**Epidemiology of Distal Radius Fracture
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**Top of Form**

**Summary:**Distal Radius Fractures (DRF) are among the most common in people. The high frequency and socio-economic aspects of this traumatic disease make its epidemiological research and development of preventive strategies to reduce fracture risk particularly relevant. The social significance of the problem is based on common complications after imprecise surgical treatment and rehabilitation, as well as on the high rates of unsatisfactory functional results.

Epidemiological evidence for distal radius fractures among the population can be used for planning and organizing prevention and structuring of adequate medical care for these injuries.

Ensuring timely preventive strategy for people at high risk of fractures is a challenge for health systems worldwide. An important link between patients at risk and their proper treatment is done through the identification and risk assessment in these patients based on sound epidemiological study.

**Keywords**: epidemiology, distal radius fracture (DRF), frequency, osteoporosis

Distal radius fractures (DFR) are among the most common in people - up to 10-15% of all fractures [10]. Proper understanding of the pathophysiology in these fractures and their proper response is particularly important because this type of traumas is not limited only to adults. High energy injuries of the distal radius become more frequent in young patients, and long-term functional results remain unclear. The social significance of the problem is based on frequent complications (about 30% averagely according to most authors) after incorrect surgical and physical rehabilitation treatment and high rates of unsatisfactory functional results. Urbanization and the dynamics of modern life increase the percentage of high energy, unstable and complicated fractures.

With increasing number of elderly patients with significant motor and labor activity, the distal radius fracture requires a new reassessment and a new concept for adequate and optimized timely treatment. On the other hand, the increased life expectancy and the related osteoporotic changes in the bone system lead to an increase in late complications.

This is one of the most common fractures in people and they represent about 1/6 of the fractures treated in emergency departments. Distal fractures of the radius and ulna together are about 75% of all damage to the wrist and around 15% of all skeletal injuries in adults. The most common manifestation of these fractures is in menopausal women. The risk increases with a family history of osteoporosis or fractures. Smokers are at higher risk in relation to low bone mineral density.

Top of Form

During follow-up of 107,190 patients in the USA [6] it has been found out that the frequency of DFR is 125/10,000. The frequency of DFR in Caucasians (136/10,000) is twice higher than that of other races (59/10,000); and in women (189/10,000) it is 4.8-fifth higher than in men (39/10,000). Another American study [3] of 1998 shows that forearm fractures represent 1.5% of all cases treated in emergency departments, as DFR and ulna fractures are the largest proportion of all fractures (44%).The incidence/frequency of distal radius fracture has often been studied and it is proved to have increased over the years [2].

According to the definition of the WHO, osteoporosis is the most common systemic skeletal disease characterized by low bone mass and impaired micro-architecture of bone tissue leading to enhanced bone fragility and increased risk of fractures. Epidemiology of osteoporosis-related fractures is directly dependent on factors related to the underlying bone changes and those associated with trauma, such as age and falling [14]. It is assumed that 50% of women and 25% of men over 60 will suffer at least one fracture during the remainder of her/his life. Caucasian women are at higher risk for osteoporotic fractures than men and African-Americans of both sexes. Asian women are also at increased risk. The main localizations of osteoporosis fractures at the age of 60-70 are in the wrist, while the hip and vertebrae are leading in patients over 70. The frequency of fractures of the distal radius, unlike those of the femur and spine shows no continuous increase after the age of 50 and reaches a constant value after the age of 60. Although from 30 to 40% of adults have osteoporosis, only 3-6% get fractures as these patients are at an increased risk of falling [5].

Epidemiological data of 395 patients with DFR in Poland, Warsaw [9] in the period 2003 - 2005 and classified according to AO classification show that DFR represent 18% of all fractures (77% of fractures of the forearm). The average age of patients is 58 years (women – 63.5 years of age and men – 44.8 years of age).

In a study of Oyen et al. [16], from University Hospital Bergen, Norway, investigating the role of osteoporosis as a risk factor for DFR and published in 2011, it has been found out that prevalence of osteoporosis in patients with DFR is 34% for females and 17% for males. In the age group of 60-69, the corresponding values ​​are 25% and 7%. According to the study osteoporosis is a risk factor for DFR in both sexes - every second to every third patient with a fracture covers current criteria for treatment of osteoporosis [15]. A study carried out by Clayton et al. has identified a high correlation between bone mineral density and severity of distal radius fractures [12].

The aim of the study in 2000 in Switzerland [11] is to assess the frequency of hospitalization and total hospital days associated with osteoporotic fractures and to compare results with data from other common diseases in both sexes. 62,535 hospitalizations for fractures have been registered. The reason for 51% of all fractures in women and 24% for men has turned out to be osteoporosis. Direct costs for medical care and hospitalization of patients with osteoporosis and/or related fractures are 357 million Swiss francs.

The epidemiology of fractures in elderly people is changing rapidly. Analysis of 5953 fractures in 2000 in the United Kingdom [4] shows that the potential risk factor for about 30% of fractures in men, 66% of fractures in women and 70% of inpatient fractures is osteoporosis.

Top of Form

A long-term comprehensive study of DFR in adults conducted by Vogt et al. [17] in 527 patients with DFR shows that the incidence of these fractures is 7.3/1,000. 27% of fractures are intra-articular and 73% are extra-articular. Independent predictors of DFR are reduced bone density BMD of the distal radius, a history of recurrent falls, and the presence of another fracture after the age of 50. The use of oral estrogen has a protective role.

In a study in the Czech Republic [1] the authors analyze the results of long-term monitoring of the main epidemiological characteristics of fractures of the proximal humerus, distal radius, and proximal femur. In fractures of the distal radius the average age is 59 (45.8 years of age for men and 64.7 years of age for women) the ratio male to female is 29:71. By the 5th decade the representation of male is higher in all groups of fractures. In the 6th decade the ratio has been changed.

The female is prevalent in DFR (about 67% of fractures are in women), where two peaks are observed: over 50 years of age and in childhood, while male have pronounced peak in childhood and modest increase in incidence after the age of 70.

In 2001, [2] during monitoring of patients with DFR in the southern Swedish region a rate of 26/10,000 is established. The ratio of the incidence of distal radius fracture in women to men is 3.3:1. The incidence increases with age in both men and women. Fractures classified according to AO-classification as type A are about 80% of fractures in women and 64% for men. The incidence of C-type fractures is lower among women and men below the age of 50, but increases with age and is highest in the age group over 80 years.

The average age for women is 69 (range 19-101) years and for men it is 55 (range 19-90) years.

TheTop of Form

The association between the incidence of fracture of the distal radius and age is quite clear-cut, as a bimodal distribution has been observed: increased incidence in young people (14-25 years of age) and a second peak over 65 years of age.

DFR in Oulu, Finland, 2008 [7] constitute almost 17% of all fractures in adults. They occur most often in the following two groups: 1) elderly with osteoporosis, in whom low-energy traumas are more common and 2) young people with normal bone mineral density who get high-energy traumas. Distal radius fractures occur most often in older postmenopausal women, and four times more common in women than in men, mostly aged 60-69.

Most likely race affects the incidence of distal radius fractures in the elderly in relation to the increase of osteoporotic changes in bones, developed more indicatively in Caucasians. Studies, conducted in the United States, New Hampshire [6] for the period 1998-2004 including 107,190 patients, aims to determine the incidence of distal radial fractures and their relation to age, race, sex, comorbidity of patients. Data show the frequency of distal radius fractures 125/10,000, as the frequency in individuals of the white race is 136/10,000, and for other races - two times lower - 59/10,000.

The aim of the Swedish [8] study is to examine the relationship between smoking and bone mineral density (BMD) and radiographically confirmed prevalent vertebral fractures and fractures in older men. Smokers have an increased risk of new osteoporotic fractures of the humerus, radius, pelvis and hip bones.

On the basis of the above data on the epidemiology of DFR, we can draw the following conclusions:

* These are the most common fractures in people: between 10 and 18% according to various studies
* They represent 75-77% of all fractures of the forearm
* The average age is 58 (women – 65 years of age; men - 47 years of age)
* Approximately 73% of DFR are extra-articular, as type A fractures in women are about 79% and in males - 64%
* 70% of DFR are a result of low-energy injuries
* The presentation of DFR in both sexes is in the ratio women to men = 3.5 to 5.1
* DFR in Caucasians is approximately 2 times more often than in the other races
* Osteoporosis is a risk factor for DFR in both sexes (about 30% of fractures in men are due to osteoporotic changes and about 66% of fractures in women)

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