

## The comparison of satisfaction of prosthesis in below amputation men using a mechanical and Myoelectric prosthesis by using of TAPES questionnaire

mA. Keivani Hafshejani<sup>1</sup>, M. Sattari Naeini<sup>\*2</sup>, A. Langari<sup>3</sup>

1- Shahrekord University of Medical Sciences, Shahrekord, Iran

2-Naein Branch, Islamic Azad University, Naein, Iran

3- North Khorasan University of Medical Sciences, Bojnurd, Iran

E-Mail: [Sattari@gmail.com](mailto:Sattari@gmail.com)

**Abstract:** Design and manufacturing of the Myoelectrical prosthesis (in compared to Mechanical prosthesis) is time consuming and expensive. Therefore, considering the high cost of these prostheses should be increase the satisfaction of prosthesis. This study was conducted on assessing the quality of life between two groups. The two groups compared from the aspect of quality of life. The participants were categorized in two groups of 20 below elbow amputation veterans that use from Mechanical or Myoelectrical prosthesis that refer to central technical orthopedic Kosar. For gathering the data we use TPEAS questionnaire. This questionnaire evaluates participants from 3 items: psychosocial adaptation, functional limitation and satisfaction of life. For data analysis use to t independent and ANOVA test. The obtained results revealed that there are significant differentiations in prosthesis satisfaction. This identified that the Myoelectrical groups have upper prosthesis satisfaction in compare to Mechanical group. Therefore the hypothesis of this research in terms of higher satisfaction in the Myoelectrical group was accepted.

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### 1. Introduction:

Limb amputation is a term that separate means or part of body. Throughout the history, enduring failure is usually equal to amputation (Jhon *et al.*, 1992). There are 1700000 amputations people who live in the United States of America and 185,000 people yearly are discharged from the hospital with amputation (Edeer 2011).

Several factors such as trauma, infection, tumors, vascular disease, accidents, infectious diseases, and so create an amputation. Yet a high percentage of amputation statistics are in countries at war. so the 68/8% of statistics amputation is due to trauma in the above organ pipe (Jhon *et al.*, 1992; Gerzeli *et al.*, 2008; Atkins *et al.*, 1996). Although recent improvements of human science improve the quality prosthetics and prosthetic limbs but it is costly (Gerzeli *et al.*, 2008; Kahle *et al.*, 2008; Brodkorb *et al.*, 2008).

A person with an amputation is met with a sharp decline in the ability to fulfill his/her activities. In general, a variety of upper limb prostheses are designed and used. They can be split based on kinetic mechanisms of mechanical prostheses, Beauty (cosmetic) and myoelectric.

The researches which compare mechanical prostheses and myoelectric show that myoelectric Prosthetics are more acceptable because of the more power of grip, no need to the total bandage system and increasing the personal ability (Weaver *et al.*, 1988).

Unfortunately, despite the efforts that have been made in the field of prostheses performance,

the ability of individuals to use them is not so well and some people do not prefer to use any type of prosthesis (Jhon *et al.*, 1992; Atkins *et al.*, 1996; Biddiss *et al.*, 1988; Mazet *et al.*, 1956).

A very important point that should be considered is that the rehabilitation of the upper limb amputation should be done as a team, in which the Constructive prosthesis is considered as one of the team members (Weaver *et al.*, 1988; Durance and shea, 1998). Despite significant improvement in the area of prosthetic parts with high performance and high aesthetic, patient satisfaction has not improved significantly. Specifically many of the above-limb amputees, straw or prefer not to use prosthesis or use the cosmetic prostheses. Identify factors affecting performance of the upper limb prostheses and evaluation of individual skills in the use of dental prosthesis is very important (Weaver *et al.*, 1988; Durance and shea, 1998).

Despite the importance of identifying factors that affect the performance of prostheses, few studies have been done in this area and researches have shown conflicting results. Roeschelin and Domholdt (1989) found that factors such as age, lack of a dominant hand, the lack of elbow and learning how to use a prosthetic implant have not a considerable effect on the performance of prosthetic (Roeschelin and Domholdt, 1989).

However Bourough and Book (1991) in their study concluded that a personal training in the use of prosthetic have significant impact on the success and performance of the prosthesis. Studies

have shown that people with different levels of amputation of both physical and mental performance, social must be able to adapt to new conditions. In the past, the more physical aspects generally considered, but recently the psychological variables, is more social. Fewer studies have been done in relation to quality of life and there is little literature about quality of life and none have worked exclusively on this issue (Gallgher and Maclachan, 2004). Thus, to obtain valuable results reveal that the policy prescription, buy and the standard implant should be install, classical studies in higher education and research is done.

Seems to be largely a function of the quality of life in people with amputations easily, improving mental and emotional satisfaction in using the prosthesis, artificial performance seems directly related to the quality of life, so it was researchers to assess quality of life between the two groups amputation using simple mechanical joint myoelectric and amputee veterans with equal sample size for orthopedic services Technical Orthopedics Orthotics & Prosthetics Center will visit Tehran Kowsar, TAPES questionnaire to assess quality of life, and then compare the data to.

## 2. Method

A descriptive cross-sectional study is to compare functional limitation for veterans with unilateral below elbow amputees using two mechanical prostheses and myoelectric unilateral below elbow amputee veterans of our study population center in Tehran Orthotics & Prosthetics Kosar Foundation, formed in 2011.

The plan approved by the Research Council of Tehran University of Medical Sciences Faculty of Rehabilitation offers a referral center providing comments and cooperation Kosar Center officials. All files honored war veterans with amputations below the elbow will get away from the Archive Center. Following hospital records, using the criteria for inclusion and exclusion criteria were not sampled cases that were excluded.

That in each case was given a code number using four wood samples and 40 samples were selected randomly, then, 40 people were randomly divided into two equal groups of 20 which used their current prosthesis last six months. These people have no underlying problems, including heart disease - cardiovascular, diabetes, chemical injury, severe orthopedic conditions such as fractures and bone infections of the upper limb, blindness, lower limb amputation, and physiological illness. they were invited to Kosar center to provide for the orthotics and prosthetics was constructed.

The program participants were invited to the orthoses and prostheses Kosar center and after examination, interview and re-sample matching

criteria TAPES questionnaire will be provided. Participants completed questionnaires and returned it. TAPES questionnaire is designed and introduced for the first time in 1999 by Gallagher and Maclachan and used in order to improve the knowledge of prosthesis about individual compliance and improving the services (Gallgher and Maclachan, 2004). The validity and reliability of questionnaire are examined in Iran in 2008 in the satisfactory condition (Fardipoor, 2008).

According to a study that has examined the reliability and validity of the questionnaire to assess quality of life of people with upper limb amputations addressed, the research team in order to examine the validity of the questionnaire, the questionnaire was given to 10 academic experts people, and to their views and corrective actions have been considered.

The reliability of the questionnaire was assessed using Cronbach's alpha coefficient for the overall reliability of the questions related to compliance, social compliance, compliance with limits, exercise limits, functional limitations, social limitations, aesthetic satisfaction, satisfaction, satisfaction with weight and yield Respectively 81%, 78%, 73%, 71%, 75%, 72%, 71%, 77%, 70%, respectively.

Desmond and Maclachan (2005) to assess the validity and reliability TAPES questionnaire, have used TAPES in a study to assess the scale factors for upper extremity amputees.

This study was conducted on 100 men with upper limb amputation, the findings suggest that there is good reliability and validity in 9 subscales of TAPES questionnaire to assess quality of life was amputation of the upper limb (Desmond and Maclachlan, 2005).

Its sections are:

The first part is personal information, the second part consists of three main questions, psychosocial adjustment, activity restriction and satisfaction with the prosthesis, the last sub-section is satisfactory prosthesis The three categories of aesthetic satisfaction, satisfaction, satisfaction with weight and performance are the limitations of activity limitation exercise, functional limitations, and social limitations to bring a rubber The other part to questions about the amount of pain that a person is a member of cut, phantom pain, feeling healthy individuals to own and use average pay.

For data analysis software SPSS version 17 was used to mash Excel., In this study using techniques based on a comparison of independent variables (mechanical and Myoelectric)

Calculate the mean of the dependent variable (compliance, restrictions, satisfaction, performance, style, ...) will draw the necessary tables and then compare the averages and the difference paid to the analysis of data. Methods and

1- Descriptive statistics including: mean, standard deviation

2 - T-test and ANOVA test data used

Obtaining informed consent from all patients, respecting ethical considerations and the principle of secrecy and pledged that there was no risk of physical or mental

### 3. Results:

In the user of mechanical prosthetic group, age over 45 years class, with a 60% was the largest group. The maximum time for amputation was 15 to 25 years with 65%, which 60 percent of those 15 to 25 years used their prosthesis and 40% used the prosthesis for 5 to 10.

In the Myoelectric group 65 percent of people was 45 years old which 47.4 percent of them passed 15 to 25 years of their member. 55% of those 15 to 25 years are using the prosthetic that 60 percent of them between 5 and 10 years passed of prosthesis.

In the satisfaction of beauty questions it is found that the mean of Myoelectric group is more than mechanical and satisfaction of in Myoelectric is higher in this section. T-statistics of the test were estimated equal to (-2.323) and tests significance (0.026) indicate that there was a significant difference between the two groups in satisfaction of beauty parameter ( $0/05 > p$ ).

In our study, no significant difference between the mean duration of the mechanical prostheses and the Myoelectric prosthesis was observed ( $0/05 > p$ ). Duration of implant use was significantly higher in the group Myoelectric.

### 4. Discussion:

The questions seem to be satisfied with the cosmetic appearance of the better and more similar to normal hand, Bandages lack of a better performance Myoelectric various tasks, such a variety of hobbies, driving, exercise, eat less of certain electronic prosthesis was true and not unexpected result (Hsu and Michael, 2008).

Karimi (2010) suggests that the low acceptance rate among amputees of upper limb prosthesis, the prosthesis should be to enhance the beauty and increase the efficiency of the effort.

Consent from the weight of prosthesis the items were only assessed, Myoelectric prosthetic weight in fact, only about 300 to 400 grams heavier than mechanical prostheses that is corroborated these findings (Hsu and Michael, 2008). One of the most important causes of inability motor in the prosthesis is weight and high levels of expression (Karimi, 2010).

The question of the consent of the prosthesis with respect to the Mayo prosthesis fitting more and more accurate electrical needs, the need for performance (an open hand), but while the mechanical prosthesis does not require precise

fitting bandages to help hold the implant body And individual performance, mental focus and does not require much physical activity is needed most, so the prosthetic mechanical performance, satisfaction is higher, but the results Showed no significant differences (Hsu and Michael, 2008).

The results of this research study, Karimi (2010), which examines the performance of upper limb prostheses in various activities in the upper limbs of amputees are in agreement, this difference was not significant in explaining Karimi (2010) says Most people are used to anchor dentures were just provides recommendations to use new techniques Materials and components to enhance prosthesis more suitable for this type of deposit is required.

In our study, no significant difference between the mean duration of mechanical prosthesis and Myoelectric prosthetic was found. The implant duration of Myoelectric group was significantly higher.

Study, Fox and Murray (2002) with the consent of the prosthesis in individuals with lower limb amputation TAPES questionnaire leg amputations were performed on 46 patients, results indicated a positive correlation between satisfaction with the term artificial time prosthesis was used (Fox and Murray 2002).

In general, the comparison between the two groups, the mean quality of life in Myoelectric is higher than mechanical.

The results showed that both scores obtained from the questionnaires, Myoelectric group averages were higher than the mechanical group, This means that the quality of life of amputees using prosthetic Myoelectric were higher than those using a mechanical prosthesis. Similar to our results Millestin (1986) and colleagues studied 314 individuals with upper extremity amputation Myoelectric than mechanical prostheses showed a higher acceptance rate (Millstein SG and et al 1986).

The results perfection and Justice (2010) indicated that the quality of life for people with unilateral above knee amputee using the intelligent knee joint is mechanically simpler than (Kamali and adli 2010).

R sorby (1980) 40 patients with amputation below the elbow of the prosthesis Myoelectric used for a period of 1 to 3 years were tested, the results of this study showed that although the two men after a follow-up decision to use mechanical prostheses were but 60 to 90 percent acceptance rate Myoelectric prosthesis was reported (sorby 1980).

Kruger and Fishman (1993) 120 cases of amputation below the elbow for three years studied, the results of this study showed that 44 percent of those prosthetic Myoelectric as the best option they chose While 34 percent of people

choose to get me 22% of the mechanical prosthetic dentures abandoned, In addition to receiving the results was that 68 percent of people who actively used their prosthesis And 32 percent of those who took it as a fulcrum to be consistent with our results (Kruger and Fishman 1993).

In research Chaw and Biddes (2007) found that technology in order to enhance their satisfaction in using the prosthetic implant can affect (Chaw and Biddes 2007).

Table 1. The table of variables

MYOELECTRIC				MECHANICAL				
Standard deviation	Average	PERCENT	NUMBER	Standard deviation	Average	PERCENT	NUMBER	YEAR
7/414	45/42	15	3	9/593	45/89	15	3	Below 35
		20	4			25	5	36-44
		65	13			60	12	Above 45
6/393	23/26	15/8	3	6/889	18/75	25	5	Below 15
		47/4	10			65	13	15-25
		36/8	7			10	2	Above25
6/504	21/75	20	4	6/778	17/05	40	8	Below 15
		55	11			60	12	15-25
		25	5			-	-	Above 25
6/353	9/6	15	3	7/087	9/7	25	5	Below5
		60	12			40	8	5-10
		25	5			35	7	Above 10

Table 2. Descriptive and analytical statistics parameters of mechanical and myoelectric prosthetics group.

T	P value	MYOELECTRIC		MECHANIC		Variable
		S.D	AVERAGE	S.D	AVERAGE	
-2/323	0/025	3/447	15/25	4/020	12/5	Satisfaction of Beauty
1/981	0/055	1/281	2/8	1/273	3/6	Satisfaction with weight
0/738	0/465	5/316	17/05	5/401	18/3	Satisfaction with performance
2/075	0/045	2/292	19/1	2/28	20/60	Overall compliance

#### 4. Conclusions:

In this study the satisfaction of weight and beauty and overall performance of two groups which used mechanical and Myoelectric prosthesis was compared. The results of TAPES questionnaire and statistically analysis show that:

- quality of life of amputees using prosthetic Myoelectric were higher than those using a mechanical prosthesis
- Due to the lack of bandages, more similar to a natural and normal hand function Myoelectric prosthesis satisfaction in men below amputation higher than mechanical prosthesis is used.
- no significant difference between the mean duration of the mechanical prostheses and the Myoelectric prosthesis was observed

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#### Corresponding Author:

Dr. M. Sattari Naeini  
Naein Branch, Islamic Azad University, Naein,  
Iran  
E-mail: [Sattari@gmail.com](mailto:Sattari@gmail.com)

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