p<0.01). No significant differences in baseline characteristics between groups (Table 1).

Table 1: Baseline Characteristics.

Characteristics	Intervention Group (n=15)	Control Group (n=15)	p-value
Age (years, $\bar{x}\pm s$)	63.2 $\pm$ 8.5	64.1 $\pm$ 7.9	0.76
Male gender, n(%)	8(53.3)	9(60.0)	0.73
Affected joint (knee/hip)	13/2	9/6	0.15
Kellgren-Lawrence grade ($\bar{x}\pm s$)	2.6 $\pm$ 0.8	2.7 $\pm$ 0.7	0.68
Morning stiffness (mins, $\bar{x}\pm s$)	45.2 $\pm$ 12.3	47.1 $\pm$ 11.8	0.69
Total daily stiffness time (mins, $\bar{x}\pm s$)	88.5 $\pm$ 19.2	91.3 $\pm$ 18.6	0.65
ROM (degrees, $\bar{x}\pm s$)	67.3 $\pm$ 13.2	65.8 $\pm$ 12.9	0.74

Discussion

This study confirms a strong correlation between osteoarthritis severity and joint stiffness, consistent with mechanisms involving cartilage loss and synovial thickening⁴. Stiffness-alleviating interventions addressed key factors: ROM exercises prevented adhesions⁵, thermal therapy enhanced tissue extensibility⁶ and activity pacing minimized stiffness triggers⁷. The significant reduction in stiffness translated to improved function, highlighting stiffness management as a critical nursing target⁸.

Limitations include small sample size and short follow-up. Future studies should explore long-term efficacy and biomarkers of stiffness.

Conclusion

Osteoarthritis severity correlates significantly with joint stiffness. Stiffness-alleviating nursing interventions effectively reduce stiffness and improve function, warranting integration into clinical practice.

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