



**Bernardino Ramazzini (1633–1714). Portrait by Anthony Stones.**  
 Source. Glass B, Stones A, Franco G. *Diseases of Workers by Bernardino Ramazzini. A Tribute in the Year 2000.* Wellington, NZ: Occupational Safety and Health Service, Department of Labour; November 2000. Reproduced with permission.

# De Morbis Artificum Diatriba [Diseases of Workers]

Bernardino Ramazzini. From the Latin text of 1713, revised, with translation and notes by Wilmer Cave Wright. (Chicago: University of Chicago Press; 1940.)

**I NOW WISH TO TURN TO . . .**  
 workers in whom certain morbid affections gradually arise from . . . some particular posture of the limbs or unnatural movements of the body called for while they work. Such are the workers who all day long stand or sit, stoop or are bent double; who run or ride or exercise their bodies in all sorts of ways. First to come upon the stage shall be those who stand at their work, such as carpenters when they hew and saw wood, carvers, blacksmiths, masons, and others. . . . Standing, even for a short time, proves so

exhausting compared with walking and running, though it be for a long time. It is generally supposed that this is because of the tonic movement of all the antagonist muscles, both extensors and flexors, which have to be continually in action to enable a man to keep standing erect. . . . It follows that whenever occasion offers, we must advise men employed in the standing trades to interrupt when they can that too prolonged posture by sitting or walking about or exercising the body in some way. . . .

The maladies that afflict the clerks . . . arise from three causes: First, constant sitting, secondly the incessant movement of the hand and always in the same direction, thirdly the strain on the mind from the effort not to disfigure the books by errors or cause loss to their employers when they add, subtract, or do other sums in arithmetic. . . . Incessant driving of the pen over paper causes intense fatigue of the hand and the whole arm because of the continuous and al-

most tonic strain on the muscles and tendons, which in course of time results in failure of power in the right hand. . . .

Those who sit at their work and are therefore called “chair-workers,” such as cobblers and tailors . . . become bent, hump-backed, and hold their heads down like people looking for something on the ground; this is the effect of their sedentary life and the bent posture of the body as they sit and apply themselves all day to their tasks in the shops where they sew. . . . Since to do their work they are forced to stoop, the outermost vertebral ligaments are kept pulled apart and contract a callosity, so that it becomes impossible for them to return to the natural position. . . . These workers, then, suffer from general ill-health . . . caused by their sedentary life. . . . But it is not so true of many other sedentary workers, potters and weavers, for example, who exercise the arms and feet and in fact the whole body; this keeps them in better health because the impuri-

ties in the blood are more easily dispersed by such movements. All sedentary workers suffer from lumbago. . . . They should be advised to take physical exercise, at any rate on holidays. Let them make the best use they can of some one day, and so to some extent counteract the harm done by many days of sedentary life. . . .

Now there are two kinds of printers; some are almost constantly seated while they select the metal types from their boxes and set up the copy or sort and replace in the boxes types that

are no longer needed. . . . Then there are the others whose work is at the press, and they stand all the time; using both hands they smear with ink the type that has been set up, for which they use a kind of tool made of soft leather and stuffed with hairs; one of them with the right hand moves the upper part of the press and presses hard on it, and thus on the instant there appears clearly printed on the paper. . . . They repeat the process again and again till they have made the required number of copies of the

whole work. This is certainly a very ingenious device; I wish that the result were only to supply learned men with books and not fishmongers with paper to wrap up their mackerel. The first class of men, the compositors, are sentenced to the sedentary life and hence are exposed to the diseases that ensue therefrom; the second class, the pressmen, have to stand incessantly at work that is very fatiguing, for almost the whole body must be exerted in such a task; hence these workmen inevitably suffer from lassitude and intense fatigue, and when stricken in years are compelled to say farewell to that sort of work. Those who remain seated and work with their hands are threatened with another misfortune from having to keep the eyes continually fixed on those black letters, for they gradually contract weakness of vision, and when their eyes are not strong to begin with they are afflicted with dimness of sight, suffusions (bloodshot eyes) and other diseases of the eyes. . . .

Bakers . . . all become bow-legged. . . . Above a thick board or three-legged table they fasten a smooth block of wood of conical shape at the top of a three-legged frame in such a way that it can be rotated, then they place a great mass of dough underneath, drop down the wooden block from above and press with all the strength of their arms and with their knees as well, while someone keeps turning over the dough. Since the articulation of the knees is not very strong, their legs are bowed outwards. For this trouble there is no remedy, for even when they are young and

strong they soon become bow-legged and in course of time, lame. . . .

In crowded cities, especially sea-ports like Venice . . . one sees a vast number of porters whose work is indispensable for loading and unloading merchandise from the cargo-ships. . . . All porters become in time round-shouldered, because the dorsal vertebral are constantly bent forward and become set in that position. For though they know none of the laws of mechanics, nature has taught them that it is easier to carry weights on the shoulders with the chest hollowed, than with the body erect. . . . I have noticed that at Venice and Ferrara these heavily laden men carry sacks of wheat and other weights, not as ours do on one shoulder, but on the neck and dorsal vertebrae, so that the weight may lie all along the carrier's back; they say that the load tires them less and they feel less pressure than if they carried it on one shoulder. . . .

Carpentering is a toilsome business and greatly fatigues the workers, but those who suffer most are the men who with a saw cut up trees into boards. This kind of work is very tiring. . . . Those too who work at the lathe, especially when the wood is box, olive, or turpentine tree or the like, find their task very fatiguing; for they are obliged to put an incessant strain on the hands and arms in order to control the chisel and with it by degrees shave off the right amount according to the design of the work; the right foot is always at work to keep the wood that is to be shaped turning round and

### Editors' Note

In March 2001, with the support of President George W. Bush, the US Congress voted to undo the nation's landmark ergonomics standard, passed just a few months earlier in November 2000. Congressional votes on repeal were split mainly along party lines, with the votes against the standard running 66 (Republican) to 44 (Democrat) in the Senate and 223 (R) to 206 (D) in the House of Representatives.

The repealed Occupational Safety and Health Administration (OSHA) standard addressed one of the longest-ignored occupational threats to American workers. Each year, more than 1.8 million US workers report musculoskeletal disorders such as carpal tunnel syndrome and back injuries; in 600 000 cases, the disorders are serious enough that workers take time off from work, costing industry an estimated \$9 billion a year in sick days and decreased productivity.

The OSHA standard was supported by public health and labor advocates and was the result of more than 10 years of work and a year of hearings and public comment. It would have required employers to create programs informing workers about musculoskeletal disorders and their symptoms; to encourage reporting; and, if a serious incident were reported, to evaluate the workplace and take action to address the risks. The standard had consistently come under fire from business groups, who claimed that it would be too costly to enact.

This extract from the writings of Bernardino Ramazzini (1633–1714) reminds us that, however current the battles over OSHA's ergonomic standard may be, these types of occupational hazards were recognized by astute public health and medical observers long ago.

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round; moreover they must keep the eyes fixed on the work, and from that rotary motion of the wood the eyes contract some injury, since it stimulates the spirits and humors to a vertiginous sort of motion. . . . For carpenters I have no precautions to suggest except this: They should be moderate and not overwork. . . .

Nowadays women sit to weave, but in such a posture that they somehow look as though they were standing. This kind of work is certainly very fatiguing, for the whole body is tasked, both hands, arms, feet, and back, so that every part of the body at once shares in the work. . . . Now an occupation so fatiguing natu-

rally has its drawbacks, especially for women, for if pregnant they easily miscarry and expel the fetus prematurely and in consequence incur many ailments later on. It follows that women weavers, I mean those who are engaged wholly in this occupation, ought to be particularly healthy and robust, otherwise

they break down from overwork and as they get on in years are compelled to abandon this trade. . . . Therefore in work so taxing moderation would be the best safeguard against these maladies, for men and women alike; for the common maxim "Nothing to excess" is one that I excessively approve.

## Bernardino Ramazzini: The Father of Occupational Medicine

Bernardino Ramazzini was born in Carpi, Italy, in 1633. While he was still a medical student at Parma University, his attention was drawn to diseases suffered by workers. In 1682, when he was appointed chair of theory of medicine at the University of Modena, Ramazzini focused on workers' health problems in a systematic and scholarly way.<sup>1</sup> He visited workplaces, observed workers' activities, and discussed their illnesses with them. The medicine courses he taught were dedicated to the diseases of workers.<sup>2</sup>

Ramazzini systematized the existing knowledge and made a large personal contribution to the field by collecting his observations in *De Morbis Artificum Diatriba* [Diseases of Workers]; the first edition was printed in Modena in 1700 and the second in Padua in 1713. Primarily on the basis of this work, Ramazzini is called "the father of occupational medicine."<sup>3,4</sup>

Each chapter of the *De Morbis Artificum Diatriba* contains a description of the disease associated with a particular work activ-

ity followed by a literature analysis, workplace description, questions for workers, disease description, remedies, and advice. The clinical picture was directly observed by Ramazzini, who questioned workers about their complaints. He regularly asked his patients about the kind of work they did and suggested that all physicians do the same.<sup>4</sup>

Ramazzini realized that not all workers' diseases were attributable to the working environment (chemical or physical agents). He observed that a variety of common workers' diseases appeared to be caused by prolonged, violent, and irregular motions and prolonged postures. Such cumulative trauma and repetitive-motion injuries have recently been called the occupational epidemic of the 1990s.<sup>5</sup> Ramazzini studied the relationship between certain disorders and postural attitudes, repetition of movements, and weight lifting and anticipated some preventive measures. ■

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