

Original Article

EFFECTS OF BURN ON THE MOBILITY OF UPPER LIMB/S, FUNCTIONS OF HAND /S & ACTIVITIES OF DAILY LIVING

Perera M M N *¹, Nanayakkarawasam P P ², Katulanda P ³.

*^{1,2} Allied Health Sciences Unit, Faculty of Medicine, University of Colombo, Sri Lanka.

³ Department of Clinical Medicine, Faculty of Medicine, University of Colombo, Sri Lanka.

ABSTRACT

Background: Burn is an injury cause destruction of skin and underling tissue. Post burns complications are severe. Objective of this study is to identify the effects on the Active Range of Motion (AROM) of upper limb/s, hand functions and Activities of Daily Living (ADL) who attend the physical therapy department of burns unit.

Methodology: It was a descriptive cross sectional study carried out at out-patient physical therapy department of burns unit of National Hospital of Sri Lanka (NHSL). Fifty subjects recruited into the study. Interviewer assisted self administered questionnaire Disabilities of Arm, Shoulder, Hand Questionnaire (DASH), AROM of nine movements of shoulder and elbow joints and hand function assessment Signals of Functional, Impairments of hand (SOFI) was used to collect data.

Results: Study results showed that Flame burns were the most common burn type and majority of the victims were females. Study population had affected AROM in almost all the movements at the joint, which had affected to the ADL significantly. "Keeping an object shelf above head" and "engaging in heavy work", showed significant correlation with movements of shoulder. SOFI score for the right hand showed significant correlation with selected Activities of Daily Living (ADL) ("writing", " using knife to cut food" opening a jar" etc ;).

Conclusion: patient with burn injury including upper limb joints may encounter disabilities. Even though it is mild AROM restrictions at a joint, This restriction affects to persons' independency in ADL s. This emphasizes the need of intensive medical care as well as long term physical therapy rehabilitation programme for burns patients.

Limitations: Each subject's AROM was not measured at their discharge which was already stated to be a limitation.

KEYWORDS: Burns, Activities of Daily living (ADL), Active Range of Motion (AROM)

Address for correspondence: Perera M M N, Allied Health Sciences Unit, Faculty of Medicine, University of Colombo, Sri Lanka. **E-Mail:** pereramnm18@yahoo.com

Access this Article online

Quick Response code



DOI: 10.16965/ijpr.2014.694

International Journal of Physiotherapy and Research

ISSN 2321- 1822

www.ijmhr.org/ijpr.html

Received: 04-11-2014

Accepted : 17-11-2014

Peer Review: 04-11-2014

Published (O): 11-02-2015

Revised: None

Published (P): 11-02-2015

INTRODUCTION

Burn, is an injury that causes destruction of skin and underling tissue. Whole soft tissue including nerve endings can all be damaged. It may be caused by a variety of physical agents. Severe burn injury is a medical emergency. Resultant complications of the injury are highly variable, depending on the tissue affected, the affected location, and the degree of severity. A burn victim may experience a number of potentially fatal complications. Other than physical complica-

tions, Burns results psychological distress due to scar formation and deformity [1].

Burn wounds are classified according to the severity of the injury. Injury can also assess in terms of Total Body Surface Area (TBSA), which is the percentage affected by partial thickness or full thickness burns. People who meet with burn injury have to undergo many difficulties throughout their life. There is a major risk of developing contractures in burns patients. Generally spontaneous epithelialization of burn

wounds and late skin grafting leads to scar deformations and contractures. Secondary contractures involve muscles and tendons, which develops after joint contractures. Ultimate result of a contracture at a joint site leads to reduction of AROM of the joint which restricts movements of extremities. Contractures of upper extremity have a major effect than in lower extremity. Involvement of shoulder, elbow and hand has large impact on ADL such as bathing, dressing and toileting etc. Not only major joints but also involvement of small joints of hand and wrist may cause severe limitations to patients' functional independence. Hands are more vulnerable parts of human body [1]. Hands represents 6% of burn injuries of all hand burn injuries. Patient without injury to other joints losses up to 54% function when he loses his hand function [1] Small joints of the hands are more vulnerable to form contractures which are very difficult to address during the treatments program. Therefore deformities are very common with hand burns. Web space contractures are common deformity in hand burns.

Limitations of joint AROM of hand and its' small joints affects, on occupational and functional independence.

Therefore if one of the joints of upper limb is affected despite the severity, it causes major impact on ADLs. Restoring functional ROM, strength and mobility is very much needed to minimize the scar formation and contractures which may interfere with ADL effectively.

Therefore it is important to find out how injury may affect on the mobility of upper limb/s and functions of the hand/s and effect to the ADL s. The results of the study will help medical care professionals to better identify most common limitations and impairments of burns patients in their day to day life. In addition study will help to highlight the importance of follow up physical therapy treatments to the patients even after discharged from the hospital. And results will emphasize the importance of establishing burns management and rehabilitation units in other hospitals.

METHODOLOGY

Study carried out at outpatient physical therapy department of burns unit of National Hospital

Sri Lanka (NHSL), recruiting fifty consecutive subjects. Permission obtained from the director of the National Hospital Sri Lanka (NHSL) and consultant of the burns unit of the NHSL. Ethical approval obtained from the ethics review committee of Faculty of Medicine.

Subjects above 16 years, who had met with burn injury to right, left or both upper limbs with or without an injury to any part of the body were recruited into the study .They should visit outpatient physical therapy department of burns unit at NHSL one month after discharge. Each prospective patient informed about the study and the fact that their participation is not obligatory. Informed written consent was obtained from each patient prior to the interview

This study was mainly based on a self administered questionnaire (including DASH) and physical assessment carried out to measure shoulder and elbow joint ranges and assessment of hand function SOFI. Questionnaire was translated into Sinhala and Tamil languages. The Face validity was ensured by getting the translation reviewed by subject experts.

The study group privacy was ensured during the interview and patients were reassured about the confidentiality of their information.

At the end of completion of the questionnaire, subject were asked to perform the SOFI hand Function assessment. As the second step, AROM measurements were noted down in affected joints of upper limb.

Data was analyzed by using Statistical Package for the Social Sciences (SPSS) version 17.

RESULTS

The most of the participants included to the study were females (60%). The participants were inquired about their dominant hand and 88% reported as right hand dominant.

Half of the study population was within 21%-40% of burn surface area. Six subjects reported as severe cases, as they were within the range of 61%-80% of burn surface area.

The joint contracture severities of joints were calculated using severity ranges for each joint for relevant movement, as used by Schneider JC

et al [2] in literature. Mild contractures were more common (70%), where severe contractures represent not more than 10% for each joint.

Relationship between the Range of Motion (ROM) of Each Movement and Activities of Daily Living (ADL)

Out of twenty one physical activities in DASH, seventeen of the most important seventeen day to day activities were selected. For most of the activities, “p” and “r” values showed negative relationship, This indicates that to perform specific activity, **required AROM of that movement, was not there at the joint.**

SHOULDER JOINT: Activities showed significant higher negative correlation with shoulder **Flexion and shoulder abduction** (at 0.001 and 0.005 levels respectively), with the activities, “placing an object on a shelf above your head” (r= -0.524, p= 0.001 and r= -0.570, p= 0.000) and “gardening’ (r= -0.462, p=0.006)

Shoulder extention (0.005 significant level), **flexion** (0.005 significant level) and **abduction** (0.005 significant level) **showed** satisfactory negative relationship for the activitiy “washing back” and “Gardening”.

Positive relationships indicated that, those activities need less amount of AROM of particular movement at that joint. Therefore this showed **less disability in performing that particular activity.**

Both shoulder **extension and internal rotation** showed positive values for “writing” and “using knife to cut food”. Similarly **internal rotation** with “keeping object on a shelf above” and **external rotation** with “putting on a sweater” did not show negative relationship indicating less utilization of those AROM for the specific activities.

Table1: Relationship with shoulder range of motion and DASH activities.

| Activity of daily living | Range of motion | No. of patients | Significance* | Co-relation Coefficient* |
|---|-------------------|-----------------|---------------|--------------------------|
| Keeping an object on a shelf above head | Flexion | 35 | 0.001 | -.524** |
| | Extention | 35 | 0.011 | -.423* |
| | Abduction | 35 | 0 | -.570** |
| | Internal rotation | 35 | 0.884 | 0.026 |
| | External rotation | 35 | 0.092 | -0.289 |
| Wash or blow drying hair | Flexion | 34 | 0.629 | -0.086 |
| | Extention | 34 | 0.778 | -0.05 |
| | Abduction | 34 | 0.749 | -0.057 |
| | Internal rotation | 34 | 0.333 | -0.171 |
| | External rotation | 34 | 0.962 | -0.009 |
| Washing back | Flexion | 35 | 0.028 | -.372* |
| | Extention | 35 | 0.696 | -0.068 |
| | Abduction | 35 | 0.008 | -.443** |
| | Internal rotation | 35 | 0.801 | 0.044 |
| | External rotation | 35 | 0.423 | -0.14 |
| Put on a sweater | Flexion | 35 | 0.689 | -0.07 |
| | Extention | 35 | 0.854 | -0.032 |
| | Abduction | 35 | 0.799 | -0.045 |
| | Internal rotation | 35 | 0.842 | -0.035 |
| | External rotation | 35 | 0.636 | 0.083 |

*significance 2 tailed Pearson correlation at 0.05
 **significance at 0.001

Table 2: Relationship with shoulder range of motion and DASH activities continued.

| Activity of daily living | Range of motion | No. of patients | Significance* | Co-relation Coefficient* |
|-------------------------------|-------------------|-----------------|---------------|--------------------------|
| Managing transportation Needs | Flexion | 35 | 0.064 | -0.316 |
| | Extention | 35 | 0.283 | -0.187 |
| | Abduction | 35 | 0.179 | -0.232 |
| | Internal rotation | 35 | 0.263 | -0.195 |
| | External rotation | 35 | 0.29 | -0.184 |
| Writing | Flexion | 35 | 0.724 | -0.062 |
| | Extention | 35 | 0.235 | 0.206 |
| | Abduction | 35 | 0.712 | -0.065 |
| | Internal rotation | 35 | 0.314 | 0.175 |
| | External rotation | 35 | 0.289 | -0.184 |
| Using a knife to cut food | Flexion | 35 | 0.908 | -0.02 |
| | Extention | 35 | 0.435 | 0.136 |
| | Abduction | 35 | 0.95 | -0.011 |
| | Internal rotation | 35 | 0.407 | 0.145 |
| | External rotation | 35 | 0.236 | -0.205 |
| Gardening | Flexion | 34 | 0.006 | -.462** |
| | Extention | 34 | 0.264 | -0.197 |
| | Abduction | 34 | 0.019 | -0.4 |
| | Internal rotation | 34 | 0.845 | -0.035 |
| | External rotation | 34 | 0.018 | -0.402 |

*significance 2 tailed * Pearson correlation at 0.05

** significance at 0.01

Table 3: Relationship with shoulder range of motion and DASH activities continued.

| Activity of daily living | Range of motion | No. of patients | Significance* | Correlation Coefficient* |
|---------------------------|-------------------|-----------------|---------------|--------------------------|
| Engaging heavy Work | Flexion | 34 | 0 | -.609** |
| | Extention | 34 | 0.012 | -.427* |
| | Abduction | 34 | 0.001 | -.553** |
| | Internal rotation | 34 | 0.813 | -0.042 |
| | External rotation | 34 | 0.08 | -0.305 |
| Preparing meal | Flexion | 30 | 0.081 | -0.323 |
| | Extention | 30 | 0.73 | -0.066 |
| | Abduction | 30 | 0.042 | -.374* |
| | Internal rotation | 30 | 0.518 | 0.123 |
| | External rotation | 30 | 0.037 | -.383* |
| Caring a bag or Briefcase | Flexion | 35 | 0.576 | 0.098 |
| | Extention | 35 | 0.506 | 0.116 |
| | Abduction | 35 | 0.636 | 0.083 |
| | Internal rotation | 35 | 0.082 | 0.298 |
| | External rotation | 35 | 0.414 | -0.142 |
| Heavy bag above 10 pounds | Flexion | 33 | 0.041 | -.358* |
| | Extention | 33 | 0.308 | -0.183 |
| | Abduction | 33 | 0.105 | -0.287 |
| | Internal rotation | 33 | 0.684 | -0.074 |
| | External rotation | 33 | 0.031 | -.377* |

*significance 2 tailed * Pearson correlation at 0.05

** significance at 0.01

Table 4: Relationship with shoulder range of motion and DASH activities continued.

| Activity of daily living | Range of motion | No. of patients | Significance* | Correlation Coefficient* |
|--------------------------------|-------------------|-----------------|---------------|--------------------------|
| Opening a jar | Flexion | 35 | 0.661 | -0.077 |
| | Extention | 35 | 0.566 | 0.101 |
| | Abduction | 35 | 0.489 | -0.121 |
| | Internal rotation | 35 | 0.155 | 0.246 |
| | External rotation | 35 | 0.213 | -0.216 |
| | Turning a key | Flexion | 35 | 0.589 |
| Extention | | 35 | 0.843 | -0.035 |
| Abduction | | 35 | 0.419 | -0.141 |
| Internal rotation | | 35 | 0.247 | 0.201 |
| External rotation | | 35 | 0.126 | -0.264 |
| Making bed | | Flexion | 35 | 0.194 |
| | Extention | 35 | 0.683 | -0.072 |
| | Abduction | 35 | 0.217 | -0.214 |
| | Internal rotation | 35 | 0.727 | 0.061 |
| | External rotation | 35 | 0.736 | 0.059 |
| | Changing a bulb | Flexion | 29 | 0.117 |
| Extention | | 29 | 0.207 | -0.242 |
| Abduction | | 29 | 0.058 | -0.356 |
| Internal rotation | | 29 | 0.798 | 0.05 |
| External rotation | | 29 | 0.28 | -0.207 |
| Little recreational Activities | | Flexion | 18 | 0.175 |
| | Extention | 18 | 0.596 | -0.134 |
| | Abduction | 18 | 0.408 | -0.208 |
| | Internal rotation | 18 | 0.873 | -0.041 |
| | External rotation | 18 | 0.427 | -0.2 |

*significance 2 tailed * Pearson correlation at 0.05

** significance at 0.01

Table 5: Relationship with elbow range of motion and DASH activities.

| Activity of daily living | Range of motion | No. of patients | Significance* | Correlation Coefficient* |
|---|-----------------|-----------------|---------------|--------------------------|
| Keeping an object on a shelf above head | Flexion | 32 | 0.092 | -0.303 |
| | Extention | 32 | 0.503 | -0.123 |
| | Pronation | 31 | 0.095 | -0.305 |
| | Supination | 31 | 0.304 | -0.191 |
| | Flexion | 31 | 0.879 | -0.029 |
| Wash or blow drying hair | Extention | 31 | 0.857 | 0.034 |
| | Pronation | 30 | 0.027 | -.403* |
| | Supination | 30 | 0.028 | -.401* |
| | Flexion | 32 | 0.005 | -.486** |
| Washing back | Extention | 32 | 0.026 | -.393* |
| | Pronation | 31 | 0.007 | -.478** |
| | Supination | 31 | 0.015 | -.434* |
| | Flexion | 32 | 0.705 | -0.07 |
| Put on a sweater | Extention | 32 | 0.935 | 0.015 |
| | Pronation | 31 | 0.004 | -.504** |
| | Supination | 31 | 0.008 | -.467** |
| | Flexion | 32 | 0.136 | -0.27 |
| Managing transportation needs | Extention | 32 | 0.633 | -0.088 |
| | Pronation | 31 | 0.286 | -0.198 |
| | Supination | 31 | 0.18 | -0.247 |
| | Flexion | 32 | 0.548 | -0.11 |
| Writing | Extention | 32 | 0.614 | -0.093 |
| | Pronation | 31 | 0.035 | -.381* |
| | Supination | 31 | 0.012 | -.445* |
| | Flexion | 32 | 0.947 | 0.012 |
| Using a knife to cut food | Extention | 32 | 0.566 | 0.105 |
| | Pronation | 31 | 0.13 | -0.278 |
| | Supination | 31 | 0.23 | -0.222 |
| | Flexion | 30 | 0.02 | -.423** |
| Gardening | Extention | 30 | 0.14 | -0.276 |
| | Pronation | 29 | 0.025 | -.417* |
| | Supination | 29 | 0.015 | -.446* |

*significance 2 tailed * Pearson correlation at 0.05

** significance at 0.01

ELBOW JONT: Elbow- **flexion, extension, pronation** and **supination** meal showed significant negative correlation with activities “preparing meal” and “washing back”. “Carrying heavy bag above 10 pounds”, “Gardening” and “engaging heavy work” correlated negatively with **all movements except extension**. Study population showed significant negative relationships with **pronation** and **supination** of elbow with numerous activities, “wash or blow drying hair”, “put on sweater,” writing” and “making bed”.

Table 6. Relationship with elbow range of motion and DASH activities.

| Activity of daily living | Range of Motion | No. of patients | Significance* | Correlation Coefficient* |
|--------------------------------|-----------------|-----------------|---------------|--------------------------|
| Carrying a bag or briefcase | Flexion | 32 | 0.567 | -0.105 |
| | Extention | 32 | 0.915 | -0.02 |
| | Pronation | 31 | 0.163 | -0.257 |
| | Supination | 31 | 0.602 | -0.097 |
| Engaging heavy work | Flexion | 31 | 0.007 | -.491** |
| | Extention | 31 | 0.148 | -0.276 |
| | Pronation | 30 | 0.023 | -.429* |
| | Supination | 30 | 0.011 | -.473* |
| Opening a jar | Flexion | 29 | 0.511 | -0.121 |
| | Extention | 29 | 0.755 | -0.057 |
| | Pronation | 28 | 0.04 | -.372* |
| Turning a key | Supination | 28 | 0.058 | -0.344 |
| | Flexion | 32 | 0.843 | 0.036 |
| | Extention | 32 | 0.741 | 0.061 |
| Making bed | Pronation | 31 | 0.131 | -0.277 |
| | Supination | 31 | 0.131 | -0.277 |
| | Flexion | 32 | 0.222 | -0.222 |
| | Extention | 32 | 0.344 | -0.173 |
| Preparing meal | Pronation | 31 | 0 | -.597** |
| | Supination | 31 | 0.003 | -.523** |
| | Flexion | 26 | 0.044 | -.397* |
| | Extention | 26 | 0.035 | -.415* |
| Heavy bag above 10 pounds | Pronation | 26 | 0 | -.667** |
| | Supination | 26 | 0.002 | -.577** |
| | Flexion | 30 | 0.007 | -.483** |
| | Extention | 30 | 0.159 | -0.264 |
| changing a bulb | Pronation | 29 | 0.015 | -.448* |
| | Supination | 29 | 0.044 | -.377* |
| | Flexion | 27 | 0.147 | -0.287 |
| | Extention | 27 | 0.783 | 0.055 |
| Little recreational activities | Pronation | 26 | 0.145 | -0.294 |
| | Supination | 26 | 0.651 | -0.093 |
| | Flexion | 17 | 0.203 | -0.325 |
| | Extention | 17 | 0.878 | 0.04 |
| Little recreational activities | Pronation | 16 | 0.021 | -.571* |
| | Supination | 16 | 0.109 | -0.416 |

*significance -2 tailed Pearson correlation at 0.05

** significance at 0.01

Effects of Burn Injury on Hand Burns:

Thirty three right hands affected and twenty six left hand affected subjects were reported during the assessment. “Opening grip”, “finger flexion” and “opposition” was the most affected activities of left hand (12%, 12%, and 12%). Quite significant effect showed is **right hand** for “finger flexion” and “opposition” (21%, 18%).

Results indicate marked affection on **right hand** for these activities.

To spot the effect on ADL with hand burns, six activities of DASH questionnaire(Opening a jar, Writing, Turning a key, Using a knife to cut food, Preparing meal, Managing transportation needs), which showed higher contribution of hands, were separately correlated with right and left hand SOFI score. “Opening a jar”, “writing”, “use a knife to cut food” and “prepare meal” showed significance at 0.001 significant levels with right hand score. Among them writing was highly correlated with **right hand** score (r=0.726, p=0.000) whereas no significant relationship with left score (r=0.295, p= 0.143). “Preparing meal” highly correlated with **both hands**. Other than that ability to “open a jar” also revealed relationship with **left hand** score, while it significantly correlated with **right hand**.

Table 7. Relationship between right hands’ score and activities of daily living.

| Affected hand | Activity of daily living | No. of patients | Significance* | Correlation Coefficient* |
|---------------|-------------------------------|-----------------|---------------|--------------------------|
| Right | Opening a jar | 33 | 0.007 | .460** |
| | Writing | 33 | 0 | .726** |
| | Turning a key | 33 | 0.02 | .404* |
| | Using a knife to cut food | 33 | 0.004 | .486** |
| | Preparing meal | 33 | 0 | .655* |
| | Managing transportation needs | 33 | 0.035 | .369* |

*significance -2 tailed Pearson correlation at 0.05

** significance at 0.01

DISCUSSION

The study results showed that flame or heat burns were the most common reason for burns and majority were female burn survivors (60%). WHO [3] states that suicidal rate of females was 16.8 per 10,000 in Sri Lanka.

A limitation in AROM at a joint was the common problem with burnt patients which represent as contractures. A special method was used to determine the type of contracture at each joint

in each patient. Previously this method had been used by Jeffrey C. Schneider et al (2006) [2] in their study. The factors they had presented for using this method, was fair and reasonable for this study also. Literature states[2] that moderate severity contractures may cause limitation in the middle third of the ROM which was clinically significant.

The activity "Keeping an object on a shelf above head", showed significant correlations with **all movements except internal and external rotation** of the shoulder joint. Similar results were given by Paul D. Triffitt (1998) [4]. But internal and external rotation (spearman correlation, 0.65, 0.45) also showed significance. In Mitell Sison Williamson et al (2009) [5] s' study, significant co-relation showed for **shoulder flexion, abduction and elbow flexion** ($p < 0.05$) for activity "high reach", although methods were different.

Shoulder flexion correlated with many ADL's in this study. This may be because the flexion accompanies with the scapular abduction which was a more functional movement. Furthermore according to two authors [5,6] suggests, this is due to compensatory movement due to the contracture at the joint.

Shoulder flexion, abduction and all the movements of the elbow joint illustrates significant co-relation for activity, "washing back" ($p < 0.05$) in this study. Approximately similar results revealed for shoulder flexion and elbow supination in Mitell Sison Williamson et al. (2009)[5] whereas shoulder flexion and abduction in Tina L. Palmarei et al (2003) [6] for this activity. Although study results comparable to this study, difference of results may be due to quality of sample. Both studies had used study sample with axillary contractures hence this study was not.

Pronation and supination of elbow joint were very much needed in "writing". Significant co-relation with movements of **elbow supination and pronation** for this activity proved this. Similarly to "keep an object on shelf above" needed **shoulder flexion, abduction** movements.

Although hand burns were common, hand function score was low for both hands indicating

less impairment. Early ROM exercises in post injury state and correct positioning may be the contributing factor for this. There were no similar studies to find impact of hand burns on ADL s'. Relationship between activities in DASH questionnaire and total score of SOFI for each hand, indicate significant relationship highlighting need of functional ROM of small joints of hand.

"Preparing a meal" and "opening a jar" correlated with both hands, indicating need of both hands. It is difficult to explain how and to what extent both hands involved in" preparing meal", but the activity, "opening a jar" showed significant co-relation with both hand s' SOFI score. This activity emphasizes the need and use of **all joints of the hand**.

Other activities correlated **only with right hand**. "Writing" also showed significant relationship with right hand score as well as elbow movements, emphasizing it further more. This indicates that we used to use our dominant hand for most of the activities that we perform.

CONCLUSION

Although a limitation of ROM was less at a joint, study showed that it cause considerable impact on individual ADL. Majority of selected activities showed importance and involvement of all major joints in most of the activities impress this further. Involvement of dominant hand increases the effect on functional independence. As hand involved in almost all the fine movements, right hand SOFI score showed significant relationship with selected ADL's. According to the study results it shows that burn survivors need intensive medical care and life long physiotherapy rehabilitation Programme. In Sri Lanka, National Hospital is the only place which has proper burns care and rehabilitation unit. Although every effort has been taken to reduce the disability level of these patients, still there are number of patients who are having considerable affection to their ADLs.

Limitations and Relevance of findings

Sample, size was limited and AROM not followed up at the time of their discharge.

Goniometer was not an advanced technique to measure AROM 100% accurately. Utilization of

adapted DASH questionnaire in hospital setting to assess improvements of patients' upper limb functions will be beneficial. It can be used as an indicator of patients ADL achievements, weekly.

Abbreviations

ADL – Activities of Daily Living
AROM – Active Range of Motion
DASH –Disabilities of Arm Shoulder Hand
SOFI – Signals Of Functional Impairment
TBSA- Total Body Surface Area

Acknowledgement

I like to thank to the Director of the National Hospital Sri Lanka and consultant plastic surgeon, Dr. Mrs. Chandani Perera in charge of the Burns unit for granting permission to carry out this research.

My heartfelt gratitude goes to the senior physiotherapist Mrs. A.D. Perera, Physiotherapist Mr. Buwaneka Deegahawathura, Physical therapy department of the burns unit and to all participants for their willingness to participate in my study.

Conflicts of interest: None

REFERENCES

- [1]. Maslauskas K, Rimdeika R, Rapoliene J, Ramanauskas T. Analysis of burned hand function (early versus delayed treatment). *Medicina (Kaunas)*, 2005;41(10):846-851.
- [2]. Schneider JC, Holavanahalli R, Helm P, Goldstein R, Kowalske K. Contractures in burn injury: defining the problem, *Journal of Burn care and Research*.2006;27(4):508-1 (Accessed on 04.08.2009)
- [3]. world health organization. Burns, WHO. 2010 (available at http://www.who.int/violence_injury_prevention/other_injury/burns/en/index.html) (accessed on 08.07.2010)
- [4]. Triffitt PD. The Relationship between Motion of the Shoulder and the Stated Ability to Perform Activities of Daily Living. *Journal of Bone and Joint Surgery Am*, 1998: (80):41-6. (Accessed on 08.07.2010)
- [5]. Williamson MS, Bagley A, Petuskey K, Takashiba S, Palmieri T. Analysis of Upper Extremity Motion in Children After Axillary Burn Scar Contracture Release, *Journal of Burn Care and Research*. 2009;30:1002–1006. (Accessed on 15.08.2010)
- [6]. Palmieri TL, Petuskey K, Baly A, Takashiba S, Greenhagh D G, George T. Rab, Alterations in functional movement after axillary burn scar contracture: A motion analysis study, *Journal of burn care rehabilitation*. 2003;24:104-108. (Accessed on 20.03.2010).

How to cite this article:

Perera M M N, Nanayakkarawasam P P, Katulanda P. EFFECTS OF BURN ON THE MOBILITY OF UPPER LIMB/S, FUNCTIONS OF HAND /S & ACTIVITIES OF DAILY LIVING. *Int J Physiother Res* 2015;3(1):832-838.

DOI: 10.16965/ijpr.2014.694