

## E D I T O R I A L

## Criteria for the case definition of upper limb musculoskeletal diseases in the occupational setting

Musculoskeletal disorders (MSDs) are the most common work-related health problems affecting the workforce in the European Countries and in the United States with consequent loss of productivity, demands for health care and compensations/benefits. Though seldom life threatening, MSDs can cause severe disability and affect the quality of life. They are multifactorial in nature and can involve different body regions, mainly the low back, neck and upper limb. During the last decades of the XX Century, reporting of MSDs has progressively increased in industrialized countries. According to data published by the US Bureau of Labor Statistics, the incidence of MSDs showed a rising trend from the end of the seventies: in 1994, approximately 32% of all occupational injuries and illnesses requiring days away from work resulted from overexertion or repetitive motion; in 2005, MSDs still accounted for 30% of the injuries and illnesses in the industry sector, although the incidence rate for carpal tunnel syndrome and events due to repetitive motion decreased by more than 10%.

The third European Survey on working conditions, published in 2000, reported that 31% of the workers were continuously exposed to repetitive hand/arm movements and 12% had to move or carry heavy loads; accordingly, backache and muscular pain were two of the most prevalent outcomes, reported approximately by 30% of the workers. First available data of the fourth European Survey (2005) show that almost 25% of the EU-25 workers report suffering from backache and 22% complain about muscular pains. Notably, both conditions have a higher prevalence in new Member States (39% and 36%, respectively). On the basis of these data, the European Agency for Safety and Health at Work has identified MSDs as one of the priorities for future European Union research needs and has promoted the "European campaign on musculoskeletal disorders 2007" to improve MSDs prevention at workplace level.

The association between MSDs and occupation was observed centuries ago by Bernardino Ramazzini, the father of occupational health. In his *De morbis artificum diatriba*, published in 1700, he described low back disorders among sedentary workers (shoe makers, tailors...) and muscle-tendon disorders of the upper arm among scribes and weavers. In recent years, several epidemiological studies have postulated a relationship between some physical risk factors, such as manual, forceful and repetitive work and MSDs.

A critical review of the evidence of the positive association between physical risk factors and MSDs was published in 1997 by the National Institute of Occupational Health.

As far as upper limb work-related musculoskeletal disorders (UL-WRMSDs) are concerned, it is now widely known that these disorders are common among workers performing repetitive and forceful manual work. However, some important issues deserve further research. This is for example the case of the contribution of individual characteristics or psychosocial factors, although the most critical issue is the lack of consensus in their management and classification. One of the reasons could lie in the use of terminology. The term disorder is generally defined as an abnormal physical or mental condition, whereas dictionaries define disease, in general terms, as the absence of health or the presence of unspecified impairment or dysfunction and medical literature defines it with a constellation of clinical, anatomic and biochemical abnormalities. Furthermore, the term health is also hard to define; for the World Health Organization health is "a complete physical, physiological, and social wellbeing". Complexity increases if we introduce the term "normal". In clinical epidemiology, one common definition of disease is the deviation from the "norm", that is the case in which the variable under study lies more than two standard deviations from the mean. Furthermore, when legal implications are involved, as in the occupational set-

ting, suffering from a condition labelled as “disease” may bring both benefits and negative consequences for workers, thus affecting their behaviour in the reporting of symptoms.

All these issues are strictly related to the diagnostic process. The diagnosis of a disease is a complex process, also influenced by experience and learning, that usually begins with clinical investigation (history and physical examination) and can be further enriched with the results of diagnostic instrumental tests. The integration of data collected can lead to the definition of a specific condition. Diagnosis is a prerequisite for the management of prevention and treatment of diseases. The main purposes of the diagnostic process are: the identification of conditions with a common pathogenetic mechanism and aetiology or effectively treatable with the same procedure.

Reliable classification of UL-WRMSDs is necessary both for clinical and research purposes. Generally agreed criteria are also needed to compare results from different epidemiological studies, to estimate the burden and natural history of the disease and to understand the role of causal factors. In the occupational setting, the use of a shared case-definition is also essential to analyse the dose-response relationship. To date several case definitions for UL-WRMSDs have been proposed and published in the literature, yet they are based on different combinations of symptoms, physical examination findings and instrumental test results.

In order to respond to these needs, a workshop on this topic was held during the 2004 Premus Conference in Zurich; at the same time, a group of expert researchers organized a meeting to set up a task force to develop well-defined and broadly accepted criteria for the definition of musculoskeletal diseases in the occupational setting. The group was composed by European, American and Canadian researchers.

Following that first meeting, a pre-congress event entitled “Criteria for the case definition of upper limb musculoskeletal diseases in the occupational setting” was held in Bologna in June 2006, within the 28th Congress of the International Commission on Occupational Health (ICOH). The workshop aimed at presenting the state of the art on diagnostic and classification criteria and at focusing on the critical aspects to be taken into account during the collection of signs and symptoms.

The main issue that emerged during the workshop concerned the peculiarity of UL-WRMSDs and its ability to affect their diagnostic approach. UL-WRMSDs are multifactorial in nature, their pathogenesis is not always clear and many of these disorders do not have a “gold standard” diagnosis against which other diagnostic procedures may be evaluated. As a consequence, different approaches may be postulated: defining diagnostic criteria based on the consensus of experts or collecting specific groups of signs and symptoms and looking for patterns of clustering within individuals considering the phenomenon indicative of a common origin. Some experiences have already been proposed and published in the literature.

What would now be desirable is to reach a consensus about a possible classification system to be used on a wide scale to allow better comparison of data originating from different studies. The importance of the selection and the specific definition of the best informative elements to be collected during physical examination or instrumental testing has also been deeply discussed. In the absence of a “gold standard”, further research is needed to assess diagnostic tests by means of longitudinal studies.

To date the relationship between UL-WRMSDs and occupational exposure to manual work characterized by high levels of repetitiveness, use of force and awkward postures is well documented. Less is known, however, about the dose-response relationship at low-medium levels of exposure and about the definition of a reliable threshold limit value. The ability of a classification system to discriminate categories of diseases associated with different risk factors would also be tested as a potential tool to shed light on this topic. This issue also underlines the need to reach a shared consensus on methods used for exposure assessment.

Reaching an international consensus on the definition of UL-WRMSD and developing a systematic procedure to validate these tools in different countries will be a difficult task. However, considered the wide distribution of UL-WRMSD and the resultant morbidity and lost work time among an ageing workforce, we believe this to be a challenge worth undertaking. The contributions presented, as special articles, in this issue of *La Medicina del Lavoro* will be important also in this respect.

F.S. Violante, Roberta Bonfiglioli  
Occupational Health Unit, Sant’Orsola-Malpighi Hospital,  
University of Bologna