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Effect of visual distraction on discomfort score during flexible fiberoptic direct laryngoscopy: a randomized control trial

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Abstract

Background Flexible fiberoptic direct laryngoscopy is the standard technique for evaluating the larynx and hypopharynx and is a routine outpatient procedure performed in ENT. This study aims to find the effect of patients' own procedure video as a distractor over the discomfort score, during flexible fiberoptic direct laryngoscopy. It can be a cost-effective alternative to local anesthetics and should be included in our routine practice.

Results The study included 60 patients undergoing flexible laryngoscopy at a tertiary care hospital. Patients were divided into two groups: group A (those patients who had visualized their procedure video while performing FFODL) and group B (those patients who had not visualized their procedure video while performing FFODL). Visual distraction was involving patients to see their own video while FFODL was being performed. After, the procedure discomfort score was assessed using a visual analog scale. In our study, both groups were comparable in terms of age and gender. The mean discomfort score was significantly reduced in group A as compared to group B (*p* value 0.003).

Conclusion This study has shown that visual distraction significantly reduced the procedure-specific mean discomfort scores and that it should be practiced routinely to alleviate patient's anxiousness and fear to go through this procedure and to gain the confidence of patients.

Keywords Discomfort score, Flexible fiberoptic direct laryngoscopy, Distraction, Visual analog scale

Background

Hopkin and Stortz introduced fiberoptic examination in the 1950s [1]. In 1963, Hirschwitz designed the first functioning fiberoptic scope [1]. Fiberoptic endoscopes revolutionized the field of medicine and are being vastly used in other procedures like shockwave lithotripsy, colonoscopy, and intubation and also being used in ENT procedures like flexible laryngoscopy and flexible bronchoscopy [2–6]. In the field of ENT, flexible fiberoptic direct laryngoscopy (FFODL) with video recording and playback capability makes it a standard procedure for the diagnosis of most of the anatomic and functional abnormalities of the nose, nasopharynx, and larynx [2, 7]. A flexible fiberoptic endoscope passes through the nasal cavity first reaching the nasopharynx then the oropharynx and larynx [1, 8]. The mostly used flexible endoscopes in ENT clinics are the video rhinolaryngoscope which has a working length of 30 cm and a diameter of 2.9 mm. It allows deflection of 140° in both directions. For many patients, nasal endoscopy is a painful and uncomfortable procedure [8]. A number of medications have been used to reduce the pain and discomfort including local anesthesia, nasal decongestants, topical cocaine, lubricants, and saline irrigation which reduces the pain to some extent but the discomfort and apprehension of the procedure that "something going through nose in to the throat" is difficult to address [2, 9–12]. To

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address this discomfort during endoscopic procedures, a video of the same procedure has been used as a distractor with encouraging results. This technique of distraction had been used for aural mircosuction, shockwave lithotripsy, cystoscopy, flexible bronchoscopy, and colonoscopy and found better tolerance of procedure with video distraction [2–5, 13, 14].

This concept of visual distraction was also tried for flexible fiberoptic direct laryngoscopy. Biggs et al. have done a study on a very small group of twenty-four patients further divided into four groups and found visual distraction as an effective method to reduce the discomfort of the patients [2]. This is the only study found in the literature for FFODL.

The aim of this study was to see the effect of using the patient's own procedure video as a distractor over the discomfort score, undergoing flexible fiberoptic direct laryngoscopy.

Methods

After the ERC approval, a randomized controlled trial was conducted in the otorhinolaryngology clinic at a tertiary care hospital from January 2021 to June 2021. Sixty patients were included in the study who were advised for FFODL. Performas were filled which included demographic details of participants. Those who underwent FFODL in the past were not included in the study.

The inclusion criteria of the participants:

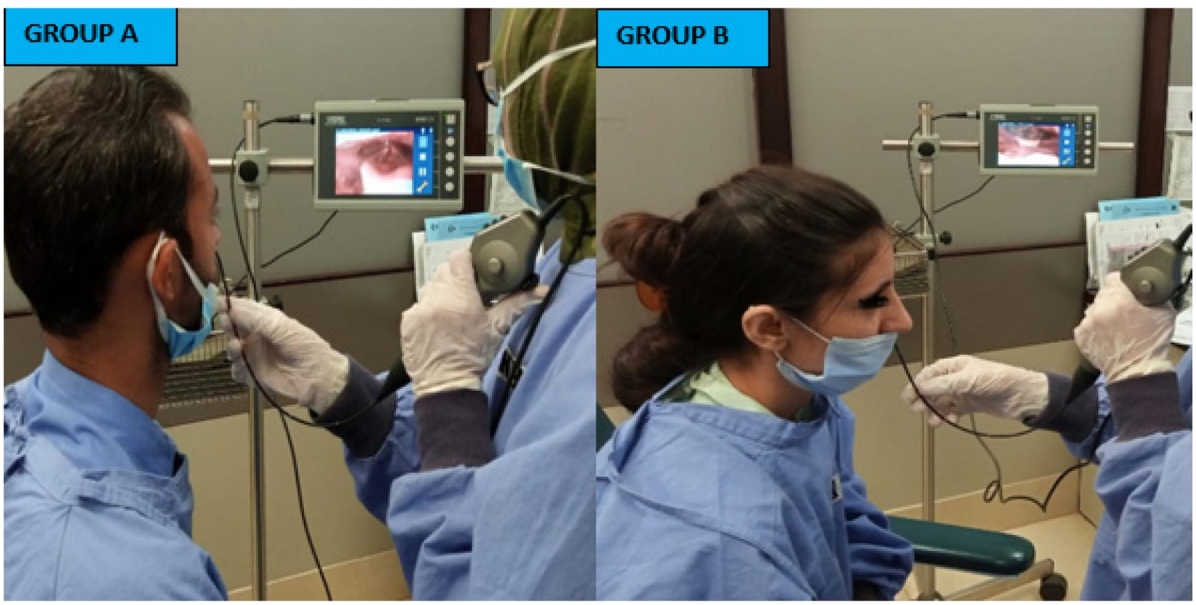
- Patients who had never undergone a flexible rhinolaryngoscopy in the past
- Patients who had a complain of hoarseness of voice
- All adult patients aged 18 to 70 years

The exclusion criteria of the participants:

- Patients who do not give consent
- Patients aged below 18 years
- Patients having mental disabilities or those that will be unable to follow instructions
- Patients with a history of anxiety or stress disorders
- Those having any known allergy to local anesthetics (10% xylocaine solution)

Pre-procedure counseling was done about the purpose of the study, and written and informed consent was taken. Randomization was done by lottery method and patients were divided into two groups: group A (those patients who had visualized their procedure video while performing FFODL) and group B (those patients who had not visualized their procedure video while performing FFODL).

Procedure performed with group A and group B



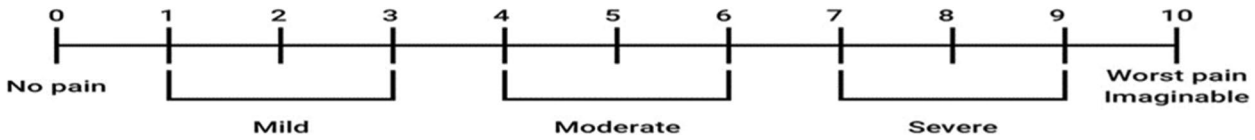


Fig. 1 Visual analog scale for marking discomfort score

Topical 10% xylocaine nasal spray was sprayed in the nasal cavity 10 min prior to the procedure to all the patients of both groups, to remove bias. The procedure was done at the ENT clinic using a KARL STORZ Video fiberoptic rhinolaryngoscope of 2.9-mm width and 30-cm length in both groups. The procedure was carried out by three different consultants who had a 5-year post-fellowship experience. After the procedure, the patient was asked to mark the intensity of discomfort on an 11-digit visual analog scale (Fig. 1).

Data was entered and analyzed in SPSS for Windows (version 22.0, SPSS Inc. Chicago). The mean standard deviation was calculated for age and discomfort score. Frequency and percentage were computed for gender. An independent sample *t*-test was applied to see any significant difference between the two groups for age, and chi-square was applied to see any significant difference between the two groups on the basis of gender. No significant difference was found for age or gender between the two groups. An independent sample *t*-test was used to compare the discomfort score between groups A and B. A p value of ≤ 0.05 will be considered statistically significant. Overall data of 60 patients will also be stratified according to age and gender against discomfort score to look for any significant pattern.

Results

A total of 60 patients were included in the study; all patients were assessed for different symptoms including change in voice, foreign body sensation in the throat, and those who were planned for thyroid surgery and underwent pre-operative vocal cord mobility assessment. The average patient age was 36.7 (standard deviation $\pm$ 15.1 years). Out of 60 patients, 35 were males and 25 were females.

Both groups were compared in terms of age and gender. The mean age of groups A and B was 40.0 years (standard deviation $\pm$ 15.04 years) and 33.4 years (standard deviation $\pm$ 14.7 years), respectively. There was no statistically significant difference found between the two groups (p value 0.725). There were 18 male patients and 12 female patients in group A while 17 male patients and 13 female patients were in group B. There was no statistically significant difference found for the male to female ratio in the two groups (p value 1.0). So both groups were comparable for age and gender.

The mean for procedure-specific discomfort was calculated for both groups. For group A, procedure-specific discomfort was 1.2 (standard deviation $\pm$ 0.9), and for group B, it was 3.3 (standard deviation $\pm$ 1.5). Group A showed statistically significant reduced procedure-specific discomfort scores as compared to group B (p value 0.003) (Table 1).

Discussion

The visual image through a flexible fiberoptic laryngoscopy was reported first in 1954 [6]. Visual distraction plays a very important role in reducing the discomfort of the patient and has shown an overall better experience. Patients can watch their examination on the screen simultaneously while it is being performed. In our study, there was a statistically significant decrease in discomfort score in those that were visually distracted by a live video shown to them of the procedure in the outpatient setting and then the score was measured on the VAS scale which is quoted as a highly subjective method but still has a high sensitivity [15, 16].

Xiaolian et al. in their study have found that patients undergoing colonoscopy who were being distracted by visual and audiovisual stimuli had a better tolerance for the procedure [5]. Choudhury and Amer showed a significant reduction in pain perceived by audiovisual distraction during aural micro-suction [13].

Biggs showed that the discomfort scores significantly reduced in the visual distraction group with $p = 0.04$, while only the use of topical anesthesia did not show a

Table 1 Descriptive statistics of age, gender, and discomfort score for both study groups

	Group A	Group B	*p* value
Age			
Mean	40.0 years	33.4 years	**0.725**
± Standard deviation	± 15.04	± 14.7	
Gender			
Male	**18**	**17**	**1.0**
Female	**12**	**13**	
Discomfort score			
Mean	1.2	3.3	
± Standard deviation	± 0.9	± 1.5	**0.003***

An independent *t*-test was applied. A p value ≤ 0.05 is considered as significant

* Significant at 0.05 levels

significant reduction in discomfort scores with $p > 0.05$ when performing flexible laryngoscopy. However, the sample size of his study was very small (24 patients) which was further divided into four groups, so the very small sample size compromised the reliability of his study results [2]. In our study, the sample size was calculated keeping the power of study 90% and both groups were exposed to the same method of examination except for showing procedure video as a visual distractor.

Similarly, Marsdin showed that a group of patients who were distracted by viewing their own lithotripsy procedure had significantly lowered reported pain with the mean reduced from 6.1 to 2.4 ($p < 0.0001$) and distress score with the mean reduced from 4.4 to 1.0 ($p = 0.0001$) [3]. However, audiovisual distraction had no additional benefit in patient pain perception during nail surgery [14].

Koenig et al. in their observational prospective study investigated whether visualization aids in increasing patient comfort during urethrocystoscopy, and they have drawn the following conclusions that men who undergo flexible urethrocystoscopies should watch their procedure in real time on video along with the urologist [17]. Further efforts should be put into making urethrocystoscopy more comfortable for women, and lastly, real-time visualization alone is not sufficient enough to make the urethrocystoscopy less painful [17]. They have recommended to use music during urethrocystoscopy to help patients relax as found in the new observations made by Yeo et al. and Zhang et al. [17].

Another study of Patel in 2008, which was done on females, concluded that using the video monitor facilitates training and allows the patient to better understand disease conditions by visualizing endoscopic findings and appears beneficial in men from a pain standpoint but does not appear to offer decreased pain in women [18]. Further studies are needed to identify specific methods and factors that would make office cystoscopy more tolerable in women [18].

González-Padilla has shown that self-visualization in females could provide a benefit in the perception of pain during rigid cystoscopy as compared to males; however, these benefits were only shown in females with two or more previous cystoscopies [19].

Although our study design was a randomized control trial, there was an adequate sample size so a strong methodology. But a limitation of our study is that we sprayed local anesthetic nasal spray in both groups which may reduce the discomfort, that is why procedure discomfort scores were marked more leftward. However, this further opens the horizon for new studies of using visual distraction without local anesthesia.

Conclusion

Flexible fiberoptic rhinolaryngoscopy is a common procedure performed in the otolaryngology clinic. However, it is not painful but the procedure can be uncomfortable. In this study, the visual distraction significantly reduced the procedure-specific mean discomfort scores. Visual distraction is a simple and cost-effective technique to reduce the discomfort while performing flexible fiberoptic rhinolaryngoscopy.

Abbreviations

FFODL	Flexible fiberoptic direct laryngoscopy
SPSS	Statistical Package for Social Sciences
VAS	Visual analog scale

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Authors' contributions

MP: supervision, data collection, literature review, and writing. AA: materials, data collection, analysis and interpretation, literature review, and writing. AN: conception, design, materials, analysis and interpretation, and critical review. SA: design, supervision, and critical review. HA: supervision and critical review. DS: data collection and writing. The authors read and approved the final manuscript.

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Availability of data and materials

Can be provided via email if required.

Declarations

Ethics approval and consent to participate

Liaquat National Hospital Ethical Review Committee approval was taken and REF: APP# 0711–2021-LNH-ERC was given. Consent to participate: informed verbal and written consent was taken from the patients.

Consent for publication

Informed verbal and written consent was taken from the patients.

Competing interests

The authors declare that they have no competing interests.

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