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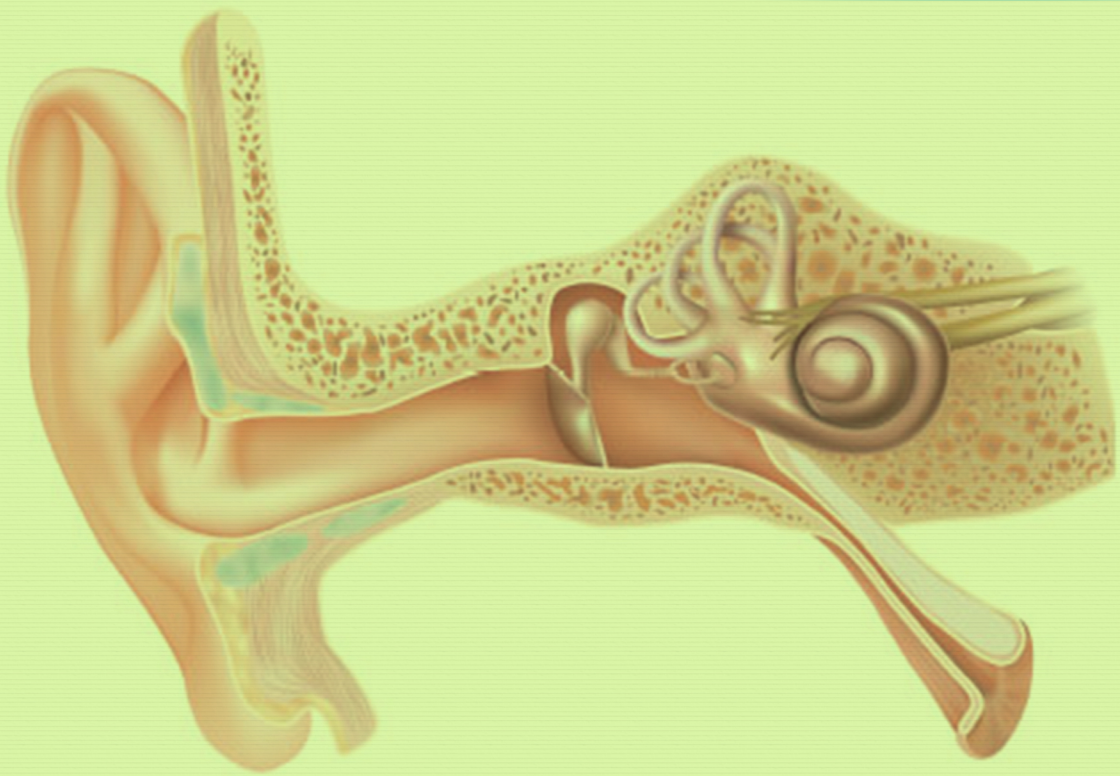

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Editorial

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Henkin R. The hidden epidemic of smell loss (hyposmia) in the United States. *Otolaryngol Open J.* 2015; 1(1): e1-e2.

The Hidden Epidemic of Smell Loss (Hyposmia) in the United States

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There is a hidden epidemic of hyposmia in the United States. While most otolaryngologists may see one or two patients with hyposmia yearly there are as many as 21 million people in the United States with hyposmia.[1] Most of these patients experienced hyposmia following an influenza-like infection.[2] Data suggest that there are 30 million patients who experience a flu-like illness yearly; our data suggest that about 1% of these patients develop permanent hyposmia or about three million people develop and suffer with this symptom on a yearly basis. As many as two million patients who have what can be termed allergic rhinitis suffer with hyposmia on a chronic basis.[2] Otolaryngologists do see these patients but if they do not exhibit rhinitis, sinusitis or nasal polyps the patient's hyposmia may not be paramount in their evaluation or treatment. Patients with hyposmia after a traumatic brain injury represent a third major etiology of hyposmia with as many as 500,000 patients exhibiting a persistent hyposmia after their head injury.[2] Hyposmia associated with aging, head and neck radiation or chemotherapy, Parkinson's disease or other metabolic or neurological issues constitute a part of this epidemic which is not recognized by otolaryngologists as a major medical problem.

While hyposmia may not be life threatening for most of these patients their lives are inhibited by their inability to obtain flavor from food, enjoy social events around meals or to smell both pleasant and unpleasant or dangerous odors. Most patients are deeply disturbed and can become depressed by this loss and search unsuccessfully for methods to restore their smell function.

The major problems related to this epidemic are lack of understanding of the mechanisms responsible for it, how to evaluate it or how to treat it.

Most patients with hyposmia do not have an anatomical or neurological etiology as the cause of their loss. Most patients exhibit hyposmia related to abnormalities of their olfactory receptors which are damaged by the viral RNA associated with their influenza or by an underlying immunological pathology associated with their rhinitis.[2]

Most otolaryngologists do not have the equipment to evaluate quantitatively the sensory changes about which the patients complain. We have established specific testing techniques to help to evaluate these patients.[2] Results of these tests define the roles of the receptors, the brain and the interaction between the receptors and brain play in hyposmia.

Most otolaryngologists are unaware that drugs are available to treat these patients.[2] Many studies have demonstrated that treatment with oral theophylline has been successful in restoring smell function in many of these patients.[3] And recently, intranasal theophylline has been even more efficient in helping these patients restore their smell function.[4]

It is up to otolaryngologists to understand the extent of this epidemic and to respond to it with the same energy and enthusiasm that they extend to their surgical practice for which they were well trained. Recognition of this hidden epidemic is the first step in its evaluation. Understanding the mechanisms which initiated it and its treatment will help otolaryngologists deal with this hidden epidemic.

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Editorial

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In Support of Nerve Monitoring during Thyroid Surgery

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Interventions during surgical procedures are hotly debated for many years. Interventions of benefit to patients stand the test of time and become accepted by the surgical community at large after a period of several years. The benefit conferred by the intervention is inversely proportional to the time taken for acceptance by the surgical community. After acceptance by the surgical community the intervention becomes accepted as the standard of care. In Otolaryngology, laryngeal nerve monitoring during thyroid surgery and image guided sinus surgery are two such interventions.

The benefits of Laryngeal Nerve Monitoring (LNM) in thyroid surgery are in the debate stage. As a surgeon who uses LNM in every thyroidectomy and parathyroidectomy over the last eight years, I have greatly benefitted from it. My patient outcomes have improved with regard to nerve function both temporary and permanent. I would like to take this opportunity to write in support of the technique.

The technique is described by Randolph GW, Dralle H, with the International Intraoperative Monitoring Study Group.[1] Largely because of its ease of use and reliability, I have been using an endotracheal tube with surface Electromyography electrodes (EMG-ET), which directly contact the vocal cords.

Dralle has calculated that a randomized controlled trial will need at least 40,000 patients per arm for adequate statistical power and may not be feasible to study these techniques.[1] So, we looked at 119 consecutive thyroidectomies/parathyroidectomies where residents were involved and I was the attending surgeon, to study the incidence of Recurrent Laryngeal Nerve (RLN) paralysis.[2] One patient developed a permanent vocal fold paralysis (1/119 or 0.84%). Another patient had a vocal fold paresis which recovered in 4 weeks (1/119 or 0.84%). This is an acceptable morbidity rate.

Anatomic variations are seen in the Laryngeal nerves which cannot be predicted preoperatively.[3-5] LNM aids in these cases. LNM has its pitfalls and a learning curve.[6] Improper positioning of the EMG-ET can give rise to complications[7] which are treatable.

We performed a survey of the American Head and Neck Society (AHNS) members and found the following: The response rate was 18%. The most commonly cited reasons for using LNM were medical-legal protection and increased confidence. Younger surgeons were more likely to use LNM.[8] The results suggest that LNM use has become more widespread and may eventually become routine practice.

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Letter to the Editor

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Dear Editor,

I'm honoured and enthusiastic to be part of Otolaryngology – Open Journal, I'd like to talk to you about my idea of peer review.

We have to be open mind in all topic of Otolaryngology, sure, but we necessity to encourage new research and new researcher.

Too much times, too strict peer review "cut the wings" to new enthusiastic research topic.

In my opinion, we, like reviewers have to be severe in evaluation of research method, statistic evaluation, references and language, but we should maintain open mind always in uncommon topic.

The aim of the research is discovery, discovery something "different or far" from common is the heart of innovation.

The "Linear thinking always" can make blind, sometimes "abstract thinking" can determinate, if the scientific propose is well organized, a brilliant discovery.

My wish, dear Editor, is that our new journal can empathize and discover new research and researchers to give a new push in Otolaryngology world.

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Research

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Effectiveness of Bronchodilator Therapy on Dyspnoea After Total Laryngectomy

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SUMMARY

Dyspnoea is an important symptom affecting quality of life in the laryngectomy. In these patients, it is useful to conduct spirometry and provide appropriate drug therapy when a bronchial obstruction is present.

ABSTRACT

Objective: The aim of this study was to evaluate the effects of long-term bronchodilators (six months of treatment) by performing a functional assessment and determining the degree of breathlessness in a group of laryngectomies.
Materials and Methods: We evaluated 93 outpatient laryngectomies by means of spirometry (extra-tracheal device); the mMRC scale was administered to determine the degree of dyspnoea. When appropriate, we began treatment with bronchodilators according to measured bronchial obstruction and repeated the test after six months of therapy.
Results: Patients undergoing total laryngectomy very often develop clinically evident bronchoconstriction and severe dyspnoea over the long term. In laryngectomies, the prevalence of airway obstruction is high (about 60%) and the incidence of dyspnoea is also very high (51 out of 62).
Conclusion: Bronchodilator therapy improved pulmonary function and dyspnoea within 180 days of treatment. The possibility of evaluating and quantifying the degree of obstruction allows optimization of drug therapy.

KEYWORDS: Dyspnoea; Lung function; Laryngectomy; Chronic Obstructive Pulmonary Disease (COPD).

INTRODUCTION

Patients undergoing total laryngectomy experience a series of physiological changes in breathing pattern caused by the separation of the lower airways from the upper airway, because the air enters through the tracheostoma bypassing the upper respiratory tract, thus eliminating the functions of the nose on the air inhaled, such as heating, humidification, and filtration.[1] At the level of the lower airways, this anatomical disruption produces irritation and dryness of tracheo-bronchial mucosa, crusting at the level of the stoma and cough.[1]

In laryngectomies, in the first two months after a tracheostomy, an increase occurs in the efficiency of the mucociliary clearance. This is probably due to a reactive bronchial hypersecretion, which protects the respiratory mucosa by direct contact with the airflow, which is no longer filtered and conditioned by nasal mucosa. As a result of the absence of air, irritants and infectious organisms contained in the inspired air are no longer stimulated.[2] In later stages, atrophy of the mucosa and a reduction in intranasal temperature occur, which increases the time of mucociliary clearance and, therefore, result in conditions that aid in the development of chronic infections by saprophytic bacterial flora.[3] Therefore, a few months after surgery, the permanent tracheostoma leads to a decrease in mucociliary function, resulting in exclusion of the upper

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airways, because of viral and bacterial infectious episodes that are repeated over time.

It is important to consider that patients who develop laryngeal cancer are heavy smokers, in almost all cases: laryngeal cancer and Chronic Obstructive Pulmonary Disease (COPD) often coexist.[4,5] After the risk of developing a second cancer, the second leading cause of morbidity and mortality in these patients is the progressive deterioration of lung function[6] until respiratory failure occurs.

OBJECTIVE OF THE STUDY

Our main objective of this study was to examine the effects of bronchodilators (six months of treatment), with respect to functional and clinical data. Indication for therapy was obtained by assessment of lung function (by spirometry) in the patients who had undergone total laryngectomy surgery.

MATERIALS AND METHODS

The Monaldi Hospital (Naples, Italy) Institutional Review Board (IRB) has approved this study. We evaluated 93 consecutive patients who had undergone total laryngectomy (Table 1) in our Respiratory Department from January 2012 to April 2013. Patients included had undergone total laryngectomy surgery for laryngeal carcinoma between 1981 and 2008, and their age ranged between 44 and 83 years (mean age 65 years), 82 patients were male and 11 women, 89 were smokers (96%). The patients had no history of asthma and had never been treated with bronchodilator therapy. They underwent clinical examination and spirometry; in addition, their dyspnoea was assessed according to the modified Medical Research Council (mMRC) scale. The mMRC breathlessness scale comprises five statements that describe the range of respiratory disability from none (Grade 0) to almost complete incapacity (Grade 4).

Patients (n=93)		
Sex, m/f	82/11	
Age, year	65.6 +/- 10	
Pulmonary Function		
FVC, L	2,2 +/- 0,8	
FVC, % pred	65,6 +/- 20,9	
SVC, L	2,5 +/- 0,8	
SVC, % pred	72 +/- 0,2	
FEV1, L	1,7 +/- 0,7	
FEV1, % pred	61 +/- 0,2	
FEV1/FVC, % pred	69,8 +/- 12,9	
MMRC Grade of Dyspnea		
Average value	1,6 +/- 1,6	
Grade 0	42/93	45%
Grade 1	01/93	1%
Grade 2	19/93	21%
Grade 3	16/93	17%
Grade 4	15/93	16%

Table 1: Baseline characteristic of patients.

Patients with obstructive syndrome were evaluated for the degree of dyspnoea according to the mMRC scale: 1) short of breath when hurrying or walking up a slight hill, 2) walk slower than contemporaries on level ground because of breathlessness, or had to stop to breathe when walking at own pace, 3) had to stop to breathe after about 100 metres or after a few minutes on a level surface; 4) too breathless to leave the house or breathless when dressing or undressing.

To conduct the pulmonary function test, a Spirometer (Medical International Research) MIR III was used, which quantified the following parameters in each patient: SVC (Slow Vital Capacity), FVC (Forced Vital Capacity), FEV1 (Forced Expiratory Volume in 1 second), FEV1/FVC.

The extra-tracheal device was set up with a silicone adapter mounted on a cardboard mouthpiece and a filter (Figure 1). The specific adapter silicone was well tolerated by the patient. The appropriate adapter was used to perform spirometry in patients with alterations in the margins of the stoma skin, with an irregular diameter and not only adhering to the cardboard mouthpiece.

Figure 1: The extra-tracheal device.

The nozzle of the spirometer was connected to the tracheostoma by means of the extra-tracheal device, exerting slight pressure to avoid air leaks.

Spirometry testing was performed according to the following procedure:

1 -Patients were informed about spirometry and how the test would be conducted;

2 -the cannula, if present, is extracted from the trachea and tracheobronchial secretions are removed;

3 -the extra-tracheal spirometry device is connected to the tracheostoma;

4 -spirometryis executed according to ATS/ERS criteria (2005).[7]

5 -spirometryis interpreted according to ATS/ERS criteria (2005).[8]

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After pulmonary function testing, the skin was examined for irritation or allergic reactions to the silicone adapter. The patients were asked to rate comfort and acceptance of the device, and adverse skin reactions were also evaluated. Patients who had a variable degree of obstruction were treated according to the Global initiative for chronic Obstructive Lung Disease (GOLD) guidelines (2014).[9]

After six months of treatment, the patients underwent another spirometry test, and the degree of dyspnoea was re-evaluated. Statistical analysis was performed with the Biostat Calculator.

RESULTS

The patients reported good compliance to the method and reported no cases of adverse skin reactions. The results showed that 26 patients had no alteration in pulmonary function; 64 patients had obstructive syndrome (11 patients had mild obstructive syndrome, 32 patients a moderate obstruction, 21 patients a severe obstruction), and finally, spirometry was not reproducible in five patients. Among patients with obstructive syndrome, 16 had a reversible obstruction treated with a β-adrenergic agonist.

According to the mMRC evaluation the results shows ten patients had no dyspnoea except on strenuous exercise, one had a degree of dyspnoea of 1, 20 had a degree of dyspnoea of 2, sixteen reported a level of dyspnoea of 3, finally, 15 patients had a degree of dyspnoea of 4.

Fifty-two of the sixty-two patients with obstructive syndrome received bronchodilator treatment according to the GOLD guidelines. Ten patients were excluded: one patient had lung cancer and nine asymptomatic patients had a mild degree of obstruction. After six months of therapy, lung function and the degree of dyspnoea in the study patients were evaluated: five of 52 patients receiving bronchodilator therapy were lost to follow-up. Forty-seven patients were reassessed after undergoing bronchodilator treatment (Table 2) and had a reduction in the level of dyspnoea: six patients had a reduction in dyspnoea from grade 2 to 1;17 had a reduction from grade 3 to between grades 2 and 1;13 had a reduction from grade 4 to between grades 3 and 2; finally, 11 subjects had a reduction from grade 5 before bronchodilator treatment to between 4 and 2 after treatment. After the revaluation, a significant improvement in Forced Expiratory Volume (FEV) 1 was noted with a *p value* <0.0005 (Figure 2) and the parameter dyspnoea improved with a *p value* <0.01 (Figure 3).

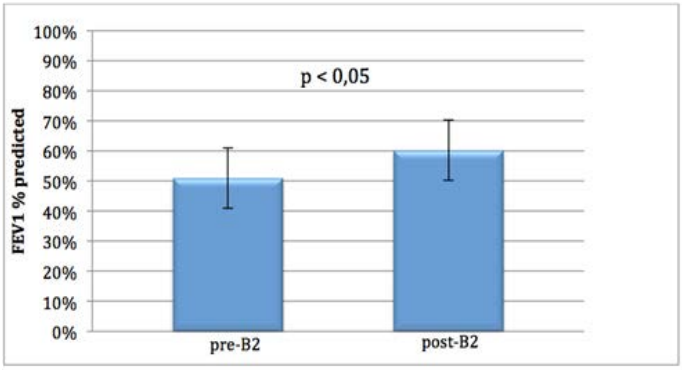

Figure 2: Improvement in FEV1% predicted after 6 months of pharmacological therapy.

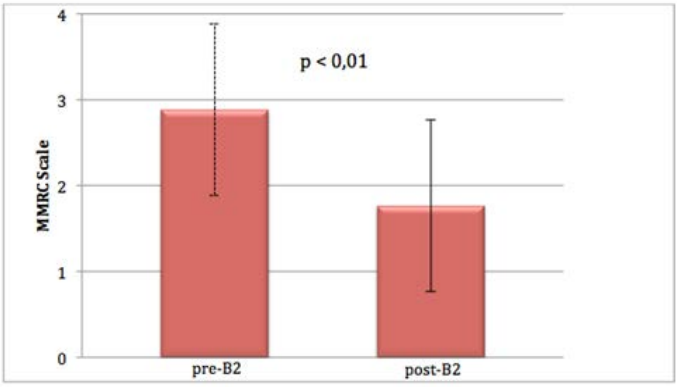

Figure 3: Reduction of dyspnoea after 6 months of pharmacological therapy.

		before	after	P-value
Patients (n= 47)				
Sex, m/f	42/5			
Age, year	65.9 +/- 8,8			
Pulmonary Function				
FVC, L		1,96+/- 0,7	2,09+/- 0,8	p 0,018
FVC, % pred		61,1 +/- 0,19	66 +/- 0,2	p 0,030
FEV1, L		1,37+/- 0,6	1,52 +/- 0,6	p<0,0005
FEV1, % pred		51,84 +/- 17,2	58,50 +/- 18,4	p<0,0005
FEV1/FVC, %	pred	61,26 +/- 10,3	64,08 +/- 11,8	p 0,054
MMRC Grade of Dyspnea				
Average value		2,9 +/- 0,8	1,8 +/- 0,9	p<0,01

Table 2: Changes in pulmonary function and dyspnoea after pharmacological therapy.

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DISCUSSION

It is well known that exposure to cigarette smoke and anatomic and functional alterations after surgery predispose individuals to the development of respiratory problems. Pulmonary function tests are rarely performed in patients with total laryngectomy due to the absence of an appropriate extra-tracheal device; however, laryngectomies are generally smokers (in our group 94% of patients) and, in addition, the anatomical changes that occur after surgery contribute to the development of chronic inflammation of the airways. For all study patients, it was possible to make an assessment of lung function with the help of a simple device. The extra-tracheal device allowed connection of the patient to the spirometer, without air leaks during spirometry. The ability to perform spirometry has made it possible to conduct a uniform assessment of patients.

Of the 93 patients examined, 62 (67%) had a variable degree of obstruction, and 52 (56%) had dyspnoea during exercise. Patients in need of drug treatment began therapy and were re-evaluated after six months, at which time functional improvement and a significant decrease in the dyspnoea index were noted. The mMRC scale does not measure breathlessness itself, but the disability caused by breathlessness.[10] This remains the issue of greater importance, because the appropriate treatment has an impact on patients' quality of life. The capacity to assess and quantify the degree of obstruction and to provide the appropriate therapy for each patient can help to improve quality of life. Therefore, in the follow-up of patients with total laryngectomy, it is also necessary periodically to perform a study of lung function by spirometry.[11] Even patients with normal lung function prior to total laryngectomy, show a progressive obstructive ventilatory defect, within one year of follow-up; however, patients who undergo conservative intervention have no significant reduction of the breathing parameters.[12]

CONCLUSION

In conclusion, baseline lung function should be assessed early in all patients with total laryngectomy. Further studies should also be dedicated to broader populations, because most of these patients are smokers and often treated with the wrong therapy, without reference to the functional data, with frequent exacerbations, with a decidedly negative impact on quality of life.

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CONSENT STATEMENT

The patient has provided written permission for publication of the case details.

ETHICAL STANDARDS

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional guidelines on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

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Research

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Preliminary Findings on Gender Differences in Aesthetic Rhinoplasty Patients: Body Appreciation and Appearance Comparisons

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ABSTRACT

Objective: Body image has a crucial role in considering elective aesthetic surgery. Yet, gender differences have not been well studied in this respect. The present study aimed to provide preliminary comparisons between male and female patients regarding body appreciation and appearance comparisons.
Materials and Methods: A consecutive sample of 70 rhinoplasty patients was selected in a private surgical clinic in Tehran, Iran. The Persian versions of Body Appreciation Scale (BAS) and Physical Appearance Comparison Scale-Revised (PACS-R) were used to gather data. Independent t-test was used to compare the scores between male and female participants.
Results: Male patients had higher scores in body appreciation ($p<0.05$) and women had higher scores in physical appearance comparisons. The magnitude of the relationship was large for body appreciation ($d=0.71$) and small for appearance comparisons ($d=0.08$).
Conclusion: Findings of the present study showed that Iranian male rhinoplasty patients hold more positive attitudes toward their body and tend to compare their physical appearance less often. It is suggested for future research to conduct studies on gender differences among rhinoplasty patients regarding other body image variables.

KEYWORDS: Rhinoplasty; Body image; Psychology; Gender differences.

ABBREVIATIONS: BAS: Body Appreciation Scale; PACS-R: Physical Appearance Comparison Scale-Revised; TUMS: Tehran University of Medical Sciences; BDD: Body Dysmorphic Disorder.

INTRODUCTION

Modern lifestyle, constantly influenced by media exposure of universal beauty standards, gives aesthetic values a pivotal role in social life. Beauty has always been admired and important; however, nowadays the awareness of various methods to improve beauty along with advancements in medicine has motivated many people toward these methods of improving attractiveness, shifting the balance of medical priority in favor of various, sometimes unnecessary, interventions. Whether a patient's decision to have aesthetic plastic surgery is a fully autonomous and conscious is still debatable. In that respect, as the face is the centre of attention in human encounters, facial plastic surgery has gained a special role in plastic surgery practice.[1]

It has been suggested[2] that cosmetic surgery is body-image surgery in nature. Physical modifications will therefore enhance one's body image as well as the physical appearance

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of the body. An interesting review of the available evidence[3] concluded that it was scientifically premature to assume that cosmetic surgery necessarily leads to significant mental health benefits such as improved body image or decreased depression. There appears a general lack of well-controlled research into the scope of possible psychological outcomes following different cosmetic surgeries.[4]

Among different cosmetic surgeries, rhinoplasty is considered to be very popular; however, research suggests that aesthetic rhinoplasty applicants report stronger psychopathological symptoms.[5-7] Findings indicate that patients who seek aesthetic rhinoplasty are more disturbed in somatization, anxiety, depression, social dysfunction, depression, general health,[8] self-esteem,[9] perfectionism,[10] narcissism,[11] schizotypal personality, and paranoid personality disorder.[12] Recent findings also suggest that interest in rhinoplasty is associated with lowered body appreciation[13] and high levels of physical appearance comparisons in social settings.[14]

In this respect, gender differences have not been well researched. Women are generally more interested in cosmetic procedures and would consider them more frequently in comparison with men.[15] Furthermore, it has been reported that women obtain lower scores in general body appreciation[16,17] as a measure of positive body image. The available evidence also suggests that women report higher levels of body-image concerns in comparison with men,[18] which have been explained as a function of the greater sociocultural pressure on women to attain ideals of physical attractiveness.[19]

Moreover, recent work has reported that women are significantly more interested than men to undergo cosmetic procedures,[20,21] which is consistent with the actual female-to-male ratio of cosmetic patients standing at 9:1.[22] Another research[23] investigated the gender differences in rhinoplasty patients in dimensions of psychopathology. Results suggested that female patients had significantly higher symptoms in four dimensions out of total ten subscales of psychopathology. Nevertheless, women showed stronger symptoms in all subscales. Inspection of effect sizes indicated that women had significantly higher scores in anxiety, obsessive-compulsive symptoms, depression, and paranoid ideation.

In contrast, several researchers have proposed that male patients are more difficult to manage in surgical settings. Wright[24] reported that male patients brought a set of unexplored motivations and expectations to the surgeon along with unresolved emotional conflicts resulting in feelings of ambivalence, emotional instability, and sometimes even hostility toward the surgeon. It has also been suggested that in general, men tend to have a poorer understanding of their deformity than do women. Thus, they cannot describe the changes they expect from the surgery.[24,25] This tendency, combined with a tendency toward selective hearing among male patients, makes it more important for the surgeon to determine the patient's goals and expectations.

The current study primarily aimed to compare body appreciation and physical appearance comparisons between female and male rhinoplasty patients. Another purpose of the study was to explore the ratio of female-to-male patients in a consecutive sample of the patients in Iran.

METHOD

Participants

A total of 70 rhinoplasty applicants were recruited in a consecutive manner from a private surgical clinic in Tehran, Iran. All applicants were willing to participate and fill a short survey concerning body and appearance. Sixty women and 10 men were included in the study. Demographic details were self-reported by participants. Baseline characteristics of both female and male patients are presented in Table 1.

Variable	Men	Women
Age(M, SD)	27.00, 7.19	23.56, 6.1
Weight(M, SD)	84.10, 16.98	56.12, 9.34
Height(M, SD)	181.80, 6.34	164.19, 4.42
BMI(M, SD)	25.39, 4.77	20.81, 3.27
History of Nasal Trauma(N)	0	0
Previous rhinoplasty(N)	0	0
Breathing problems(N)	1	0

Table 1: Baseline characteristics of the sample.

Measures

Body appreciation scale: Respondents filled out the body appreciation scale (BAS; see appendix 1).[26] All items were rated on a 5-point Likert-type scale ranging from 1 (*never*) to 5 (*always*). Internal consistency of the scale was reported high (alpha=0.94) in the United States.[26] Psychometric analysis of the Persian version of this measure in Iran suggested that only ten items of the BAS have adequate psychometric characteristics.[13] Therefore, we used 10-item version of BAS in this study (alpha=0.91). We averaged the scores of items to achieve a total score; therefore, total scores could range between 1 and 5.

Physical appearance comparison scale-revised: The 11-item revised scale of physical appearance comparison (see appendix 2)[27] was used. This one-dimensional scale measures the frequency that one compares his/her physical appearance with others in different settings. A 5-point Likert-type response option (coded between 0 and 4) was provided ranging from "*never*" to "*always*". Total score is acquired by summing all 11 items responses; therefore, scores may range between 0 and 44. Cronbach's alpha of the physical appearance comparison scale-revised (PACS-R) was 0.96 in the present study. Previous work suggests

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that the Persian form of this scale has adequate reliability and validity.[14]

Procedure

Ethical approval was obtained from Tehran University of Medical Sciences (TUMS) ethics committee. Participants were recruited using convenience sampling method in a consecutive manner in a private surgical clinic. Data were collected on an individual basis by a research assistant. Respondents provided informed consent before the administration and were debriefed about the objectives of the study after administration of the tests. All data were treated confidentially and questionnaires were preserved in a safe place. All surveys were included in the study.

Statistical Analysis

Statistical data analysis was performed in a blinded fashion. Data analysts were not involved in the process of data collection. In order to examine the gender differences in body appreciation and appearance comparisons, independent t-tests were used. Levene's test was also performed in order to assess the equality of variances between the two groups. Cohen's d was calculated as a measure of effect size in order to overcome the shortcomings of sample size and statistical significance tests. Data analytic procedures were performed using SPSS 22.0.

RESULTS

In the present study, the ratio of female-to-male patients was 6:1. Table 2 summarizes the differences between female and male patients. As Levene's test suggested, equal variances were assumed for both comparisons. As can be seen, men have a higher mean in body appreciation ($p<0.05$). While women's score in physical appearance comparison is higher, this effect is not statistically significant ($p>0.05$). The effect size is relatively strong for body appreciation ($|d|=0.71$) and very small for appearance comparison ($|d|=0.08$).

DISCUSSION

The present study aimed to explore gender differences among rhinoplasty patients. Very few studies have systematically assessed potential differences between female and male patients. Using a consecutive sample of patients from a surgical clinic in Tehran, we compared body appreciation and physical appearance comparison between females and males who applied for aesthetic rhinoplasty.

Findings suggested that male rhinoplasty patients had higher levels of positive body image and lower frequency of comparing their physical appearance in social settings such as restaurants and gyms. Therefore, male rhinoplasty patients have a better condition in terms of body image. Research suggests that men's tendency to engage in appearance comparisons is associated with self-esteem, anxiety, drive for muscularity, sexual satisfaction, obligatory exercise, and Body Dysmorphic Disorder (BDD) symptoms[28,29] which may result in request for cosmetic surgeries[30,31] and depression.[32] As a result, it is very important for facial plastic surgeons to screen patients prior to confirmation of surgery because some patients may be mainly in need of psychological consultation rather than a cosmetic surgery.

There is evidence that men generally have higher scores of body appreciation[16] which is consistent with the present results. Moreover, present findings are consistent with the notion that generally males engage in appearance-related comparisons to a lesser degree compared to their female counterparts.[33-35] Gender moderated this relationship, with women showing a stronger relationship between appearance comparison and body dissatisfaction in comparison with men. Therefore, it may be concluded that women who have higher degrees of appearance-related comparisons are more likely to apply for a cosmetic surgery.

The present study has several limitations. First, the sample is recruited from a single site using a non-probability sampling strategy. Second, symptoms of BDD were not compared between males and females in the present sample. Third, the number of male participants was small. Therefore, findings of the present study may be considered as preliminary results in studying gender differences among rhinoplasty patients. Consequently it is strongly recommended for future research to consider gender differences in regards to investigating psychological aspects of rhinoplasty.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

Variable	Gender(N)	M	SD	t-test statistic	df	p-value	Cohen's d
Body appreciation	Male(10)	4.75	0.35	2.144	68	0.036	0.71
	Female(60)	4.33	0.59				
Physical appearance comparisons	Male(10)	27.25	13.92	-0.261	68	0.795	-0.08
	Female(60)	28.27	11.07				

Table 2: Multiple comparisons of body image between female and male patients.

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Appendix 1

S.NO	The Body Appreciation Scale (BAS) items:[26]
1	I respect my body
2	I feel good about my body
3	On the whole, I am satisfied with my body
4	Despite its flaws, I accept my body for what it is
5	I feel that my body has at least some good qualities
6	I take a positive attitude toward my body
7	I am attentive to my body's needs
8	My self-worth is independent of my body shape or weight
9	I do not focus a lot of energy being concerned with my body shape or weight
10	My feelings toward my body are positive, for the most part
11	I engage in healthy behaviors to take care of my body
12	I do not allow unrealistically thin images of women presented in the media to affect my attitudes toward my body
13	Despite its imperfections, I still like my body

Appendix 2

S. NO	The Physical Appearance Comparison Scale-Revised (PACS-R) items:[27]
1	When I'm out in public, I compare my physical appearance to the appearance of others.
2	When I meet a new person (same sex), I compare my body size to his/her body size.
3	When I'm at work or school, I compare my body shape to the body shape of others.
4	When I'm out in public, I compare my body fat to the body fat of others.
5	When I'm shopping for clothes, I compare my weight to the weight of others.
6	When I'm at a party, I compare my body shape to the body shape of others.
7	When I'm with a group of friends, I compare my weight to the weight of others.
8	When I'm out in public, I compare my body size to the body size of others.
9	When I'm with a group of friends, I compare my body size to the body size of others.
10	When I'm eating in a restaurant, I compare my body fat to the body fat of others.
11	When I'm at the gym, I compare my physical appearance to the appearance of others.

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Research

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Sentinel Node Biopsy in Larynx Cancer: 5 Years Follow-up

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ABSTRACT

Background: The management of the clinically and radiologically negative neck in patients with early Head and Neck Squamous Cell Carcinoma (HNSCC) is still controversial. As approximately 20 to 30% of these patients harbor occult disease in the neck, most of them have to undergo elective neck dissection with no great benefit to majority of them. Sentinel Lymph Node Biopsy (SLNB) is emerging as a potential method for staging of lymphatic metastasis in HNSCC. It has been demonstrated that the status of the sentinel node predicts the presence of metastasis in the remainder of the nodes within the nodal basin.

Objective: To evaluate the accuracy of method in squamous cell carcinoma of larynx and compare neck status between Sentinel Node Biopsy (SNB) followed by Elective Neck Dissection (END) and SLNB alone.

Results: Eighteen patients, 12 at glottis and in 6 supraglottis with a mean age of 63 years (49-83) were evaluated. The follow-up was 64 months (48-87), sentinel node was identified in all the patients and it was positive in four patients (22%). Five patients (27%) received post-operative radiotherapy because of local factors such as: positive margin, vascular invasion, perineural invasion or extra-capsular spread. During the follow-up period none of the patients had local or neck recurrence (0%). In the last evaluation none of the patients had local or neck recurrence.

Conclusion: Sentinel Node Biopsy (SNB) in larynx cancer shows negative predictive value of 100%, accuracy of 100% and recurrence rate of 0%. It is important to note that no randomized study of sufficient sample size and sensitivity exists in the literature, but preliminary studies shows a new perspective in head and neck cancer.

KEYWORDS: Head and neck cancer; Sentinel node biopsy; larynx.

ABBREVIATIONS: HNSCC: Head and Neck Squamous Cell Carcinoma; SLB: Sentinel lymph node biopsy; SNB: Sentinel Node Biopsy; END: Elective Neck Dissection; US: Ultrasound; AJCC: American Joint Committee of Cancer; H&E: Hematoxilin-Eosin; IHC: Immunohistochemical; SSS: Step Serial Section; SPEC-CT: Single photon emission computed tomography; CT: Computed Tomography.

INTRODUCTION

The management of the clinically and radiologically negative neck in patients with early head and neck squamous cell carcinoma (HNSCC) is still controversial. As only approximately 30% of patients harbor occult disease in the neck, most of the patients have to undergo elective neck dissection with no benefit.[1] As in several other solid tumors, sentinel lymph node biopsy (SLNB) is emerging as a potential method for staging lymphatic metastasis in HNSCC.[2,3]

It has been demonstrated that the status of the sentinel node predicts the presence of

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metastasis in the remainder of the nodes within the nodal basin.[4] Multiple validation studies revealed that sentinel node detection rates in HNSCC are above 95% and negative predictive values for negative sentinel nodes of 95%.[5]

HNSCC had a high metastatic potential because of rich lymphatic network in head and neck area, therefore with a high propensity to lymph nodes metastasis.[6-8] Lymph node status is the most important prognostic factor in patients with HNSCC.[9] Evaluation of the neck is still largely based on palpation only.[10]

However, it is widely accepted that palpation is unreliable for assessment of the neck nodes. The sensitivity of palpation is generally around 75% and specificity varies from 73% to 97%.[11,12] Ultrasound (US) can detect a high number of non palpable enlarged lymph nodes, but some studies shows that when the sensitivity is about 90%, the specificity is as low as 30%.[13,14]

Other studies shows that combined evaluation (palpation, US and CT-scan) has average 30% of false negative and false positive.[15] Even in patients with no clinical evidence of lymph node metastasis (N0), there is a high incidence of occult metastasis. This ranges from 10 to 50% depending on the primary tumor characteristics, which include tumor subsite in head and neck area, T-stage and depth of invasion.[6,8]

Therefore, a strategy to identify patients at risk of metastasis in clinically negative necks allows accurate staging and implementation of appropriate adjuvant treatment, avoiding unnecessary elective neck dissection (END) for remaining 70 to 80% of patients and therefore minimizes morbidity associated with the treatment.[16]

The sentinel lymph node biopsy (SLNB) concept has been adopted from the treatment of melanoma and breast cancer to early oral and oropharyngeal squamous cell carcinoma during the last decade with great success.[17-19] Multiple validation studies in the context of elective neck dissections revealed sentinel node detection rates above 95% and negative predictive values for negative sentinel nodes of 95%.[5] The purpose of SLNB mapping is to detect the lymph node echelon that first drained from the primary lesion by using dye or radioactive tracer. This concept has the potential to become the new standard of care in the near future.

The aim of this study is to evaluate patients with Squamous Cell Carcinoma (SCC) of larynx without evidence of neck metastasis submitted to sentinel node biopsy instead of elective neck dissection and describe the neck recurrence rate.

METHODS

Consecutive patients with SCC of larynx that would need END as part of their surgical treatment and without clinically and radiologically lymphatic metastasis and without previous treatment, were included in the study between June 2006 to November 2013. All patients were staged according to 2002 American Joint Committee of Cancer (AJCC) Staging.[14]

The local Institutional Review Board (IRB) approved the study protocol. Informed consent was obtained from all the patients submitted to this study. All the patients had histopathological confirmation of SCC.

Then the patients were staged at the neck and primary site with computer tomography scan before the treatment. Each side of the neck was considered separately when END was indicated bilaterally, due to bilateral lymphatic drainage of lesion.

Each patient was then submitted to direct laryngoscopy and injection of radiolabeled colloid at the periphery of the tumor, with special needles for microlaryngoscopic surgery in paraglottic space. The radiotracer (^{99m}Tc dextran) transit time to the lymph node is less than 1 h and may be retained in the lymph node for an additional 3-6 h.

The dose of radioisotope was 0.2 mCi. Intraoperative detection of sentinel node was performed with handheld gamma probe after resection of larynx tumor with partial external laryngectomy or endoscopic transoral laryngectomy. In case of external approach for partial laryngectomy, the same incision is used for detection and removal of sentinel nodes. Otherwise, in case of transoral endoscopic approach, nn incision is made at the regions with higher levels of radiations than background and they were excised.

The primary resection of tumor is always performed for easier detection of sentinel nodes without the high radiation energy in primary tumor site, very close to the nodal echelons, which usually trespass the radiation of sentinel node that could be undetectable in presence of radiation of primary tumor. After removal of sentinel node, it was checked for radioactivity in *ex-vivo* out of the surgical field.

Standard pathological evaluation consisted of examining a three longitudinal section of lymph nodes by Hematoxilin-Eosin (H&E) staining in order to find metastatic deposits. If H&E was negative for metastasis, Immunohistochemical (IHC) evaluation with Step Serial Section (SSS) was performed. Patient was referred to postoperative radiation therapy in presence of positive margins, perineural invasion, presence of vascular or lymphatic embolus, presence of extracapsular spread or multiple lymphatic metastasis.

When only a single metastasis without extracapsular spread was detected, no adjuvant treatment was delivered. In case of positive margins or extracapsular spread was detected, besides radiation therapy, concomitant postoperative chemotherapy was delivered with cisplatin and 5-fluorouracil.

Post-operative evaluation with clinical examination was performed monthly in first six months, bi monthly until the

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first year, and every three months after. Radiologic evaluation was performed every six months with CT scan.

SNLB Technique

SLNB was performed *via* peritumoral injection of technetium. Lymphoscintigraphy and Single photon emission computed tomography (SPEC-CT) was performed in all cases. The skin of neck was marked accordingly and a gamma probe was used for identification of sentinel lymph node. Step serial sections of the sentinel lymph node were stained with hematoxylin-eosin and immunohistochemistry was performed.

All patients were followed postoperatively with a computed tomography (CT) scan every six months. Adjuvant treatment was indicated in patients with positive margins, extracapsular spread, presence of perineural invasion, or vascular emboli.

Statistical Analysis

Statistical analysis were performed *via* SPSS Statistics 17 (Windows & Mac) software, and comparisons were made *via* Odds Ratio. The disease free survival between the two groups was also calculated for the two populations. A confidence interval of 95% was employed.

For the evaluation of recurrence rate during the estimated interval time, the Cox regression model was employed. For comparisons between groups by age, stage, histopathological status and follow-up length, a T-test was employed. P-values <0.05 were considered statistically significant.

Ethics

The current study was approved by the Institutional Review Board (IRB). Informed consent was obtained from all the subjects.

RESULTS

Eighteen patients were evaluated. Average age was 63 years (range 49-83 years). In 12 patients the primary site was glottis and in 6 patients, supraglottis.

The average follow-up of 64 months (48-87) was achieved. The sentinel node was not found in only one patient who was excluded from the study. This patient was treated by END. Sentinel node was positive in four patients (22%). Five patients (27%) received post-operative radiotherapy because of local factors such as: positive margin, vascular invasion, perineural invasion or extra-capsular spread. During the follow-up period none of patients had local or neck recurrence (i.e. neck recurrence rate was 0%).

Variables	Patients	Obs1
Gender	Male	18(100%)
	Female	0(0%)
Age	63 years old	Min 49 - max 83
Follow-up	64 months	Min 48 - max 87
Tumor	Glottis	12 cases
	Supraglottis	6 patients
Tumor stage	T3NOM0	15 patients
	T2N0M0	03 patients
SNB +	4 patients	22%
RT post op	5 patients	27%
Neck recurrence	0 patients	0%

SNB: Sentinela Node Biopsy; RT: Radiotherapy.

Table 1: Subject's data.

DISCUSSION

The status of metastasis to the cervical lymph node is the single most important prognostic factor in HNSCC.[9,20] Peritumoral lymphatics provide the primary access for tumor cells to enter the lymphatic system. Tumor cell motility and rich lymph vessel density are the key factors that determine this initial lymphatic permeation.[21]

The diagnostic ability of US, CT-scan and Magnetic Resonance Imaging (MRI) is primarily based on node morphology and size criteria, with nodes smaller than 10 mm generally not considered to be harboring metastasis, thus radiologic features shows even 30% of false-negative and false-positive.[22,23] It has been observed that the status of sentinel node predicts presence of metastasis in the remainder of the nodes within the nodal basin, which forms the basis of SLNB.

The concept of SLNB for HNSCC attracted significant interest in the recent past for the mere fact that there are no reliable methods to detect occult metastasis in clinically N0 necks.[13,24,25] Literature review shows sentinel node detection rates above 95% and negative predictive values for negative sentinel nodes of 95%.[5]

There is a critical point when the lymph node is fully occupied by carcinoma cells at which the tracer could not flow into the lymph node and therefore would show no accumulation of radiotracer. Another consideration is about 'skip metastasis' reported in until 16% of patients with SCC of the oral tongue.[26] Our casuistic do not permit evaluate these points.

The SLNB technique initially was described with injection of isosulphan blue dye around the tumor. As the technique needs visualization, it is necessary to expose the entire nodal basin, thereby increasing the invasiveness of the procedure. Moreover, isosulphan blue dye has apparent lower reliability than radiotracer localization with hand held gamma probe. For localization of sentinel node.[27]

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Different radiolabeled materials have been developed for lymphoscintigraphy, and ^{99m}Tc is now the most widely used material for lymphoscintigraphy with intraoperative detection on sentinel node. The main advantages of ^{99m}Tc colloids are: emission of only gamma rays and low radiation exposure to the patients and physicians, half-life of six hours and it has a peak energy. The dose of radiotracer used are ranged from 0.5 to 0.8 mCi.[27] These tumors traditionally are considered difficult to access for the injection of isotope, but an experienced surgeon may easily do the procedure.

Standard pathological evaluation consists of examining a longitudinal section by H&E staining in order to find metastatic deposits.[28] Studies have shown that routine evaluation misses up to 21% of disease nodes. It is suggested that SSS with H&E and IHC, and molecular methods may help to identify smaller metastatic deposits.[29]

Our results observes similar results on neck recurrence in both groups and despite the difficultness of access to larynx tumor it could be performed without Lymphoscintigraphy with intra-operative injection of radiotracer of ^{99m}Tc dextran which has a higher flow rate through lymphatic channels than ^{99m}Tc phytate and allows intra-operative evaluation after performance of partial laryngectomy through an external or endoscopic approach.

With microlaryngoscopic needless and small syringe of 1 ml, it is easy to inject radiotracer around the tumor in larynx, glottic or supraglottic area. The number of patients of our randomized study was not large and this could be a bias, even the follow-up could be longer, but until now no one recurred in the neck. The technique on SLNB could be promising in neck staging for HNSCC of larynx with high accuracy for selection of adjuvant treatment.

The objective of SLNB is to decrease the morbidity of pathologic neck staging. In addition to oncologic safety, an improvement in the quality of life of patients undergoing SLNB needs to be demonstrated. Prospective randomized studies are necessary to standardize the method and hopefully avoid some controversies surrounding the technique. The ultimate question to be answered is, if this technique can improve survival and reduce morbidity in long term follow-up.

CONCLUSION

This data gives, besides the studies limitations, support to continue evaluating patients committed by larynx cancer with sentinel node biopsy without elective neck dissection. The neck recurrence rate in those patients was 0%.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interests.

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Opinion

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Pharyngotonsillitis: A Quick Review

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Tonsils and adenoids are part of the lymphoid system that surrounds the pharynx and are involved in humoral and cellular immunity. The tonsils are incomplete encapsulated aggregates of lymphoid nodules, arranged below and in contact with the epithelium of the initial portions of the digestive and respiratory tract. According to their location, they can be called: palatine, lingual and pharyngeal. The tonsils are bilateral and are located at the boundary between the oral cavity and oropharynx.[1] Because of its location, these tonsils come into constant contact with inhaled or swallowed microorganisms, becoming targets for infection.

Pharyngotonsillitis (PT) or Sore Throat (ST) is a self-limiting infection usually confined to the posterior pharynx, tonsils, soft palate and posterior lymph nodes of the lymphatic ring of Waldeyer that drain into the posterior cervical region. The STs are transmitted from person to person, and the nasopharynx and oropharynx are the main foci of microorganisms colonization.[2]

The rate of acute PT incidence was recorded in a study carried out in Portugal by Simões, et al.[3] The incidence of acute sore throat was 3,651.1/105 for the age group of 0 to 4 years; and 3,440.3/105 for the age group of 5 to 9 years and 2,020/105 for the age group of 10 to 14 years.

Sore throats are common in children, and in most cases they are viral. The most common bacterial agent is β-hemolytic Group A Streptococcus (GAS) corresponding to 15% to 20% of cases in children and adolescents; although there are reports of an incidence not greater than 10% in general population.[4-6]

However, some studies registered non-group A streptococcal (non-GAS) PT. In cultures of pharyngeal exudate, it was found other serogroups of ß-hemolytic streptococcus, such as B, C, F and G and there are reports of pharyngitis caused by these groups, especially the C and G.[7-9]

Streptococcal PT, if not adequately treated, can lead to non-suppurative complications such as rheumatic fever and glomerulonephritis, with high costs and high morbidity especially in developing countries such as Brazil.[10] So the importance of knowing, studying and treating this disease better, is sometimes neglected.

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Research

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Shape from Shading and Optical Flow used for 3-Dimensional Reconstruction of Endoscope Image

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ABSTRACT

Recent year's endoscopy is widely used in computer assisted surgeries. Three-Dimensional (3D) reconstruction has been presented due to the lack of depth information from endoscope images. One of the fundamental approaches in the domain of computer vision is Shape From Shading (SFS). This algorithm was proposed to obtain the shape of an object from a single intensity image. Because of the severe conditions are required in shape from shading to reconstruct 3D surface. The photometric calibration is proposed from the view of image processing. The calibration is important for illumination-based visualization techniques such as shape-from-shading. The result showed that the stability of surface reconstruction is improved when the photometric calibration is used before shape from shading. But the surface reconstruction from Shape From Shading (SFS) is the relative variation in the gray gradient field. So, the change from relative variation to absolute variation is necessary when the actual size of surroundings have to be known. Then the optical flow is introduced to solve this change in my paper. The optical tracker is also used in this system to capture the pose of endoscopy.

KEYWORDS: Photometric calibration; 3D reconstruction; Shape from shading; Optical flow.

ABBREVIATIONS: 3D: Three-Dimensional; SFS : Shape From Shading; SIFT: Scale Invariant Feature Transform; PDE: Partial Differential Equations.

INTRODUCTION

3D reconstruction from endoscope image is a boomed technology in minimally invasive surgery, the lack of depth from endoscope image push the development of diverse technology in 3D reconstruction. The reconstruction of endoscopic sequence images[1] is being frequently studied during the past years. The feature matching between sequence images is important for the subsequent reconstruction. Scale Invariant Feature Transform (SIFT) is wildly used in image matching but suffered from low matching pairs when employed in endoscope image. In this paper, the Shape From Shading (SFS) is implemented to 3D reconstruction due to its advantage. The surface is reconstructed from only a single image when the SFS is used. Every pixel in image is used for reconstruction compared with the extracted feature points.

SFS is one of the key technologies for three-dimensional reconstruction in computer vision. The principle is to use the change of single image gray to restore the relative height or the normal vector of surface in each point.[2] SFS technology was first developed by MIT's Horn[3] to solve the reconstruction of the lunar surface. He considered SFS problem as the inverse of the imaging process. The information of image gray is closely related with the intensity of surface reflection. Thus, the surface brightness can be changed to obtain the height information.

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A few of recent works applied shape from shading to endoscopic images based on photometric calibration.[4] However, in order to reconstruct an accurate shape from endoscopic images, the knowledge of light sources is necessary and important. The camera response function, light source intensity and light spatial distribution function are important when shape from shading method is used for the reconstruction. The gray card is produced by myself in this paper, which contains eighty percent to twenty percent gray. It can be regarded as the medium to calibrate the relationship between light source intensity and camera response function. When this relationship is illustrated with curve diagram, we can obtain the inverse of image intensity to compensate the original image.

In our work, an implemented photometric calibration is proposed which still performs well in synthetic image and real image. More detailed descriptions and experimental results of this method will be presented in Material and Methods. Finally, the conclusions are drawn in Discussion.

MATERIAL AND METHODS

The Construction of Non-Lambertian Reflection Model

The image irradiance equation based on the Oren-Nayer model[5] is widely used in shape from shading and can be expressed as follow formulas.

$$I(x,y) = R(p,q) = \frac{A}{\sqrt{1+|\nabla z|^2}} + \frac{B|\nabla z|^2}{1+|\nabla z|^2} \qquad (1)$$

Generally speaking, the radiation source toward the radiation intensity is different in all directions, having directionality. The object with that character is called Lambert reflector. And the light intensity is defined in the formula above. If the camera coordinate system is set as reference system, and the height of object surface is set as z(x,y), so the object surface normal vector can be represented by a normal vector of the surface at various points $n=(n_1,n_2,n_3)$. $p=\partial z/\partial x$, $q=\partial z/\partial y$, $p=-n_1/n_3$, $q=-n_2/n_3$.

The Numerical Algorithm to Solve the PDE Equation

The SFS problem (1) can be formulated as the following Eikonal PDE:

$$|\nabla z(x,y)| = \sqrt{f^2-1} \quad \forall x \in \Omega$$

$$z(x,y) = \varphi(x,y) \quad \forall x \in \partial\Omega \qquad (2)$$

A numerical algorithm based on the high-order Godunov fast sweeping scheme[5,6] is proposed to solve the Eikonal Partial Differential Equations (PDE) equation.

The Model of the Gray Card

The gray card is produced with the same radiance, which contains eighty percent to twenty percent gray. It can be regarded as the medium to calibrate the relationship between light source intensity and camera response function Figure 1.

Figure 1: The model of the gray card.

The Result of Experiment

When we get the curved diagram in Figure 2, we can obtain the inverse of image intensity to compensate the original image and the result is showed in Figure 3. In order to demonstrate the validity of this photometric calibration, the reconstruction implemented in synthetic and real image and the result shown in Figures 4 and 5. The action of the experiment is inspired by the model in paper.[7]

The curved diagram between camera response and image intensity.

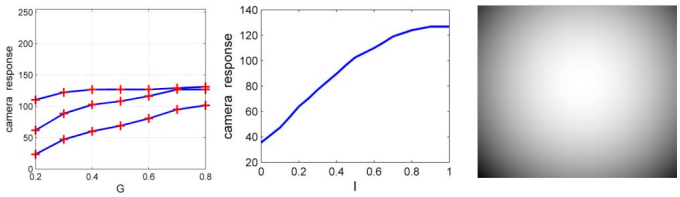

Figure 2: Left is the relationship between camera response and gray level (7 levels in my paper). The middle is relationship between camera response and image intensity. The right is the cosine term $\frac{n \cdot l}{r^2}$.

The Pseudo-color indicates the distribution of image intensity before and after calibration

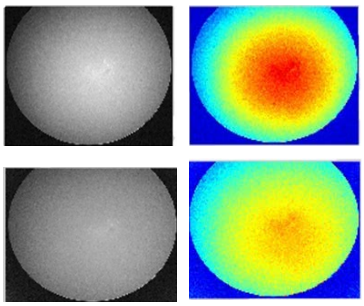

Figure 3: The upper set is indicating before calibration and the under set is indicating after calibration.

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Synthetic image

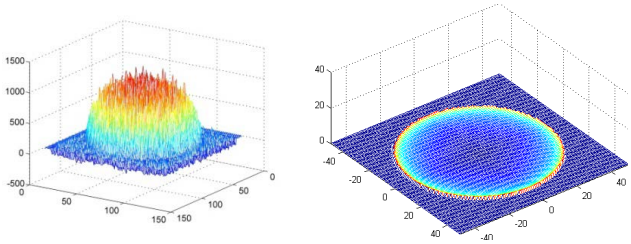
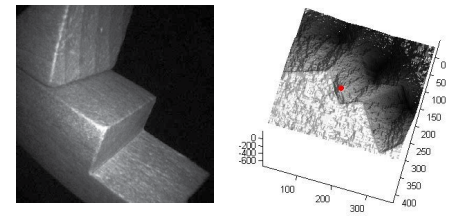
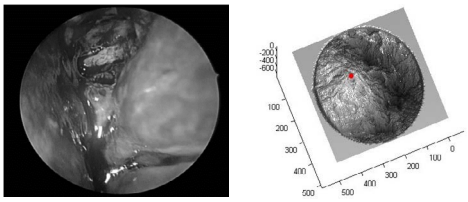


Figure 4: The left is the reconstruction of the synthetic sphere and the right is the error between ground truth and our reconstruction.

Real image



(a)



(b)

Figure 5: The real image reconstruction. Left is the original image and right is the corresponding reconstruction result in set of (a) and (b).

DISCUSSION

Because 3D reconstruction help doctors diagnose, so choose suitable endoscope under the environment of 3D reconstruction method is particularly important. During the project investigation and experiment analysis shows that although the contrast method has its unique advantages, but also has disadvantages:[1] To restore the depth of the surface is not absolute information, assuming assisted by endoscope can use external tracking equipment movement information, and then derive the depth of the surface information according to the relationship between image and object. But in the process of actual implementation need complex experimental system and equipment.[2] Although a single image can be restored to form, but general surgery are taken in the process of video images. So that by extending the way of the contrast method combining reconstruction of different gray gradient information, we can get endoscopic coordinates of 3D tissues and organs.

According to the algorithm of defect group we put forward the solution. If we want to reconstruct the 3D surface shape; we should transit it to the world coordinate system and get endoscopic pose information. Although optical tracker can locate endoscopic posture, but due to the lack of trace markers and the transformation of the relationship between endoscopic, so it is difficult to transfer 3D surface shape to world coordinates. Provide extended way for doctors under the endoscopic view of tissues and organs of the three-dimensional topography, can be a good guide for doctor's surgery.

CONCLUSIONS

The small error in synthetic image demonstrates the validity of photometric calibration. The next mission is introducing the optical flow make the change from relative variation to absolute variation.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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