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der anaesthesia until the full range of lateral motion is obtained. A light cast is then applied with the foot in dorsiflexion, the heel in full supination and the forefoot in compensatory pronation. This should be maintained for about three weeks, with a walking iron having been incorporated. At the end of that time, after care is administered consisting of physiotherapy and the wearing of a stiffened shank shoe or foot plate. The latter is absolutely essential in forestalling the possible eventuality of a traumatic weak foot.

Summary

THE common derangements of the ankle joint have been discussed and the mechanism of their production outlined. It has been pointed out that a clear understanding of the pathological physiology of these lesions is essential to intelligent treatment and good end results.

Medical-Engineering Control of Industrial Health Hazards

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THE development, over the past few years, of an added interest in human relationships has led to a new trend of medicine in industry. This has been due in part to the even greater recognition of the solidarity of interests between employers and employees, more particularly in the larger companies, and in part to the increased frequency of common law suits for alleged negligence on the part of employers and to the inclusion of certain diseases in compensation acts in various states. During this depression period, also, industrial workers with decreased earnings have leaned upon employers to a greater extent for medical care. The result has been a great galaxy of diseases, some of which are definitely from an industrial source while others, notwithstanding they are common to the race, are being classified as "occupational." Industrial management is now showing an increased interest in alleged health hazards in industrial plants, and is seeking closer contact with the medical profession.

Until recently the physician in industry received too little recognition as a part of industrial management. With these changing conditions the usefulness of the physician is undoubtedly becoming more appreciated, with the result that there will be a constantly increasing demand for his services in a consulting capacity.

The following "ad" which appeared not long since in one of our leading newspapers may be said to reflect the present general attitude of employers:

INDUSTRIAL PHYSICIAN

Large manufacturing organization with headquarters in Middle West and factories throughout the country has opening for young clinician in industrial medicine; research in health maintenance; potential opportunity to assume responsibility for direction of comprehensive medical program. Successful candidate will be given opportunity for special training in industrial hygiene.

Many are of the opinion that this attitude may change, but there is no doubt that certain policies recently adopted with respect to the safeguarding of the health of industrial workers will be permanent.

How is the medical profession going to meet this situation? The passive attitude which physicians have shown in the past with reference to the formulation of medical policies in industry, has given non-medical groups a wide latitude in carrying out many controversial practices in the medical care of industrial workers. Unless the medical profession becomes interested and formulates some means of protecting the health of industrial workers the responsibility will undoubtedly be placed in the hands of lay groups, which has so often been the case in the past. Consequently, there has arisen considerable criticism both on the part of industrial management and the medical profession as to the extent to which industry may assume the care and safeguarding of the health of employees in whom a very considerable investment has been made.

THE lowest estimate of the cost for employing a new industrial worker is \$100, while some estimates are as high as \$500. This includes the time necessary for training, defective work during the training period, efficiency to be attained to bring the new worker to a point where he can contribute an equal share with his fellow workers. In many instances it takes considerable time to discover the ability of a new worker to perform work assigned, which often means he may not have the necessary qualifications for the job for which he was employed but he has shown sufficient ability and personal qualifications to warrant transferring him and training him for other work. Such procedure is of great advantage to the worker as well as to the employer.

Investment in this individual multiplied by the number of employees in any single industrial organization is large, and if ignored means thousands of dollars invested from which there is no return; hence employers recognize that any labor turnover demands close attention, and necessary policies to eliminate the causes must be instituted.

In the larger industrial organizations the Medical Department should assume responsibility for proper placement with respect to mental and physical qualifications, having attached to its staff the necessary engineering consultants. This medical-engineering staff should have at its disposal the necessary equipment for investigating any plant condition or process which might be suspected of being a health hazard. The equipment should include sampling devices and chemical materials for determining dusts, fumes, and gases which may be encountered in the particular industry.

In the smaller plants where such a staff could not be supported financially, close cooperation might be maintained between the physician to whom injured employees are referred for medical care and the engineering staff of the plant, the engineering staff of the compensation insurance carrier, and, if possible, larger plants having similar processes. In this manner medical-engineering control might function at all industrial plants regardless of size, thereby building up knowledge which would be invaluable both to employers and

THE physician working in conjunction with the engineer who understands the various processes is in a better position to diagnose any disease which may be felt to have an industrial origin or to eliminate the industrial cause. This in turn may determine the proper and immediate medical treatment, and avoid possible errors of diagnoses due to a lack of knowledge of the exact nature of the occupation; as, for example, the confusion perhaps of carbon monoxide poisoning with a diabetic coma; chronic lead poisoning with a peptic ulcer; occupational dermatitis with dermatophytosis (fungus infection).

The engineer, in turn, with a *medical* contact will have a clearer understanding of what conditions may constitute a health hazard. In the designing of new equipment or in changing present methods of manufacture possible health hazards will be foreseen and eliminated before installation. This will result in a material saving in future cost of protective equipment, in increasing the efficiency of workers, and in eliminating future liabilities.

The engineer should study conditions which may be detrimental to health and by quantitative measurements determine the dosage of substances that workers receive. In conjunction with the findings of the physician safe practices may eventually be determined for any occupation. Among the means at the engineer's disposal for eliminating an occupational hazard may be mentioned:

1. Removal of source:
 - (a) substitution of non-toxic materials;
 - (b) complete isolation of process;
 - (c) wetting dry, dusty materials.
2. Protective devices:
 - (a) air conditioning;
 - (b) respirators;
 - (c) dermal coverings.

The investigations by the physician of industrial processes thought to have an injurious effect on the individual worker will require a careful periodic physical examination. In certain types of occupations it will necessitate additional studies, as blood, urine, sputa, feces, and roentgenological examinations.

The practice by industrial management of making periodic physical examinations of industrial workers has been somewhat controversial. Many physicians have felt that this procedure has been opposite to good medical practice, whereas in reality it fosters a closer relationship between physician and patient, for most physical defects found at the time of such an examination are in no way connected with the individual's occupation. The employee is urged to correct, by consulting his family physician, conditions found which later may or may not cause lack of earning capacity and economic insecurity, whereas if these conditions were not brought to his attention he would have had no thought of seeking medical advice. With this added knowledge of health problems the worker also feels an increased responsibility for the medical care of his family.

Thus there is established a still closer contact with the family physician.

The economic value of such examinations, not only to industry but also to the individual, cannot be estimated by any known standard of measurement. It can be appreciated only by one who over

a period of years sees the number of individuals in a large group who, without medical supervision, would have become totally disabled and forced to cease all gainful employment.

The greatest example of such health supervision has been in the control of tuberculosis in industrial organizations that have had well defined health programs over a period of years. No other disease affects the economic security of the industrial worker to such an extent as tuberculosis.

From the large number of physicians who see industrial workers from a surgical standpoint certain contacts have already been established with employers so that it is only a step ahead for them to assume the responsibility of safeguarding all workers from a health standpoint.

And who is better qualified?

WHILE industrial hygiene must of necessity be considered a post-graduate course in our medical schools, nevertheless some conception of this problem should be given to undergraduates. Simply knowing the symptoms of a few common poisonings which may occur in industry will handicap the average medical graduate if practicing in an industrial community. This lack of training often results in hasty diagnosis and in the patient's occupation being regarded as the cause of the illness, if no other cause is easily discernible. All too frequently no effort is made to contact the employer to learn the true nature of the employee's occupation.

Correct diagnosis is most important, for if a belief is unjustly created in the employee's mind that the materials with which he is working are injurious to his health it is most difficult to eradicate, and it is mentioned by him on all occasions of mental or physical illness during his entire employment. There cannot but arise, therefore, a feeling on the part of the employer that some physicians attribute all illnesses of industrial workers directly or indirectly to their occupations.

As information is gathered by physicians and others doing research work our knowledge will be more accurate, thus enabling both the employer and the employee to reach a more satisfactory understanding without the conflicting testimony now so often heard in our courts. A clearer conception of what constitutes an occupational disease will prevent serious mistakes in diagnoses which are unfair to all alike.

If more attention is not given to these problems the present tendency will become more pronounced for industry or governmental agencies to establish bureaus where workers in certain types of occupations will receive physical examinations and be given working credentials. Various State Departments of Labor are at present making medical-engineering surveys, and there is at least one state where the Insurance Commission offers to employers complete medical care for industrial accidents, so that it would seem as if occupational diseases will be included in the near future. This will tend to result in complete medical care of the industrial worker by such agencies.

Active medical-engineering control of these problems at this time will have an important bearing on future practices and on future legislation. Which way the pendulum will swing will depend on how actively cooperation is established between industrial management and physicians.