ORIGINAL ARTICLE

CONTENTS

An assessment of the results of self-monitoring after conservative treatment of hand and wrist fractures

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ABSTRACT

Aim: The objective of this study was to evaluate the effectiveness and safety of this method after simple fractures of the hand and wrist.

Materials and Methods: 202 patients, 117 males (58%) and 85 females (42%) at mean 57 years of age, with stable, non- or minimally displaced hand and wrist bone fractures were enrolled in the study. Patients were treated conservatively by immobilization in a plaster or thermoplastic splint, or functionally, without any immobilization. After one visit to the clinic and receiving instructions on how to deal with a broken finger or hand, the patients were dismissed with recommendation to remove the plaster splint after 4-5 weeks and start using the hand. After 2 months all patients were interviewed by phone, asking about the course of treatment and satisfaction with this method of care.

Results: 179 patients (89%) were fully satisfied with the self-monitoring program, and 23 (11%) were partially satisfied. The most common problems in these patients were pain at the fracture site and limited mobility of the affected finger or wrist. No complications requiring hospitalization and surgery were found.

Conclusions: The change in the post-fracture care system from a traditional to a self-monitoring has shown great effectiveness and safety for patients. This improved the work of the hand clinic, improved patients' access, increased satisfaction and reduced costs.

KEY WORDS: fracture self-monitoring; simple hand fractures; conservative treatment; assessment of outcomes.

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INTRODUCTION

The demand for hand surgeries (both elective and outpatient) has increased significantly over the past decade, and with it, the pressure on access to the operating room and for outpatient services has increased. This is caused, among other things, by two phenomena. The first is the natural aging process of societies, which is why a larger number of older people require seeking medical attention. The second is due to cultural changes and increased demands on maintaining health and physical fitness. Patients with minor musculoskeletal, post-traumatic or post-morbid disorders, who have yet to

20 years ago, tolerated well these complaints, now they seek medical advice to return to full fitness, as they did before an injury or illness. These phenomena are compounded by the backlog in surgical treatment caused by the COVID-19 pandemic, which significantly limited access to planned medical services for 2 years. For various reasons, including economic ones, the availability of hospital treatment has become lower after the pandemic. The consequence of these trends is a change in the strategy of insurers and healthcare providers, consisting in the redesign of service delivery schemes and the implementation of new policies aimed at improving cost efficiency [1, 2]. As part of the redesign concept, it is recommended to reduce follow-up visits after hand and wrist fractures [3, 4].

In the literature, you can find information about systemic changes in outpatient care in hand surgery. They consist in limiting the frequency of follow-up visits in specialist clinics, in favour of control performed by the patient himself. This is the so-called "self-monitoring fracture care" or "virtual fracture clinic" concept, which has gained popularity during and after the COVID-19 pandemic and is well rated by patients [1-4]. This method of control after simple hand and wrist bones fractures is largely unknown in the authors' country.

AIM

The objective of this study was to evaluate the effectiveness and safety of "fracture self-monitoring" concept after simple hand and wrist fractures.

MATERIALS AND METHODS

In 2025, a total of 458 patients were treated in out-patient hand clinic due to finger, metacarpal or distal radial fractures. Of this number, 209 (46%) fractures were non- or minimally displaced and showed a stable configuration. These patients were treated conservatively either by immobilisation in the plaster splint, thermoplastic splint or brace (n=173), or functionally, without any immobilization (n=36). For the first visit to the out-patient hand clinic, patients were referred from the emergency department, where the fracture was diagnosed and primary fitted (immobilized), or from another, district hospital. After determining that fracture is non- or minimally displaced and shows stable configuration, plaster splint was corrected (if necessary) or replaced with brace, and the patient received verbal instructions for hand exercises and to use their hands in light daily activities and at work, i.e. with computer, hand writing with a pen or carrying light objects. The patients were advised to remove the splint himself/herself after 4 weeks (with finger and metacarpal fractures) or 5 weeks (with distal radial fractures). Next, the patients should start using their hands without immobilization, gradually expanding the range and load of the hand. The patients were informed that in the event of eventful course (unexpected pain, oedema, movement restrictions), they could report to the out-patient hand clinic. They were also asked to present to the clinic if any problems with use of the hand occur within a month after the removal of the immobilization. Two hundred and nine patients were recruited to participate in the study. An informed, verbal consent was obtained from each patient for the participation in the study.

FOLLOW-UP

In the next part of the study, two-months after first visit, the patients were followed-up by a phone interview. They were asked about the course of the treatment, how they coped with removal of plaster splint, whether they experienced any significant problems during this period and whether they were satisfied with this form of follow-up. A total of 202 patients, 117 men (58%) and 85 women (42%) were available. Three patients (2%) could not be contacted. A group of 202 patients (100%) is a subject of the analysis.

ETHICAL APPROVAL

The study received approval from the Bioethics Committee of the Pomeranian Medical University in Szczecin. All procedures adhered to the ethical principles of the Declaration of Helsinki, ensuring participant confidentiality and anonymity

RESULTS

Spectrum of fractures in patients enrolled in the study is summarized in Table 1. The most common were finger and II-V metacarpal fractures, making a total of 156 cases (77%). Distal radial fractures were relatively under-represented, compared to the total number of patients with these fractures presented in the clinic. The reason was the need for follow-up during and after treatment in these patients, as most fractures were displaced and required primary reduction. In this situation, follow-up during and after treatment is recommended. Flow-chart and satisfaction of patients in the study is summarized in Table 2. Of the 209 patients who were implemented in the fracture self-monitoring program, seven (3,3%) could not be contacted 2 months after fracture. Of the remaining 202 patients, eight (4%) presented to the clinic in person, during the 1-month observation period, before the telephone interview. These patients were considered not-fully satisfied with the fracture self-monitoring regimen, because the reason for their visit was a problem with the injured hand.

Of the remaining 194 patients who were contacted by a phone call at 2 months, 179 (89%) reported no problems with fracture self-care and were fully satisfied with the self-monitoring regimen. Fifteen (8%) were partially satisfied and reported various problems during post-fracture period. Including patients who reported to the clinic in person (n=8), a total of 23 patients (11% of 202) were partially satisfied with the fracture self-monitoring. Concerns of these patients are summarized in Table 3.

]The most commonly reported problem was pain at the fracture site and limitation of fractured finger or wrist movements (in the case of distal radial fractures). During a telephone or personal interview, patients were informed how to exercise to improve finger/wrist mobility. Five patients (29%) with distal radial fractures who reported limitation of wrist mobility were advised to contact their General Practitioner for referral for rehabilitation. Two patients were asked to contact the clinic in person and they had an X-ray taken that showed bone union with a slight displacement which did not require corrective treatment. In one of these patients, the wrist was slightly deformed, typical for such displacement. In 2 patients, after fractures of the proximal phalanges of fingers, significant reduction of finger mobility was found and they were also referred for rehabilitation. In one patient with a trans-articular fracture of the base of the middle phalange of the little finger, a slight subluxation was found in the proximal interphalangeal joint, but it did not require surgical correction, only more intensive rehabilitation. This patient was the second to have a slight deformity (the first was a woman after a distal radial fracture). Of the 12 patients who complained of fracture site pain, only two considered it moderately severe, but none were taking analgesic drugs. These patients were

Table 1. Spectrum of fractures in the study

Fracture type	Number of patients	[%]
Finger fracture	95	47%
Thumb fracture	7	3,5%
Thumb metacarpal fracture	10	5%
II-V metacarpal fracture	61	30%
Carpal fracture (triquetrum bone)	12	6%
Distal radial fracture	17	8,5%
Total	202	100%

Source: Own materials

Table 2. Flow-chart and satisfaction of patients in the study

Particular patients' populations	Number of patients	[%]
Number of patients implemented to the fracture self-monitoring	209	-
Patients lost from follow-up	7	3,3%
Total number of patients reviewed	202	100%
Patients contacted by telephone	194	96%
Patients presented to the clinic in person	8	4%
Patients satisfied with self-monitoring regimen	179	89%
Patients not fully satisfied with self-monitoring regimen (including those who presented to the clinic)	23	11%

Source: Own materials

Table 3. Problems identified in 23 patients who were not fully satisfied with the fracture self-monitoring regimen

Problem of patients not fully satisfied*	Number of patients	[%]
Persisting pain in the fracture site	12	52%
Reduced finger range of motion	9	39%
Reduced wrist range of motion	8	35%
Swelling around the wrist	4	17%
Deformation of the finger/wrist	2	9%
Other concerns	4	17%
Total	39	

* Total number of problems is not equal number of patients, because several patients had 2 or 3 problems at the same time
Source: Own materials

advised that if the pain does not resolve within the next month, they should report to an outpatient clinic. Among the four patients with other concerns, two reported a fracture-independent problem: trigger finger and de Quervain tenosynovitis. Other two reported formation of small lump on the palm no restricting hand function. This was probably an early form of Dupuytren's disease. These patients were advised to observe their hands and present to hand clinic in case of progression of the disease. Eight patients (4%) presented in the clinic in person due to different concerns: six due to problems with removing the stitches and 5 for the reasons mentioned in table 2. All patients who visited the clinic were given professional advice, as well as everyone who was interviewed by phone. None of the 202 patients implemented in the postoperative self-monitoring program required hospital admission due to treatment complications. 179 patients (89%) were fully satisfied, whereas 23 (11%) were partially satisfied.

DISCUSSION

The change in the concept of outpatient postoperative care after minor and medium-sized hand and wrist fractures is forced by the large number of injuries to the hand and by limited health care resources, which cause a long wait for a face-to-face follow-up visits. Experience from the Covid-19 pandemic has shown that patients can safely control themselves and start with activities (exercises) with the injured hand. All they need are instructions provided upon discharge home after primary fitting the fracture. Since the

vast majority of hand fractures heal (unite) without complications, post-fracture follow-up by a healthcare professional (nurse, doctor) is, in most cases, not necessary. Such a concept results in a significant relief of the outpatient sector, which primarily increases the availability of consultations for people who actually need it. The author's observations from the outpatient hand clinic indicates that at least 10-15% of visits after simple hand and wrist fractures are unnecessary, and patients could serve themselves. In these cases, the visit is frequently limited to a one-minute conversation. The only professional activity for which a doctor or nurse is needed is to remove plaster or thermoplastic splint from finer or wrist, which - as already mentioned - can be performed by the patient himself, and not in a specialist hand clinic. The results of our study show that minimizing follow-up visits after primary fitting of simple hand and wrist fractures is safe and convenient for both patients and the healthcare system. It is safe for doctors, because in the event of any complication during treatment, patients can present to the hand clinic, where the treatment can be modified, e.g. from conservative to surgical.

In the literature, one can find studies on the effectiveness and safety of a self-monitoring program in the treatment of simple limb fractures (called„virtual fracture clinic"VFC). This concept has been proposed as an efficacious alternative to face-to-face fracture clinics. Better usage of clinical time and resources, increased accessibility, decreased patient wait times and reduced cost have been undoubtful advantages of the virtual fracture clinic. Johnson et al. (2025) reported results of a systematic review of the literature about clinical efficacy and patient satisfaction of the VFC in the United Kingdom. The authors reviewed a total of 25 studies involving 63 thousands of patients with simple fractures treated conservatively. VFCs reported an 84% mean compliance rate with British Orthopaedic Association Standards for Trauma, compared to 6% for face-to face fracture clinics. Virtual fracture clinics make minimal diagnostic errors and report a low reattendance rate following discharge, accounting for 5%. Patients have good health outcomes, a high mean satisfaction rate of 85% and prefer this treatment model over traditional follow-up appointments [3].

Similar results are reported in an another systematic review by Davey et al. (2020). Overall, 15 studies involving 12 thousands of patients with simple fractures treated conservatively, with mean follow-up of 13 months were reviewed. In total, 66% of patients were directly discharged after primary fracture fitting, with protocol derived conservative management, with 9% using the Helpline and 16% contacting their general practitioner for advice or reassurance. A total of 1,2% of patients experienced fracture non-unions and 48 patients (0,4%) required surgical intervention. The overall patient satisfaction rate was 81%, with only 1,3% experiencing residual pain at the fracture site. The mean cost per patient for virtual fracture clinic was 71 GBP (Great Britain Pound), with a mean saving of 53 GBP when compared to traditional (face-to-face) clinic models [4].

Maunder at al. (2025) reported results of an implementation of a virtual fracture clinic in one province in Australia. The authors triaged patients to the virtual fracture clinic based on predefined criteria over a 5-week period. Primary outcomes included patient satisfaction, travel distance savings and cost savings. Out of 514 fracture cases 185 (36%) were managed through the virtual fracture clinic. Compared with the traditional face-to-face model, virtual clinic patients had shorter waiting times, and 91% of those seen in the virtual fracture clinic could be discharged without further review. Virtual clinic patients were highly satisfied, with 139 (75%) patients declaring a willingness to undergo the same treatment again. It also resulted in significant travel distance and cost savings. No patients required surgery during the follow-up period. With high patient satisfaction and no compromise in safety, this model could redefine how fracture care may be delivered in patients having problems with access to traditional acute traumatic orthopaedic care [5].

Waite et al. (2023) reported results of an another systematic review about safety and effectiveness of paediatric virtual fracture clinics. The authors reviewed 6 studies which met the inclusion criteria The results show that there was a high rate of direct discharge from the VFC leading to reduced outpatient appointments. There were limited incidences of missed fractures and the rates of re-presentation were similar to that of face-to-face orthopaedic clinics. There were significant cost savings for the hospitals and high parent satisfaction. The authors conclude that VFCs have shown to be safe and effective at managing most stable, low operative risk paediatric fractures. However, they emphasise the need of safety ensuring with a telephone helpline and an open return to fracture clinic policy [6].

Our work has some limitations: it only concerns relatively simple (although very common) hand and wrist fractures. However, it should be emphasized that these fractures account for approximately 60% of all fractures fitted in an emergency department and changes in the organization of care in this field bring visible and measurable benefits. Perhaps this model could be extended to simple hand and wrist fractures treated operatively. The authors also applied this model of care to outpatient control after common hand surgeries, such as carpal tunnel release, trigger finger release, excision of benign hand tumours and Dupuytren's disease. The implementation of postoperative self-monitoring has shown great effectiveness and safety for patients.

In summary, it can be said that the change of the post-fracture care system from the traditional face-to-face to the self-monitoring program has shown great effectiveness and safety for patients. This is another element of the optimization of organization of hand surgery services, after the

first two, which are: (1) the transfer of part of the operations from the operating theatre to the procedure room at the surgical ward, and (2) providing anaesthesia by the surgeons themselves and the cancelling anaesthesiologists assistance at operations [7, 8]. All these changes have contributed to improving the work of the surgical department, increasing the availability of patients for treatment, increasing patient satisfaction and reducing costs. The results of the current study show that the transformation of outpatient postoperative care into the post-fracture self-monitoring contributes to further improvement of standards and fits into the positive trend of changes in traditional healthcare.

CONCLUSIONS

The change in the post-fracture care system from a traditional to a self-monitoring has shown great effectiveness and safety for patients. This improved the work of the hand clinic, improved patients' access, increased satisfaction and reduced costs.

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CONFLICT OF INTEREST

The Authors declare no conflict of interest

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