

Introduction: After upper blepharoplasty in the patients with dermatochalasia accompanied by visual field defects, causes of eyebrow descent could be postoperative relaxation of frontalis muscle. It is generally accepted that the eyebrow is a specialized and complex area in which the frontalis muscle and orbicularis oculi muscles interdigitate strongly, and in the patients with dermatochalasia accompanied by visual field defects the frontalis muscle tends to be hypercontracting to compensate the visual disturbances. But in the patients without visual field defects and who had the cosmetic surgeries, the changes in the activity of the frontalis muscle has not been studied or proved. The authors recorded the activity of the frontalis muscle using invasive needle electromyographics and compared the changes of the eyebrow levels by clinical photography.

Methods: Prospective study was done with the 13 patients between June, 2011, and February, 2012. The subjects had dermatochalasia without visual field defects, not had any surgery that could effect the levels of the eyebrow, had no trauma or underlying diseases and had the mean age of 55.5 (range : 48 to 69). Every subject was set on the same position (Frankfort horizontal line), and the same 5 activities (1. close eye smoothly, 2. primary gaze, 3. forward gaze, 4. opened eye maximally, 5. upward gaze). The recording of the electromyography and standardized clinical photographs were taken. The recordings were done preoperatively, and 2 weeks, 3 months, 6 months after the operation. The quantified results were compared with the root mean square (RMS) value on standardizing by the personal reference activity (1. close eyes smoothly) and in the clinical photography, the changes of the eyebrow position were recorded.

Results: In the 4 activities (2. primary gaze, 3. forward gaze, 4. opened eye maximally, 5. upward gaze), RMS values of the frontalis muscle using the invasive needle electromyography were standardized by the reference RMS (1. Close eye smoothly) value and ANOVA test was done. All of the 4 activities showed statistically significant changes after 6 months of operation. ($p < 0.05$) (Fig. 1) The ANOVA test of the position change of the eyebrow (medial canthus, lateral limbus, lateral canthus and lateral ending point) showed no change preoperatively, and after 2 weeks, 3 months, 6 months after the operation. ($p > 0.05$)

Conclusions: After cosmetic upper blepharoplasty, the eyebrow position had no changes, but the activity of the frontalis muscle had been decreased at 6 months after operation. The dynamic changes of the eyebrow elevator (frontalis muscle) and the eyebrow depressor muscles had stabilized the whole balance of the eyebrow position and resulted in no change. In cosmetic patients, upper blephatoplasty could be carried out without concern for postoperative eyebrow descent or the need for adjunctive procedures to fix or elevate the eyebrows.

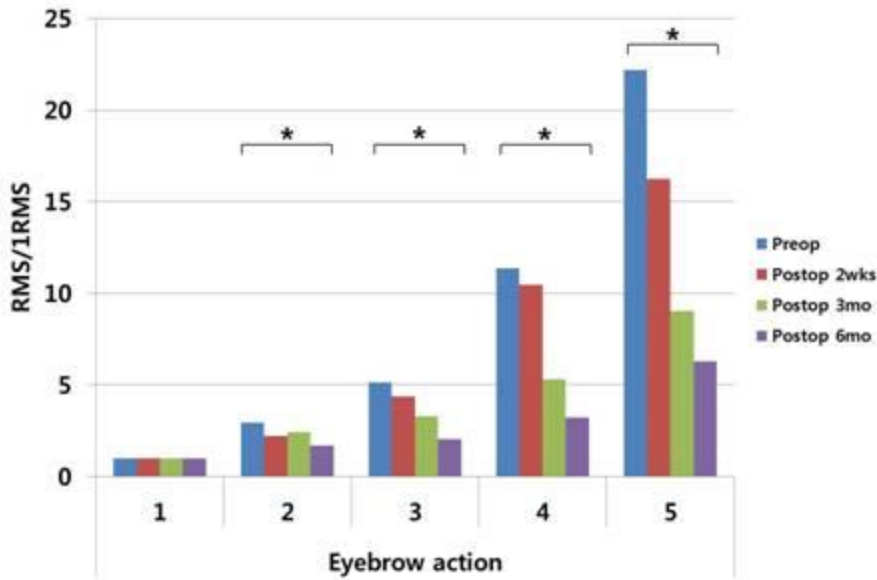


Fig. 1. Proportional index of RMS value compared with 1RMS value in frontalis muscle according to the eyebrow actions. RMS: root mean square, 1: closed eye smoothly, 2: primary gaze, 3: forward gaze, 4: opened eye maximally, 5: upward gaze, wks: weeks, mo: months (* $p < 0.05$)