
AUDIOLOGY MEASUREMENT USING TELEMEDICAL SOLUTION IN CENTRAL ASIA

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Abstract

Nowadays, the telemetry mediated systems tend to be an alternative to the standard measurement systems. With the decreasing cost of electronic devices, the use telemetry systems is becoming more and more common, as it allows to test remotely and to send the results to the specialised centres with experienced staff. Healthcare personnel involved with hearing services in less modern locations need consistent training, oversight and feedback by audiologists in order to provide quality services. The aim of the study is to present usage of telemedical tools for diagnosis between Poland and Kyrgyzstan. A hybrid synchronous and asynchronous model of testing is used in Kyrgyzstan. Before starting the remote Auditory Brainstem Response (ABR) testing Kyrgyz technicians completed comprehensive training courses. They were instructed on the correct patient preparation for testing, abrasions of the skin, electrode sticking, clip attaching, and launching of the appropriate software. Support documentation was prepared; instructional materials including a brochure and instructional video. The equipment was sent to the centre in Kyrgyzstan. At the beginning of the project we made numerous mock examinations, after that we started the remote Kyrgyz-Polish testing. The whole process was performed with the use of the Team Viewer application (a proprietary computer software package for remote control, desktop sharing, online meetings, web conferencing and file transfer between computers). During the process, the testing room can be seen on the video and we can speak with the technician depending on our Russian speaking personnel. After the test, the results are collected and sent to a specialist in

Poland to determine the result. The documents are then translated and sent to Kyrgyzstan. Up to 20 remote examinations can be performed weekly. This technology assists clinicians by making it easier for them to consult with other more experienced audiologists.

Keywords: teleaudiology; diagnostic auditory brainstem responses

Introduction

When distance and inaccessibility pose barriers to audiology care, the answer in Poland is tele-audiology. According to the American Speech-Language-Hearing Associations (ASHA) position statement, telemedicine offers “the potential to extend clinical services to rural, remote, and underserved populations, and culturally and linguistically diverse populations”.¹ This short paper will present usage of telemedical tools for diagnostic audiology between Poland and Kyrgyzstan – diagnostic Auditory Brainstem Responses (ABRs).

In Kyrgyzstan, there is a very big problem with access to audiological services. Children and even adults are often not diagnosed at all, mainly because of the lack of adequately trained personnel and financial reasons. Sometimes it can be both: parents have a poor interest and lack perception of a child’s hearing problems. An additional and important aspect is the need to travel long distances to obtain diagnostic testing. Because there are only a few clinics available in major towns, parents often have to travel several kilometres to get to the specialised clinic. In addition, travel expenses and loss of earnings due to absence from work are major reasons parents abandon further diagnostic testing.^{2,3} As a result, the diagnosis of hearing loss in infants is delayed.⁴ Recognising the

need to improve services related to the early detection of hearing defects, it was suggested that a new model of service delivery should be implemented for medical screening.

Telemedicine, a modern technological approach, allows provision of adequate audiological services. It is a solution that allows to conduct of ABR testing via Internet. The results have been shown to be consistent with the results of tests performed in a standard way.^{2,5,6}

Methods

With the opening of a new branch of The Centre of Hearing and Speech in Bishkek activities began related to objective hearing measurements using the telemedicine system. The most important factors for successful teleaudiology are connectivity and well trained personnel at the remote site. Consequently training for personnel in remote sites was a priority. Before starting remote ABR testing, several training courses were given to Kyrgyz technicians in Poland. They were instructed on the correct patient preparation for testing, abrasions of the skin, electrode placement, clip attaching and launching of the appropriate software. In addition instructional materials were prepared, including an information brochure and instructional video. Thereafter, the equipment was sent to the centre in Kyrgyzstan. At the beginning of the project numerous mock examinations were performed to understand how the project would run in the real life setting.

For tele-ABR the audiologist at the telemedicine centre in Poland used a laptop computer with Internet connection and the Team Viewer application installed on it. Team Viewer is proprietary software for remote control, desktop sharing, online meetings, web conferencing and file transfer between computers. During the testing, the testing room was seen on the video it was possible to speak with the technician (depending on availability of Russian speaking personnel). The Kyrgyz remote site used a laptop with the Vivosonic system and Team Viewer application installed. Every week a schedule of ABR's in Kyrgyztan was received. Remote staff prepared patients for testing and connected the equipment. When the patient was ready for testing (natural sleep), the coordinator in Poland took control of the remote computer over a secure private network. The first test made is impedance control. (Figure1)

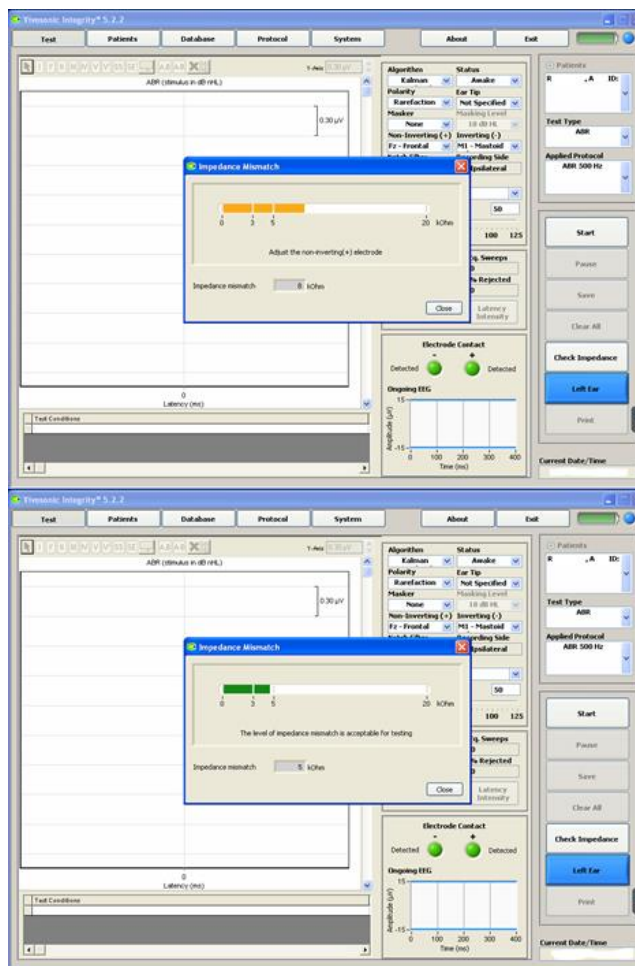


Figure 1. Impedance levels checked before testing.

Once the impedance level was acceptable, ABR testing began with protocols for 500 Hz and click stimuli. The remote site in Poland was connected to Kyrgyzstan using a hybrid connection of synchronous and asynchronous exchange. The synchronous part was remote desktop testing with videoconferencing during the entire process. Asynchronous connectivity was used when the results were gathered and stored, then sent for review and description to a specialist in Poland.

Results

Extensive experience in the telemedicine helped in developing this and other projects.⁷⁻¹¹ All connections were successful, including completion of remote measurements and obtaining the results and descriptions from specialists in Poland. Our hybrid model requires a moderately fast network connection at both sites. However, even with a very good and

reliable connection there are sometimes delays in transmission and dys-synchrony between voice and video or moves made on the desktop. This requires patience from remote staff and coordinators in Poland. Despite these difficulties the results achieved have been equivalent to conventional onsite testing. This approach had given the centre several advantages. First, it is possible to conduct remote objective hearing measurements in remote locations, where it is very desirable. Second, it is possible to mentor and supervise trained staff in remote sites in real time while diagnosing patients. Third, practices at distant centres can be observed to check and control the quality of services in the distant branch.

Conclusion

This tele-ABR project has increased accessibility to diagnostic hearing services in Kyrgyzstan which, with the help of specialists from Poland, provides a high level of service in our remote branch.

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Conflict of interest. The authors report no conflicts of interest.

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