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BRITISH SOCIETY OF AUDIOLOGY EDUCATION COMMITTEE

GUIDELINES ON THE TRAINING OF INDUSTRIAL AUDIOMETRICIANS

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1. Introduction and Aims

Audiometry is often carried out on industrial workers and others exposed to noise. Such tests do not normally include bone-conduction or masking, and are used to identify those subjects whose hearing is beyond normal limits and may have been affected by noise exposure (see Health and Safety Executive, HSE, 2005 for details of required tests and interpretation of results). Testers in these situations, often referred to as Industrial Audiometricians, do not usually hold a formal qualification in audiology. This document outlines the minimum training recommended for Industrial Audiometricians, and can be used as a guide by training providers. Anyone satisfactorily completing a BSA accredited course in Industrial Audiometry may be awarded a BSA Certificate.

Further specific training in industrial audiometry is not normally required for those who already hold a suitable qualification in audiology, including:

- BAAT pts I & II
- BSc Audiology
- MSc Audiology
- HAC Registration

All those undertaking industrial audiometry must be familiar with the HSE document mentioned above.

2. Role of Industrial Audiometricians

Industrial Audiometricians are required to:

- Undertake a brief subject interview and/or administer a questionnaire regarding otological and noise history
- Perform otoscopy and pure-tone a-c threshold audiometry without masking, both in accordance with BSA recommended procedures. Audiometry may be manual or automated
- Interpret results and classify them in accordance with HSE guidelines

- Relay information to subjects and, with consent, to the employer or other person with overall responsibility for that particular hearing test program.
- Make appropriate 3rd party referrals

3.1 Training

Candidates need to have knowledge and skills in the following areas:

- Communication needs of hearing impaired people
- Anatomy and physiology of the outer, middle and inner ear, with particular reference to the effects of excessive sound on these structures
- Hygiene and disinfection
- Safe technique for otoscopy
- Identification of the structures of the outer ear and eardrum
- Contraindications to audiometry
- Manual and automated audiometry, including Bekesy
- Referral criteria and process
- Third party insurance

Learning Outcomes

On successful completion of training candidates will be able to:

- Give clear instructions to patients (including those with hearing loss)
- Examine the outer ear without an otoscope
- Perform thorough and safe otoscopy on adults
- Recognise abnormal conditions and refer accordingly
- Perform manual a-c audiometry
- Perform automated a-c audiometry
- Interpret the audiogram and ensure appropriate advice is given
- Maintain accurate subject records
- Apply reasonable standards of quality control in the gathering and use of results

It is also recommended that Industrial Audiometricians undergo refresher training or competency review every three years.

3.2 Training Syllabus

The training should be practical and include extensive 'hands-on' experience of audiometry, ear examination and appropriate analysis of audiograms, under the supervision of qualified, experienced tutors.

The following syllabus and duration of its components represent the minimum training requirements for qualification as an Industrial Audiometrician. Theoretical items may be interspersed with practical work.

Basic Acoustics (40 minutes)

Concepts of sound pressure level & frequency; loudness & pitch. Nature of dB SPL and dB(A) scales. Use of a simple sound level meter. Introduction to

audiogram format & what it shows. Concept of screening and diagnostic audiometry.

The Ear and Threshold of Hearing (1 hour)

Basic anatomy of the ear. Physiology of the hearing process. Statistical definition of normal hearing. Types and features of hearing loss including conductive, sensorineural and mixed. Degrees of loss. Non-organic hearing loss.

Noise-Induced Hearing Loss and Social Handicap (1 hour)

Pathology of Noise-Induced Hearing Loss (NIHL), temporary and persistent hearing loss and tinnitus. Audiometric characteristics of NIHL, presbycusis and other common high frequency losses.

Risks from occupational, non-occupational and gunfire noise. Importance of inter-subject variability. Peak sound pressure, equivalent continuous noise level and equivalent personal daily exposure. Recommended exposure limits for continuous and impulse noises.

Effects of NIHL on speech discrimination. Disability, handicap and social consequences associated with NIHL

Personal Hearing Protection (1 hour)

Types of protector and their relative effectiveness for different situations. Importance of fit and of full-time usage. Hygiene and care of protectors. Comfort issues and compatibility with other protective devices.

The role of otoscopy to check for abnormalities in the ear canal which could affect hearing protection use.

Monitoring Audiometry (1 hour 20 minutes)

Environmental conditions, ISO/IEC standards, sound-attenuating booths. Effects of background noise, visual cues and other distractions.

Objectives of monitoring audiometry. Factors affecting accuracy of audiometry. Test-retest variability.

Care and preparation of subjects including administration of questionnaire.

Otoscopy to check outer ear and ear canal, in accordance with BSA recommended procedures. Instructions to subject, fitting of earphones and monitoring of subjects during tests.

Manual and automated audiometers. Subjective and objective calibration requirements and procedures. Care and maintenance of equipment and identification of common faults.

Methods of Air-Conduction Screening Audiometry without Masking (1 hour 30 minutes)

BSA procedure for manual audiometry as required by the current HSE guidelines. Automated audiometry methods including Bekesy.

Effects of tinnitus, indications of non-organic hearing loss, acceptability of performance and requirement to repeat for practical or health reasons.

Data storage, handling and protection.

Audiogram Categorisation (2 hours)

Review of manual and automatic audiogram formats and symbols. Assessing the validity of audiograms. Categorisation of results according to HSE guidelines, the effects of age and gender. Difficulties arising from borderline test results.

Organisation of Audiometric Programme (30 minutes)

Role of Industrial Audiometricians. Confidentiality and legal aspects, noise at work regulations. Correctly reporting the findings verbally and in writing. Anonymous reporting of results where consent for disclosure has not been given. Referral procedures. Role of baseline audiograms. Importance of recent noise exposure and temporary threshold shift (TTS). Educational benefits of audiometry in a hearing conservation programme.

Practical

Otoscopy, manual and automated audiometry (5 hours)

4. Examinations

Examinations will accompany a training course to qualify an Industrial Audiometrician within a BSA accredited course. Course examinations would normally consist of at least these minimum components:

- i) A 30 to 40 -minute written paper consisting of 10-20 questions requiring short answers, or a multiple-choice question format, to briefly test all aspects of the course material.
- ii) A practical examination lasting 15 to 30 minutes, in which candidates are required to demonstrate proficiency in performing otoscopy, and audiometry.
- iii) A short oral examination of the candidate's understanding of audiogram interpretation, audiometric procedure and reporting.

It is anticipated that a course of 2 days in the classroom, plus homework or distance learning, would be the minimum required to cover the syllabus. Training may be spread over a longer period and additional related topics covered relevant to specific workplace settings.

A BSA Certificate in Industrial Audiometry will be awarded to students completing an accredited course and the BSA will maintain a register of certificates awarded.

5. Course accreditation & moderation

Applications from course providers for accreditation should be sent to the BSA Education Committee, who are also able to advise on content etc (see BSA guidance on applying for course accreditation).

The BSA will not bear the financial burden of setting up or running training schemes directly. A nominal charge (currently £30 per student) is payable to BSA to cover the cost of accreditation and moderation.

References

Health & Safety Executive “*Controlling noise at work. The Control of Noise at Work Regulations 2005 – Guidance on Regulations*” (2005)

British Society of Audiology “*Recommended Minimum Procedure for the Cleaning of Specula etc. and associated Infection Control*” (1998), *British Journal of Audiology* **32**, 221

British Society of Audiology “*Guidelines on Minimum Training Standards for Otoscopy and Impression Taking*” (2004), www.thebsa.org.uk

British Society of Audiology “*Recommended Procedure for pure tone air and bone conduction threshold audiometry with and without the use of masking and determination of uncomfortable loudness levels*” (2004), www.thebsa.org.uk

British Society of Audiology “*How to apply for course accreditation*” (2007), www.thebsa.org.uk