LASERS

DEVICE INDUCED THERMAL INJURY (NEOCOLLAGENOSIS); PROFIBROTIC RESPONSE OR TRUE NEOCOLLAGENOSIS?

Sheila Natari Natari [1] - Sook In Ryu Ryu [2] - Bo Young Kim Kim [2] - Ji Hyun Park Park [2] - Il-hwan Kim Kim [2]

Graduate School, Korea University, Major In Dermatology, Department Of Medical Science, Seoul, Republic Of Korea [1] - Korea University Ansan Hospital, Department Of Dermatology, Ansan, Republic Of Korea [2]

Background: Many light and radiofrequency-based rejuvenation devices have claimed to increase the collagen production in skin dermal tissue, each devices cause different thermal damage and therefore different histopathological result. Yet there hasn't been enough scientific evidence to prove whether the result is just profibrotic response or not.

Objectives: To find the optimal skin rejuvenation device that shows true neocollagenesis.

Methods and Materials: We evaluated dermal collagen thickness and gene expression of pro-collagen type 1 & 3, MMP-3 and TGF-β resulted from difference energy based devices in rat model in vivo. The wound healing response was evaluated histologically and by RT-PCR on immediate, 1 week, 2, 4, 8 and 12 weeks after initial procedure.

Results: At 12th week observation, the most relevant changes of dermal thickness were found in specimens after treatment with electrosurgical unit, fractional CO2 and Q-switched ND:YAG 1064nm respectively. Pro-collagen 1 and 3 also found highest in electrosurgical unit, fractional CO2 and microneedle RF respectively. Dramatic change of MMP-3 and TGF-β is noticeable at the early observation which indicates the wound healing process and went back to normal level at 12th weeks. Ratio of pro-collagen 1/3 found lowest after treatment with Q-Switched ND:YAG 1064nm and fractional CO2 respectively.

Conclusion: All devices resulted in higher expression of pro-collagen and dermal thickness yet they all have their drawbacks in certain points. Electrosurgical unit resulted in most significant change but due to the irreversible thermal damage and extreme high pro-collagen result, it is considered as a profibrotic response and not relevant for minimal ablative rejuvenation treatment. Fractional CO2 and Q-Switched ND:YAG 1064nm are applicable to face skin rejuvenation treatment as they resulted in thickening of dermal tissue as well as low pro-collagen 1/3 ratio which is similar to neocollagenesis purpose.