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Prosthesis Use in Current Status of Wenchuan Earthquake with Qualitative Method

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ABSTRACT

Objective: The aim of this study was to investigate the disaster recovery and the current status of prosthesis use after Wenchuan earthquake.
Research methods: Qualitative method was conducted, and 22 out-patients who received check-up regularly were invited into face-to-face semi-structured interviews.
Results: Three themes are summarized: prosthesis has become part of the body and play an important role in daily life and work, various reasons affect the experience of prosthesis, community rehabilitation resources are limited for long-term maintenance.
Conclusion: These findings highlighted that prothesis not only help them be more independently, but also reintegrate society and family, and lead a normal life. But now the biggest needs and weakness are community rehabilitation resources. Families involve in the rehabilitation and society increase tolerance can help amputations return to society better, live and work more independently.

Key words: Wenchuan earthquake, prosthesis, qualitative method

INTRODUCTION

According to the International Center for Research on the Epidemiology of Disasters (CRED) database, earthquakes are usually more deadly than other natural disasters [1], causing 45% of the deaths [2], and the survivors suffered from amputations. Wenchuan earthquake in 2008 caused a large number of casualties, it was reported that about 7000 people [3] needed prosthesis assembly, most of whom are lower limb amputations [4]. The government and Non-Governmental organizations provided artificial limbs for free after the disaster, which is the important to improve the mobility of lower limb amputees [5]. Therefore, prosthesis fitting and disaster recovery are the most urgent and continuous needs for amputees to improve the quality of life and the ability of independence.

At present, most of the domestic and foreign literature focus on prosthesis making and rehabilitation training[6] , the use of artificial limbs, especially the experience after backing to the community were rarely [7-8] . This study uses qualitative method to explore the status of prosthesis use and problems encountered after Wenchuan earthquake. Hoping to provide more disaster recovery bases and references for people who are in need.

MATERIALS & METHODS

Qualitative research method was conducted during December 2018 to February 2019. And 22 out-patients who received check-up

regularly were invited to semi-structured interviews.

All the subjects volunteered to participate in this research, and signed the informed consent form approved by the Hong Kong Polytechnic University Ethics Committee (NO:HSEARS20180812002).

Inclusion criteria:(1) Age≥18 years old; (2) lower limb amputation from Wenchuan earthquake, and Use prosthesis.

Exclusion criteria: (1) With serious organic disease or chronic disease; (2) Inability to communicate. When the data reaches saturation (no new topics are found) are terminated.

The interview was under the guideline, which was set up based on the research purposes[9]. We started with an open question: such as "How is your life or job recently". According to each participant's feedback to deep into the topic gradually. All interviews were recorded with consent and lasted 28-71 minutes, with an average of 44 minutes, and were conducted at convenient, comfortable, safe and quiet room.

Statistical Analysis

Qualitative content analysis was used to analyze the data. Data analysis and collection were carried out at the same time. The researchers transcribed the recordings word-by-word within 48 hours and checked by another person to ensure accuracy of the transcript. At first, reading the recordings line by line, and at the same time reduced the meaning units; after that keep the core, curtailed the meaning units (this is the condensed meaning units), coded [10](the meaning units are labeled) and classified (the data sharing the same meaning). Then, the potential categories were linked and themes were extracted [11]. The total length of the recordings were 7,641 minutes. Categories and themes were formed when researchers came to reach consensus through team discussion , also when there were differences or uncertain opinions. Each researcher wrote a reflective journal according to the data.

Table 1 information of participants(n=22)

	No of participants	Percentage (%)
Gender		
Male	7	32%
Female	15	68%
Age		
18-30	10	45%
≥31	12	55%
Marital Status		
Married	9	41%
Spinsterhood	10	45%
Widowed	3	14%
Prosthesis type		
Unilateral prosthesis	17	77%
Bilateral prosthesis	5	23%

RESULTS

There were three core themes summarized, which focused on the use status and affecting factors of the prosthesis use(see table 2).

Of the 22 participants; There are 9 interviewees under the age of 18 and 13 aged 18 or older at the time of the 2008 earthquake; 11 unmarried, 8 married, 3 widowed. Other information is shown in table 1.

Table 2 The process of theme induction

Participants No	Meaning statements	Condensed meaning units	Codes	Categories	Themes
A4、A6、A8、A11、A13、A17、A19、A20、A22	Bring convenience Daily use is relatively long and ability fuction is no diffierent with before.	Improving quanlity of life ,making life back before amputation	Prosthetic,quanlity of life ,daily life,convenience,	Application status and satisfaction of artificial limbs	Prosthesis has become a part of the body,and play an important role in daily life and work
A2、A3、A4、A5、A6、A7、A8、A9、A11、A14、A15、A16、A17、A20、A21、	Some people have phantom limb pain all the time, and some occasionally, with varying levels, characteristics, and duration . Stump limb pain is always present and related to the pressure caused by friction of prosthesis,the only way is to stick to it. The effects of climate change are always there,winter aggravate stump pain , frostbite, stuffiness, sweating in summer. The quality of the prosthesis affect the comfort of the prosthesis	Pain affects the prosthetic experience Climate change impact on stump and prosthetic are continues The quality impacts prosthesis use .	Pain Frostbite, sweat, stuffiness, Quality, skills	Accompanying symptoms, endless troubles Quality of prosthesis impacts function	Various reasons affect the experience of prosthesis
A3、A2、A8、A9、A14、A15、A16	There are no rehabilitation resources for prosthetic limbs in the community, have to go to big hospitals when there is a problem with prosthetic. Worried that would not be able to afford long-term maintenance without support of “Stand Up ”	Bing lack of community prosthetic maintenance resources ,adn long-term maintenance costs are expensive, and it cannot be afford without support	Prosthetic, community prosthetic maintenance resources, long-term maintenance	Lacking of rehabilitation resources, long-term maintenance is difficult	Community rehabilitation resources are limited for long-term maintenance.

Prosthesis has become a part of the body, and play an important role in daily life and work

All interviewees shared the role of artificial limbs in life. They had painful experiences in the adaptation stage, such as the skin damage, stump pain and discomfort, which made people sleepless at night. After a long-term exercise and adaptation, they have worked well with prosthesis in life, just as A4 said: “Now I feel very good after has worn prosthesis, there is no difference from before” ,A8 also said“ It was inconvenient to do things without artificial limbs, A4 and A20 indicated that they used prosthesis at least 14 hours per day, and has exceeded the needs of daily life ”. A3 stated that:“ after using artificial limb, feel more convenient, because the hands were freed , and self-care ability was developed”. And all interviewees said that prosthesis didn’t only be a part of body ,but also play an irreplaceable role in the improvement of self-care ability.

Various reasons affect the experience of prosthesis

Accompanying symptoms, endless troubles

Each participant shared the distress of accompanying symptoms, the most common is phantom pain and residual limb pain [12] .A3 mentioned that phantom pain is like a kind of heartbreak . It cannot be cured, no rules, the degree and properties also were different, such as A15 described: “Phantom pain especially severe, feel like electric shock ”; A3 mentioned that :“It can happen at any time ,but most frequency was in the night, it last up to 48 hours, feel like nail being drilled in and out”; A3 and A2 learned mirror therapy under the guidance of therapists, but A2 mentioned that “Mirror therapy did not work. He used boiling water with salt, tea water, herbal medicine to hot compress and massage stump, which could relieve the pain slightly” A20:“Aft er putting on the prosthesis, stomp the feet” ; A3:“ Listening music to distract attention, at the same time to strengthen exercise”. Only use medication if still feel pain, but A3 afraid of the side effects: “Pouring out the medication and just take the capsule to give myself psychological comfort” .

Stump pain is mainly caused by friction of prosthesis. A10 said that : "Standing too long can cause stump pain" .A20:" Because of the pressure generated by the stump and prosthesis contacted , especially in winter, cannot be stand for" .There were 13 participants described the difficulties of residue skin , the most common was abrasion, pain ,hemorrhage of the skin ,sometimes even got infection. A3:" The stump is often rubbed bloody by the prosthesis"A15 also said: "Too pain to walk after the skin has ruptured". A22 said: "As long as you walk with prosthesis, you have stump pain, but you just can tolerate it now", because "The only way to adapt to artificial limb was to keep walking, until you get calluses, even if the skin is broken" said A22.

The interviewees tried a variety of methods to relieves the pain. A8, A10, A22 and A23 mentioned professional rehabilitation instruction, such as massaging the stump, meanwhile, some of them shared their personal experiences ,A2:"Placing a pad between the prosthesis and the stump ,which can relieve the pressure".A20: "Massaging the residual with body lotion after bathing to avoid further scarring ".

Four participants shared the problems of residual muscle atrophy,A8 said: " The socket became too big to fit the stump, because of the muscle atrophy", so they need to change the socket according to the condition of residual limb. But couldn't solve the problem fun, the one way was to strengthen stump exercise, which can effectively relieve the muscle atrophy and better maintain the stump function.

Quality of prosthesis impacts function

Many interviewees said that the quality of artificial limbs has a great impact on function . A3 ,A4,A5,A7,A8,A15,A20 also shared troubles they encountered ,like heavy prosthesis, restricted bending and tight joints. A8 : "The previous socket could not be fixed to the stump, just use a rope tied around the prosthesis, or glued to the waist. It was not fixed sufficiently stable to wear, and difficult to walk, and skin was also worn out."

So they had to change a better quality one, which can develop their mobility, also promote their quality of life and self-care ability. But some wounded didn't found prosthetic support , and it was not affordable for them to replace a new one , so some of them used walking aids ,like walking stick, or reduced the use time .But at the same time ,it means that the frequency of prosthetic use and its function would be lower.

Community rehabilitation resources are limited, what can we do to long-term maintenance

There are psychological, physiological and social problems in the amputees after Wenchuan earthquake. Only comprehensive rehabilitation can help them to get overall recovery [13]. But the lack of community rehabilitation resources was the most serious problems. A7:"We don't know what is or how to carry out prosthetic maintenance ".But most of the wounded shared that :" The problems related to prosthesis cannot be solved in community". Participants in this study get free prosthesis and maintenance from "Stand Up" now, it is a Non-governmental organization.

DISCUSSION

All participants shared that the most common symptoms were residual limb pain and phantom pain, which have negative impacts to quality of life [14-16], it was accordance with the researches of Zhang Wei ,QinBo, Xinyue Huang [17]. In this study, most interviewees were also sharing the experience of phantom pain and residual limb pain, the characteristics as electric shock, tearing. Chronic pain would seriously affect daily life, work ability and interpersonal communication of amputees [18]. In order to keep stump function and good gait , doing continuous rehabilitation exercises with stump training, wearing prosthesis training and walking training after installation of prosthesis [14] ,and carry

out rehabilitation assessment regularly were very necessary .Therefore, those who with chronic pain after amputation should be treated comprehensively with the physiological - psychological - social medical model, in order to achieve comprehensive recovery and return to society as soon as possible [18] .

The state provided policy support for the disabled, and also issued favorable employment policies. But all the amputees said that the government and public welfare organizations provided great help for amputees to install prosthesis after the earthquake in that 2-3 years , and there were policies for the injured in the later period, but the community rehabilitation resources still lack [19], this study showed the consistent result with those research. Facing with such a situation, some of the amputees had to seek help to get free prosthesis and related maintenance costs from another project, but there were also amputees who did not find welfare projects ,so couldn't afford the rehabilitation and prosthetic maintenance costs by themselves.

According to the conditions in Chinese communities, some researchers have proposed general practitioners to be the leader role , specialized rehabilitation physicians as a secondary (periodically monitor) way of Collaboration(hygiene department, civil affair ,community and family) for the popularity of rehabilitation knowledge, to promote appropriate technology, which was conform to most urban communities in China. On the one hand, the shortage of human resources in community rehabilitation can be reduced, on the other hand, the popularization of post-disaster rehabilitation knowledge can be promoted, that can temporary relief current demand [20].

Prosthesis mainly compensates for the function of amputated limbs, helping the wounded realize self-care and engage in appropriate work [21]. But lower limb prosthesis was more likely to experience difficulties and obstacles in the physical environment [22], it was also consistent with this study. The results showed that amputees faced more restrictions in finding work, even used prosthesis. So some interviewees choose to indoor jobs with less activity and closer to home. A number of interviewees also lamented that work brings more than income, the contact with colleagues and encouragement make them more willing to participate in social activities, and they also can find their value from work .Studies have proved that rehabilitation and treatment after greatly hurts can only restore physical function, but psychological rehabilitation is the auxiliary factor for amputees to return to society and improve their independent life [23-25].In the interview, all the interviewees shared different psychological troubles they had experienced, they were able to stand up again through the care and support from society and families. However, some of the injured reported that the unintentional actions of family members had inflicted far more harms on them than others. Some said it was disgust at heart to be asked things related to earthquake repeatedly. Also some help couldn't really solve their problems because didn't fit with their needs. Totally ,disaster psychological rehabilitation require the participation of family, concern from society, especially, we should pay attention to avoid secondary damage.

All in all, prosthesis not only replaced missing limbs, but also gave the wounded confidence and courage to live independently. Disaster rehabilitation is a long-term process, and need to take highly focus on psychological rehabilitation and family participation, so the community can improve self-care ability through strengthening the training of amputees and their families to alleviate the lack of rehabilitation resources in community and create the conditions of independent life for the wounded.

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