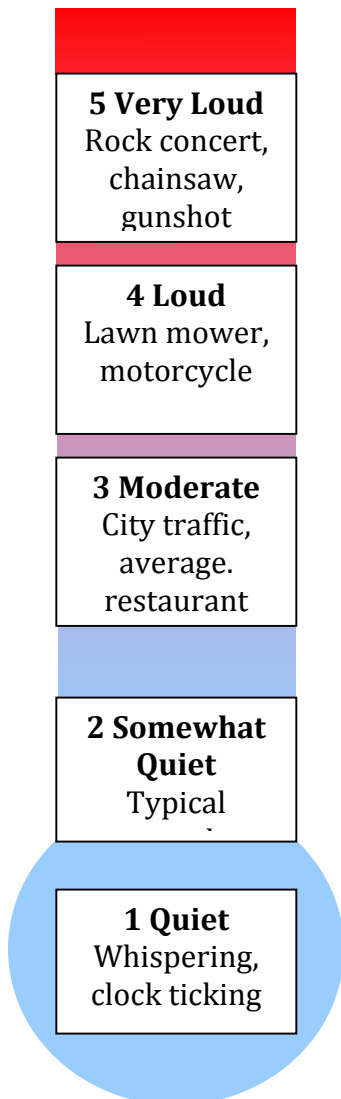


Instructions



The purpose of the noise history is to assess your exposure to various noise sources. Simply mark with a pen the time you spent in each environment. You may be exposed to two or more sources at once so be sure to mark all sources for the time frame. *For example, you may ride your bicycle and listen to your personal listening device at the same time.* If you used a specific loud object or tool please list that object in the loud objects section and mark the duration of use. An additional area to write in other tasks that do not fit the listed activities is provided. In addition to marking your duration, please also indicate the loudness level of the environment.

Estimate the loudness where 1 = quiet, like an empty room; 2 = somewhat quiet, can hear clearly over sound without need for people to raise voice; 3 = moderate; sound of activity is loud enough to be distracting and difficult to understand others without raising voice; 4 = loud; can barely hear others even with voice raised; 5 = very loud; at the point where cannot hear others at all and may start to be painful (see figure to left). This can be done by filling in the boxes at the bottom of the card or by writing the number in the corresponding box.

LITERATURE CITED

- Abdala C and Dhar S. 2010. Distortion product otoacoustic emission phase and component analysis in human newborns. *J. Acoust Soc Am.* 125(3)1584-1594.
- Agrawal Y, Platz EA, Niparko JK. 2009. Risk factors for hearing loss in US adults: data from the national health and nutrition examination survey, 1999 to 2002. *Otol & Neuro* 30:139-145.
- Aladag I, Eyibilen A, Guven M, Atis O, Erkokmaz U. 2009. Role of oxidative stress in hearing impairment in patients with type two diabetes mellitus. *J Laryngol Otol* 9:1-7.
- Al-azzawi LM, Mirza KB. 2004. The usefulness of the brainstem auditory evoked potential in the early diagnosis of cranial nerve neuropathy associated with diabetes mellitus. *Electromyogr Clin Neurophysiol.* 44:387-394.
- American Speech-Language-Hearing Association. 1990. Guidelines for screening hearing impairment and middle-ear disorders. *Asha* 32(S2):17-24.
- Attias J, Furst M, Furman V, Reshef I, Horowitz G., Bresloff I. 1995. Noise-induced otoacoustic emission loss with or without hearing loss. *Ear Hear.* 16:612-618.
- Austin FD, Konrad-Martin D, Griest S, McMillam GP, McDermott D, Fausti S., 2009. Diabetes-related changes in hearing. *Laryngoscope*, 119, 1788-1796.
- Axellsson A and Fargerber SE. 1968. Auditory function in diabetics. *Acta Otolaryng.* 66:49-64.
- Bainbridge, KE, Hoffman, HJ, Cowie, CC. 2008. Diabetes and hearing impairment in the united states: audiometric evidence from the national health and nutrition examination survey, 1999 to 2004, *Annals of Internal Medicine* 149 (1): 1-10.
- Bayazit Y, Yilma M, Kepekci Y, Mumbuc S, Kanlikama M. 2000. Use of the auditory brainstem response testing in the clinical evaluation of the patients with diabetes mellitus. *J. Neuro Sci.* 181:29-32.
- Berlin, C.I., Hood, L.J., and Wen, H. et al. 1993. Contralateral suppression of non-linear click-evoked otoacoustic emissions. *Hear Res.* 71:1-11.
- Berlin CI, Hood LJ, Hurley AE, Wen H, Kemp DT. 1995. Binaural noise suppresses linear click evoked otoacoustic emissions more than ipsilateral or contralateral noise. *Hear Res.* 87:96-103.

- Biassoni EC, Serra MR, Richter U, etc. 2005. Recreational noise exposure and its effects on the hearing of adolescents. Part II: development of hearing disorders. *Int J. Audio.* 44:74-85.
- Boettcher, F.A. (2002). Susceptibility to acoustic trauma in young and aged gerbils. *J. Acous Soc Am.* 112(6):2948-2955.
- Boul A and Lineton. 2010. Spontaneous otoacoustic emissions measured using an open ear-canal recording technique. *Hear Res.* Epub ahead.
- Burkard RF, Eggermont JJ, Don M. 2007. Auditory evoked potentials: basic principles and clinical application. Lippincott Williams and Wilkins: Baltimore.
- Choi SW, Benzie IF, Ma SW, Strain JJ, Hannigan BM. 2008. Acute hyperglycemia and oxidative stress: direct cause and effect? *Free Radic Biol Med.* 44:1217-1231.
- Clark WW 1991. Noise exposure from leisure activities: a review. *J. Acous Soc Am* 90(1):175-181.
- Cody AR and Johnstone BM. 1981. Acoustic trauma: single neuron basis for the "half octave shift". *J. Acous Soc Am.* 70(3):707-711.
- Collet L, Kemp DT, Veuillet E, Duclaux R, Moulin A, Morgon A. Effect of contralateral auditory stimuli on active cochlear micro-mechanical properties in human subjects. *Hear Res.* 43:251-262.
- Cullen JR and Cinnamond MJ. 1993. Hearing loss in diabetes. *J. Laryngol. Otol.* 107:179-182.
- Dalton DS, Cruickshanks KJ, Klein R, Klein BE, Wiley TL. 1998. Association of NIDDM and hearing loss. *Diabetes Care.* 21(9):1540-1544.
- De Leon-Morales LVD, Jauregui-Renaud K, Garay-Sevilla ME, Hernandez-Prado J, Malacara-Hernandez JM. 2005. Auditory impairment in patients with type 2 diabetes mellitus. *Arch. Med. Res.* 36:507-510.
- Dhar S and Abdala C. 2007. A comparative study of distortion product otoacoustic emission fine structure in human newborns and adults with normal hearing. *J. Acoust Soc Am.* 122(4)191-202.
- Dietzel K. 1964. Diabetes und gehr. In *Internazional Symposium ber Diabetes Fragen.* Academie Verlag, Berlin.
- Di Leo MAS, Di Nardo W, Cercone S, Ciervo A., Lo Monaco M, Greco AV, Paludetti G, Ghirlanda G. 1997. Cochlear dysfunction in IDDM patients with subclinical peripheral neuropathy. *Diabetes Care.* 20:818-822.

- Di Nardo W, Ghirlanda G, Paludetti G, Cercone S, Saponara C, Del Ninno M, Di Girolamo S, Magnani P, Di Leo MAS. 1999. Distortion-product otoacoustic emissions and selective sensorineural hearing loss in IDDM. *Diabetes Care*. 21: 1317-1321.
- Don M, Ponton CW, Eggermont JJ, Masuda A. 1993. Gender differences in cochlear response time: an explanation for gender amplitude differences in the unmasked auditory brainstem response. *J. Acous Soc Am*. 94(4):135-148.
- Donald MW, Bird CE, Lawson JS et al. 1981. Delayed auditory brainstem responses in diabetes mellitus. *J. Neurol Neurosurg Psychiatry*. 44(7):641-646.
- Durmus C, Yetiser S, Durmus O. 2004. Auditory brainstem evoked responses in insulin-dependent (ID) and non-insulin dependent (NID) diabetic subjects with normal hearing. *Int J. Audiol*. 43:29-33.
- Edgar TO. 1915. Klinische beitrage zur Feage de akuten toxischen des Gehororganes bei Diabetes Mellitus mit besonderer Berucksichtigung der Erkankungen des inneren Ohres. *M Schr. Ohrenheilk*. 49:225-260.
- Edwards RM, Squires NK, Buchwald JS, Tanguay PE. 1983. Central transmission time differences in the auditory brainstem response as a function of sex, age, and ear of stimulation. *Int J. Neurosci*. 18(1-2):59-66.
- El-Tabal ES, Mackenzie I, Surenthiran SS, Abouaasha F, Boulton AJM. 2003. The relationship of hearing loss to age, duration, degree of control, and complications in diabetic patients. *Audiol Med*. 1:242-246.
- Elamin A, Fadlallah M, Tuvemo T. 2005. Hearing loss in children with type 1 diabetes. *Indian Ped*. 42:15-21.
- Fausti SA, Erickson DA, Frey RH, Rappaport BZ, Schechter MA. 1981. The effects of noise upon human hearing sensitivity from 8000 to 20000 Hz. *J. Acoust Soc Am*. 69(5):1343-13473.
- Fausti SA, Henry JA, Schaffer HI, Olson DJ, Frequ RH, Bagby GC Jr. 1993. High-frequency monitoring for early detection of cisplatin ototoxicity. *Arch Otolaryngol Head Neck Surg*. 119(6):661-666.
- Ferrer JP, Biurrun O, Lorente J., Conget JI, de Espana R, Esmatjes E, Gomis R. 1991. Auditory function in young patients with type 1 diabetes mellitus. *Diabetes Res Clin Pract*. 11(1):17-22.
- Folsom, R.C. and Owsley, R.M. (1987). N1 action potentials in humans. Influence of simultaneous contralateral stimulation. *Acta Oto-Laryngologica* 103, 262-265.

- Fowler PD and Jones NS. 1999. Diabetes and hearing loss. *Clin. Otolaryngol.* 24:5-8.
- Fraenkel, R. Freeman, S., and Sohmer, H. 2003. Susceptibility of young adult and old rats to noise-induced hearing loss. *Audio Neuro.* 8:129-139.
- Frisina ST, Mapes F, Kim S, Frisina DF, Frisina RD. 2006. Characterization of hearing loss in aged type II diabetics. *Hear Res.* 211:103-113.
- Fukushima H, Cureoglu S, Schachern PA, Kusunoki T, Oktay MF, Fukushima N, Paparella MM, Harada T. 2005. Cochlear changes in patients with type 1 diabetes mellitus. *Otol. HNS.* 133:100-106.
- Fukushima H, Cureoglu S, Schachern PA, Paparella MM, Harada TH, Oktay MF. 2006. Effects of type 2 diabetes mellitus on cochlear structure in humans. *Arch. Otol. HNS.* 132:934-938.
- Gates GA, Cobb JL, D'Agostino RB, Wolf PA. 1993. The relation of hearing in the elderly to the presence of cardiovascular disease and cardiovascular risk factors. *Arch Otolaryngol Head Neck Surg.* 19: 156-161.
- Gates, G.A. et al. 2000. Longitudinal threshold changes in older men with audiometric notches. *Hear Res.* 141:220-228.
- Gerling IJ and Finitzo-Herber T. 1983. Auditory brainstem response with high stimulus rates in normal and patient populations. *Acta Otol Rhinol Laryngol.* 92:119-124.
- Gibbin KP and Davis CG. 1981. A hearing survey in diabetes mellitus. *Clin Otolaryng.* 6:245-350.
- Glorig, A. and Nixon, J. 1960. Distribution of hearing loss in various populations. *Ann Otol Rhinol. Laryngol.* 69:497-516.
- Goforth L, Hood LJ, Berlin CI. 1997. Efferent suppression of transient-evoked otoacoustic emissions in human infants. *ARO Abstracts* , 20:166.
- Gold, T. 1948. Hearing. I. The Cochlea as a Frequency Analyzer. *Proceed Royal Soc Bio Sci.* 135(881):462-491.
- Goldscher M, Pratt H, Hassan A. et al. 1986. Auditory brainstem-evoked potentials in insulin-dependent diabetics with and without peripheral neuropathy. *Acta Otolaryngol.* 102:204-208.
- Goodarzi MT, Varmaziar L, Navidi AA, Parivar K. 2008. Study of oxidative stress in type 2 diabetic patients and its relationship with glycated hemoglobin. *Saudi Med J* 29:503-506.

- Guinan JJ. 2006. Olivocochlear efferents: anatomy, physiology, function, and the measurement of efferent effects in humans. *Ear Hear.* 27(6):589-607.
- Helfer TM, Canham-Chervak M, Canada S, Mitchener TA. 2010. Epidemiology of hearing impairment and noise-induced hearing injury among US military personnel, 2003-2005. *Am J Prev Med.* 38(1S):S71-S77.
- Henderson D, Bielefeld EC, Harris KC, Hu BH. 2006. The role of oxidative stress in noise-induced hearing loss. *Ear Hear.* 27:1-19.
- Henderson, D. et al. 1993. Individual susceptibility to noise-induced hearing loss: an old topic revisited. *Ear Hear.* 14(3):152-168.
- Henry, K.R. 1984. Cochlear damage resulting from exposure to four different octave bands of noise at three ages. *Behav Neuro.* 98:107-117.
- Hetu, R. et al. 1977. TTS at 4kHz among school-age children following continuous exposure to broad band noise. *J. Acoust Soc Am.* 62:S96.
- Hochhauser CJ, Rapaport R, Shemesh E, Schmeidler J, Chemtob CM. 2008. Age at diagnosis, gender, and metabolic control in children with type-1 diabetes. *Ped Diabetes.* 9(4:1)303-307.
- Hodgetts WE, Rieger JM, Szarko RA. 2007. The effects of listening environment and earphone style on preferred listening levels of normal hearing adults using an mp3 player. *Ear Hear.* 28(3):290-297.
- Hodgson MJ, Talbott E, Helmkamp JC, Kuller LH. 1987. Diabetes, noise exposure, and hearing loss. *J Occup Med.* 29 (7):576-579.
- Holmes AE, Widen SE, Erlandsson S, Carver CL, and White LL. 2007. Perceived hearing status and attitudes toward noise in young adults, *Am J of Audio.* (16): S182-189.
- Hood LJ, Berlin CI, Bordelon J, Rose K. 2003. Patients with auditory neuropathy/dys-synchrony lack efferent suppression of transient evoked otoacoustic emissions. *J. Amer Acad. Audiol.* 14:302-313.
- Hood LJ, Berlin CI, Hurley A, Cecola RP, Bell B. 1996. Contralateral suppression of transient-evoked otoacoustic emissions in humans: Intensity effects. *Hear Res.* 101:113-118.
- Hood LJ, Hurley AE, Goforth L, Bordelon J, Berlin CI. 1997. Aging and efferent suppression of otoacoustic emissions. *ARO Abstr* 20:167.

- Hood LJ, Berlin CI, Goforth-Barter L, Bordelon J, Wen H. Recording and analyzing efferent suppression of transient-evoked otoacoustic emissions. In Berlin CI: *The Efferent Auditory System*. San Diego: Singular Publishing Group, 1999.
- Hughson W and Westlake HD. 1944. Manual for program outline for rehabilitation of aural casualties both military and civilian. *Trans Am Acad Ophthal Oto-lar.*, Supp:3-15.
- Hultcrantz M, Simonoska R, Stendberg AE. 2006. Estrogen and hearing: a summary of recent investigations. *Acta Otolaryngol.* 126(1):10-4.
- Ishii EK, Talbott E, Findlary RC, D'Antonio JA, Kuller LH. 1992. Is NIDDM a risk factor for noise-induced hearing loss in an occupationally noise exposed cohort. *Sci Total Environ.* 127(1-2):155-165.
- Jerger J, Chmiel R, Stach B, Spretnjak M. 1993. Gender affects audiometric shape in prebycusis. *J. Am Acad Audiol.* 4(1):42-49
- Johnson TA. 2010. Cochlear sources of otoacoustic emissions. *J. Am Acad Audiol.* 21(3):176-186.
- Jorado AMD. 1857. Consideration sur un cas du diabete. *Union Med Du Paris.* 11:446
- Jorgensen MB and Buch NH. 1961. Studies on inner ear functions and cranial nerves in diabetics. *Acta Oto.* 53:350-364.
- Jauhiainen, T. et al. 1972. Combined effect of noise and neomycin on the cochlea. *Acta Oto-Laryngol.* 73:387-390.
- Jokitulppo JS, Bjork EA, Akaan-Penttila E. 1997. Estimated leisure noise exposure and hearing symptoms in Finnish teenagers. *Scand Audiol.* 26(4):257-262.
- Jokitulppo J, Toivonen M, Bjork E. 2006. Estimated leisure-time noise exposure, hearing thresholds, and hearing symptoms of Finnish conscripts. *Mil Med.* 171(2):112-116.
- Kakralapudi V, Sawyer R, Saecker H. 2003. The effect of diabetes on sensorineural hearing loss. *Otol. Neurol.* 24:382-386.
- Kalluri R and Shera CA. 2001. Distortion-product source unmixing: a test of the two-mechanism model for DPOAE generation. *J. Acoust Soc Am.* 109:622-637.
- Kemp DT. 1978. Stimulated acoustic emissions from within the human auditory system. *J. Acoust Soc Am.* 64(5):1386-1391.
- Kemp DT and Brown AM. 1983. An integrated view of cochlear mechanical nonlinearities observable from the ear canal. In : de Boer E, Viergever MA, eds.

- Mechanics of Hearing*. The Hague: Martinus Jijhoff. 75-82.
- Kilicdag, E.B et al. 2004. Effects of estrogen therapy on hearing in postmenopausal women. *Am J. Ob Gyn.* 190:77-82.
- Knight KR, Kraemer DF, Winter C, Neuwelt EA. 2007. Early changes in auditory function as a result of platinum chemotherapy: use of extended high-frequency audiometry and evoked distortion product otoacoustic emissions.
- Kokotas H, Petersen MB, Willems PJ. 2007. Mitochondrial deafness. *Clin Genet* 71: 379-391.
- Kummer P, Janssen T, Arnold W. 1998. The level and growth behavior of the 2f1-f2 distortion product otoacoustic emission and its relationship to auditory sensitivity in normal hearing and cochlear hearing loss. *J. Acoust Soc Am.* 103:3431-3444.
- Kujawa SG, Liberman MC. 2006. Acceleration of age-related hearing loss by early noise exposure: evidence of a misspent youth. *J. Neuro.* 26(7):2115-2123.
- Kurien M, Thomas K, Bhanu TS. 1989. Hearing thresholds in patients with diabetes mellitus. *J. Lar Otol.* 103:164-168.
- Lees RM, Roberts JH, Wald Z. 1985. Noise induced hearing loss and leisure activities of young people: A pilot study. *Canadian J. Public Health.* 76:171-173.
- Lisowska G, Namyslowski G, Morawski K, Stojek K. 2001. Cochlear dysfunction and diabetic microangiopathy, *Scand Audiol.* 30: Suppl 52:199-203.
- Liu F, Xia M, Xu A. 2008. Expression of VEGF, iNOS, eNOS increased in cochlea of diabetic rat. *Acta Otolaryngol.* 128:1178-1186.
- Long GR, Talmadge CL, Lee J. 2008. Measuring DPOAEs using continuously sweeping primaries. *J. Acoust Soc Amer.* 124:1613-1626.
- Lucertini M, Moleti A, Sisto R. 2002. On the detection of early cochlear damage by otoacoustic emissions analysis. *J. Acoust. Soc. Am.* 111:972-978.
- Maassen M, Babisch W, Bachmann KD, Ising H, Lehnert G, Plath P, Plinkert P, Rebentisch E, Schuschke G, Spreng M, Stange G, Struwe V, Zenner HP. 2001. Ear damage caused by leisure noise. *Noise Health.* 4:1-16.
- Maia CAS and de Campos, CAH. 2005. Diabetes Mellitus as etiological factor of hearing loss. *Brz J. Oto.* 71 (2):208-214.
- Mauermann M, Uppenkamp S, van Hengel PWJ, Kollmeier B. 1999. Evidence for the distortion product frequency place as a source of distortion product otoacoustic

- emission (DPOAE) fine structure in humans. II. Fine structure for different shapes of cochlear hearing loss. *J. Acoust Soc Am.* 106:3484-3491.
- McFadden SL, Henselman LW, Zheng XY. 1999. Sex differences in auditory sensitivity of chinchillas before and after exposure to impulse noise. *Ear Hear.* 20(2):164-174.
- McFadden SL, Zheng XY, Ding DL. 2000. Conditioning-induced protection from impulse noise in females and male chinchillas. *J. Acoust Soc Am.* 107(4):2162-2168.
- McFadden D, Martin GK, Stagner BB, Maloney MM. 2009. Sex differences in distortion-product and transient-evoked otoacoustic emissions compared. *J. Acoust Soc Am.* 125(1):239-246.
- McQueen CT, Baxter A, Smith TL, Raynor E, Yoon SM, Prazma J, Pillsbury HC. 1999. Non-insulin dependent diabetic microangiopathy in the inner ear. *J. Laryng. and Otol.* 113:13-18.
- Miller J.M. et al. 1998. Interactive effects of aging with noise induced hearing loss. *Scand Audio Suppl.* 48:53-61.
- Moller AR. 2006. Hearing: Anatomy physiology and disorders of the auditory system. Elsevier: San Diego.
- Moore JK, Simmons DD, and Guan Y. 1999. The human olivocochlear system: organization and development. *Audio Neuro.* 4:311-325.
- Morell RJ, Kim HJ, Hood LJ, Goforth L, Friderici K, Fisher R, Van Camp G, Berlin CI, Oddux C, Ostrer H, Keats B, Friedman TB. 1998. Mutations in the connexin 26 gene (GJB2) among Ashkenazi Jews with nonsyndromic recessive deafness. *New Engl J. Med.* 339:1500-1505.
- Morlet T, Goforth L, Hood LJ, Ferber C, Duclaux R, Berlin CI. 1999. Development of human cochlear active mechanism asymmetry: Involvement of the medial olivocochlear system. *Hear Res.* 134:153-162.
- Moscicki EK, Elkins EF, Baum HM, McNamara PM. 1985. Hearing loss in the elderly: an epidemiological study of Framingham Heart Study Cohort. *Ear Hear.* 6(4):184-190.
- Mostafapour SP, Lahargoue K, Gates GA. 1998. Noise-induced hearing loss in young adults: the role of personal listening devices and other sources of leisure noise. *Laryngoscope* 108: 1832-1839.
- Nakae S and Tachibana M. 1986. The cochlea of the spontaneously diabetic mouse II. Electron microscope observations of non-obese mice. *Ach Otorhinolaryngol.* 243:313-316.

- Namyslowski G, Morawski K, Kossowska I, Lisowska G, Koehler B, Jarosz-Chobot P. 2001. Contralateral suppression of TEOAE in diabetic children. Effects of 1.0 kHz and 2.0 kHz pure tone stimulation-preliminary study. *Scand Audiol.* 30: Suppl 52:126-129.
- Neitzel R, Seixas N, Goldman B, Daniell W. 2004a. *Ann. Occup. Hyg.* 48 (5): 463-473.
- Neitzel R, Seixas N, Olson J, Daniell W, Goldman B. 2004b. Nonoccupational noise: exposure associated with routine activities, *J Acoust. Soc. Am.* 115 (1): 237-245.
- Niedzielska G and Katska E. 1998. ABR disturbances in children with insulin dependent diabetes mellitus. *Int J. Ped Otorhino.* 44:1-4.
- Niskar AS, Kieszak SM, Holmes AE, Esteban E, Rubin C, Brody DJ. 2001. Estimated prevalence of noise-induced hearing threshold shifts among children 6 to 19 years of age: The Third National Health and Nutrition Examination Survey, 1988-1994, United States. *Pediatrics* 108:40-43.
- Ohlemiller KK, Rice MER, Gagnon PM. 2008. Strial microvascular pathology and age-associated endocochlear potential decline in NOD congenic mice. *Hear Res.* 244:85-97.
- Olsen-Widen SE, Erlandsson SI. 2004. Youth attitude towards noise scale (YANS). In: Olsen SE 2004. Psychological aspects of adolescents' perceptions and habits in noisy environments. Licentiate dissertation.
- Osterhammel D and Christau B. 1980. High frequency audiometry and stapedius muscle reflex thresholds in juvenile diabetics. *Scand Audiol.* 9:13-18.
- Ottaviani F, Dozio N, Neglia CB, Riccio S., Scavini M. 2002. Absence of otoacoustic emissions in insulin-dependent diabetic patients: is there evidence for diabetic cochleopathy. *J. Diabetes Comp.* 15(5):338-43.
- Parving A, Elberling C, Balle V, et al. 1990. Hearing disorders in patients with insulin dependent diabetes mellitus. *Audiology.* 29:113-121.
- Polyakov A, Pratt, H., and Shi, Y. 1998. Evidence for efferent effects on early component of the human auditory brain-stem evoked potentials, *Electro and Clin Neuro* 108, 543-553.
- Price, G.R. 1976. Age as a factor in susceptibility to hearing loss: young versus adult ears. *J. Acoust Soc Am.* 60:886-892.

- Pudar G., Vlaski L, Filipovic D, Tanackov I. 2009. Correlation of hearing function findings in patients suffering from diabetes mellitus type 1 in regard to age and gender. *LXII(9-10)*395-401.
- Rabinowitz PM, Wise JP Sr, Mobo BH, Antonucci PG, Powell C, Slade M. 2002. Antioxidant status and hearing function in noise-exposed workers. *Hear Res* 173:164-171.
- Rasmussen GL. 1946. The olivary peduncle and other fiber connections of the superior olivary complex. *J. Comp Neurol.* 84:141-219.
- Raynor EM, Carrasco VN, Prazma J, Pillsbury HC. 1995. An assessment of cochlear hair cell loss in insulin-dependent diabetes mellitus and noise-exposed rats. *Arch Otolaryngol Head Neck Surg.* 121:452-456.
- Reeb-Whitaker CK, Seixas NS, Sheppard L, Neitzel R. 2003. Accuracy of task recall for epidemiological exposure assessment to construction noise. *Occup Environ Med* 61:135-142.
- Ren T, He W, Scott M, Nuttall AL. 2006. Group delay of acoustic emissions in the ear. *J. Neurophysiol.* 96(5)2785-2791.
- Rosen S, Bergman M, Plester D, El-Mofty A, Satti MH. Presbycusis study of a relatively noise-free population in the Sudan. *Ann Otol Rhino Laryngol.* 71:727-743.
- Rosowski JJ. 1991. The effects of external and middle-ear filtering on auditory thresholds and noise-induced hearing loss. *J. Acous Soc Am.* 90(1):124-135.
- SEARCH for Diabetes in Youth Study Group. 2007. Incidence of diabetes in youth in the United States. *J. Am Med Assoc.* 297(24):2716-2724.
- Seixas NS, Kujawa SG, Norton S, Sheppard L, Neitzel R, Slee A. 2004. Predictors of hearing threshold levels and distortion product otoacoustic emissions among noise exposed young adults. *Occup. Environ. Med.* 61:899-907.
- Serra MR, Biassoni EC, Richter U, Minoldo G, Franco G, Abraham S, Carignani JA, Joekes S, Yacci MR. 2005. Recreational noise exposure and its effects on the hearing of adolescents. Part I: An interdisciplinary study, *Int. J. Audio.*, 44: 65-73.
- Shera CA. 2004. Mechanisms of mammalian otoacoustic emissions and their implications for the clinical utility of otoacoustic emissions. *Ear Hear.* 25(2):86-97.
- Shera CA. Are different otoacoustic emissions different? Invited presentation, *American Academy of Audiology Research Conference*, Dallas, 2009.
- Shera CA and Guinan JJ. 1999. Evoked otoacoustic emission arise by two fundamentally

- different mechanisms: a taxonomy for mammalian OAEs. *J. Acoust Soc Am.* 105:782-798.
- Shera CA, Guinan JJ. Mechanisms of mammalian otoacoustic emission. In: Manley GA, Fay RR, Popper AN, eds. *Active Processes and Otoacoustic Emissions*. New York: Springer, 2008:305–342
- Sieger A, Skinner MW, White NH, Spector GJ. 1983. Auditory function in children with diabetes mellitus. *Ann. Otol. Rhinol. Laryngol.* 92:237-241.
- Siervogel, R.M. et al. 1982. Longitudinal study of hearing in children II: cross-sectional studies of noise exposure as measured by dosimetry. *J. Acoust Soc Am.* 71:(2):372-377.
- Sisto R, Chelotti S, Moriconi L, Pellegrini S, Citroni A, Monechi V et al. 2007. Otoacoustic emission sensitivity to low levels of noise-induced hearing loss. *J. Acoust. Soc. Am.* 122:387-401.
- Smith TL, Raynor E, Prazma J, Buenting JE, Pillsbury HC. 1995. Insulin-dependent diabetic microangiopathy in the inner ear. *Laryngoscope* 105:236-240.
- Somma G, Pietroiusti A, Magrini A, Coppeta L, Ancona C, Gardi S, Messina M, Beramaschi A. 2008. Extended high-frequency audiometry and noise induced hearing loss in cement workers. *Am J. Ind Med.* 51(6)452-462.
- Starr A, Picton TW, Sininger Y, Hood LJ, Berlin CI. 1996. Auditory neuropathy. *Brain* 119:741-753.
- Sun, J.C. et al. 1994. Is the older ear more susceptible to noise? *Laryngoscope* 104:1251-1258.
- Tay HL, Ray N, Ohri R, Fronntko NJ. 1995. Diabetes mellitus and hearing loss. *Clin. Otolaryngol.* 20:130-134.
- Taylor IG and Irwin J. 1978. Some audiological aspects of diabetes mellitus. *J. Lar. Rhino. Oto.* 92:99-113.
- Triana RJ, Suits GW, Garrison S, et al. 1991. Inner ear damage secondary to diabetes mellitus. *Arch Surg.* 126:635-640.
- Ugur AK, Kemaloglu YK, Ugur MB, Gunduz B, Saridogan C, Yesilkaya E, Bideci A, Cinaz P, Gosku N. 2009. Otoacoustic emissions and effects of contralateral white noise stimulation on transient evoked otoacoustic emissions in diabetic children. *Int. J. Ped Oto.*, 73, 555-559.
- Vasilyeva ON, Frisina ST, Zhu X, Walton JP, Frisina RD. Interactions of hearing loss

- and diabetes mellitus in the middle age CBA/CaJ mouse model of prebycusis. *Hear Res.* 249:44-53.
- Vaughan N, James K, McDermott D, Griest S, Fausti S. 2005. A five-year prospective study of diabetes and hearing loss in a veteran population. *Oto & Neuro* 27:37-43.
- Velenovsky, D.S. and Glatke, T.J. 2002. Contralateral and binaural suppression of otoacoustic emissions. In M.S. Robinette and T.J. Glatke (Eds.). *Otoacoustic Emissions: Clinical Applications* (pp. 163-189). New York: Thieme.
- Virtaniemi J, Laakso M, Nuutinen J, Karjalainen S, Vartiainen E. 1993. Tympanometry in patients with insulin-dependent diabetes mellitus. *Scand Audiol.* 22:217-222.
- Virtaniemi J, Laakso M, Nuutinen J, Karjalainen S, Vartiainen E. 1994. Acoustic-reflex responses in patients with insulin-dependent diabetes mellitus. *Am. J. Otolaryngol.* 15(2):109-113.
- Virtaniemi J, Kuusisto J, Karjalainen L, Karjalainen S, Laakso M. 1995. Improvement of metabolic control does not normalize auditory brainstem latencies in the subjects with insulin-dependent diabetes mellitus. *Am. J. Otol.* 16(3):172-176.
- Wagner W, Plinkert PK, Vonthein R, Plontke SK. 2008. Fine structure of distortion product otoacoustic emissions: its dependence on age and hearing threshold and clinical implications. *Eur Arch Otorhinolaryngol.* 265(10):1165-72.
- Wagner W, Heppelmann G, Kuehn M, Tisch M, Vonthein R, Zenner HP. 2005. Olivocochlear activity and temporary threshold shift-susceptibility in humans. *Laryngoscope* 115:2021-2028.
- Wang, Y., Hirose, K., and Liberman, M.C. 2002. Dynamics of noise-induced cellular injury and repair in the mouse cochlea. *J. Assoc Res Oto.* 03:248-268.
- Wang S, Schacht J. 1990. Insulin stimulates protein synthesis and phospholipid signaling systems but does not regulate glucose uptake in the inner ear. *Hear Res* 47: 53-62
- Wen H, Berlin C, Hood L, Jackson D, Hurley A. 1993. A program for quantification and analysis of transient evoked otoacoustic emissions. *ARO Abstracts* 16:102.
- Widen SE, Holmes AE, Erlandsson SI. 2006. Reported hearing protection use in young adults from Sweden and the USA: effects of attitude and gender, *Int. J. Audio.* 45 (5): 273-280.
- Williams W. 2005. Noise exposure levels from personal stereo use. *Int. J. Audio.* 44(4):231-236.

- Willott, JF. 2009. Effects of sex, gonadal hormones, and augmented acoustic environments on sensorineural hearing loss and the central auditory system: insights from research on C57BL/6J mice. *Hear Res.* 252(1-2):89-99.
- Wu HP, Cheng TJ, Tan CT, Guo YL, Hsu CJ. 2009. Diabetes impairs recovery from noise-induced temporary hearing loss. *Laryngoscope*: Pre-publication.
- Yates GK and Withnell RH. 1999. The role of intermodulation distortion in transient-evoked otoacoustic emissions. *Hear Res.* 136:49-64.
- Zhu, X. et al. 2007. Auditory efferent feedback system deficits precede age-related hearing loss: Contralateral suppression of otoacoustic emissions in mice. *J. Comp Neuro.* 503:593-604.