



بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

How to perform videostroboscopy more efficiently?

Saeideh Moayedfar

Ph.D student at Tehran University of Medical Sciences

What is Videostroboscopy?

What about Equipments?

How we can have output?

What are the important cautions?

Outline



What is Videostroboscopy?

**During voice production,
the vocal folds vibrate at
high speeds**



Videostroboscopy



Moayedfar.s@gmail.com

Benefits



Outpatient procedure

Safe

No companion needed

No discomfort following procedure

No pre-procedure preparation

Gold standard

Immediate results discussed with patient

Cost effective

Basic knowledge before doing

- ▷ Medical **indication** and **contraindications**
- ▷ **Risks** and **benefits** of the procedure
- ▷ Related **anatomy** and physiology
- ▷ Documentation of the **procedure**
- ▷ Ability to **interpret** results and implications in management



The importance of videostroboscopy

- In patients with voice complaints and no abnormality change of diagnosis in **44%**.
- In **70%**, change of diagnosis, a previously unappreciated benign vocal fold lesion was found.
- In another **19%**, vocal fold bowing was identified better.
- In patients with vocal fold nodules, polyps and cysts findings correlated with surgical findings **100%** of the time.

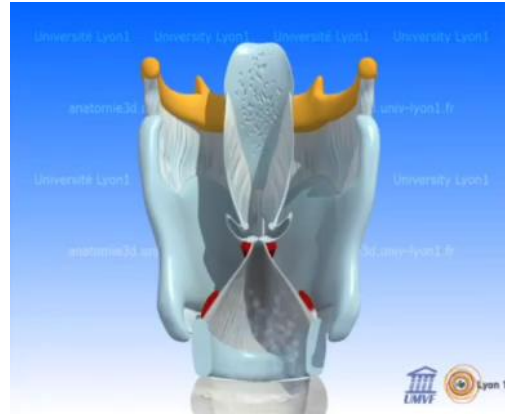


HOW
DOES IT
WORK



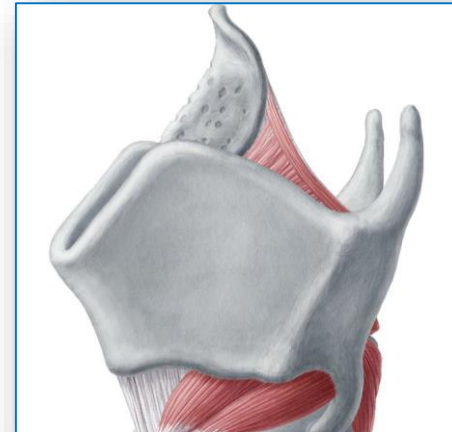
Vibration of vocal folds

- ▷ The vocal folds vibrate at **100 to 500** cycles per second
- ▷ **30** frames records with stroboscopy technique per second



Stroboscopy principle

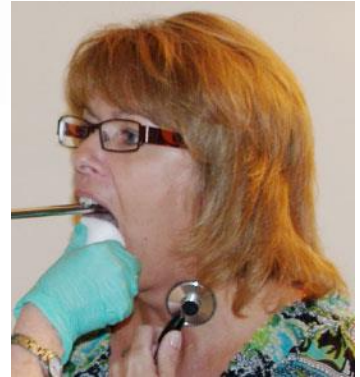
The timing of the flashing is triggered by the fundamental frequency of the voice, as detected by a **microphone** OR **stethoscope** placed tightly over the **thyroid lamina**



Which is better?



The disadvantage of a microphone input source is that it may pick up the voice of the examiner



Slow motion principle

- ✓ Sets the frequency of strobe flashing to a frequency slightly off and several multiples slower than vocal fold vibration.
- ✓ Allowing images from sequential parts of the vibratory cycle to be recorded and viewed as a **slow-motion** movie of vocal fold vibration.

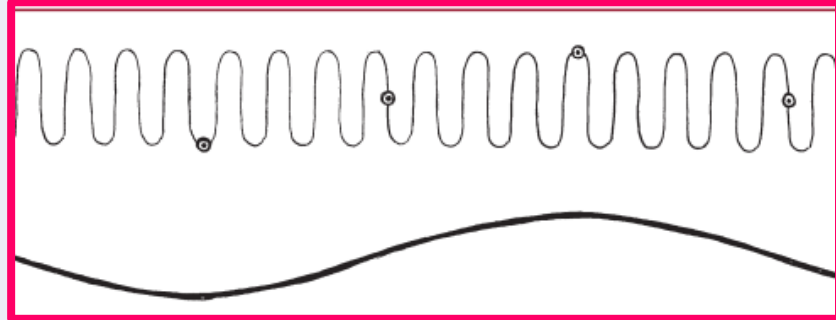
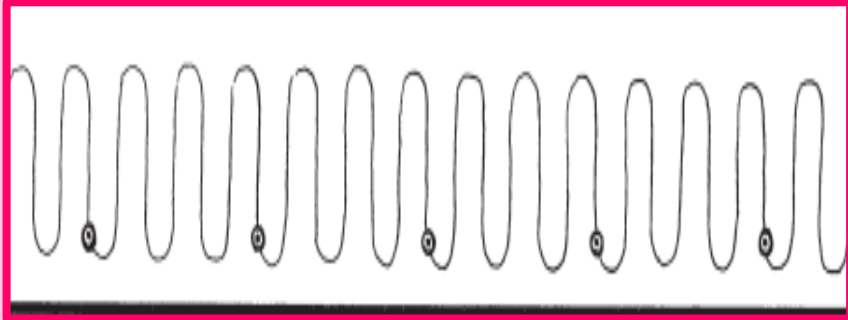
Slow motion principle

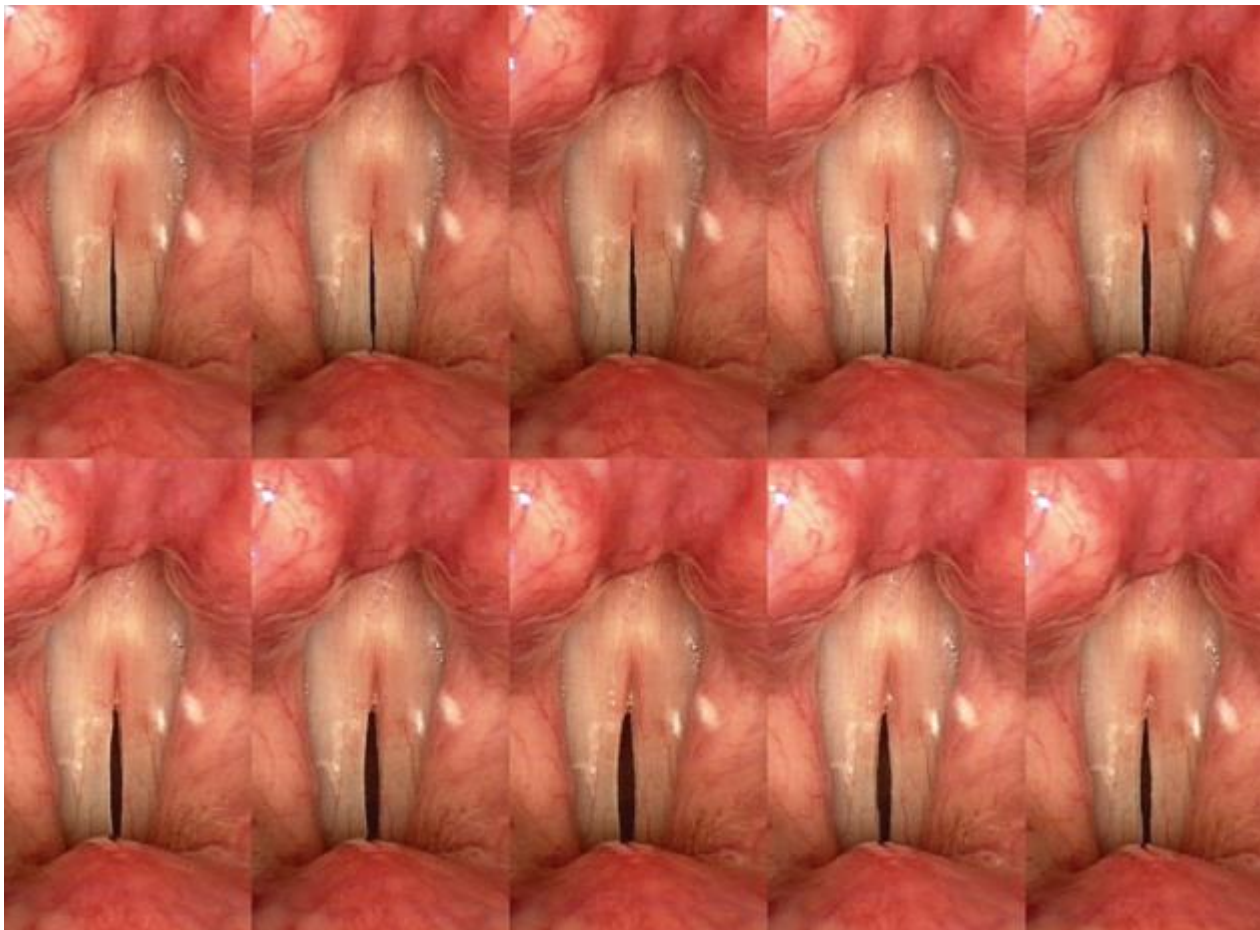
- ▶ Each flash supplies one image, taken at one phase point of the whole cycle.
- ▶ Thus, stroboscopy is not real-time slow motion, but rather a composite of separate flashes, triggered across many waveforms.

Still Mode

Operating Mode

**Strobe
flashing
mode**





Moayedfar.s@gmail.com

Limitation of videostroboscopy

Diplophonia

Severe dysphonia

Tremor

Spasmodic dysphonia

Videolaryngoscopy **VS** videostroboscopy



Moayedfar.s@gmail.com



**What about
Equipments?**



Moayedfar.s@gmail.com

System Components

- ❖ Monitor
- ❖ **Strobe Light Source**
- ❖ Foot pedals
- ❖ Power supply cable
- ❖ Camera and Lens
- ❖ **Endoscope**
- ❖ **Microphones** (Contact microphone connector, Air microphone connector)
- ❖ **Recording System** (computer, DVD or VCR)
- ❖ Printer
- ❖ **Management software Digitally**





**Additional
equipments**





Light Source



The diagram features a central yellow square with the text "Lighting sources" in bold green font. This central square is flanked by two green arrow-shaped boxes pointing towards it. The left arrow contains the text "Steady halogen light" in white, and the right arrow contains the text "Flashing xenon light" in white. The entire diagram is set against a white background.

**Steady
halogen light**

**Lighting
sources**

**Flashing
xenon light**

Halogen

- is most useful to see the true color of the vocal fold and surrounding tissues.
- Redness of these tissues may indicate irritation due to a viral or bacterial infection, gastroesophageal reflux, or tissue fatigue.

Xenon

- allows an averaging of the vocal fold cycles.
- visualize vibration and tissue health.

**New
technology**



StroboLED

Advantages

No extra white balance, sharpened images

Constant light intensity over lifetime

low consumption device, environmentally friendly

eco-friendly (eliminated the need for frequent lamp replacements)

lifespan of 2000 to 60,000 hours



Endoscopes

Endoscopes

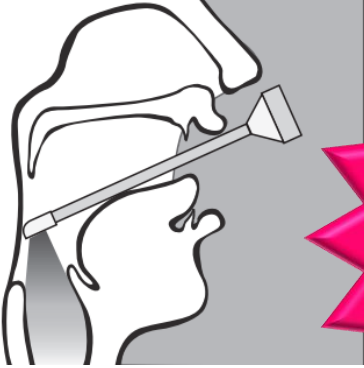
Rigid

Flexible

90-degree

70-degree





**70
Degree**

Must be placed at an angled position

Shorter distance from the vocal folds to the lens

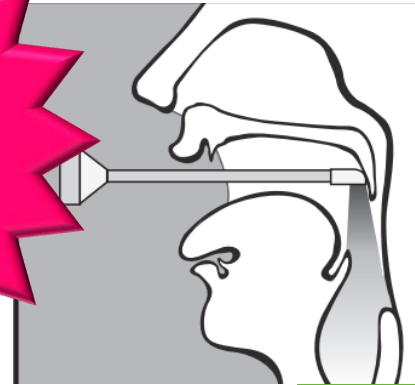
The scope closer to the tip of the epiglottis

Place straight back, behind the uvula

The vocal fold is longer

The risk of gagging the patient due to touching of the uvula is greater

**90
Degree**



	Rigid	Flexible
Tongue movement	Limited	Not limited
image quality	Better	Lower
anesthesia	Sometimes	Always
details of vocal fold vibration	More	Less
rapid diadokokinesis and kinetic motions of the vocal folds	No	Yes
magnification of lesions	Yes	No
small lesions	Yes	No



DISADVANTAGE

Flexible	Rigid
Smaller image with less resolution using standard fiberscopes	Limited to vowel production
Requires topical anesthesia more frequently than rigid laryngoscope	More likely to elicit gag reflex
Video endoscopes very expensive	Requires unusual positioning for patient



a



b

g

p

The image features a dark blue background. On the left side, there is a vertical green bar with a gradient from light to dark green, and a smaller, slightly offset green bar below it. In the center, there is a white banner with a green outline and a drop shadow. The banner has a central rectangular section with rounded corners and two pointed ends extending outwards. The text "Management software" is written in a bold, green, sans-serif font within the central section of the banner.

**Management
software**

- Each system has its own management software
- Some of the softwares can extract images frame by frame for better interpretation

But

When it is not possible, what should we do?!





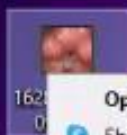
Play the video with KMP

Frame extraction

Output for interpretation



**How we can have
output?**



1628187801709

Open

- Share with Skype
- Cast to Device >
- Scan with ESET NOD32 Antivirus
- Advanced options >
- Share
- Open with >
- Give access to >
- AVS Convert to... >
- Extract Audio to... >
- Add to archive...
- Add to "1628187801709.rar"
- Compress and email...
- Compress to "1628187801709.rar" and email
- Restore previous versions
- Send to >
- Cut
- Copy
- Create shortcut
- Delete
- Rename
- Properties

- Movie Maker
- The KMPlayer
- VLC media player
- Winamp
- Windows Media Player
- عكس
- فيلم و تلويزيون
- Search the Microsoft Store
- Choose another app





**What are the
important cautions?**

Anesthesia

- ▷ If the tongue depressor ✓
- ▷ If the posterior oropharynx is easily visualized without gagging ✗
- ▷ If the uvula is excessively long and must be manipulated ✓
- ▷ Large tonsils ✓
- ▷ If the rigid telescope must be introduced behind the palate to visualize the larynx ✓



elderly patients and female patients better than young male adults

The choice of topical anesthesia is up to the clinician

spraying of the palate, velum, oropharynx, and base of tongue

The most common types : Pontocaine 2%, Lidocaine 2%, and Cetacaine.

Many state licensure laws **do not allow** speech-language pathologists to use topical anesthetics

Dizziness

Seizures

Shortness of breath

Swelling (especially of the face/tongue/throat)

Slow/shallow breathing

Vision changes ringing in the ears

Fast/slow/irregular heartbeat

Shaking

Unusual tiredness

Rash

Trouble breathing



Cautions



- ▶ Prior to cleaning, switch off the device.
- ▶ The fixation of microphone may just be tightened enough.
- ▶ Only endoscopes which previously have been cleaned and disinfected may be stored in the quivers.
- ▶ When installing the unit, make sure that there is enough cooling air supply.

Cautions



- ▶ Most stroboscopy systems allow for manual light adjustment to approximate true tissue color
- ▶ Alternatively, color balance can be manipulated by the examiner to better detect specific visual characteristics.



Cautions



The videostroboscopy examination is easy to perform but **very** difficult to interpret

Misinterpretation



misdiagnosis

Stroboscopic interpretation of the larynx

Amplitude

**Mucosal
wave**

Symmetry

Periodicity

**Free edge
contour**

**Glottal
closure**

**Non-
vibratory
portion**

**Vertical
level**

**Supraglottic
activity**

Patient Rights

Imagine yourself instead of a patient



References

- 1) Woo P. Stroboscopy. Plural Publishing; 2009 Nov 1.
- 2) Kendall KA, Leonard RJ, editors. Laryngeal evaluation: indirect laryngoscopy to high-speed digital imaging. Thieme; 2011.
- 3) Stemple JC, Roy N, Klaben BK. Clinical voice pathology: Theory and management. Plural Publishing; 2018 Dec 20.
- 4) <https://www.asha.org/policy/ps2008-00297/>

**سرمایه گذاری روی افزایش دانش منجر به تصمیم های بهتر در
درمان خواهد بود و ما را رشد خواهد داد**

