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ROLE OF FACIAL EXERCISE IN DISEASE PREVENTION- A NEED OF THE HOUR



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ABSTRACT

A narrative review was conducted with articles published between 1985 to 2022 highlighting the upsurge of the utilization of facial muscle exercise in disease management and prevention. The primary objective of this review was to acknowledge the efficacy of facial muscle exercise in delaying disease progression. Exercise is defined as subdivision of physical activity that is planned, structured and repetitive in nature, to enhance or preserve physical fitness, and has historically been an essential component of a healthful way of life. As the years have progressed, the role of exercise in the prevention and treatment of several chronic diseases has notably increased. Facial muscle exercises, which involve strengthening movements and manipulation of the facial musculature, are strategically incorporated into the therapeutic protocols of several current diseases. Significantly however, the utilization of facial muscle exercises in disease prevention, is unsupported at present.

INTRODUCTION

Exercise is invariably among the most commonly prescribed therapies in both healthy and diseased states. Often used interchangeably with physical activity, exercise is in actual fact a subdivision of physical activity that is planned, structured and repetitive in nature with the intention of enhancing or sustaining physical fitness. In contrast to a state of rest, exercise is characterized by a dramatic increase in bodily demand. By stimulating the sympathetic nervous system, exercise prompts a unified bodily response in an attempt to maintain homeostasis during a period of increased metabolic, physical, cardiovascular and respiratory demands. For thousands of years, exercise has been utilized to advance health and longevity. Currently, there is indisputable evidence to reinforce the use of lifetime exercise in the prevention and treatment of several chronic diseases [12]. An indication is present for recommending exercise in the primary and secondary prevention of cardiovascular diseases (coronary heart disease, hypertension, peripheral artery disease); pulmonary diseases (chronic obstructive pulmonary disease); musculoskeletal diseases (rheumatoid arthritis, osteoporosis fibromyalgia, chronic fatigue syndrome); metabolic disorders (obesity, type 2 diabetes, insulin resistance, dyslipidemia); depression; anxiety; and cancer [1,2,3].

The facial muscles play a pivotal role in the execution of day-to-day tasks; and can be separated into the muscles of facial expression and

the muscles of mastication. These are a group of striated tissues which attach the facial skin to the skull [2,3]. Facial exercises embody numerous strengthening movements and manipulation of the facial musculature, with the intention of increasing the muscular tonicity, thereby abating sagging of the facial skin. By enhancing the blood flow, facial exercise incites regeneration of tissues and removal of metabolic waste products. Research delineating the use of facial exercises in disease management is ample. At present, it is utilized in the recovery of Bell's palsy; post-stroke facial nerve paresis; Parkinson's disease and treatment of depression [6]. Contrastingly however, there is inadequate data supporting the implementation of facial exercises in prevention of these diseases.

OBJECTIVES

The purpose of this review is to briefly discuss the role of facial exercises in disease management and to assess its awareness among the general population.

DISCUSSION

This narrative review was conducted to acknowledge the effect of facial exercise in (preventing certain diseases and reducing the intensity of symptoms) physical rehabilitation by strengthening the facial muscles and increasing coordination.

FACIAL EXERCISES IN IMPROVING STRESS AND DEPRESSION

Facial muscles engage in unique movements, considerably different from the remaining human motor reserve. The central control of facial muscles is highly complex and is categorized anatomically and functionally. The neurons responsible for the control of facial muscles are widely distributed in the brainstem. The autonomous nervous system which involuntarily controls the facial muscles consists of sympathetic (SNS) and parasympathetic nervous system (PNS). The myelinated vagus nerve, which is the main pathway of the PNS, emerges from the nucleus ambiguus and acts as a vagal brake. It can efficiently and rapidly decrease the heart rate and the blood pressure increasing the vagal tone and vice versa [5]. The voluntary control of facial muscles i.e., breathing can also affect the heart rate. These movements activate the ventral vagus complex and coordinate the face muscles with the heart, thereby orienting the person towards social interaction and providing adaptive responses to various environmental challenges [5]. Additionally, facial expressions are an essential part of psychological responses in social interactions and require both autonomous and somatic responses by the emotional motor system. These interconnections display human's unique ability to display emotions by merely controlling their thinking and breathing process.

According to the study by Okamoto and Manabe (2021), facial

muscle movements can assist in the improvement of depressive and anxiety symptoms, and reduce the severity of chronic stress. These effects are mediated both psychologically and anatomically [5]. Although a summary of these studies suggests that facial muscle exercise improves certain parameters of mental health, the methodological shortcomings of these studies provide difficulties in asserting the effects on mental health [13].

EFFECTS ON AGING AND FACIAL REJUVENATION

Facial aging is characterized by sagging of the skin and the reduction of subcutaneous adipose and muscle tissue. Due to enormous advancements in the average life expectancy, efforts to alter facial aging are seemingly essential [5,8]. Methods to improve facial aging include both invasive and non-invasive techniques. Facial exercises offer a less invasive and inexpensive alternative approach to rejuvenation, with the intention of decreasing skin sagging by enhancing muscle tone. Within the facial area, tissue reduction provides a minor contribution towards the severity of wrinkles, but a major contribution towards their proportional distribution. Additionally, it may partake in the progression from dynamic to static wrinkles. Similar to those of the limbs and trunk, the facial muscles are also skeletal muscles, and thus increase in mass by way of exercise.

However, earlier studies have provided inconclusive results regarding the effectiveness of facial muscle exercises for rejuvenation. A previous systematic review disclosed positive and substantial volume alterations in the upper lip, jawline and cheek areas as a result of repetitive isometric exercises [10]. Facial exercises were observed to expand the cross-sectional area of facial muscles, and a direct relation was noted between enhanced facial muscle strength and increased elasticity of the skin. Furthermore, the activity of the muscles during exercise reduces the infiltration of fat into the muscles. In 2021, another systematic review was conducted in an attempt to explore the effects of facial exercises on the targeted musculature and facial rejuvenation [5,8]. The majority of the interventions utilized consisted of isometric exercises, which may minimize and prevent the development of wrinkles. The results were in line with previous research, in terms of increased facial skin elasticity and thickness, and cross-sectional area of muscles [11]. Moreover, there was an increased sense of fullness in the cheeks. Facial exercises were also found to increase labial closure and tongue elevation strength; lip and orbicularis oris endurance, and the sealed lip ratio. It was stated that lip closure training could alleviate lip closure dysfunction, correct sleep apnea, and prohibit daytime sleep by cortical activation.

REDUCING SYMPTOMS IN OBSTRUCTIVE SLEEP APNEA

Another study conducted by Neumannova and Hobzova in 2018 discussed the involvement of oropharyngeal muscle exercise in combination with continuous positive pulmonary pressure and pulmonary rehabilitation as an adjunct therapy for obstructive sleep apnea (OSA). Obstructive sleep apnea is described as pauses in breathing during the sleep which last for at least 10 seconds with preserved function of muscles. Oropharyngeal exercises engage facial muscles, soft palate and tongue influencing the edema and collapsibility of the upper respiratory tract. These exercises depicted promising results in both non-controlled studies and randomized controlled leading the authors to a conclusion that oropharyngeal exercises reduces the severity and duration of symptoms of obstructive sleep apnea (OSA) and can be combined with other interventions in treating mild to moderate OSA [7].

EFFECTS ON BELL'S PALSY AND SYNKINESIS

Facial muscles contract in various directions to exhibit a group of patterns that facilitate nonverbal communication. The subtle features of expressions are brought about by a balance between contraction and relaxation of these muscles [4].

Synkinesis is defined as involuntary contractions of muscles due to voluntary contractions of other muscles. Ocular and facial muscles

are the most affected group of muscles. Synkinesis can occur due to neurodegeneration of a nerve (Parkinson's disease) or due to trauma or viral infection as in the case of Bell's Palsy. Facial neuromuscular retraining has emerged as a major nonsurgical treatment for patients with synkinesis [4]. It is a specialty program created uniquely for rehabilitation of facial muscles in paralysis, paresis and synkinesis.

CONCLUSION

Exercise is a powerful, yet overlooked treatment for several chronic conditions. Facial exercises, in particular, have been proven effective in the treatment of mental health disorders, facial aging, obstructive sleep apnea and synkinesis. However, as far as we know, the use of facial exercises in disease management is restricted to only these few diseases. Due to the scarcity of available evidence, it is difficult to determine whether facial muscle exercises are potent in the management of additional diseases, and whether the routine incorporation of facial exercises can be utilized to prevent the occurrence of disease as a whole. Further research could be conducted to evaluate the efficacy of facial muscle exercise in disease prevention.

RECOMMENDATION

In the future, perennial research, which is meticulously planned, and accumulation of blue ribbon evidence is necessary.

REFERENCES

1. Caspersen CJ, Powell KE, Christenson GM. Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Rep.* 1985;100(2):126-31.
2. Vina J, Sanchis-Gomar F, Martinez-Bello V, Gomez-Cabrera MC. Exercise acts as a drug; the pharmacological benefits of exercise: Exercise acts as a drug. *Br J Pharmacol* [Internet]. 2012 [cited 2022 Feb 16];167(1):1-12. Available from: <https://www.ncbi.nlm.nih.gov/labs/pmc/articles/PMC3448908/>
3. Ceria-Ulep CD, Tse AM, Serafica RC. Defining exercise in contrast to physical activity. *Issues Ment Health Nurs* [Internet]. 2011 [cited 2022 Feb 16];32(7):476-8. Available from: <https://www.ncbi.nlm.nih.gov/labs/pmc/articles/PMC4922498/>
4. Azizzadeh, B. and Nduka, C. ed., 2022. Facial Neuromuscular Retraining for Synkinesis. In: *Management of Post-Facial Paralysis Synkinesis*. pp.75-90.
5. Lim, H. W. (2021). Effects of facial exercise for facial muscle strengthening and rejuvenation: Systematic review. *The Journal of Korean Physical Therapy*, 33(6), 297-303. <https://doi.org/10.18857/jkpt.2021.33.6.297>
6. Vaughan, A., Gardner, D., Miles, A., Copley, A., Wenke, R., & Coulson, S. (2020). A systematic review of physical rehabilitation of facial palsy. *Frontiers in Neurology*, 11, 222. <https://doi.org/10.3389/fneur.2020.00222>
7. Neumannova, K., Hobzova, M., Sova, M. and Prasko, J., 2018. Pulmonary rehabilitation and oropharyngeal exercises as an adjunct therapy in obstructive sleep apnea: a randomized controlled trial. *Sleep Medicine*, [online] 52, pp.92-97. Available at: <https://pubmed.ncbi.nlm.nih.gov/30292081/>.
8. Hwang, U. J., Kwon, O. Y., Jung, S. H., Ahn, S. H., & Gwak, G. T. (2018). Effect of a Facial Muscle Exercise Device on Facial Rejuvenation. *Aesthetic surgery journal*, 38(5), 463-476. <https://doi.org/10.1093/asj/sjx238>
9. Wysong A, Joseph T, Kim D et al. Quantifying soft tissue loss in facial aging: a study in women using magnetic resonance imaging. *Dermatol Surg.* 2013;39(12):1895-902.
10. M Smith A, Ferris T, K Nahar V et al. Non-traditional and non-invasive approaches in facial rejuvenation: a brief review. *Cosmetics.* 2020;7(1):10.
11. Macey PM, Henderson LA, Macey KE et al. Brain morphology associated with obstructive sleep apnea. *Am J Respir Crit Care Med.* 2002;166(10):1382-7.
12. Church TS, Earnest CP, Skinner JS, Blair SN. Effects of different doses of physical activity on cardiorespiratory fitness among sedentary, overweight or obese postmenopausal women with elevated blood pressure: a randomized controlled trial. *JAMA.* 2007;297:2081-2091.
13. Laurin D, Verreault R, Lindsay J, MacPherson K, Rockwood K. Physical activity and risk of cognitive impairment and dementia in elderly persons. *Arch Neurol.* 2001;58:498-504.