Noise exposure and risk to hearing in professional practice and leisure activities from balloon pops

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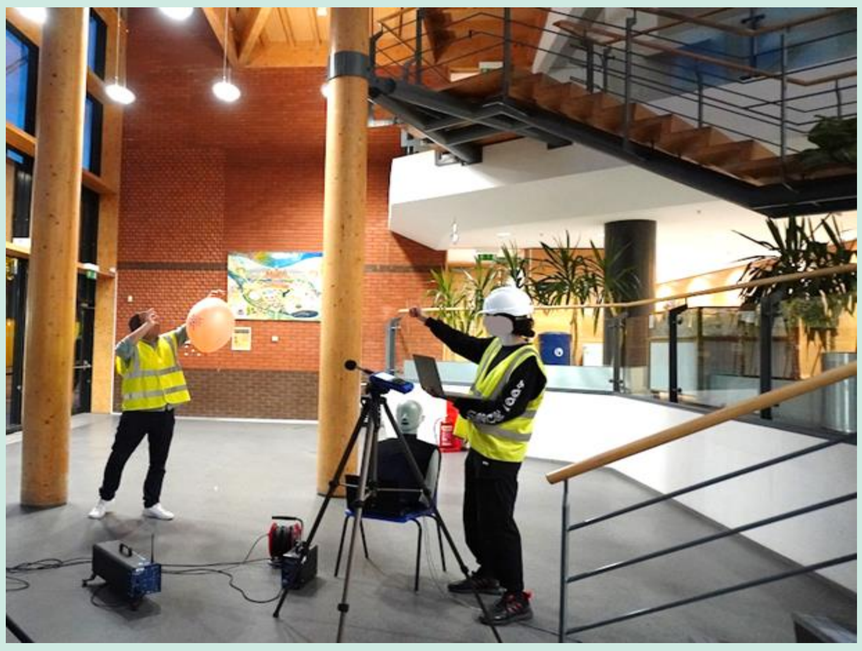
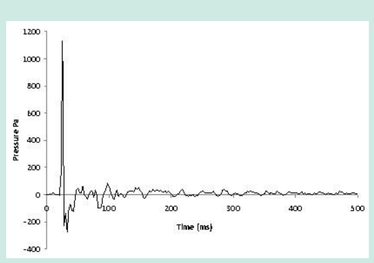
BACKGROUND

- Due to its harmless appearance and leisure connotations, acoustic practitioners and lay users often inflate, and pop balloons unprotected and unsuspectingly without being aware of the serious auditory risk that those bursts may entail to their hearing health.





LITERTAURE REVIEW

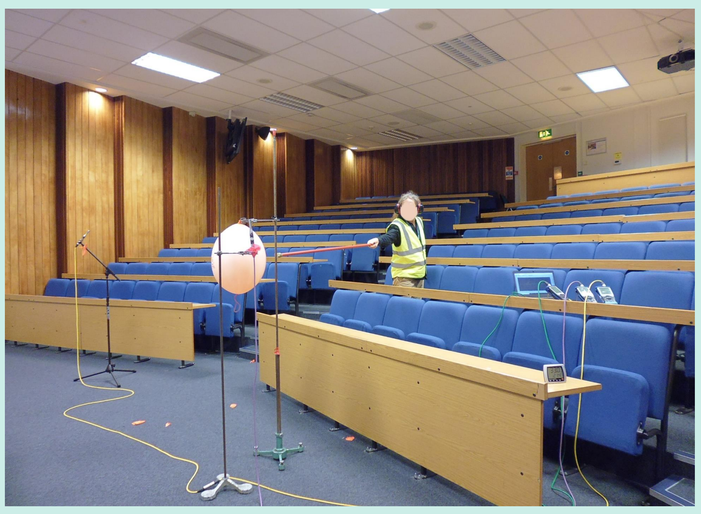
- There are no studies in the literature determining the exposure and assessing the risks to hearing from popping air-filled balloons.
- There is a total absence of guidance on auditory safe practices for acoustic practitioners or general lay users to avoid over exposure and hearing damage.

RESEARCH AIMS

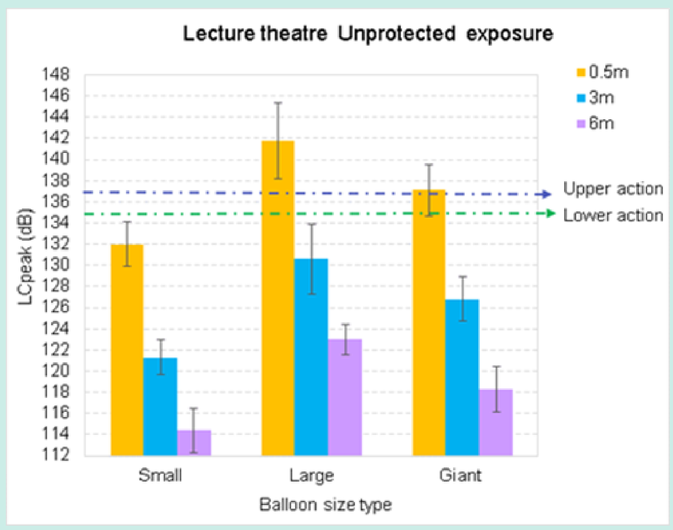
- To determine the noise exposure and assess the risk of hearing damage from bursting air-filled balloons.
- To raise awareness and educate acoustic practitioners, professional bodies, and lay users on the associated auditory risks.
- To provide novel and comprehensive guidance on practical safe balloon utilisation procedures.
- To propose an international normative requiring a safety warning label and safety instructions to accompany every balloon package.

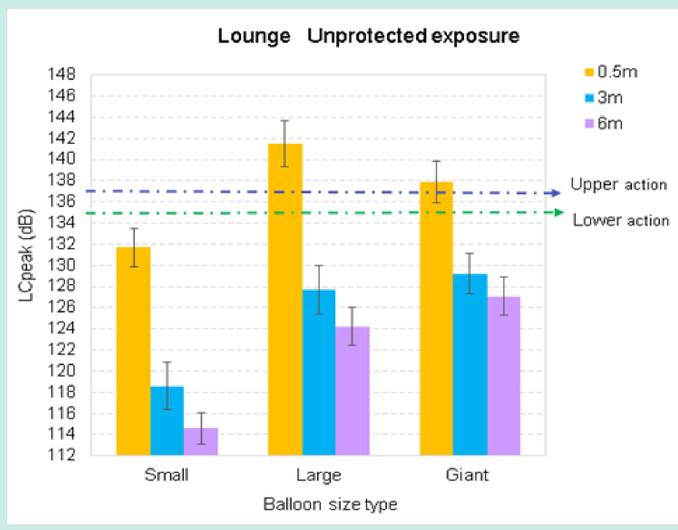
METHODOLOGY

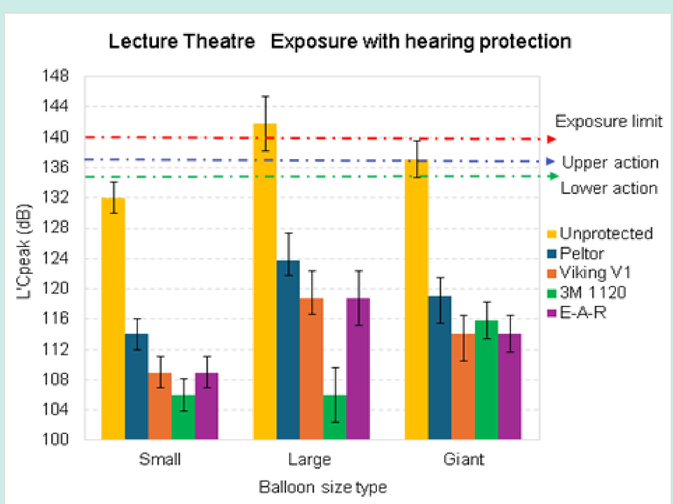
- Test and assessment method in line with the *UK Control of Noise at Work Regulations 2005 .*
- *LCpeak , Lpeak* field measurements replicating typical utilisation by practitioners and lay users.
- Measurements at ear height in the absence of the exposed subject.
- 3 balloon sizes, 3 environments, 3 exposure distances (0.5m (reference),3m, 6m), 27 scenarios.
- Reference exposure distance = 0.5m (arm's length also distance between ear to puncture point).
- 15 valid bursts recorded per balloon size, distance and environment.
- Total of 405 measurements analysed to determine: unprotected and protected exposure, critical distances, auditory risks and the estimated permissible number of unprotected burst events.

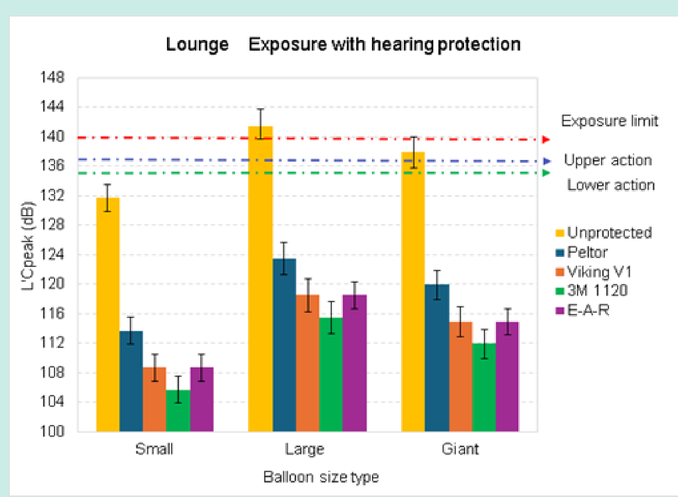


RESULTS AND ANALYSIS









CONCLUSIONS

- Noise exposure of an unprotected person holding and puncturing a balloon (at 0.5m) of two widely used sizes, exceeded various international occupational health regulatory exposure limits.
- The exceeded exposure constituted a risk of permanent hearing damage.
- Wearing commercially available hearing protection would reduce the exceeded exposure (at 0.5m) enough to eliminate the risk of hearing damage.
- At distances of 3m or further from any balloon size burst, unprotected exposure levels were well below regulatory limits and therefore the risk of hearing damage was small.
- Children's maximum unprotected permissible exposure limit (Lpeak =140dB) was virtually exceeded by all sizes at all exposure distances in all rooms.
- Full research information will be reported in a forthcoming journal article.