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MAGNETIC AND ELECTRIC NONINVASIVE TRANSCRANIAL AND PERIPHERAL STIMULATION PROPOSED APPLICATIONS FOR ORAL PHYSIOLOGY AND BIOMECHANICS RESEARCH IN MICROGRAVITY. LESSON LEARNED FROM ORAL PATHOLOGY AND AGEING STUDIES.

Abstract

One of the main components of spaceflight that raises great challenges to both astronauts and scientists are the microgravity adverse effects induced on the human body. Over the last years studies have been developed both in simulated microgravity (HDBR, DI) and real microgravity. A complementary source of knowledge are the similarities with various human pathologies, especially related to ageing studies. This paper aims to highlight the convergence of knowledge between physiological responses from microgravity exposure, pathophysiological changes associated with aging and non-invasive and non-pharmacological therapeutic methods feasible for use in spaceflight. Besides muscle and bones (in most cases the research was carried out on the lower half of the body), spaceflight also affects oral hard and soft tissues, but in literature this subject is not well documented, with limited information being available on oral tissues (i.e., mandible and teeth, salivary glands, and saliva) . We are particularly interested in sarcopenia, changes in the peripheral nerves and neuromotor plaque in the masticatory muscles; lingual, labial and buccal weakness (LLBW); nociplastic pain in oral pathologies and in microgravity; temporomandibular joint dysfunction (TMD); soft tissue changes and pathologies involved in the act of mastication and swallowing; corticomotor neuroplasticity of tongue muscles and swallowing biomechanics. Non-invasive direct and transcranial peripheral stimulation methods (TMS, Tdcs) have been studied and in some cases successfully applied in recent decades in the case of neurological and other pathologies such as recovery in post-stroke dysphagia, analgesia in nociplastic pain in glossodynia, sleep bruxism, obstructive sleep apnea. Considering our own positive experience in using transcranial magnetic stimulation for pain relief in glossodynia and for post-stroke recovery, the proposed interdisciplinary team of authors from Romania covering wide medical specialties, engineering and biophysics, do propose an exploratory study based on

parallelism of ageing and space physiology, along with experiment scenarios considering TMS and tDCS methods.