Ankle Laxity and Associated Factors Among Older Adults: A Community-Based Study in Odai Town

Naoya Ito[1], Akinobu Nishimura[1, 2], Tomoki Terada[3], Koki Yamazaki[1], Yuki Fujikawa[4], Masahiro Hasegawa[1]
[1] Department of Orthopaedic Surgery, Mie University Graduate School of Medicine, Mie, Japan, [2] Department of Orthopaedic and Sports Medicine, Mie University Graduate School of Medicine, Mie, Japan, [3] Department of Orthopaedic Surgery, Suzuka Kaisei Hospital, Mie, Japan, [4] Department of Orthopaedic Surgery, Owase General Hospital, Mie, Japan,
Email of Presenting Author: naoitomedic@med.mie-u.ac.jp

Disclosures: Naoya Ito (N), Akinobu Nishimura (N), Yuki Terada (N), Koki Yamazaki (N), Yuki Fujikawa (N), Masahiro Hasegawa (N) (Information for disclosures can be taken from the online abstract system after entering ALL authors.)

INTRODUCTION: Ankle instability is a common musculoskeletal problem that increases the risk of recurrent sprains, development of post-traumatic ankle osteoarthritis, and falls among older adults. While ankle laxity has been extensively studied in athletes and younger individuals, epidemiological data in community-dwelling older adults remain scarce. Understanding risk factors for ankle laxity in this population is crucial for establishing effective preventive strategies, especially in rural areas where access to specialized care may be limited. We hypothesized that ankle laxity in older adults would be associated not only with previous ankle injury but also with lifestyle and occupational factors accumulated throughout life.

METHODS: A total of 558 participants (mean age: 71.1 years) who took part in three consecutive community health screenings in Ōdai Town were included. An ultrasound probe was positioned over the anterior talofibular ligament (ATFL). Manual anterior drawer stress was applied by an experienced orthopaedic surgeon (Figure.1), and ATFL displacement was measured in millimeters. Ankle laxity was defined as an ATFL widening ≥1.5 mm in either ankle (Figure.2). Independent variables included age, sex, body mass index (BMI), history of ankle sprain (self-reported, either side), occupational history (categorized into white-collar vs blue-collar), and exercise habits during early to middle adulthood (regular participation vs none). Logistic regression analysis was performed to determine associations between ankle laxity and explanatory variables. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated. A p-value <0.05 was considered statistically significant.

RESULTS SECTION: Lower BMI was inversely associated with ankle laxity (OR 0.91, 95%CI 0.86–0.97, p = 0.0016). History of ankle sprain was strongly associated with ankle laxity (OR 2.95, 95%CI 1.90–4.57, p < 0.001). White-collar occupational history was associated with increased risk compared to blue-collar (OR 1.72, 95%CI 1.16–2.54, p = 0.0067). No significant associations were observed for age, sex, or exercise habits during early to middle adulthood. (Table.1)

DISCUSSION: This study demonstrates that ankle laxity in older adults is not solely determined by chronological aging but is strongly influenced by modifiable and life-course factors. A lower BMI may reflect reduced soft tissue support around the ankle joint, thereby increasing susceptibility to ligamentous laxity. The strong association with prior ankle sprain highlights the importance of early injury prevention and rehabilitation strategies, as insufficient recovery may predispose individuals to chronic instability persisting into older age. Interestingly, white-collar work history was associated with ankle laxity, suggesting that prolonged sedentary occupational environments may contribute to diminished neuromuscular conditioning and ligament resilience compared to more physically demanding work. Contrary to expectations, exercise habits during early to middle adulthood were not protective, indicating that either exercise type/intensity was insufficient to maintain ankle stability or that cumulative injury risk counteracted potential benefits. Limitations of this study include its cross-sectional design, which precludes establishing causality, and reliance on retrospective recall of exercise and occupational history, which may introduce recall bias. Furthermore, the definition of laxity was based on ultrasound under manual stress, which, while practical in large-scale community settings, may lack the precision of instrumented stress testing. Overall, these findings underscore the multifactorial nature of ankle laxity in older adults and suggest that both preventive measures against ankle sprains and targeted strengthening interventions, particularly for individuals with sedentary work histories, may be beneficial for reducing long-term instability and associated fall risk.

SIGNIFICANCE: Ankle laxity in older adults was associated with lower BMI, history of ankle sprain, and white-collar work history, but not with exercise habits. These results provide insight into occupational and injury-related risk factors that may be targeted in community-based preventive strategies to reduce ankle instability and subsequent osteoarthritis or fall risk.

Figure.1

Figure.2

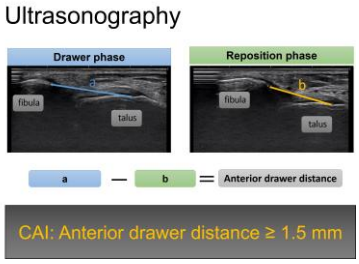

Table 1. Logistic regression analysis of factors associated with ankle laxity

Variable	Odds Ratio (OR)	95% CI	p-value
Age (per year)	1.01	0.98 – 1.04	0.42
Sex (female)	1.08	0.73 – 1.61	0.71
BMI (per kg/m²)	0.91	0.86 – 0.97	0.0016
History of ankle sprain	2.95	1.90 – 4.57	<0.001
Clerical occupational job	1.72	1.16 – 2.54	0.0067
Exercise habits	0.97	0.65 – 1.46	0.89