

Factors Influencing the Time to Return to Work After Occupational Hand Injuries

Galip Gencay Üstün
ORCID: 0000-0002-3538-1152

Kutluhan Yusuf Küçük
ORCID: 0000-0002-2563-1154

Gökhan Sert
ORCID: 0000-0002-8005-5049

Murat Kara
ORCID: 0000-0002-9387-1977

Hakan Uzun
ORCID: 0000-0002-7584-3833

Department of Plastic Reconstructive and Aesthetic Surgery, Hacettepe University Faculty of Medicine, Ankara, Türkiye.

Corresponding Author: Galip Gencay Üstün
E-mail: ggustun@hacettepe.edu.tr

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ABSTRACT

Purpose: Returning to work requires a certain period of time for patients who have suffered a hand injury as a result of a work accident. Evaluating the factors influencing the time to return to work (time off work) is aimed.

Methods: A total of 111 patients were involved in the study. Data collected from medical records and phone reviews. Independent variables such as age, gender, Hand Injury Severity Scale (HISS) score, fracture on plain radiography, treatment method (surgical/conservative), physical demand of the occupation, mechanism of injury, and physiotherapy were reviewed. Afterwards, the relationship between these variables and time to return to work has been evaluated.

Results: In 111 subjects, 107 were able to resume their previous jobs after the injury. Average time to return to work was 58.6 days among patients who were able to return to work. It took more time for patients to return to work which were considered heavy/very heavy. Patients with fractures, higher HISS scores, who were treated surgically and undergone physiotherapy returned to work later. The effect of age, gender and mechanism of injury was statistically insignificant.

Conclusion: HISS score and fracture on radiography can be used to predict time off work following surgery. If the necessary counseling is given to the patients with these conditions, it will be easier to plan the return of the patients to their lives.

Keywords: hand, injury, rehabilitation, time, timework.

INTRODUCTION

The time to return to work after an occupational hand injury is important for the patient, patient's relatives and employers. It has been shown to be determined by many variables which include severity of injury, type of treatment, requirement of physiotherapy and many socioeconomic variables such as intelligence, financial status, personal expectations and economic motivation [1-3].

Hand injuries effect patients' socioeconomic status and may cause loss of skilled workforce resulting in direct and indirect financial loss to the society [4]. Trauma to the hand not only jeopardizes the income, but also hinders the integration into a larger network of social relationships acquired at work [1]. Although there are criticisms of underreporting, the number of reported work accidents in our country has been decreasing over the years [5]. However, the data on the time to return to work is lacking.

The purpose of this study is to evaluate the average time off work for patients with occupational hand injuries based on age, gender, Hand Injury Severity Scale (HISS) score developed by Campbell and Kay [6], presence of fracture, mechanism of injury, physical demand of work and treatment type.

METHODS

A hundred and twenty patients who were treated for occupational hand injuries between April 2020 and October 2021 were included in this study. Child workers (<18 years) and patients with missing data were excluded from the study. A total of 111 subjects were recruited. The study protocol was approved by the local Non-interventional Clinical Researches Ethics Board (registration number:2022-74).

Patient demographics, gender, age, occupational characteristics, type and etiology of injury, presence of fracture, severity of injury according to HISS, treatment method (surgical vs conservative), physiotherapy status and duration were extracted from patient files. Afterwards, patients were contacted via phone and the ability to continue working in the same job, the time off work (TOW) and rehabilitation time were reviewed. The time off work was defined by the length of time between the injury and return to work in the same episode of hand injury. All subjects underwent

immediate surgical treatment if necessary. The length of rehabilitation time was defined as the length of time between the first day and the last day of regular physiotherapy according to the same episode of hand injury. Severity of injury was assessed by using the Hand Injury Severity Scale (HISS). HISS was chosen for evaluation of severity of injury because previous researchers has shown its correlation with TOW and impairment of upper extremity [7,8]. Physical labor demand was classified in 5 levels according to U.S. Department of Labor, from sedentary to very heavy to review its effect on time off work [9].

Descriptive analysis of this study results was done by SPSS v22.0. Categorical variables were gender, physical demand of the job, presence of fracture, treatment (surgical or not), physiotherapy requirement and ordinal variables were age, HISS score and time off work (days). Chi square test was used to determine relationship between categorical variables while Mann Whitney U test and Kruskal Wallis tests were used to analyze ordinal variables. Spearman's analysis used to analyze correlation between TOW and HISS.; p values < 0,05 were considered to be significant.

RESULTS

A total of 111 subjects with occupational hand injuries were involved in the study (Table 1). Mean age was 43.6 years. Ninety-nine subjects were male and 12 were female. Majority of the subjects (n=102, %91.8) resided in Ankara. Injury mechanisms were lacerations with sharp objects in 83 patients (%74.8), crush injuries in 18 patients (%16.2), and avulsion injuries in 10 patients (%9). Seventy-six patients (%68.5) were immediately treated in the operating room, while the rest were treated without hospital accommodation (conservatively). Average HISS score was 31.1, which is considered moderate (HISS 21-50) according to Campbell's classification [6]. Forty patients (%36) had fractures diagnosed with plain radiographies. Forty-three patients (%38.7) had soft tissue injuries (nerve/vessel/tendon) that required surgical repair. Thirty-three patients (%30) had tendon injuries, 24 patients (%21) had nerve injuries and 15 patients (%13.5) had vascular injuries (27 patients had combined tendon/vascular/nerve

Table 1. Patient Characteristics

	n	%
Gender		
Male	99	89
Female	12	11
Mechanism of injury		
Laceration	83	74.8
Crush	18	16.2
Avulsion	10	9
Soft Tissue Injury*	43	38.7
Tendon	34	30
Vascular Injury	15	13.5
Nerve	24	21
Physiotherapy after initial treatment	44	39.6
Ability to resume work		
Capable of work	81	72.9
Not capable of work	13	11.7
Capable but not completely	17	15.3
Physical Job Demand**		
Sedentary	16	14.4
Light	22	19.8
Medium	33	29.7
Heavy	14	12.6
Very Heavy	26	23.4

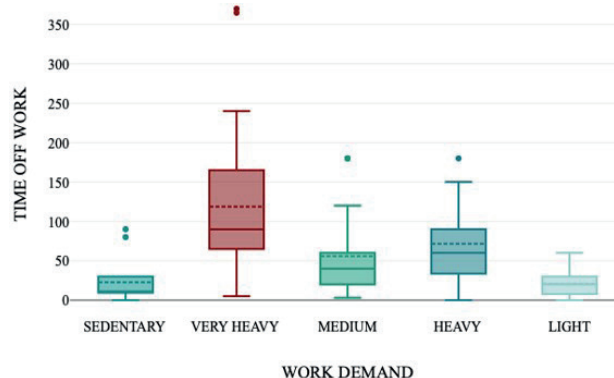
injuries). Forty-four patients (%39.6) received physiotherapy after initial surgical treatment and the average duration of rehabilitation was 41 days.

A hundred and seven patients were capable of doing their previous job while 4 patients were unable to do so (These patients all worked in jobs classified as very heavy). Average time off work was 58.6 days. Patients who couldn't return to work were excluded from time-off work analysis. Nearly one third of the subjects had sedentary and light physical demand (n=38, %34.2), 33 patients (%29.7) had medium, and 40 patients (%36) had heavy and very heavy physical demand in their occupation. Among sedentary physical demand group average TOW was 22.6 days, for light physical demand group it was 20.8 days, for medium and heavy physical demand group it was 55.8 days, and for very heavy physical demand group it was 71.5 days (Table 2). As occupation requires more physical demand, returning to work took more time ($p < 0.001$) (Figure 1).

Patients who had higher HISS scores ($p = 0,002$), fracture on radiography ($p = 0,04$), undergone physiotherapy ($p < 0.001$) and surgical treatment

Table 2. Time Off Work and HISS Scores Among Physical Demand Groups

Physical Demand	n	Time Off Work (days)	HISS
Sedentary	16	22.6	19.9
Light	22	20.8	30.2
Medium	30	55.8	35.1
Heavy	14	71.5	30.2
Very Heavy	26	118.7	34.1

**Figure 1.** The relationship between TOW and physical demand of the occupation.

($p < 0.001$) had been able to return to work later. The effect of age ($p = 0,609$), gender ($p = 0,631$) and mechanism of injury ($p = 0,984$) on time-off work was statistically insignificant. Time-off work and HISS were positively correlated (Spearman's rho 0.3, $p = 0,002$).

HISS score was also predictive of surgical treatment ($p < 0.001$) and physiotherapy necessity ($p < 0.001$). However, mechanism of injury ($p = 0,161$) did not lead to higher/lower HISS scores.

DISCUSSION

The hand is the most commonly injured part of the body, and working-class men up to age 40 years comprise the main group that is injured. Duration of treatment of patients with these injuries may take months, due to the necessity for the lengthy rehabilitation protocols [4]. Prolonging the process may jeopardize the income, result in problems with the workplace, and eventually lead to unemployment. Thus, the time to return work is a significant parameter when evaluating hand injuries [1,3].

In our study, average length of time off work was 58 days and it is relatively short when compared with other studies which reported 13-14 weeks

of absence [7,10]. Similar to our study, Wong et al reported 7 weeks of absence from work, which they concluded it was due to less severe injuries in their patient group (average HISS score was 29) and lesser percentage of crush type injuries [8]. Although the results of our study confirm the effect of HISS score on TOW, the effect of etiology of the injury (crush/laceration/avulsion) on TOW could not be demonstrated. Authors think this may be due to the severity of crush type injuries, which may result with a severe or light injury. Crush type injuries in our study group may be less severe when compared with others. Although we couldn't find statistically significant difference of injury mechanism on HISS, our crush injuries have an average of 18.1 HISS score when compared to score of 31 of whole study group. We think the lack of significance was also due to small number of crush injury subjects in our study group.

One of the important factors in determining the time to return to work is the physical activity required by the job. At the beginning of the treatment, when the patient is expected to be away from work, the physical skills required by the job should be taken into consideration as well as the injury and the patient should be informed about the job change that may be required. While it can be extremely distressing for an acute injury to result in a job change, the existence of the risk of not returning to work stands out. In addition to the longer return to work in very heavy jobs, it is noteworthy that all 4 patients who had to change jobs worked in very heavy jobs. The existence of patients who may face a job change or compulsory retirement due to a work accident is annoying and the burden will increase exponentially if the necessary precautions are not taken according to the social state principle. One way to reduce this burden is to tighten training and inspection mechanisms on occupational health and safety.

HISS has been presented to be valuable for determining TOW [11,12]. A remarkable detail in the results of the study is that the patients with higher HISS scores, who underwent surgery and then undergone physiotherapy took longer time to return to work. It is plausible to think that the increased HISS score will lead to the necessity of surgery, which will lead to the need for physiotherapy. Therefore, it is not possible to consider these variables independently of each

other. However, the ability of HISS to present numerical values on a large scale makes it more advantageous over other two variables, which can only give yes/no values. With following studies, cut-off values of HISS may be presented to predict TOW.

Some limitations of the study need to be addressed. Apart from medical variables, there are many socioeconomic variables effecting TOW such as education level of the subject, presence of compensation claims, economic status [8,13]. As indirect costs outweigh the direct healthcare costs more focus should be given to the non-medical parameters. We couldn't assess the subjects according to their socioeconomic status. If a subject has economic motivations to return work, doesn't have compensation claims he/she might return to work earlier despite severe injuries and higher physical demands. We couldn't reach this information because subjects were discrete about their financial status when we asked detailed information enough to analyze financial status objectively.

Occupational hand injuries remain as a complex subject with economic, social and medical aspects. As with current knowledge, predicting time off work when an individual patient presenting with injury is challenging due to many medical and non-medical factors. There are predictors for it but due to several groups of factors which are independent from each other and medical professionals can't access to the non-medical information is the reason for it. Given the indirect cost of occupational injuries being more than the direct costs, as a health care professional our focus should be to give immediate care for individuals as this would provide the best potential decrease of treatment time.

Author contribution

Study conception and design: GGÜ, KYK, and HU; data collection: GGÜ, KYK; analysis and interpretation of results: GGÜ, GS, MK and HU; draft manuscript preparation: GGÜ, KYK, GS, MK and HU. All authors reviewed the results and approved the final version of the manuscript.

Ethical approval

The study was approved by the local Non-interventional Clinical Researches Ethics Board (Protocol no. 2022-74)

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Conflict of interest

The authors declare that there is no conflict of interest.

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