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PAIN AND DISABILITY DURING SIX MONTHS IN PATIENTS WITH A DISTAL RADIUS FRACTURE

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Abstract: *Introduction:* Evidence of the disability and quality of life after a distal radius fracture reported by the patients themselves is lacking, since previous studies focussed on radiological assessment and objective clinical parameters.

Aim: To describe the pain and disability and how they change during 6 months of recovery in patients with distal radius fracture.

Material and Methods: This is a prospective randomized study of 42 patients with a distal radius fracture. They were assessed three times: baseline visit (7–10 day), three and six months after injury. At each visit patients completed the PRWE (Patient – rated wrist evaluation) questionnaire with 15 items: 5 – Pain; 6 – Specific activities and 4 – Usual activities subscale.

Results: At baseline patients experience moderate pain (minimal at rest, mild during repeated movement, severe when lifting), there is very severe disability in performing specific and usual activities. After three months the pain diminishes to mild (none at rest, mild when lifting), as well the disability that is mild (professional activity is affected most). Six months after injury there is only minimal pain and functional difficulties. The domains of specific activities remained more impaired at each phase, compared to usual activities (personal care and household work).

Conclusion: The results of this study describe the normal course of recovery after a distal radius fracture. Three months after the injury significant improvement is expected, and after six months there should be only minimal disability. Atypical recovery may suggest the appearance of a complication or a need to change the treatment protocol.

Key words: distal radius fracture, PRWE, disability

Introduction

Distal radius fractures are the most prevalent of all fractures [1, 2]. 30% of the patients treated in the Emergency Centres have an injury to the wrist, and 5% of all diagnoses are of a distal radius fracture [3].

In 2001 the World Health Organization (WHO) approved the new International Classification of Functioning, Disability and Health (ICF) that is a classification of human functioning and disability and emerges as a broader model of health [4]. It has three main domains: Body Structure/Function, Activity and Participation. Problem areas within each domain are: Impairment (deficit in anatomical structures or physiology), Activity Limitation (difficulties doing tasks) and Participation Restriction (problems experienced while involved in life situations). According to ICF, the term DISABILITY is modified and not only refers to limitations on an individual level, but covers as a whole the impairment of body structure and function, activity limitation and participation restriction [5].

Until recently, numerous studies that analysed the distal radius fractures and the outcome of the different treatment modalities were focussing on the impairment: anatomical abnormalities (radiographic findings), loss of functional capacities (range of motion, grip strength). But these impairments do not always reflect the pain and disability of the injured wrist. Several studies [6, 7, 8] have shown that anatomical and functional deficits are not necessarily the best outcome measures as they do not always correlate with the activity and participation restrictions. That is why in recent years considerable enthusiasm has been expressed for the creation of new questionnaires as outcome measures that would provide accurate evidence of the disability from the patient's perspective. The patients themselves evaluate their health status (in this case the status of their wrists). These outcome scales such as Short form 36 (SF-36), Disability of Arm, Shoulder and Hand Questionnaire (DASH), Patient-rated Wrist Evaluation (PRWE) Questionnaire are used to determine the condition after injury as well as for follow-up of the treatment protocol.

MacDermid made an analysis of the responsiveness of the SF-36, DASH and PRWE in 2000 [9].

PRWE was first published in 1998 by J.C. MacDermid as a result of the study of the International Wrist Investigators Group [10].

In 1814 Sir A. Colles published his famous paper where he first described distal radius fractures, and of their outcome he said: "one consolation only remains, that the limb will at some remote period again enjoy perfect freedom in all of its motions and be completely exempt from pain; the deformity, however will remain undiminished through life." This suggestion was not scientifically determined [11].

The qualitative study of A.Bialocerkowski in 2001 examines the disability in patients with a wrist injury [12]. Symptoms were present 1–164 months (av. 19). It describes the activities that were performed with difficulties, mostly work-associated and domestic duties. But the difficulties were not quantified, and how they change during time was not analysed, nor is it fracture specified.

A large prospective study on 275 distal radius fracture patients was published in 2001 in Canada that evaluated the range of motion, grip strength as well as the disability with SF-36, PRWE and DASH during one year [13]. The results obtained from this study can be used as a data base for comparative statistics in future studies.

Well-designed longitudinal studies focussing on impairment gave important knowledge of the anatomical and functional deficits, but have provided little understanding of the disability experienced by patients following distal radius fracture. They have not analysed the functional needs of the patients, the level of their difficulties level and their own perception of the disability. Studies of the quality of life after a distal radius fracture are lacking.

Aim

To describe the pain and disability and how they change throughout the phases of recovery in patients with a distal radius fracture during 6 months. This should improve our scientific knowledge of the course and the outcome of distal radius fractures.

Material and methods

Patients:

This is a prospective randomized study of 42 patients with a distal radius fracture, performed at the University Surgical Clinic "St. Naum Ohridski", Skopje.

Patients with an acute distal radius fracture with mature skeletons (age over 16 years) were included. The method of treatment was one of the following modalities: immobilization; closed reduction and immobilization; closed reduction, percutaneous K-wire application and immobilization; external fixation augmented with interfragmentary K-wires application, open reduction and plate osteosynthesis, external fixation combined with minimally invasive internal fixation.

Exclusion criteria were: fracture in patients with immature skeletons (not finished epiphysis fusion), additional wrist injury (carpal fracture, neurovascular injury), open fractures (except for Gustillo grade I), bilateral injury, repeated wrist injury, patients not able to comply.

Outcome evaluation:

Patients were evaluated three times: at their control visit 7–10 days after injury (baseline); again at three months following fracture (when immobilization or external fixation is taken off and the operative wounds have healed) and finally 6 months after injury. At each of these three visits patients completed the PRWE questionnaire.

With the Patient-rated wrist evaluation – PRWE [10] the patient himself evaluates the pain in his wrist with a distal radius fracture, as well as his disability. Patients completed the questionnaire themselves. Any language or illiteracy barrier was addressed using hospital or family translators.

The PRWE contains 15 items in two scales PAIN and FUNCTION (function divided into Specific and Usual activities subscales). Each item is scored on an 11 points scale (0–10). The Pain subscale has 5 items (4 on pain intensity: at rest, during repeated movement, when lifting a heavy object and when at its worst, and one on pain frequency), the Specific activities subscale 6 items (turning a door knob, knife cutting, fastening buttons, pushing up from a chair, carrying 5kg, use of bathroom tissues), and the Usual activities subscale 4 items (patients rate their difficulty in four domains of their usual functioning/participation such as personal care, household work, work, recreation).

The results of individual items and subscores of the three subscales can be totalled [14]. The total score (/100) for wrist pain and disability is calculated by dividing the sum of the 10 functional items by two and adding the subtotal (/50) to score for the pain subscale (/50). This provides a total score from 0–100, where higher scores indicate greater pain and disability. The scores of each individual item were provided with qualitative descriptors defined as: none (0), minimal (1–2), mild (3–4), moderate (5–6), severe (7–8) or very severe (9–10). These descriptors were also extended to subscales and the total score (Table 1).

Table 1 – Табела 1

Descriptors of severity for PRWE scores
Опис на бодовиште од PRWE

DESCRIPTOR	ITEM	PAIN	SPECIFIC ACTIVITIES	USUAL ACTIVITIES	TOTAL
None	0	0	0	0	0
Minimal	1–2	1–10	1–12	1–8	1–20
Mild	3–4	11–20	13–24	9–16	21–40
Moderate	5–6	21–30	25–36	17–24	41–60
Severe	7–8	31–40	37–48	25–32	61–80
Very Severe	9–10	41–50	49–60	33–40	81–100

On the initial radiograph the type of the fracture was determined according to the AO classification (type A = extra-articular; type B = partially articular; and type C = articular fracture) [15].

Results

The characteristics of the group of examined patients are given in Table 2.

Table 2 – Табела 2

Characteristics of 42 distal radius fracture patients
Карактеристики на 42 пациенти со фрактура на дисталниот крај на радиусот

Age	mean 55.14y (17–76)
Sex	female 27 (64.3%) male 15 (35.7%)
Injured side	right 17 (40.5%) left 25 (59.5%)
Dominant side	dominant injured 17 (40.5%) nondominant injured 25 (59.5%)
Mechanism of injury	fall 34 (80.9%) fall of height 7 (16.7%) other 1 (2.4%)
Fracture type (AO classification)	extraarticular A – 15 (35.7%) partially articular B – 2 (4.8%) completely articular C – 25 (59.5%)
Intervention	immobilization 9 (21.4%) closed reduction + immobilization 20 (47.6%) ex.fix. + intrefragm. K-wires 7 (16.7%) intrefragment. K-wires + immobiliz. 2 (4.8%) open reduction + internal fix. (plate) 3 (7.1%) open reduction + ex.fix.+ inter.fix. 1 (2.4%)
Physical therapy	yes 33 (78.6%) no 9 (21.4 %)

Table 3 shows the mean scores for the whole group for each individual PRWE item, as well as for the three subscales and the total score. Using the descriptors of the results of each item for the Pain subscale, at baseline there is only minimal pain at rest and mild during repeated movements that becomes severe when lifting weight and the frequency is occasional. After three months there is no pain at rest, minimal during repeated movements, mild during lifting with rare frequency, and six months after there is only minimal when lifting (Figure 1).

Table 3 – Табела 3

Mean PRWE scores for each item, the three subscales and the totals for the three time points
Просечен PRWE резултат за одделните прашања, за трите подскали и вкупниот резултат од трите временски периоди

Item	Baseline	3 months	6 months
Pain			
– at rest	1.1	0	0
– with repeated movement	3.1	1.4	0.9
– when lifting heavy object	7.6	3.6	1.8
– at it worts	5.3	3.7	2.7
– frequency	3.7	2.4	1.6
Specific activity			
– door knob	8.9	2.5	0.5
– cutting	9	2.4	0.1
– buttons	8.5	1.3	0
– push up	9.5	5.2	1.7
– 5 kg	10	7	3
– towels	8.2	0.7	0
Usual activities			
– personal care	7	1.3	0.1
– household	8.7	3.3	0.7
– work	9.4	4.9	0.9
– recreation	7.6	1.9	0.6
Pain (50)	20.8	11.1	7
Specific activity (60)	54.1	19.1	5.3
Usual activity (40)	32.7	11.4	2.3
Total score (100)	64.2	26.6	10.8

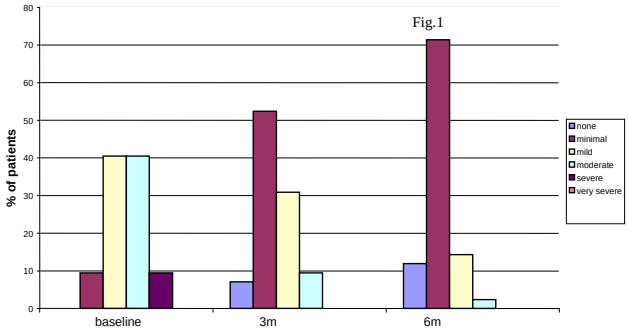

Figure 1 – Pain Score during 6 months
Слика 1 – Бодирање на болката во текот на шест месеци

The patients found all of the specific activities impossible to perform at baseline (severe to very severe disability). But three months later there is considerable reduction of the disability registered as minimal (the exceptions are pushing up and carrying 5kg, which remain severe). The improvement continues, so there is only mild difficulty at 6 months with carrying 5kg, and with all other specific activities patients do not experience difficulty (Figure 2).

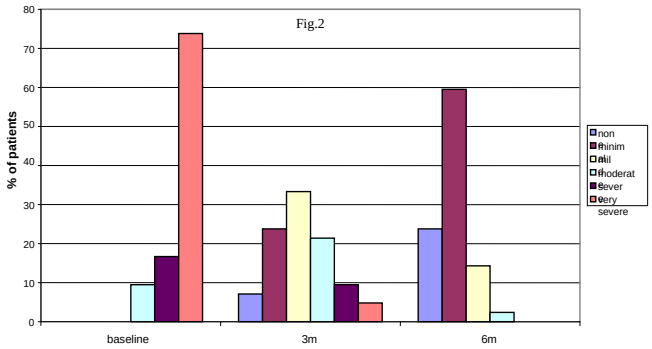

Figure 2 – Disability with Specific Activities during 6 Months
Слика 2 – Онеспособеност кај специфичните активности во текот на шест месеци

In performing usual activities there is a gradual decrease in disability during the six months period, starting as severe difficulty in personal care and household and very severe in professional work, then as minimal and mild the third month, and finally after six months there is no difficulty in personal care and household work. It is noticeable that the worst score is for the professional activity domain, decribed as moderate the third month, and minimal the sixth (Figure 3).

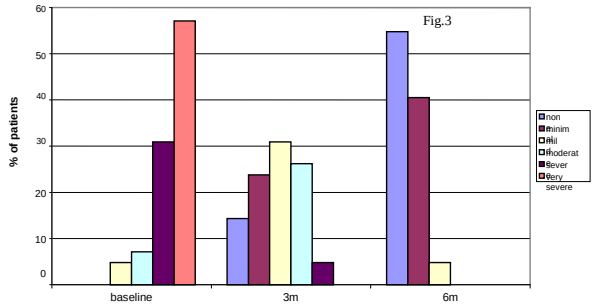

Figure 3 – Disability with Usual Activities during 6 Months
Слика 3 – Онеспособеност кај вообичаените активности во текот на 6 месеци

Table 2 also represents the mean scores for the three subscales. The pain starts as moderate, mild three months later and then minimal after six months. In performing specific activities there are very severe difficulties at baseline, but mild and minimal three and six months later. The patients report very severe difficulties with usual activities at baseline, mild after three, and minimal after six months.

The total PRWE score changes from severe pain and disability at baseline, through mild three months later, to minimal after six months (Figure 4).

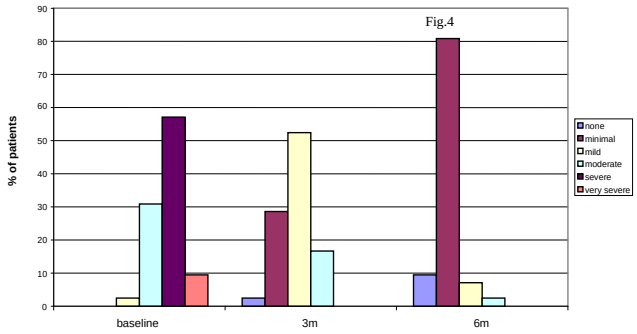

Figure 4 – Total PRWE score during 6 months
Слика 4 – Вкупен PRWE резултат во текот на 6 месеци

In the examined group of patients the following complications were noticed: one patient with a pin tract infection with an external fixation, two patients had Hand-shoulder syndrome at the third month, one had Sudeck atrophy at the third month, and one had Tunnel carpal syndrome EEG registered at the sixth month.

Discussion

This study provides information for the pain and disability in patients with a distal radius fracture and how they change during first six months after injury.

The results show that at the beginning (baseline) the patients experience the worst pain and have the most severe disability. This coincides with the period after immobilization, closed reduction or operative treatment that is the initial phase of soft tissue reparation and fracture healing. Because of the pain, the immobilization or external fixation, or simply because of the surgeon's advice not to use the injured extremity, there is a severe disability in performing both specific and usual activities.

At the next two points of evaluation (third and sixth month) there is a continuous decrease in pain and disability, so that there is only minimal disability at the sixth month in a small number of patients. When analysing separate activities, the most difficulties all of the patients experienced were with carrying 5kg and pushing up from a chair (specific activities) and of the usual activities the worst and longest the impairment of professional work. This study found the most diversity with the results for the difficulties in recreation, which could be explained with the preinjury recreational habits. Most of the patients reported the recreation to be least impaired after injury because it consisted only of walking, but the patients who were active in sports experienced severe difficulties in recreation even after six months.

The data from this study enable construction of a standard model for the description and prediction of pain and disability in patients with a distal radius fracture. Comparing the result of an individual patient with this standard model would help to identify if the recovery process in that patient is typical. Step-off from this typical course of recovery should be regarded as a possibility of the development of a complication and a need for modifying the treatment protocol. In this study the patient that was diagnosed with a Sudeck atrophy the third month had a PRWE score that was significantly worse than the mean score, as well as the patient with the EEG verified Tunnel carpal syndrome at the sixth month. Thus, patients who report unusually higher scores for pain and disability should be considered as presenting early signs of complications that should be addressed. Similarly, in patients who do not exhibit substantial improvement in their scores the third month, more intensive rehabilitation therapy should be indicated, as well as additional investigations to look for undetected associated injuries. Conversely, in patients with exceptionally low scores for pain and disability, the analgesic and rehabilitation therapy should be terminated, they may return to work earlier and be followed less frequently.

The questionnaires for patients' self-evaluation (as PRWE), should help document and understand the individual disability in patients, monitor the effectiveness of the treatment protocols, and help in clinical decision-making during recovery.

Conclusion

The results of this study describe the normal course of recovery after a distal radius fracture. Three months after the injury significant improvement is expected, and after six months there should be only minimal disability. Atypical recovery may suggest an appearance of a complication or a need to change the treatment protocol.

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Резиме

БОЛКАТА И ОНЕСПОСОБЕНОСТА ЗА ВРЕМЕ ОД 6 МЕСЕЦИ КАЈ ПАЦИЕНТИТЕ СО ФРАКТУРА НА ДИСТАЛНИОТ КРАЈ НА РАДИУСОТ

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Апстракт: Недостасуваат студии кои ја проценуваат онеспособеноста и квалитетот на животот по здобиена фрактура на дисталниот крај на радиусот, и тоа од аспект на самите пациенти, бидејќи досегашните студии се фокусирале на рендгенографска анализа и процена на објективните клинички параметри.

Цел: Да се опишат болката и онеспособеноста и нивното менување низ етапите на заздравување кај пациентите со здобиена фрактура на дисталниот радиус во период од 6 месеци.

Методологија: Спроведена е проспективна студија на 42 пациенти со фрактура на дисталниот радиус. Пациентите се иследувани во три фази: на 7–10 дена од повредата; на 3 месеци; и на 6 месеци од повредата. Во сите три фази пациентите пополнуваат PRWE (Процена на рачниот зглоб од страна на пациентот) прашалник од 15 прашања: 5 од подскалата за Болка, 6 од подскалата Специфични активности и 4 од Вообичаени активности.

Резултати: На 7–10 дена од повредата кај пациентите постои средна болка (минимална при мирување, блага при повторувани движења до тешка при подигнување тежина) и има многу тешка онеспособеност при извршувањето на специфичните и вообичаените активности. На 3 месеци има намалување на болката до блага (нема при мирување, до блага при подигнување тежина), со намалување на онеспособеноста до блага (најмногу е засегната професионална активност). На шестиот месец има минимална болка и функционална засегнатост. Во секоја од фазите е полош резултатот при изведување на специфичните активности (подигнување тежина, потпирање на раката) во споредба со вообичаени животни активности (лична хигиена, работа во домаќинството).

Заклучок: Резултатите од студијата го опишуваат нормалниот тек на заздравување по скршеница на дисталниот радиус. По 3 месеци се очекува значително намалување на онеспособеноста, за по 6 месеци да има заостанување на само минимална онеспособеност. Отстапувањата од овој тек на заздравување укажуваат на можен развој на компликации или потреба од примена на друг тераписки протокол.

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Клучни зборови: фрактура на дисталниот крај на радиусот, PRWE, онеспособеност.

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