

Typhoon Aircrew Hearing:

An Audit into the Prevalence of Noise Induced Hearing Loss (NIHL)



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About Me

- Medical Officer (GP) based at RAF Odiham, CH-47 operations
- MRCGP 2020
- Deployments/Exercises:
 - MPA, Falklands 2020
 - Ex Blue Flag, Israel 2021
 - Op Newcombe, Mali, Apr 2022
- Starting DipAvMed Sep 2022
- Audit conducted with RAF Centre of Aviation Medicine, Henlow with Wg Cdr Green.



Scope

- Issue
- Audit Methods
- Result
- Discussion
- Questions.

Issue

- Typhoon pilots have reported¹ excessive noise levels in the Typhoon cockpit:
 - a. Aerodynamic / canopy whine. A high-pitched whining / buzzing sound occurring in sporadically in Tranche 3 aircraft
 - b. Cautions and warnings. Excessively loud audio cautions
 - c. Communication systems problems. Poor volume and loud static from the radio systems
 - d. General background. Environmental conditioning system and other sounds.

¹ Source Defence Air Safety Occurrence Reports: (DASOR): 17\9273; 18\11741; 21\2825; 21\2846; 21\2850; 21\3961; 21\5314; 21\5377; 21\7235; 22\1700.

Issue

- *“several years of Typhoon flying is believed to significantly contribute to Noise Induced Hearing Loss (NIHL).”¹*

¹ Source DASOR: 21/2825.

Helmet Systems

- Mk 4



- Mk 10



- HMSS



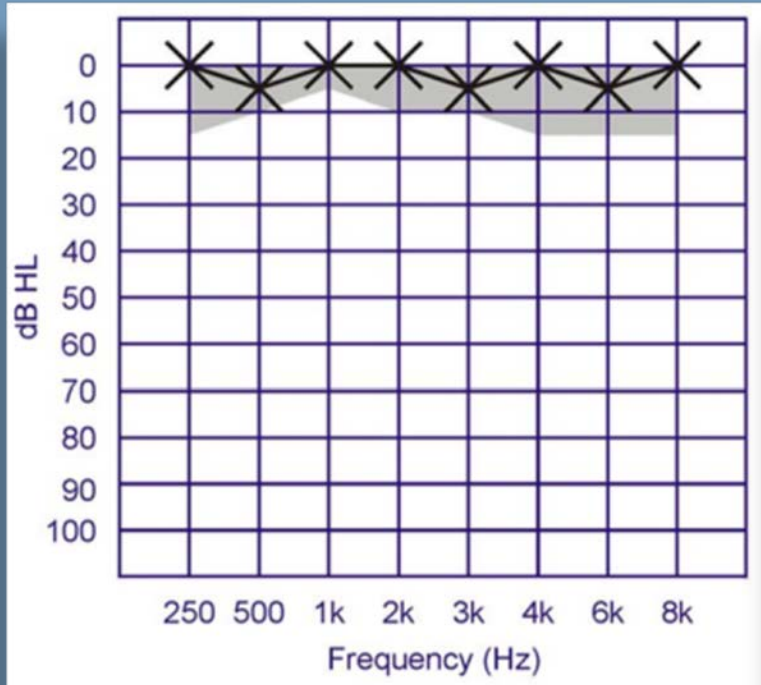
MOD Audiometric Standards

- Audiometric standards. There are five grades of hearing acuity: 1, 2, 3, 4 and 8, described in the following table:

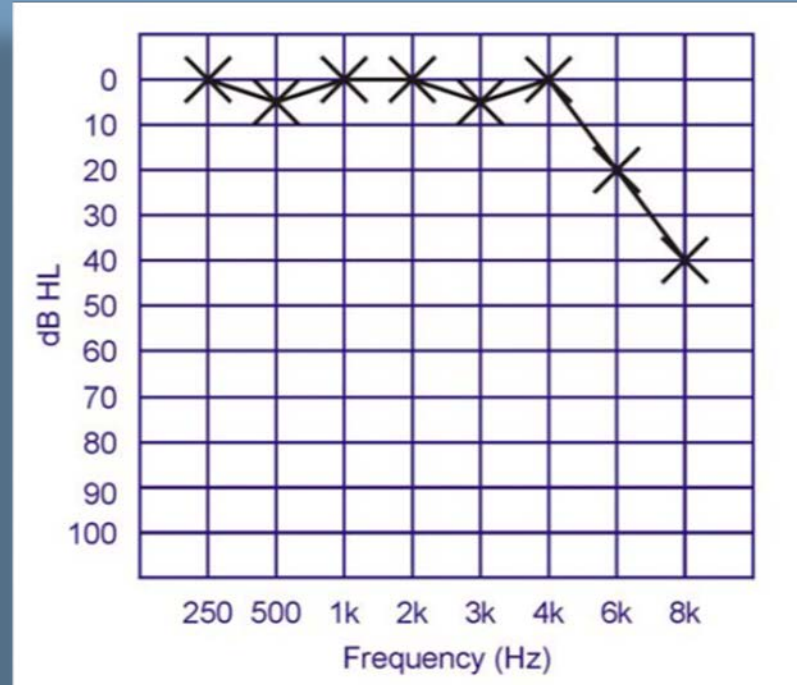
Grades	Sum of hearing level at low frequencies in dB	Sum of hearing level at high frequencies in dB	General description
1	Not more than 45. (RN only: No single level to be more than 20dB)	Not more than 45. (RN only: Level not to be more than 30 dB at 6 kHz or 20 dB at any other frequency)	Good hearing
2	Not more than 84	Not more than 123	Acceptable hearing
3	Not more than 150	Not more than 210	Impaired hearing.
4	More than 150	More than 210	Poor hearing where continuing employment is subject to specialist assessment.
8	More than 150	More than 210	Poor hearing that has been assessed as being incompatible with continued service.

- During service any change in the H degree, other than a fall from H1 to H2, must be referred for an ENT/ Occupational medicine opinion.

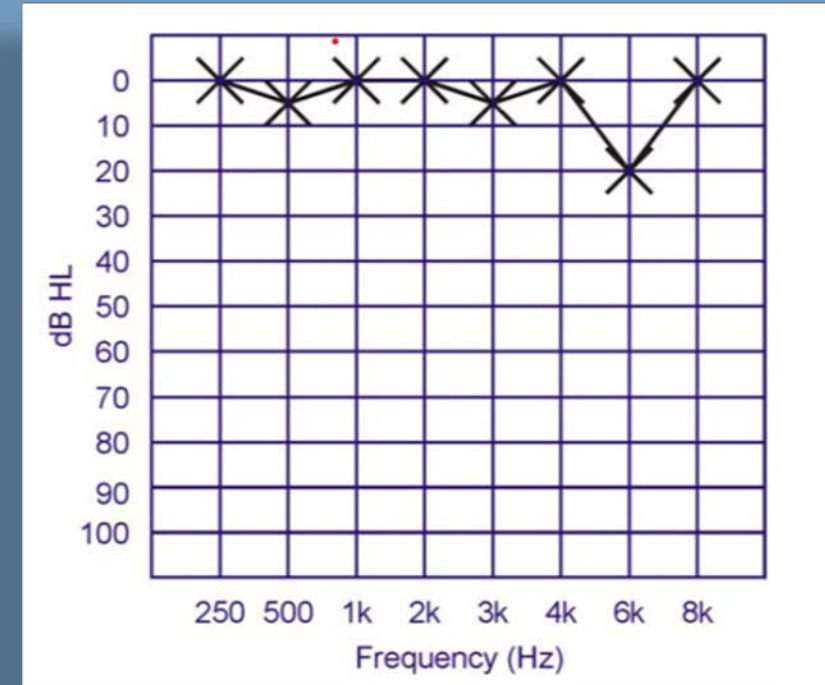
Normal



AAHL



NIHL



Taken from JSP 950 Part 1 Lft 6-4-2(V1.1 Sep 15)

NIHL Diagnosis

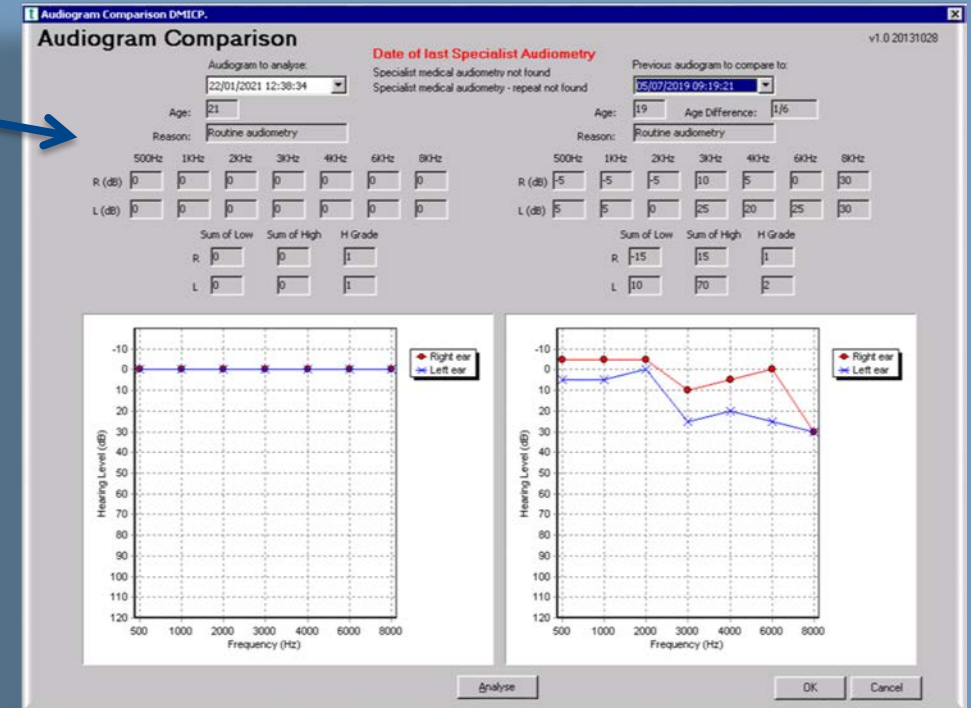
- A diagnosis of NIHL has 3 requirements, which must be satisfied:
 1. A history of exposure to loud (> 85 dB(A)) noise for a significant period
 2. A high frequency (3, 4, or 6 kHz) hearing impairment
 3. The presence of a notch or bulge in the audiogram, maximum depth is at 4 or 6 kHz.

Method

- Audit of Typhoon pilot hearing records to determine the prevalence of hearing changes in the Typhoon Force pilot population
- 177 aircrew included in the search
- RAF Lossiemouth and RAF Coningsby.



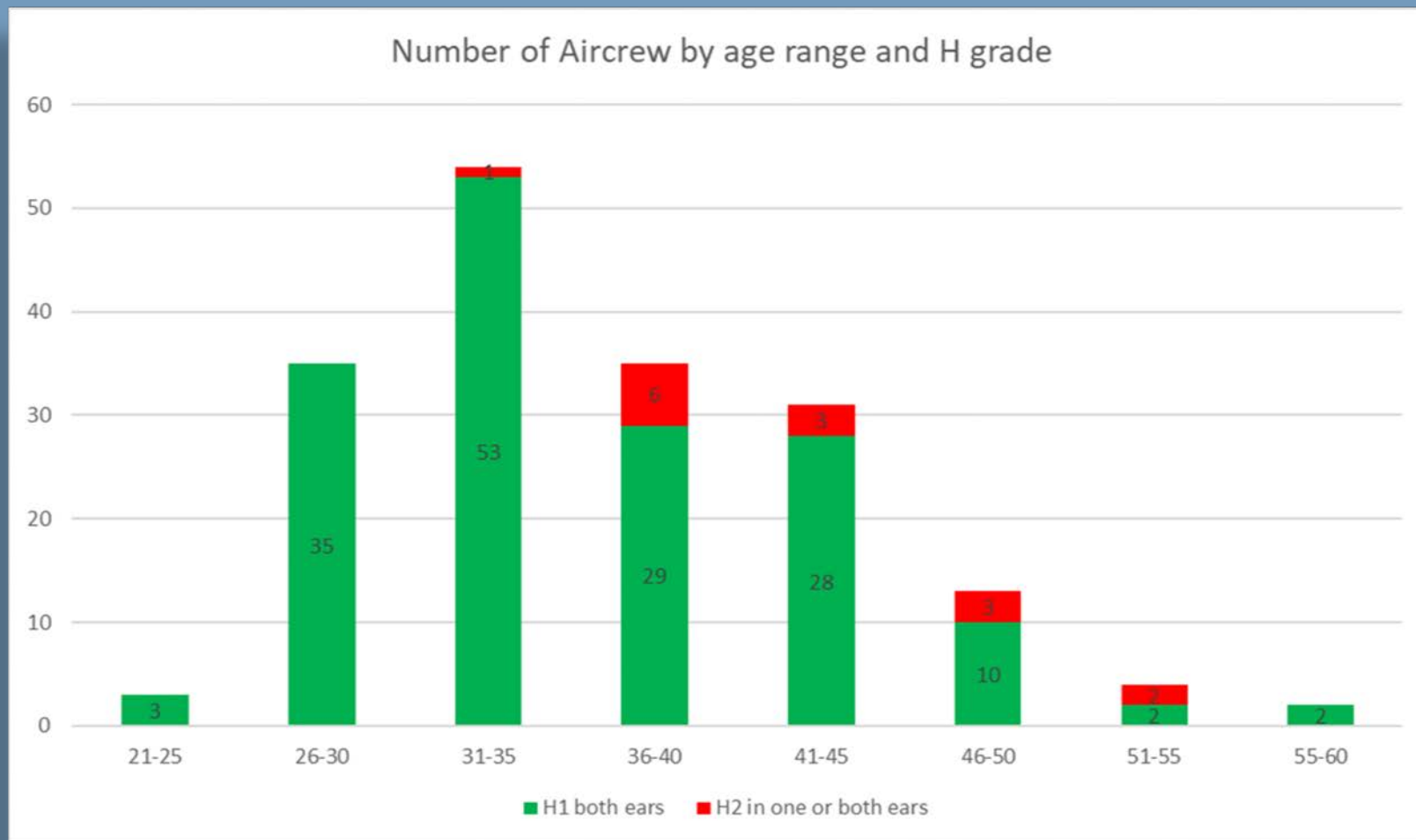
Method



Results

- 177 aircrew
- Mean age of 37
- 162 (91.5%) retain hearing at H1 H1
- 15 (8.5%) have hearing at H2 in one or both ears
- None have hearing at H3 or below.

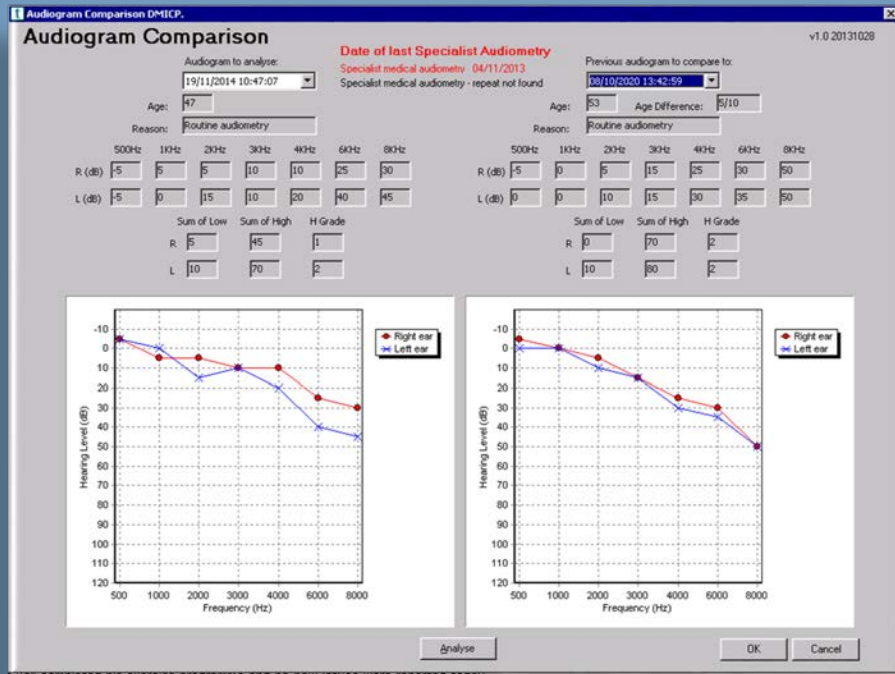
Results



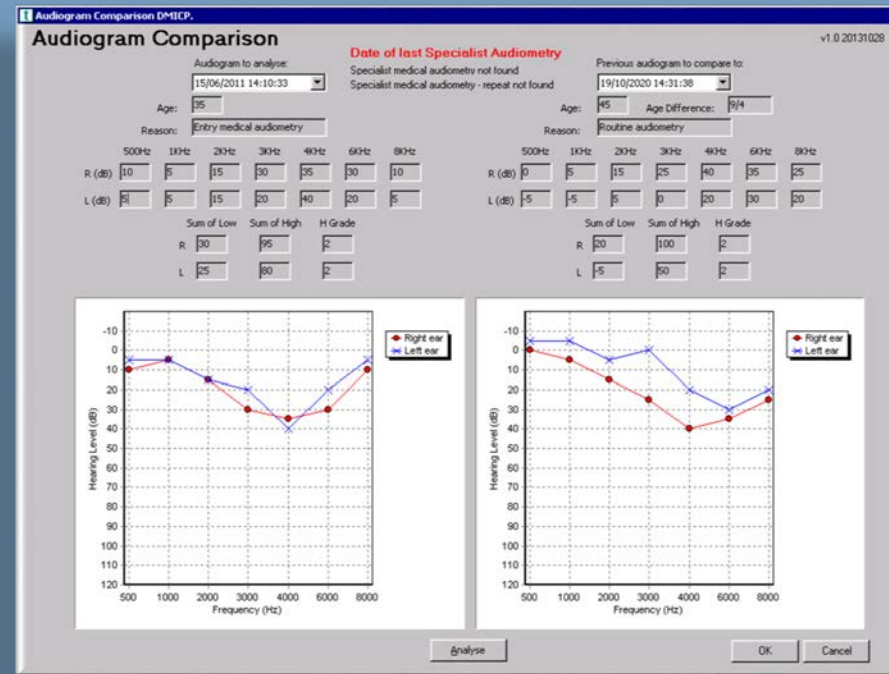
Graph 1. Hearing status of Typhoon pilots shown by age.

NIHL Prevalence

- 2 (1%) have a confirmed diagnosis of NIHL from ENT consultant
- Both prior to Typhoon service (Rotary, Hawk, Tornado, Harrier)

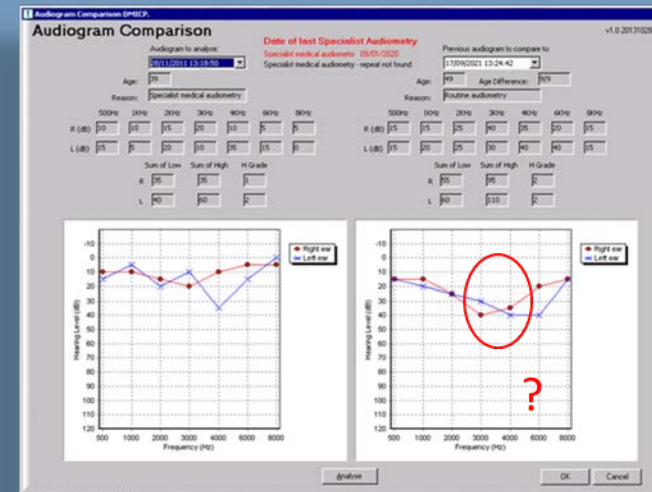
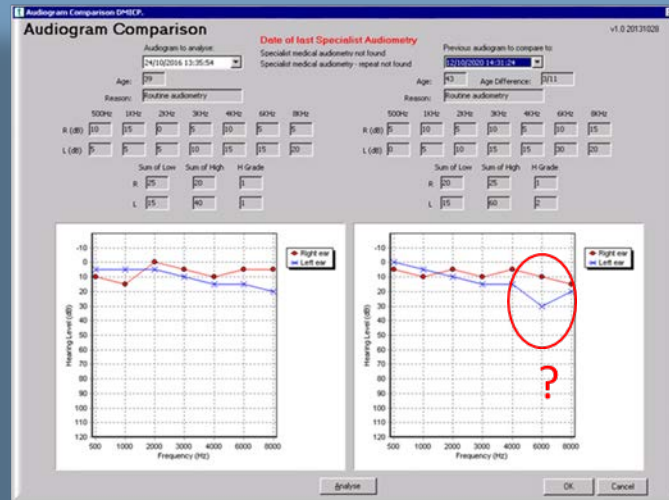
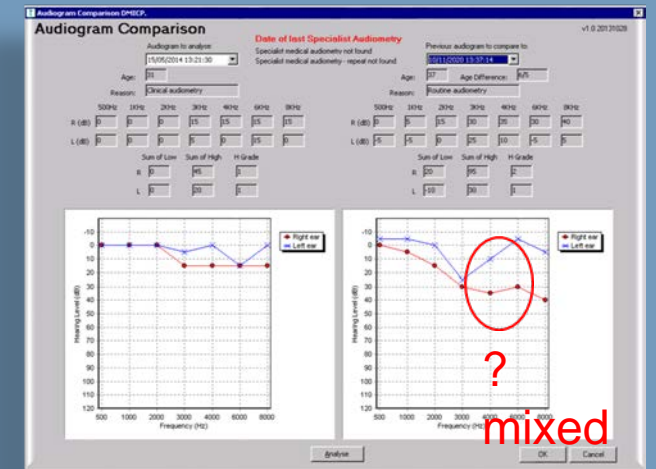
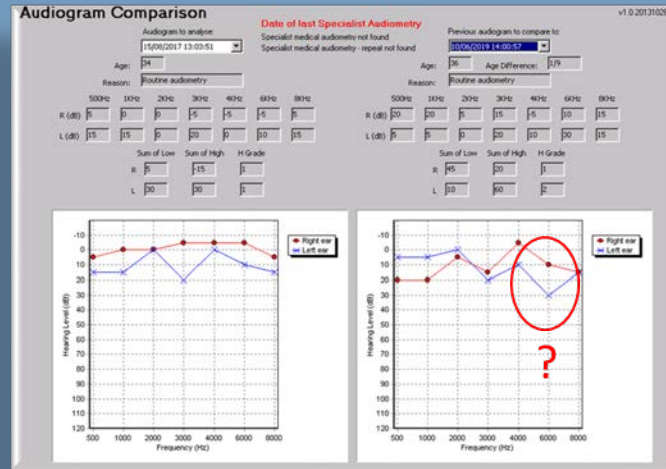
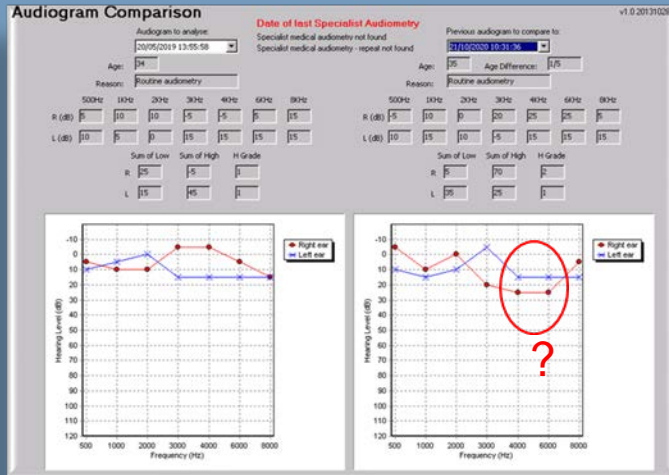


Age 54, mixed AAHL and NIHL diagnosed 2016



Age 46, clearer NIHL diagnosed 2009 but stable since

Evidence in 13 Others?



Limitations

- Complex patient service history, ageing
- Some aircrew absent due to career reasons
- Noise in personal time (motorbikes, shooting, music)
- Reliability of audiometry
- Lack of comparison population – control group needed/normative data.

Discussion

- From the evidence available there does not appear to be any significant hearing reduction in the cohort
- In the Typhoon Force, the prevalence of hearing loss is low and likely to be similar to other age matched individuals.

Discussion

- Notwithstanding these findings, the reported ringing in ears and discomfort experienced by the Typhoon pilots in regard to noise emanating from the canopy bow merits further engineering investigation
- Consideration is being given to the use of VAMP-31 on Typhoon with Mk4 and Mk10 helmets
- ANR on HMSS Mk 2?

With Thanks To

- DACOS Av Med Gp Capt Harper
- OC APS Wg Cdr Green
- CFMO Wg Cdr Rutland
- SMO CON Wg Cdr Leaming
- SMO LOS Wg Cdr Shepherd
- 11 Sqn, Sqn Ldr Thomas (photo support)



References

- File reference: 20210630-NIHL audit Typhoon
- DASORs 17\9273; 18\11741; 21\2825; 21\2846; 21\2850; 21\3961; 21\5314; 21\5377; 21\7235; 22\1700
- JSP 950 Part 1 Lft 6-4-2(V1.1 Sep 15)ASSESSING AUDIOGRAMS -GUIDANCE FOR MEDICAL STAFF
- JSP 950 Annex D to Leaflet 6-7-7 (v2.1 Dec 21).

Questions



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