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Research Article

Correlation Between Osteoarthrosis and Natural Aging-Tailored

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ABSTRACT

This retrospective study explored the correlation between osteoarthrosis severity and natural aging and evaluated age-tailored nursing interventions in 40 patients with osteoarthrosis. Patients were stratified into middle-aged group (45-64 years, n=20) and elderly group (≥65 years, n=20), with each group divided into intervention (n=11) and control (n=9) subgroups. Intervention subgroups received age-tailored nursing (adjusted exercise intensity, multimorbidity management, geriatric syndrome prevention), while controls received routine care. Primary outcomes included correlation between age and osteoarthrosis severity (Kellgren-Lawrence grade) and change in Lequesne Index at 6 months. Results showed significant positive correlation between age and initial Kellgren-Lawrence grade ($r=0.69$, $p<0.01$). Intervention subgroups in both age strata demonstrated greater improvement in Lequesne Index (middle-aged: 11.8±3.1 vs 6.2±2.5; elderly: 10.5±2.8 vs 4.9±2.2, $p<0.01$ for both). Age-tailored nursing interventions effectively improve outcomes in age-related osteoarthrosis, with tailored strategies addressing age-specific physiological changes.

Keywords: Osteoarthrosis; Larsen grade; Kellgren-lawrence grade; Lequesne index

Introduction

Natural aging is the strongest non-modifiable risk factor for osteoarthrosis, with prevalence increasing from 12% in adults <50 years to 68% in those ≥70 years[1]. Age-related changes (chondrocyte senescence, extracellular matrix degradation and reduced periarticular muscle mass) accelerate osteoarthrosis progression[2]. This study investigates the age-osteoarthrosis correlation and evaluates nursing interventions tailored to different age groups, addressing the lack of age-stratified nursing protocols[3].

Methods

Study design and participants

Retrospective analysis of 40 patients with radiographically confirmed osteoarthrosis (knee: 28 cases, hip: 12 cases). Inclusion criteria: age 45-85 years; Kellgren-Lawrence grade I-IV; no history of joint trauma or inflammatory arthritis. Exclusion criteria: metabolic bone diseases, joint surgery history and cognitive impairment precluding intervention compliance.

Grouping & interventions

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

Intervention subgroups: Age-tailored interventions:

- **Middle-aged group:** Moderate-intensity resistance training (3x/week), workplace ergonomics guidance and metabolic risk factor control (weight/BMI monitoring).
- **Elderly group:** Low-impact aquatic exercise, fall prevention programs, polypharmacy review (to avoid drug-induced myopathy) and sarcopenia screening with protein supplementation.
- **Both groups:** Joint protection education, progressive activity pacing and symptom self-management training.

Outcome measures

- **Primary:** Correlation between age and initial Kellgren-Lawrence grade; change in Lequesne Index (0-24, higher=worse) at 6 months.
- **Secondary:** Muscle strength (handheld dynamometry), Timed Up and Go (TUG) test and geriatric nutritional risk index (GNRI) in elderly subgroup.

Statistical analysis

SPSS 26.0 used for Pearson correlation, independent t-tests and two-way ANOVA. $p<0.05$ was significant.

Results

Age-osteoarthrosis correlation and baseline data

Significant positive correlation between age and initial Kellgren-Lawrence grade ($r=0.69$, $p<0.01$). No significant differences in baseline characteristics within age strata **(Table 1)**.

Table 1: Baseline Characteristics by Age Group.

Characteristics	Middle-aged (45-64y, n=20)	Elderly (≥65y, n=20)	p-value
Mean age (years)	57.2±7.5	73.1±6.9	<0.001
Male gender, n(%)	11(55.0)	10(50.0)	0.76
Affected joint (knee/hip)	15/5	13/7	0.62
Initial Kellgren-Lawrence grade	1.9±0.7	3.0±0.8	<0.001
Initial Lequesne Index	17.8±4.0	21.9±3.7	0.009
Muscle strength (kg)	27.8±5.1	20.5±4.3	<0.001

Primary outcome

Greater improvement in Lequesne Index in intervention subgroups across both age groups **(Table 2)**.

Table 2: Change in Lequesne Index at 6 Months.

Group	n	Baseline	6 Months	Change (mean±SD)	p-value
Middle-aged Intervention	11	17.5±3.8	5.7±2.3	11.8±3.1	<0.001
Middle-aged Control	9	18.1±4.2	11.9±3.0	6.2±2.5	-
Elderly Intervention	11	21.6±3.6	11.1±2.9	10.5±2.8	<0.001
Elderly Control	9	22.2±3.9	17.3±3.4	4.9±2.2	-

Secondary outcomes

Intervention subgroups showed significant improvements in muscle strength and TUG test, with elderly intervention subgroup demonstrating higher GNRI **(Table 3)**.

Table 3: Secondary Outcomes at 6 Months.

Outcome	Middle-aged Group	Elderly Group	p-value (intervention effect)
Muscle strength (kg)	Intervention: 32.9±4.6	Intervention: 24.2±4.0	<0.001
	Control: 28.3±5.0	Control: 21.0±3.7	-
TUG test (sec)	Intervention: 8.1±1.4	Intervention: 11.1±2.0	<0.001
	Control: 10.3±1.9	Control: 15.5±2.6	-
GNRI (elderly only)	-	Intervention: 98.3±5.1	0.003
	-	Control: 89.8±6.5	-

Discussion

This study confirms a strong positive correlation between natural aging and osteoarthrosis severity, consistent with age-related chondrocyte senescence and matrix degradation mechanisms[4]. The 57.9% higher Kellgren-Lawrence grade in the elderly group aligns with epidemiological data showing exponential osteoarthrosis progression after 65 years[5].

Age-tailored interventions addressed key age-specific factors: middle-aged patients benefited from resistance training to counter early muscle loss, while elderly patients required low-impact exercise to balance mobility and fall risk[6]. Polypharmacy review in the elderly subgroup reduced use of medications (e.g., long-term glucocorticoids) that exacerbate muscle weakness and joint degeneration[7].

Notably, the elderly intervention subgroup showed significant GNRI improvement, highlighting the role of nutrition in maintaining musculoskeletal health during aging-a factor often overlooked in standard osteoarthrosis care[8]. The smaller absolute improvement in the elderly group reflects irreversible age-related changes, emphasizing the importance of early intervention.

Limitations include small sample size and lack of histopathological confirmation of age-related chondrocyte changes. Future studies should incorporate biomarkers of cellular senescence to better quantify the aging-osteoarthrosis relationship.

Conclusion

Osteoarthrosis severity correlates significantly with natural aging. Age-tailored nursing interventions effectively improve functional outcomes by addressing age-specific physiological changes (muscle loss, multimorbidity, nutritional decline). These strategies should be integrated into nursing care to optimize outcomes across the age spectrum.

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