THE EFFECT OF LONG-PULSED 1064 NM ND: YAG LASER-ASSISTED HAIR REMOVAL ON SOME SKIN FLORA AND PATHOGENS: AN IN VIVO STUDY

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Introduction

Laser hair removal has become the treatment of choice for the removal of unwanted hair. The most commonly used lasers include diode (800 nm), alexandrite (795 nm), and neodymium: yttrium-aluminum-garnet (Nd: YAG) laser (1064 nm).
Absorption by melanin at 1064nm is lower than at shorter wavelengths but is still sufficient to permit selective photothermolysis of the pigmented hair follicle with permanent destruction This reduces the thermal damage to the surrounding epidermis, making Nd: YAG laser the safestoption in dark-skinned patients.
Distinctive axillary odours emanate, when a large and permanent population of microorganisms thrives on secretions from eccrine, apocrine and sebaceous glands. Resident axillary microbiota consists mainly of bacteria of the genera Staphylococcus, Micrococcus, Corynebacterium and Propionibacterium. In females, Staphylococci predominate over Corynebacteria. The use of laser radiation, even with the aim of hair removal, can alter the microbial flora and it can be accompanied by alteration of the smell of sweat. The duration of this antimicrobial effect is undetermined, and so are the accompanying skin changes such as sweat odour and amount.

Aim of the work

Evaluation of immediate (pre *versus* post each session) and delayed antimicrobial effect (pre first session *versus* pre fourth session) effect of ND-YAG laser assisted hair removal.

Patients and Methods

Thirty females scheduled for axillary ND-YAG laser hair removal were included. Skin swabs were collected from the vault of the dominant axilla before and after each of the four sessions (S1-S4). Bacteriological cultures were performed to record the counts of total aerobes, total anaerobes, lipophilic bacteria, total staphylococci, Staphylococcus epidermidis (S. epidermidis), S. saprophyticus, S. hominis and S. aureus. Changes in sweat odour and folliculitis (if present) were recorded.

Results

Table 1: Axillary bacterial colony counts of pre- and post- S1by ND-YAG laser in 30 females

Type of bacteria	Colony count (x10^5 CFU/cm^2)		p-value
Total aerobes	**Pre - S1**	**Post- S1**	
Mean± SD	778.3±1429.7	511.4±1318.7	Wilcoxon Signed Rank test=30.0 P<0.001*
Median	278.9	111.3	
Min-Max	2.5-6250.0	0.0-6012.0	
Total anaerobes			
Mean± SD	787.3±1422.9	305.1± 693.4	Wilcoxon Signed Rank test=30.0 P<0.001*
Median	338.7	66.3	
Min-Max	2.5-6662.5	0.0-3737.0	
Total staphylococci			
Mean± SD	408.6±536.1	455.9±1703.6	Wilcoxon Signed Rank test=37.0 P<0.001*
Median	248.5	85.0	
Min-Max	12.5-2720.0	0.0-9425.0	
Lipophilic bacteria			
Mean± SD	936.5±2268.7	244.7±646.2	Wilcoxon Signed Rank test=19.0 P<0.001*
Median	205.0	78.7	
Min-Max	0.0-9262.0	0.0-3532.5	
S.epidermidis			
Mean± SD	1.4± 7.3	4.8±22.0	Wilcoxon Signed Rank test=4.0 P=0.593
Median	0.0	0.0	
Min-Max	0.0-40.0	0.0.-120.0	
S.saprophyticus			
Mean± SD	9.4±27.6	11.4±53.3	Wilcoxon Signed Rank test=8.0 P=0.161
Median	0.0	0.0	
Min-Max	0.0-125.0	0.0-292.0	
Mean± SD	246.3±300.6	108.4±157.6	Wilcoxon Signed Rank test=25.0 P<0.001*
Median	120.0	25.0	
Min-Max	3.4-1283.7	0.0-578.5	

P*: p value significant at level <0.05* S1: first session of ND: YAG laser

Table 2: Axillary bacterial colony counts of pre -S1 and pre- S4 by ND-YAG laser in 30 females

Type of bacteria	Colony count (x10^{5}CFU/cm^2)		p-value
Total aerobes	**Pre- S1**	**Pre- S4**	
Mean± SD	778.3±1429.7	172.6±176.6	Wilcoxon Signed Rank test=89.0 p=0.003*
Median	278.9	126.3	
Min-Max	2.5-6250.0	1.0-762.5	
Total anaerobes			
Mean± SD	787.3±1422.9	400.6±1069.7	Wilcoxon Signed Rank test=84.0 p=0.002*
Median	338.7	103.7	
Min-Max	2.5-6662.5	2.5-5037.5	
Total staphylococci			
Mean± SD	408.6±536.1	510.1±1659.0	Wilcoxon Signed Rank test=91.0 p=0.004*
Median	248.5	105.0	
Min-Max	12.5-2720.0	1.5-8612.5	
Lipophilic bacteria			
Mean± SD	936.5±2268.7	189.3±295.5	Wilcoxon Signed Rank test=144.5 p=0.070
Median	205.0	110.0	
Min-Max	0.0-9262.0	0.0-1250.0	
S. epidermedis			
Mean± SD	1.4± 7.3	4.0± 21.9	Wilcoxon Signed Rank test=3.0 p=1.000
Median	0.0	0.0	
Min-Max	0.0-40.0	0.0-120.0	
S.saprophyticus			
Mean± SD	9.4±27.6	18.3±47.7	Wilcoxon Signed Rank test=35.0 p=0.445
Median	0.0	0.0	
Min-Max	0.0-125.0	0.0-237.5	
S.hominis			
Mean± SD	246.3±300.6	145.8±198.8	Wilcoxon Signed Rank test=150.0 p=0.090
Median	120.0	70.0	
Min-Max	3.4-1283.7	0.0-825.0	

P*: p value significant at level <0.05*
S1: first session of ND: YAG laser S4: fourth session of ND: YAG laser

Conclusion

Laser caused an immediate and delayed reduction in axillary aerobes, anaerobes, lipophilic bacteria and staphylococci. This form of dysbiosis might lead to sweat odor changes.