

Multimedia material in Spanish, English and Valencian for the practical class of Cardiac Auscultation

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Abstract- Recently, the use of multimedia material has become a common practice in the classes, as it allows that the students are able to maintain and improve class attention, as well as to understanding better all the concepts acquired. In this sense, we have carried out a video in Spanish, Valencian and English of the practical class of Cardiac Auscultation taught in the Medical Degree and in other related degrees within the Health Sciences. The video was made in the three languages used (Spanish, English and Valencian) in the Medicine Degree groups. It is a clinical physical examination procedure widely used in the clinic field, but at the same time it presents some difficulty for the student. The objectives are to learn to accurately locate the cardiac auscultation foci (mitral, aortic, tricuspid and pulmonary) and to recognize each of the heart sounds. This multimedia material allows students to maintain and improve attention in class and increase their learning capacity, as has been shown in the surveys carried out. Nowadays, its use is an aid for students who have to carry out this practice in a non-face-to-face way.

Keywords: *teaching methodology, practical class, cardiac auscultation, survey, video.*

1. INTRODUCTION

Cardiac auscultation consists in a physical exploration clinical procedure, used in a daily basis in clinical practice. It permits the diagnosis of, among others, many congenital pathologies, thus being very employed in pediatric patients (Zipes & Libby, 2018). This technique is, therefore, a basic skill with a great importance for medical students everywhere. The practical lesson on cardiac auscultation belongs in the cardiovascular module of the subject 'Medical Physiology I' of the Medical Degree, and of other similar degrees in the Health sciences department. This practical lesson presents, as a common difficulty for students, the exact placing of the auscultation points, and the recognition of all the different cardiac rumors. The usage of an innovative docent method (EDUTECH, 2009; López Zamora & López Domínguez, 2013) based on the projection of a video showing the valvular auscultation points (areas of highest exposure of each cardiac sound), and the recognition and differentiation of every one of the main cardiac rumors (Zipes & Libby, 2018), will improve

the student's learning, incentivizing focus and motivation during the lesson. This brought us to create a video in Spanish, Valencian and English for this practical lesson in Cardiac Auscultation, within the acceptance of two Docent innovation projects by the University of Valencia. By these means, the elaboration of the material in three different languages will facilitate its projection in every one of the Spanish, Valencian and English groups of students within the Medical Degree.

This material will always remain available for students in the online platform of the University of Valencia, also known as 'Aula Virtual'. Such material can be visualized by students prior to the practical lesson itself, so they have a better understanding of the lesson itself, a most profitable learning experience with a greater acquisition of concepts or even the possibility to resolve doubts of problems during the prior visualization of the contents (EDUTECH, 2009; López Zamora & López Domínguez, 2013). This is, therefore, a way for the student to familiarize itself with the content, the technique and the concepts which will be covered in the practical lesson in the laboratory (Bates, 2017; Rozman, 1986). Furthermore, this media content is to be used within the practical explanation, performing as an aide to the lecturing process (EDUTECH, 2009; López Zamora & López Domínguez, 2013). During the academic year 2020/21, this material has allowed both a synchronic and an asynchronous lecture of the practical lesson for the student, if they didn't manage to be present at the time of the actual lecture for any reason.

It can be said that the multimedia material in the educational system, as in other Information and communication technologies (ICT) will constitute a valid resource with ample range of possibilities and advantages for decency and lecture quality, enough to have in real consideration (López Zamora & López Domínguez, 2013; Mirete, García-Sánchez, & Hernández-Pina, 2015). This video will bring us flexibility and an improvement in the lecturing and learning processes (Mirete et al., 2015).

2. CONTEXT

The present multimedia material proved to be of great help the students in terms of learning the methodology and techniques in cardiac auscultation, which always presents itself with a certain degree of difficulty. These main issues rely on the exact placing of the auscultatory points and the recognition of every one of the different cardiac sounds. It is imperative to have a good knowledge of this technique due to it being the basic and most frequent technique used in daily clinical practice.

The main aims of this video are the following:

1) On a clinical point of view, students will learn the main parts constituting a biauricular stethoscope, and the adequate use of it. They will also learn to place all the valvular auscultation points (the point where every particular cardiac sound has its maximum expression), and the recognition of every one of the physiological cardiac sounds.

2) From a docent point of view, it optimizes the lecture time, since it allows a deeper comprehension of the concepts explained during the lesson, allowing for less doubts within the pupils on the proposed objectives and on their execution. For this reason, it can have a very positive impact on the established time period for the lecture and on its development.

3) Since the video can be visualized at any moment, it benefits the students in their learning process, since it is vastly used for exam preparation for this subject. The concepts, being explained in a more didactical way by means of drawings, animations and sounds, are most proficiently learned by the students with this medium, rather than by other means, which is of utmost importance in this technique due to its vast usage in everyday clinical practice.

The contents of this material can be visualized not only by students of the degree in Medicine, but also by other students of other similar subjects, all belonging in the health sciences department, such as Pharmacy, Physiotherapy, Nursing and Sports sciences.

3. DESCRIPTION

This video improves notoriously the formative activity in all the different language groups that concur in the Medical Degree in our university (Spanish, English and Valencian), since it demonstrates both the necessary material and methodology to carry about the practical lesson on cardiac auscultation. For this reason, the video includes the following clinical aspects of daily practice:

1.- Introduction to the basis of the practical lesson on cardiac auscultation and the importance of its use in daily clinical work (Bates, 2017).

The video starts with a description of the placing of every one of the preferential expression points of every valvular auscultation sounds. Classically, five auscultation points have been considered for cardiac auscultation. Since the first and second cardiac sounds, which are those normally audible with the stethoscope, have important and significant valvular components, they have to be located within the anterior thoracic wall. Even if these points do not represent exact anatomic projection areas for the cardiac valves, they are indeed areas where a higher perception of those sounds is reached. This does not mean that in every specific point we will listen to the murmurs produced by just one valve, but the valvular sound that

is most intensely heard will be the one produced by the valve whose auscultation point is being listened to. This technique is vitally important in clinical practice, since it belongs to the physical exploration of the patient, and it allows the diagnosis of a great deal of congenital cardiovascular diseases. For this reason, it is commonly used in pediatric patients (Bates, 2017; Zipes & Libby, 2018).

2.- Description of all 5 auscultation points.

Auscultation points are the exact areas where the different valve rumors are projected, therefore the area where they can be best heard (Zipes & Libby, 2018).

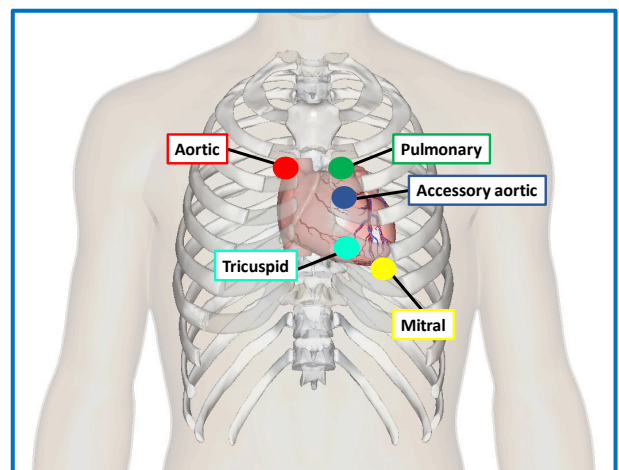


Figure 1. Placement of the different auscultation points.

Figure 1 shows the five cardiac auscultation points with their correct localization on the thoracic wall. These points named as follows: mitral focus, aortic focus, tricuspid focus, pulmonary focus and last, we have another one called 'accessory (or secondary) aortic focus' (Erb area).

3.- To get the present material together, an adequate environment was required. That is, a room with a suitable temperature, where silence predominated in order to properly hear the sounds. An adequate exploration bed and a biauricular stethoscope were also required (Rozman, 1986). In this case, an electronic phonendoscope was needed, instead of a conventional one, to manage to record the cardiac sounds, and its management with the use of a mobile phone application, in

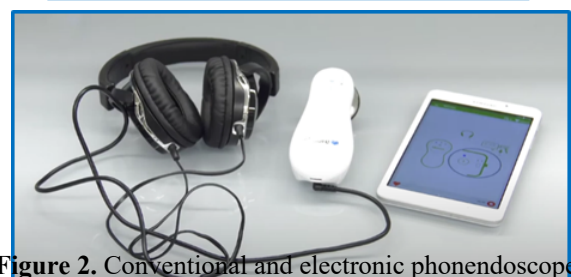


Figure 2. Conventional and electronic phonendoscope.

order to facilitate the final editing of the video (Fig. 2). The technical personnel of the educative innovation department (Department of permanent formation and educative innovation) of the University of Valencia was responsible for the process of video filming and of its posterior edition of the material.

4.- After giving a brief explanation of the position that must be adopted by the subject upon whom the cardiac auscultation practice is going to be performed (supine position with a slightly incorporated head), the nature of the cardiac sounds was explained (Zipes & Libby, 2018). For this explanation, the multimedia material includes Microsoft Power Point slides which illustrate all the different physical aspects that take place for every one of the cardiac sounds.

5.- To follow up, an auscultation of every one of the cardiac focuses will be performed, describing in the video, the way to proceed with the auscultation. It will be performed on an individual, making sure it feels as relaxed and calm as possible. As shown on figure 3, on every one of the auscultation focuses, the exact localization of it will be defined on the video image with the superposition on the individual of an electronically generated thorax, with coordinates and axis, which will allow the student to place the focus with a higher accuracy.

The cardiac auscultation process is as follows: 1) Auscultate first with the diaphragm and afterwards with the bell or the other way round, in a determinate focus, centering the attention first on the perception of a sound, afterwards on another one and finally, centering the attention of both sounds simultaneously (Fig. 3). 2) The process is repeated on the rest of the auscultation points. 3) To wrap up the process, it's interesting to consider several variations with which to proceed again with the auscultation, such as: auscultation after a maximum inspiration followed by an apnea (ventilatory withholding), a spiration followed by an apnea or a particular physical exercise.



Figure 3. Snapshot of the video showing, on the patient, the position of every one of the auscultation points to be explored by the doctor.

6.- Lastly, the multimedia material is evaluated by means of an anonymous poll (Mirete et al., 2015), carried about by the online platform of the University of Valencia called 'Aula Virtual'. This poll is taken by the students of all the different groups taking the subject on Medical Physiology I of the Medical Degree. It consists of a series of questions which analyze the utility of the video for the students' learning process. It comprises 4 questions: Has it been helpful to you for the practical lesson? Has it helped in the comprehension of the proceedings explained for the cardiac auscultation process? Do you think the video will be useful for your exam preparation?

Would you recommend the video to other colleagues who study health sciences subjects? On the same score, after the questions there's a small space for students to express their comments or suggestions on the video, with the aim to improve the docent aspect of the video for future academic years.

4. RESULTS

1.- Development of the multimedia material

The development of the docent multimedia material in both English, Spanish and Valencian for its incorporation in the cardiovascular area of the practical lectures in Medical Physiology I of the Medical Degree, with the finality of reaching a higher quality docency in every one of the first year groups, using, in the video, the same language that will be used during the practical lesson itself. In the same way, the multimedia docent material can be spread and applied to the physiology subject in different degrees in health sciences, such as Pharmacy, Physiotherapy, Human nutrition and dietetics, Podology, Nursing and Sports and physical activity sciences.

The multimedia material in all three languages can be found in 'mmedia' and 'youtube' links as shown in figure 4.

Video in Spanish:

https://mmedia.uv.es/html5/g/cream/70186_auscultacioncardiac a16.mp4
<https://youtu.be/5TbIdAY9CBE>

Video in English:

https://mmedia.uv.es/html5/g/cream/70185_auscultacioncardiac aingles16.mp4
https://youtu.be/30iIC_8E5QA

Video in Valencian:

https://mmedia.uv.es/html5/g/cream/70187_auscultacioncardiac avalencia16.mp4
<https://youtu.be/F4inVzp1GYc>

Figure 4. Image of the links 'mmedia' and 'youtube' for all 3 videos.

2.- Analysis of 'Youtube' views

During a 60-day period, the views were monitored for all 3 videos. While the video in Spanish reached 1119 views, 21 'likes' and 1 'dislike', the video in English language reached 4910 views, 67 'likes' and 3 'dislikes'. On the other hand, the video in Valencian reached 232 views and 2 'likes'.

These results suggest that the most viewed video was the one in English, since it can be viewed by students in other universities in an international level. For this reason, it had a higher 'likes' number. Also, the visualizations in the video in Valencian were higher than the student number in this group (70-80 students), suggesting that the students were able to visualize it also during the exam prep period for the subject.

3.- Analysis of the anonymous poll

Figure 5 shows the results obtained in the anonymous poll, offered to the students of all three language groups. On the first

question, we can observe that the video was useful for the learning of the practical lesson for the 63-75% of the students in all language groups. Between a 17-25% don't know whether if it was or not useful, and 11% of the English group have not seen the video. This last percentage will remain for the rest of the questions.

On the second question proposed in the poll, according to the vast majority of the students who saw the video, it facilitated the explanation of the practical lesson.

Moving on to the third question, between a 63-75% of the students believe the video has a use in exam preparation, while a 17 to 25% of the students don't know if it will be helpful. What surprised us is the 6 to 12% in both Valencian and English groups who believe that the video will have no utility in exam preparation, whilst in the video all concepts that are asked in the exam are explained in a theoretical and graphical way, as well as having explained them in the lecture itself.

For the last question, the majority of students in the poll in the Spanish and Valencian groups would clearly recommend the video to other students. On the other hand, 23 % of the English group don't know if they would recommend it, and a 9% has not seen it.

4.- Analysis of comments and suggestions made by students who took the poll

In regards to the comments or suggestions made by the students in an anonymous way, we can observe that the majority liked the material, as well as finding it useful as a learning method.

Some of the students claim it to be one of the best and most useful video in regards to their learning and exam preparation that they recall in the entire Medical Physiology I subject in the Medical Degree.

5.- Results of the multimedia content, in an academic point of view

With the inclusion of this multimedia content in lectures, we step into a new and more evolved docent method, which improves the current one through the implementation of complementary elements, such as the present video, increasing the dynamism of the lecture and improving learning, focus, motivation, reflection, and the actions taken by the students.

At the same time, it allows to reinforce concept fixation and comprehension in physiology, referring to the cited practical lesson (placement of cardiac valves and the projection of rumors or cardiac focus). Therefore, it will allow a much more proficient preparation both for the exam and for a future clinical practice of this technique.

The video favors the optimization of the lecture time. With the present multimedia material, we improve the comprehension of the concepts explained during the lectures, decreasing the doubts among the students, and thus having a positive repercussion on the established period of available time for the practical lecture.

5. CONCLUSIONS

The usage of this new methodology for the practical lecture on cardiac auscultation in all 3 language groups has had a remarkable reception and has been widely appreciated, as seen in the polls and comments made by the students.

The video has been used not only by students in the medical degree, but also by students from other degrees such as pharmacy, Physiotherapy, Nursing and Physical activity and sports sciences. It can be concluded from this, that it possesses a huge utility in our department's docency and lectures.

The video guaranteed a better optimization of the lecture time, since it facilitates the comprehension of the concepts explained in it.

The docent experience in this academic year 2020/2021 confirmed that it is, indeed, a very useful methodology, both for presental lectures as for those non presental ones. For example, Medicine students can carry out cardiac auscultation at their homes, following the instructions in the video.

It has been of great use in practical and theoretical lectures, since it is a very basic procedure during clinical practice and must, therefore, be learnt correctly to perform it with the adequate precision.

La utilización de esta metodología para la clase práctica de Auscultación Cardíaca en los grupos de español, inglés y valenciano ha tenido una gran acogida y les ha gustado mucho, como queda reflejado en las encuestas y comentarios o sugerencias realizadas por los estudiantes.

ACKNOWLEDGMENTS

The multimedia material in this task has been achieved with the concession of docent innovation projects of the University of Valencia (UV-SFPIE_PID19-1097274 y UV-SFPIE_PID20-1353113). We would like to thank the help provided by Prof. Francisco Javier Chorro Gascó (Head of the cardiology department at the 'Hospital Clinico Universitario' of Valencia, and Cathedatic of the Medicine department in the Faculty of Medicine and Dentistry of the University of Valencia), and of Prof. Luis Such Belenguer (Emeritus Prof. Of the physiology

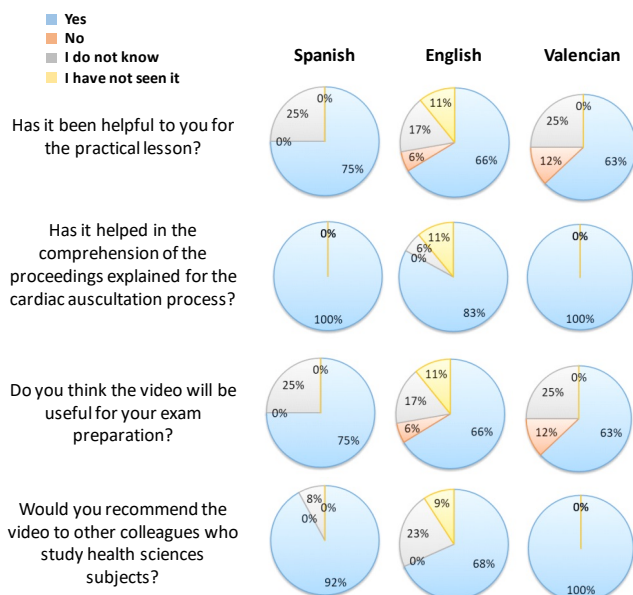


Figure 5. Results of the anonymous poll made to the students, regarding their opinions on the multimedia material.

department in the Faculty of Medicine and Dentistry of the University of Valencia), in the elaboration of this video. Lastly, we would like to mention the medicine student D. Fernando Roca Valderas, for his participation in the video as a patient.

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