Obstructive sleep apnea (OSA) is a chronic disease, consisting in the occurrence of numerous breaks and shallow breathing during sleep, which results in the pathophysiological condition of hypoxia. Patients with OSA are characterized by reduced sleep quality and excessive daytime sleepiness, caused by numerous awakenings and sleep fragmentation. OSA is a worldwide health problem, affecting nearly 25% of the general population. In addition, it is a risk factor for the development of many diseases and disorders (i.e. hypertension, increased risk of cardiovascular incidents, cognitive dysfunction, or organic changes in the brain that cause dementia), which is why it is so important to understand the pathophysiological processes in OSA and look for markers of the risk of developing comorbidities. Intermittent hypoxia generates significant amounts of reactive oxygen species (ROS), which damage all cellular structures, including proteins, genetic material, or lipids. The effect of this is, among others, damage to the DNA of cells, and thus its ends, i.e. the so-called telomeres, which are markers of cellular aging. The intensification of oxidative damages causes faster shortening of the telomeres, which is a physiological phenomenon at the correct rate and is observed in cells with age. In addition, oxidative damages increase inflammation, activating the nuclear factor κβ (NF-κβ) pathway, which causes the expression of many pro-inflammatory factors. Unfortunately, their long-term effect increases oxidative stress and inflammation, which creates the so-called positive feedback loop. The positive feedback loop results in the intensification of the changes described above. So far, many studies confirm that patients with OSA are characterized by shorter telomeres. What is more, some find associations with various diseases accompanying OSA. Therefore, the mechanism of telomere shortening in OSA should be further explored. Knowing the exact signaling pathways will allow future research to expand, and it is possible that a marker associated with a higher risk of developing certain OSA-related disorders may be found in the future. Thanks to this, it will be possible to predict the progress of the disease in a timely manner, react appropriately, and introduce appropriate preventive measures.