ISSN (print) 2522-1906, ISSN (online) 2522-1914
PHYSICAL REHABILITATION AND RECREATIONAL HEALTH TECHNOLOGIES
Vol. 10 No. 5, 2025

Original Scientific Article DOI: 10.15391/prrht.2025-10(5).03

Effectiveness of individualized occupational therapy interventions without the use of prosthetics for military servicemen with unilateral upper extremity amputations

Anna Postonogova[a], Oleksandra Kalinkina[b], Kostiantyn Kalinkin[b], Iryna Zharova[b], Olexii Nikanorov[b]

[a]Ukrainian Society of Ergotherapists, Zhytomyr, Ukraine
[b]Department of Therapy and Rehabilitation, National University of Ukraine on Physical Education and Sport, Kyiv, Ukraine

Corresponding author: Oleksandra Kalinkina
e-mail: kalinkina.pt@gmail.com

Abstract

Purpose. This paper presents the results of an experimental study investigating the effectiveness of individualized occupational therapy interventions for people with upper limb amputations without the use of prosthetic devices. This study is relevant because the number of people in Ukraine who have had a limb amputated as a result of the ongoing war is increasing, as is the need for effective rehabilitation methods to improve quality of life.

Material & Methods. The study employed a pre-test–post-test experimental design, allowing for the evaluation of changes in participants' functional status and occupational performance following a structured occupational therapy intervention without prosthetic devices. Occupational therapy sessions were aimed at client education and teaching the clients new skills to use modified and compensatory strategies for task performance, adaptive equipment, as well as making adaptation of the environment for increased functional independence. Participants included 10 male military servicemen between the ages of 20 and 45 years old with upper extremity amputations who participated in occupational therapy interventions for two months. The assessment was carried out using the Canadian Occupational Performance Measure (COPM), Disabilities of Arm, Shoulder and Hand (DASH) questionnaire and Visual Analogue Scale (VAS). Statistical data were analyzed using descriptive statistics and paired samples t-test.

Results. As a result of the occupational therapy interventions, the study participants demonstrated a statistically significant decrease in disability levels according to the DASH, as evidenced by an average score decrease from 80.5 prior to intervention to 44.2 post-intervention ($p<.001$). Similarly, the COPM assessment revealed clinically significant improvements (≥2-point change) in the performance of personal hygiene tasks, dressing, and cooking, as well as in satisfaction with performing personal hygiene, cooking, and driving tasks. The decrease in pain levels reported by the participants was also statistically significant with an average of 5,5 pre-test and 3,4 post-test on VAS ($p<.001$).

Conclusions. The comparative analysis of disability levels, pain levels, as well as performance of meaningful occupations before and after interventions indicates a significant improvement in functional independence and life satisfaction of military servicemen with amputations following an individualized occupational therapy program. Results presented in the paper demonstrate a positive correlation between COPM and DASH. The study indicates that occupational therapy services aimed at teaching compensatory strategies of task performance, environmental education and patient education are beneficial for clients with upper extremity amputations even without the use of prosthetic devices. Additionally, the results of the study support the effectiveness of occupational therapy for military servicemen.

Keywords: occupational therapy, military servicemen, upper extremity amputations, COPM, DASH, quality of life.

Introduction

Upper extremity loss, often resulting from trauma related to burns, violence, occupational accidents, or combat injuries (Orr et al., 2018), profoundly affects an individual's ability to engage in meaningful occupations. It has been reported that compared to lower limb loss, individuals with upper limb amputations experience more severe impairments in occupational performance and report a higher disability rating as well as increased susceptibility to post-traumatic stress disorder (PTSD) (Fitzgibbons & Medvedev, 2015). The number of military and civilian clients with upper extremity amputations has dramatically increased since the full-scale invasion of Ukraine in 2022, although official statistics have not been made public.

Occupational therapy (OT) plays a pivotal role in addressing the complex needs of this population across the rehabilitation continuum. Occupational therapists are well trained to serve this population due to their holistic approach that includes both physical rehabilitation and psychosocial support (AOTA, 2021). Pre-prosthetic OT care includes wound and edema management, desensitization, range of motion, and functional training, all essential for preparing the residual limb for prosthetic use. In addition, occupational therapists collaborate with clients to determine the most appropriate prosthetic device based on their lifestyle needs and functional goals, helping manage expectations regarding device capabilities and limitations (Atkins, 2016; Hermansson & Turner, 2017; Klarich & Brueckner, 2014). Once a device is selected, OT provides training for prosthetic controls to ensure functional integration into meaningful daily activities, improving functional independence and quality of life and facilitating communication with the prosthetist regarding potential concerns (Atkins, 2016; Hermansson & Turner, 2017).

Beyond physical rehabilitation, OT also addresses the psychosocial implications of limb loss. Practitioners support emotional adjustment, facilitate community reintegration, and help clients re-engage in roles such as worker, caregiver, or student (Smurr et al., 2008; Swanson Johnson & Mansfield, 2014). Therapy interventions may include coping strategy development, goal setting, and self-efficacy enhancement. Those who received OT services demonstrated improved psychosocial outcomes, including better adjustment to limb loss, greater ease in discussing their condition, improved work-related confidence, and increased acceptance of both the amputation and the prosthetic device (Laurie & Mandacina, 2018).

Importantly, OT also serves individuals who either elect not to use a prosthetic device or are awaiting one. Biddis & Chau (2007) reported that adult clients show rejection rates of 26% for body-powered prostheses and 23% for electric ones, with an overall non-wear rate of 20%. A systematic review of 123 studies by Smail et al. (2020) revealed that, over time, the primary reasons for prosthetic abandonment consistently aligned with two main categories: comfort and function. Among the most frequently reported and enduring comfort-related issues were prosthesis weight, heat buildup, and excessive perspiration. In such cases, OT focused on one-handed techniques, environmental adaptations, and task modification to support continued engagement in daily life (Biddiss & Chau, 2007; AOTA, 2021). This comprehensive approach underscores the essential role of OT in maximizing function, participation, and quality of life for individuals with upper limb loss regardless the use of prosthetic devices. The purpose of this study was to investigate the effectiveness of an OT treatment program without the use of prosthetics for military servicemen with upper extremity amputations in Ukraine.

Material and methods

Participants

The study used a convenience sample of 10 military servicemen receiving occupational therapy services in an outpatient rehabilitation clinic in Kyiv. All participants were males between ages 20 and 45, with an average age of 32). Inclusion criteria encompassed: age over 18, unilateral upper limb amputation, cognitive ability sufficient to participate in an interview and complete self-ratings. Exclusion criteria included: age under 18, civilian trauma, bilateral amputations. This research project was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Study participants signed informed consent and were notified of their right to withdraw from participation from the study at any time without any consequences. The study was approved by the Ethics Committee of the National University of Ukraine on Physical Education and Sport (Protocol №10 from 19.09.2024).

Methods

The study utilized a pre- and post-intervention design, with data collected at two distinct time points to evaluate changes resulting from the occupational therapy intervention. Occupational therapy services were provided for two months with an average duration of sessions lasting on average 60 minutes, 3 times per week.

To collect and compare data related to patient outcomes, we utilized three valid assessment tools: the Visual Analogue Scale (VAS), the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire, and the Canadian Occupational

Performance Measure (COPM). The VAS is a simple, unidimensional tool used to measure subjective pain intensity by asking individuals to report their pain level on a 10-point scale ranging from "no pain" to "worst pain imaginable" (Hawker et al., 2011). It is widely used due to its ease of use, responsiveness, and minimal burden on participants with various health conditions.

The DASH is a 30-item self-report questionnaire that assesses symptoms and function of clients with musculoskeletal disorders of the upper limbs (Østlie et al., 2011). It provides a quantitative score representing the patient's perceived disability, allowing for detailed functional evaluation. The shortened version of this instrument, QuickDASH, has been proven to be reliable and valid in people with upper limb amputations. A recent study confirms the successful use of the DASH with individuals with upper extremity amputations (Pyörny et al., 2024).

The COPM is a client-centered outcome measure that identifies issues in occupational performance through a semi-structured interview process (Larsen & Law, 2025). It enables patients to self-rate their performance and satisfaction in priority areas, facilitating individualized goal-setting and tracking of meaningful change over time.

Procedure

Initial assessment was conducted using the VAS, the DASH and the COPM and was supplemented with data collected through observation and occupational profile. Interventions aimed at training basic activities of daily living (ADLs) with the goal of restoration of function and independence through task adaptation, use of assistive technology, and environmental modification. First, adaptation of methods for task completion involved teaching individuals to use their residual limb, contralateral limb, or other body parts (such as the mouth, thighs, or torso) to stabilize or manipulate objects during ADLs. Techniques included compensatory strategies such as one-handed dressing methods (e.g., anchoring clothing against a surface while inserting the arm), using friction or gravity to assist with tasks, and sequencing activities to optimize efficiency and reduce frustration (Atkins et al., 1996; Resnik & Borgia, 2015). Second, adaptive equipment and clothing played a critical role in compensating for the loss of limb function. Common aids included built-up or curved utensils for easier grasp, non-slip mats and suction holders to stabilize dishes or grooming tools, and adaptive clothing with Velcro, magnetic closures, or larger zipper pulls to reduce the fine motor demands of dressing (Burger & Marincek, 2007; Østlie et al., 2012). These devices supported autonomy and reduced reliance on caregivers. Third, reorganizing the environment was essential to enhance safety and efficiency during daily routines. Strategies include using non-slip mats and stable surfaces for grooming or cooking, positioning key items within accessible reach, and optimizing room layouts to minimize trip hazards and promote single-limb balance during mobility tasks, all of which are crucial for fall prevention and energy conservation (Stark et al., 2021). Collectively, these evidence-based interventions aligned with occupational therapy principles of maximizing participation, promoting independence, and facilitating functional adaptation in daily living contexts.

For military servicemen, return to independent driving is a significant marker of restoration of functional independence. Occupational therapy interventions addressed both the physical and psychosocial aspects of this complex task. Psychosocial interventions, including counseling and cognitive-behavioral strategies, were used to reduce driving-related anxiety and build confidence, especially in veterans with post-traumatic stress disorder (PTSD) or who associate driving with traumatic events (Classen et al., 2014). Educational sessions provided essential knowledge about the legal process for obtaining adaptation for vehicles, funding support for vehicle modification, helping veterans navigate bureaucratic systems advocating for their needs (Miller et al., 2021). Training also focused on the use of vehicle adaptations such as spinner knobs, left-side gear shifters, electronic hand controls, and remote mirror adjusters, all of which enable one-handed or compensatory driving techniques (Burger and Marincek, 2013).

Clients were taught methods of one-handed driving that emphasize control, safety, and biomechanical efficiency, often using simulated driving to practice skills. Functional components of driving, such as entering and exiting the vehicle, seatbelt fastening, mirror adjustments, and ignition use, were addressed through task-specific training that breaks down each activity into manageable steps and encouraged practice with adaptive tools. Following a two-month intervention, the clients were assessed using the abovementioned outcome measures: the VAS, the DASH, and the COPM.

Statistical analysis

Statistical analysis used in the study included: descriptive statistics, tests of normality and the Paired samples t-test.

Results

As a result of individualized client-centered and occupation-focused interventions, clients demonstrated substantial improvements across multiple outcome measures (Table 1).

Table 1. Descriptive statistics of pre- and post-test assessment using the DASH and VAS (n=10)

	Range	Min	Max	Mean	SE	SD
DASH pre-test	14.1	74.2	88.3	80.530	1.3832	4.3742
DASH post-test	9.1	39.4	48.5	44.160	1.0406	3.2908
VAS pre-test	3.00	4.00	7.00	5.5000	.26874	.84984
VAS post-test	2.00	2.00	4.00	3.4000	.26667	.84327

Table 2. Test of normality for pre- and post-test assessment using the DASH and the VAS

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
DASH pre-test	.128	10	.200	.977	10	.950
DASH post-test	.171	10	.200	.936	10	.514
VAS pre-test	.222	10	.178	.906	10	.258
VAS post-test	.362	10	<.001	.717	10	.001

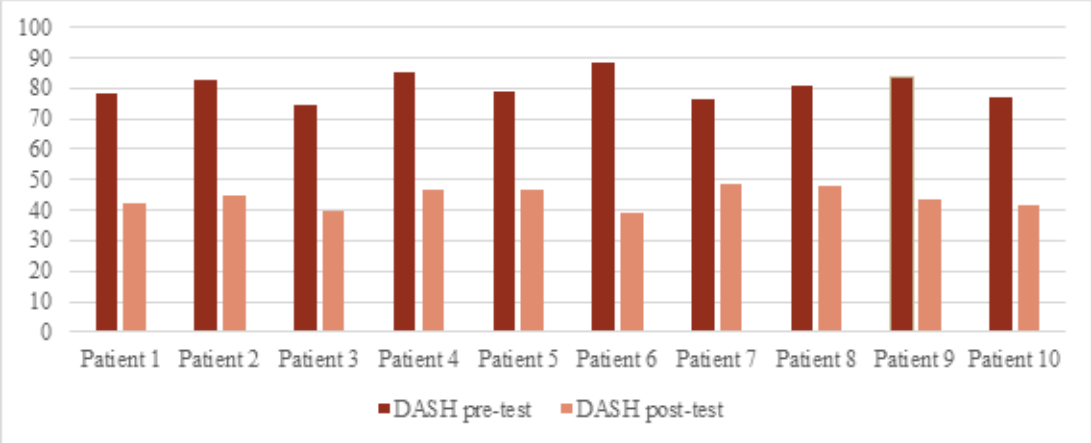

Figure 1. Changes in DASH scores pre- and post-intervention.

Table 3. Paired Samples T-test analysis of pre-and post-tests on the DASH and VAS

	Paired Differences					t	df	Significance	
	Mean	SD	SE	95% CI Lower	95% CI Upper			One-Sided p	Two- Sided p
Differences in DASH scores	36.37	5.65	1.79	32.33	40.41	20.36	9	<.001*	<.001*
Differences in VAS scores	2.10	.875	.28	1.47	2.73	7.58	9	<.001*	<.001*

*Note: * - represents statistically significant difference at p<0,01.*

Based on the results of Kolmogorov-Smirnov and Shapiro-Wilk tests, we concluded that most data were normally distributed except for post-test testing on VAS as evident from Table 2. Therefore, we used the parametric paired t-test to determine whether there was a statistically significant difference between client outcomes as measured before and after occupational therapy intervention.

According to the DASH questionnaire, there was a notable reduction in perceived disability, with average scores decreasing from 80.5 pre-intervention to 44.2 post-intervention as illustrated on Fig. 1. This change represents a clinically meaningful improvement in upper limb function and suggests enhanced ability to perform daily tasks with less difficulty.

Additionally, participants experienced a considerable reduction in pain levels, with Visual Analogue Scale (VAS) scores dropping from an average of 5.5 before the intervention to 3.4 afterward, indicating improved pain management and comfort during daily activities.

The results of Paired samples t-test suggest that the improvements in both the DASH and the VAS scores after the intervention were statistically significant (Table 3). The effect size analysis for the paired samples indicates a very large and clinically meaningful effect with Cohen's d=6.44 with a 95% CI of 3.45 to 9.42., Hedges' g=6.17

Table 4. Changes in performance and satisfaction as a result of the COPM interview

Occupational performance issues	Performance 1	Satisfaction 1	Performance 2	Satisfaction 2	Change in performance	Change in satisfaction
Personal hygiene	2.8	2.0	4.8	4.0	+2.0*	+2.0*
Dressing	2.6	1.8	4.6	3.6	+2.0*	+1.8
Cooking	2.0	2.0	4.8	4.8	+2.8*	+2.8*
Leisure (physical exercises)	1.2	1.0	2.8	2.2	+1.6	+1.2
Driving	1.8	1.2	3.2	3.2	+1.4	+2.0*

*Note: * - represents minimal clinically significant difference.*

for the DASH, and Cohen's d=2.40 with a 95% CI of 1.13 to 3.64, Hedges' g=2.30 for VAS.

Similarly, performance and satisfaction with the performance of identified occupations assessed using the COPM revealed a ≥2-point change in most areas of daily activities. Specifically, participants reported marked gains in their ability to perform personal hygiene tasks, dressing, and cooking, as well as increased satisfaction in performing personal hygiene, cooking, and driving. The changes in pre- and post-ratings of key activities as reported by the COPM are presented in Table 4.

Discussion

The results of our study indicate that the individualized OT interventions developed for clients with unilateral upper extremity amputations without the use of prosthetic devices is effective in restoring functional independence across key life domains such as self-care, leisure activities, and driving. Data collected using the COPM and DASH outcome measures confirmed this as average scores for performance and satisfaction (COPM) improved, while levels of functional disability (DASH) significantly decreased. Perceived disability ratings per DASH reported by our study participants (44.2) after occupational therapy interventions are consistent with those reported by American veterans with unilateral upper limb amputations (49.5) (Resnik et al., 2019). These outcomes reflect both an objective enhancement of daily functioning and an improvement in patients' subjective perception of their activity and independence. Therefore, our results complement the clinical commentary of Rich and colleagues (2025) who concluded that occupational therapy plays an essential role in rehabilitation of clients with lower extremity amputations and highlighted its effectiveness in supporting the client's cognitive and mental health, activity, accessibility through training and interventions targeting pain reduction.

While specific protocols and guidelines for occupational therapy interventions targeting prosthetic use have been developed and successfully integrated into practice a long time ago (Smurr et al., 2008; Resnik et al., 2019), interventions that exclude prosthetic training are also essential for rehabilitation of clients with upper extremity amputations regardless of their stage of recovery. Previous research indicated that despite many years of training individuals with amputations still have problems with activities of daily living, particularly in relation to independent functioning (Kejlaa, 1993). A national study of veterans with upper limb loss conducted in the United States in 2019 found that 52% of veterans with upper extremity amputations wore their prosthetic device less than 8 hours per day, with almost a third of the overall number of participants reporting wearing prostheses less than 4 hours per day (Resnik et al., 2019). These findings suggest that clients with amputations spend most of their time without the prosthetic device, even if they have it, which substantiates the need for interventions focusing on prosthetic-free functional independence.

Our findings highlighting the positive impact of occupational therapy intervention in reducing pain are particularly significant given the high prevalence of phantom and residual limb pain among individuals with amputations. A recent systematic review and meta-analysis revealed that residual limb pain in individuals with upper limb amputation was 58% (95% CI: 46 to 68) (List et al., 2025). Both phantom and residual pain can persist for years after amputations, making occupational therapy interventions targeting participation and pain reduction especially useful for functional recovery, psychological well-being, and quality of life.

The interventions used in our study were structured around gradual engagement in therapy, beginning with basic self-care tasks and advancing to more complex activities such as exercise routines and driving. This progressive, occupation-focused and client-centered approach aligns with contemporary research emphasizing the importance of personalized therapy for individuals with limb loss (AOTA, 2021). Literature also supports the notion that occupational therapy programs are most effective when tailored to patients' personal goals and life context, a principle that was central to the design of this study. A recent study carried out by Stevens and

colleagues suggested that activity and participation was the strongest predictor of well-being in individuals with upper limb amputation (Stevens et al., 2023), which highlights the significance of our findings.

Occupational therapy interventions for driving are critically important, as the interruption in driving represents a significant disruption in daily life and occupational participation (Bassingthwaighte et al., 2024). In a study on occupational performance needs of young veterans in the US (Plach & Sells, 2013), driving was identified as one of the key needs for reintegration into the community. A positive impact on occupational therapy for driving rehabilitation of combat veterans has been reported (Classen et al., 2014a, Classen et al., 2014b). Using occupational therapy-based task-specific training for imitation or simulated driving training reinforced procedural memory and improved performance before real-world testing. Therefore, the results of our study support and enhance previous research. Interventions included in our study offered a comprehensive, individualized approach that supported the clients' safe and confident return to driving.

Lastly, our results point to a positive correlation between the decreasing scores on the DASH and improved performance and participation on the COPM. Therefore, our study adds to the existing literature comparing outcome measures like the COPM and DASH. Similarly to findings of Lauritzson and colleagues (2023), our study revealed a weak correlation between the DASH and the COPM. This may be attributed to the fact that each tool captures distinct aspects of functional ability, with the COPM offering a more personalized, client-centered, and flexible approach to evaluating occupational performance and the DASH providing a general measure of perceived disability.

Conclusion

Our study validates the effectiveness of occupational therapy interventions without the use of prosthetics for clients with unilateral upper extremity amputations as evident from a clinically significant change in scores on the DASH and VAS before and after intervention. Additionally, study participants experienced a clinically significant improvement (≥2 points of change) in performance of personal hygiene tasks, dressing and cooking, and in satisfaction with performing personal hygiene, cooking and driving. These outcomes support the recommendation for broader clinical implementation of similar programs, with a focus on individualized care, occupation-focused and client-centered approaches, we all we active client involvement to meet rehabilitation goals. Additionally, the results presented in the paper demonstrate a positive correlation between COPM and DASH. The study indicates that occupational therapy services aimed at teaching compensatory strategies of task performance, environmental education and patient education are beneficial for clients with upper extremity amputations even without the use of prosthetic devices.

References

American Occupational Therapy Association [AOTA]. (2021). Occupational therapy scope of practice. American Journal of Occupational Therapy, 75(3), 7513410020. https://doi.org/10.5014/ajot.2021.75S3005

Atkins, D. J. (2016). Adult upper-limb prosthetic training. In D.J. Atkins & R.H. Meier, (Eds), Comprehensive management of the upper-limb amputee (pp. 39–59). Springer. https://doi.org/10.1007/978-1-4612-3530-9_6

Bassingthwaighte, L., Gustafsson, L., & Molineux, M. (2024). Lifespace and occupational participation following acquired brain injury during driving disruption: a mixed methods study. *Disability and Rehabilitation*, *47*(1), 120–134. https://doi.org/10.1080/09638288.2024.2338192

Biddiss, E. A., & Chau, T. T. (2007). Upper limb prosthesis use and abandonment: a survey of the last 25 years. *Prosthetics and orthotics international*, *31*(3), 236–257. https://doi.org/10.1080/03093640600994581

Burger, H., & Marincek, C. (2013). Driving ability following upper limb amputation. *Prosthetics and orthotics international*, *37*(5), 391–395. https://doi.org/10.1177/0309364612473500

Classen, S., Monahan, M., Canonizado, M., & Winter, S. (2014). Utility of an occupational therapy driving intervention for a combat veteran. *The American journal of occupational therapy : official publication of the American Occupational Therapy Association*, *68*(4), 405–411. https://doi.org/10.5014/ajot.2014.010041

Classen, S., Cormack, N. L., Winter, S. M., Monahan, M., Yarney, A., Lutz, A. L., & Platek, K. (2014). Efficacy of an occupational therapy driving intervention for returning combat veterans. *OTJR : occupation, participation and health*, *34*(4), 177–182. https://doi.org/10.3928/15394492-20141006-01

Fitzgibbons, P., & Medvedev, G. (2015). Functional and clinical outcomes of upper extremity amputation. Journal of the American Academy of Orthopaedic Surgeons, 23(12), 751-60. https://doi.org/10.5435/JAAOS-D-14-00302

Hawker, G. A., Mian, S., Kendzerska, T., & French, M. (2011). Measures of adult pain: Visual Analog Scale for Pain (VAS Pain), Numeric Rating Scale for Pain (NRS Pain), McGill Pain Questionnaire (MPQ), Short-Form McGill Pain Questionnaire (SF-MPQ), Chronic Pain Grade Scale (CPGS), Short Form-36 Bodily Pain Scale (SF-36 BPS), and Measure of Intermittent and Constant Osteoarthritis Pain (ICOAP). *Arthritis care & research*, *63 Suppl 11*, S240–S252. https://doi.org/10.1002/acr.20543

Hermansson, L. N., & Turner, K. (2017). Occupational therapy for prosthetic rehabilitation in adults with acquired upper-limb loss: Body-powered and myoelectric control systems. Journal of Prosthetics and Orthotics, 29(4S), P45–

P50. https://doi.org/10.1097/JPO.0000000000000154

Klarich, J., & Brueckner, I. (2014). Amputee rehabilitation and preprosthetic care: Amputee rehabilitation. Physical Medicine and Rehabilitation Clinics of North America, 25(1). https://doi.org/10.1016/j.pmr.2013.09.005

Larsen, A. E., & Law, M. (2025). Canadian Occupational Performance Measure the state of the art – a review. *Scandinavian Journal of Occupational Therapy*, *32*(1), 2473045. https://doi.org/10.1080/11038128.2025.2473045

List, E. B., Klieverik, V., Martin, E., Krijgh, D. D., & Henk Coert, J. (2025). Prevalence of residual limb pain and neuromas after upper extremity amputation: a systematic review and meta-analysis. *The Journal of hand surgery, European volume*, 17531934251345368. Advance online publication. https://doi.org/10.1177/17531934251345368

Miller, C. J., Shin, M., Pugatch, M., & Kim, B. (2021). Veteran Perspectives on Care Coordination Between Veterans Affairs and Community Providers: A Qualitative Analysis. *The Journal of rural health: official journal of the American Rural Health Association and the National Rural Health Care Association*, *37*(2), 437–446. https://doi.org/10.1111/jrh.12526

Orr, A., Glover, J., & Cook, C. (2018). Amputations and prosthetics. In H. M. Pendleton & W. Schultz-Krohn (Eds.), *Pedretti's occupational therapy: Practice skills for physical dysfunction* (8th ed.; pp. 1083–1116). St. Louis: Elsevier.

Pyörny, J., Sletten, I. N., & Jokihaara, J. (2024). Concurrent validity study of QuickDASH with respect to DASH in patients with traumatic upper extremity amputation. *BMC musculoskeletal disorders*, *25*(1), 86. https://doi.org/10.1186/s12891-024-07183-w

Resnik, L., & Borgia, M. (2015). Reliability, Validity, and Responsiveness of the QuickDASH in Patients With Upper Limb Amputation. *Archives of physical medicine and rehabilitation*, *96*(9), 1676–1683. https://doi.org/10.1016/j.apmr.2015.03.023

Smail, L. C., Neal, C., Wilkins, C., & Packham, T. L. (2020). Comfort and function remain key factors in upper limb prosthetic abandonment: findings of a scoping review. *Disability and Rehabilitation: Assistive Technology*, *16*(8), 821–830. https://doi.org/10.1080/17483107.2020.1738567

Smurr, L.M, Gulick, K., Yancosek, K., & Ganz, O. (2008). Managing the upper extremity amputee: A protocol for success. Journal of Hand Therapy, 21(2), 160-176. https://doi.org/10.1197/j.jht.2007.09.006

Stark, S., Keglovits, M., Somerville, E., Hu, Y. L., Barker, A., Sykora, D., & Yan, Y. (2021). Home Hazard Removal to Reduce Falls Among Community-Dwelling Older Adults: A Randomized Clinical Trial. *JAMA network open*, *4*(8), e2122044. https://doi.org/10.1001/jamanetworkopen.2021.22044

Sugar, A. H., Ozelie, R., & Turner, K. (2024). The Occupational Therapy Practitioner Experience and Practice Related to Upper Limb Loss or Difference and Prosthetics. Journal of Occupational Therapy Education, 8 (2). https://doi.org/10.26681/jote.2024.080217

Swanson Johnson, S., & Mansfield, E. (2014). Prosthetic training: Upper limb. Physical Medicine and Rehabilitation Clinics of North America, 25(1), 133-151. https://doi.org/10.1016/j.pmr.2013.09.012

Supplementary Information

Author's contribution

Anna Postonogova: Conceptualization, Methodology, Investigation, Data Curation, Writing – Rough Preparation, Visualization, Project Administration; **Oleksandra Kalinkina:** Check, Resources, Writing – Rough Preparation; **Kostiantyn Kalinkin:** Check, Visualization; **Iryna Zharova:** Check, Formal Analysis, Resources, Writing – Review And Editing, Supervision; **Olexii Nikanorov:** Methodology, Software, Writing – Review And Editing. All authors have read and agreed with the published version of the manuscript.

Declarations

Conflict of Interest
Authors declare no conflict of interest to disclose.

Received: August 18, 2025; Accepted: September 29, 2025
Published: October 30, 2025

The online version available at
https://doi.org/10.15391/prrht.2025-10(5).03