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PROFESSIONAL PAPER

Occupational Overuse Syndrome (Technological Diseases): Carpal Tunnel Syndrome, a Mouse Shoulder, Cervical Pain Syndrome

Merita Tiric-Campara¹, Ferid Krupic², Mirza Biscevic³, Emina Spahic⁴, Kerima Maglajlija⁴, Zlatan Masic⁵, Lejla Zunic⁶, Izet Masic⁴Neurology Clinic. Clinical Center of Sarajevo University. Sarajevo, Sarajevo, Bosnia and Herzegovina¹Department of Orthopaedics, Institute of Clinical Sciences, Sahlgrenska Academy, University of Gothenburg, Sweden²Orthopaedics and Traumatology Clinic. Clinical Center of Sarajevo University. Sarajevo, Bosnia and Herzegovina³Faculty of Medicine, University of Sarajevo, Sarajevo, Bosnia and Herzegovina⁴XION Company, Vienna, Austria⁵Faculty of Health Sciences, University of Zenica, Zenica, Bosnia and Herzegovina⁶

Corresponding author: MeritaTiric Campara, MD, PhD. Neurology Clinic. Clinical center of University of Sarajevo. Bolnicka 25. Sarajevo. E-mail: merita.tiric@gmail.com

ABSTRACT

Technological diseases are diseases of the modern era. Some are caused by occupational exposures, and are marked with direct professional relation, or the action of harmful effects in the workplace. Due to the increasing incidence of these diseases on specific workplaces which may be caused by one or more causal factors present in the workplace today, these diseases are considered as professional diseases. Severity of technological disease usually responds to the level and duration of exposure, and usually occurs after many years of exposure to harmful factor. Technological diseases occur due to excessive work at the computer, or excessive use of keyboards and computer mice, especially the non-ergonomic ones. This paper deals with the diseases of the neck, shoulder, elbow and wrist (cervical radiculopathy, mouse shoulder and carpal tunnel syndrome), as is currently the most common diseases of technology in our country and abroad. These three diseases can be caused by long-term load and physical effort, and are tied to specific occupations, such as occupations associated with prolonged sitting, working at the computer and work related to the fixed telephone communication, as well as certain types of sports (tennis, golf and others).

Key words: technological diseases, carpal tunnel syndrome, mouse shoulder, cervical pain syndrome.

1. INTRODUCTION

Computers are considered as an integral part of everyday life in today's work and life (1-5). They are used in a wide variety of professions from banking, health, communication to entertainment and leisure time. "Thanks to the" great use of computers, occurs the diseases of the modern era, which one of the authors of this article named "Technological diseases" – Carpal Tunnel Syndrome (CTS), a Mouse Shoulder (MS) and Cervical Pain Syndrome (CPS). Within past a few decades rapidly increased automation of offices and very few authors in the scientific literature have reported about positive association between computer use and musculoskeletal symptoms as consequences (6-10). Under term of "Technological diseases" we mean the diseases caused by the harmful influence of the job in the first place, the working position in which it is involved excessive work on a computer, such as the banking sector, the health sector and many others who are directly or indirectly connected with the work on the computer and overuse of keyboard and computer mice, which are in large number of cases of non-ergonomic, and inappropriate for a hand. It is therefore recommended to use ergonomic computer mice. Using them can prevent diseases of the modern era, technological diseases associated with prolonged sitting and working on a computer such as Carpal Tunnel Syndrome, Cervical syndrome, and cer-

tainly the most interesting for the many unknown, but not less important disease, mouse shoulder an increasingly common diagnosis in clinics of family medicine. These diseases are described in more detail in this paper (11-20). In Bosnia and Herzegovina to overuse injuries has not paid enough attention from the medical nor the social and economic aspects, although it is evident that large amounts of funds are allocated for treatment and rehabilitation of these diseases. In Clinical Center University of Sarajevo in the cabinet for EMNG of the Neurology clinic, monthly are diagnosed 10 cases with carpal tunnel syndrome, while cases of cervical syndrome is in a significant expansion during last 5 years which more and more represent not only a medical but also social economic problem (21-23).

2. CARPAL TUNNEL SYNDROME

Carpal tunnel syndrome (CTS) is the most common canalicular syndrome resulting from pressure on the central nerve (median nerve) in the carpal tunnel (lat. canalis carpi) and reflected in reduction of sensation, pain, paresthesia (numbness, tingling), and muscle weakness in the hands and forearms .

The median nerve in its course passes through the carpal canal (Figure 1). The bones of the hand (lat. ossa carpi) make gutter channels, and rectangular connection (lat. retinaculum

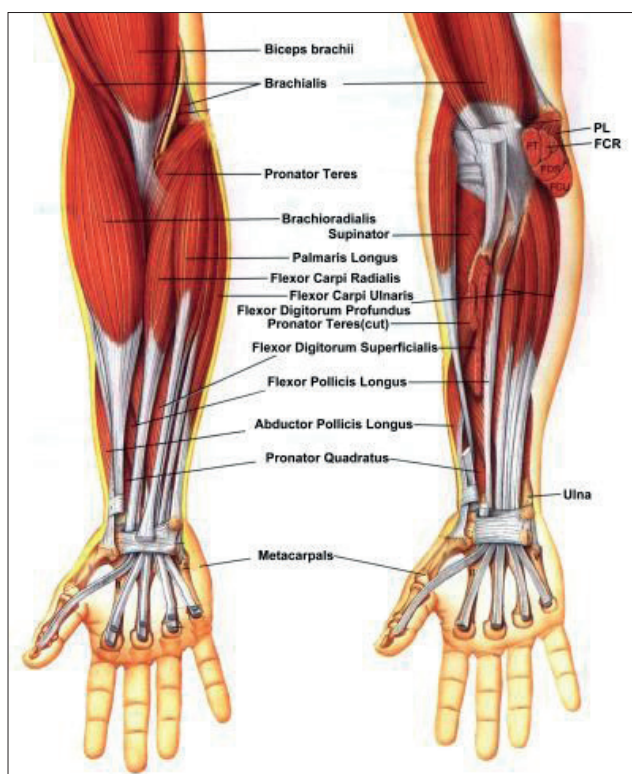


Figure 1. The muscles of the forearm.

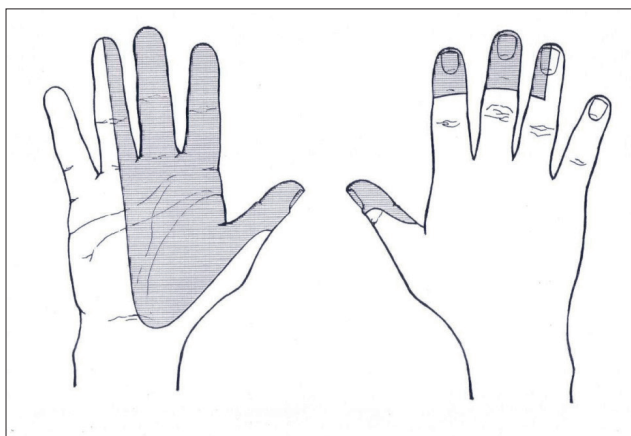


Figure 2. Sensory innervation of the median nerve in a hand

flexorum) covers the channel. In the channel along with the nerve are located tendon flexor muscle of fingers, m. pronator teres, m. pronator quadrates, m. flexor carpi radialis, m. palmaris longus, m. flexor carpi ulnaris, m. flexor digitorum superficialis et profundus and m. flexor pollicis longus. All these muscles supplying the median nerve. Carpi ulnaris M.flexor the inner half, m. Flexor digitorum profundus is innervated by n. ulnaris.

Carpal tunnel syndrome (CTS) was first described in the mid-1800 by James Paget's (Figure 1). The world's best known as peripheral compressive neuropathy and one of the fastest growing technology diseases in the United States. At least 1 out of 10 people develop this disorder or suffering from the symptoms of this syndrome. This is one of the most common causes of absenteeism in the workplace and disability in the United States (2)

Signs and symptoms are: a) pain in the palm of the hand, especially near the thumb and first two fingers; b) numbness and

tingling often occur in the thumb and first two fingers; and c) weakness, usually thenar eminence (muscles at the base of the thumb), can occur when a severe clinical picture (Figure 2) (3).

Compression of the nerve in the carpal tunnel (carpal tunnel syndrome) is recognized as the impact of trauma and attributed to tenosynovitis of the rheumatoid arthritis. Even since 1954, Albert and his colleagues concluded that there are numerous reports describing the spontaneous development of carpal tunnel syndrome of unknown pathogenesis (4).

In case of a longer duration of illness and long-term nerve compression, there is an unnecessary prolongation of the patient discomfort, severe nerve damage, prolonged recovery time after surgery, and generally reduced chances for successful surgical treatment. Thereby reducing the working ability of the patient, leading both to the individual and to the socioeconomic consequences.

At the Department of Orthopedic Surgery, Faculty of Medicine, University of Zagreb, and Zagreb University Hospital Center is conducted a retrospective study on 114 patients and 154 hands with CTS that were surgically treated between 1999 and 2004. In this study, it was found that patients in only 52% of cases within one year since reporting to the physician were referred to an orthopedist. In the period prior to surgical treatment, 96.1% of patients were treated by physical therapy, although all eventually underwent a surgical procedure, and 42% of patients in the same time period it was on sick leave, usually from three to six months. The results demonstrate that the timeliness of surgical treatment is essential to the success of the outcome of the procedure, and that the time which elapses from entering the patient's health care system to the surgical treatment of unnecessary cost.

This situation, besides being detrimental for the patient, and leads to unnecessary economic losses include the expense of physical therapy and absenteeism. The patients involved in the study in question is estimated that these economic losses, in the period prior to surgical treatment, for several hundred thousand Euros higher than in the postoperative period.



Figure 3. EMG median nerve recording procedure

From this stems the need for shortening the period of time that has elapsed since entering the patient in the health care system to its referral to an orthopedic clinic, so as to accelerate the processing and diagnosis of the patient, i.e. shortened unnecessarily long period of nonsurgical treatment. Accordingly, physical therapy is helpful in the treatment (5).

In the diagnosis of CTS we also use provoking tests of which we will mention four that are suitable for use in general practice. These are the Tinel, Phalen, Bilic and Tourniquet test. Tinel's test is positive if the percussion in the carpal ligament is followed with occurrence of pain and/or paresthesia. Phalen's test is performed so that the wrist is placed in the second forced palmar flexion for 60 seconds, and is posi-

tive if within this time span occurs pain and/or paresthesias (Figure 2). Compression of median nerve in this position with carpal tunnel syndrome causes the characteristic symptoms of burning and tingling (6).

Bilic test is performed in palmar flexion of the wrist by 45 degrees by pressing above the median nerve in the distal ridges and mid wrist for 30 seconds. The test is positive if within this time span occurs pain and/or paresthesia. Tourniquet test is performed so that the cuff pressure gauge is mounted on the upper arm and inflated above the systolic pressure value. The test is positive during 60 seconds occurs pain and/or paresthesia in the innervation area of median nerve.

Alongside this symptom, electrical neurophysiological diagnostic is the “gold standard” in the diagnosis of carpal tunnel syndrome, in order to determine the exact location of nerve compression, and in order to set the indication for surgical treatment (Figure, 3, 4, 5) (6).

In the case of known primary disease that caused Carpal tunnel syndrome the primary disease is treated first. The conservative methods of treatment include immobilization, local application of corticosteroids and avoidance of chronic, repeated trauma. If the cause of the syndrome is mechanical

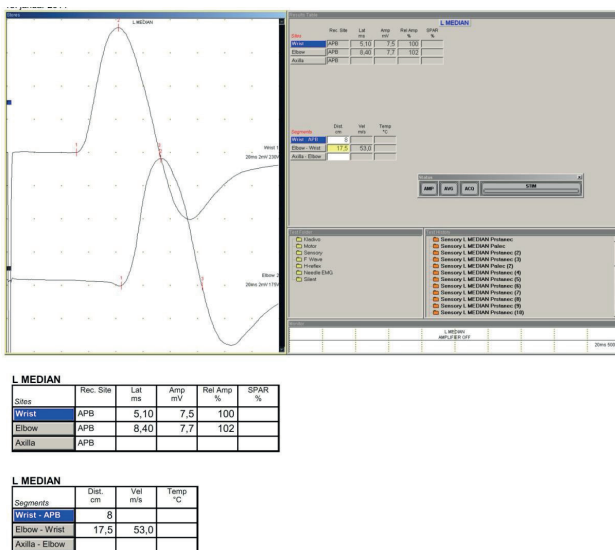


Figure 4. EMNG: Motor Conduction Velocity of nervus medianus

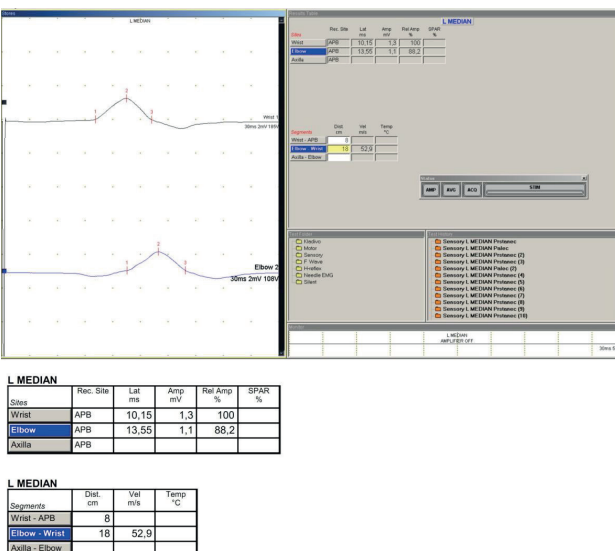


Figure 5. EMNG: Sensory Conduction Velocity of nervus medianus

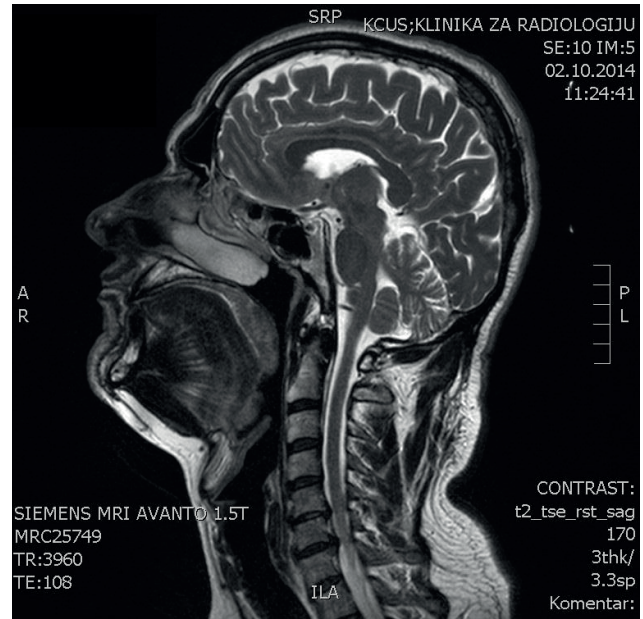


Figure 6. Example of cervical syndrome caused by disc herniation with reduction of liquor space (Source: I.M.)

compression, the treatment is surgical (cutting of retinaculum flexorum).

In Turkey was conducted a study that suggests that treatment with vitamin B6 improves clinical symptoms as well as sensory and electro diagnostic results in patients with carpal tunnel syndrome, and therefore it is advisable to treat carpal tunnel syndrome with vitamin B6 (7).

Another study in Turkey was carried out at the Institute of Neurology in cooperation with the Clinic for Physiotherapy in which patients were included with carpal tunnel syndrome. They are divided into two groups, one in the treatment arm used immobilization and massages, while the other control group used only immobilized arm.

The study results showed that the massage of the painful area only in patients with carpal tunnel syndrome is sufficient for mild cases.

This was also one of the biggest studies with massage treatment in patients with carpal tunnel syndrome. The researchers recommend self-administration of massage methods, and this would reduce the time to go to the doctor and rehabilitation centers, and thereby save money, both for health funds, and patients (8).

Manipulation (effleurage): Thirty seconds smoothing the skin's surface, from distal to proximal forearm. Friction: sixty seconds, massaging the deep tissues from the distal to proximal. (8)

3. CERVICAL PAIN SYNDROME

Cervical pain syndrome (CPS) refers to a range of disorders caused by changes in the cervical spine and soft tissue surrounding it, with pain as the predominant symptom. Neck pain is a common problem for a large portion of today's population.

Factors contributing to this problem are the modern way of life, prolonged sitting and inadequate, fixed or artificial positions. The root of these problems is found in the mechanical disorders of the cervical spine, poor posture and quick movements of the body (9).

Anatomical specificity of the cervical spinal column are: a small side vertebral joints that cervical spine provide great mobility, transversaria foramina through which the vertebral artery (C6-C2) and the spinal cord enters in the vertebral canal.

Cervical radiculopathy causes symptoms that radiate from the neck. Although the problem is in the spine, the symptoms can be felt in the shoulder or arm. Symptoms will be felt in the area where the nerve is in its path.

By clinical examination of the spine the specialist can usually determine which nerve is involved. Symptoms include pain, stiffness and weakness. Reflexes on the upper arm may be affected. (10).

Risk factors for radiculopathy are activities that put excessive or repetitive load on the spine. Patients involved in heavy work or are in contact sports, are more prone to the development of those with radiculopathy more sedentary. A family history of radiculopathy or other spine disorders also increase the risk of developing radiculopathy (Figure 6) (11).

In the younger population, cervical radiculopathy is the result of disc herniation or acute injury. In the older population, cervical radiculopathy is often the result of foramen narrowing and the formation of osteophytes then reduced the amount of disk and degenerative changes in the joints (12).

Cervical syndrome classification:

CERVICAL SYNDROME patients complain of pain in the neck that occurs gradually or abruptly, after taking a certain position, rapid or uncontrolled movements of the neck or cooling.

CERVICOCEPHALIC SYNDROME usually develops as a result of irritation or compression of the nerve roots C1-C3. The main symptom is headache of varying character and intensity. Headache is localized in the neck with a tendency to spread to the shoulders, the face, orbital or auricular region.

CERVICOBRACHIAL SYNDROME result is irritation or compression of the nerve roots C4-C8, mostly due to prolapse of the intervertebral disc, severe degenerative changes or injury.

VERTEBROBASILAR SYNDROME occurs as a result of irritation of the last cervical sympathetic with fiber mesh wrap vertebral artery, causing reflex vascular disorders in the vertebrobasilar basin.

Irritation commonly caused by degenerative changes in the cervical spine: spondylosis (osteophytes), uncarthrosis, spondylosis. Atherosclerosis can worsen symptoms (13).

The typical clinical presentation of patients with cervical syndrome is characterized by the presence of pain and sensitivity in the muscles back of the neck with the spread of pain in the back of the head, shoulders or scapular region (Figure 6). The sensitivity of the muscle can occur during execution of one or more movements, and the headache is a common symptom.

Symptoms and signs are: a) pain in the neck, which may be sharp or blunt; b) the tension in the neck; c) painful and limited mobility; d) inability to perform daily duties due to stiffness in the neck; e) pain in the shoulders and arms associated with pain in the neck; f) fainting; g) dizziness; h) tinnitus; i) blurred vision; j) headache; k) diplopia; l) weakness; m) feeling of heaviness, tenderness and paresthesia in the upper extremities; n) impaired concentration and memory, etc. (13).

Diagnostic imaging such as magnetic resonance imaging, computerized tomography, or myelography should be used as a strategy for assessment. Electromyography is useful in differentiating between the various entities when distinguishing clinical diagnosis. Treatment of this disorder has not been studied systematically in a controlled manner. However, using a variety of treatments, radiculopathy usually improves without the need for surgery. Indications for surgery were persistent pain, increased weakness, or new or progressive process. Future studies evaluating different treatment options will be helpful in guiding practitioners towards optimal economic evaluation (13).

The goal of treatment is absolutely the same as for any other illness. Always seeks the same goal, or cure, and if this is not possible, at least alleviate symptoms and apply palliative care. Since we are talking about a technological disease that affects more and more to older and younger people should therefore work on the prevention of disease. It is very important to advise patients about lifestyle, how to maintain mobility and that despite the difficult situation improve the quality of life.

Treatment without medications should be: a) massage hot/cold; b) rest; c) exercises with light stretching (gently stretch your neck to one, then the other side and keep 30 seconds); d) exercises for neck recommended by physiologists; e) transcutaneous electrical stimulation (TENS); f) short-term immobilization; g) surgical treatment; h) acupuncture; i) traction (enlargement of the intervertebral space), j) medicamentous treatment:

Early and adequate treatment with analgesics, anti-inflammatory drugs, muscle relaxants and help with sleep problems are carriers of pharmacological treatment in patients with neck pain (14).

Performed is a study on how the steroid injections affect the reduction of pain in patients with cervical syndrome, who are waiting for surgery discus, and whether the possible suspension of surgical treatment.

Transforaminal injection of steroids has gained popularity with the explanation that the inflammation of nerve roots causing radicular pain, and because steroids are placed on the local level should relieve symptoms.

Prospective-cohort study indicates a decrease in the need for surgical treatment because of treatment-injection steroid injections. The clinical effect is measurable and statistically significant improvement registered radicular pain (14).

Another in a series of studies on the treatment of cervical syndrome confirmed the effectiveness of acupuncture in the cervical region of patients with radicular symptoms. Favorable results have been seen in almost 90% of cases. These results indicate that treatment of acupuncture cervical region can be effective as the conservative therapy for the treatment of cervical radiculopathy (15).

4. MOUSE SHOULDER

Computers are considered as an integral part of everyday life. They are used in education, health and medicine, science, banking, recreation and entertainment, politically engaged people (16). Approximately 75% of jobs are dependent on the work on the computer (17, 18).

Chen and colleagues examined the effect of five computer mice made at different angles in 12 respondents employed in

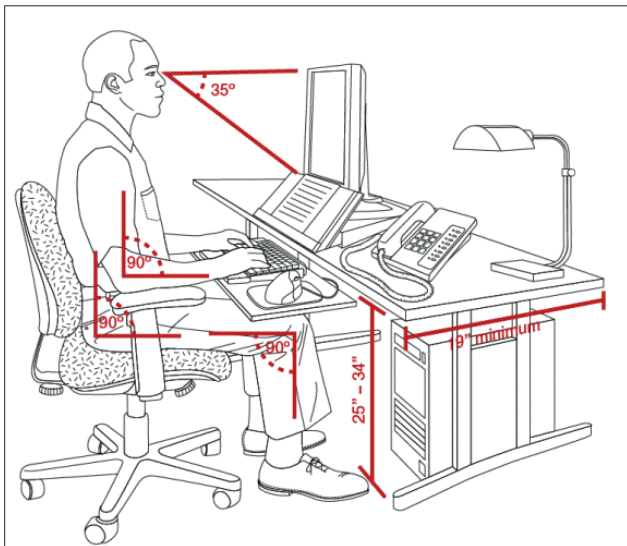


Figure 7. Recommended proper position of the neck, torso, arms and legs when working at a computer

the business sector in Taiwan. They concluded that too frequent use of non ergonomic computer mice causes extreme discomfort in the muscle and tendon system of the hand along with various manifest symptoms in the shoulder and forearm. The use of ergonomic mice custom hand shape, thanks to the different corners of the obliquity have less adverse effect on the activity of the forearm and shoulder. (19)

The shoulder belt is common, even among the most frequent localization of musculoskeletal pain after pain in the back and knees (20).

The long-term work at the computer leads to inflammation of tendons and exchanges shoulder joint, and in severe cases can lead to tearing of tendons and muscles “rotator cuff”. If inflammation persists, the capsule and ligaments of the shoulder joint becomes stiffer and limited mobility. Inappropriate placement of computers may have adverse effects on posture in children (21).

Limited and painful mobility is especially pronounced when raising your arms above your head or behind your back. Long-term pain becomes stronger and leads to the development of muscle weakness areas of the shoulder belt through a series of hands, and preventing further activities.

Symptoms of pain in the shoulder differently vary from intense that it can spread to other parts of the body, to moderate that lingers on the shoulder belt, but still hinder the function of the hinge, and can even lead to sleep disorders.

The anatomy of the shoulder is a specific because the shoulder joint consists of primary, secondary and ancillary wrist joints. The anatomical structure makes the most complex joint of the body. Joints shoulders: glenohumeral joint (shoulder joint primary), Scapulothoracic joint (secondary shoulder joint), and sternoclavicular joint (extra joints).

Muscle groups that may be a potential source of pain are rotator cuff (responsible for balance of the glenohumeral joint), stabilizing the scapula (responsible for the position of the scapula) the primary drivers (responsible for the strong movements).

For the diagnosis of mouse shoulder, the most important is detailed history with regard to occupation and profession of the patient and physical review. We should not forget to ex-

amine whether the patient has in the past had a shoulder injury, or some localized inflammation in the same.

Information about the character, pain intensity and directions of its expansion are of great importance. In fact it is necessary to establish that the primary cause of shoulder pain, and that the anatomical structure of the shoulder is affected. It is known that the pain can be transmitted from the adjacent region to the shoulders, for example. The cervical region, or by visceral fibers of the heart.

In equivocal cases, x-rays of the shoulder joint may help in differentiating existing inflammation of the joints and structure surrounding joint of a possible slight shoulder dislocation.

The primary method for the treatment of mouse shoulder in a timely manner to reduce the strain on shoulders, mostly working with computer mouse.

If the patient is in question, and cannot make a break, they definitely need the to replace old with new ergonomic computer mouse that is adapted to grip and allows the natural position of the hand during mouse use.

NSAIDs are the first drugs of choice. In the long-term intractable pain states and may prescribe therapy application of corticosteroid injections in the shoulder joint. An indispensable aspect of therapy is physical therapy. Physical therapy is appropriate in the chronic phase of the disease, which aims to stabilize and strengthen the muscles of the shoulder belt, and the resultant reduction in pain.

Jan C. Winters and colleagues came to the conclusion that only 50% of patients with newly diagnosed painful condition experience a full recovery within the first 6 months. This percentage rises to 60% in the first year of the onset of pain. They also proved that speaking to the long-term treatment, at the end of treatment, there was no difference in effect between the corticosteroid and physical therapy (22).

Onyebek LC investigated the effects of props during the use of the mouse on the palm, forearm and upper extremities, and came to the result that 90% of respondents who have used the support arm had less pain in the shoulder girdles of those who are not used to. The use of any support results in less tension, and less applied force to a computer mouse during operation, and therefore less hassle and pain in the shoulder (23).

5. PHYSICAL REHABILITATION AND PREVENTION OF TECHNOLOGICAL DISEASES

5.1. The role and organization of the Centers for Physical Rehabilitation (CBR)

If the patient required outpatient treatment, family doctor referred him Physiotherapy in CBR (Community based rehabilitation) i.e. the center for rehabilitation in the community. CBR's are organized within the framework of primary health care and are located within the health centers. CBR—rehabilitation in the community—the definition of a Joint Paper, ILO, UNESCO, WHO, in 1994.

Community rehabilitation strategy based on community development for the rehabilitation, equalization of opportunities and social integration of people with disabilities, their families and communities and the appropriate health of educational, professional and social services.

Community rehabilitation allows people with disabilities

to take initiative and improve their own lives, and to contribute to the community, and not just use the funds and resources that are available. Thus, the entire community and all its members are winners.

CBR became the backbone of the carrier non-institutional organization of the program in physical medicine and rehabilitation of persons with disabilities as well as a large number of chronically ill patients in the prevention of disability.

5.2. The forms of work in the CBR

Rehabilitation system reaches into every community rehabilitation team becomes more flexible and actively participate in all aspects of rehabilitation. Rehabilitation includes all age groups.

Treatment in the community increases the accessibility and quality of services for people with disabilities and their families.

Services include primary treatment damage and disability in the center and at home, as well as patient education, health promotion and prevention of disease and disability.

CBR Team composition: a) 1 medical doctor specialist in physical medicine and rehabilitation; b) 1 physiotherapist; c) 1 occupational therapist; d) 2 medical technicians—physiotherapist; e) Medical technician—general direction; f) 0.5 Social Worker; g) 0.4 special education teacher—speech therapist.

5.3. The most common reasons for referral of patients in the CBR

The most common reasons due to which family physician refers patients to the ambulance treatment in rehabilitation centers in the community are:

Adult patients: a) Cervical pain syndrome; b) Lumbar pain syndrome; c) Rheumatic diseases; d) Rehabilitation after stroke. Children and young people: a) Neurological children; b) Deformities of the spinal column; c) Deformities of the lower extremities; d) Rehabilitation after injuries of the locomotor apparatus

6. ACCREDITATION STANDARDS RELATED TO PHYSICAL REHABILITATION

Standard 5I: Center/Service for Physical Rehabilitation

Health Center promotes the concept of active participation of disabled people and their families in identifying needs and resources in rehabilitation develop a shared vision of their life in society, the implementation of the vision and the monitoring and evaluation of implementation.

Criteria

5I.295 Within the health center there is a center for the rehabilitation of disabled persons (CBR) with support groups and self-help.

5I.296 center is managed by the appointed specialist in physical medicine and rehabilitation.

5I.297 Depending on the systematization of jobs, the Centre employed physiotherapy technicians, occupational therapists, nurses, general direction.

5I.298 Physical therapists adhere to the Code Company physiotherapists with permission to work in practice.

5I.299 specialist in physical medicine and rehabilitation therapists are members professional organizations that provide guidance on continuing professional development.

5I.300 All employed staff in service has a documented plan for ongoing personal professional development that includes measurable goals for learning.

5I.301 There is evidence in writing of actions taken on the permanent professional development that reflects the plan.

5I.302 There are dated, documented criteria for referring patients to physical therapy. The criteria are written/reviewed in the past three years.

5I.303 There are dated, documented procedures on granting new cases to team members for physical therapy. The procedure is written/rewritten in the past three years. Instructions: Cases should be awarded according to the skills and experience required for the indicated treatment, together with the need for equitable distribution of the number of cases.

5I.304 There are documented procedures on the regulation of proper completion of the treatment of patients having implemented the rehabilitation plan. The procedure is written/rewritten in the past three years.

5I.305 estimated needs of the patient/user for the physical treatment by physical examination which receives measurable data for evaluation.

5I.306 Each patient was referred to physical therapy has an individual rehabilitation plan for the implementation of physical therapy.

5I.307 Before each procedure/treatment is carried out risk assessments. Note: This includes risk assessment, contraindications to treatment and precautions. Also, include the verification of hazards such as wet floors, and the provision of suitable clothing and shoes worn by therapists and patients/users.

5I.308 rehabilitation program undertaken only after the results of the risk assessment.

5I.309 risks associated with the use of electrical equipment reduces the use of safety switches.

5I.310 Before using the apparatus and its application to a patient, is made visual and physical verification of security equipment.

5I.311 There is plenty of space and are available partitions/curtains in the room/rooms for physiotherapy treatment that patients provide visual privacy when using the equipment.

5I.312 equipment is kept in a place where not to interfere with access to fire exits, entrances, hallways and other equipment.

5I.313 Health Centre organizes regular meetings for people with disabilities and their family members, performs basic assessment of their needs and implements early education and basic rehabilitation programs under the guidance of an appropriate therapist.

5I.314 health center, or CBR, is developing a multi-sectoral cooperation and contracts with appropriate institutions for labor and social policy, education, institutes Employment, sports institutions, etc. Panel evidence-based clinical practice guidelines on musculoskeletal rehabilitation interventions,

7. DISCUSSION AND RECOMMENDATIONS ON THERAPEUTIC MODALITIES

Several studies have reported positive or negative association between computer use and musculoskeletal symptoms (24-26). The prevalence of Computer Carpal Syndrome (CTS) among computer professionals based on clinical signs

and symptoms is approximately 13,1% and almost 1 out of every computer professional suffers from this condition. Very few data published about this topic – studies about CTS prevalence based on clinical signs and symptoms, according to Ali KM and Sathiyasekaran BWC, ranging from 3 to 6 % only, but we think real situation is much worse. Postural stress due to inadequate workstation ergonomics (inappropriate location of monitor, keyboard or mouse) discussed as cause of all mentioned technological diseases in this text (Figure 7). Aydan Oral et al. Had written paper about Evidence Based Physical Medicine and Rehabilitation strategies for patients with cervical radiculopathy due to disc herniation. They reported that neck pain affected 4,82% of the world population in 2010, ranks second after low back pain among musculoskeletal disorders as one of the leading causes of years lived with disability, with contribution of 33,6 million years (26). Physical medicine and rehabilitation interventions in radicular neck pain and their evidence based are: a) educational interventions; b) exercise; c) workplace interventions/ergonomics; d) physical agents (TENS, therapeutic ultrasound, low-level laser therapy) pulsed electromagnetic field therapy, non-invasive brain stimulation techniques, etc); e) injection therapy (epidural steroids, botulinum toxin, ozone); f) cervical collars; g) traction; manual therapies (massage, manipulation and mobilization (commonly used in the management of discogenic neck pain); complementary and alternative medicine treatments (acupuncture, herbal medicine, etc.). Much research efforts have been spent and several risk factors such as heavy lifting, lifestyle, psychosocial factors identified, but the etiology of technological diseases are still or not enough unclear. Recurrences and functional limitations can be minimized limitations with appropriate conservative management, including medications, physical therapy, exercise and patient education. But, these subgroup of developing chronic and disabling symptoms generating large social costs (26).

According to the Panel evidence-based clinical practice guidelines on musculoskeletal rehabilitation interventions the key points to clinicians are (23) (Table 1 and 2):

Therapy	Acute	Chronic
Exercise/neuro-muscular reeducation	ID	A
Traction	C	C
Ultrasound	ID	C
TENS	ID	ID
Massage	ID	ID
Thermotherapy	ID	ID
Electrical stimulation	ID	ID
EMG biofeedback	ID	ID
Combined rehabilitation interventions	ID	ID

Table 1. Summary grid of neck pain guidelines. *Adapted from the Philadelphia Panel Members and Ottawa Methods Group.2. A, benefit demonstrated; C, no benefit demonstrated; EMG, electromyographic; ID, insufficient or no data; TENS, transcutaneous electrical nerve stimulation

- The Philadelphia Panel recommends continued normal activities for acute, uncomplicated low back pain and therapeutic exercise for chronic, subacute, and postsurgical low back pain.
- The Philadelphia Panel also recommends transcutaneous electrical nerve stimulation and

Therapy	Calcific tendinitis	Capsulitis, bursitis, tendinitis, nonspecific pain
Ultrasound	A	C
Exercise	ID	ID
TENS	ID	ID
Massage	ID	ID
Thermotherapy	ID	ID
EMG biofeedback	ID	ID
Electrical stimulation	ID	ID
Combined rehabilitation modalities	ID	ID

Table 2. Summary grid of shoulder pain guidelines. *Adapted from the Philadelphia Panel Members and Ottawa Methods Group.1A, benefit demonstrated; C, no benefit demonstrated; EMG, electromyographic; ID, insufficient or no data; TENS, transcutaneous electrical nerve stimulation.

- exercise for knee osteoarthritis.
- For chronic neck pain, the Philadelphia Panel recommends proprioceptive and therapeutic exercise.
- The Philadelphia Panel found evidence to support the use of therapeutic ultrasound in the treatment of calcific tendinitis of the shoulder.
- The main difficulty in determining the effectiveness of rehabilitation interventions is the lack of well-designed, prospective, randomized, controlled trials.

Acute neck pain is often associated with injury or accident, whereas chronic neck pain is related to repetitive injury. Neck pain is commonly managed with analgesics and rest, but referrals to rehabilitation are increasing. The Philadelphia Panel sought to improve the appropriate use of rehabilitation interventions for neck pain by providing evidence-based guidelines. A summary of the Panel's recommendations can be found in Table 2.

Rehabilitation specialists offer several conservative interventions for the management of shoulder pain. There are few published guidelines for the management of shoulder pain.

8. CONCLUSION

Thanks to the high use of computers, resulting diseases of the modern era, known as the "Technological disease." Under this term we mean the diseases caused by the harmful influence of the job in the first place, the working position in which it is involved excessive work for a computer, such as the banking sector, the health sector and many others who are directly or indirectly connected with the work on the computer and overuse keyboards and computer mice, which are in a number of cases of non-ergonomic, and inappropriate for a handful. Establishing the diagnosis of diseases of technology is an interdisciplinary process that requires special knowledge in medicine and related fields related to health and safety at work. Determining the causes and diagnosis of occupational diseases is carried out according to the criteria of modern medicine work.

First, we identify the clinical picture of the disease on the one hand and identification in the working process on the other side, and their immediate connections. Medical history is the gold standard, because without it, it would be possible to find information on working conditions and the duration and intensity of exposure to a particular hazard from the workplace. The intensity and length of exposure to harmful factor must be that level that is known and proven scientific

research that can damage health. Prevention would involve, educate employees by computers to ensure better and more regular position of the spine and shoulder while working at the computer, as well as the use of stylish ergonomic mice in hand. Of course, adequate work breaks are required, in order to avoid fatigue and exhaustion syndrome, but today it is difficult to appreciate the extent and speed of work. No less important and efficient are exercises to strengthen the shoulder belt, as well as exercises for posture.

CONFLICT OF INTEREST: NONE DECLARED.

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