Attending football matches may be bad for your hearing!

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Introduction

The UK places limits on workplace noise exposure in order to protect workers from noise-induced hearing loss (NIHL) ¹. The Control of Noise at Work Regulations 2005 mandate that action be taken when workers are exposed to:

- 80-85 dB averaged over an eight-hour working day *and/or*
- 135-137 dB at any point ('peak sound pressure')

Noise exposure must not exceed 87 dB average or 140 dB peak sound pressure.

For every 3 dB increase, allowable exposure time is halved. In dose terms, exposure to 90 dB for four hours is equivalent to the 87 dB limit (eight hour average).

Objectives

To undertake a pilot study of noise exposure at Liverpool FC matches, in order to inform the public about any risk to their hearing

Method

Funding: This study was funded by the **British Tinnitus Association**

Ethical considerations: The study was registered with our institutional review board and formal ethical approval was deemed not to be required

We used the SoundMeter Pro software for Apple iOS (Faber Acoustical, Salt Lake City, UT, USA, v4.3.1) on personal iPhone 7S's. Recordings were made continuously between the first and final whistles. Data were downloaded and analysed in Microsoft Excel.

136 dB

Highest peak sound pressure
Liverpool vs Middlesbrough
21 May 2017

Highest average exposure (2h)
Liverpool vs Manchester United
14 October 2017

89 dB

Results

To date, recordings have been analysed for five matches.

Noise exposure for all matches fell above the action levels detailed above.

For all five matches, **mean time weighted noise exposure was 86.97 dB** (range 83.97 to 89.56 dB).

Mean peak sound pressure was 132.87 dB (range 128.43 to 134.58) with no match exceeding the workplace limit for a single sound event.

Recordings lasted approximately 2 hours for each match

Match versus	Noise exposure (dB) (2h)	Peak sound pressure (dB)
Manchester Utd	89.56	131.24
Middlesbrough	87.75	136.61
Sevilla	87.49	134.58

Conclusions

Even though workplace noise exposure limits do not cover recreational activities, it is recognised that regularly exceeding them can lead to NIHL. With members of staff working at these matches, workplace limits may still be relevant. Our recordings showed that average noise exposure (two hours) approached 90 dB for some matches, which in dose terms is equivalent to exposure to eight hours at 84 dB, within the action levels mentioned above.

We continue to analyse the recordings from other matches and hope to advise both the public, organisers and funders on this issue.

REFERENCES

- 1) Noise at Work. HSE. Available from: <http://www.hse.gov.uk/noise/employers.htm#noise>