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Role of Sound Enhancer Device in Teleconsultation

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ABSTRACT

Aim
To study the role of sound enhancer device in teleconsultation.

Methods
This study was conducted in the plastic surgery department in a tertiary care centre in the month of May-June 2019. A sound enhancer device was used with mobile phone for videoconferencing as form of teleconsultation by plastic surgery trainees in operation theatre and outpatient department. At the end of the study feedbacks were taken from the trainees.

Results
It was found that on using the sound enhancer device, the sound quality improved and it was helpful in the teleconsultation sessions using videoconferencing.

Conclusion
The use of sound enhancer is a simple, cost-effective, innovative method of using a simple technology to aid in utilisation of teleconsultation facilities in a very non-sophisticated way.

Keywords
Sound enhancer device; Teleconsultation; Telemedicine.

INTRODUCTION

Telemedicine is the remote delivery of healthcare services, such as health assessments and consultations, over the telecommunication infrastructure. Telemedicine helps healthcare workers in evaluating, diagnosing and treating patients who are at a remote place. With the advent of telemedicine it has been possible to save time by teleconsulting for minor ailments. Recent advancements in communication technologies has made it possible to use simple technologies such as videoconferencing and smart phones without the need for an in person visit. Telemedicine's role has grown as more and more people are seeking healthcare at a low cost. In this study, we describe the use of a simple device in the form of a sound enhancer with mobile phone videoconferencing as part of teleconsultation. Videoconferencing through mobile phones has been long in place but sound is not usually clear and loud in spite of keeping the device in maximum volume mode. To enhance the sound external power run speakers are used but an innovative indigenous method of enhancing sound without use of electricity is described here.

MATERIALS AND METHODS

This study was conducted in the plastic surgery department in a tertiary care centre in the month of May-June 2019. Informed consent was taken from all the participants. A sound enhancer device (Figure 1) made of bamboo was used as part of telemedicine in the form of teleconsultation from consultants and specialists who are at remote places and their advice was used by means of videoconferencing by mobile phone device in operation theatre and in out patient departments by 6 plastic surgery trainees in their learn-

ing curriculum. Cases were discussed and doubts were cleared and advices were given regarding the further management of the patient depending on the case discussed. Feedbacks were taken from the 6 plastic surgery trainees regarding the use of sound enhancer in teleconsultation. The sound enhancer was made up of indigenous material like bamboo; it has a docking station for holding the mobile phone and two hollow speakers bilaterally on both ends. The mobile phone device is mounted over the docking station and the sound is amplified by the speakers and perceived by the recipients. The sound enhancer for videoconferencing was utilised at the time of surgery in the operation theatre (Figure 2) and also in the outpatient department.

Figure 1. *Showing Parts of Sound Enhancer*

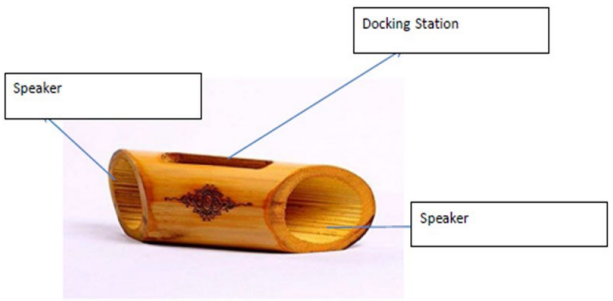

Figure 2. *Showing Teleconsultation Session*

RESULTS

On the analysis of the feedback form (Table 1) it was found that the use of bamboo sound enhancer during videoconferencing with mobile phone as means of teleconsultation was found to be effective with respect to quality of sound, enabling one to listen to the distant faculty and consult with them regarding the cases both intraoperatively and in outpatient department.

DISCUSSION

Telemedicine, a term coined in the 1970s, which literally means "healing at a distance",[1] signifies the use of information and communication technology (ICT) to improve patient outcomes by increasing access to care and medical information. Four elements are germane to telemedicine: 1. Its purpose is to provide clinical support. 2. It is useful in overcoming barriers due to distance and connecting users who are in different physical locations. 3. It involves the use of various types of Information and communication technologies. 4. Its goal is to improve health outcomes. Recent advancements in, and increasing availability and utilization of, ICTs by the general population have been the biggest drivers of telemedicine over the past decade, rapidly creating new possibilities for health care service and delivery. This has been true for developing countries and underserved areas of industrialized nations.[2] With the advent of low cost digital communication, there is increase in the interest in the application of telemedicine among health-care providers, and have enabled health care organizations to envision and implement new and more efficient ways of providing care.[3,4] As internet has become more popular it has aided in ICT advancements, thereby expanding the scope of telemedicine to encompass web-based applications (e.g. e-mail, teleconsultatios and conferences *via* the internet) and multimedia approaches (e.g. digital imagery and video). These advancements have led to creation of newer telemedicine applications that the world is coming to use. Telemedicine is helpful in those situations where the healthcare worker on duty has little or no access to expert help[5]; it is able to offer remote physician access to otherwise unavailable specialist opinions,[6] providing reassurance to both doctors and patients. Telemedicine programmes have been shown to directly and indirectly decrease the number of referrals to off-site facilities and reduce the need for patient transfers.[7,8] Telemedicine creates a university without borders that fosters academic growth and independence because the local participating surgeons have direct access to experts in the developed world. The knowledge sharing that has occurred has shown to aid health-care professionals in overcoming the professional isolation that they often face in remote areas, and to improve their skills and the services they offer.[9]

We describe our experience with the use of bamboo enhancer in teleconsultation. The sound enhancer acts as amplifier as well as stand for the phone. It is light weight and portable, easy to transport and no cords or cables or batteries required. The hand-

Table 1. *Describes the Feedback form Obtained from 6 Plastic Surgery Trainees*

Question	Trainee 1	Trainee 2	Trainee 3	Trainee 4	Trainee 5	Trainee 6
1. Was the quality of sound enhanced with the use of the enhancer?	Yes	Yes	Yes	Yes	Yes	Yes
2. Were you able to clearly listen to the distant faculty and clarify your doubts?	Yes	Yes	Yes	Yes	Yes	Yes
3. Did this aid in enhancing your teleconsultation experience?	Yes	Yes	Yes	Yes	Yes	Yes
4. Did you find any drawbacks?	No	No	No	No	No	No
5. Would you recommend this device and its utility to your peers?	Yes	Yes	Yes	Yes	Yes	Yes

made sound enhancer enables one to share sound through passive sound amplification. It is incredibly durable, renewable and rich in tonal variation. The sound enhancer is made from eco-friendly and sustainable bamboo. Its 100% green and uses no electricity. It can be used for hands-free calls and Skype. It has an anti-tilting inclined stand and precise mobile slot for minimum leakage. It is cost effective from prices ranging from 350 INR to 550 INR. Teleconferencing and video-conferencing can be done with enhanced sound using mobile phone and bamboo sound enhancer. This mode of telecommunication and telemedicine helps doctors in teleconsulting with remote faculties without the use of sophisticated technologies. There are certain limitations to the use of bamboo sound enhancer such as use in a noisy room may impair its sound clarity and loudness. Usually it can be used in phones with bottom speakers only and part of the mobile screen may not be visible after keeping the mobile on the stand, hence it may not provide very good video clarity compared to sound enhancement.

CONCLUSION

The use of sound enhancer device made of bamboo is sustainable, cost-effective and simple method for aiding mobile phone videoconferencing for teleconsultation with specialists and remote faculties thus achieving an innovative method of enhancing the teleconsultation experience. The anticipated limitation of the study is that there is no control conditions to compare it with the use of no amplification system. The huge limitation of the study is that there is no control conditions to compare it with the use of no amplification system. The present study is a preliminary study and it requires randomised controlled multicentric trials with statistical analysis to further substantiate the role of bamboo sound enhancer in teleconsultation.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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