

ACCESSIBILITY OF LOWER LIMB PROSTHESIS TRANSFORMS THE BEHAVIOUR TRAJECTORY OF AMPUTEES-A SCRUTINY

Dr. Sarasvathi. V¹, Dr. Visalakshi Rajeswari²

¹Asst.prof, Dept of Resource Management,

²Professor and Head of the Department, Dept of Resource Management

ABSTRACT

Health and well – being have pervaded the minds and hearts of human beings as inextricable entities. Unfortunately the thrust on maintaining them remains backstage. A scan across the globe lays before one a big picture – burgeoning population with spotlights of those who are sick, aged and vulnerable. Amidst them is there a mounting category of those individuals remaining immobilized due to various circumstances. Cause of their plight is shouldered by the diseases they had fallen prey to or the accidents that had left them so. Either way the statistic on amputees' sequel to those reasons keep surmounting day by day. India is an active participant in increasing the number. Curiosity to locate the truth behind led to some blinding facts. A **micro level investigatory study** was taken up by collecting data on amputees registered in four hospitals and three prosthetic centres in Coimbatore City chosen adopting convenience sampling. The number recorded for a period of one year from 2014 – 2015 (beginning), showed the presence of **928 amputees**, among whom 88 per cent were men. This data projected another alarming statistic. From among the total amputees reported more than **72 per cent (669) were lower limb amputees**, again displaying predominance of men. This indeed is a very big challenge for any country. Considering the minimal topographical area covered for this micro level study, the magnitude of the problem can never be compromised. These facts albeit necessitated finding out the profile (age of the amputee, cause of amputation, level of amputation) of the affected samples, especially those who had gone for an artificial limb – a prosthetic limb. Almost 50 (7%) had refused prosthetic limb during the initial stages itself – a finding which highlights on the poor awareness among the genre or the lack of accessibility to prosthesis in the early stages itself. Prosthesis can improve the results of rehabilitation of the person with a limb amputation. Successful design of prosthetic devices hinges upon a research and development process that intimately combines end-users with device developers. This process focuses on the **usability** of the product in what is sometimes called a “user centred” approach to design. Readjusting to life after amputation is likely to be challenging for most people. Difficulties in adjustment are typically associated with reports of depression, feelings of hopelessness, low self-esteem, fatigue, anxiety, and sometimes suicidal ideation. A multitude of related problems, including maladaptive coping behaviours (e.g., drug /alcohol consumption), greater disability, poorer social functioning, and loss of functional independence, may result from difficulties in psychological adjustment. The ultimate challenge to the family is to meet the rehabilitation-related needs and

International Conference on Recent Trends in Engineering & Science

Shree Ramchandra College of Engineering, Pune (India)

29th-30th September 2016, www.conferenceworld.in

ICRTES - 16

ISBN : 978-93-86171-06-1

*simultaneously to meet the needs of the family and its members of having a normal life. These factors also affect the **Resource management** potential of the affected individual. This study was focused on a **behaviour trajectory**, considering the **user as a "consumer"**. The benefits they acquire or what they lose is thought of as a **discount**, as **their health** is an essential resource, which can help them sustain, overcome their discomfort and lead a quality living. It is also envisaged that the outcomes of the study would make the device **more "accessible"** than being **affordable** and pave a positive way for realistic and fruitful use of the device (prosthesis), for its **"designed use"**.*

Keywords: *Accessibility, Prosthesis, Trajectory, Amputee, Rehabilitation*

I. INTRODUCTION

Health and disease are logical, complex and multi-factorial (Lloyd, 2014). The most common causes of impairment and disability include chronic diseases such as diabetes, cardiovascular disease and cancer; injuries such as those due to road traffic crashes, conflicts, falls, birth defects, malnutrition and other communicable diseases (NHRC 2005). Among these, diabetic foot ulcers cause elongated hospitalisations with high treatment costs and high rates of lower extremity amputations resulting in increased morbidity and decreased quality of life (Akçay, 2012). Injuries appear to be one of the major causes of disability accounting for at least 100,000 (23 percent) amputees. *Amputations are performed to remove severely diseased, injured, or no longer functional extremities.* Amputation leads to a permanent disability and brings a dramatic change in the life and function of the individual. This changed situation is experienced more by the lower limb amputees than by the upper limb amputees. Limitations in body structure and function due to the removal, affect the activity level, and thereby, the participation of the individual in the society (Ustun et al., 2003). Additionally, personal and environmental factors play an important role in determining outcomes after amputation and also their long term functioning. Psycho-social supports are considered as important determinants for adjustment to amputation (Desmond et al., 2008). Depression, anxiety and body image disturbances pose as determinants of standards in one's Quality of Living (QoL). Emotional status of lower limb amputee patients may be linked to perception of the body image (Akyol, 2013). **Prosthesis** is an artificial extension that replaces a missing body part such as an upper or lower body extremity. Prosthesis can improve the results of rehabilitation of the person with a limb amputation. If given the opportunity, most persons with an amputation will be able to use an artificial limb well. Successful design of prosthetic devices hinges upon a research and development process that intimately combines end-users with device developers (Biddiss, 2007). This process focuses on the **usability** of the product in what is sometimes called a "user centred" approach to design. The concept of usability and the design and conduct of usability testing studies may be unfamiliar to many in prosthetics and rehabilitation because of the dearth of studies published in these areas. **Successful rehabilitation** of the amputee requires that the prosthesis be **acceptable** to him or her. Prosthesis acceptability depends on several factors including cosmesis, mass properties of the prosthesis, comfort, and function. Comfort and function are directly dependent on the quality of fit of the socket, the quality of suspension, the type of components used and the relative geometrical position of these components to each other. The position and orientation of these components, the major elements being the

socket, joint(s), and terminator (e.g., foot), are defined as the alignment of the prosthesis. If an acceptable alignment of lower-limb prosthesis cannot be achieved, the limb may be rejected by the wearer. (<http://www.rehab.research.va.gov/jour/86/23/2/pdf/zahedi.pdf>). One of the single most determining factors of whether a person will use prosthesis is prosthetic socket design. Regardless of the cause, **prosthesis abandonment** is a serious problem that should be avoided whenever possible given the likelihood that repetitive stress syndrome may develop in individuals that rely heavily on one limb for daily tasks. The foundation for all prosthetic procedures is a well designed and considerate prosthetic socket (http://www.lakeprosthetics.com/published/The_Evolution_of_Upper_Limb_Prosthetic_Socket.5.pdf)

Readjusting to life after amputation is likely to be challenging for most people. Difficulties in adjustment are typically associated with reports of depression, feelings of hopelessness, low self-esteem, fatigue, anxiety, and sometimes suicidal ideation. A multitude of related problems, including maladaptive coping behaviours (e.g., drug /alcohol consumption), greater disability, poorer social functioning, and loss of functional independence, may result from difficulties in psychological adjustment (Garafalo, 2000). Sequel of amputation has adopted an almost exclusive focus on the **negative impact** the event has on the persons' life and well-being. Recently, there has been an attempt to redress this imbalance by identifying factors that promote positive adjustment (Gallagher and MacLachlan, 2000).

The ultimate challenge to the family is to meet the rehabilitation-related needs and simultaneously to meet the needs of the family and its members of having a normal life (Gonzalez et al., 1989). These factors also affect the **Resource management** potential of the affected individual.

Amputees possess by definition a functional asymmetry. Lower leg amputation generally includes asymmetrical weight-bearing with more weight on the non-prosthetic leg (Duclos, et al. 2008). This can be detrimental to an amputee's long term quality of life. This suggests that successful rehabilitation of an acute or chronic impairment extends beyond the acquisition of endurance, strength, range of motion, or learning about a new strategy (Miller and Deathe, 2004) - factors contributing to one's **well being** and **quality of life**.

Prosthetic technology is certainly advancing rapidly. For most people, these state-of-the-art devices are neither affordable nor well suited for day-to-day life. Yet it is found that amputees are apprehensive about **access and adaptability of prostheses**, which they depend on to regain gait and postural balance absolutely necessary for normal living. The study aims to analyse the reasons pertaining to limitations in use of prosthesis on the one side and to highlight the aspects of its censure that do not qualify for being user friendly on the other.

This study was focused on a **behaviour trajectory**, considering the **user as a” consumer”**. The benefits they acquire or what they lose is thought of as **a discount, as their health** is an essential resource, which can help them sustain, overcome their discomfort and lead a quality living. It is also envisaged that the outcomes of the study would make the device **more “accessible”** than being **affordable** and pave a positive way for realistic and fruitful use of the device (prosthesis), for its **“designed use”**.

II. METHODOLOGY

An investigatory study is a type of field survey where the required information from the concerned sector is obtained by investigating details about the particular sample using specific methods. Coimbatore district, in

Tamil Nadu, South India was selected for the study. Four hospitals and three Prosthetist Centers were selected as sample from where the necessary information was collected adopting purposive sampling. A sample design is a definite plan for obtaining a sample from a given population.

Observation is purposeful, systematic and selective way of watching and listening to an interaction or phenomenon as it takes place (Kumar, 2011) and a favorable method used in behaviorism. Overt observations refer to the researcher being open about their intentions in the field and ensuring all members of the group are aware of what is happening. Details collected from recorded data for the preferred period of study projected the following.

III. RESULTS AND DISCUSSION

Collection of data on cases recorded about amputees over a specific period of time within a stated geographical area was found necessary; the findings of which are discussed under:

3.1 Pragmatic data on Amputees

Secondary data from authentic sources regarding amputees over one year (2014-15) was collected. **928** cases had been recorded, among whom **819** were male and **109** were female candidates. Year wise details of amputees is presented in Table-I

Table-I: Data on Amputees

Year of study	Total Number of amputees	Gender wise number of amputees	
		Male	Female
2014	388	351	37
2015	540	468	72
Grand total	928	819	109

The data was collected from a very small segment of the medical service providers (4 Hospitals, 3 Prosthetic centers). With this milieu, investigator proceeded with gathering further details on the individual amputee. Hence this part of the findings of the study is discussed as under.

3.2 Micro level Study of Amputees

The detail of each amputee was obtained; through questionnaire and checklist method through primary data .The results obtained are outlined as follows:

3.3 Details on Lower Limb Amputees

Table-II: Details on Lower Limb Amputees

Year of study	Total Number of lower limb amputees	Gender wise number of amputees	
		Male	Female
2014	273	225	37
2015	396	346	72
Grand total	669	571	98

This data projected is an alarming statistic. From among the total amputees reported in 2015 (**928**), more than 71 per cent (**669**) were lower limb amputees. This indeed is a very big dispute for a District as Coimbatore-Medical Hub of the State. This information was lead and warranted for further research in this area. Hence the profile of the affected samples, especially those who had gone for an artificial limb – a prosthetic limb was taken for further research. **About 50 (7%) had refused prosthetic limb during the initial stages itself – a deplorable finding that led for exploration, as without limbs mobility is a million dollar issue. Even performing personal job would be difficult -foremost state of despair. This led to the question on the awareness among the genre or the lack of accessibility to prosthesis leading to its rejection in the early stages itself.** An overt observation was then planned to reveal the authentic disinterest in procuring one.

3.4 Profile of the Amputees using Prosthesis

This aspect of the study is analyzed under the following headings:

3.4.1 Personal Details of the Sample

3.4.2 Causes of Amputation

3.4.3 Locus of Amputation

Table-III Personal details of the sample

Particulars	Number
	(N= 669)
Age Range (in years)	

> 20	58
21-40	230
41-60 yrs	263
< 61	118
Gender	
Male	557
Female	112

3.4.1 Personal details of

the sample

The results of the study revealed the following. The 41- 60 years group (39 %), the stamina of the economic society ranked high among the victims who had gone in for prosthesis, followed by 21 – 40 years group reported by 34 per cent (230). The most worrisome aspect was the 118 who were above 61 years of age and the 58 belonging to the adolescent category who, also were not spared from this predicament. The words of Abdul Kalam Ji “Great dreams of great dreamers are transcended” seeded in the minds of our future generation takes a twitch due to their disability. Male members predominated, recording approximately 83 per cent of the affected population.

3.4.2 Causes of Amputation: This aspect of the study is explained through Table

Table: IV Causes of Amputation

Major Causes	Particulars	Number (N= 669)
Medical	Diabetes	171
	Gangrene	1
	TAO	54
	Vascular	7
Surgical	RTA	156
	Crush	141
	Avulsion	75

	Burn	19
Other	Cancer	39
	Congenital	6

The causes recorded for amputation was classified under three major etiological reasons, namely, 4 medical and surgical reasons and others (congenital and cancer). Surgical reasons with RTA and crush injuries (**156** and **141** respectively) were represented in a higher version, closely followed by diabetes and TAO (**171** and **54**) as medical excuses. Comparatively, causes from other sources were reported in less key. Surgical reasons developed mainly from accidents and trauma therefore can be nailed as the prime reasons for amputation with diabetes and diabetes - induced gangrene falling close in line as medical reasons.

These findings give fool proof evidence that the populace have to be doubly careful – one primarily, not to fall prey to accidents and further trauma and secondly develop a healthy life style fighting against amputation related to medical grounds, where both ‘caution’ and ‘attitude’ have to be cherished as one’s life time mantra.

3.4.3 Locus of Amputation

Table: V Locus of amputation:



Bilateral



Transtibial



Transfemoral

Locus of amputation	
Transtibial (Below Knee)	423
Transfemoral (Above Knee)	202
Bilateral	44
Lateral Side	
Right	398
Left	227
Bilateral	44

Cases with below knee amputation (423), was found to be higher than above knee cases (202) - a real blessing in disguise, with 44 reporting to have undergone bilateral amputation. It was pathetic to record higher rate of samples to have lost the right limb (398) against who had lost their left (227). Of course, the bilateral suffered loss of both the legs. These factors project a very bleak picture of a contemporary generation which had lost a lifetime of normal living. Nevertheless, their efforts, willingness and audacity to go in for prosthesis to regain at least one small proportion of their missing appendage are laudable, commendable and appreciable.

3.5 Accessibility to Prosthesis

In this aspect of the study about 151 samples responded of the chosen sample size 175. This part of the study enlightened the behavior pattern of the studied samples. The results of the study is discussed under the following heads:

3.5.1 Reaction to Physical Components

This aspect of the study explains the approach practiced by the sample in coping the stressors and the eventual crisis caused. Hence this part of the findings explains the following factors used as coping measures:

a. Status of Independence

b. Job Integration

c. Values Revisited

a. Status of Independence

The samples were well aware of their position in terms of their dependency either on people or on inanimate supportive devices. Table explains the same.

Table: VI Status of Independence

Particulars	Percent responding (n=142)			
	Overall percentage* (n=142+9=151)	TF n=48	TT n=88	Bilateral n=15
Class I — Totally independent	50	31	64	33
Class II — Independent with one cane or crutches	25	40	20	7
Class III — Independent at home ambulating with prosthesis, but need wheelchair for outdoor activities	13	17	3	53
Class IV — Non-ambulatory except in wheelchair	6	2	9	7
Class V — Independently ambulant with crutches, but not wearing a prosthesis (n=9)	6	10	5	-

It was very encouraging to record almost half the sample state that they remained totally independent even after amputation (class I category) Dependence on supportive devices like crutches and canes further threw light on the sentiments they attached to the value of living on their own. This also reflects the extent to which the samples had accepted the predicament and had ushered in feasible solutions to make their life more acceptable, peaceful and worth living. Similarly, one can also assume the confidence they had on the devices used for support – products of research – which came in handy during a dire need. The findings all the more bring out the efforts put up by the samples to reduce the stress caused to the family members' sequel to the amputation they suffered. The table throws light on the nine samples met in the Centers who had rejected prosthesis (belonging to class V) but being independently ambulant with crutches –living examples, who had access to but could not adapt to prosthesis.

b. Job Reintegration

While the previous section dealt with how the samples managed on the physical aspect, this part describes their temperament to establish themselves in the economic front (Table VII). Only 58 per cent among the entire sample (142) had resumed job after amputation, among whom 57 per cent got reintegrated with the same job and 43 per cent had sought a new one. It was quite surprising that more than 30 per cent among transtibial had continued with the previous job, while 67 per cent among transfemoral had sought for a change in job.

Table: VII Job Reintegration

Particulars	% (n=83)	Job	Percent responding		
			TF (n=24)	TT (n=49)	Bilateral (n=10)
Continue same job (n=47)	57	Business	11	21	0
		Salaried	9	21	0
		Professional	4	30	4
Change in job (n= 36)	43	Business	28	28	3
		Salaried	11	22	2
		Professional	0	0	6
Nature of job (n= 83)	28	Part time work	42	29	30
	72	Full time work	58	71	50

Age at the time of amputation, wearing comfort of the prosthesis, and education level were significant indicators of successful job reintegration. Subjects with physically demanding jobs who changed type of job before and after the amputation more often successfully returned to work than subjects who tried to stay with the same job. Older patients with a low education level and problems with the wearing comfort of the prosthesis were the population at risk who required special attention during the rehabilitation process in order to return to work. Lowering the physical workload by changing to another type of work enhances the chance of successful

International Conference on Recent Trends in Engineering & Science

Shree Ramchandra College of Engineering, Pune (India)

29th-30th September 2016, www.conferenceworld.in

ICRTES - 16

ISBN : 978-93-86171-06-1

reintegration opines, Schoppen (2001). The decision by 67 percent of transfemoral amputees to change their job is thus justified.

The shift in employment patterns of samples post-amputation followed identifiable trends. The physical demands of the jobs to which amputees returned also changed in a predictable fashion. Amputees, who were employed in a light to moderate job prior to injury, continued the same job or secured a sedentary job post-amputation. The factors influencing the job pattern included nature of employment, age at the time of amputation, level of amputation and education level.

The vocational guidelines for Social Security disability define work activity as medium, light, or sedentary.

Sedentary work means that you are able to sit for up to 6 hours in an 8 hour day and lift up to 10 lbs. occasionally during a day.

Light work means that you can stand and walk for up to 6 hours in an 8 hour day and lift 10 lbs. frequently and 20 lbs. occasionally

Medium work means that you can stand and walk for up to 6 hours in an 8 hour day and lift 25 lbs. frequently and 50 lbs. occasionally (<http://www.disabilitysecrets.com/blog/2010/05/social-security-disability-lig.html>).

Post-amputation jobs were generally more complex with a requirement for a higher level of general educational development than pre-accident jobs. A trend emerged as about 75 per cent of employed amputees returned to a job that was less heavy than their former job, but required greater intellectual ability. Millstein (1985) had documented amputees to report that the accident employer often offered continuing employment. He had also reported other changes in employment post-amputation. Here the story was different.

More than half of the amputees were found to identify negative repercussions of their amputation including reduced potential for salary increases and fewer opportunities for job promotion. Job security was adversely affected by amputation. Few of them had experienced periods of unemployment lasting more than six months since the amputation before reintegration. Interestingly, each additional day in acute care resulted in an average decrease of ten days of disability report (Herbert et al., 2006). In general as duration of sick leave increases, the chance of return to work decreases. Barriers in returning to work often arise from personal, work or family-related problems, rather than from the original health condition itself (Health and Safety Executive [HSE] Guidance 2005). Blue collar workers with injuries took longer to return to work than white collar workers. Self-employment also influenced one's return to work (Amick and Gustafsson, 2004).

c. Values Revisited

Personal values provide an internal reference for what is good, beneficial, important, useful, beautiful, desirable, constructive, etc. Values generate behaviour, state, Rokeach, (1973) and help solve common human problems. ([https://en.wikipedia.org/wiki/Value_\(personal_and_cultural\)s](https://en.wikipedia.org/wiki/Value_(personal_and_cultural)s)) Hence an attempt was made to find out the values the sample cherished through their accommodative behaviour consequent to using of the prosthesis.

International Conference on Recent Trends in Engineering & Science

Shree Ramchandra College of Engineering, Pune (India)

29th-30th September 2016, www.conferenceworld.in

ICRTES - 16

ISBN : 978-93-86171-06-1

Table: VIII Values Revisited

Components considered	Action to cope with stressor events/ crisis	Adaptation strategies/ coping responses	Values cherished
Physical	Informed decision making	Use of biomechanical device	Positive
		Reduction in contact/ mechanical stress through customized fabrication	Health
		Avoiding awkward postures, excessive force	Safety
Cognitive	Cognitive decision making	Prevention of static muscle loading	Comfort
		Safety and product quality	Satisfaction
		Information to interact with the device	General well being
Ergonomic	Conscious decisions/ Seasoned approach	Adapted motor response	Passion to change
		User – centered approach	Adaptability
		Better use of technology	Accommodation
		Health consciousness	Wishful thinking
		Desire to be productive	Resilience
		Participatory approach	Dignity
			Integrity
			Self –respect / self - esteem
			Negative
			Egoistic
	Adamant behavior		
	Inferiority complex		
	Self pity		
	Body image		
	Embodiment		

Despite giving multiple evidences for adapting to their plight and exposing many admirable positive values, the samples were found to retain a few negative traits. Being left on their own without any assistance, financial insecurity, joblessness coupled with an aimless future probably had prompted them to give vent to such sentiments. Not all could take it as a sugar coated pill.

The process-oriented definition indicates a difference between coping and automatic behavior states Bomer (2004). Coping represents efforts with reference to situations of psychological stress that call for mobilization and involve all efforts to manage regardless of outcome. So managing may include avoiding, denying, minimizing, tolerating, accepting the stressful situation or striving for change. *Here the samples had “managed” their stressful situation in an exemplary way by following all these strategies. Similarly they have also proved that through such adaptation they have molded their resilience* which it radiates in the form of their commitment, communication, cohesion, adapting, connectedness, time allocation for being together and is problem solving as National Network on Family Resiliency (1996) declare.

IV. PROSTHESIS –A SYMBOL OF AMPUTEE “EMPOWERMENT”

“Empowerment” is the process of individuals directed towards taking charge of such a process of promoting informed self-care efforts realms as health promotion and health protection. To this effect the prosthetist team was found to collaborate, teach, counsel and intervene with clients, as Pender et al (2002) state, mainly to facilitate their active involvement in making rational and informed choices about health, health care, well being and mastery of their environment. The rehabilitation process in fact had been a common ground for both the prosthetic team and beneficiary to reap mutual benefits. This phase-the participatory ergonomic phase definitely had left the amputees “Empowered”.

V. PROSTHESIS – ACCESS AND ADAPTABILITY

The success of any endeavor relies on a two way process where the consumers have an access to it and the way they accept it. It is all the more pronounced with those who have a disability. Then accessibility refers to the design of the products, devices, services or environments for people with disabilities, which they try to adapt. Adaptability then exhibits the ability of the person to learn from experiences which in the long run improves the fitness on the learner. Therefore for any product to be accepted, both accessibility from the giving end, the entrepreneurs and adaptability from the receiving end, the consumers have to be ensured. Once done the consumers can state they are in a **comfort zone**.

The first concept refers to a product and or the service available for access, while the second reflects the trait of an individual to access the product or service and the way they use it once it is accessed. Either way the opinions of the concerned individuals receive priority. With this backdrop the opinion of the selected sample on the following factors was deduced to understand how far the prosthesis is **accessible** and to what extent they have **adapted** to it.

VI. POINTERS FOR ACCESSIBILITY

Responses received for a few questions discretely fitted in all the tools used for the study and the aftermath of observation revealed some valid points that reflect the opinion of the sample regarding access to the prosthetists and the device as such, which are explained in Table.

Table: IX Pointers of Accessibility

Driving forces	Factors of accessibility	Percent responding (n=142)		
		Positive	Negative	Positive and negative
Personal needs	Satisfy basic needs	*		*
	Enable mobility and balance	*	*	*
	Job reintegration	*		
	General awareness	*		
Personal factors	Age	*		*
	Gender – dependence (for visits)			*
	Personality issues		*	*
	Social status	*		*
	Dependence syndrome		*	*
	Restricted movement		*	
	Becoming a symbol of sympathy	*		*
Family support	Assistance at home (for daily chores)			*
	Assistance for mobility (for ambulation)	*	*	
	Visit prosthetist		*	
	Living alone		*	
	Motivation from family	*		*
	Engage paid help		*	*
Service available	Access to Centers (prosthetist)	*		

International Conference on Recent Trends in Engineering & Science

Shree Ramchandra College of Engineering, Pune (India)

29th-30th September 2016, www.conferenceworld.in

ICRTES - 16

ISBN : 978-93-86171-06-1

Driving forces	Factors of accessibility	Percent responding (n=142)		
		Positive	Negative	Positive and negative
	Nature of service provided	*	*	*
	Hospital support for on - site fabrication			*
	NGO/ Government/ philanthropist support	*		*
	Fabrication facilities available nearby	*	*	
	Counseling services	*	*	
	Prospects for customized fabrication	*		
	Procedural factors / lapses		*	*
Financial support	Affluent to meet the needs	*		*
	Support from family	*		*
	Free limb	*	*	
	People responsible for accidents		*	*
	Insurance cover		*	
	Compensation from employers		*	
	Reimbursement for prosthesis from employers		*	

The views of the sample on pointers for accessibility were culled out under five major driving forces. The findings revealed the mixed feelings they had for the stated factors. Statements for which they had responded in the neutral (positive and negative) shows their status of confusion and reflects the agony they would have undergone before being fitted with the prosthesis. Measures to create a general awareness among the public about the services available through **different media** may be more of assistance than the word of mouth strategy adopted until when one is destined to a need. In a developing country like India, earnest efforts from Government, employers, insurance companies and even hospitals to embrace those in needy on an ‘**insurance wrap**’ can end up in making the accessibility prospects much brighter.

VII. EXPERIENCES ON ADAPTABILITY

The responses received for accessibility issues have been concrete and were given after giving enough thought for each point, revealing their cognitive ability. Obviously, their reasons to adapt would also be on a higher plain. Table following presents the concerned data.

International Conference on Recent Trends in Engineering & Science

Shree Ramchandra College of Engineering, Pune (India)

29th-30th September 2016, www.conferenceworld.in

ICRTES - 16

ISBN : 978-93-86171-06-1

Table: X Responses for Adapting to Prosthesis		
Nature of response	Factors for adaptability	Percent responding (n=142)
Positive	Accepted life style	54
	Attitude change	72
	Positive mind set (attitude)	60
	Good counseling	50
	Access to Rehabilitation services	82
	Passion to accept change	24
	Advances / developments in fabrication	48
	Cosmesis	40
	Customized fabrication	72
	User - friendly	75
	Free/ reasonable cost	50
	Social acceptance	48
Negative	Disability	100
	Lack of Balance confidence	94
	Weight of the prosthesis	86
	Restricted movement	90
	Aversion to dependence	54

International Conference on Recent Trends in Engineering & Science

Shree Ramchandra College of Engineering, Pune (India)

29th-30th September 2016, www.conferenceworld.in

ICRTES - 16

ISBN : 978-93-86171-06-1

Lack of improvised components	67
Bleak prospects for work integration	36
Expensive	45
Pain in stump	72
Feel inferior to appear in public	48
Limitations in social acceptance	64
Crude appearance of the limb	50
Donning is time consuming	68
Need for assistance in donning	62

Adaptation encompasses long term actions to recover from a crisis situation states Bomer (2004). Similar to the responses received for accessibility, the statements given for accepting prosthesis was also expressions of their mixed feelings. Dichotomy prevailed in the way the samples accepted to adaptation – exhibiting both their positive and negative feelings towards it. Nevertheless the positive feelings highlighted the finer sentiments they had for product availability, access and services coupled with a changed positive outlook on life (on the personal front), both of which are profusely encouraging for those in the service. These facts prove that accessibility to prosthesis is profoundly acknowledged, proving the hypothesis. Contrarily, adaptability was found to be more or less individualistic, that is user – centered. These factors project a host of lame excuses individuals can state to avoid going in for prosthesis. They reflect the negative sentiments the sample’s themselves attached to their predicament, giving vent to their emotions on helplessness, depression, pain, resource commitments, social rejection, personality issues and the like. Certain factors not afforded by them like social and family support, (psycho social support) social acceptance, insurance coverage, cost involved – all are witness to their lack of affordability. Perception of their body image complied with the concepts of embodiment on a negative track, prevents them from responding in the affirmative to the question of accessibility.

VIII. CONCLUSION

Findings of the study show symptoms of a good awakening which is expected to gain momentum and become stronger in the near future. In any attempt made at rehabilitation, researchers stress the measurement of ‘outcomes,’ geared obviously by the need for evidence – based practice, in place of giving services that have a traditional ‘sake of service’ note. This field, especially where the beneficiary essentially has to be a proactive participant has seen parallel increase in the use of outcome measures. A judicious mix of their limitations, variations, capabilities with functional requirements, societal demands and gifts from science and technology

International Conference on Recent Trends in Engineering & Science

Shree Ramchandra College of Engineering, Pune (India)

29th-30th September 2016, www.conferenceworld.in

ICRTES - 16

ISBN : 978-93-86171-06-1

can have a long term advantage over an adversary. No more does humanity have the privilege to look at this cohort with a socially myopic eye. On their part, (the samples) it is high time they rose up to the occasion and joined the mainstream of personal and national development. Motivation and encouragements in the form of access and strategies for adoption have been on board for them for a safe sail. It is up for the beneficiaries to take them or reject them in their stride.

REFERENCES

1. <http://www.rehab.research.va.gov/jour/86/23/2/pdf/zahedi.pdf>, 14.8.1012
2. http://www.lakeprosthetics.com/published/The_Evolution_of_Upper_Limb_Prosthetic_Socket.5.pdf
3. www.nhrc.nic.in
4. Duclos, C., Roll, R., Kavounoudias, A, Mongeau, J-P., Roll, J-P., Forget, R. "Postural changes after sustained neck muscle contraction in persons with a lower leg amputation." *Journal of electromyography and kinesiology* (2008).
5. Amick BC, Habeck RV, Ossmann J, Fossel AH, Keller R, Katz JN. Predictors of successful work role functioning after carpal tunnel release surgery. *J Occup Environ Med.* 46 (2004):490–500. Doi:10.1097/01.jom.0000126029.07223.a0. [[pubmed](#)]
6. Health and Safety Executive [HSE] Guidance. "Working together to prevent sickness absence becoming job loss—practical advice for safety and other trade union representatives." UK: Health and Safety Executive [HSE] Guidance; 2005.
7. Gustafsson M, Ahlstrom G. "Problems experienced during the first year of an acute traumatic hand injury—a prospective study." *J clin nurs.* 13 (2004):986–95. Doi:10.1111/j.1365-2702.2004.01019.x. [[pubmed](#)]
8. Akyol, Bernatander, Ahmet Salim Goktepe, Ismail Safaz, Omer Kuru, and Arif Kenan Tan. "Quality of Life in Patients with Lower Limb Amputation: Does It Affect Post-amputation Pain, Functional Status, Emotional Status and Perception of Body Image?" 21 No.4(2013): 334-340 (doi:10.3109/10582452.2013.851761)
9. Biddiss E, Chau T. "Upper-limb prosthetics:Critical factors in device abandonment." *Am J Phys Med Rehabil* 86 No.12(2007):977–87.[PMID: 18090439]
10. Desmond D, Gallagher P. "Coping and psychosocial adjustment to amputation." *Psychoprosthetics.* London: Springer-Verlag; 2008.
11. Garafalo JP. Psychological adjustment in medical populations. *Curropin Psychiatry.* 2000;13:647-653.
12. Gallagher P, Maclachlan M. Positive meaning in amputation and thoughts about the amputated limb. *Prosthorthot Int.* 2000;24:196-204.
13. Gonzalez, S.; Steinglass, P.; and Reiss, D. "Putting the Illness in Its Place: Discussion Groups for Families with Chronic Medical Illnesses." *Family Process.* 28 (1989):69–87.
14. Kumar, Rahman & Krovi, "Assistive Devices For People With Motor Disabilities." *Wiley Encyclopaedia of Electrical and Electronics Engineering* (2011)