Study on early change of lung function among new coal miners

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Objective To study the early effects of lung function in new underground coal miners. **Methods** A group of 287 male miners was selected from new employees at the Xuzhou Mining Group Company for study. 132 male students at a mining technical school were selected as controls. Data collection included: individual demographic parameters, family medical history, occupational history, and smoking history, measurement of dust concentrations in work areas, and lung function tests. This prospective cohort study took place over 3 years during which time total dust and respirable dust concentrations in the new coal miners' work areas were measured twice each month. For both miner and student groups, FVC and FEV_1 were tested initially before dust exposure commenced, and then 15 times over the 3 years. **Results** The average total dust and respirable dust concentrations in the miners' work areas were 23.8 mg/m^3 and 8.9 mg/m^3 respectively, which greatly exceeded national health criteria. During the first year of dust exposure, the miners average FVC (5.19L) was higher than that of the controls (5.19 versus 4.92L; $p<0.01$). During the 2^{nd} and 3^{rd} year the difference in average FVC between miners and control group was not significant (5.14 versus 5.12L; $p>0.05$). Before dust exposure, the miners' FEV_1 was significantly higher than that of the control group (4.48 versus 4.28L). In the miners group, FEV_1 declined rapidly during the first year following dust exposure (from 4.48 to 4.25L), and in the 2nd and the 3rd year the average FEV_1 of the miners was significantly lower than that of controls (4.34 versus 4.56L; $p<0.01$), although there was some fluctuations during the follow-up period. Overall, the average FEV_1 of miners group showed a significant decline during the study. There were significant correlations between FVC or FEV_1 and age, height, weight, and smoking, with the three-year total loss of FVC and FEV_1 in smoking miners (154 ml, 184ml) being greater than those for non-smoking miners (83 ml, 91ml). **Conclusion** The study showed that there are apparent effects of coal dust on lung function in new underground coal miners, with. FEV_1 being more impacted than FVC. The importance of smoking in reducing lung function was apparent and added to the effect of dust exposure in reducing lung function.

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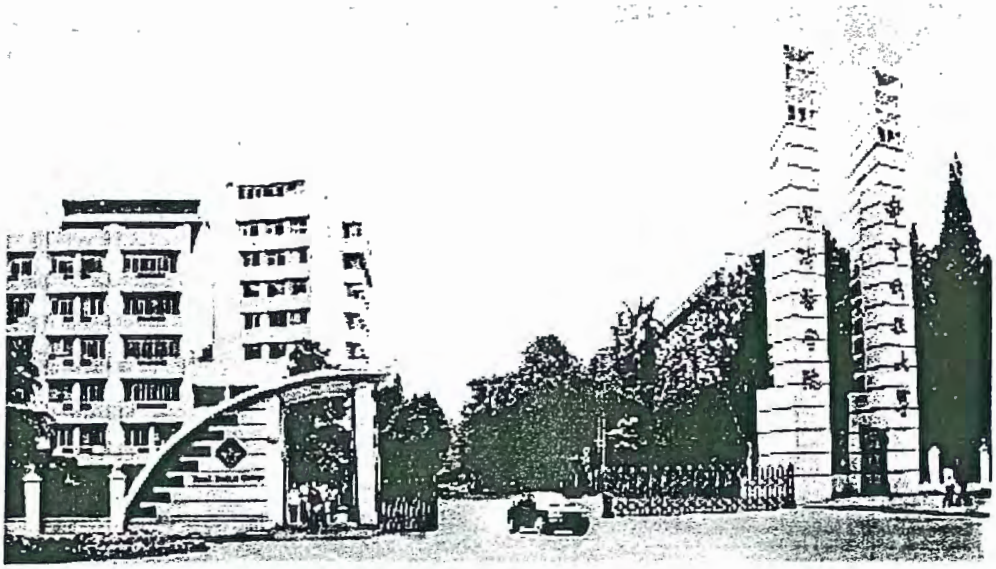

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