Behavioral Analysis of Practitioners Who Frequently Perform Facial Thread-Lifting Procedures

Seung Min Oh, MD, MMBA¹
Bong Cheol Kim, MD²
Min Seung Kim, MD³
Sang Bong Lee, MD⁴
Woo Kyung Bae, MD, MPH⁵

¹ON Clinic, Seoul, Korea

²Lamar Clinic Isu Branch, Seoul, Korea

³Inee Clinic, Seoul, Korea

⁴Pygmalion Clinic, Seoul, Korea

⁵Health Promotion Center, Seoul National University Bundang Hospital, Seongnam, Korea

Background and Objectives

The effects of thread-lifting remain controversial because of the lack of a standardized protocol. To examine the treatment practices of Korean doctors who frequently perform thread-lifting.

Materials and Methods

At a large-scale aesthetic conference in Korea, we conducted a survey including clinicians who practice facial thread-lifting and analyzed the procedures and preferences of the doctors who participated in the questionnaire-based survey. We then compared the treatment characteristics of clinicians who perform thread-lifting at least once per week (high-frequency) to those of clinicians who perform it less than once per week (low-frequency) using multivariate regression analyses.

Results

Overall, 243 clinicians participated in the questionnaire-based survey, and the responses of 150 participants who currently perform thread-lifting were analyzed. The number of threads injected per hemi-face was higher in the high-frequency group than in the low-frequency group. Furthermore, the high-frequency group was more likely to use molding cog threads than the low-frequency group.

Conclusion

Practitioners who frequently perform thread-lifting are likely to prefer molding cog threads and insert a relatively large number of threads per face. These results facilitate the development of a standard thread-lifting procedure and standard evaluation protocol for the effectiveness of this procedure.

Key words

Thread lifting, Protocol of thread lifting, Molding thread, Cog thread

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Correspondence

Woo Kyung Bae
Health Promotion Center, Seoul National University Bundang Hospital, Seongnam 13620, Korea
E-mail: 65597@snubh.org
<https://orcid.org/0000-0001-6729-4128>

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INTRODUCTION

Thread-lifting is a procedure that is widely performed for facial rejuvenation and has a large market [1,2]. However, the lifting effect of the procedure remains controversial. In 2018-2019, systematic reviews of the effects of thread-lifting were published [3-5]. In one of these reviews, seven existing studies conducted using four types of thread were analyzed; however, the types of thread and techniques used differed, and the effects of thread-lifting were subjectively evaluated. The authors concluded that there were no specific effects, excluding the results of two studies that were conducted under the sponsorship of a particular company [3].

Despite the uncertainty about its effects, the thread-lifting procedure is still being actively performed. Recently, several additional studies have been published showing the effectiveness of thread-lifting [6-10]. Therefore, no consensus has been reached on the value of this procedure.

Tissue experiments and comparative clinical trials have been performed to examine the lifting effect of this procedure; however, each doctor has different treatment methods, and these studies are not standardized. Among the studies included in the systematic review by Haydar et al., there were no split face studies or patient control studies, and only one blinded surgeon-scoring study was included [3].

Therefore, a standard protocol and further studies are needed to delineate the lifting effect of the procedure. A standard protocol should be designed based on the lifting principle used and demonstrated safety. We aimed to study

the characteristics of practitioners who frequently perform thread-lifting through the use of a questionnaire to help standardize this procedure.

MATERIALS AND METHODS

1. Participants and survey design

A survey was conducted for clinicians who attended the 33rd fall Korean Association for Laser, Dermatology, and Trichology conference, held in Seoul, Republic of Korea, on December 1, 2019. The survey was conducted in a web-based, real-time, mobile environment. The researchers sent a text message with a link to the survey to attendees who registered at the conference. Attendees could participate in the survey by clicking the link in the text message. Each link contained a unique encrypted number, allowing it to be accessed only once, thus preventing duplicate questionnaire participation. Therefore, even if the link was forwarded to another person's cell phone, the survey could not be resubmitted. By clicking the link, those who participated in the web survey started the questionnaire after reading the IRB-related content on the first screen and consenting to participate in the questionnaire (Fig. 1). After entering their gender and age, each participant answered a survey consisting of 13 multiple-choice questions (Fig. 2). These questions investigated the frequency of treatment, experience with the procedure, preferred products, preferred techniques, and side effects.

2. Statistics

The participants were divided into two groups: those who performed the procedure one or more times per week

Fig. 1. IRB related content on the first screen of web based questionnaire.

Fig. 2. Web survey with 13 multiple-choice questions.

and those who performed the procedure less than once per week. The participant's age was analyzed using a t-test. Gender, professional/operational experience, education method, technique, and the number of threads injected per hemi-face were analyzed using the Chi-square test. Multiple responses were given for questions regarding thread type, preferred product, and preferred technique, and each item was analyzed using the Chi-square test. An ordered regression analysis was performed on the number of threads injected per hemi-face according to the frequency of treatment using age, gender, specialized subjects, career experience, and education method as disturbance variables. Logistic regression was performed for thread type, preferred product, and preferred technique. Stata version 15.0 (StataCorp. 2017. Stata Statistical Software: Release 15. College Station, TX: StataCorp LLC.) was used for statistical analysis of the survey results.

3. Ethics

Ethics approval was obtained from the Institutional Review Board of Seoul National University Bundang Hospital (B-1912/580-303).

RESULTS

1. Baseline demographics

Among the clinicians who participated in the academic conference, 243 completed the questionnaire. Of these, 150 were analyzed, excluding 93, who answered that they never performed the thread-lifting procedure.

The demographic and sociological characteristics of the survey participants are shown in Table 1. The participants were divided into two groups, depending on how frequently they performed the thread-lifting procedure: those that performed the procedure less than once a week (low-frequency) and those that performed the procedure one or more times a week (high-frequency).

There were no differences in gender or preferred education method between the two groups. The high-frequency group had higher percentages of aesthetic physicians (48.3% vs. 36.7%) and plastic surgeons (13.3% vs. 4.4%) than the low-frequency group. Moreover, the percentage of participants who had more than one year of experience was higher in the high-frequency group than in the low-frequency group (51/60, 85.0% vs. 57/90, 63.3%).

2. Univariate analysis

Univariate analysis was performed on the procedure characteristics between the two groups (Table 2). Regarding

Table 1. The demographic and sociological characteristics of the participants

Characteristics	Total (n = 150)	< 1/week (n = 90)	> 1/week (n = 60)	p-value
Age (years)	42.5 ± 8.8	42.9 ± 8.9	41.8 ± 8.7	
Specialty				0.050
Aesthetic physician	62 (41.3)	33 (36.7)	29 (48.3)	
Dermatologist	18 (12.0)	12 (13.3)	6 (10.0)	
Plastic surgeon	12 (8.0)	4 (4.4)	8 (13.3)	
Other	58 (38.7)	41 (45.6)	17 (28.3)	
Experience				0.008
< 1 month	7 (4.7)	6 (6.7)	1 (1.7)	
1 month < 1 year	35 (23.3)	27 (30.0)	8 (13.3)	
1 year < 3 years	34 (22.7)	15 (16.7)	19 (31.7)	
3 years < 5 years	30 (20.0)	21 (23.3)	9 (15.0)	
> 5 years	44 (29.3)	21 (23.3)	23 (38.3)	
Education				0.903
Self-education	15 (10.0)	10 (11.1)	5 (8.3)	
Small seminar	67 (44.7)	42 (46.7)	25 (41.7)	
Hands-on education	45 (30.0)	26 (28.9)	19 (31.7)	
Standard training	5 (3.3)	2 (2.2)	3 (5.0)	
Large conference	16 (10.7)	9 (10.0)	7 (11.7)	
Other	2 (1.3)	1 (1.1)	1 (1.7)	

Numbers are presented as mean ± standard deviation or number (%).

the type of thread most frequently used for the procedure, 95 (63.3%) survey participants use molding cog thread, 59 (39.9%) use cutting cog thread, and 47, (31.3%) use mono thread. Regarding preferred products, 73 (48.7%) survey participants prefer N-cog® (N-finders Co. Ltd), 71 (47.3%)

prefer Mint® (Hans Biomed Co. Ltd), and 56 (37.3%) prefer Blue Rose Forte® (Hugel Co. Ltd). No significant differences were observed between groups in the type of thread used or preferred products.

When asked how many threads are injected per hemi-

Table 2. Characteristics of practice according to the procedure frequency

Factor	Total (n = 150)	< 1/week (n = 90)	≥ 1/week (n = 60)	p-value
Thread type (multiple response)				
Mono-thread	47 (31.3)	28 (31.1)	19 (31.7)	0.943
Cutting cog	59 (39.9)	35 (38.9)	24 (40.0)	0.891
Molding cog	95 (63.3)	52 (57.8)	43 (71.7)	0.084
Multi-filament	20 (13.3)	14 (15.6)	6 (10.0)	0.327
Mesh	17 (11.3)	12 (13.3)	5 (8.3)	0.344
Cone type	34 (22.7)	21 (23.3)	13 (21.7)	0.811
Others	6 (4.0)	4 (4.4)	2 (3.3)	0.734
Number of threads				
1-5/hemi-face	87 (58.7)	59 (65.6)	29 (48.4)	0.092
6-10/hemi-face	53 (35.3)	26 (28.9)	27 (45.0)	
> 11/hemi-face	9 (6.0)	5 (5.6)	4 (6.7)	
Preferred technique (multiple response)				
Mono thread	58 (38.7)	32 (35.6)	26 (43.3)	0.338
Bidirectional cog	91 (60.7)	53 (58.9)	38 (63.3)	0.585
Multi-directional cog	77 (51.3)	49 (54.4)	28 (46.7)	0.350
Multi-filament	21 (14.0)	12 (13.3)	9 (15.0)	0.773
Mesh type thread	15 (10.0)	9 (10.0)	6 (10.0)	1.000
Fascia fixation	34 (22.7)	19 (21.1)	15 (25.0)	0.577
Others	10 (6.6)	6 (6.6)	4 (6.7)	0.353

Numbers are presented as number (%).

Thread type, preferred product, and preferred technique items are multiple responses.

Fig. 3. (A) N-cog® thread, (B) Blue Rose Forte® thread.

Fig. 4. (A) N-cog® thread, (B) QTL®.

Table 3. Multivariate analysis of treatment preferences according to procedure frequency

Factors	Variables	OR	95% confidence interval	p-value
Number of threads		2.901*	1.299-6.478	0.009
Thread type (multiple response)	Mono-thread	1.729**	0.726-4.118	0.217
	Cutting cog thread	0.895**	0.413-1.943	0.780
	Molding cog thread	2.353**	1.006-5.502	0.048
	Multi-filament thread	0.616**	0.185-2.043	0.428
	Mesh thread	0.487**	0.143-1.658	0.250
	Cone type thread	0.493**	0.168-1.441	0.196
Preferred technique (multiple response)	Mono thread	1.502**	0.686-3.288	0.309
	Bidirectional cog	0.987**	0.455-2.139	0.973
	Multi-directional cog	0.787**	0.362-1.710	0.545
	Multi-filament	2.066**	0.617-6.911	0.239
	Mesh type	1.004**	0.293-3.440	0.995
	Fascia fixation	1.315**	0.540-3.203	0.547

In each analysis, age, gender, specialty, career, or preferred education method was used as the disturbance variable.

*OR was calculated using ordered regression analysis.

**OR was calculated using logistic regression analysis.

face, 87 (58.0%) participants in the survey answered 3-5, 53 (35.3%) responded 6-10, and 9 (6.0%) responded 11 or more. Regarding preferred technique, 91 (60.7%) survey participants prefer bi-directional cog thread insertion (Fig. 3A, N-cog®; Fig. 3B, Blue Rose Forte®), 77 (51.3%) prefer multi-directional cog thread insertion (Fig. 4A, N-cog®; Fig. 4B, QTL®), and 58 (38.7%) prefer mono thread insertion. No significant difference in preferred technique was observed between groups.

3. Multivariate analysis

Multivariate analysis was performed between the two frequency groups (Table 3). The high-frequency group used more threads per hemi-face than the low-frequency group (odds ratio [OR], 2.901; $p = 0.009$). Furthermore, molding cog thread was more likely to be used by the high-frequency group compared to other threads (OR, 2.353; $p = 0.048$). There were no statistically significant differences in preferred products or techniques.

DISCUSSION

To the best of our knowledge, this is the first study to analyze the demographic and sociological characteristics of clinicians who practice the thread-lifting procedure. The high-frequency group injected more threads per face than the low-frequency group. In addition, molding cog threads were used more frequently in the high-frequency group compared to the low-frequency group.

The physical traction of the cog causes the thread-lifting effect at the beginning of the procedure and chemical ef-

fects, including neocollagenesis, that continuously occur in the tissue afterward [11]. Through experiments in pigs, Yoon et al. [11] observed the histological changes that occurred when the thread was injected into the body over one year, and systematically summarized these changes. They demonstrated that the lifting and tightening effects were produced by the neocollagenesis and fibrous bridging phenomena occurring in the surrounding tissue after thread injection. Furthermore, Lee et al. [12] revealed in animal experiments that the degree of neocollagenesis that appears after thread insertion is independent of the type of material and is proportional to the area of the surface area of the material. Based on the results of these studies, inserting a larger number of cog threads would create stronger traction and increase neocollagenesis. We speculate that the doctors who perform frequent procedures might have observed that inserting a relatively large number of threads leads to better sustainability and satisfying results of thread-lifting. Analyzing the frequency of practitioners' procedures may be used as a reference in making standard procedures.

Although the effectiveness of thread-lifting has not been demonstrated by meta-analyses [3-5], these analyses were based on studies with various treatment methods that have not proved to be effective. Analyzing the procedures of practitioners who frequently perform thread-lifting may facilitate the development of standard procedures. In the absence of a structured training curriculum and standard procedure for thread-lifting, clinicians are sharing their treatment methods through seminars, live procedure training, and experience. A standardized procedure based on our understanding of the principles of thread-lifting is need-

ed; only then can the effects of thread-lifting be accurately evaluated.

One limitation of this study was that the differences between the two groups were analyzed in the absence of evidence that those in the high-frequency group had better outcomes than those in the low-frequency group. However, our results suggest a starting point for future research based on the analysis of the problems of previous results. For example, the information that high-frequency practitioners insert a large number of threads is useful for practitioners to develop effective procedures and perform various studies.

Our data was self-reported and is subject to the inherent biases of such data collection. Further studies should be designed to collect prospective, concrete procedure characteristics and related outcomes, predefined in detail derived from the standardization of the thread-lifting procedure.

In the future, research on the principles and safety of the procedure according to various factors, such as the type of thread, protocol, number of threads, and design method, should be conducted. These results would facilitate the development of a standardized thread-lifting procedure and allow an accurate re-evaluation of the effects of thread-lifting.

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CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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