The compression force on lumbar disc was estimated by using the 3-Dimensional Static Strength Prediction Program (3D-SSPP, Center for Ergonomics, University of Michigan) software system. For each job described, the load on lumbar disc was calculated as the product of the compression force and the duration of lifting in hours. The lifetime cumulative load (Newton*hours, Nh) for each participant was then estimated by summing up the load on lumbar disc for all jobs. Logistic regression was used to assess association between MRI abnormalities and lifetime cumulative lifting load.

**Results**

The subjects were categorised into tertiles by lumbar cumulative lift load, i.e., <4.0 x 10^5, 4.0 x 10^5~<8.9 x 10^5, and >= 8.9 x 10^5 Nh. The prevalence rates of LDD findings varied by disc level. Observed LDD findings increased with cumulative lift load. At the L5-S1 disc level, MRI findings of disc height narrowing (Odds ratio, OR = 4.1, 95% Confidence interval, CI 1.9~10.1), dehydration (OR = 2.5, CI 1.5~4.1), disc protrusion (OR = 2.2, CI 1.2~4.1), annulus tear (OR = 2.2, CI 1.2~4.2), disc bulging (OR = 1.9, CI 1.2~3.1) was found among those with cumulative lifting load of >= 8.9 x 10^5 Nh as compared to those with <4.0 x 10^5 Newton-hours. The tests for trend were significant (p < 0.05) for all abovementioned disc conditions.

**Conclusions**

Our results suggest a dose-response relationship between cumulative lift load and LDD.