# Relation between fibrosis and low frequency noise

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## INTRODUCTION

Long-term exposure (> 10 years) to low frequency noise (LFN) (which refers to the sounds of ≤500 Hz, including infrasound) characterized by high-amplitude pressure (≥90 dB), causes vibroacoustic diseases (VAD) (N A A Castelo Branco, 2004). Furthermore we can find the definition of vibroacoustic disease given by (Branco, 1999). "VAD is a systemic pathology, characterized by an abnormal growth of the extra-cellular matrices, and caused by excessive exposure to LFN".VAD, as a pathological entity, has been defined by Castelo Branco and his scientific team which included medical doctors, mathematicians, physicists, biologists, engineers, and acousticians despite it has not been acknowledged yet by the World Health Organization (World Health Organization 2009). However, in the last 60 - 70 years, lots of debates have been held about whether the acoustic phenomenon can/cannot cause extra - auditory effects on the living organism (M. Alves - Pereira, 1999). The main goal of the article is to question whether is disease defined? Is it implied on the International classification of disease system? If the disease is defined what are the key points for diagnosis and what is the clinical stage of it? Also, it is about to find corresponding results that will adequately represent the disease and its characteristics.

## MATERIAL AND METHODS

PRISMA Statement Methodology was applied. In the first step, the study includes works in the period between January 2007 and December 2016, where 2257 papers were found (of which 2256 were identified by searching the database and 19 papers were found through other papers, namely by searching their literature); later, another papers were included which were older than the above presented.

## RESULTS

After the research had been conducted among aircraft technicians (Marciniak et al., 1999) it was determined that each of them has a thickened pericardia and where it also was found that many have thick cardiac valves. In fact, normally (Nuno A. A. Castelo Branco, Fragata, Martins, Monteiro, & Alves-Pereira, 2005), while according to the results presented in the paper (Nuno A. A. Castelo Branco et al., 2005) average pericardial thickness was 1.5 mm ± 0.45 conducted on professions. Research conducted on 236 aircraft technicians (Nuno A. A. Castelo Branco, Rodriquez, Pereira, & Jones, 1999), where the results have been monitored in the past 15 years (where the average worker's age is 43). Speaking in percentages, the cases of the disabilities are neurological (81, 34%), malignancy (28, 11.9%), psychiatric (23, 9.7%), cardiovascular (16, 6.8%), and osteoarticular (14, 5.9%). (Mohr 1965) study (1 – 2 minutes exposure to 95-140 dB and 30-100 Hz) led to consequences as chest wall vibration, interference with normal breathing, throat fullness, cough and gagging sensation. On the other hand (Ponomarkov 1969) study (1.5 – 2 hours exposure to 105-155 dB) caused 3 mm diameter hemorrhages in the lungs, compression of lung tissue and stretching of the connective-tissue structures of the alveolar walls.

## DISCUSSION AND CONCLUSIONS

From the attached results we can conclude that a disease does not affect every person in the same way as well as that it causes various complications but as the main characteristic relation between fibrosis and low-frequency noise is manifested as non-productive cough, hoarseness, repeated upper and lower respiratory infections, bronchitis and respiratory insufficiency (Ana Mendes et al., 2012). (Ferreira & Portuguesa, 2007) emphasizes in his paper that he has always believed that long-term exposure to outside particles, such as dust, smoke and chemical particles causes respiratory pathology. Despite these results vibroacoustic disease has not been acknowledged by the World Health Organization (World Health Organization 2009).

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