Temporal processing disorders associated with styrene exposure

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Due to known neurotoxic styrene properties it is likely that auditory processes/abilities such as auditory temporal processing may be affected. The aim of the study was to assess temporal processing abilities in styrene-exposed workers (67 subjects, mean age 40.3 ± 8.7) versus non exposed control individuals (50 subjects, mean age 36.5 ± 11.2). All participants presented either normal hearing or mild sensorineural hearing loss. The mean styrene exposure in the study group was 37.8 mg/m^3 (S.D. 23.8). The following temporal processing tests were implemented: Gaps-in-noise (GIN), Frequency pattern test (FPT), Duration Pattern Test (DPT) using adequate sensation levels of stimuli.

Audiometric hearing thresholds were significantly worse in styrene-exposed subjects for most of the frequencies tested. Abnormal results for GIN test presented 14 (20.89 %) styrene-exposed individuals vs. 6 (12 %) controls; for FPT - 35 (52.23 %) styrene-exposed workers and 10 (20 %) unexposed controls; for DPT 50 (74.62 %) exposed subjects vs. 13 (26 %) control subjects. Exploring Chi-square test a significant association was found between styrene exposure and test results for FPT and DPT. Analysis of covariance (ANCOVA) was performed to compare the dependent variables between styrene-exposed and non-exposed subjects including age and average hearing thresholds in the analysis. Significant differences between styrene-exposed and non-exposed subjects were found for FPT (p=0.010), and DPT (p=0.000). Age showed to be significantly associated with FPT results only, hearing level with GIN scores only.

We conclude that styrene can be related to central auditory dysfunction characterised by a temporal processing disorders.

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