

# Nonablative facelift in Indian skin with superpulsed radiofrequency

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## ABSTRACT

**Aims:** To evaluate the effect of nonablative superpulsed radiofrequency used for skin tightening and improvement of skin folds in Indian patients. **Settings and Design:** One hundred patients in the age group of 35-65 years with laxity of skin over face and neck were taken up for study using superpulse radiofrequency. **Methods and Materials:** Superpulsed radiofrequency is a biterminal, monopolar device which delivers current at the frequency of 1.75 MHz. In this study, current was delivered to the tissue with a capacitive electrode with a diameter of 25 mm. Power of 100-120 W, frequency of 18 Hz and pulse width of 50 ms was used. **Statistical Analysis Used:** Chi-square test, nonparametric Friedman test. **Results:** Evaluation was done by two independent observers on the basis of comparative photographs taken before treatment and then monthly after treatment for up to 6 months. A quartile grading scale was used. Patient satisfaction scores matched the clinical improvements observed. Ninety four patients completed a 6 month follow up. The age groups taken were 31-40 years, 41-50 years, 51-60 years, and >60 years and various areas were studied. The difference in improvement in all areas except glabellar folds across all age groups was found to be statistically significant. **Conclusions:** Nonablative face lift with a superpulsed radiofrequency machine is a safe, convenient and quick office procedure with excellent cosmetic results. It is noninvasive and there is no downtime. It can be used in all skin types and is safe on Indian skin. Longterm studies of effect of nonablative radiofrequency treatment on Indian skin is required.

**Key words:** Facelift, radiofrequency, skin tightening

## INTRODUCTION

As one ages, skin begins to get lax resulting in sagging of the skin.<sup>[1]</sup> Surgical facelifts involve hospitalization, anesthesia, and a prolonged recovery period. Therefore, nonablative rejuvenation techniques such as nonablative radiofrequency, infrared lasers, botulinum toxin, and fillers are now becoming more popular treatment options. Adults with moderate facial aging manifested by skin laxity are being treated with nonablative radiofrequency energy for skin tightening.<sup>[2-5]</sup> Radiofrequency energy causes uniform volumetric heating of the dermis causing collagen contraction and remodeling which in turn results in tightening of skin and improvement of skin folds.<sup>[4,6]</sup> A cost-effective radiofrequency equipment has been devised to produce similar energy when used in a superpulsed mode.

The aim of the study was to evaluate the effect of nonablative superpulsed radiofrequency used for skin tightening and improvement of skin folds in Indian patients.

## MATERIALS AND METHODS

The study was conducted on the first 100 patients who came to a private clinic during the period of October 2005 to December 2008 and satisfied the criteria mentioned below. Patients in the age group of 35–65 years with periorbital skin laxity, cheek laxity, glabellar folds, nasolabial folds, lax jowls, Marrionette lines, and neck laxity were included in the study. The patients were treated with superpulsed radiofrequency equipment. Both male and female patients were included. Pregnant women, patients on pace makers, those with history of keloids or active skin problems, those who were on treatment with retinoids, those who were undergoing chemical peels, ablative or nonablative laser resurfacing, within last 6 months were not included in the study. Six patients were lost to follow up and hence were excluded from the study.

Superpulsed radiofrequency is a biterminal, monopolar device which delivers current at the

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frequency of 1.75 MHz. In this study, current was delivered to the tissue with a capacitive electrode with a diameter of 25 mm. Power of 100 W, frequency of 18 Hz and pulse width of 50 ms was used.

Informed consent was obtained from all patients. They were then photographed in frontal position and at 45° angles from both sides with proper lighting. A thin layer of cooling gel was applied on the area to be treated. Capacitive electrode was moved in a circular manner on the skin with moderate pressure. Sequential strokes were given segment wise to cover the entire face and neck. Sixty overlapping passes were made over an area of 2 x 2 square inches in about 40 seconds. The electrode was moved back and forth till edema and erythema were seen. The temperature in that area was then measured with a pediatric thermometer strip and a temperature of 40°C was taken as the end-point. The patient felt a warm sensation during the treatment. There was no pain or burning sensation although no local anesthetic was applied. There was redness and mild swelling for a couple of hours after treatment. An immediate lifting effect was seen. Patients resumed normal activities with no down time whatsoever. Each patient underwent a total of five sessions and the interval between two sessions was 3 weeks. Photographs were taken at every session and patients were followed up for 6 months. Evaluation was done by two observers (treating doctor and colleague) on the basis of comparative photographs taken before treatment and then monthly after treatment for up to 6 months. A quartile grading scale was used (0 = less than 25%, 1 = 25%–50%, 2 = 51%–75%, 3 = more than 75% improvement).<sup>[1]</sup> Patient's satisfaction surveys were also obtained at each follow-up visit.

The data were analyzed with the help of SPSS package version 12.

## RESULTS

Evaluation was done by two observers using the quartile grading scale. Patient satisfaction scores matched the clinical improvements observed. Ninety four patients completed a 6 month follow up. The age groups taken were 31–40 years, 41–50 years, 51–60 years, and >60 years and various areas were studied. The difference in improvement in all areas except glabellar folds across all age groups was found to be statistically significant as indicated by the “P” value [Tables 1 and 2]. By the mean ranking (nonparametric Friedman test), cheek laxity had the highest improvement among all areas followed by nasolabial folds, jawline, glabellar fold, Marionette lines, and neck laxity [Table 3, Figures 1 and 2. Graphic representation depicted that patients in the age group 31–40 had marked improvement, those in the age group of 41–50 had moderate improvement while older patients showed mild-to-moderate improvement in all areas [Figure 3].

**Table 1: Comparison of area wise improvement in laxity across different age groups over 6 months**

Area	Age (years)	Quartile grading scale				Total PTS	Chi sq. (P)
		3	2	1	0		
Periorbital laxity (POL)	31–40	18	11	4	0	33	22.529 (0.001)
	41–50	12	14	7	2	35	
	51–60	3	5	10	5	23	
	>60	0	0	1	2	3	
Cheek laxity (CL)	31–40	23	10	0	0	33	22.379 (0.001)
	41–50	16	15	3	1	35	
	51–60	3	13	6	1	23	
	>60	0	0	2	1	3	
Jaw line (JL)	31–40	18	10	5	0	33	14.306 (0.026)
	41–50	11	12	9	3	35	
	51–60	4	6	9	4	23	
	>60	0	0	0	3	3	

**Table 2: Comparison of area wise improvement in folds across different age groups over 6 months**

Area	Age (Years)	Quartile grading scale				Total PTS	Chi sq. (P)
		3	2	1	0		
Glabellar folds (GF)	31–40	7	16	8	2	33	5.836 (0.44)
	41–50	11	15	7	2	35	
	51–60	5	9	4	5	23	
	>60	0	0	0	3	3	
Nasolabial folds (NLF)	31–40	20	12	1	0	33	20.205 (0.002)
	41–50	9	16	8	2	35	
	51–60	5	7	9	2	23	
	>60	0	1	2	0	3	
Marionette lines (MLF)	31–40	16	12	5	0	33	30.894 (0.00002)
	41–50	10	16	6	3	35	
	51–60	0	6	9	8	23	
	>60	0	0	1	2	3	
Neck laxity (NL)	31–40	23	10	0	0	33	26.974 (0.0001)
	41–50	16	15	3	1	35	
	51–60	3	13	6	1	23	
	>60	0	0	2	1	3	

All patients reported tightening of skin in our study. Significant tightening was observed 3–4 months after treatment.<sup>[1,7,8]</sup> This tightening persisted for up to 6 months as seen in this study. Those individuals with mild-to-moderate laxity at the beginning of the treatment responded better than those with severe laxity.<sup>[1,4]</sup> No significant difference was seen between responses

in males and females. There were only three patients above the age of 60 willing to undergo a nonsurgical face lift in our study and hence it is difficult to compare results in this age group. Areas like cheek and neck responded better than the forehead

**Table 3: Quantitative comparison of satisfaction scores between the areas**

Area	Mean satisfaction
Cheek laxity	5.16
Nasolabial folds	4.36
Jawline	3.91
Periorbital laxity	3.89
Neck laxity	3.60
Glabellar folds	3.54
Marionette lines	3.45

Friedman-test Chi-square = 110.4320988 "P" value =  $1.6 \times 10^{-21}$   
Higher score indicates better satisfaction



**Figure 1:** Softening of nasolabial folds and tightening of periorbital laxity



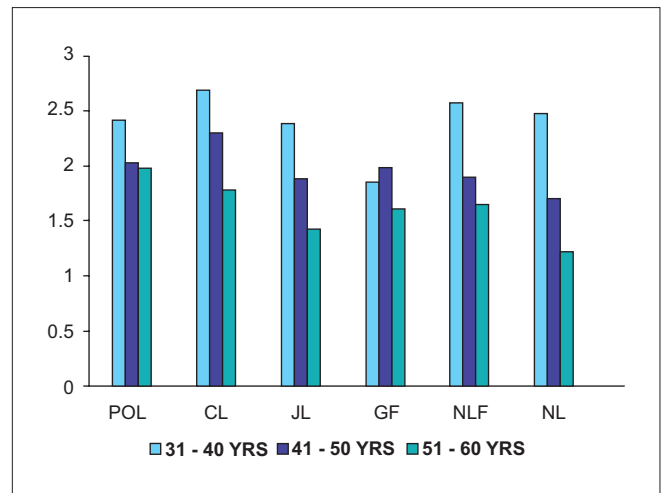
**Figure 2:** Improvement in neck laxity

(Picture 8). Static lines became less prominent but there was no significant improvement in dynamic wrinkles. No reduction in fat was noted as per objective photographic assessment done by the observers. Side effects were mild and limited to erythema and edema which subsided in a few hours.<sup>[8]</sup> One patient had a superficial skin burn over a one cm<sup>2</sup> area which healed in a week's time without any scarring. Second degree burns and residual scarring have also been reported in literature.<sup>[3,9]</sup> No pigmentation or scarring was seen in this study.

## DISCUSSION

Radiofrequency transmits low radiofrequency energy to the deep dermis raising the temperature of the dermis to 60–65°C while keeping the epidermal temperature at 40°C. There is no pain or burns due to its superpulsed mode and pulse width shorter than thermal relaxation time of skin. Heating of the dermis causes denaturation of collagen resulting in contraction of collagen fibers.<sup>[4]</sup> This effect provides the initial gratifying results of tighter, smoother looking skin. There is activation of mediators such as transforming growth factor beta (TGF-β) which result in neocollagenesis.<sup>[10]</sup> Collagen remodeling occurs in the subsequent healing phase eventuating in renewal of facial contours and long-term tightening of skin.<sup>[1,4]</sup> Conductive coupling is based on energy concentrated at the tip of an electrode being delivered to a target. This results in production of heat at the point of contact and may cause injury to the epidermis. Capacitive coupling disperses energy across a surface to create a zone of temperature increase in the dermis without creating an injury to the epidermis.

One of the most popular monopolar Radiofrequency devices has several disposable treatment tips and newer hand



**Figure 3:** Age wise comparison of improvement in the treated areas. POL (periorbital laxity), CL (cheek laxity), JL (jawline), GF (glabellar folds), NLF (nasolabial folds), NL (neck laxity). 0-3 is the quartile grading scale

pieces.<sup>[10]</sup> The superpulsed radiofrequency device on the other hand has a single reusable electrode. This makes the superpulsed radiofrequency more cost effective. Other devices utilize bipolar RF and laser systems (780–910 nm diode and 700–2000 nm infrared light). Tissue arcing leading to scar formation has been reported with them.<sup>[11]</sup> No such side effects are seen with superpulsed RF device. Another system utilizes both unipolar and bipolar RF and delivers different depths of RF current to the skin. This is supposed to reduce cellulite and cause tissue tightening.<sup>[10]</sup> The superpulse radiofrequency system does not have any effect on cellulite. Non-ablative infrared lasers utilize light energy in the range of 800–1800 nm to cause skin tightening.<sup>[10]</sup> There are no comparative studies as to which is better. Moreover, this is an initial study on superpulsed radiofrequency.

## CONCLUSION

Nonablative face lift with a super pulsed radiofrequency machine is a safe, convenient and quick, office procedure with excellent cosmetic results. It is noninvasive and there is no downtime.<sup>[8]</sup> It is cost effective as electrodes are reusable. It was found to be safe on Indian skin and can be used in all skin types. A “hands on” clinical experience is important as it is an operator controlled treatment. Nonablative face lift with a super pulsed radiofrequency may not a substitute for surgery but is an excellent treatment option. It can be combined with other modalities of skin rejuvenation like Intense pulsed light, botulinum toxin, and fillers. Since subsequent ageing is inevitable, a touch up is recommended after 1 year.<sup>[1]</sup> Long-term effects of nonablative radiofrequency treatment need to be studied.

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