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Socioeconomic Impact of Circular Saw Injuries in Post-Retirement Population in a Regional Unit

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Abstract Due to disease control measures, the number of elderly people increases in the community making them more actively participating in different kinds of activities. [1,4] DIY-related hand injuries are common and can be severe and disabling. Recent statistical figures from NHS Digital show that there were more than 5,600 admissions in England for powered hand-tool hand injuries, and more than 2,700 for non-powered hand-tool injuries, between 2020-2021. In the Northeast region, we noticed increasing DIY-related hand injuries among older age groups. 14% of the injuries among the elderly seen at emergency departments are related to the upper limb trauma, while 29% of them related to the hand and wrist. [4] The mode and level of injury are important determining factors for the functional outcome. Distal and clean-cut injuries carry far better prognosis than proximal and crush injuries. [3] Patients who underwent surgical intervention especially replantation or revascularization, may be in need for secondary procedures. This will depend on the extent, mechanism, level of injury, adequacy of soft tissue coverage and post operative rehabilitation. [3] Several factors may help in decision making regarding the need for replantation or revascularization. These factors include ischemia time, mechanism of injury, level of amputation, patients' age and profession, and other concomitant life-threatening injuries Replantation, revascularization became more successful due to recent advances in microsurgical team. [3] Return of function after replantation is an important factor to determine if the replantation was saucerful or not. Those patients may require secondary procedures. [3]

Keywords: *Circular saw, retirement, hand injury, socioeconomic, DIY*

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1. Introduction

We sought to gain an insight into the pattern of DIY-related injuries, surgical management and outcome in the postretirement population.

2. Methods

Patients aging above 65 years who presented to our hand unit between July 2017 and January 2022 with DIY related hand injuries were prospectively included in this study. Pattern of injury, surgical management and outcome were recorded. The clinical outcome was assessed during hand physiotherapy follow up based on the Minimal Clinically Important Difference (MCID) of the quick Disability of Arm, Shoulder, Hand score (Quick DASH). Scores at the beginning and end of rehabilitation were compared.

The Disability of the Arm, Shoulder, and Hand (DASH) questionnaire is an upper-extremity-specific outcome measure. It is commonly used in clinical trials and studies on upper-extremity disorders. The Quick DASH is a shorter version of DASH score and used to evaluate the long-term functional outcomes.

Although both of DASH and Quick DASH score are equally reliable, The Quick DASH score is easier that DASH score for this it is more convenient to the patients. To calculate Quick DASH scores, at least 10 of the 11 items must be completed; scores cannot be calculated if more than one item is missing. Higher scores carry bad prognosis. [3] Figure 1.

The minimal clinically important difference (MCID), also known as the minimal important change used to assess the responsiveness to the Quick DASH score. Any small change in the score carry good prognosis to the patient. [5]. Figure 2.

QuickDASH

Please rate your ability to do the following activities in the last week by circling the number below the appropriate response.

	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	UNABLE
1. Open a tight or new jar.	1	2	3	4	5
2. Do heavy household chores (e.g., wash walls, floors).	1	2	3	4	5
3. Carry a shopping bag or briefcase.	1	2	3	4	5
4. Wash your back.	1	2	3	4	5
5. Use a knife to cut food.	1	2	3	4	5
6. Recreational activities in which you take some force or impact through your arm, shoulder or hand (e.g., golf, hammering, tennis, etc.).	1	2	3	4	5

	NOT AT ALL	SLIGHTLY	MODERATELY	QUITE A BIT	EXTREMELY
7. During the past week, *to what extent* has your arm, shoulder or hand problem interfered with your normal social activities with family, friends, neighbours or groups?	1	2	3	4	5

	NOT LIMITED AT ALL	SLIGHTLY LIMITED	MODERATELY LIMITED	VERY LIMITED	UNABLE
8. During the past week, were you limited in your work or other regular daily activities as a result of your arm, shoulder or hand problem?	1	2	3	4	5

Please rate the severity of the following symptoms in the last week. *(circle number)*	NONE	MILD	MODERATE	SEVERE	EXTREME
9. Arm, shoulder or hand pain.	1	2	3	4	5
10. Tingling (pins and needles) in your arm, shoulder or hand.	1	2	3	4	5

	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	SO MUCH DIFFICULTY THAT I CAN'T SLEEP
11. During the past week, how much difficulty have you had sleeping because of the pain in your arm, shoulder or hand? *(circle number)*	1	2	3	4	5

QuickDASH DISABILITY/SYMPTOM SCORE = $\left(\left[\frac{\text{sum of n responses}}{n}\right] - 1\right) \times 25$, where n is equal to the number of completed responses.

A QuickDASH score may not be calculated if there is greater than 1 missing item.

Figure 1. Quick DASH

Numeric Rating	Description	Psychometric property	
7	*A very great deal better*	SCB / MCII	IMPROVEMENT
6	*A great deal better*	SCB / MCII	
5	*A good deal better*	SCB / MCII	
4	*Moderately better*	MCID / SCB	
3	*Somewhat better*	MCID	
2	*A little better*	MCID	
1	*Almost the same, hardly any better at all*	No change	
0	*No change*		
-1	*Almost the same, hardly any worse at all*	No change	DETERIORATION
-2	*A little worse*	MCID	
-3	*Somewhat worse*	MCID	
-4	*Moderately worse*	MCID / SCW	
-5	*A good deal worse*	SCW	
-6	*A great deal worse*	SCW	
-7	*A very great deal worse*	SCW	

Figure 2. MCID

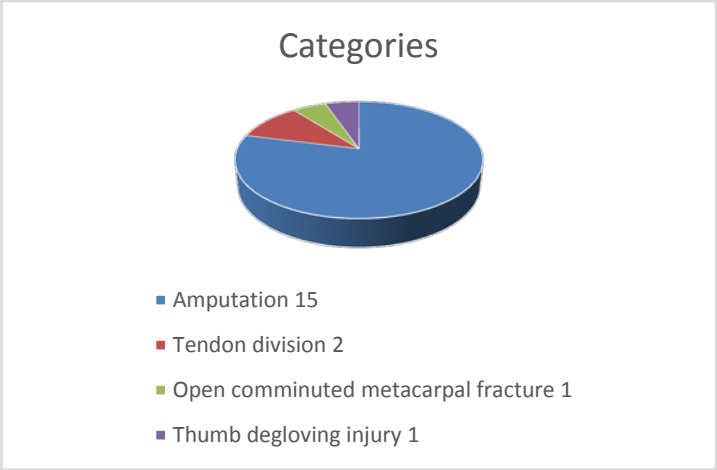

Figure 3. The Categories

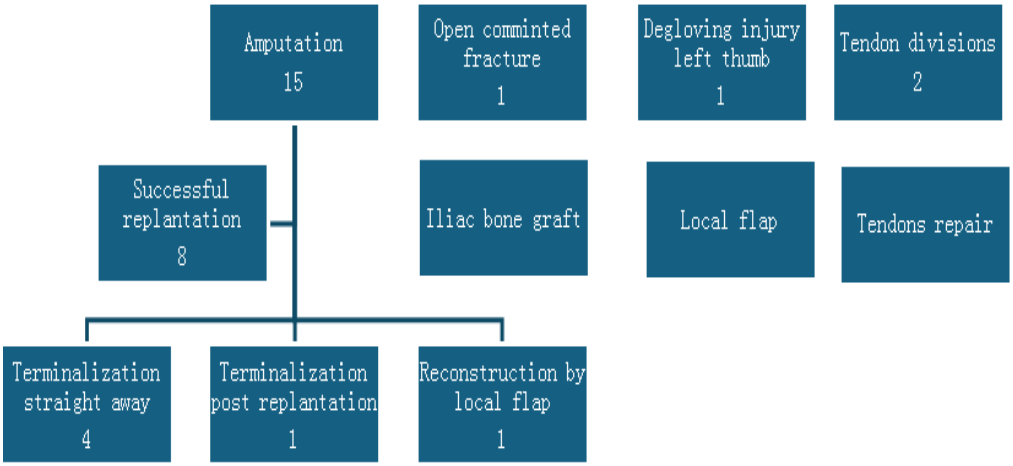

Figure 4. The Outcome

3. Result

19 patients were included. Age ranged between 66-94 years (average 72). They have been categorized into 15 patients sustained amputation of one or more digits, 2 had multiple flexor tendon divisions in zone-II, 1 patient presented with thumb degloving and 1 sustained open comminuted metacarpal fracture. Figure 3.

The outcome of these patients is variable. The patients of amputation, 8 out of 15 went for successful replantation/revascularization. For the remaining 7, 4 went for terminalization straight away, 2 went for soft tissue reconstruction by local flap and 1 went for terminalization after failed trial of replantation.

The patient of open comminuted fracture underwent reconstruction by iliac bone graft. On the other hand, the patient who suffered from degloving injury left thumb underwent reconstruction by local flap. Finally, the 2 patients of tendon division, had tendon repair successfully. Figure 4.

MCID Score ranged between 7.8 and 56.8 with no specific character for any of the categories.

Dependency outcome was variable, 16 patients were completely independent after completing their physiotherapy, two were partially dependent and one needed full social care package.

Although there is no significant difference in both of pain severity and cold intolerance in between the different categories, the case of thumb amputation which reconstructed by local flap shows the highest CRPS, Quick DASH score and the only one who was in need for full social care package.

Replantation cases was in need for longer period of rehabilitation in comparison to the cases of tendon repair. Average 10 months for the former and 5 months for the later.

The cases of amputation carried a higher complication rate in comparison to the other 3 categories.

4. Discussion

MCID, Quick DASH score are useful tools for the prognostic outcome for the cases of upper limb trauma.

Based on the degree of damage the rehabilitation outcome can be predicted. The cases of amputation needs longer rehabilitation time in comparison to the other categories of upper limb trauma.

5. Conclusion

Severe hand injuries in older age groups can dramatically change their quality of life. Surgical treatment and compliance with hand physiotherapy follow up can be challenging due to frailty or comorbidities.

We propose a better education system to highlight the risks, reduce the incidence, and improve awareness of these injuries among elderly for better quality of life and to reduce the associated workload and financial burden within the NHS.

Limitation of the study

Small group of patients.

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