This chapter resulted from a demand to investigate the quantity and diversity of the studies and research conducted in Brazil on repetitive strain injuries/ work-related musculoskeletal disorders (RSI/WRMSD). The terms RSI and WRMSD refer to the same general set of functional and/or organic problems (a loose group of conditions) that affect the musculoskeletal system, mostly the neck and upper limbs, as a result of work (Maeno, 2003; MS, 2001a).

This research is based on the Lattes database registered with the Brazilian National Council for the Development of Scientific and Technical Research (CNPq), one of the most complete databases in Brazil. We searched for all records that contained the keywords RSI and/or WRMSD. 685 records were found in a search made on June 7th, 2002, but the volume of cases grew rapidly as 768 records were found on August 7th, 2002. The products of scientific research registered in this database include articles in refereed journals, book chapters, masters and doctoral theses, some undergraduate research, specialization courses and written presentations for lectures and seminars. This article analyses records relating to a) doctoral theses; b) masters theses; c) monographs written for specialist courses and d) research reports written for undergraduate degrees.

An analysis of the database confirms that the subject of RSI/WRMSD is being taken up by a variety of academic disciplines in both pure and applied research. It also reveals that research and teaching institutions in the different regions of the country are researching the question.

In order to deal with the complexity of data that resulted from the searches, (i.e. data drawn from multiple disciplines employing different research techniques and methodological approaches), we opted to aggregate the records, classifying them according to a series of wide-ranging themes. We have tried to build a synthesized description of the records without introducing our professional bias or personal interests as ergonomists which could lead to certain areas of study being highlighted in preference to others because we found them easier to comprehend.

The categories formulated for classifying the material discovered are as follows:

- Physio-pathological mechanisms involved in the onset and evolution of RSI/WRMSD
- Studies of clinical cases, which involve diagnostic, therapeutic and preventive investigations
- Therapeutic interventions which employ medicine, physiotherapy, acupuncture, occupational therapy and psychotherapy

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8 ‘RSI’ – ‘Repetitive Strain Injuries’ is called ‘LER’ meaning ‘Lesões por Esforços Repetitivos’ in Brazil, whereas ‘WRMSD’ stands for ‘work-related musculoskeletal disorders’ and in Brazil is translated as ‘DORT’ which stands for ‘disfunções músculo-esqueléticas relacionadas ao trabalho’.
• Epidemiological approaches which seek to identify occupational and individual risk factors involved in the onset and evolution of RSI/WRMSD
• Ergonomic approaches which seek to identify the occupational components involved in the onset and evolution of RSI/WRMSD
• Psychological and sociological approaches which attempt to explain work-related psycho-social factors
• Biomechanical and posture studies
• A psycho-social approach to analyze the discrimination of RSI/WRMSD victims at work
• Preventive interventions designed to eliminate, minimize and monitor the occupational components involved in the onset and evolution of RSI/WRMSD
• Studies on work-related causes of RSI/WRMSD
• Studies of the legal aspects of RSI/WRMSD as a work-related illness
• Studies of the representations that RSI/WRMSD victims have about their work and RSI/WRMSD
• Studies about the types of rehabilitation for victims and their return and adaptation to work
• Preventive approaches through health education
• Research on the impact of gymnastics as a preventive measure against RSI/WRMSD.

The occupations of victims was analyzed and then related to the sector of the economy in which they worked. (However, not all studies/research mentioned or described the work carried out by victims as often this information was not relevant to the scientific question posed in the studies.)

**Occupational categories in the industrial sector:**
Food processing and abattoirs;
Shoe manufacture;
Construction;
Printing;
Manufacturing;
Metalworking, electrical and electronic goods manufacture;
Chemicals, paper and cardboard manufacture;
Textiles and clothing manufacture;
Glass manufacture.

**Occupational categories in the service sector (both public and private):**
Restaurants (industrial kitchens);
Banking;
Commerce employees (supermarkets);
Hospital and health occupations;
Judicial (the Law Courts);
Teachers and other educational workers;
Data Processing;
Telecommunications.
Occupational categories in the agricultural sector:
Milkers;
Rural workers in the sugarcane industry;
Workers in poultry slaughterhouses.

Other occupational categories – employees, autonomous workers and professionals:
Dentists;
Electricians;
Sportspeople;
Musicians.

These preliminary results allow some observations on the RSI/WRMSD problem in Brazil, which can explain both the number and diversity of studies and research conducted.

RSI/WRMSD has become a field of activity and study primarily because of its etiological and pathological characteristics, because it is closely related to work activity, and because of its numerous human, social, political and economic repercussions. It is also an interesting subject from a strictly scientific viewpoint since practices and scientific paradigms are dynamic and subject to revision (Sato, 2001). Understanding the multiple dimensions and types of actions required to study RSI/WRMSD leads to challenges that are both inter and trans-disciplinary. There are implications for the human, social and biological sciences, in both basic and applied dimensions of research. For example, chronic, recurrent pain is difficult to treat and frequently results in temporary or permanent incapacity that affects not only work but also day-to-day living, however, such pain is the main ‘invisible’ physical sign that a serious pathology is developing (Maeno, 2003). In addition to the pain and physical limitations that affect work and home life, victims may fear that they will lose their jobs. As a consequence of a lack of professional security, victims also suffer from isolation, discrimination and prejudice because their symptoms are ‘invisible’ to others (colleagues, friends, family) and to society (MS, 2001b). Moreover, a great number of workers with RSI/WRMSD have mental health problems such as anxiety, depression and conflicts related to their personal, professional and social identity (Sato, 2003; MS, 2001b).

Work-related musculoskeletal problems have been considered to be an important public health problem in a number of countries, with some major social and economic impacts, due to their increasing prevalence as a cause of occupational illness and because these problems indiscriminately attack workers in all sectors of the economy: agriculture, industry, services and professionals. These problems also affect people in different hierarchical and socioeconomic positions (Maeno, 2003; Salim, 2002; MS, 2001a; Assunção and Rocha, 1993). The above factors have become the subject of attention from state, the scientific community and wider society in Brazil.

Social recognition of the RSI/WRMSD phenomenon in Brazil

In Brazil, scientific recognition of musculoskeletal work-related illnesses initially occurred at the beginning of the 1970s. In 1973, an article was published about “Occupational Tenosynovitis among Washerwomen, Cleaners, and Ironers” (Assunção and Rocha, 1993). The term “RSI” was introduced officially into São Paulo State
regulations in 1992, and was later confirmed in regulations drawn up in other Brazilian states and the 1993 Ministry of Social Welfare’s Technical Regulation on the Evaluation of Incapacity due to RSI (MS, 2001a). The same ministry introduced the term “WRMSD” in 1998 when the Technical Regulation was revised (Maeno, 2003; MS, 2001a).

In the 1980s, in response to social demands, principally coming from one occupational group, i.e. data entry clerks, Brazilian workers and scientists started uncovering the working conditions associated with the development of these ailments. They were accompanying technical and scientific developments being made in other parts of the world at that time (Barreira, 2000; Assunção and Rocha, 1993; Rocha, 1989).

However, the social and political struggle around RSI/WRMSD achieved some meaningful victories at the end of the 1980s together with a wider social movement, including trade unions, organizing around OHS issues. The trade union movement and OHS technicians and professionals forged new partnerships that constituted landmarks in the history of the Brazilian trade union movement’s action in relation to workers’ health. Among their achievements was the inclusion of clauses in collective labor contracts which recognized the necessity for rest breaks (seen as a means of preventing RSI/WRMSD); reduction of the formal working day for data-entry clerks to 6 hours, and the social and formal recognition of tenosynovitis among data-entry clerks through the Ministry of Social Welfare’s Administrative Order (no. 4062, of 6th of August, 1987) (Barreira, 2000; Rocha, 1989).

In the 1990s, the social movement for the recognition and prevention of RSI/WRMSD increased in importance as rates of musculoskeletal disturbances grew among diverse occupational groups. At the same time, there was increased publicity, awareness and understanding of the problem. Together with this social and political process, in 1990 the Brazilian state promoted improved regulatory provisions for the identification, prevention and compensation of RSI/WRMSD with a new Ergonomics Regulation (NR17). This regulation widened coverage of a number of working and organizational conditions associated with the development of RSI/WRMSD and restricted the use of financial incentives designed to increase productivity. New state government regulations in 1992, and the Ministry of Social Welfare’s regulations in 1993, (mentioned above), also resulted in increased recognition and possibilities of compensation for RSI/WRMSD victims.

Besides the social process which resulted in greater visibility and increasing knowledge relating to both the diagnosis and prevention, economic conditions produced changes in workplaces which led to the appearance and development of some musculoskeletal disorders, accompanied by work-related mental and emotional disturbances (Sato, 2003; Wooding and Kuhn, 1997b; Levenstein, Wooding and Rosemberg, 1995; Penney, 1995). Work was organized in new ways, and these new forms of organization were related to the increasing prevalence of both RSI/WRMSD and mental disturbances in contemporary work (Salim, 2002; Barreira, 2000; Mattos, Porto and Freitas, 1997; Lima, Araújo and Lima, 1997).

The introduction of new technologies and management techniques have been related to increased risks (or “invisible risks”, as some authors call them). The most common risks experienced today are due to: the acceleration of work rhythms; increase of managerial control over productivity quotas and rest breaks which reduces down time and increases
productivity; increased workloads associated with the ‘intensification of work’; incentives designed to encourage working beyond the normal working day in order to compensate for reduced purchasing power; incentives designed to increase competitiveness between workers through differentiated remuneration or in order to avoid punishment; the reduction in the level of control or influence exercised by workers over the content, rhythm and final product of their work, (often determined and monitored by computerized systems).

The restructuring process in Brazil intensified and disseminated itself throughout various productive sectors from the moment that Brazil’s internal market was opened up to international competition in the 1990s. This was associated with the introduction of technology and new managerial techniques that demanded greater productivity, an acceleration of work rhythms, intensification of work and a reduction in labor costs (the same situation occurred in industrialized countries). The reduction of labor costs amplified the instability of working conditions within the sectors where it occurred.

These new models of production (neo-Taylorism, neo-Fordism, Toyotism) of industrial goods and services, whether globalized or implemented in Brazilian style, result in the modern coexisting with older forms of production. This has been called ‘conservative modernization’ by Leite (1994), or described as a ‘Brazilianized version’ of the Japanese model by Salerno (1990) and “Taylorized-just-in-time” by Humphrey (1990). All these authors discuss the subject from differing viewpoints, but it is agreed that work intensification and casualization result in “true epidemics” of RSI/WRMSDs (Mattos, Porto and Freitas, 1997). Other authors speak of the push for flexibility and the deregulation of workers’ rights which have weakened representative trade union power (Antunes, 1997), and of the casualization of work and the weakening of the collective organization of workers which results in the “worsening of working conditions and the rise in the degree of informality in the labor market” (Ramalho, 1997).

The evidence therefore indicates that the RSI/WRMSD question in Brazil, in common with the rest of the world, will continue to promote impasses both for science and for the organization of production practices in contemporary Brazilian workplaces.