Stethoscope speaker

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Effective use of Kikuzo

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In the body, various body sounds are generated due to blood flow in blood vessels and heart and air flow in trachea and lungs. Auscultation involves examining these body sounds from outside the body using a stethoscope. However, a stethoscope cannot be performed simply by applying a stethoscope to the body. The body sound heard from a stethoscope reflects the condition of the organ, and the body sound cannot be identified without understanding the structure of the sound. To understand the characteristics of body sounds and determine sounds, there are CDs, DVDs, and web teaching materials created using recorded body sounds or synthesized body sounds as sound sources. On the other hand, various sounds are generated simultaneously in the living body, but since the way of hearing differs depending on the place where the stethoscope is applied, the sound cannot be heard unless you listen carefully to the target body sound and select it. The auscultation simulator is effective for learning auscultation techniques for selectively listening for body sounds using a stethoscope. In recent years, in addition to these learning methods, new learning using small speakers dedicated to auscultation has become possible. In this article, I would like to describe the effective use of the 3S stetho sound speaker, a dedicated auscultation speaker, for kikuzo.

I. Speaker for auscultation Kikuzo

Kikuzo is a speaker specializing in auscultation developed by Telemedica. The size of the main body is 76 mm x 135 mm x 35.5 mm, weighs 210 g, and is palm-sized. A strap bracket is attached to the side of the main unit, so that a simulated patient can hang from the neck. The main unit has a built-in small pioneer speaker developed to reproduce body sounds, and a stethoscope is placed on the 55-mm diameter auscultation part acoustic silicon on the top surface of the main unit with a stethoscope. Connect the audio source terminal to the stereo mini jack on the side of the main unit with a 3.5mm audio cable to play the sound. The listening elephant is powered by two AA batteries and has a built-in amplifier so you can adjust the volume.

II. Auscultation sound source of kikuzo

① Auscultation portal website

The auscultation sound source exclusively for kikuzo is the auscultation sound collected by Medica is processed in-house and “Study of the auscultation sound can be learned! 3S Portal Site (https://3sportal.telemedica.co.jp/). It was opened on February 20, 2017. The elephant library on this dedicated site contains a total of 177 body sounds, including 110 heart sounds, 45 breath sounds, 12 bowel sounds, and 10 Korotov sounds. In addition, case descriptions and illustrations are provided for each case, which can be viewed by pressing the "more" display.

②Auscalade (smartphone app)

Nippon Light Service Co., Ltd. sells an Android tablet equipped with the virtual heart sound auscultation application Auscalade. Auscalade is a heart disease patient

This is supervised by Dr. Kazuka Kazu, the father of the simulator “Ichiro”, and contains explanations of heart sound chart waveforms and findings of heart sounds, making it easier to learn about heart sound auscultation. Oh

One of the features of Skaleid's auscultation study is that chess on the chest illustration drawn by Dr. Noriyuki

Moving the tope icon reproduces heart sounds or murmurs corresponding to the aortic valve, pulmonary valve, tricuspid, and mitral valve. The strongest point is set in any of the four areas for each case, and the auscultation site

If you are not accurate, your heart sound will be attenuated and you will be able to learn the importance of the auscultation site along with understanding body sounds. Auska Raid was released on the Apple and Android app stores as a smartphone-only app on October 29, 2019, so anyone can use it easily.

III. Learning effects using Kikuzo

It is generally said that the sound that can be heard by human hearing is about 20Hz to 20,000Hz. On the other hand, the main frequency of heart sounds is a low frequency of about 100Hz, and it can be heard with human ears using a stethoscope. However, when the sound is processed by the auditory central system, it is said that if there is no information (knowledge) about the auscultation sound, it will cause a mistake in sound source identification, so it is difficult for a beginner of auscultation to distinguish heart sounds. I am. To understand the structure of sounds and recognize them as meaningful sounds, knowledge learning using reference books is effective. However, we need to be aware that there is a limit to learning sounds using letters and that there are individual differences in how we hear sounds. In Japan, a dog barking is referred to as "one-one".

In Rica, it is referred to as “bow-wah”. This can happen with auscultation. Therefore, in auscultation learning, it is important to actually listen to various sound sources. In a study conducted by the author, when a medical student listened to a real sound and heart sound of a heart sound auscultation simulator and easy-to-understand (amplified sound) sounds and sounds, a medical student listened to the real sound (amplified sound volume). The correct answer rate for the unacceptable sounds and sounds was 13% and 26%, whereas the easy-to-understand sounds and sounds were 91% and 95%. Also, after listening to easy-to-understand

The correct answer rate when listening to Ⅲ and Ⅲ sounds increased to 80% and 91%. As a sound source,

Listening to real auscultation sounds is important, but it is also necessary to listen to easy-to-understand auscultation sounds. When conducting auscultation learning in a group, listening to the sound source of CDs, DVDs, and Web teaching materials with speakers generally makes bass difficult to hear. Also, when other noises are heard, the effect of auscultation learning may not improve unless the learner listens strongly to the sound that is heard. Using headphones or earphones helps to eliminate other noises and make it easier to concentrate on the sound, but these methods are passive listening as well as music, and auscultation of body sounds requires additional nerves. I think concentration is needed. On the other hand,

To provide a learning environment. If there are many learners, it is possible to distribute the sound to multiple listening elephants at the same time by using an earphone splitter (distributor) to connect the sound source and the listening elephant. If the number of series is too large, the volume will decrease, but there is no problem for normal use because the volume can be adjusted with the kikuzo.

IV. Efficient learning using Kikuzo

A simulator for auscultation such as heart sounds and breathing sounds has a built-in speaker at the auscultation site. It seems. However, because the auscultation site is limited, multiple people cannot auscultate at the same time at the same time, and it takes a lot of time to learn. Another challenge is that it is difficult for the learners to keep their concentration because one learner waits while the other is auscultating. This problem can be solved by using multiple auscultation simulators, but it seems difficult in terms of price, so we connected the elephant to the auscultation simulator, Multiple people can listen to the same sound at the same time while watching the scene. You cannot use a stethoscope to search for sounds, but listening to sounds using a stethoscope will increase the learner's concentration, which may improve stethoscope abilities. In addition, since the volume can be adjusted with the listening elephant, it is thought that the volume that can be easily listened to for each learner will promote understanding and shorten the time.

Efficient learning using listening elephants
The auscultation sound of Ichiro I was output to the elephant listening, and four people were auscultating at the same time.

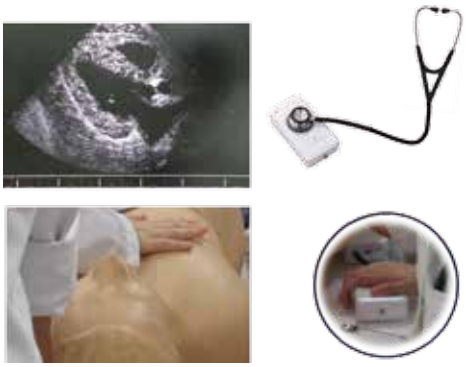
V. Simulator enhancements I used a Kikuzo

Simulators used in the medical field are equipped with excellent functions according to each learning purpose. However, each simulator does not reproduce all human phenomena, so if there are missing functions depending on the learning content, they may be used in combination with other simulators. For example, there is HeartWorks (Nihon Light Service Co., Ltd.) as a simulator used to learn echocardiography. It is an excellent simulator that can learn abundant cases with realistic echo images, but we also use a heart auscultation simulator when learning the pathology of the heart. However, if you have an kikuzo to listen to,

You can listen to the heart sounds of the heart disease that have echo images (at the position of the lobe), so you can better understand the condition. In addition, it is possible to reproduce the vibration and thrill of the chest wall due to aortic stenosis with an kikuzo to it. When the volume of the kikuzo is increased, the silicon surface of the body vibrates,

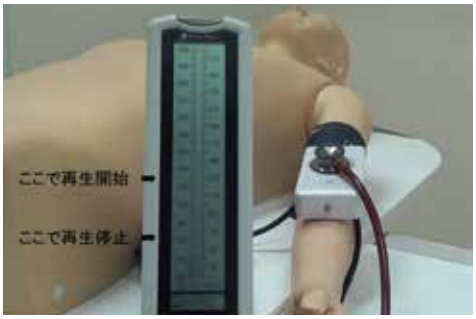
You can experience a similar palpation.

In addition, the general purpose auscultation simulator does not have a blood pressure measurement function. However, in aortic regurgitation and aortic stenosis, learning the effects on blood pressure at the same time as cardiac auscultation will deepen the understanding of the pathology. So a heart auscultation simulation



Simulator extension using listening elephant
Echocardiography simulator: Listening to the heart sound at the position where the probe was applied by Heartworks Palpating with an elephant listening to the thrill of aortic stenosis

Attach the sphygmomanometer to the data arm and place the listening elephant at the site. It is placed on the listening elephant above the manshette. You can practice measuring systole and diastole by starting or stopping Korotkoff sound considering the timing of decompression. The timing of Korotkoff sound can be changed arbitrarily, which is useful for practicing blood pressure measurement by auscultation.



Simulator extension using listening elephant Cuff the left upper arm of Ichiro II and measure blood pressure as usual. Connect the listening elephant to the 3S portal site and play the Korotov sound when the blood pressure monitor memory is in systole and stop when it is in diastole.

VI. Conclusion

In recent years, it has been said that doctors and nurses have stopped auscultating after the image diagnosis has advanced dramatically. On the other hand, pharmacists and physiotherapists are not able to use their

Assessment is becoming more important. The importance of auscultation is spreading across healthcare professionals. We also believe that it is important for medical and nursing students to learn auscultation more in order to understand their condition. The listening elephant, a small speaker dedicated to auscultation, introduced this time

You can easily learn auscultation without restrictions in places,

Improve the learning effect by various ideas of the instructor

A great educational device that can think.

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