

## **FRENCH TALC PNEUMOCONIOSIS**

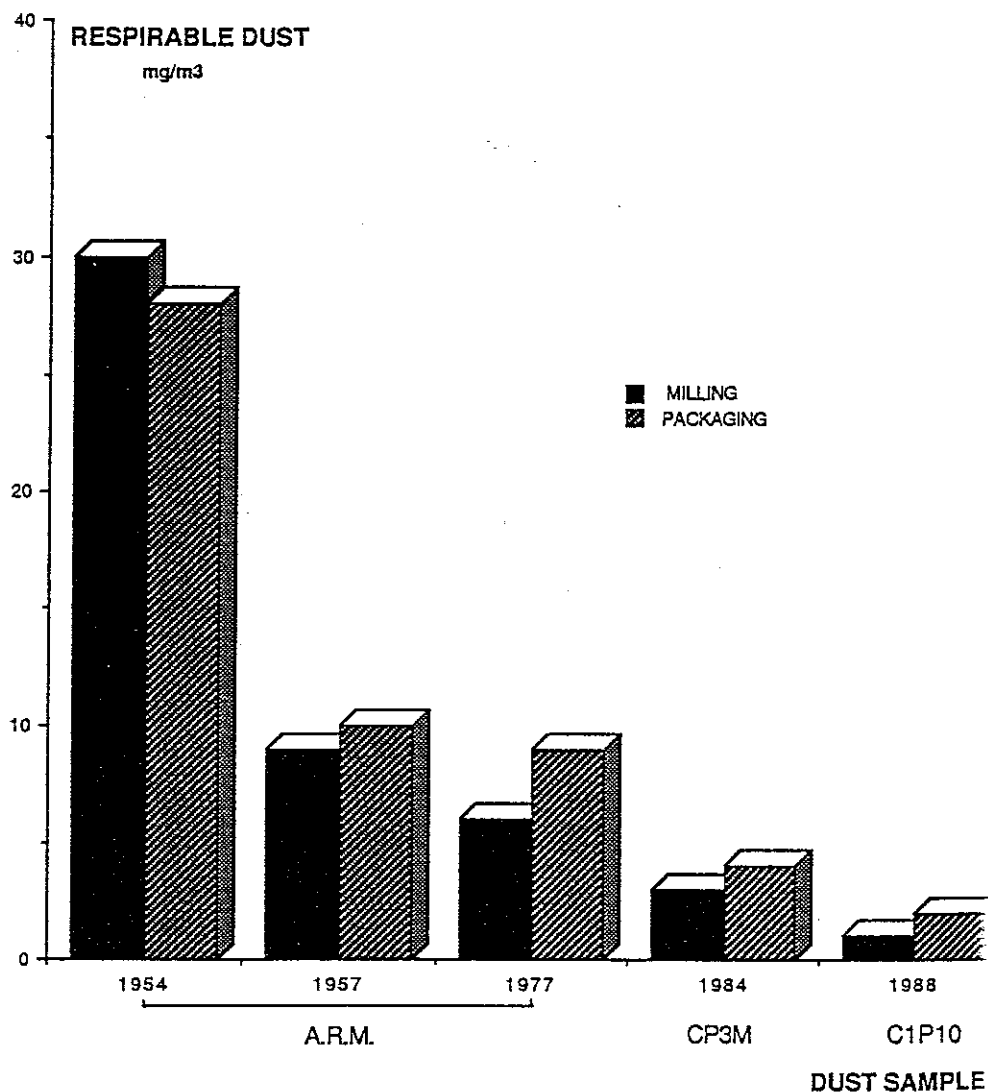
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### **ABSTRACT**

French talc (talc from LUZENAC) is associated with various amounts of chlorites, small quantities of carbonates ; there is no asbestos and quartz is below 3 %. The clinic and radiologic features are not specific : micronodular pneumoconiosis, generally without clinical symptoms. In some cases, confluent opacities and a pseudo-tumoral aspect with emphysema may be observed. In these cases, restrictive or mixed ventilatory insufficiencies are noticed. Talc and talc-bodies are always found in the bronchio-alveolar lavage of such patients. The histologic lesions are composed of macrophages containing particles with slight fibrosis. Radiologic signs, clinical and functional symptoms progressed in some cases several years after dust exposure has been stopped. Broncho-pulmonary infectious factors can sometimes explain a more severe evolution. Mortality by cancer is not significantly higher than in general population. We did not observe any case of mesothelioma. Morbidity by non malignant respiratory diseases is significantly higher compared with control subjects.

### ***The French talc***

The only French talc deposit currently exploited is located in LUZENAC (Ariège) in the South of France. Talc is extracted in open air with no dust, and then processed in a plant (sorting, drying, milling, packaging). In the factory very high dust levels were observed in the past but had gradually decreased during the last years (Fig 1)



*Fig. 1 - STATIC DUST MEASUREMENTS INSIDE THE FACTORY*

The French talc contains talc and chlorite with a small quantity of dolomite ; there are traces of pyrite ; the amount of free silica varies from 0.5 % to 3 % (less than 1 % for a particle size distribution of less than 10 microns). This talc does not contain any asbestos (table I).

*Table 1 - FRENCH TALC MINERALOGICAL COMPOSITION (Talc de Luzenac)*

MINERALS	TALC 1 (%)	TALC 2 (%)	TALC 3 (%)
TALC	56	41	90
CHLORITE	42	58	9
DOLOMITE	2	1	1

Small traces of pyrite (150 ppm)

No asbestos. Free silica : 0.5-3 % (< 1 % dust < 10  $\mu$ )

### *Material and methods*

Our experience is based on the following data :

- a cross sectional study carried out in 1978 on 176 millers with a ECSC (European Coal and Steel Community) questionnaire, a clinical examination, a chest X-ray, a vitalographic spirometry ;
- a retrospective mortality study from 1945 to 1981 completed by a prospective study until 1988 ;
- a functional respiratory study on 39 pneumoconiotic workers matched to 39 non dust exposed control subjects with similar age and smoking habits ;
- a more detailed study of 8 hospitalized pneumoconiotic workers. A bronchioalveolar lavage was carried out on all of them and a surgical lung biopsy on three.

### *Results*

The prevalence of pneumoconiosis is highly related with dust levels observed in the past years (Fig. 1). In the cross sectional study on 176 workers having worked exclusively in the talc industry, 46 suffered from pneumoconiosis (27 %). Among them 36 had a slight pneumoconiosis (small opacities in categories 1/0, 1/1, 1/2), 10 showed signs of pneumoconiosis with higher profusion (categories 2 and 3) or large opacities. Pleural thickenings were rare (three cases) and never calcified. In two cases not included in the study, a progressive massive fibrosis with

emphysema was observed. Intensity and duration of dust exposure were linked to the radiologic signs of pneumoconiosis.

The functional respiratory symptoms (cough, phlegm, dyspnea) were significantly higher among pneumoconiotic workers than in non pneumoconiotic patients.

The ventilatory function of pneumoconiotic workers was significantly impaired (Table II). This observation was based on a study carried out on 39 pneumoconiotic workers (33 cases with small opacities with profusion equal to 1, and 6 cases with small opacities with profusion equal to 2 and 3 and/or large opacities). They were matched to 39 non exposed control subjects with similar age and smoking habits. The TCO (single breath method) was decreased and a moderate restrictive ventilatory syndrom was observed among the 6 most impaired pneumoconiotic workers.

In both group V'max 25 % and V'max 50 % were lower than reference workers, in relation with smoking habits (29 smokers).

*Table II - TALC PNEUMOCONIOSIS FUNCTIONAL RESPIRATORY STUDY*

FUNCTIONAL TESTS	NON DUST EXPOSED 39 workers	ALL PNEUMOCONIOTIC 39 workers	PNEUMOCONIOTIC Profusion 2-3 Large opacities 6 workers
VC	103	96.8*	87*
RV	97.6	87.8	81
TLC	100	94.2*	86*
FEV/VC	100	102.5	102
V'max 50 %	79	77	65
V'max 25 %	47.2	49.6	35
Single breath TCO	111	100*	78*

% compared with the ECS'S reference values

\* significant

A bronchoalveolar lavage was performed on eight pneumoconiotic workers, all smokers : we observed an hypercellularity with a significant increase in neutrophil and eosinophil polymorphonuclear leukocytes (table III).

Table III - BRONCHOALVEOLAR LAVAGE - 8 cases

PATIENTS	Cell x 10 <sup>3</sup> /ml	% alive cells	Macrophages %	Lymphocytes %	PMN %	PME %
1	300	100	77	13	9	1
2	220	95	95	3	2	0
3	880	70	75	5	13	7
4	530	66	89	6	4	1
5	544	80	76	13	5	6
6	74	-	90	6	2	2
7	450	-	87	11	2	0
8	1200	80	94	1	5	0
Mean value	531 ± 366	-	85 ± 8 %	7 ± 5 %	5 ± 4 %	3 ± 2 %

PMN = Polymorphonuclear neutrophils, PME = Polymorphoeosinophils

Numerous talc particles were found in all lavages fluid : uncoated plate like particles (0.5 to 40 microns), talc bodies and atypical ferruginous bodies.

A surgical pulmonary biopsy was performed on three patients. In two cases, a macrophagic alveolitis with mineral overload and a slight interstitial sclerosis could be seen, but the biopsy had been performed after a pulmonary infectious disease which had altered the pneumoconiotic radiologic signs. A third patient was suffering from a chronic obstructive pulmonary disease, his lung biopsy showed mineral overload with perilobular and peribronchial densification and emphysema lesions.

The evolution of pneumoconiosis can be evaluated from the observation of some clinical cases and the data of the mortality study. In most cases, clinical and

radiological signs were stable when dust exposure were over. A worsening was observed in two cases after an acute pulmonary infection. In one case, a pneumococcal pneumonia recovered with a pseudotumoral sequela and in the other case, the patient showed an acute respiratory distress syndrom due to influenza with persistent opacities after recovery : there was an intense macrophagic alveolitis with mineral overload which cleared after corticosteroid therapy. In some cases, the evolution towards worsening was gradual after interruption of dust exposure, with signs of progressive massive fibrosis and emphysema. According to the data of the retrospective mortality study, the life expectancy of dust exposed workers was not significantly different than in the local and national population. The mortality due to cancer, especially to lung and digestive cancers was not significantly different than in the local and national population. By contrast, the mortality due to chronic respiratory diseases in a cohort of 97 workers deceased between 1970 and 1981, matched to 97 subjects dead at the same age and having lived in the same area showed a mortality ratio of 2.4. A follow-up study until 1988 confirmed these results.

As a conclusion, the French talc pneumoconiosis is frequent among talc workers and related to dust overexposure. In most cases, it is an asymptomatic micronodular pneumoconiosis. In few cases with radiological profusion, a moderate restrictive insufficiency appears ; in rare cases a progressive massive fibrosis can be observed which can be emphasized by an acute lung infection. The basic lesion is a macrophagic alveolitis with mineral overload and a slight interstitial sclerosis. There is an increased mortality rate due to chronic respiratory diseases but no carcinogenic risks and no mesothelioma.

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