

Return to work of individuals with arthritis: A review of job performance and retention

Satoko Yasuda Crockatt*, Pam Targett, David Cifu and Paul Wehman
Virginia Commonwealth University, Physical Medicine and Rehabilitation, Center for Rehabilitation Science and Engineering, Richmond, VA, USA

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Abstract. With so many people affected by arthritis and the significant impact it has on themselves and on their families, employers as well as on society, employment of individuals with arthritis is an important topic to consider. A review of literature was conducted to examine the issues that arise from arthritis, factors that influence work disability and employment retention, and interventions and services that are available to promote and retain employment for individuals with arthritis. In recent years, employers have begun to proactively intervene in terms of both prevention activities as well as provision of accommodation. Work disability is a common occurrence for individuals with arthritis and factors that influence work disability for those with arthritis include employment factors, employee factors, disease factors, and other factors such as access to health care and vocational rehabilitation. It is critical to consider the complex interaction of these factors in order for individuals with arthritis to remain productive and future research must consider all of these aspects when developing and implementing interventions.

Keywords: Arthritis, employment, work disability, vocational rehabilitation

1. Introduction

Arthritis is the second most frequently reported chronic condition in the United States, with osteoarthritis (OA) and rheumatoid arthritis (RA) being the first and second most common, respectively [14]. The annual incidence in North America is 24–75/10,000 [48] and its prevalence is expected to increase as the US population ages [20]. In 2002, 43 million (21%) of US adults aged 18 and older had self-reported or doctor-diagnosed arthritis and an additional 23 million adults (11%) had possible arthritis [15,51]. Annually, it results in 39 million physician visits, 744,000 hospitalizations, 3 million visits to outpatient departments, and 2.2 million visits to emergency departments [17].

In 2001, 68 percent of people with arthritis or chronic joint symptoms were younger than 65 years old. [19]. Arthritis prevalence increases with age [15] and as the population ages, the number of US adults with doctor-diagnosed arthritis is projected to increase from 42.7 million in 2002 to 64.9 million in 2030 [51]. Arthritis affects more than 34 million Caucasians, more than 4.5 million African Americans and nearly 2.6 million Hispanics and the prevalence of arthritis is higher among women (24.3%) than men (17.1%) [15]. The purpose of this paper is to review the current literature on challenges that individuals with arthritis are faced with regards to employment and interventions that are available to promote employment as well as retention of employment.

2. Osteoarthritis and rheumatoid arthritis: Critical differences and issues for work performance

Osteoarthritis, the most common type of joint disease, is a heterogeneous group of conditions resulting in

*Address for correspondence: Satoko Yasuda Crockatt, Virginia Commonwealth University, Center for Rehabilitation Science and Engineering, Theatre Row Building, 730 East Broad Street, PO Box 843038, Richmond, VA 23298-3038, USA. Tel.: +1 804.827.2562; Fax: +1 804.827.0663; E-mail: syasuda@vcu.edu.

common histopathologic and radiologic changes [38]. It is a degenerative disorder resulting from the biochemical breakdown of articular cartilage in the synovial joints [38]. In the United States, approximately 80–90% of individuals older than 65 years have evidence of primary osteoarthritis. Osteoarthritis has a higher prevalence among men when it occurs before the age of 45, but women predominate after age 55 [33,79]. Although osteoarthritis is thought to be largely due to excessive wear and tear, secondary nonspecific inflammatory changes may also affect the joints. Osteoarthritis typically develops slowly and progresses over several years. Primary osteoarthritis is a common disorder of the elderly, and patients are often asymptomatic. Patients with symptoms usually do not notice them until after they are aged 50 years. Deep, achy, joint pain exacerbated by extensive use is the primary symptom. Also, reduced range of motion and crepitus are frequently present. Joint malalignment may be visible. Heberden nodes, which represent palpable osteophytes in the distal interphalangeal joints, are characteristic in women but not men. Heberden nodes are features of osteoarthritis, not rheumatoid arthritis. Inflammatory changes are typically absent or at least not pronounced. Usually, the pain slowly worsens over time, but it may stabilize in some patients. Osteoarthritis of the knee is a leading cause of disability in elderly persons [91]. Osteoarthritis also causes millions of Americans to miss work because of back pain.

Historically, osteoarthritis has been divided into primary and secondary forms, although this division is somewhat artificial. Primary osteoarthritis is typically considered to be idiopathic, age-related degenerative changes (“wear and tear”) of the affected joints, without specific antecedent disease, injury, or trauma [38]. Secondary osteoarthritis is conceptually easier to understand. It refers to degenerative disease of the synovial joints that results from some predisposing condition, usually trauma that has adversely altered the articular cartilage and/or subchondral bone of the affected joints. Secondary osteoarthritis often occurs in relatively young individuals. Age-related osteoarthritis occurs in many locations, predominantly the joints of the hands (specifically the distal interphalangeal (DIP) joints, proximal interphalangeal (PIP) joints, and carpometacarpal (CMC) joints at the base of the thumb but also includes joints of the knees, hips, feet (first metatarsal phalange (MTP) joint) and lumbar and cervical spine (apophyseal articulations). While OA can have an association with other diseases, it is not typically considered a systemic disorder, thus its effects are limited to the joints of the body.

Rheumatoid arthritis is a chronic systemic inflammatory disease of undetermined etiology involving primarily the synovial membranes and articular structures of multiple joints. The presenting complaint may be remote from a joint or may involve inflammatory symptoms at a joint. The disease is often progressive and results in pain, stiffness, and swelling of joints. In late stages deformity and ankylosis develop. The prevalence of RA is approximately 1% in the United States. The occurrence rate ranges from 0.5% to greater than 5% depending on ethnic variation. Age of onset is usually between 25 and 50 years. The disease can occur at any age but tends to peak in the fourth and fifth decades of life. The pediatric form of RA is juvenile rheumatoid arthritis (JRA), which is characterized by onset in children younger than 16 years.

Rheumatoid arthritis is usually a disease of insidious onset, although it can be abrupt. The diagnosis typically is made when 4 of 7 qualifying criteria established by the American Rheumatism Association are met. These qualifying criteria include; morning stiffness lasting longer than 1 hour before improvement, arthritis involving 3 or more joints, arthritis of the hand, particularly involvement of the proximal interphalangeal (PIP) joints, metacarpophalangeal (MCP) joints, or wrist joints, bilateral involvement of joint areas (ie, both wrists, symmetric PIP and MCP joints), positive serum rheumatoid factor (RF), rheumatoid nodules, or radiographic evidence of RA. Other contributing history includes; general malaise, weakness, fever of undetermined etiology, weight loss, myalgias, tendonitis, and bursitis. Joint involvement is typically polyarticular and symmetrical, usually sparing the distal interphalangeal (DIP) joints. Joint involvement and inflammation is evinced by; edema, effusion, warmth, tenderness to palpation, destruction (a late finding), subcutaneous rheumatoid nodules, swan-neck and boutonniere deformities, ulnar deviation of fingers at MCP joints (late findings), and bursitis. RA can also affect the cruciate ligament of the atlanto-axial (C_{1–2}) articulation in the cervical spine, resulting in spine instability and elevating the risk for spinal cord insult and injury, particularly with falls or head trauma. Importantly, RA is a diffuse systemic disease involving many areas of the body. Other organ systems that may be also be affected include; cardiac (carditis, pericarditis), pulmonary (pleuritis, intrapulmonary nodules, interstitial fibrosis), hepatic (hepatitis), ocular (scleritis, episcleritis, dryness of the eyes), vascular (vasculitis), skin (subcutaneous nodules, ulcers),

Thus, while both OA and RA can result in periods of physical limitation related to joint pain and associated

functional decline, there are important differences between these two most common arthritides with respect to the workplace. Secondary OA, the most common arthritis seen in younger adults, will typically affect a single joint or region of a limb. Thus, that specific region would need to potentially be adjusted for in the design of the work site to reduce undue or repetitive stress or trauma. Importantly, if the worker has ongoing joint or regional pain, they may be more likely to modify their activity or work to accommodate these difficulties, and thus may be already adding stress to an uninvolved region and potentially predisposing it to future injury or arthritis. Individuals, more likely older, with multiple joint (or region) involvement from primary OA may have more complex ergonomic challenges at the worksite, requiring both a multitude of modifications and an ongoing process. Rheumatoid arthritis has a more typical pattern of at risk joints, specifically the larger joints of the hand and wrist, and thus workplace modifications can specifically target these regions. Reducing the stresses across these joints by modifying job tasks, utilizing adaptive aides, employing joint protection techniques, and increasing the use of larger joints (elbows or shoulders). Additionally, periods of rest and awareness of the importance of energy conservation are also key elements to manage the overall systemic effects of RA. An awareness of the non-articular, systemic (organ) effects of the individual's RA is critical, so that both the worker and the employer can be attuned to signs and symptoms of worsening. A close, therapeutic relationship between the worker and their arthritic physician (e.g., rheumatologist, physiatrist, internist) is vital.

3. Issues resulting from arthritis

3.1. Work disability

Arthritis is the leading cause of disability in the United States [18], causing more frequent activity limitation than heart disease, cancer or diabetes [12]. This is particularly problematic since arthritis affects individuals in the prime of their working years [19]. According to the National Health Interview Survey data, there was an 11% drop in the workforce participation among working age persons with arthritis between 1970 through 1987, reporting some type of activity limitation due to the disease [86]. Similarly, in a study conducted in Minnesota [36], 13.7% of persons with OA and 26.3%

of those with RA retired early due to illness, compared to 3.4% of those without arthritis.

There seems to be an association between the pattern of joint involvement in OA and repetitive use. Work activities that require repetitive use of particular joint groups lead to OA [52]. Jobs that require kneeling and squatting predispose individuals to knee OA. While work that requires heavy lifting can lead to hip OA [52]. Studies show an increase in knee OA in those who in engage jobs that require high physical demands like dock workers, shipyard workers, miners, concrete workers, when compared to office or clerical staff [25,26,90].

Rheumatoid arthritis has been reported to affect individual's ability to work early on [13,50], in examining work-related factors that contribute to increased risk of work disability in people with RA, reported that 7.5%, 18%, and 27% were work disabled at 1, 5, and 10 years, respectively. A systematic review of studies on productivity loss due to RA [16] reported that from 22 to 76% (median 54%) of workers with RA had experienced work loss due to the disease within the past 6 months, and 36 to 84% (median 66%) within the past 12 months. The median of the estimates of mean duration of work loss within the past 12 months was 39 days (range 7–84 days).

Being competitively employed can have positive effects on the quality of life of people [82]. Individuals with arthritis are of no exception. Work disability, as a result of arthritis onset, has been reported to diminish their quality of life, such as lower levels of self-esteem, life satisfaction, adaptation, perceived health status, and specifically for those with rheumatoid arthritis, higher levels of depression and pain [35,53,62]. Despite the important role employment plays in the quality of life of people, individuals with arthritis are faced with the challenge of managing the negative physical symptoms of arthritis that they experience while trying to maintain their employment.

3.2. Low utilization of VR services

Very few people with chronic disease, including those with arthritis, receive public vocational rehabilitation services [37]. People with arthritis represent 8.3% of cases of work limitation [75] but make up 2% of those served by VR [8]. What is more disturbing is that even though there are reports that interventions are more effective when provided to individuals with arthritis prior to work disability [6,71], VR services are typically given after a job loss has occurred and the results are disappointing. In a randomized trial design

study, unemployed persons with musculoskeletal conditions and with desire to return to work were no more likely to regain employment after referral to public VR than those who were not referred [56,83].

3.3. *Cost on society, family, individuals*

Arthritis burdens both the individual and society with substantial financial costs [13,27,63]. Individuals experience significant reduction in income [36,88] and it has been reported that average direct medical costs can range from \$5425 to \$ 10,053 [27,64,85]. Those with RA have been reported to have over \$4000 more in medical expenses compared with workers without RA [66]. The noneconomic impact of work disability on the individual and family members can also be substantial, such as social participation and household activities [78,89].

The cost of arthritis-related work disability has been reported to be \$49.6 billion in the United States in 1992 [49], costing the US economy \$86.2 billion annually [21]. The burden that falls on the employers is twofold. First, the employers incur increased health care costs due to rise in health insurance premiums from claims made by their employees with medical issues. Second, the employers experience decreased productivity. Indirect costs from lost productivity due to arthritis have been reported to exceed the direct medical costs of providing health care [9,54,61,87], with a mean annual indirect cost of \$9,744/year/patient (1998 US dollars) according to a review of cost studies of people with arthritis [67]. Additionally, employers are faced with indirect costs that stem from their employees having arthritis. This comes in the form of employees being absent from the job as well as productivity lost while the employee is at work but is not performing to the fullest due to their health issues (presenteeism). In a synthesis of evidence about the total cost of health, absence, short-term disability, and productivity losses for 10 conditions, arthritis was estimated as having one of the highest overall economic burdens on employers in terms of absenteeism and presenteeism (on the job productivity) [44].

4. **Factors associated with work disability or unemployment**

Individuals with arthritis are faced with numerous barriers, which prevents them from retaining their employment. Individual or personal barriers involve phys-

ical limitations such as fatigue, not being able to use their hands, depression, pain, bowel and bladder issues, changes in cognition and communications, and spasticity [57]. Workplace barriers may include not being able to choose their rest periods, physical activities (e.g. working for 8 hours, handling, and prolonged sitting), working conditions (e.g. being too cold), task related activities (writing, repetitive work), and worksite access issues [5].

A number of cross-sectional and longitudinal studies have analyzed various socio-demographic, clinical, and work related factors associated with work disability or unemployment among persons with arthritis. The results of these findings have been summarized in four recent reviews of the literature. Sokka, and Pincus [74] analyzed predictive and associative markers in 15 studies. They found individuals who were not working have more joint involvement, radiographic damage, and/or laboratory abnormalities than those who were employed. Demographic variables such as age, occupation, level of education, duration of disability, and functional status of performing activities of daily living appeared to identify work status more than physiological variables.

De Croon et al. [29] conducted a review of literature on factors that predicted work disability in individuals with RA. Of the nineteen publications between 1988 and 2004 that were identified, 13 met the methodological criteria and were examined by using a rating system that assessed the level of evidence for the predictive factors. Results showed strong evidence that physically demanding jobs, low functional capacity, old age, and low education consistently predicted work disability. On the other hand, biomedical factors did not consistently predict work disability. Due to lack of studies that met the selection criteria, there was no evidence found to support personal factors predicting work disability, such as coping style, or work environmental factors that included autonomy, support and work adjustments roles in employment. The authors concluded that work disability associated with RA is a "biopsychosocially determined misfit" between individual capability and work demands.

Verstappen et al. [81] reviewed 27 articles that examined work disability and employment of individuals with rheumatoid arthritis, published between 1980 and 2002. With regards to sociodemographic variables, the authors found that individuals who were older, less educated, and earned lower income prior to RA onset were more likely to be work disabled. Inconsistent findings were reported for marital status and

race was not a risk factor for work disability. Those with much greater functional disability and underwent joint surgery or received more disease modifying anti-rheumatic drugs (DMARDs) or used a glucocorticoid were also more likely to be engaged in work disability. With regards to work-related factors, individuals who were not working due to RA onset often had blue collar jobs and more physically demanding jobs compared to those who were still employed.

Burton et al. [16] reviewed studies that examined the relationship between RA and reduced workplace productivity from an employer perspective. Of the 307 articles that were screened, 38 met the selection criteria for the review. A median of 66% of employees with RA experience work loss due to RA in the previous 12 months. The median duration of the work loss was 39 days. Having a physically demanding type of work, more severe RA, and older age were consistently predictive of work disability after onset of RA. The authors concluded that disease status ultimately determined work disability and should be the primary target for intervention.

Transportation to and from the workplace can prevent individuals with arthritis from maintaining employment [50,57]. However, transportation issue is dependant upon the individual circumstances since those who can drive to work can obtain a handicapped license plate or permit and are not faced with this issue [11]. It is the workers who use public transportation that often report commuting as a major problem [57].

5. Factors associated with maintaining employment

The majority of the research has focused on examining factors associated with the risks of work disability for individuals with arthritis, with much less looking at factors that affect retention of employees with arthritis. Support from management and employers is a critical part in maintaining employment for those with RA [30, 80]. Many individuals with arthritis are faced with multiple challenges and make major adaptations in order to maintain work [57]. Some changes are more advantageous to maintaining employment than others [22]. Allaire [10] summarized the various work changes that assist employees with arthritis in preserving employment. These included cutting back on employment activity, using sick days, changing their jobs, using job accommodations provided by the employers, and other types of changes such as help with commuting, ob-

taining assistance from coworkers, timing their work schedule according to their fatigue level, and getting up earlier to manage morning stiffness. The author concluded that there was little evidence with regards to the efficacy of these various work changes. Specifically for those with RA, the most helpful adaptations made to continue working are reported to be change job or alter career path, alter work hours, use more disease modifying anti-rheumatic drugs, sleep more, and work at home [57].

Lacaille et al. [50] in addition to identifying physical function and pain influencing work disability, identified work-related factors that are associated with increased risk of work disabilities for those with RA. The authors reported that the risk of work disability is lowered for individuals who are self employed, whose work stations are modified, that work was important to the person, and who received continued support from family towards employment. These factors are potentially modifiable and with effort to do so, will consequently help individuals with RA remain employed.

More recently, Varekamp et al. [80] investigated what employees with RA need to retain their employment, from both their perspectives as well as those of the health professionals. Among the employees with RA, employer support, understanding and acceptance of RA as well as responsibility and coping ability, suitable working conditions, support from coworkers, health professionals, and the organization were reported to be necessary for them to continue working. From the professional's perspective, well informed professionals who cooperate, employees' coping capacities and commitment to work, financial regulations at the workplaces, adequate social security provisions, medication, and therapy, a positive attitude on the part of employers and colleagues, and suitable conditions were reported to be necessary for continued employment. The authors concluded that factors necessary for continued employment for individuals with RA lie at different psychosocial, practical, organizational and social policy levels.

In addition to the work changes, coping skills and self-management efforts of those with arthritis to remain productive and healthy plays a significant part in remaining employed [22,39]. Studies have focused on cognitive coping efforts, such as acceptance, positive reframing, and relaxation to manage their symptoms or losing their job due to arthritis [1,58] but Gignac [40] recently examined behavioral coping strategies that 492 individuals with osteoarthritis or rheumatoid arthritis used to manage their arthritis and employment. Coping

behaviors reported at home and work included adjusting time spent on activities, getting help from others, modification to activities and anticipatory coping (e.g. planning, caution, movement such as stretching and exercising to minimize symptoms, and alternating rest with activity). Fewer coping behaviors were reported at the workplace than at home and more anticipatory coping were reported by those who expected to remain employed. Other factors that were associated with maintaining employment included modification to activities, longer disease duration, and discussing arthritis with their employers.

6. Interventions that promote employment

6.1. Vocational rehabilitation

Vocational rehabilitation is one way to address work disability and job loss. However, there is little evidence regarding the effectiveness of vocational rehabilitation [6]. A review of the vocational rehabilitation programs in patients with chronic rheumatic diseases [28] reported that the rate of successful return to work varied from 52 to 69% [8,72,76,77]. Studies that have examined the effects of vocational rehabilitation have reported their job tenure as being short-termed [37].

6.2. Programs to assist job retention

Studies suggest that prevention of work disability and retaining their job may be more effective rather than assisting individuals to return to work [4,11,31,84]. A considerable amount of arthritis related work disability occurs early after disease onset [13,34,47,60,73,84]. Of those with RA, 20% to 40% have quit their jobs completely as a result of RA within the first 3 years of the disease [13,31,32]. Therefore, it is important that intervention be provided as soon as possible in order to minimize the effects of work disability, preferably while the individual is still employed. Providing accommodation for impairment related work problems is the primary job retention intervention [11,70].

A few programs to assist individuals with arthritis retain employment have been developed. In Project Alliance, although most participants did not complete the program, among those who did, 80% retained employment (need to contact author for detail as to why many did not complete) [70]. Similarly, 92% of employed participants with arthritis retained employment

6 months after participating in the Job Raising Program, which used a self-improvement model of vocational rehabilitation developed for individuals with arthritis [3].

Allaire et al. [6] conducted a randomized controlled trial with 242 participants with 48 months of follow-up to determine the efficacy of vocational rehabilitation provided to persons with rheumatic diseases while they were still employed but were at risk for job loss. The experimental group received two 1.5 hour sessions of vocational rehabilitation where barriers in the workplace, in commuting, and in the individual's home were identified using Work Experience Survey tool [69]. The counselors interviewed participants face-to-face using the tool. After barriers of the participant were identified, the participant and counselor prioritized the barriers. Potential solutions were suggested and their feasibility was discussed. The best solutions were identified as a plan of action. If the participant desired, an on-the-job evaluation of barriers was available and likewise, counselors could contact an employer on the participant's behalf. The control group received printed materials about disability employment issues and resources by mail. Results indicated that job retention intervention effectively prevents job loss for persons with rheumatic diseases at risk for job loss if it is provided while they are still employed. Also, there were significant differences between groups at 24 months and 48 months follow-up. This suggests that although intervention was brief, the effect is long lasting and highly cost effective.

Allaire [7] examined the effectiveness of job retention intervention in employed individuals with rheumatic diseases who are at risk for work disability. One hundred and twenty-two participants in the experimental group received intervention which consisted of the following components; identification of work barriers using WES tool [69] and solutions, vocational counseling and guidance, and education and self-advocacy. The control group received copies of pamphlets and fliers about how to manage health-related employment issues and available resources that experimental group participants received. Result showed that job loss was delayed and satisfaction level higher in the experimental group compared to the control group, suggesting that job satisfaction may lead to job retention.

In order to minimize the effects of work disability, health professional need to identify workers with arthritis early so that they can provide intervention to those who are at risk of work disability [45]. The Work Limitations Questionnaire was developed to assess limitations of workers with health conditions and

the validity has been reported for use amongst workers with OA [59]. The Work Instability Scale assesses the need for workplace modifications among workers with rheumatoid arthritis and it has been reported to have 82% specificity for identifying need for modification [41].

6.3. Health and disease management programs provided by employers

Given that the most individuals with arthritis develop the illness between 35 and 50 years of age, and that many experience functional limitation that results into reduced productivity, employers have vested interest in proactively accommodating individuals who develop the disease to prevent work disability and so that individuals are able to maintain their employment.

More and more employers, recognizing the relationship between poor health and employment costs as well as retention [23,24,42], are proactively providing services and programs that increase productivity and morale and incentives for staying at work, such as training, health promotion, fitness facilities, and leisure activities. A well designed health and disease management program that is properly implemented has been reported to enhance the quality of health care that are provided to workers, improve their productivity, and lower their health risks [46,68], as well as decreasing costs [2,43].

Mahalik et al. [55] reviewed the literature on arthritis with a specific focus on worksite interventions aimed at improving employability. Their review stressed the need to treat and assist individuals with arthritis with employment. They found that when accommodations were made a multifaceted was used, however often-times individuals with arthritis either chose not to seek accommodation due to the potential stigma associated with disclosure and/or were not aware of possible adjustments. The authors noted that there is a small, but continually growing body of research in this area. More recent new is the report of work site interventions to assist individuals with employment. The authors recommend that future research in this area should use a combination of psycho-educational and behavioral components within a cognitive-behavioral approach. The need for randomized, comparative studies measuring multiple outcome variables along with long term follow up to better measure the effectiveness of worksite interventions is also affirmed.

7. Discussion

There are a limited number of studies evaluating the effectiveness of vocational rehabilitation services and/or programs for individuals with arthritis. One approach, proven effective with other populations, to prevention or reoccurrence involves analyzing the person's work activities in enough detail to identify those features of his working life which are placing him at risk. It is not unusual for a patient to want some type of "quick fix" to allow him or her to immediately return to work. However, simply receiving physical relief fails to identify what caused or aggravated the problem in the first place thereby initiating possible recurrence.

Instead, it is recommended that the management of work related disability should start early on. The clinician (rehabilitation team representative) should visit the work place in order to identify problems and assess what factors contributing to the patient's condition are under his or her direct control. This type of functional assessment is the first step toward identifying effective work place supports and accommodations that may enable the person to return to work. Supports may include any one or a combination of instruction on different ways to complete tasks and assistive technology. In some instances, this may require the team member to work with the firms' occupational health department. If a person is going to work at a new place of employment this may be done in conjunction with a vocational rehabilitation provider.

If a worksite visit is not feasible, then the team will have to settle for interviewing the patient about tasks performed and observe him or her demonstrating how it is done. Unfortunately, a lot of critical information can be lost, as this approach is not nearly as informative as making direct observations in the actual work setting. Additionally, every patient and workplace is different. Thus, there is no simple formula for gathering the needed information. Again, making direct observations in the real work setting can be crucial to assisting an individual with arthritis with returning to work either at preinjury workplace same job, different job in same work place or gaining employment in a new place of employment.

Once observations are made, the team representative should be in a better position to help determine which risks can be eliminated by teaching the patient a new way of working, which require minor changes and which require more radical changes. Radical changes often will involve negotiations between the employer and the worker. In some instances this may relate to

accommodations like use of assistive technology, increased breaks, change in scheduling, performing work in a different way, or reassignment of job functions. Under some circumstances, it may require the new worker be assigned to a vacant position.

Increased break times or changes in scheduling can also be an effective accommodation. Some individuals may require longer break times or multiple shorter ones throughout the course of the work day. Others may find that they simply feel better certain times of day and will benefit from changes in scheduling to be at work during peak performance periods.

Sometimes, a work task may be performed in a different way; yet still yield the same result in an acceptable amount of time. This type of change in the way the activity is performed may serve as a meaningful accommodation to some workers.

A change in job functions may be helpful. This might involve reassignment of marginal or non essential job functions to another worker. Perhaps, a change in essential functions, the major job duties, or reassignment to a vacant position will be warranted.

Whenever assistive technology is needed, it may need to be fabricated or adapted to the individuals needs. This is because sometimes, existing products intended to help overcome various challenges are poorly designed from a functional standpoint. For example, the optimal height of a workstation will depend on the size of the worker.

One of the factors that can be modified so that individuals with arthritis are able to either retain their employment after onset of arthritis or return to work if they had to terminate their employment is workplace environment. Employers should consider providing workplace accommodations as well as appropriate treatment and insurance coverage in order retain skilled employees with arthritis. A recent study on the impact of RA on medical expenditures, absenteeism, and short-term disability benefits [66] found that the total average cost for employees with RA was \$4244 (2003 dollars) more than those without RA. Since the annual cost of RA has been reported to be associated with the duration of the disease and the extent of the disability as measured by Health Assessment Questionnaire (HAQ) scores [67], combination of diagnosis followed by treatment with disease-modifying drugs provided within the first 3 months of onset [65] with workplace accommodations, such as work station modifications [50], would be effective for employees diagnosed with RA to remain productive.

Work disability is a common occurrence for individuals with arthritis and factors that influence work dis-

ability for those with arthritis include employment factors, employees factors, disease factors, and other factors such as access to health care and vocational rehabilitation. The prospect of individuals with arthritis remaining productive depends on the complex interaction of numerous factors and future research must consider all of these aspects when developing and implementing interventions.

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