Teenagers’ Views
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Summary

Noise, distance and reverberation (echo) cause problems in listening situations for teenagers with hearing loss. FM systems are one way to help. What do teenagers think about using them?

We interviewed 20 teenagers, between 11-17 years old, using a mixture of hearing aids and cochlear implants. We asked them about their views on FM systems and they told us:

- They used their FM technology in most lessons.
- Benefits included accessing their teacher’s voice more easily and clearly.
- They also expressed frustrations around teachers not managing the FM technology effectively. In some cases this had resulted in some of them not wanting to wear an FM system at all.
- Almost all of the teenagers did not use the FM technology for Physical Education (PE) lessons or at home.
- The reasons for not wearing the FM system for PE included not liking the wind noise and a fear of damaging or losing the system.
- Reasons for not wearing the FM system at home included a perceived lack of ownership of the device i.e. as belonging to school. Also many felt there was no need for it in home situations. This was even when they could identify home or personal situations where listening was more difficult.

Practical use: Out and About?
This encouraged us to follow up by focusing on using improved radio aid technology now available to teenagers, the Phonak Roger system. The Phonak Roger system does not use the traditional FM frequency to transmit signals but uses a digitally processed signal transmitted on 2.4 GHz bandwidth. We were interested in exploring the use of radio aids during a set of activities that would typically be considered challenging for FM device use. These included rock scrambling, canoeing and a trip to a museum.

- Professionals showed an initial reluctance to trial the transmitters in the given situations. This usually related to a fear of complicating the management of these activities.
- However, after using the device both the professionals and young people identified the benefits the Roger system provided and would recommend use of the device.

Overall, the findings identified a need to improve awareness and knowledge on the optimal use and potential benefits of radio aid technologies even in challenging situations.
Introduction: Why are FM systems necessary?

There have been many studies (see references) highlighting the importance of minimising acoustically challenging factors of distance, reverberation and noise.

Teenagers with hearing loss are reliant on hearing technologies to hear their teacher, family and friends. In secondary school classrooms it is usual for teachers to move around the classroom and this means the distance between the teenager and teacher will increase and the teacher’s voice decrease. The speaker’s voice is also subject to background noise and the effect of reverberation. One accepted method of overcoming these acoustic challenges in learning environments is through the use of radio aid technology. They can be effectively used with young people and children using hearing aids, cochlear implants and bone anchored hearing devices. Radio aid technology overcomes these acoustical challenges by:

- Reducing the speaker to microphone distance,
- Limiting reverberation times reducing the 'echo' effect,
- Enabling the speakers voice to present more loudly to the child's ear wearing the receiver and overcoming routine background noise e.g. classroom noise, outdoor traffic, car engine etc.
Exploring teenagers' views

Unless teenagers see the benefit of FM technology use they are unlikely to use them. So it was important to listen to their views.

We asked 20 teenagers their views and experiences of using FM systems at home and school. Seven teenagers were hearing aid users and 13 were cochlear implant users. Data were collected via semi-structured interviews from 20 young people (11-19 years of age) using FM devices with their hearing aids (n=7) or cochlear implants (n=13). Interviews were transcribed and thematic content analysis was used to interrogate the data.

Four main themes and 19 sub themes were identified in the participants' accounts which describe their experiences and views on FM technology use. Example quotes from the young people have been included to illustrate the concepts being discussed.

We asked teenagers about:

- Their views and experiences of using FM/radio aid technology.
- Consider the situations at school at home where they use or do not use FM/radio aid technology.
- Explore the challenges and benefits of using this technology.

We then followed this up with a trial of the Phonak Roger system where a group of 8 young people and 4 professionals (1 teacher of the deaf, 2 teaching support assistants and 1 activity instructor) were involved. Participants came from across the United Kingdom.

This trial looked at radio aid (Phonak Roger system) use in outdoor situations. Based on the young people's lack of use of the FM systems at home, outdoors and during Physical Education (PE) lessons identified in the interviews, we were interested in looking at a set of activities that were identified as potentially challenging for FM system use, these included:

- Rock scrambling
- Canoeing
- A tour of a museum.

Videos and field notes were collected from young people, their teachers of the deaf, teaching support assistants and activity instructors about the use of the Roger system during these activities. The videos and field notes were qualitatively analysed to identify the users' perspectives.
We then asked both teenagers and professionals about using the Roger system, where we wanted to:

- Explore the professionals’ views about the viability and practicality of using the Roger radio aid system for a variety of activities on a teens residential camp.

- Capture the experiences of the teenagers, their teachers of the deaf, teaching support assistants and activity instructors using the Phonak Roger system during outdoor and educational field trips.
Teenagers use of FM systems at school

The young people were asked about how and where they used their FM technology at school and what perceived benefits it provided. Most of the young people interviewed were making use of the technology for a variety of lessons at school. They were able to describe the benefits it provided and articulated the specific improvements in sound quality it provided.

Usage:
17 out of 20 young people used the FM system at some point during the school day.

"I use it in all the lessons, so I can hear what the teachers say." (S1)

"I use it in all my lessons except sport."

“Some of the lessons I am good at and some of the lessons I’m not good at, so if I am not good at the lesson then I get the FM sometimes.”(S2)

Perceived benefits: These mostly related to the perceived changes in quality of their teacher’s voice and how it impacted on their ability to hear and understand the message conveyed.

"Because when I am not looking I can hear... It’s like they are standing right next to you." (S4)

“Well, because I can hear loud and clearly and not misunderstanding, and not always putting my hand up and asking them to repeat again. (S18)

“It helps me with,... I think it just helps me to hear more. Because if they are far away I can’t hear them but if I have my radio on I could hear them.” (S16)

"It amplifies what the teacher is saying so I can hear and then I can understand more better." (S10)

"It’s easy to understand what the teacher is saying, without me keep saying what did she say...I can understand what they are saying, and I can hear what they are saying when they are talking very quiet." (S8)
Situations when FM systems are not used at school

Most of the teenagers were using their FM technology for the majority of lessons. For those lessons where they were not using it the teenagers gave a variety of reasons. These included coping in certain lessons so not needing it, wanting to avoid unwanted attention drawn to them, having to leave their friends to go and fetch FM system or return it to charge overnight at the beginning and end of each school day.

"Yes, sometimes I just watch a movie and I don't have to give the FM to the teacher." (S12)

"Because she just tells us what to do and sometimes from the last work we would finish that off and she goes where I sit so I can hear her clearly and I do work so I don't really need to have my implant on all the time, so I don't use it in ICT." (S16)

“So I have to do that every single day, and I have to pack my radio and give it the teacher and give it to another teacher and if I left it there I have to go all the way downstairs to get it and go all the way back upstairs and put it on the new teacher.” (S1)
Challenges to FM use in Physical Education (PE) lessons

Most of the subjects mentioned how they did not use their FM during PE lessons. The reported reasons for non-use of the FM systems in PE included concerns that the system would get damaged, small adaptors could be lost so they were not allowed to or that they did not need it as the teacher was loud enough or reluctant to wear the system.

“I sometimes, not usually, use it in PE but sometimes because of the wind I can’t really hear because the wind is so loud it goes into the microphone. So I don’t always use it in PE.” (S16)  

"Why not PE? Because you are not allowed to have things round you.” (S4)

"I don’t use it in PE no. It’s quite dangerous actually when you use it in PE." (S15)

"You know the shoes, sometimes they can get damaged. One day that is what happened. I was playing cricket and I had the receivers on, then I accidentally hit the bat at the shoes, then I start to try it but it was broken so I don’t use it again for PE.” (S1)
Teenagers’ use of FM systems at home or for personal use

We were interested to find out if the young people were using their FM technology at home together with what perceived benefits it provided in their lives outside of school. We also explored the reasons for use or non-use of the system at home and whether they would consider using it in the future.

**Usage:** Out of the 20 young people only 2 teenagers had ever tried their FM at home. Others expressed concerns about using the FM at home.

"Sometimes my dad wears it for the bike so I can hear him because I am in front of him." (S9)

"Because it will be very hard to use the radio aid at home if it won't work and we don't know how to fix it." (S12)

**No perceived need/benefit at home:**
The majority of young people had never worn their FM’s at home and most of these did not consider it necessary as felt they coped well in home situations.

"I don't need it at home that much. I take my dog for a walk and then when I get back home I go to bed. I am tired from the day time." (S11)

**Potential use at home:** However some of the young people expressed situations which they still found difficult at home for listening, like the television and would be curious to see if the FM system could help.

"It would be easy to listen to the TV. Maybe the TV, and to listen to my family because sometimes my family talk very quietly." (S8)

"When I am helping my mum around the house." (S4)

**Ownership?**
While exploring the reasons for the limited use of FM systems by the teenagers at home, the issue of ownership emerged. There was a feeling that the participants thought of their FM systems in terms of school only, as the property of the school for learning and had not thought of them as benefitting them outside of the classroom.

"it's not my radio aid. You know my old school, they had one because they bought it from audiology and they lent it so it's not really ours." (S10)

"Because the radio aid is only for school." (S13)

"it is just meant for the school not for home." (S18)

"we are not allowed to take them home." (S8)
Perceived difficulties with using FM technology

While the young people using their FM systems could explain the benefits it provided, yet there was a discrepancy between how much they liked their FM systems in relation to the benefits it gave them. This was explored further as they were asked about the difficulties they experienced. These factors were varied and identified some of the challenges we face when supporting these young people and need to work to improve. We have outlined the difficulties they reported.

**Interference / intermittent**: this relates to the quality of the sound when using their FM systems.

"Sometimes it gets a bit fuzzy, like crackles." (S6)

"it is difficult as the teacher is going 'br br br'." (S13)

"It's not really bad but it's a bit buzzy." (S17)

**User error**: the difficulties expressed here related to how the teaching and support professionals used and managed the equipment.

"If they have it round their neck, especially the ladies they wear a big necklace and it bashes on them." (S9)

**Unwanted attention/ Embarrassment**: some of the teenagers expressed a reluctance to wear the technology because of the negative attention they thought it brought upon them, especially among their classmates

"The way you have to give it to teachers and they say 'all right, all right' so I stopped using that, I was good without it." (S19)

**Management/ Responsibility**: the added layer of responsibility around making sure the devices were charged, collected from specific bases or classes and then returned after school was an issue that resonated with our young people. This meant they were separated from their friends during some of the more sociable times of the day.

“Every morning I had to pick it up and sometimes I would forget... it is boring giving it to your teachers and everything.” (S14)

"Because sometimes it's hard to change it and put it back on and take it from lesson to lesson." (S16)
Inability to hear peers: An irritation was expressed around the way the FM systems were sometimes set up, meaning they could only hear the teacher through their hearing device, rather than their peers, or classroom assistants, proving difficult in group situations.

"It’s good for people but .. I can’t hear the children.. only the teachers." (S17)

I can hear what my friends are saying but sometimes it is difficult because when they talk they talk very quietly, so I am missing things with my radio aid when they are talking." (S8)

"No the transmitter is only connected to the teachers, so I can only hear the teacher, and it quietens all the other sound, so it is even harder to hear my friends." (S10)
Out and about: Roger use in challenging situations

We took the opportunity of a young people's residential week away to do a follow up study looking at their actual usage of a radio aid system in a variety of outdoor pursuits.

We used the Phonak Roger system to trial with a group of teenagers. We completed informal interviews and took video footage of each activity.

Based on the young people's lack of use of the FM systems at home and during Physical Education (PE) lessons, we were interested in looking at a set of activities that were identified as not being typical scenarios where FM systems were used.

These included:

- Rock scrambling
- Canoeing
- A tour of a museum.

We were interested to see how successful it would be to wear a FM system in these situations, whether the young people would find them beneficial and what obstacles we may encounter, both during set up and during the activity. We also wanted to explore the experiences and views of the teenagers’ teachers of the deaf, teaching support assistants and activity instructors using the Phonak Roger system during outdoor and field activities.

Professional concerns

A number of concerns and reservations from professionals about using the FM technology were experienced. Professionals strongly expressed the view that taking teenagers in outdoor pursuits was challenging enough without adding new equipment. It was perceived as something that may be too complicated to manage, might not be feasible to get right practically and may be of limited benefit to the young people. Previous experiences coloured their views.

In practice the Roger system was relatively straightforward and intuitive to set up. There were initial complications related to access to technology. Some of these set up challenges included:
Teenagers not having their FM shoes, as they belonged to the school and were left there for summer holidays.

The need for a professional who felt confident about setting up the FM systems and troubleshooting them along the way.

Willingness of outside instructors and other support professionals to wear and manage the new FM technology. In the end the professional challenges were far outweighed by the benefits received in the various outdoor pursuits.
Rock scrambling: young peoples' views

This activity involved rock scrambling over, up and through rock tunnels and boulder outcrops. It was managed and run by an outward bound instructor with support from teachers of the deaf and other professionals looking after the young people. The set up of the FM system was easy to do but still added a layer of complication to an activity already full of safety instructions and extra equipment like helmets. It also relied on the willingness of the instructor to wear the transmitter when giving instructions, remembering to mute it when it was not in use and coping with troubleshooting interruptions when adaptations needed to be made.

The young people trying it out had this to say:

“I could hear the instructor speaking... Weird I’ve never done that before, heard someone in a tunnel”

“It was really good because it blocked out the wind. Whereas the old one... it would always get the wind. But this...it was only getting the person’s voice.”

"Even if there was like a wall or anything in between the person and the other one it would still work, because I went caving/ rock scrambling and I could hear the instructor really nice and clearly."
Canoeing: instructor's feedback

This activity proved to be the most eye opening in terms of the benefit that was received and how it directly improved the communication situation for the young people involved.

Only one girl was able to try it out as the first hurdle to cross was the young people wearing their hearing technology at all during this water sport. The participant who did had waterproof cochlear implants and was therefore able to try the FM system.

Using the FM system meant that they were able to hear the instructor in a separate boat up to 20 metres away. This means they were able to take on a leadership role, as they were able to relay instructions to the rest of the group. It directly improved the communication environment and access to information for the teenager using it.

“Very useful I’ve been able to speak to Jenny when she’s been 20 metres in front of me, which has been great and she can follow the instructions.”

The outward bound instructor reported that wearing the FM system was a completely new experience for her having had years of taking children out on the water. She said that she could immediately see the benefit and could think of other activities such as cycling that she would like to trial them in. In this study it became obvious that motivation for using the FM system and putting up with minor adjustments were directly related to the actual benefit experienced and observed.
The final group activity in which we trialled the Roger FM system was a tour and treasure hunt round a stately home/museum. This involved small groups of up to six children going with a leader, who pointed out information and initiated conversations along the way. There were at least two teenagers wearing the FM systems in each group. The activity was full of opportunities for language and general knowledge enrichment but was also involved a lot of background noise.

We interviewed one of the teaching assistants afterwards, who was a group leader who said:

“It was a noisy place, because there were all sorts of other people going round the house. Again there was lots of language and vocabulary which we could input, questions we could ask them, we could get their attention, for those children using Roger, so I observed again that the children using Roger definitely stayed interested in their activities round the Stately Home for longer than those children who didn’t who got bored quicker, so that was something as an outsider I noticed as well. And again when we were trying to set them up it was very easy to connect and we could check with them as they were going along – ‘do you still hear me, can you hear me?’; so in terms of the set-up and the usability as you were going through the Stately Home it was very good.”
Conclusion: facing the challenges and making optimal use of radio aids

Teenagers identified the benefits provided by FM technology in educational settings but many reported challenges associated with FM device use. The use of FM outside of educational settings was not common and very few were able to discuss the potential for this.

Looking at the use of radio aids outside the typical school setting. Our findings highlighted the views of those using transmitters and the young people using the receivers. An initial reluctance was observed by professionals to trial the transmitters in the given situations, which was usually related to a fear of complicating these activities. However, after using the device both the users of the transmitters and the young people identified the benefits in communication the remote microphones provided. The experienced teacher of the deaf leading the residential group explained how using the radio aid in what would routinely be considered challenging situations changed her opinion:

“I've had an education actually because yesterday clearly with the canoeing it was a fantastic advantage to be able to connect the two boats, between the children and the staff member who was in the other one. It would have worked fantastically on a climbing wall. So at school I am, we are inclined to say 'We're going a trip we'll not bother with the radio aid'. But I'm going to definitely be re-thinking it because actually it's the time you definitely need a radio aid”.

Overall, we identified a need to improve awareness and knowledge on the optimal use of radio aid technologies. The potential benefits of using radio aid technology outside of school needs to be considered: learning is a daylong experience and our trial in challenging circumstances demonstrated how much the Roger system had to offer teacher and learner.
Useful References: further reading


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