

I LARYNGOSCOPE THE INSTRUMENT SERVES TO VIEW WHETHER ANESTHESIA WAS APPLIED LOOK IN THE PATIENTS WITH PROBLEMS IN THE LARYNX

Bárbara E. Sánchez Rinza, Victor Nabil Lugo Ali, Jaramillo N. A.*

Facultad de Ciencias de la Computación

Benemérita Universidad Autónoma de Puebla, *INAOE

brinza@hotmail.com, tel (52) (222) 2 29 55 00 ext 7241, 302,

Edificio 135, 14 Sur y Avenida San Claudio. Ciudad

Puebla Mexico

SUMMARY

Surgeons from Hospitals, have problems with patients arriving unconscious and have any problems in the area of the larynx, such as fracture, inflammation or congenital conditions, and is needed when surgery and the anesthesia or medication in that area; often not applied in the desired location, due to the above is why I proposed the existence of the laryngoscope, this device is intended to illuminate and monitor the area to avoid such problems. Performed it with two fiber yarns for each illuminated by a LED and another to monitor by a CCD camera that will be introduced by the patient's mouth to reach the affected area; respectively connected to a monitor where we can see what happens.

1.-INTRODUCTION

Fiber optics is a transmission medium of analog or digital information in which the basic principles of operation are clearly justified, but lax to applying the laws of geometrical optics is a very fine line of transparent material, glass or materials plastics, through which light pulses that represent data to be transmitted [1]. The light beam is completely confined and propagates inside the fiber at an angle of reflection above the critical angle of total reflection, according to Snell's law. The light source may be from a laser or an LED. Optical fibers that are transforming the world of communications are also revolutionizing, in the domain of medicine, the technique of imaging,

diagnosis and therapy [2]. These extra fine and flexible fibers have opened the window overlooking the living tissues of the human body. Introducing them through natural body openings or through small incisions, and directing by internal passages of the body, doctors can peer into the airways of the lungs, intestinal folds, the heart chambers and many other spaces that once were inaccessible. That's why we use the fiber as the main material in the realization of our laryngoscope to be an excellent means of transmission and propagation of light.

2. - HOW IT WORKS THE LARYNGOSCOPE

The laryngoscope should take the path in dotted lines, shown in Figure 1.

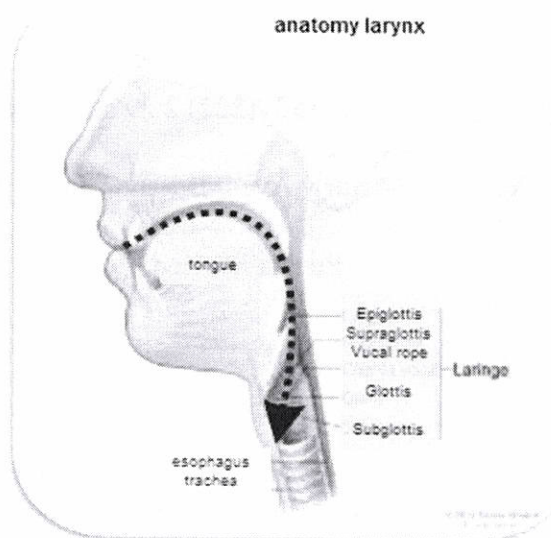


Figure 1 Anatomy of the larynx and trajectory of the laryngoscope

The laryngoscope is a thin, flexible device that will allow us to see deeper into the throat; and it is controlled by a specialist using a monitor can see what happens as we can see in Figure 2.

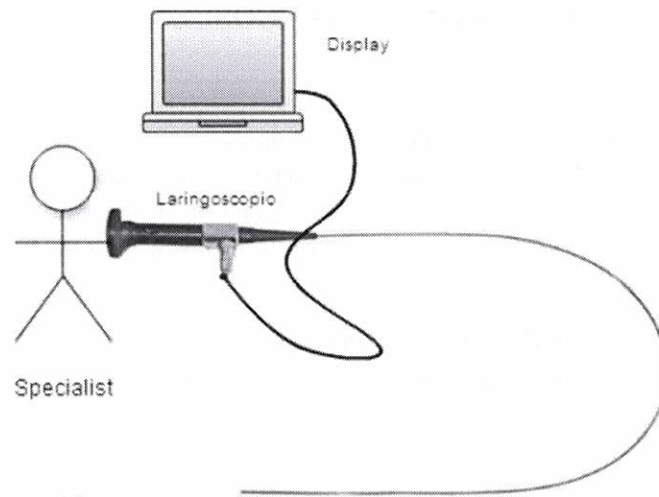


Figure 2 Use the laryngoscope

The specialist will introduce the laryngoscope by the patient's mouth to anesthetize and lying generally in the position as Figure 3 indicates, this device will light up and will monitor the observation area.

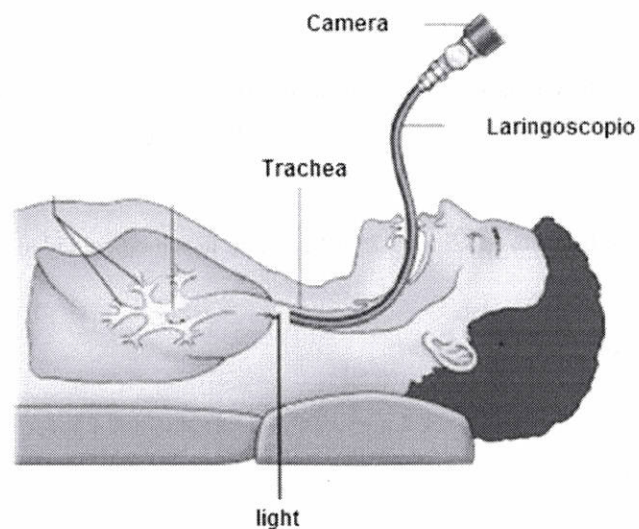


Figure 3 Position of patient

3. - SPECIFICATIONS LARYNGOSCOPE

a) Fiber

By choosing our type of fiber yarn we use for our laryngoscope was important to consider many factors including the diameter of the trachea, in this case we take the dimensions of the trachea of a child younger than 1 year, that for our equipment can be used to patients of any age, the dimension of the trachea of a lower is 6mm, whereby the diameter of the fiber strands should be less than that dimension.

Will be used singlemode fiber yarns as shown in Figure 4 with a diameter of 1.2 mm by using 2-wire will be occupying about 2.4mm, 6mm least we have to limit in doing [3].

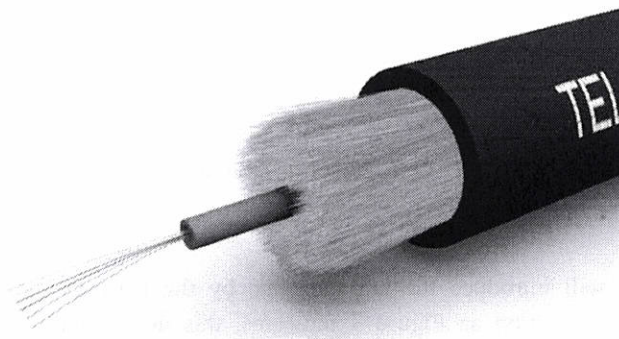


Figure 4 fiber yarns indoor-outdoor single-mode cable.

b) CCD lens

To monitor the area, It will assign at the end of the fiber yarn with a CCD lens less than 1mm in diameter in size perfect for our laryngoscope (see Figure 5) [4].

Data sheet:

1/13 "0.8mm lens f4.0 sensor M3.5 × p0.25, ttl 2.86mm lens medical video equipment.

Model: 113080

Image Format: 1/13 "mt9v124

Sensor: mt9v124

Focal length: 0.8mm (± 5%)

Circle image max: ϕ 1.6mm

f.o.v: 80° (d) * 68° (h) * 53.4° (v)

Resolution: VGA

Optical distortion: $<2\%$

Aperture: f4.0 ($\pm 5\%$)

Support: m3.5xp0.25

B.F.l.: 1.385m m

M.o.d.: 0 ~ 50mm

t.t.l.: 2.86m m ± 0.05 mm

Constructure lens 2.

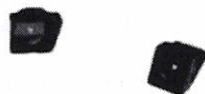


Figure 5 Medical lens CCD

c) Software

This system can be installed on different operating systems such as: MS-DOS, Windows 95-98 and Windows NT, it should be emphasized that the software was done by this team for this project. It brings a set of functions that make easy handling, is called ImagenCX100, see Figure 6.



Figure 6 Software Image CX100.

Opening the Image CX100 software we show two windows, which is called "video" as see in Figure 7, where we may be seeing everything that our fiber dedicated to monitoring of the area being displayed and a context menu that allows us to work many of its functions and are explaining later.

On the menu we have 9 buttons, then the function of each is explained:

1. Open.- can open another file previously captured with this software.
2. Save.- Capture and save the desired image.
3. Continue .- capture the image in the window is stopped, this button allows us to spread the image and continue watching as video.
4. Stop .- image when running as a video to save or simply observe in detail at that time.
5. Max / min.- Changes the image resolution.
6. Exit.- Terminates the program.
7. This box indicates if the camera is turned on and connected to the software.

The "Scaling", "Average" and "Contrast" buttons allow us to scale our image, change the resolution to the average level and used to change the contrast respectively.

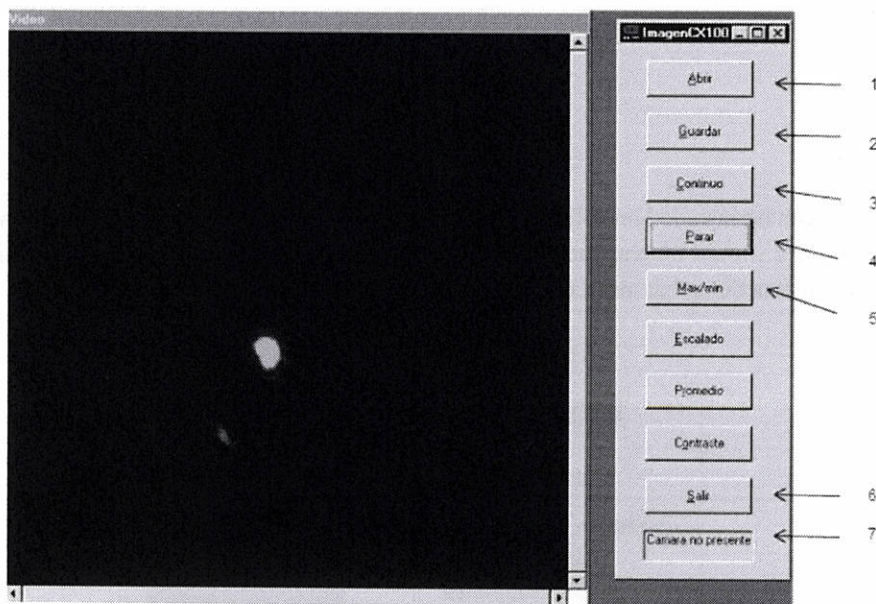


Figure 7 software interface

Desiring save an image, select the "Save" button on the menu and then we will open a screen as in Figure 8 where we will assign the name that will keep the image, the location where you want to save and ready we will click on "Save ".

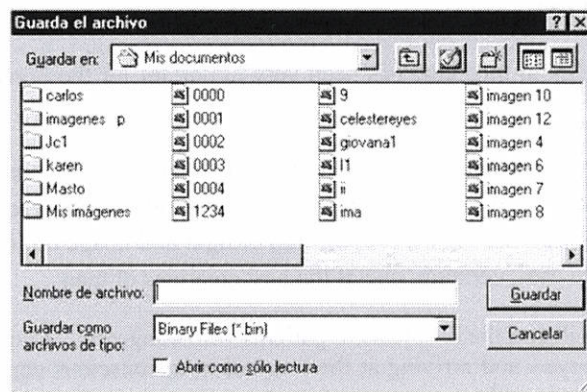


Figure 8 Tab to save a file.

4. - RESULTS

We found that using a fiber optic strand, in this single-mode case, we can provide lighting placed at one end a led his uniform light traveling through the fiber to the end of the thread and give the necessary illumination (see Figure 9), so that the other fiber yarn can fulfill its function to record the area that the specialist wants aided by a CCD camera, these two threads covered by a tube with a very flexible maximum diameter of 5 mm, allowing you to be handled without problem, the things that these two fibers can record can be observed simultaneously on a monitor with the option of saving the image to be of great help for the special by its own software.

In this way we meet the goal of our laryngoscope; illuminate and monitor the area of the larynx, glottis, epiglottis, vocal cords, trachea and surrounding areas.

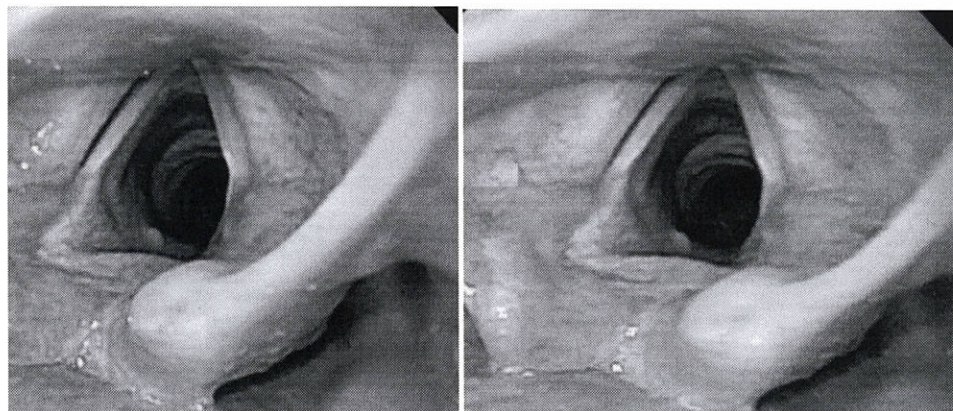


Figure 9 Viewing the trachea.

5.-CONCLUSIONS

The use of technology in medicine has been very important for the prevention, diagnosis and cure of many diseases.

Optical fibers have been helpful for the evolution of technology, because of its minimal signal loss and its optimal properties of bandwidth, plus the weight and size reduced of the optical fiber. In this paper we use their properties for the propagation of light and image transmission; This fine material is useful for multiple uses, certainly one of the best creations of man.

The laryngoscope will end the problems in patients with congenital or some inflammation problems in the area of the larynx and arriving at the hospital in unconscious condition and have to operate immediately. This device allows me to see that anesthesia is actually provided in the required

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