FUNCTIONAL OUTCOME OF UPPER LIMB AMPUTEES

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Abstract:

Aim: To assess the functional outcome of Upper Limb Amputees.

Design: Descriptive Cohort study.

Materials and Methods: 30 Upper limb amputees who have registered for Hand Transplantation were called for follow-up. Using data from Medical Records and by an interview a proforma was filled.

Results: Majority of the amputees (64%) were independent in all activities of daily living. 23% were partially dependent on their family for bathing and dressing. The bilateral amputees were fully dependent for their ADL. Symptoms of overuse injury like shoulder pain and wrist pain in the unaffected limb was reported by 9 patients (30%).

5 Patients were students and they are continuing their studies. 8 Patients (26%) are continuing the same occupation. 8 Patients (26%) have changed their occupation following the amputation. 9 Patients (30%) have stopped working and are supported by their family members.

Phantom pain was experienced by 20 patients (66%) and stump pain by 14 patients (46%). 70% of the amputees especially children and young adults perused their leisure activities. Prosthesis use of 8hrs/day was noted in 9 patients (30%) who were distal amputees using only a cosmetic prosthesis. Majority of the amputees, 57% have discarded their prosthesis after about a month’s time.
CONCLUSION: Prosthesis usage in upper limb amputees is considerably less as it is not functionally satisfactory. A new option is available, is Hand Transplantation especially for bilateral upper limb amputees.

Introduction:

Hand is an important organ. Most of the activities of daily living are dependent on the integrity of upper limbs. Loss of an upper limb at any level is devastating to the patient as it not only hinders their livelihood but also reduces their self esteem.

With mechanisation and increased use of equipment in all spheres of life, the rate of injuries of upper limbs is on the rise. Consequently there is an increase in the number of upper limb amputees.

A number of prosthetic replacements for lost hands and forearms are currently available, ranging from purely aesthetic to those with emphasis on function. The patient’s acceptance of prosthesis varies considerably. Unlike lower limb prosthesis, the upper limb prosthesis carries a social and emotional function and a strong symbolic value.

Despite the variety of upper-limb prostheses currently available, we still haven’t figured out how to make one that duplicates what God gave us. Sensation, dexterity, grip patterns — these are things nature provides that we just can’t match electronically or mechanically.

Eighteenth century poet and hymn writer William Cowper said, “God made the country, and man made the town.” What we create looks “manmade,” for obvious reasons. We have a long way to go before the form and function of upper-limb prostheses come anywhere close to matching those of a natural hand.

AIM OF THE STUDY

- To find out the functional outcome of upper limb amputees
- To assess the maximum hours of use of upper limb prosthesis
- To find out the incidence of phantom pain and stump pain in upper limb amputees.
- To find out the percentage of upper limb amputees who had to change their occupation following the amputation.

Materials & Methods:

SUBJECTS:

Upper limb amputees who have registered for Hand Transplantation during the period of January 2010 to December 2010 at the Institute of Research and Rehabilitation of Hand, Stanley Medical College & Government Stanley Hospital, CHENNAI.

DESIGN:

Descriptive cohort study
Methods:

Upper limb amputees were called for follow-up. Using data from Medical Records and by an interview a proforma was filled.

Demographic details such as age, sex, domicile ie whether living in urban or rural area was collected.

The cause, level of amputation, dominance of the involved limb were noted.

Interview included the following data:

- The type of prosthesis used and the number of hours the amputee used the prosthesis.
- The reason for rejection of the prosthesis was enquired.
- Change in occupation, continuance of the same job after amputation or if unemployed
- Activities of daily living – Whether Independent, Partially dependent or Totally Dependent.
- Pursuit of leisure activities
- Presence or absence of Phantom pain and Stump pain.
- Use of any drugs, intake of alcohol for pain.
- Symptoms of overuse injury such as shoulder pain, wrist pain, swelling etc in the unaffected limb.
- Willingness to undergo Hand Transplantation.

Discussion:

The commonest cause of amputation in this study was Industrial Accident which includes crush injury in factory machines, agricultural machines, sugar-cane crushing machines and lifts. Carelessness while working with the machines was the root cause of these accidents.

Amputations of the upper limb following Electrical burns (17%) is as common as Road traffic accidents (23%). Another cause of upper limb loss seen in our population is Cracker Burst Injury.

Male preponderance in the age group of 20 to 30 yrs was seen. There was no difference in the domiciliary distribution of the amputees as 16 patients (53%) belonged to urban area and 14 patients (47%) belonged to rural areas. Involvement of the dominant limb was 22 (67%) and non-dominant limb was 11 (33%) comprising of a total of 33 limbs of 30 patients (3 patients were bilateral amputees).
Majority of the amputees (64%) were independent in all activities of daily living. 23% were partially dependent on their family for bathing and dressing. The bilateral amputees were fully dependent for their ADL though they have functional prosthesis but do not use them as donning and doffing is very laborious and prosthesis are heavy and not useful for routine ADL, but is used occasionally for cosmesis.

Symptoms of overuse injury like shoulder pain and wrist pain in the unaffected limb was reported by 9 patients (30%).

5 Patients were students are they are continuing their studies 8 Patients (26%) amputees are continuing the same occupation, 8 Patients (26%) have changed their occupation following the amputation. 9 Patients (30%) have stopped working and are supported by their family members.

Phantom pain was experienced by 20 patients (66%) and stump pain by 14 patients (46%). This includes prosthetic users and non-users. None of them were taking any drugs. 4 patients admitted to taking Alcohol occasionally, during socialization, but not for pain relief. Pain did not affect their functional ability.

70% of the amputees especially children and young adults pursued their leisure activities. Most switched over the sports activities from one which involves use of both limbs like Cricket to a sport which can be played using a single limb like Badminton. They took part in family functions and outdoor activities some wearing their prosthesis and a few without any prosthesis. However 30% of the amputees have no leisure activities and avoid socializing.

Although 13 patients had a functional prosthesis and 13 had a cosmetic prosthesis, most of them used it only for cosmesis. 2 patients have myoelectric prosthesis and are independent in ADL. Two patients both below elbow amputees of dominant hand refused to use any prosthesis. They insist on having a real limb and not an artificial one.

A careful follow-up is required for recipients of a CTA, which is a non-life-saving procedure. One of the most crucial points in hand transplantation is the rehabilitation programme, which begins 12 h after surgery and must be undertaken for several years. The first year it includes Physiotherapy, electrostimulation and occupational therapy, then it continues twice weekly over the entire follow-up period. At present, an appropriate programme should be performed to teach the recipients all movements necessary to perform daily activities because they seem to have “forgotten” how to carry them out over the several years following amputation. Muscular power and range of motion should be improved with steady and targeted exercises. Patients need strong motivation, not usually required in solid organ transplant recipients, as the results follow a rigorous protocol of physiotherapy.

Major progress, especially in pharmacological immunosuppression, surgery and rehabilitation, has been made over the past decade, and one wonders if it is still justified to categorically withhold such a therapeutic option from patients.

All the patients were keen on Hand Transplantation and have given their willingness. Most of them were primarily treated in our Institute and have used prosthesis and found it less than satisfactory.
They have been educated about Hand Transplantation, the advantages and disadvantages, the prolonged rehabilitation programme following the transplant and the need to take Immunosuppressants lifelong. Few of them have gained knowledge about Hand Transplantation from Internet and Media.

All the patients above 20yrs were screened for co-morbid conditions and evaluated by Hand Surgeons, Physiatrist and Anaesthesiologist. Psychological assessment through Mini mental scale has been done. The importance of immunosuppressants and their continued use post-transplant and its complications have been emphasised. Children although registered will not undergo Hand Transplantation till they are 20yrs of age and can give consent on their own. Also they will attain skeletal maturity by then.

A new hope now dwells among these unfortunate amputees to get back a limb though at the cost of life - long immunosuppressants. Nevertheless these victims of fate are eagerly waiting for the first Hand Transplantation at our Institute for after all what is life without quality.

Conclusion:

* Industrial accident was the commonest cause of upper limb amputation.

* There was no great difference in rate of amputation among urban and rural population.

* Symptoms of overuse injury in the unaffected limb was reported in 30% of the patients.

* 70% of the patients pursued leisure activities.

* Phantom pain was reported in 66% and stump pain in 46%.

* The overall rejection rate of prosthesis was 57%.

* Hand Transplant is a new option available for these amputees to improve their quality of life.
References:

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