Oral Flora in Elderly People

In Japan, the elderly population is increasing in concurrence with a low birthrate. The number of people in Japan aged 65 or older accounted for 20.2% of the total population in 2005¹, and is projected to rise to as high as 26.0% in 2020⁰. This has led to an increase in the number of bedridden elderly for whom opportunities to perform physical activities in daily living have decreased. Oral hygiene of the bedridden elderly is often poor³, and this promotes the formation of dental plaque containing opportunistic pathogens⁴⁻⁵. We compared the isolation frequencies of opportunistic pathogens such as Candida albicans, Enterobacter cloacae, etc., in dental plaque between elderly people requiring and not requiring systemic care⁶. All opportunistic pathogens showed higher isolation frequencies in elderly people requiring systemic care than in those not requiring systemic care (Fig. 1). As a reservoir for respiratory pathogens, dental plaque can be aspirated into the lungs and cause pneumonia⁷⁻⁸. These higher isolation frequencies in the plaque may associate with the risk of aspiration pneumonia¹⁻⁴. Moreover, in addition to changes in microflora, the protective immune functions of elderly people may also contribute to the development of pneumonia.

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Physical Fitness, Oral Infection, and NK Cell Activity in the Elderly

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Abstract: Objective: Many of the protective immune responses of elderly people are impaired and this leads to an increased risk of oral and systemic bacterial infections. Little is known about the interaction between the systemic immune response and physical fitness or oral infection. The present study was an epidemiological study of the independent elderly, performed to determine the relationships between activated natural killer (NK) cells and physical fitness or oral microorganism infection.

Methods: We selected 253 independent elderly subjects (female: 122, male: 131) who were aged 79 or 80 years old. We conducted a medical examination, followed by 6 physical function tests. Blood samples were drawn, and activated NK cells were evaluated using CD16, CD56 and CD69 monoclonal antibodies with flow cytometry. Bacterial counts for oral streptococci, lactobacillus and opportunistic pathogens were performed using culture techniques.

Results: A larger percentage of activated NK cells/NK cells (CD56⁺CD16⁹⁺/CD56⁺CD16⁺) showed significant positive correlations to the maximal knee extensor strength left and right in females and males, and the maximum hand grip strength in females and males. A larger percentage of another type of activated NK cells/NK cells (CD69⁺/CD56⁺CD16⁺) was also correlated with total streptococci and negatively correlated with species numbers of opportunistic pathogens. In contrast, a larger percentage of non-activated NK cells/NK cells (CD56⁺CD16⁹⁺/CD56⁺CD16⁺) showed significant negative correlations to the maximal knee extensor strength left and right in females and males, and the maximum hand grip strength in females and males.

Conclusion: This study suggested that elderly people with reduced physical function in the legs and hands tend to be susceptible to opportunistic infection due to reduced NK cell activity. Therefore, older people including bedridden elderly need to keep physical fitness in their leg muscles and healthy microorganism flora in the oral cavity.

Key words: Physical fitness, Activated NK cell, Hand grip strength, Knee extensor strength, Elderly