Research Article

Effects of an Occupation-Based Intervention on Hand and Upper Extremity Function, Daily Activities, and Quality of Life in People With Burn Injuries: A Randomized Controlled Trial

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Importance: Occupational performance and function are affected in people with burn injuries to the hand and upper extremity; this can lead to the development of some disabilities and endanger quality of life.

Objective: To investigate the effects of occupation-based intervention on hand and upper extremity function, daily activities, and quality of life in people with burn injuries.

Design: Randomized controlled trial.

Setting: Specialized burn hospital in Iran.

Participants: Patients ($N = 20$) with burn injuries to the hand and upper extremity.

Interventions: The control group received only traditional rehabilitation, and the intervention group received traditional rehabilitation and took part in the Cognitive Orientation to daily Occupational Performance (CO-OP) protocol (18 sessions, 45 min/day, for both groups).

Measures: Assessments included the CO-OP; Michigan Hand Outcomes Questionnaire; Shortened Disabilities of the Arm, Shoulder and Hand Questionnaire; Modified Barthel Index; World Health Organization Quality-of-Life Scale–Brief; a visual analogue scale; measurements with a goniometer and dynamometer; and the figure-of-eight method. These evaluations were conducted with both groups before the rehabilitation program commenced and at Wk 2, 6, and 14 (follow-up).

Results: The results showed that there were notable changes in all the study variables except edema in both groups. However, these changes (p [V] ≤ .05) were not statistically significant between the two groups.

Conclusions and Relevance: According to the results, the occupation-based interventions are as effective as traditional therapeutic interventions for the improvement of hand and upper extremity function, ability to perform daily activities, and quality of life in people with burn injuries.

What This Article Adds: The CO-OP protocol, as an occupation-based intervention, can improve hand performance, ability to perform daily activities, and quality of life in people with burn injuries, and thus it can be useful in rehabilitation clinics.

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Burns are the fourth most common type of physical trauma among people worldwide, after traffic accidents, falls, and interpersonal violence (Forjuoh et al., 2006). They are considered a major public health problem (Peck et al., 2008; World Health Organization, 2008). The prevalence of burns in developing countries such as Iran is 1.3 per 100,000 people, and the prevalence in developed

countries is about 0.14 per 100,000 people (Tang et al., 2015).

Burn injuries have many physical, economic, social, psychological, and emotional consequences that could endanger the person's health status and quality of life (Mohaddes Ardebili et al., 2017). Thus, they are considered a threat to a society's general health (Tang et al., 2015). Research indicates that the most common limbs affected by burns are the upper limbs and the hands (Aghakhani et al., 2015). Hypertrophic scarring and motor dysfunction (Tang et al., 2015), loss of range of motion, joint deformities (Cowan & Stegink-Jansen, 2013), peripheral neuropathies, and pain are the most common problems caused by burns. Burns in the upper extremities can also cause some functional limitations, which could in turn affect the individual's return to meaningful activities, including self-care, recreation, and work (Mata et al., 2017).

In recent years, because of the importance of this kind of injury and its effects on a person's quality of life, the study of burns has been increasing. Because successful burn management involves not only wound closure and medical procedures but also rehabilitation and a return to one's regular life (Moore et al., 2009), multiple studies have identified the need to propose a multidisciplinary approach regarding rehabilitation after a burn injury (Jagnoor et al., 2018). According to a study conducted by Jagnoor et al. (2018), occupational therapy services are a known part of a multidisciplinary approach (Jagnoor et al., 2018). Because occupational therapy goals mainly focus on returning to the previous level of function as well as participating in a meaningful occupation, occupational therapy plays a major role in the rehabilitation process of people with burn injuries (Mata et al., 2017).

Occupation-based interventions include client-centered activities in which the client and therapist collaborate to select and design meaningful activities that are based on the client's interests, needs, health status, and improved participation in daily life (American Occupational Therapy Association [AOTA], 2020). In fact, this method uses some meaningful activities to improve functional components and ultimately brings the person to their maximum capability to perform activities (AOTA, 2020). One occupation-based intervention is the Cognitive Orientation to daily Occupational Performance (CO-OP; Polatajko et al., 2001). The CO-OP approach uses the learning of a metacognitive strategy (simply stated as "goal–plan–do–check") that is applied to meaningful, self-identified problems in everyday life. The use of a metacognitive training strategy enhances participation in a meaningful activity by promoting self-awareness, self-monitoring, performance adjustment, and generalization as well as transference of these skills to other tasks and contexts in everyday life (Steinhart et al., 2020). Recent research indicates that the CO-OP protocol not only improves motor performance (Izadi-Najafabadi et al., 2022) but also is meaningful for clients to use in their daily lives (Zera & Brodecki, 2022). In fact, based on the inherent aim of the CO-OP protocol to enable skill acquisition through a process of strategy use and guided discovery, focusing treatments directly on improving performance in everyday life activities, and hoping for secondary improvement in impairments and meaningful activities (McEwen et al., 2010; Polatajko et al., 2001), the protocol is perceived as necessary for life reintegration in patients with burn injuries.

Although advances in intensive care and burn care have significantly improved the survival outcomes of people with severe burn injuries over the past 10 yr (Brusselaers et al., 2010), Mata et al.'s (2017) study of patients with burn injuries to the upper extremities showed that burns can lead to some changes in the ability to perform simple activities of daily living, maintain life roles, and participate in meaningful occupations (Mata et al., 2017), and, ultimately, quality of life (Williams & Berenz, 2017). Although the ability to use one's hands is necessary for daily routine activities, professional activities, and exploring the world (Saberi et al., 2018), in this study we aimed to investigate the effects of an occupation-based intervention on hand and upper extremity function, daily activities, and quality of life in people with hand burn injuries.

Method

Study Design

This study was a randomized controlled trial that started recruiting participants in December 2018 and ended with the last follow-up in May 2020. The study protocol received ethical approval from both the Iran University of Medical Sciences and the Iran Clinical Trial Center, in Tehran.

Participants

A total of 20 patients with hand and upper extremity burn injuries were investigated. During the first week after a skin graft surgery, the included participants were referred to a rehabilitation center by the surgeon. The inclusion criteria were as follows: between age 18 and 65 yr, 1 wk since the surgery (Skirven et al., 2014), an acceptable level of cognitive function (defined as a score ≥21 on the Persian version of the Mini-Mental State Examination; Seyedian et al., 2008), and depth of burn of second or third degree consisting of 2.5% to 3% total body surface area according to the modified Lund and Browder chart (Murari et al., 2017). The exclusion criterion was existence of accompanying injuries such as fractures, tendon injuries, or wound infections. Because the participants were admitted to a specialized burns hospital during the first week after surgery, the intervention's objective and the study method were fully explained to them, and they then filled out an informed consent form.

Randomization and Participant Allocation

Eligible participants were assigned into the two groups, a control group ($n = 10$) and an intervention group ($n = 10$), using a random-numbers table.

Interventions

The control group received traditional rehabilitation for 45 min/day, 3 times/wk (a total of 18 sessions). The interventions included range-of-motion training, muscle strengthening, mobilization, stretching, scar massage, edema controlling, and graded stretching exercises (Tang et al., 2015). According to each participant's type of injury, the required splints, pressure gloves, burn clothes, or silicone sheets were prescribed.

The intervention group received traditional rehabilitation in the first 2 wk, 45 min/day, three times/wk (6 sessions) and then the CO-OP protocol in the next 4 wk, 45 min/day, three times/wk (12 sessions). We had two reasons for offering traditional rehabilitation to the intervention group. The first and most basic reason was the mobility needs of these participants. Because of severe mobility problems, such as a lack of range of motion and a lack of muscle strength required to move the wrists and fingers, and a severe swelling of the hands, as well as possible sensory problems due to a lack of movement of the hand because of skin graft surgery, they were unable to perform any movement until they had completed the CO-OP treatment protocol. Motor prerequisites had to be met, which was possible only by conducting traditional interventions. The steps of the CO-OP protocol are presented in Table 1.

Measures

The Persian version of the Canadian Occupational Performance Measure (COPM; Atashi et al., 2010) was used to determine occupational performance and satisfaction. Hand performance and disability were evaluated using a Persian version of the Michigan Hand Outcomes Questionnaire (MHQ; Ebrahimzadeh, Birjandinejad, & Kachooei, 2015) and the Persian version of the Shortened Disabilities of the Arm, Shoulder and Hand Questionnaire (Quick–DASH; Ebrahimzadeh, Moradi, et al., 2015). Pain was assessed with a visual analogue scale (DeLoach et al., 1998; Mendelson & Selwood, 1981), range of motion of the joints was measured with a goniometer (Edgar et al., 2009), grasp power was evaluated using a Jammar dynamometer (Mathiowetz et al., 1985), and edema was assessed using the figure-of-eight method (Dewey et al., 2007). The ability to perform daily activities was evaluated using a translated version of the Modified Barthel Index (MBI; Tagharrobi et al., 2011), and quality of life was assessed with the World Health Organization Quality-of-Life Scale–Brief (WHOQOL–BREF; Tagharrobi et al., 2011). All these evaluation trials were conducted before the intervention and at Wk 2, 6, and 14 (follow-up).

Data Analysis

We investigated the normal distribution of the data obtained after the raw data were transformed, using

Table 1. Session Structure: The CO-OP Intervention Protocol

Session No. and Title	Tasks
Before therapy: Preparation	1. Establish contact with caregivers. 2. Orient caregivers to the CO-OP. 3. Contract with caregivers to ensure resources and support. 4. Provide daily activity log. 5. Check for participants', caregivers', and therapists' prerequisites.
Session 1: Assessment	6. Review participants' completed daily activity logs. 7. Administer the COPM and identify three goals. 8. Establish participants' baseline performance using the PQRS.
Session 2: Introducing Global Cognitive Strategy	9. Introduce the global cognitive strategy, GPDC: a. Therapist introduces the puppet, "Commander GPDC." b. Therapist maps GPDC to a familiar task. c. Participant maps GPDC to a familiar task. d. Caregivers observe the session and discuss the application of GPDC at home.
Sessions 3–11: Acquisition	10. Conduct dynamic performance analysis: Ongoing. 11. Facilitate the participants' acquisition and application of GPDC. 12. Guide discovery of DSSs and mediate their application to skill acquisition. 13. Apply enabling principles. 14. Teach caregivers about GPDC and applicable DSSs. 15. Educate caregivers about their ongoing role in facilitating cognitive strategy use, to promote skill acquisition.
Session 12: Consolidation	16. Readminister the COPM. 17. Readminister baseline, using the PQRS. 18. Probe participants for generalization and transfer of GPDC and DSSs. 19. Review and reinforce the CO-OP approach and cognitive strategy use with caregivers.

Note. CO-OP = Cognitive Orientation to daily Occupational Performance; DSSs = domain-specific strategies; GPDC = goal–plan–do–check; PQRS = Performance Quality Rating Scale.

the Shapiro–Wilk test. As a result, all parameters of the data had a normal distribution. The data regarding occupational performance and satisfaction, hand performance, disability, pain, range of motion, power grasp, edema, ability to perform daily activities, and quality of life were analyzed using a 3 × 4 repeated-measures analysis of variance (ANOVA) with the two groups (intervention and control) as a between-subjects factor and time (before the intervention; at Wk 2, 6, and 14 after the intervention; and follow-up) as a within-subject factor.

Results

The procedures of selecting and allocating the participants, and an overview of the participants' follow-up, are illustrated in Figure A.1 of the Supplemental Appendix (available online with this article at https://research.aota.org/ajot). Information about the participants' demographic characteristics is presented in Table 2. The means and standard deviations of outcome measures in both the control and intervention groups at different time intervals are summarized in Table 3.

The results showed no statistically significant difference between the intervention and control groups in terms of the participants' baseline demographic and clinical characteristics. No adverse events or side effects were observed in either group. Although the group effect was not significant for any outcome measure, the time effect was significant for all outcome measures, with the exception of edema, indicating notable improvements in occupational performance and satisfaction (i.e., the COPM Function subscale [COPM–F] and Satisfaction subscale [COPM–S]), hand performance (i.e., MHQ), disability (i.e., Quick–DASH), pain (i.e., VAS pain), range of motion, power grasp, ability to perform daily activities (i.e., MBI), and quality of life (WHOQOL–BREF) in both the control and intervention groups after receiving 18 sessions of continuous treatment ($p < .0001$; Figure A.2 of the Supplemental Appendix). However, no statistically significant improvement in edema was observed in the intervention or control group. Moreover, a significant Time × Group interaction was found only for wrist flexion and extension (Table 4). The results of post hoc multiple comparisons indicated that there was no significant difference between the control and intervention groups regarding scores on the COPM–F and COPM–S, MHQ, Quick–DASH, VAS pain, range of motion, power grasp, edema, MBI, and WHOQOL–BREF at pretreatment and the Wk 2, 6, and 14 evaluations. However, greater wrist flexion and extension were found in the intervention group compared with the control group at the Wk 6 and 14 evaluations.

Discussion

Many studies have focused on people with hand burns and have shown the notable effect of therapeutic exercises on improving their movement (Grisbrook et al., 2012; Omar et al., 2012). In addition, researchers have concluded that therapeutic exercises can improve a person's quality of life by improving hand function as well as removing movement limitations (Grisbrook et al., 2012). The important point, however, is that most previous studies have mainly focused on functional components and less on functional areas, such as returning to normal life and the ability to perform their daily activities. Movement problems after burns have been shown to have a considerable impact on the performance of daily activities and affect rates of socialization and return to the community (Din et al., 2015). These effects can lead to further motor injuries and affect the individual's life in the future and their participation in the community and the resumption of past roles (Perera et al., 2015). This can result in changes in the ability to perform basic activities of daily living and to participate in meaningful occupations and to resume former roles, as well as causing

Table 2. Participant Demographic Characteristics

Variables	Intervention Group	Control Group	*p*
Age, years, *M* (*SD*)	43 (11.47)	40.50 (12.14)	.64
Gender, *n*			
Female	2	3	.61
Male	8	7	
MMSE score, *M* (*SD*)	26.90 (1.52)	27.80 (0.78)	.12
Total body surface area, %[a]			
3	6	3	.17
2.5	4	7	
Depth of burn, cm			
Deep partial thickness	4	5	.65
Full thickness	6	5	

Note. $N = 20$. MMSE = Mini-Mental State Examination.
[a]3% lower arm burns; 2.5% hand burns.

Table 3. Comparison of the Functional Outcome Measures at Different Times of the Assessment Between the Control and Intervention Groups

Outcome Measure and Assessment Time	*M* (*SD*)	
	Control Group	Intervention Group
COPM		
Function		
Pretreatment	2.01 (1.70)	1.62 (1.96)
Week 2	4.73 (2.72)	5.49 (2.24)
Week 6	8.03 (1.97)	8.82 (1.51)
Week 14	9.49 (0.94)	9.73 (0.65)
Satisfaction		
Pretreatment	0.99 (1.45)	2.19 (3.31)
Week 2	4.19 (2.83)	0.20 (2.72)
Week 6	7.64 (2.68)	8.72 (1.52)
Week 14	9.55 (0.93)	9.72 (0.62)
MHQ		
Pretreatment	28.39 (12.83)	26.09 (9.15)
Week 2	50.80 (12.23)	49.42 (14.17)
Week 6	68.02 (15.65)	67.54 (13.96)
Week 14	80.95 (16.08)	78.61 (11.17)
Quick–DASH		
Pretreatment	62.3 (8.48)	58.00 (8.91)
Week 2	46.00 (10.21)	40.90 (11.60)
Week 6	31.30 (16.58)	27.90 (6.59)
Week 14	17.60 (3.94)	19.50 (5.96)
VAS		
Pretreatment	2.85 (2.08)	3.30 (1.76)
Week 2	0.60 (0.84)	1.70 (1.88)
Week 6	0.20 (0.63)	1.50 (2.71)
Week 14	0.30 (0.94)	0.60 (1.34)
Power grasp		
Pretreatment	0.50 (1.27)	0.21 (0.45)
Week 2	2.20 (3.14)	2.00 (1.73)
Week 6	5.85 (5.80)	5.45 (2.35)
Week 14	8.50 (6.14)	9.30 (4.13)
Edema		
Pretreatment	78.80 (156.73)	40.35 (29.56)
Week 2	27.70 (12.14)	28.12 (11.10)
Week 6	24.45 (10.00)	28.15 (9.80)
Week 14	26.00 (10.84)	27.85 (9.41)
MBI		
Pretreatment	88.20 (9.37)	85.60 (14.43)
Week 2	94.60 (7.98)	96.40 (4.64)
Week 6	99.70 (0.94)	100.00 (0.00)
Week 14	100.00 (0.00)	100.00 (0.00)
WHOQL–BREF		
Pretreatment	87.70 (14.08)	79.90 (12.99)
Week 2	85.00 (13.86)	87.70 (7.37)
Week 6	96.60 (12.85)	95.00 (8.47)
Week 14	99.60 (5.85)	100.30 (7.31)
Range of motion		
Wrist flexion		
Pretreatment	26.67 (6.73)	22.5 (17.68)
Week 2	35.83 (5.99)	34.00 (17.68)
Week 6	41.67 (13.11)	45.75 (18.75)
Week 14	46.94 (12.61)	48.50 (16.80)
Wrist extension		
Pretreatment	29.44 (12.73)	23.00 (14.61)
Week 2	33.89 (13.35)	37.25 (15.20)
Week 6	40.00 (14.74)	44.25 (14.29)
Week 14	46.11 (15.67)	47.50 (16.83)
Thumb		
Pretreatment	22.00 (6.85)	24.00 (13.90)
Week 2	30.25 (7.70)	36.62 (10.67)
Week 6	38.62 (11.05)	45.37 (20.10)
Week 14	47.50 (18.43)	50.12 (20.12)
Other fingers[a]		
MP		
Pretreatment	34.93 (11.18)	32.77 (20.28)
Week 2	39.93 (9.96)	44.83 (19.01)
Week 6	48.94 (11.86)	51.06 (19.53)
Week 14	56.44 (19.47)	59.00 (19.78)
PIP		
Pretreatment	27.81 (14.53)	32.76 (18.93)
Week 2	41.44 (22.19)	15.31 (25.54)
Week 6	52.76 (18.44)	61.25 (23.55)
Week 14	59.82 (21.83)	72.00 (26.57)
DIP		
Pretreatment	15.00 (10.38)	14.87 (12.57)
Week 2	24.44 (12.49)	13.18 (17.35)
Week 6	38.31 (16.31)	42.06 (17.85)
Week 14	45.69 (18.98)	49.50 (17.55)

Note. COPM = Canadian Occupational Performance Measure; DIP = distal interphalangeal joint; MBI = Modified Barthel Index; MHQ = Michigan Hand Outcomes Questionnaire; MP = metacarpophalangeal; PIP = proximal interphalangeal joint; Quick–DASH: Quick Disabilities of the Arm, Shoulder and Hand; VAS = visual analogue scale and WHOQOL–BREF = World Health Organization Quality-of-Life Scale–Brief.

[a]Including the index, middle, ring, and little fingers.

mental disorders such as depression, aggression, worry, and fear (Mata et al., 2017). Because previous studies have emphasized the promotion of multidisciplinary interventions to improve work performance and quality of life in burn patients (Jagnoor et al., 2018), it seemed that occupation-based interventions, such as the CO-OP protocol, in which the patient plays a key role in identifying problems, could be used for this purpose.

Table 4. Results of the Main and Interaction Effect of Group and Time for the Study Measures

	Group Effect			Time Effect			Time × Group Interaction		
Measure	***F*(1, 18)**	***p***	η^2_p	***F*(3, 54)**	***p***	η^2_p	***F*(3, 54)**	***p***	η^2_p
COPM–F	0.01	.94	.00	84.74	.00	.82	2.17	.13	.11
COPM–S	1.28	.27	.07	55	.00	.75	0.35	.73	.01
MHQ	0.13	.72	.01	62.08	.00	.77	0.11	.80	.01
Quick–DASH	0.19	.67	.01	125.39	.00	.87	1.07	.37	.06
VAS	3.15	.09	.15	12.41	.00	.40	0.60	.62	.03
Power grasp	0.02	.88	.00	92.57	.00	.84	0.47	.70	.02
Edema	0.06	.80	.00	3.65	.06	.17	0.35	.60	.01
MBI	0.02	.88	.00	16.36	.00	.48	0.53	.52	.03
WHOQOL–BREF	0.08	.78	.00	28.74	.00	.61	0.32	.71	.02
Range of motion									
Wrist									
Flexion	0.32	.58	.01	32.64	.00	.64	4.15	.02	.19
Extension	0.70	.41	.03	26.58	.00	0.60	4.29	.03	.19
Thumb	0.46	.51	.02	1768.26	.00	0.99	1.46	.25	.07
Other fingers[a]									
MP	0.03	.87	.00	23.59	.00	.57	1.44	.25	.07
PIP	0.94	.35	.05	24.01	.00	.57	0.23	.71	.01
DIP	0.19	.67	.01	28.30	.00	.61	0.24	.70	.01

Note. COPM = Canadian Occupational Performance Measure; DIP = distal interphalangeal joint; F = Function; MBI = Modified Barthel Index; MHQ = Michigan Hand Outcomes Questionnaire; MP = metacarpophalangeal joint; PIP = proximal interphalangeal joint; Quick–DASH = Quick Disabilities of the Arm, Shoulder and Hand; S = Satisfaction; VAS = visual analogue scale; WHOQOL–BREF: World Health Organization Quality-of-Life Scale–Brief.

[a]Including the index, middle, ring, and little fingers.

The CO-OP protocol is a new intervention approach based on the fact that cognition plays an important role in the improvement of psychological characteristics, such as depression and anxiety (Khanipour et al., 2022); the acquisition of occupational skills; and the growth of occupational adequacy (Polatajko et al., 2001). The CO-OP approach, which is delivered in face-to-face mode, has shown some promise for enabling people with burn injuries to achieve their personal goals and to enhance their occupational performance and executive functioning through strategy use (Steinhart et al., 2020).

Our study is the first to focus on the effect of the CO-OP on people with burn injuries. The principal finding is that the CO-OP protocol, in addition to traditional rehabilitation, can be an effective approach that is associated with improvements in occupational performance and satisfaction, hand performance, disability, pain, range of motion, power grasp, the ability to perform daily activities, and quality of life.

This study indicates that there was a significant Time × Group interaction only for wrist flexion and extension, indicating that wrist flexion and extension were increased in both the control and intervention groups, with the largest overall increase in the intervention group. As is obvious in Figure A.3 of the Supplemental Appendix, the increases in wrist flexion and extension at Week 6 and follow-up assessments were significantly greater in the intervention group compared with the control group. On the other hand, no Time × Group interaction was found for the other outcome measures. Although the results show improvements in the abovementioned items in both groups with no significant differences, the important issue is the difference in time to acquire improved occupational performance and satisfaction between the two groups. In the CO-OP treatment protocol, the client and occupational therapist determine the required functions to perform the desired activities and return to previous occupational performance (Polatajko et al., 2001). The treatment is mainly based on both the improvement and practice of those specified activities. In our study, the participants in the intervention group achieved improved occupational performance and satisfaction earlier than the control group, with the final sessions focusing only on using compensatory and adaptive methods. The control group participants, who received only traditional interventions and did not emphasize their desired activities, faced many challenges during the treatment period until the last sessions. We should note that this topic was observed only experimentally by the researchers and, because of a lack of evaluations at short intervals, was not documented.

One study that paid attention to activities of daily living and quality of life in patients with burn injuries was conducted by Dan Tang et al. (2015). Although their results regarding improvements in the ability to perform daily activities and in quality of life are in line with our results, their study showed a substantial difference between their intervention and control groups that is not consistent with our results. This difference can be attributed to several reasons. One of the main reasons may be the type of treatments performed in Tang et al.'s (2015) study. In their study, no specific rehabilitation treatments were offered to the control group, which received only the initial nursing treatments at the time of hospitalization. These authors hypothesized that this issue would lead to a significant difference between the control group and the intervention group, which received rehabilitation treatments, including both occupational therapy and physiotherapy. However, at first, both the control and intervention groups received traditional rehabilitation for six sessions, which in turn led to some improvements in movement before the second phase of the treatment started. Because of essential basic motor needs such as a minimum ROM, minimum strength, or reduced edema, traditional interventions were necessary for the intervention group; eliminating them would not have been ethical.

Limitations and Future Directions

Despite this study's findings, it has some limitations. A lack of evaluations at short intervals led to a failure to record early positive results in any of the outcomes in terms of the CO-OP treatment protocol in the intervention group after the interventions started. In addition, because many participants did not complete their therapeutic sessions after returning home, and because of problems caused by the coronavirus disease 2019 pandemic, there was a total of 20 participants (10 in each group). The small sample size in both groups can be considered the main reason for potential bias in the results. We suggest that future studies use a larger sample size. In addition, considering that both groups received similar treatments for six sessions at first, which can be one of the main reasons for the lack of significant differences regarding the outcomes between the two study groups, we recommend that subsequent studies use different treatment methods in the initial treatment sessions in both control and intervention groups.

Implications for Occupational Therapy Practice

The results of this study have the following implications for occupational therapy practice:

- People with burn injuries to the hand and upper extremity experience some disabilities and functional problems. These challenges lead to an inability to perform required activities, limitations in regard to returning to their occupations, the emergence of psychological problems, and a resulting decreased quality of life.
- Interventions that use the occupations required by the client are useful for ameliorating the effects of disabilities.
- The CO-OP protocol, as an occupation-based intervention, can improve hand performance, the ability to perform daily activities, and quality of life in patients with burn injuries to the hand and upper extremity, so it can be useful in rehabilitation clinics.

Conclusion

Our study shows that occupation-based interventions that use the CO-OP approach as well as traditional interventions could improve occupational performance and satisfaction, hand performance, disability, pain, range of motion, power grasp, the ability to perform daily activities, and quality of life in people with burn injuries. Therefore, these interventions can be used in rehabilitation clinics to improve outcomes in people with burn injuries to the hands and upper extremities.

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