



# **Case Report**

# Activities of Daily Living in Spinal Cord Injury Through the Lens of Human Occupations





Maryam Derakhshanfar<sup>1</sup> , Samaneh Karamali Esmaili<sup>1\*</sup>

1. Department of Occupational Therapy, School of Rehabilitation Sciences, Iran University of Medical Sciences, Tehran, Iran.



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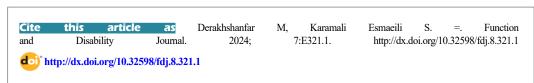
# **ABSTRACT**

Background and Objectives: Since all aspects of occupational performance are affected by cervical spinal cord injury (SCI), one of the goals of occupational therapy for these clients is to restore the abilities and routines necessary for independence in activities of daily living (ADL). The model of human occupation (MOHO) seems to help occupational therapists develop a framework for clinical reasoning about the living conditions of people with cervical SCI emphasizing the interaction between volition, habituation, and performance capacity. This study aims to investigate the use of MOHO in occupational therapy for cervical SCI and focuses on the significance of comprehending and adjusting to these specific needs to improve their participation in purposeful daily activities leading to occupational adaptation.

Case Presentation: The focus of this study is on a 26-year-old man who experienced a cervical SCI at the C6 level due to a diving accident. He exhibits varying degrees of motor and sensory deficits, characterized by partial upper extremity function and complete loss of function in the lower extremities. The client expresses a strong desire to develop skills for safe and effective transfers, the need for strategies that promote community reintegration and social interaction, and adaptive strategies and utilize assistive devices that will enable him to perform ADLs with greater independence. Conclusion: Because in a person with cervical SCI, values and interests, internalized roles, and performance capacities are affected by impairment, designing a program based on the MOHO will help occupational therapists perform more effectively.

**Keywords:** Occupational therapy, Self-care, Spinal cord injury (SCI)





#### \* Corresponding Author:

Samaneh Karamali Esmaili, Assistant Professor.

Address: Department of Occupational Therapy, School of Rehabilitation Sciences, Iran University of Medical Sciences, Tehran, Iran.

Tel: +98 (21) 22228052 E-mail: esmaeili.s@jums.ac.ir



# What is "already known" in this topic:

About half of all people with spinal cord injury have a cervical spine injury. Due to the sensory and motor effects of this injury on the upper and lower extremities, these people become dependent on others to perform their daily activities. Occupational therapy interventions for these patients aimed at improving activities of daily living are complex and a comprehensive and holistic approach to the problem of these patients is often difficult.

#### → What this article adds:

The model of human occupation (MOHO) enables occupational therapists to develop a deep understanding of the complex factors influencing an individual's ability to engage in activities of daily living following cervical spinal cord injury, and to design interventions that promote optimal functioning, independence, and quality of life. Its application can lead to improved outcomes and increased participation for individuals with cervical spinal cord injury. As such, it is a useful model for occupational therapists working in a variety of settings, and its application can be extended to research and education to promote a deeper understanding of the complex needs of individuals with spinal cord injury.

### Introduction

A

bout half of all spinal cord injuries (SCIs) happen at the cervical level. SCI may result from trauma, disease, or degeneration. The average age at which clients experience SCI is around 40 years old [1]. Func-

tional impairments due to SCI are highly variable and may impact a person's capacity to engage in activities of daily living (ADL) and social participation [2]. Persons with cervical SCI need the most extensive care among those with SCI and even the most basic ADL tasks become a challenge for them. It can render the individual dependent upon assistance in many areas of daily living [3]. ADLs that are challenged in a person with a cervical SCI include fundamental skills, such as grooming/personal hygiene, dressing, toileting, functional mobility, and eating [4]. Even though SCI seriously impresses all aspects of occupational performance, occupational therapy frequently focuses on supporting clients to regain the abilities necessary for independence in ADLs [5].

Occupational-based models help occupational therapists work on the activity and participation of individuals with SCI. Among these models, the model of human occupation (MOHO), developed by Kielhofner in the 2017s, is an occupation-centered model widely used by occupational therapists around the world [6, 7]. The MOHO is a conceptual framework that addresses how and why we engage in meaningful daily activities, which are called occupations [8]. In MOHO, the elements related to the person are volition, habituation, and performance capacity; these elements interact with the surrounding environment to produce occupational per-

formance [9]. To view the components of this model and their definitions, refer to Table 1.

The MOHO examines the mental dimensions of SCI, which leads to a decrease in the individual's volition, interests, and values in performing ADLs [6, 10]. Considering that individuals with cervical SCI cannot fully perform their ADLs due to volition and performance capacity deficits and feel that they are not competent in performing these tasks, the MOHO is a suitable model for dealing with the challenges of ADLs compared to other occupational therapy models.

This study aims to formulate ADL problems in a case with cervical SCI with clinical reasoning based on the MOHO as a conceptual framework.

# **Patient Description**

Ali (pseudonym to protect the privacy of the client) is a 26-year-old man who was diagnosed with incomplete cervical SCI. He could sit independently, spherical volar grip, full range of motion in the shoulders and elbows, and control of urine and feces, but he did not have the ability to stand and gait. Ali depends on a wheelchair for mobility. Before this accident, Ali lived alone at home and did all the household chores alone. He worked in an auto spare parts shop and job responsibilities included moving boxes, accounting, and reception. He currently lives with his sister.

#### **Concepts of MOHO**

Before this, the client's ADLs were completely carried out by his caregivers, and he had not received any expla-



nation or training during occupational therapy sessions regarding the necessity of performing these activities independently. The last column of Table 1 presents the individualized application of the MOHO in this client. In the following, the concepts of this model are explained for the case presented above.

#### Volition

Cervical SCI affects his volition and motivation and impresses his capacity to engage in ADLs. The psychological effects of SCI, such as depression and anxiety, and a decrease in sense of control over his body, lead to a reduction in volition, a feeling of helplessness, and a dwindling in self-efficacy [11]. Volition in MOHO includes personal causation, value and interest [6].

#### Personal causations

Personal causation is the perception of his competence and effectiveness in performing ADLs. It is related to the concept of self-efficacy, which plays a crucial role in motivating and participating in performing ADL and in his ability to influence the environment or achieve goals for cervical SCI [12].

#### Values and interests

One of the goals of rehabilitation is to perform ADLs that align with personal values and interests. Because he cannot pursue occupations that were once integral to his identity, he reevaluates and detects his values and interests with the help of the occupational therapist. This process results in more focus on values such as independence in doing ADLs for living alone in a house and social communication [6, 13].

#### Habituation

Habituation describes the patterns and routines influenced by context, the environment, roles, and habits. He must adapt his habits and roles to accommodate limitations to recognize meaningful habits [6, 14, 15]. The habituation concept in MOHO contains two elements of habits and internalized roles [12].

#### Habits

Cervical SCI usually disrupts previous habits due to the physical restrictions imposed by the injury. In this client, ADLs which were once performed automatically, now require conscious effort and planning, for example, using adaptive tools for feeding and grooming, and continuous monitoring of body skin to prevent bedsores [16].

#### **Internalized roles**

Cervical SCI profoundly affects his roles, functions, and consequently social participation. By internalizing the roles, he develops an identity for himself. In the family role, he is unable to transfer and leave the house to do shopping, and he needs his sister's help to do ADLs. In an employee's role at work, it is difficult to go to work and perform tasks, such as accounting [3, 17].

#### Performance capacities

Performance capacity is the capability to do things, incorporating the person's objective physical and mental elements, and their subjective experiences before, during, and after performing an occupation. A person's physical and mental abilities are factors that affect the performance capacity. He must modify one or more aspects of his volition and habituation to adapt to long-term impairments in his performance capacity. Weak trunk control in a sitting position, reduced breathing capacity, and disturbances in some movements of the upper limbs have caused problems in the independent performance of ADL. Psychological adjustment to cope with anxiety and depression gives him the necessary preparation to adapt to new conditions and perform ADLs in an atypical form [18].

#### **Environment**

From the MOHO perspective, occupational behavior is largely influenced by the environment. The environment affects motivation, organization, and occupational performance. Background elements such as physical, social, cultural, political, and economic aspects constitute an environment. According to the MOHO, a person's environment and internal characteristics are interconnected and affect their occupational behavior [19].

For him with cervical SCI, the environment has a crucial role in facilitating or impeding his occupational performance and participation. Because he is recovering at home, family and home are the main environments for him, therefore his main challenges are in performing ADLs in this environment. These challenges include the lack of proper access to the necessary equipment, such as a reacher, grab bar, or universal cuff to perform ADLs [6, 14].

#### Intervention

How an individual completes an occupation inside the environment can be observed in three mutually interdependent levels of occupational participation, occupational performance and occupational skills.



Table 1. MOHO model components and application of MOHO in cervical SCI

Concept	Subsystem	Definition	Application
Volition	Interests	The things that a person finds pleasurable or gratifying to do	The client spends most of his recreation time sleeping, watching movies on TV, and surfing social media with a mobile phone.  Before Ali used to wear sneakers and now, he has to wear KAFO, or he likes to wear tight pants, and now he has to wear loose and comfortable pants due to the difficulty of wearing and removing these clothes.
	Values	The things that one believes are significant and worthwhile	Since the client was 26 years old, he was expected to plan for his future, both in terms of starting a family and in terms of job. Due to the problem and the disappointment about the future, the clients had lost their motivation and hope for rehabilitation. Currently, he has to focus on independence in ADLs to reduce his dependence on his sister. He used to shower and shave his face every day before going to work, but currently, these activities are carried out weekly.
	Personal causations	The concept of one's ability and efficacy	The client felt hopeless and unable to perform his ADLs due to the conditions caused by the cervical SCI. Due to failure in doing some ADLs, he was not motivated to try other activities with different forms. Ali feels that due to doing the tasks related to his ADLs, his sister has suffered physical injuries such as back and knee pain, and he should become independent in performing these activities as soon as possible to put less pressure on his sister.
Habituation	Internalized roles	The integration of a status that is defined by oneself or by society, along with a set of associated attitudes and behaviors	Regarding the role of friendship, Ali had concerns such as his need sister to clean up after urine and feces, and having a negative feeling about this problem among his friends had prevented him from participating in friendship parties and meetings. Regarding his role as an employee in society, if he was able to move the wheelchair in different directions, he could go back to work and earn income but he can no longer perform the tasks related to moving boxes. He did not feel good about his role as a brother, because he cannot do the simplest activities that he used to do for his sister, such as shopping.
	Habits	Acquired tendencies to respond and perform in certain consistent ways in familiar environments or situations	Because he succeeded in doing his ADLs, he is satisfied that his therapeutic exercises have become part of his routine habits. He was very fond of fast food and now he cannot eat these foods due to issues such as weight gain and problems related to swallowing and breathing.
Performance capacities	Objective components	The capacity to carry out a certain physical act	The client was worried about bed sores, muscle atrophy, and obesity
	Subjective experience	The person's mental capacity and performance	Due to the problems related to the sensory disorder, he felt that he did not have the ability to control his body parts in order to independently perform ADLs, such as holding a spoon or a razor in his hands, or due to the weak trunk control and fear of falling, he preferred to eat lying down. The client was worried about orthostatic hypotension during activities and loss of consciousness.
Environment	Physical	The surroundings of the individuals with the items in them	He lives on the 3 <sup>rd</sup> floor of an apartment without an elevator. Before the accident, he did not have a problem with this issue, but now, due to the lack of an elevator and ramp, he is unable to leave the house. The entrance to the bathroom has a step and this is an obstacle for pushing a wheelchair into the bathroom.
	Social	Social attitudes and relationships with family, friends, neighbors, and the larger community	He was worried about people's attitude towards his physical disability at a young age and not being able to find a suitable job due to being wheelchair-bound and needing a carer to observe hygiene after urination and defecation

 $Abbreviations: SCI: Spinal\ cord\ injury; ADLs:\ Activities\ of\ daily\ living;\ KAFO:\ Knee-ankle-foot\ orthosis.$ 



The first rehabilitation focus for the client was to identify personal meaningful and achievable goals related to ADLs to enhance occupational participation, including eating with a spoon, grooming with a razor and brushing teeth, dressing and undressing, and functional mobility, such as in-bed mobility and wheelchair mobility independently. We provided opportunities for the client to experience success in small tasks, and gradually increased complexity to reinforce a sense of competence and personal causation. He stated his values and interests to identify occupations that are meaningful and valuable for these activities. Social communication with his friends was very significant to him. The client was guided to establish a scheduled time for skill acquisition and practicing ADLs. To achieve occupational performance, he identified and strengthened existing positive habits for instance brushing his teeth after every meal, shaving his face daily and eating with a spoon. We discussed the client's roles before and after the injury and helped him explore new roles he can adopt that align with his current capabilities. The integration of routine occupational therapy exercises with ADLs to enhance strength, coordination, and functional mobility of muscles led to an increase in self-confidence in performing these activities independently. The living environment was assessed and modifications were recommended to enhance accessibility and safety [6, 14, 20].

#### Discussion

This study was conducted to investigate challenges related to volition, habituation, performance capacity and environmental influences that hindered Ali's participation in ADLs, and by solving these challenges, he could improve his performance in these tasks.

There is not much evidence of the use of MOHO and its tools as a basis for clinical interventions in SCI. The study conducted by Jo showed that using the interaction between humans and the environment for environmental modification increased the time used in occupational participation and competence to perform occupations in people with disability. By applying MOHO theory to evaluate and modify one's home environment and activity performance, the researchers can comprehend the lifestyle of clients and suggest opportunities to actively participate in ADLs. Adapting MOHO theory to enhance activity participation will contribute to enhancing the quality of occupational therapy services in community settings [6]. In the other study, a scoping review explored the connection between volition as a person's motivation to engage in activities and participation among adults with acquired disabilities, such as SCI. The review found that acquired disabilities impact both volition and participation and that a positive relationship was found between the two [21]. A study conducted by Guidetti emphasized new client-centered ADL intervention based on the MOHO for persons with stroke. Its intervention empowered stroke survivors by focusing on their personal experiences and promoting their autonomy in ADLs. The results emphasized the significance of a holistic and individualized approach to rehabilitation, to improve the quality of life (QoL) for individuals recovering from stroke [22].

In the present study, with special attention to psychological issues in this client, good treatment results were obtained. As we know psychosocial support is necessary to manage challenges related to independence in ADL in cervical SCI [20]. The most basic ADLs are complicated for a person with cervical SCI, and it makes them dependent on assistance in many areas [23]. Occupational therapy's role is to modify social and living environments and regain crucial and meaningful roles and abilities. When few significant improvements exist in cervical SCI rehabilitation, the client with cervical SCI may discouraged or give up [17]. Thus, by highlighting functional skills and emphasizing on client's physical, social, emotional, sensory, and cognitive abilities, we promote their self-esteem and self-efficacy.

According to the concepts mentioned above, and the therapeutic outcomes of this treatment, the MOHO is based on a general systems theoretical framework in which the human was conceptualized to be an open system. The volitional, habituation, performance capacity, and environmental components of the human system contribute to the overall dynamic of the system, resulting in the emergence of thoughts, feelings, and actions that constitute occupational adaptation. In this view, therapeutic intervention is directed toward the alteration of any of the four components, leading to the re-organization of the entire system, MOHO provides a framework for understanding and solving ADL challenges in clients with cervical SCI and emphasizes the role of occupation in maintaining health and well-being and the impact of a person's capacity to participate in ADLs in cervical SCI [20, 24].

We can use the MOHO theory to assess the degree of independence in daily activities to provide opportunities for them to actively participate in ADLs. Therefore, it can be argued that occupational therapists should implement the MOHO-based intervention to improve clients' ADL performance and QoL.



#### **Conclusion**

MOHO-based interventions focusing on the client's volition, habituation, and performance capacity and emphasizing physical aspects, and psychological and social dimensions in the rehabilitation process, led to substantial improvements in ADL skills, such as dressing, grooming, feeding, and transferring independently.

#### Limitations

In this study, specific tools of MOHO were not used, because the researcher did not have access to these tools during the implementation of the intervention.

#### **Ethical Considerations**

## Compliance with ethical guidelines

This study was done with the informed consent of the client.

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# **Authors' contributions**

Conceptualization: Maryam Derakhshanfar and Samaneh Karamali Esmaeili; Methodology: Mayam Derakhshanfar; Writing, review and editing: All authors.

#### **Conflict of interest**

The authors declared no conflict of interest.

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# مطالعه موردي



# فعالیت های روزمره زندگی یک مرد مبتلا به ضایعه نخاعی گردن در ایران بر اساس مدل أكوييشنانسان

مریم درخشانفر ۱ 🕩 \*سمانه کرمعلی اسماعیلی ۱

۱. گروه کاردرمانی، دانشکده علوم توانبخشی، دانشگاه علوم پزشکی ایران، تهران، ایران.

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مقدمة از آنجایی که تمامی جنبه های عملکرد اکوپیشنال تحت تاثیر آسیب ضایعه طناب نخاعی قرار می گیرد، یکی از اهداف کاردرمانی برای این مراجعین، بازیابی تواناییها و روالهای لازم برای استقلال در فعالیتهای روزمره زندگی است. به نظر میرسد «مدل اکوپیشن انسان» به کاردرمانگران کمک میکند تا چارچوبی برای استدلال بالینی در مورد شرایط زندگی افراد مبتلا به ضایعه نخاعی ایجاد کنند. این مدل بر تعامل بین اراده، فرایند شکل گیری عادات و ظرفیتهای عملکردی تأکید دارد. هدف از این مطالعه بررسی استفاده از مدل اکوپیشن انسان در کاردرمانی برای آسیب طناب نخاعی گردنی است و بر اهمیت درک و تطبیق شرایط این بیماران با نیازهای خاص برای بهبود مشارکت آنها در فعالیتهای هدفمند روزانه که منجر به سازگاری اکوپیشنال می شود تمرکز دارد.

رائه مورداین مطالعه یک آقای ۲۶ ساله را بررسی می کند که به دلیل یک حادثه غواصی دچار ضایعه طناب نخاعی گردنی در سطح مهره شش گردنی شده است. او درجات مختلفی از نقایص حرکتی و حسی را نشان میدهد که با از دست دادن بخشی از عملکرد اندام فوقانی و از دست دادن کامل عملکرد در اندام تحتانی مشخص می شود. مراجع تمایل شدیدی به بهبود مهارتهای ترنسفر ایمن و مؤثر، ادغام مجدد در جامعه و تعامل اجتماعي، استراتژيهاي انطباقي و استفاده از وسايل كمكي را ابراز ميكند كه او را قادر مي سازد فعاليتهاي روزمره زندگی را با استقلال بیشتری انجام دهد.

نتیجه گیری از آنجایی که در فرد مبتلا به آسیب طناب نخاعی گردنی، ارزشها و علایق، نقشهای درونی و ظرفیتهای عملکردی تحت تأثیر اختلال قرار می گیرند، طراحی برنامهدرمانی بر اساس مدل اکوپیشن انسان به کاردرمانگران کمک می کند تا توانبخشی مؤثرتری داشته باشند.

## كليدواژهها:

كاردرماني، خودمراقبتي، أسيب طناب نخاعي



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\* نویسنده مسئول:

دكتر سمانه كرمعلى اسماعيلي

نشانی: تهران، دانشگاه علوم پزشکی ایران، دانشکده علوم توانبخشی، گروه کاردرمانی. تلفن: ۲۲۲۲۸۰۵۲ (۲۱) ۹۸+