

Dose-response relationship for noise induced hearing loss in impulse noise and continuous noise exposure workers by kurtosis adjusting exchange rate

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PURPOSE. To adjust dose-response relationship for high-frequency noise induced hearing loss (HFNIHL) in industrial impulse noise with different exchange rate calculated by kurtosis (ER_k), and to compare the dose-response curve with that in continuous noise.

SUBJECT AND METHOD. Select 32 mechanical workers as impulse noise group and 163 textile workers as continuous noise group. Use SH-126 dosimeter to measure A-weighted sound pressure level of 8 hours ($L_{Aeq,8h}$) during full working duration. The cumulative noise exposure (CNE) was calculated by $L_{Aeq,8h}$ and noise working years. Hearing thresholds were measured by audiometer and adjusted with ISO 1999:1990. Temporal kurtosis were calculated by using METLAB, with a 40 s time window. ER_k was calculated with a semi-experiential formula. Statistical analyses were done using SPSS13.0.

RESULTS. CNE of impulse noise group (103.2(dBA•year)) was significant lower than that of continuous noise group (110.6(dBA•year)) ($P < 0.05$). But prevalence of HFNIHL in both groups was similar (65.6 % vs 64.4 %). Both groups showed a good fitting dose-response curve. But the curve of impulse noise was left shift and sharper slope than the other one. The mean kurtosis was about 3.28 for continuous noise, and 39.96 for impulse noise. After adjust noise dose assessment by ER_k , the dose-response relationship (data and curve) of the tow group were similar.

CONCLUSION. The damage of impulse noise on HFNIHL was more severe than that of continuous noise according to equal energy rule. When adjust ER by temporal kurtosis in impulse noise, the dose-response curve could be similar to that of continuous noise.