



Learned Non-Use After Orthopedic Upper Extremity Injury or Surgery: A Cross-Sectional Study

Camryn Cowan, OTD; Sarah dos Anjos, PhD, OTD, MS, OTR/L

Department of Occupational Therapy | University of Alabama at Birmingham

Kristine Milliron, OTR/L, CHT; Melesa Harvey, OTR/L, CHT | UAB Highlands Hand Therapy & Encore Rehabilitation

Introduction

- Individuals with upper extremity (UE) injuries are commonly immobilized for prolonged periods of time (Martin, 2024), which can lead to a multitude of negative effects.
- Learned non-use (LNU) is a phenomenon that occurs when the body decreases the use of an immobilized body part (Field-Fote, 2015).
- Individuals who are immobilized are at risk of developing LNU, however the incidence of this phenomenon in this population is still unexplored.
- Purpose:** to identify patterns of use of the injured UE in adults with orthopedic conditions who were immobilized.

Methods

- In this cross-sectional study, individuals were included if they were:
 - >18 years old
 - Immobilized for >2 weeks and out of immobilization for >2 weeks
 - Receiving outpatient therapy services
- The Motor Activity Log (MAL) was administered once to identify real-world use patterns of the affected UE.
- The MAL is a self-reported measure of how often and how well the affected arm is utilized to complete 30 daily tasks (Table 1).
 - Amount of Use (AOU) scale (0-5): 0 = Did not use my weaker arm, and 5 = Used my weaker arm as often as before the injury/surgery
 - How Well (HW) scale (0-5): 0 = The weaker arm was not used at all for this activity (never), and 5 = The ability to use the weaker arm for this activity was as good as before the injury/surgery

Table 1. Motor Activity Log (MAL) Activities and Scales

| | |
|----------------------------------------------------------|----------------------------------------------------|
| 1. Turn on a light with a light switch | 16. Take off your shoes |
| 2. Open drawer | 17. Get up from a chair with arm rest |
| 3. Remove an item of clothing from a drawer | 18. Pull chair away from table before sitting down |
| 4. Pick up the phone | 19. Pull chair toward table after sitting down |
| 5. Wipe off kitchen counter or other surface | 20. Pick up glass bottle or can |
| 6. Get out of a car | 21. Brush your teeth |
| 7. Open the refrigerator | 22. Put makeup, lotion or shaving cream on face |
| 8. Open a door by turning a doorknob or handle | 23. Use a key to unlock a door |
| 9. Use a TV remote control | 24. Write on paper |
| 10. Wash your hands | 25. Carry an object in your hand |
| 11. Turn water on/off with a knob or lever on the faucet | 26. Use a fork or spoon for eating |
| 12. Dry your hands | 27. Comb your hair |
| 13. Put on your socks | 28. Pick up a cup by the handle |
| 14. Take off your socks | 29. Button a shirt |
| 15. Put on your shoes | 30. Eat half a sandwich or finger foods |

Methods cont.

- Data analysis: MAL scores were descriptively analyzed by participant score and item score.
- Results are presented in mean, median, range, and frequency distribution (%).

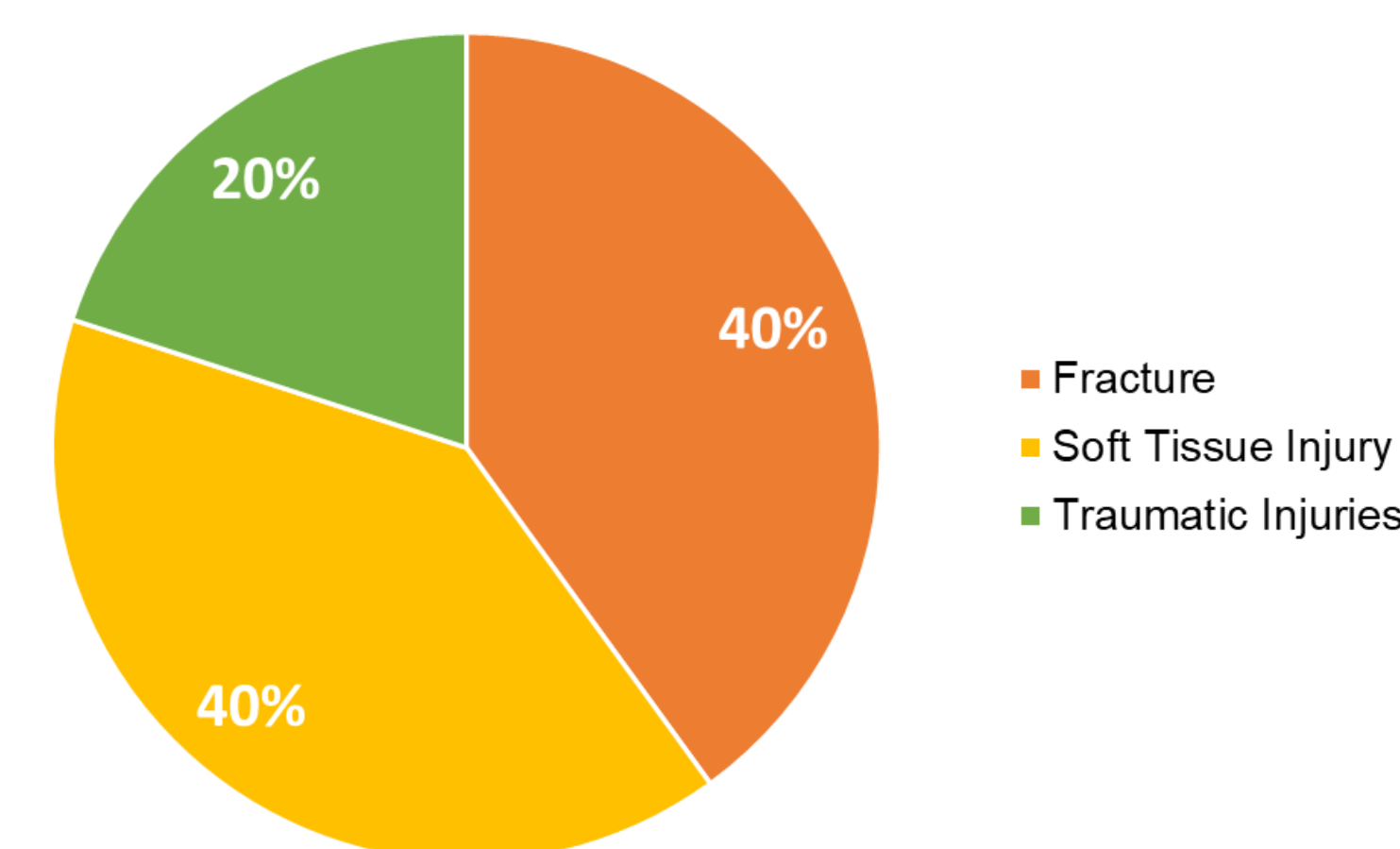
Results

- Fifteen individuals were included, with a mean age of 50. Most were White (80%), and women (60%). Diagnoses included fractures (40%), soft tissue injuries (40%), and traumatic injuries (20%).
- The majority (60%) had been out of immobilization for ≤ 12 weeks, and 60% had injuries affecting their non-dominant hand.
- Demographic information presented in Table 2.

Table 2: Demographic Information

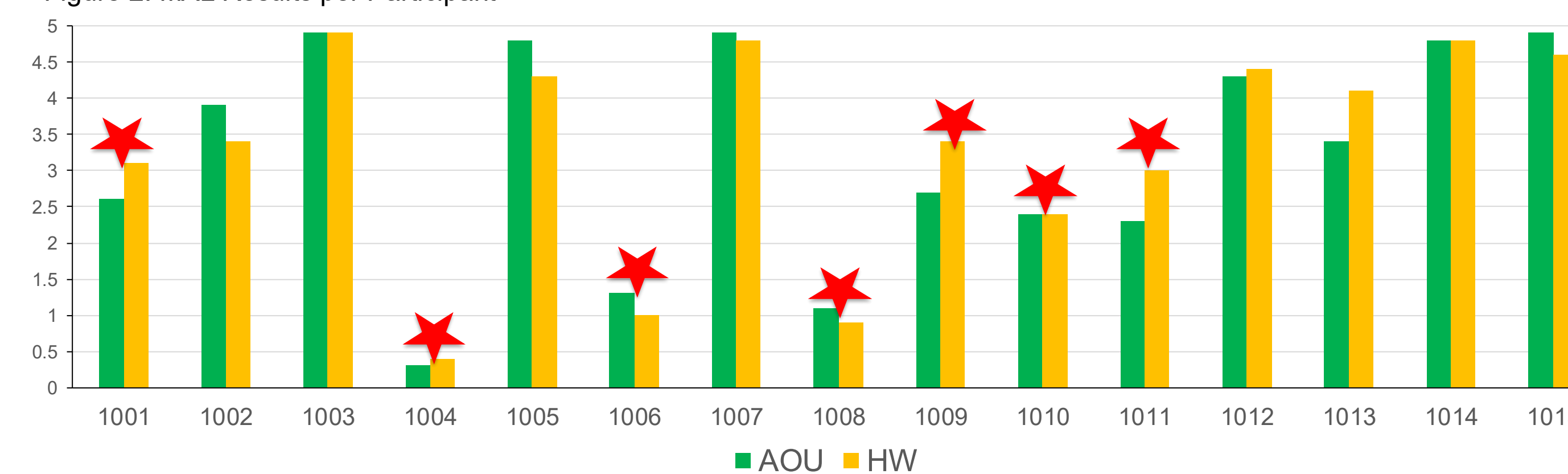
| Characteristics | N=15 |
|-----------------------------------|-----------------|
| Age (Mean, range) | 50 years, 24-74 |
| Gender at Birth N(%) | |
| Female | 9 (60%) |
| Male | 6 (40%) |
| Ethnicity N(%) | |
| Hispanic | 0 |
| Non-Hispanic | 15(100%) |
| Race N(%) | |
| White | 12(80%) |
| Black | 2 (13%) |
| Asian | 1 (7%) |
| Time since immobilization (range) | 2-104 weeks |
| Hand dominance N(%) | |
| Right | 14 (93%) |
| Left | 1 (7%) |
| Affected hand N(%) | |
| Right | 5 (33%) |
| Left | 10 (67%) |
| Dominant | 6 (40%) |
| Non-Dominant | 9 (60%) |

Figure 1. Diagnosis Frequency Distribution



- Range of AOU scores was 0.3-4.90 and range of HW scores was 0.37-4.93. (Figure 2)
- Median scores for both scales was 3.4.
- Mean for AOU was 3.2, and the mean for HW was 3.3.
- Seven participants had AOU scores below 3.0, meaning they used their affected extremity half as much or less than before their injury. Patients that had the lowest scores typically had traumatic injuries (86%) including falls (distal radius fracture, thumb metacarpal base CRPP, torn wrist tendon) or external traumas (electrocution or car door slam on thumb).

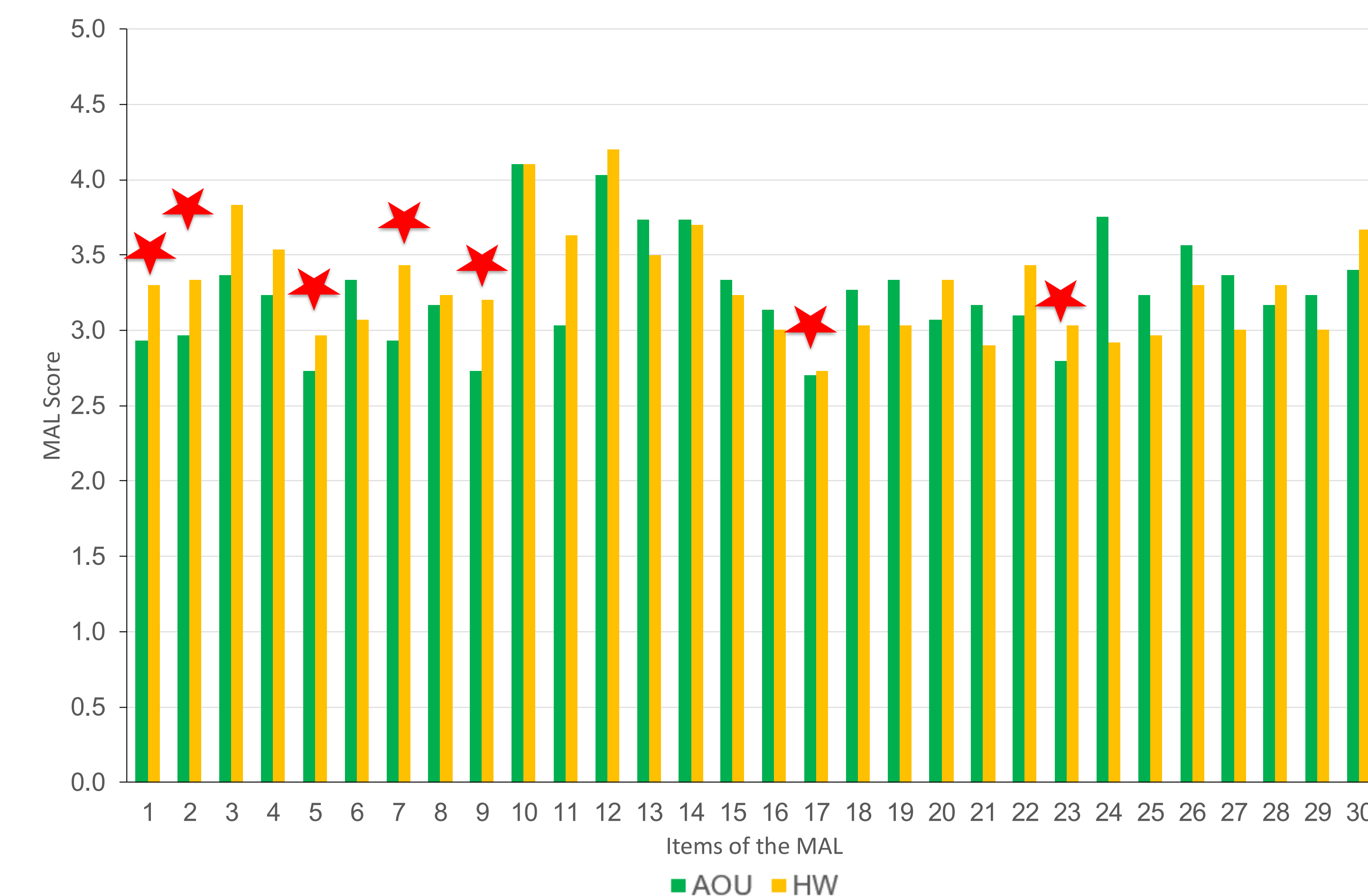
Figure 2. MAL Results per Participant



Results cont.

- The median of the AOU was 3.4 (0.3-4.9), indicating that individuals used their affected UE about half as much as before the injury.
- The median HW score was also 3.4 (0.4-4.9) reflecting moderate effort during task performance.
- Tasks involving weight bearing, wrist extension, and dexterity, such as opening drawers, wiping counters, or using a TV remote, were rated 3 or lower on the AOU scale (Figure 3).

Figure 3. MAL Results per Item



Discussion/Conclusion

- Overall, the average use of the immobilized/affected extremity was about half of what the participants had before their injury, especially in activities that required dexterity, weight bearing, and wrist extension.
- The range in scores from the MAL reflect the variability in diagnoses and in the amount of time since immobilization means was removed.
- This study reflects the importance of using occupation-based assessments in outpatient orthopedic and hand therapy settings to frame intervention plans.

References

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