

〈Regular Article〉

## Effects of 12-Week Electrical Muscle Stimulation on Facial Muscles and Nasolabial Folds

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### Abstract

**Background:** Facial aging is caused by skin aging and aging-related changes in the deep facial structures including the facial muscles, particularly due to zygomaticus major muscle (a facial muscle) weakness and atrophy. Electrical muscle stimulation (EMS) can improve facial sagging and aging; however, only few reports have scientifically verified such effects. Hence, this study aimed to evaluate the effects of EMS, including changes in zygomaticus major muscle thickness, facial shape (depth angle of the bevel line), facial expression characteristic (angle of the bevel line in the facial surface photograph), and skin viscoelasticity.

**Materials and methods:** Fourteen healthy women used an EMS test device daily for 10 min for 12 weeks. When wearing the EMS, a special gel containing a moisturizer was applied first. Computed tomography (CT) examinations were conducted using a spiral CT system before and after device use (4 and 12 weeks). Skin viscoelasticity was measured using a cutometer before and after device use (12 weeks).

**Results:** Compared with the thickness of the zygomaticus major muscle before using the device use, its thickness increased significantly at 4 and 12 weeks of device usage. Additionally, the depth and frontal angles of the nasolabial folds became more obtuse and thinner than before device use. In addition, combined with the application of a special gel, R2 (Ua/Uf) and R8 (Ua), which are indicators of skin viscoelasticity, significantly increased 12 weeks after EMS use.

**Conclusion:** EMS of facial muscles improved facial muscle thickness, nasolabial fold angle, and skin viscoelasticity, which are related to facial aging. Therefore, as a solution to facial sagging, EMS is objectively and scientifically useful for beauty care.

**Key words:** facial aging, EMS, zygomaticus major muscle, skin viscoelasticity, nasolabial fold angle.