The older worker: physical and mental attributes essential to retain a viable position in the workplace

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P.A. Scott, The older worker: physical and mental attributes essential to retain a viable position in the workplace. Gerontechnology 2002; 2(1): 55 - 59. 'Chronological age, functional age, working age, mental age, physical age, emotional age, age of wisdom - are they all the same and how do they affect the way we function at home and at work?' There is growing evidence to suggest that universally there has been a significant increase in the number of older workers in a diversity of jobs. Winn and Ilmarinen ([2000]) talk of the working population over 50 years of age as 'exploding' during the next 25 years; he predicts that the work force will comprise approximately 35% of older workers (50 – 64 yr) and only 17% of younger workers (15 – 24 yr). With an example set by Nelson Mandela who 're-started' work at 75 years of age this aging trend is not something to be overly concerned about, rather it is important to be realistically aware of the effects that aging may have on the productivity and general well-being of an older group, and to adjust one's lifestyle and work environment accordingly. This paper will present the importance of participation in regular physical exercise, and involvement in stimulating mental activities in order to maintain one's abilities to cope with the demands of life in general and work specifically. There will also be a discussion on how chronological age influences the functionality of an individual and how tasks may be modified to accommodate older workers' capabilities in order to avoid overtaxing the worker. The basic Ergonomic premise is to adjust the task to suit the specific work force.

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Functional or working age, mental age, physical age, emotional age, or the age born of wisdom - are they all the same as the number of years individuals experience in their personal life from birth to the current point in time? Aging has been defined as the manner in which one's structural framework and functional capabilities change over time, but this is not a steady progression, for aging and the effects of aging differ for individuals within different age groups and in varying situations. Nevertheless, one thing is definite; aging is a natural, unpreventable process experienced by all living organisms.

International statistics reveal that the proportion of elderly people in the population has steadily increased over the past decade and this substantial extension of life beyond 'three score and ten years' can, to a large extent be accredited to advancements in medical technology and general health care, plus an important change in attitude by, and about, the elderly. Instead of retiring and sitting at home wondering what to do, many people in the 'older' group are continuing to work after the traditional 'retirement' age, and to enjoy the challenges of this exciting 'passage of life'. There is a significant

increase in the number of older people who are actively involved in making themselves economically useful to the community.

There is growing evidence to suggest that universally there has been a significant increase in the number of older workers in a diversity of jobs. Winn and Ilmarinen[1] predict the working population over 50 years of age will 'explode' during the next 25 years, and argue that the work force will soon comprise approximately 35% of older workers (50 – 64 yr) and only 17% of younger workers (15 – 24 yr). With an example set by Nelson Mandela who 're-started' work at the age of 75 years, this aging trend is not something to be overly concerned about; rather it is important to be realistically aware of the affects that aging may have on the general well-being and productivity of an older group, and to make adjustments to individual lifestyles and work environments accordingly.

BASIC PHYSICAL AND MENTAL ACTIVITIES

A catch-phrase often used in the broad field of Human Kinetics is that 'Humans are designed to move', and it is through movement that people are able to interact effectively with the dynamic and every changing environment in which they live. One just has to look at the basic skeletal structure for clear evidence to support the above phrase; the 206 bones of the body each articulate with adjacent bones allowing for a vast range of different movement patterns, and 54 of these bones form the framework of the hands which are used to manipulate objects within the environment. It is through movement that neonates learn about themselves and their environment, and it is now fortunately acknowledged that regular participation in physical activity is the key to a healthy, productive life. From birth to death movement is an essential and integral part of everyone's life, and behind all movement there is an important cognitive component. When addressing human issues one cannot focus on just the mind or the body, the human organism is an indivisible whole, and any research dealing with human responses (at any age) must address the individual as a total entity. While the focus may be more in one area or another (e.g. more biomechanical, physiological, or psychological), in order to fully understand any human being so that one may then be in a position to enhance performance, whether it be activities of daily living, or at work, one must acknowledge the interrelated functional totality of the species.

THE EFFECTS OF AGING

Probably no one has written more extensively of the effects of aging than Roy Shephard[2-3], and as the focus of this paper is not primarily on the physical changes associated with aging, the following section will give a brief summary of these well-documented issues.

Morphology

Although stature and mass are probably the two most common anthropometric measures discussed with aging (the former reducing due to a 'shrinkage' of spinal discs, and the latter tending to increase probably due to a decrease in physical activity), there are other physical factors which we need to take cognizance of when modifying working environments to accommodate the older worker. Tortora and Grabowski[4] point out that aging is associated with bone demineralisation as there is a loss of calcium and other minerals from the bone matrix. This loss of calcium leads to osteoporosis which is characterised by a decrease in bone mass, increase in bone porosity and a decrease in the thickness of the bone cortex, making bones more susceptible to fractures under even light loads, or as a result of minor trips or falls.

The associated length and girth dimensions of the upper and lower extremities are important areas to be considered when drawing up the layout and design of work stations. Kothiyal and Tettey[5] note that there is no comprehensive information available on elderly people. It is therefore important to

gain some insights into the functional reach of the extremities of the older body. Affiliated with this is the factor of muscular strength which appears to have been better researched. It is well documented that from approximately 30 years there is a progressive loss of skeletal muscle which is replaced largely by fat. Frischkencht6 indicated that most of this age-related loss of strength is accounted for by a loss muscle mass, and this is probably due to a decrease in the number of muscle fibres as well as atrophy of Type II muscle fibres brought about by aging and/or inactivity. He proposed that the loss of functioning motor neurons in the elderly is also a possible reason for muscle fibre atrophy and eventual replacement by connective tissue. It is clear that the effect of declining muscle strength in the aging worker is a reduction in work capacity generally, but specifically where strength is required to execute the task.

Physiology

Probably the most commonly understood physiological variable is heart rate. It is also the most sensitive variable and any change in 'normal' activities (physical or emotional) is reflected in a change in heart rate. Maximum heart rate is universally accepted as 220 – age (bt.min-1); therefore exhibiting an inexorable decrease with progressive aging. The effect of this is that for any 'working' heart rate, older workers will be taxed at a greater percentage of their maximum than younger workers operating at the same task. Another variable within the broad category of cardiovascular responses is blood pressure. Both systolic and diastolic blood pressure tend to be higher in elderly people. Fleg[7] suggests that this is due to age-related stiffening of the atrial tree, and Meyer et al.[8] claim it is also the result of an increase in the total peripheral resistance which is due to the reduced elasticity of the vasculature, to increases in body fat and to higher levels of cholesterol. Shephard[3] reports that aerobic power shows a progressive decline with age, which is associated with the decrease in cardiac output. This reduction in aerobic power will be most evident in tasks requiring high-energy input and/or where a worker is required to give a sustained physical effort over an eight-hour shift. Another basic physiological factor to consider is that of thermoregulation. Meyer et al.[8] report that elderly people are generally more sensitive to any considerable rise or fall in environmental temperature, which they suggest is related to the loss of muscle mass and the associated decrease in metabolic rate; therefore where possible placing the older worker in any extreme temperatures should be avoided.

Cognitive Component

All human interaction with the environment requires some form of mental activity, which may range from basic information processing necessary for execution of appropriate motor response effectively, to highly intellectual reasoning power. A bright, alert mind will be receptive to new information and quick to formulate ideas and put them into practice with great effect. However, as Cerella[9] notes there is a general decline in the capacity of the information-processing system with advancing age, resulting in a retardation of the speed of response and the ability to cope with complex situations. This fact, exacerbated by the exponential development of technology, may have a deleterious affect on the ability of older workers attempting to cope with modern developments in the work place.

SUGGESTIONS FOR SLOWING DOWN THE RATE OF DECLINE

Acknowledging that there is a 'natural' decline in the general functions of the body, it is important to realise that this process can be minimized by regular involvement in physical and mental activities. Smith and Gilligan[10] point out that about half of the functional decline between ages 30 to 70 years is due to disuse. Aging individuals must therefore be encouraged to keep their minds and bodies agile and active. This means regular involvement in physical activity in order

to keep the cardiac muscle in good physical condition, as well as the general musculoskeletal system of the body; there is a need for regular participating in gross motor weight-bearing activities as well as fine manipulative movements with the hands. A relevant cliché is: 'If you don't use it, you lose it'. Sitting around getting old will exacerbate the aging process. And it is just as important to keep one's mind alert and stimulated, with regular involvement in cognitive tasks such as reading and mental 'games', and also through the many challenging activities that are now available on computers. Establish a pattern of continuous learning. Finally probably the most essential factor is a person's attitude; much is written about athletes having the correct mind-set, and it is equally important that the older age group adopt a positive attitude and commitment to living life to the fullest.

WORKSITE MODIFICATIONS

First it is necessary to acknowledge, as Shephard[3] has, that these biological factors are less limiting than previously assumed, and Griffiths[11] argues that chronological age is a poor indicator of health and productivity. Any appraisal of potential workers should focus on their 'functional-age' rather than their chronological years.

Given the secular trend to increased life spans, and the necessity for older age groups to fill the gaps caused by global aids effects on the young, Ergonomists must increasingly be sensitive to the needs to accommodate the older worker. As Shephard[3] pointed out, 'many potential problems can be corrected by worksite modification'. Indeed any workstation designed on sound Ergonomics principles will, whenever possible, build in flexibility to cater for the great diversity in the size, shape, and abilities of human operators, no matter what their age. Hence flexibility in design (ability to adjust working surfaces, seating positions and operating panels) must also incorporate an awareness of the capabilities and the limitations of older workers.

It is, moreover, important to recognise the benefits of having older workers within a company; they are often more motivated than younger workers, have a wealth of experience to draw on, and when things do go wrong, often have a better judgement of the situation. They tend to be less reckless and impulsive, are safer and more reliable, and have a greater sense of responsibility. Hence they can potentially offer stability and maturity to the company.

CONCLUSION

It is a given fact that there are age-related functional decrements, but with the right attitude to life in general, and specifically to one's mental and physical status, the older workers will be able to minimise this decline. On the other hand management, by ensuring that their company is run on sound Ergonomics principles will be able to modify work stations in order to accommodate all workers, including the older worker; by drawing on the experience and patience of the mature worker, and modifying the work station where necessary, one enables this older age group to make a valuable contribution to any company.

By consciously making an effort to keep mentally and physically active one cannot guarantee that one will add years to one's life, but one can certainly add life to one's years, enabling the older worker to retain a viable position in the workplace.

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