



OPEN The 16-year psychological journey of amputee survivors of the Wenchuan earthquake: a qualitative study

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To describe the real psychological experiences of amputee survivors 16 years after the Wenchuan earthquake and explore their psychological journey over this period. This study is a qualitative research, using purposive sampling to select individuals who suffered upper and/or lower limb amputations due to the 2008 Wenchuan earthquake. One-on-one semi-structured in-depth interviews were conducted, and thematic analysis was applied to analyze the interview data and extract themes. A total of 25 participants were included in the study. The 16-year psychological journey of the amputee survivors was divided into four stages, each with its respective themes: (1) Trauma and Conflict Period (1–2 years post-amputation): Themes include feelings of despair and life being worse than death, and the initial experience with prosthetics. (2) Psychological Rehabilitation Period (3–7 years post-amputation): Themes include becoming inseparable from prosthetics, and the rekindling of confidence and hope. (3) Psychological Integration and Self-Reshaping Period (8–10 years post-amputation): Themes include facing with composure, self-transformation. (4) Development Period (11–16 years post-amputation): Themes include enriching the self, accepting reality, facing the future. Society should pay attention to the psychological experiences of amputee survivors after earthquakes and develop targeted psychological intervention programs. The importance of family support, peer support, and other social resources should be emphasized. Promoting positive and proactive emotions and reducing the severity of post-traumatic stress reactions are crucial for improving the survivors' quality of life.

Keywords Wenchuan earthquake, Amputation, Psychological journey, Psychology

At 2:28:04 PM on May 12, 2008, a devastating earthquake struck Wenchuan County, Sichuan Province, China. The Wenchuan earthquake was the deadliest earthquake to occur after the 1976 Tangshan earthquake (the most fatal earthquake in 20th-century world history), and remains the most destructive earthquake in China since the founding of the People's Republic of China¹. The surface-wave magnitude was 8.0 Ms, the moment magnitude was 8.3 Mw, and the seismic intensity reached level 11. The affected area exceeded 100,000 square kilometers, leaving 18,000 people missing and 37,000 injured, including over 10,000 with serious injuries. The total economic loss was 845.1 billion yuan^{2,3}. According to a report published by the Ministry of Civil Affairs of China in 2008, the earthquake resulted in 69,227 deaths, 374,643 injuries, and 17,923 people reported as missing. Approximately 4.8 million people were displaced, and the official figures estimated that 7,000 people became disabled^{4,5}. According to reports, 0.9% of the surviving injured individuals after the Wenchuan earthquake underwent amputation⁶.

Earthquake-related amputations are sudden, traumatic events that represent a profoundly disruptive and life-altering experience for individuals. Unlike amputations resulting from chronic illness or long-term injury, these amputations often occur without warning. As a destructive surgical procedure, amputation often causes severe and long-lasting physical and emotional distress for amputees. It impairs physical function, sensation, and body image, leading to intense and diverse emotional reactions as well as complex psychological experiences^{7,8}; it also

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helps explain why amputees often experience a range of negative emotions following amputation⁹. Mckechnie and Cotigă^{10,11} found that amputees exhibit significantly higher levels of anxiety and depression compared to the general population. Desmond¹² consider that amputations cause considerable changes in everyday life of the patient, and especially in psychosocial relationships. Physical disability can lead to despair, depression, nervousness, anxiety, loss of self-esteem, stigma, isolation, and the recognition of weakness¹³. Horgan¹⁴ found that symptoms of anxiety and depression are common within the first two years following amputation, and that depression and anxiety may resurface or intensify during the post-discharge period as individuals adjust to daily life¹⁵. In fact, even ten years after the earthquake, negative psychological effects among survivors persist¹⁶, and psychological recovery may require at least ten years, or even up to twenty years^{14,17}. This was particularly true for earthquake survivors who underwent amputations. Psychological recovery is defined as the process through which individuals gradually overcome emotional trauma and functional impairments following catastrophic physical injury, and rebuild their sense of identity and capacity for life adaptation. The state of psychological recovery is significantly influenced by individual recovery characteristics, social support, healthcare access, economic conditions, and societal attitudes toward people with disabilities¹⁸.

The psychological and social impact of amputation on individuals was undeniable. Compared to non-amputee individuals, those who lose basic physical functions in the aftermath of amputation often feel that their life goals were threatened. They may experience complex and intense emotions such as anxiety, fear of death, sadness, anger, helplessness, despair, regret, and guilt¹⁹. Furthermore, for an extended period after the amputation, they may continue to suffer from phantom limb pain, residual limb pain, functional impairments, muscle atrophy, mobility restrictions, and difficulties in adapting to prosthetics^{20,21}. These survivors may also struggle to adapt to their new self-image and environment, undergoing multiple physical and psychological changes²², including alterations in their body image, functional capabilities, psychological comfort, and relationships. This complex transformation, accompanied by damage to body perception and self-esteem, can lead to a deterioration in the individual's mental health^{19,23}. Given the influence of multiple factors, the deterioration of mental health may occur over a span ranging from several days to several years, or even decades^{14,18}.

Although numerous studies have been conducted on amputation^{8,13,19,45,48,55,56}, including some addressing its long-term effects^{15,20}, research specifically focusing on earthquake-induced amputation remains limited. Previous research on earthquake-related trauma had predominantly focused on the prevalence of PTSD and its risk factors^{24–26}. There had been limited research on the long-term consequences of earthquakes, particularly concerning the long-term psychological journey of earthquake amputees²⁷. As a powerful stressor, the earthquake has a profoundly destructive impact on survivors. For amputee survivors, the experience was both fortunate and unfortunate: they were fortunate in that they survived and still have the chance to live, but they were also unfortunate because they not only face the psychological toll of PTSD^{1,28} from the earthquake but also the additional psychological burden of amputation. They must rebuild their lives, which undoubtedly instills fear. This study aims to conduct interviews with amputee survivors of the Wenchuan earthquake 16 years after the disaster, to explore their psychological journey over this period and to provide a reference for future intervention-based research.

Research methods

Qualitative approach and research paradigm

This study employed a hermeneutic phenomenology methodology²⁹, aiming to collect the life experiences and psychological changes of Wenchuan earthquake amputees over the past 16 years through in-depth interviews, reconstructing their psychological journey and understanding the construction of life meaning in the face of disaster and amputation. The research was grounded in a constructivist paradigm³⁰, emphasizing the subjective experiences and personal stories of participants within a specific socio-cultural context, while acknowledging the influence of the interaction between the researcher and participants in the data generation process.

Researcher characteristics and reflexivity

In this study, the researcher was an integral part of the research tool. The researcher was not only the collector and analyzer of data but also a participant in the construction of the psychological journey. The researcher's subjective experiences, beliefs, values, and interactions with the research subjects all influenced the research process and outcomes. Therefore, the researcher needed to possess a high degree of sensitivity, openness, and critical thinking, with the ability to deeply understand the essence of the phenomenon. The research team members had advanced degrees in medicine and nursing, with systematic theoretical training and practical experience in qualitative research methods, as well as strong interviewing skills and data analysis abilities. Additionally, the team had years of clinical nursing and psychological support experience, enabling them to keenly capture both verbal and non-verbal information from the participants, carefully observe their emotions and reactions, and effectively ensure the richness and depth of the research data. They were also capable of recognizing and clarifying their own positions, biases, and preconceptions to avoid interference with data analysis and interpretation, thereby enhancing the explanatory power and credibility of the research findings.

Context

Most of the interviews in this study were conducted in the participants' homes, with a small number held in rehabilitation medical institutions and community service centers. The choice of interview locations was made flexibly based on the participants' physical condition and psychological comfort, with the aim of creating a familiar, quiet, private environment conducive to emotional expression.

Participants

The study selected individuals who suffered upper and/or lower limb amputations due to the 2008 Wenchuan earthquake as the research subjects.

Inclusion criteria: (1) Participants who experienced the 2008 Wenchuan earthquake; (2) Participants who underwent upper and/or lower limb amputations due to the earthquake; (3) Participants who voluntarily agreed to participate in the interview.

Exclusion criteria: (1) Participants with communication and/or cognitive impairments; (2) Participants with severe psychological disorders; (3) Participants whose physical condition did not allow for participation in the study.

Sampling strategy

This study used purposive sampling³¹, following the principle of maximizing variation within purposive sampling. Participants were selected based on the research objectives and inclusion/exclusion criteria, with the aim of identifying patients who could provide the most comprehensive information. During the data collection process, the research team continuously assessed the saturation of information, and recruitment ceased when subsequent interviews no longer introduced new important themes or when the narrative structures began to repeat³². Ultimately, 25 participants were included, representing diverse genders, ages, residential locations, and social support backgrounds, in order to enhance the diversity and depth of the research findings.

Ethical considerations

This study follows the Declaration of Helsinki, and was approved by the Ethics Committee (Ethics Approval No. HSEARS20180810003). All participants voluntarily took part in the study and signed informed consent forms.

Data collection methods

Data were collected using one-on-one semi-structured interviews³³. To protect the privacy of the participants and ensure they felt comfortable, the interviews were conducted in quiet, private rooms. Before the formal interview, participants were thoroughly informed about the purpose and content of the study, and written informed consent was obtained. Interviews were audio-recorded with the participant's consent. The researcher was well-acquainted with the interview guide and adjusted the order and content of the questions based on the participant's responses while ensuring the interview remained focused on the theme. Non-verbal expressions of the participants were also closely observed and recorded, with follow-up questions asked when necessary. Each interview lasted between 30 and 40 min. Within 24 h of each interview, the audio recordings were transcribed verbatim, and the transcripts were verified by two researchers for accuracy.

Date collection instruments and technologies

The data collection tools employed in this study included an interview outline, a voice recorder, a mobile phone recording app, a notebook, and pens.

The interviews were conducted in two stages: the first stage was conducted in the 10th year after the earthquake (initial interview), and the second stage was conducted in the 16th year after the earthquake (follow-up interview).

Based on the research objectives, the interview outline was developed through a literature review and consultation with experts. The outline was revised and refined based on the results of three pre-interviews, leading to the final version of the interview guide. The questions for the first stage of interview outline were as follows:

What was your life like before the amputation?

- (1) What was your experience during the earthquake?
- (2) What was the process of your rescue and subsequent transportation after the earthquake?
- (3) What were your experiences during hospitalization and transfers after the earthquake?
- (4) What was your experience like after moving into your new home? How did your life change? (Changes in physical, psychological, and social aspects; experiences with prosthetics: what you can/cannot do, how you overcame difficulties; support from family, friends, and community).

The follow-up interview outline for the second stage were as follows:

- (1) How have you been in recent years? Has your mood or emotional state changed due to the pandemic?
- (2) Are you still using your prosthetics? Do you still experience pain in the amputated limbs?

Each interview was conducted with on-site recording after obtaining written consent from the participants. The primary device used for recording was a professional voice recorder, with a mobile phone recording app as a backup to prevent data loss. During the interviews, the researcher simultaneously took field notes, including key phrases, vocabulary, as well as non-verbal information such as facial expressions, gestures, tone of voice, emotional reactions, and environmental changes, to assist in subsequent analysis.

Date processing and analysis

Thematic analysis³⁴ was employed to analyze the data, with the following specific steps:

- (1) The interview data were read repeatedly to grasp the overall meaning of each participant's narrative at a macro level, thus providing a comprehensive understanding of the data and laying the foundation for subsequent coding.

- (2) The audio recordings were transcribed verbatim, adhering to the principle of “context preservation”³⁵ to faithfully present the participants’ original meaning, including emotional vocabulary, pauses, tone changes, and other elements, ensuring an accurate representation of the actual conversation. After transcription, two researchers independently conducted at least two rounds of cross-checking to ensure linguistic accuracy and contextual completeness.
- (3) NVivo software was used to conduct open coding on the transcribed texts. Sentences or paragraphs relevant to the research questions were identified and primary codes reflecting the psychological, emotional, cognitive, and social adaptation aspects of amputee survivors were extracted. During this process, the research team employed a comparative analysis strategy, continually inducting, integrating, and revising the coding content to ensure logical consistency in the coding system and thematic saturation³².
- (4) Based on the coding, related or thematically connected codes were grouped into preliminary categories, which were then abstracted to form overarching themes and sub-themes to represent the common experiences and core meanings in the psychological journeys of amputee survivors 16 years after the earthquake.
- (5) The coding process primarily involved manual analysis, emphasizing the researcher’s subjective interpretation and theoretical sensitivity. While NVivo was used to assist in managing the data, the researchers continuously reflected on the entire study, critically examining their preconceptions, emotional responses, values, biases, and assumptions to avoid interference with data understanding and interpretation³⁵.

To ensure transparency and credibility in the analysis process, an audit trail was established, including raw recordings, verbatim transcripts, coding notes, and the theme refinement process. All steps were independently carried out and cross-checked by two researchers, with any disagreements resolved through consultation with a third researcher until consensus was reached. Additionally, some preliminary analysis results were returned to the participants for member checking to enhance the authenticity of data interpretation and participant endorsement.

Results

In this study, interviews were conducted with 25 survivors of the Wenchuan earthquake who had undergone amputation, comprising 15 males (60%) and 10 females (40%). The mean age of participants was $M = 54.32$ years ($SD = 14.00$), with a range from 29 to 87 years. The majority of participants (88%) suffered amputation of the lower extremity. Specifically, most participants reported unilateral above-knee amputations (36%) or unilateral below-knee amputations (24%), and a portion of participants had bilateral above-knee amputations (16%); only a minority reported foot amputation (8%). Almost all participants reported experiencing phantom limb pain, residual limb pain, or both. Among them, participants who experienced both phantom limb pain and residual limb pain (44%), those who experienced only phantom limb pain (36%), and those who experienced only residual limb pain (20%). The general characteristics of the participants are detailed in Table 1.

Based on the participants’ subjective experiences, self-reports, and our observations, the 16-year psychological journey of the survivors was divided into four stages. The themes for each stage were as follows: (1) Trauma and Conflict Period (1–2 years post-amputation): The main themes were feelings of despair, life being worse than death, and the initial experience with prosthetics. (2) Psychological Rehabilitation Period (3–7 years post-amputation): The main themes were becoming inseparable from prosthetics, and the rekindling of confidence and hope. (3) Psychological Integration and Self-Reshaping Period (8–10 years post-amputation): The main themes were facing with composure, self-transformation. (4) Development Period (11–16 years post-amputation): The main theme was enriching the self, accepting reality, facing the future. The 16-year psychological journey and word cloud of Wenchuan earthquake amputees are presented in Figs. 1 and 2.

Trauma and conflict period (years 1–2)

The “Trauma and Conflict Period” refers to the stage within the first 1–2 years following the traumatic event, during which amputee survivors experience a peak in emotional trauma intertwined with internal psychological conflict. During this phase, individuals face complex psychological processes, such as physiological injury, self-denial, and a struggle with the will to survive. It is characterized by extreme feelings of depression, hopelessness, and rejection of the new physical condition, representing a critical starting point in the entire psychological adaptation process.

Despair and life worse than death

In this study, all 25 participants experienced varying degrees of amputation. Due to poor residual limb prognosis, many were unable to receive timely prosthetic fittings or faced difficulties adjusting to their initial prosthetics. This resulted in an inability to perform daily activities independently, leading to fears of becoming a burden to their families. Additionally, the participants could not return to their previous jobs, raising concerns about future economic stability and their declining status within both family and society. This led to changes in their roles and identity, contributing to a sense of silence and immersion in sadness, with a significant decline in self-esteem. As a result, the first 1–2 years post-amputation were marked by feelings of profound despair and depression, a shared experience among the survivors.

The specific manifestations of these feelings included survivors isolating themselves in their rooms, distancing themselves from family and friends, and avoiding social interaction. They frequently devalued their abilities, adopting a critical, negative, and self-denigrating attitude toward their present and future. Many described themselves as worthless, believing that their futures were bleak. One participant described their experience after the amputation:

“After being discharged and returning home, the first thing I saw was the desolation, broken walls, the roof leaking everywhere. There was nothing left.” (B1).

Serial number	Gender	Age	Marital status	Educational level	Pre-earthquake profession	Current profession	Source of income	Amputation site	Complications
B1	Female	64	Married	High school	Principal	Social worker, People's Congress representative, founder of an art studio	Pension, teaching, injury benefits, handicrafts	Both thighs	Phantom limb pain & Residual limb pain
B2	Male	46	Married	Middle school	Farmer	None	None	Left lower leg	Phantom limb pain & Residual limb pain
B3	Female	43	Married	Elementary school	Worker	None	Low-income subsidy	Right palm	Phantom limb pain
B4	Male	58	Divorced	Middle school	Worker	Social worker, founder of an art	Handicrafts	Right thigh	Phantom limb pain
B5	Female	62	Married	Elementary school	Checkpoint work	Checkpoint work	Checkpoint work	Both soles of the feet	Residual limb pain
B6	Female	29	Married	Undergraduate	Student	Online shop owner	Online shop	Left thigh	Phantom limb pain
B7	Female	54	Married	Middle school	Worker	Social worker, owner of the grocery shop	Grocery shop	Right thigh	Phantom limb pain
B8	Female	53	Widowed	Illiterate	Farmer	Sanitation worker	Sanitation worker	Right sole	Residual limb pain
B9	Male	46	Married	Middle school	Worker	Social worker, handmade beading founder	Handicrafts	Left thigh	Phantom limb pain & Residual limb pain
B10	Male	55	Married	Middle school	Convenience store owner	Teahouse owner	Teahouse	Right lower leg	Phantom limb pain & Residual limb pain
B11	Female	47	Married	Middle school	Worker	None	None	Right thigh	Phantom limb pain & Residual limb pain
B12	Male	56	Married	Elementary school	Farmer	Farmer	Farming	Left thigh	Phantom limb pain & Residual limb pain
B13	Male	62	Married	Illiterate	Farmer	None	None	Right lower leg	Phantom limb pain
B14	Female	76	Married	Illiterate	Worker	None	None	Right lower leg	Residual limb pain
B15	Female	36	Married	Undergraduate	Management work	Management work	Management work	Right upper limb	Phantom limb pain
B16	Female	44	Married	High school	Worker	None	None	Both thighs	Phantom limb pain & Residual limb pain
B17	Female	65	Married	Elementary school	Farmer	None	None	Right thigh	Phantom limb pain & Residual limb pain
B18	Male	53	Married	Middle school	Farmer	Social worker, art studio staff	Handicrafts	Left lower leg	Phantom limb pain & Residual limb pain
B19	Female	60	Married	Elementary school	Farmer	None	None	Left thigh	Phantom limb pain
B20	Male	47	Married	Elementary school	Worker	None	None	Left thigh	Phantom limb pain & Residual limb pain
B21	Male	57	Married	Elementary school	Worker	None	None	Both thighs	Residual limb pain
B22	Female	31	Married	Elementary school	Worker	Owner of the grocery shop	Grocery shop	Left lower leg	Residual limb pain
B23	Female	46	Married	High school	Farmer	Social worker, checkpoint workers	Checkpoint work	Both thighs	Phantom limb pain & Residual limb pain
B24	Female	81	Married	Elementary school	Retired	Retired	Pension	Right upper limb	Phantom limb pain
B25	Male	87	Widowed	Middle school	Retired	Retired	Pension	Left lower limb	Phantom limb pain

Table 1. General information table of research subjects ($n = 25$).

Another participant shared: “When I first wore the prosthesis, I kept tripping and causing trouble for others. Many times, I couldn’t care for myself. I felt like I could never return to the way things were. Every time I tripped, I felt really down and thought, ‘What’s the point of being alive? I have no goals. I don’t talk much, and I don’t make friends. I was just low and depressed.’” (B2).

Another participant described their emotional state during the first two years after the earthquake: “Even when participating in family livelihood support group activities, my mood was still very low. When listening to the lectures, I just zoned out, feeling completely down. The teacher was talking, and we were just there, barely responding, not saying anything at all.” (B3).

One participant stated: “After the earthquake, I went from being a healthy person to a disabled person overnight. At one point, I thought I was crippled, useless, and could do nothing.” (B7).

It is apparent that during the first two years following amputation, participants were still in a phase of conflict and confusion. Their minds were overwhelmed with thoughts like “The sky has fallen” and “What should I do now?” The destruction of their body image led to a breakdown of their internal sense of self, manifesting as feelings of hopelessness, helplessness, and worthlessness. They became uncertain about their future, even to the point of despair. This led to behaviors such as refusing to eat, non-cooperation with rehabilitation, and, in some cases, participants even considered suicide as a way to escape their emotional turmoil. As some participants described:

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"The years from 2008 to 2010 were the most challenging for me, I really thought I might as well be dead (bitter laugh)." (B2).

"After the earthquake, due to my poor emotional state, I resorted to fasting and refused to eat, thought that it would be better to die. I spent each day sitting in a wheelchair, feeling at my lowest. I was overwhelmed with despair, completely hopeless, and I thought that my life was essentially over. At that time, I experienced profound hopelessness." (B4).

"When faced with such events, there was no escaping or avoiding them; they unfold in your life regardless. You may not want to confront them, but every day, when you open your eyes, you must face them. I joined a suicide group and I wanted to die." (B23).

Initial experience with prosthetics

Participants who underwent amputations reported a significant decline in their social functioning and daily living abilities. They lost their income, became dependent on others for basic care, and added financial and emotional burdens to their families. Many participants described their initial feelings of helplessness and distress, feeling unable to walk or engage socially, and being confined to their homes. As some participants expressed:

"With the high prosthesis, I couldn't move or sit properly. I couldn't take care of myself; I couldn't even pour water. Everything relied on others. When they weren't around, it was difficult to get through the day. Being dependent on others was a painful experience for me." (B1).

"At first, I kept tripping with the prosthesis. I was always causing trouble for others. I couldn't take care of myself most of the time, and I felt like I could never return to the way things were. When I tripped, my mood would drop drastically, and I would think, 'What's the point of still being alive?'" (B2).

"My first time stepping out with crutches, my instructor helped me walk. I was so scared. I'm telling you, with every step, the sweat would run down my face, and I was trembling all over. It was terrifying, I was shaking all over." (B9).

"At first, I didn't even think about walking; I just wanted to lean on the crutches and get by. When I first wore the prosthetic, I didn't dare to take a step. It was only thanks to the volunteers and experienced disabled people who taught me. Their encouragement was really important. Only then did I dare to walk, following them as they led the way." (B12).

"In Chengdu, when I was fitted with the high prosthesis, I wasn't careful while walking, and I ended up tripping on a stone and falling." (B21).

It is evident from the participants' descriptions that the process of adaptation and role transition during this period was long and painful.

"The most frustrating part was transitioning from being a healthy person to wearing a prosthesis. You realize that you can't walk normally, and that was when my mood was at its lowest. I became depressed and overthought everything. I would pull at the bandages around my collarbone every day, which led to a deformed healing of about 4 centimeters. Now my back is permanently hunched, and every day is difficult." (B4).

"Sometimes, I complain to myself, especially when I drop something or trip. Now, missing a leg makes everything inconvenient and hard to get used to. I still feel like my foot is there, and it's upsetting. Also, now that I only have one leg, I stay home a lot and see fewer people. When I meet friends, I can't help but wonder if they are looking at me differently." (B19).

Participants described the initial difficulty in managing daily self-care, which was also the time when they experienced the greatest psychological impact. Our study suggests that the first 1–2 years after the earthquake were the most painful years within the 16-year period. To alleviate their suffering, professional psychological counseling during this period could significantly reduce the occurrence of psychological barriers and the severity of emotional distress. At the same time, the support and companionship of family members, along with meticulous care and encouragement from significant others, helped to enhance their hope for continuing with life.

Family support and companionship

Family support plays a crucial role in both physical and psychological recovery, especially in terms of emotional support, encouragement, and comfort. Individuals who have experienced significant natural disasters often feel isolated, helpless, and useless. Additionally, secondary injuries caused by the earthquake, such as the loss of family members or the trauma of undergoing an amputation surgery can exacerbate these feelings. Survivors may also develop a heightened sensitivity to situations related to their trauma, and certain everyday details can trigger painful memories, even leading to suicidal thoughts. In such moments, the presence and support of family members become particularly important, acting as a buffer and providing comfort. As described by the participants:

"The care from my family was simply meticulous. They take care of everything like making the bed and never let me handle any of it. When I need water before going to sleep, it's always warmed and placed on my nightstand." (B1).

"My father, over 80 years old, still takes care of me every day. He is always worrying about me, cooking chicken and pigeon soup for me, and stays with me until I finish eating. I feel very ashamed and unfilial. I am deeply grateful to my father; he has been a great source of encouragement and mental support for me." (B4).

"My husband and mother were always there with me during my rehabilitation. My mother would sit on a stool while my husband stood behind me. I would stand in the middle, and they would supervise me, gradually increasing the time from one minute to five minutes, and then ten minutes. My husband would massage my feet every day. He kept telling me to be strong for our son, who is still young, and that we must raise him together." (B9).

"I'm really lucky to have such a wonderful wife, hardworking and caring. She gave me a daughter, which makes me so happy. She takes great care of our family, especially my parents." (B22).

Some participants also mentioned the importance of pets as companions: *"After the earthquake, my mood was bad for two or three years. My wife bought me a small dog. It was very perceptive, especially during those two years after the earthquake. When I told it to roll over, it would do so, making me happy. It was a form of companionship."* (B2).

In our traditional culture, family bonds tend to be very close. When a member experiences a traumatic or negative event, the support provided by other family members is critical for psychological and physical recovery. Therefore, in addition to professional psychological treatment, tapping into family support is a vital and effective

method for psychological rehabilitation. However, as with everything, there are exceptions, as some participants described:

“Before the earthquake, I had conflicts with him and even considered divorce, but he refused to leave. In 2009, while living in the temporary shelters in Wudu, my husband spent his days playing cards and drinking, neglecting to take care of me. He even resented my disability. Due to financial disputes, he wanted a divorce, and this compounded the hardship, leaving me feeling deeply depressed, angry, and heartbroken.” (B3).

Support from society

In addition to family support systems, the kindness of various social groups, volunteers, and charitable organizations played a significant role in the recovery journey of the amputees. One participant described the support they received from a community-based mutual assistance group:

“From 2009 to 2010, while living in the temporary shelters, the Family Livelihood Mutual Support Group helped me the most. It helped me become more open and accompanied me in my recovery. We trusted each other, and each day my mood improved. We realized we all had to keep going with our lives.” (B3).

Another participant spoke about the assistance they received from medical professionals and organizations:

“In Deyang, during my rehabilitation, I was quite withdrawn at first. A psychologist helped me with counseling, and experts from the Hong Kong Red Cross came to provide prosthetics and teach us how to walk. Knowing that I had studied in Chongqing, where the terrain is more hilly, they even helped me apply for a better prosthetic.” (B6).

“The rehabilitation specialists from the Hong Kong Red Cross were very encouraging. They told me that through active rehabilitation exercises, it was possible to walk again. Hearing this, I felt deeply encouraged. I worked very hard every day, believing that as long as there was hope, I should continue to try my best.” (B9).

Another participant described the emotional support they received from local authorities:

“At first, I couldn’t come to terms with my situation in Shanghai. But Director Li from the local street office came every day to talk to me and help me change my mindset. He told me to think more positively, that many people had been disabled by the earthquake, not just me. I realized that this was a natural disaster, and many disabled people had lost legs or arms but were still out there living their lives. That helped me accept my situation.” (B21).

As some participants mentioned, mental strength and the motivating words of loved ones or others around them were key factors in their emotional recovery. When they chose to keep going and not give up, their mindset changed positively, and they began attempting to do what they could within their abilities.

“We realized that we all had to keep going. In the shelter area, I participated in the Family Livelihood Mutual Support Group. Everyone had their own tasks and projects, and my project was selling small goods and dry items in the shelter.” (B3).

“After the earthquake, we lost everything we had been selling, so we started a teahouse at home. I became the owner, mainly responsible for collecting money.” (B10).

“I opened a teashop in 2009. I played cards, mahjong, and served tea. I managed the business by myself, and it was doing okay.” (B18).

Psychological rehabilitation period (years 3–7): gradual strengthening of a once-fragile mind and body, rekindling confidence and hope

The “Psychological Rehabilitation Period” refers to the stage following a major traumatic event, during which individuals, after experiencing initial shock and emotional collapse, gradually transition into a period of emotional stabilization, self-acceptance, and the reconstruction of functional daily life. This phase is marked by enhanced adaptability, the return of hope, and the initial development of the capacity to coexist with a new physical condition. It represents a critical transitional stage in the overall process of trauma adaptation.

Survivors in this phase had gone through intense psychological conflict during the initial 1–2 years following the trauma, participants began to enter a more stable phase, adapting to prosthetics through remarkable perseverance and resilience. They gradually accepted new roles and identities, embracing a new life with their altered bodies. All participants agreed that a key turning point, or a new starting point after their reorientation, was crucial to their progress; it marked the beginning of self-acceptance.

Peer support through shared experience

In this phase, alongside family support, interpersonal network support was also crucial. For most participants, interacting with others who had similar physical disabilities provided opportunities to make new friends, relieve stress, and share common experiences with others who had also lost limbs. This peer support naturally emerged, and seeing peers struggle and adapt to life after amputation helped participants to view their own experiences in a more positive light, boosting their confidence and sense of identity. However, those without such experiences could never truly understand their pain. For example, many participants mentioned feeling ridiculed or isolated immediately after their amputations, experiencing helplessness and despair. Some participants described their experiences as follows:

“Normal people don’t understand the pain I endure every day; only those who have experienced amputation can truly understand how painful it is. During activities, we trust and support each other.” (B3).

“Being with these injured people, we just say whatever’s on our minds, without any reservations. It’s like sitting in a group, chatting, sharing what’s in our hearts, it makes us feel better.” (B8).

“Now, these disabled people often get together, and we try to stay optimistic.” (B10).

“We always hang out together, and when we’re with this group, no one minds what we talk about.” (B20).

Thus, it is evident that when survivors with similar experiences come together, they feel more relaxed and in a better mood. They also feel a stronger sense of acceptance, and being accepted by peers is an important aspect of psychological recovery. Therefore, it is important for social workers and therapists to create opportunities that help such trauma-affected groups establish mutual support networks.

Sensitivity and emotional fluctuations

It is understandable that the physical changes caused by disaster-related trauma are difficult to accept in a short period. The loss of a limb can lead to a profound sense of self-disorientation, and rebuilding one's self-identity takes a long time, often marked by intense fluctuations and repetitive phases. This process is prolonged and painful, with occasional negative emotional reactions. The main psychological characteristics during this period include heightened sensitivity and emotional instability.

For instance, sensitivity was one of the most commonly mentioned keywords during our qualitative interviews. Participants expressed a fear of being discussed or judged by others, with even a slight change in others' facial expressions, attitudes, or tone of voice causing significant emotional shifts, manifesting as withdrawal, isolation, or attempts to numb oneself through external substances. These reactions sometimes led to setbacks in the recovery process. During the interviews, we observed one participant who, when describing the details of his amputation at the disaster site, furrowed his brow and repeatedly smoked, indicating his emotional distress.

One participant recalled: *"I remember the most painful experience. At that time, I hadn't started wearing a prosthetic. My wife pushed me to the Wenmiao Square, and a female attendant shouted, 'Hey, come look! Come look! There's someone without a leg!' When I heard that, I felt deeply hurt."* (B25).

Acceptance of reality and recognizing one's luck

The various limitations imposed by amputation forced participants to change their lives. Over time, most of them came to accept their new reality and redefined their sense of self. For example, some participants described:

"My husband said to me, 'Think about it, you're actually very lucky in the grand scheme of things. Compared to those who died, you're fortunate!' I realized that since I survived such a great disaster, I should cherish life now. I support myself and no longer burden my family. That's the best thing I can do." (B2).

"Everyone makes comparisons. I used to feel frustrated and sad every day, always wondering how I could live and how I could get by. But when I saw others, I suddenly realized that my situation was much better than theirs. In fact, I'm still quite lucky." (B4).

"Over time, things slowly got better. Of course, I couldn't change my mindset immediately, but after a while, I began to accept things. I started to do what I could, and my mental state became better than before." (B6).

Some participants shared similar experience:

"You have to stay optimistic, there's no other choice. You can worry all day, or you can be happy all day. My thoughts before and after the earthquake are very different." (B11).

"When you can't figure things out, what else can you do? It's already a fact, so you have to accept it. I forced myself to come to terms with it and gave myself some peace of mind." (B21).

Sense of responsibility as support

When an individual transitions from being able-bodied to living with a disability, their initial focus is often on the value of their own existence rather than on taking on responsibilities. However, as they move into the rehabilitation phase, the sense of responsibility inevitably reemerges. Taking on responsibilities within their capacity becomes an important aspect of psychological recovery, as it reinforces the feeling of being useful and valuable. Two participants described:

"In the second half of 2009, when my health had improved enough for me to walk, I went to school to visit my son. He said to me, 'Mom, I feel so sorry for myself, my life is so bad, my aunt doesn't care for me or buy me insurance.' I felt really angry when I heard that, so I brought him home with me. Even though I'm disabled, I know that life still goes on, and I have to adapt. I thought about how I still have my mother and my young son who need me to take care of them. They are my emotional support." (B3).

"For me, family and my art studio are very important. The people in the studio have accompanied me for ten years, and time has passed quickly. They respect me, and my efforts have been recognized. I feel very happy." (B4).

Actively seeking similar experiences and self-motivation

In today's world, access to information is more convenient, and many participants intentionally seek out stories of other amputees overcoming similar challenges. This active search for external sources of support can be seen as a form of psychological self-empowerment, and it represents an important aspect of the psychological recovery process. One participant shared:

"I saw a video online of a disabled woman who, despite having no hands, still grows vegetables and raises two children. She even cooks by using her feet! I shared that video in our social circle, because her spirit is truly worth learning from." (B19).

In our view, although this period still presents many challenges and emotional fluctuations, it's important not to become complacent when observing positive changes in these individuals. Even though they may show signs of progress, painful memories and everyday life situations can trigger emotional setbacks, causing psychological distress and harm.

Living with the prosthesis

As participants continued to adjust to their prostheses, they began to experience the advantages they provided. Compared to using crutches and wheelchairs, the prosthesis allowed them to free their hands, enabling them to engage in daily activities and realize that they were not entirely dependent on others despite their disability. Some participants described:

"Wearing a short prosthesis was a turning point in my recovery. It allowed me to regain my independence. Once I got the short prosthesis, I was able to take care of myself, and not only did I no longer need help from others, but I could also care for my father. Gradually, I was able to return to a life similar to what I had before. However, when I wore a high prosthesis, I couldn't let go of the crutches, so my hands weren't free." (B1).

"I train every day, starting with ten repetitions, then twenty, and gradually increasing to one hundred or even one thousand. My physical condition has improved, and I can now manage my daily tasks like cooking and grocery shopping on my own." (B5).

"At the Deyang prosthetics factory, Dr. Zeng from Hong Kong suggested that I could use a 'dwarf' prosthesis. I agreed, and I am very grateful to them for making this prosthesis for me, as it allows me to do all sorts of tasks around the house." (B21).

As they became more comfortable and proficient with their prostheses, participants started to view the prosthesis as an inseparable part of their body. In fact, the prosthesis not only facilitated their independence but also helped maintain their image and self-esteem. As some participants described:

"I don't want to leave the house without my prosthesis. Although I limp, having the prosthesis makes me feel better. If I didn't have it, or if I had to use crutches, I would feel embarrassed." (B19).

"I don't want to face the world without it. I wear the prosthesis when I go out because it really helps me. At least it preserves my dignity. Wearing the prosthesis makes me feel like a person." (B25).

As daily life became easier and they no longer felt like a burden to their families, participants gained confidence and hope for the future. Many also began to actively seek ways to support themselves and engage in meaningful activities, reflecting a sense of life purpose. For example:

"Despite the challenges we face as rural earthquake survivors, we established an art studio. It's been a great help. Now, we have some income and the opportunity to get out of the house. Every month, we have a little money to manage, and that makes us happy." (B4).

"There was a woman with polio who had been very pessimistic, but after joining our community center, with support from the staff and fellow members, she quickly improved. Her son said, 'My mother is much happier now that she's part of this group.'" (B7).

"Even when I was in a wheelchair at home, I still took care of my mother. She was so old, but I would use my crutches to cook and bring the food to her." (B19).

"I told my husband that I would do the housework. Gradually, I started cooking and feeding the pigs. He would bring the pig feed home, and I'd prepare it and mix it for them. Every year, we had two pigs to care for." (B21).

Although the prosthesis provided many conveniences, it was not without its discomforts. Participants also had to endure the physical challenges associated with wearing it. As they described:

"Many people don't understand how uncomfortable prostheses can be, first of all, they're hard to wear, and after wearing them, they can be painful! In hot weather, it's unbearable. The prosthesis gets sweaty and doesn't breathe, and it makes you feel terrible!" (B1).

"In the summer, wearing the prosthesis was so uncomfortable. In the winter, the part that was amputated feels like a piece of wood, and I lose all sensation. After walking for a while, it starts to hurt where the amputation occurred." (B8).

"Sometimes, when I've been walking for a long time, the stump starts to hurt. If the weather changes, I still feel some pain. It's like my foot is still aching." (B10).

"I wear the prosthesis all day, when I went back to Mianzhu during the New Year, I wore it from 7 AM until midnight. By the end of the day, the skin on my leg was damaged, so I've learned to be more cautious about walking with it." (B23).

Psychological integration and self-reshaping period (years 8–10)

The "Psychological Integration and Self-Reshaping Period" refers to the psychological stage in which amputee survivors, after a prolonged period of adaptation, achieve a transition from mere "survival" to "growth" by integrating their traumatic experiences, reconstructing self-identity, and redefining the meaning of life. This phase is characterized by greater inner stability, enhanced capacity for self-reconstruction, and a positive attitude toward life, representing a crucial transition from trauma adaptation to psychological maturity.

Participants in this phase, through years of ongoing psychological adjustment and adaptation, gradually came to accept themselves, adjust to new roles, and actively address challenges in daily life. Over time, they unknowingly transformed into strong individuals and became role models in the eyes of others.

Positive qualities: facing reality with composure

For ordinary people, accepting oneself may not be a difficult task, but for participants who have experienced amputation, it often took years to stand before a mirror and confront their own reflection. The internal process of accepting a new self was long and arduous. However, with the support of family, encouragement from peers, and self-adjustment, they learned to accept themselves and face reality with composure, focusing on the future. As they expressed:

"We often get together with other disabled people, do some activities, and gradually, psychologically, I started to come out of it. Seeing people who had it even harder than me, but were still living happily, helped me feel better about myself." (B10).

"I don't avoid the issues I faced before. I can face them calmly, and now my heart is open. If you always live in the past, you'll carry a shadow inside you every day. But I can be more positive and vibrant now, not looking at those dark moments, they were just temporary. So, I always have a smile on my face, never a sad one." (B15).

"Some people laugh at me, but I tell them: this wasn't something I was born with, nor did I lose my leg due to bad actions. It was a natural disaster. As long as I'm alive, let them laugh. I don't care." (B21).

"Anyway, I'm a happy person. I never worry about anything. Even if the sky falls, there's always someone tall enough to hold it up." (B22).

Independence and self-strengthening: solving life's problems and challenges

At the beginning, even simple tasks in daily life became incredibly difficult for the participants, such as turning over in bed or pouring a drink. However, over time, as they became more proficient with their prosthetics, they gradually stopped depending on their family members. With a resilient mindset, they managed to live just as they had before their injury, and in some cases, even exceeded their previous capabilities. As one participant shared:

"The reason I'm confident now is because I can earn more money than I could before, even more than the average person. I can do everything that a normal person can do, except for manual labor. There are also things that normal people can't do that I can. Even though I am disabled, I can still earn more, improve my life, and support my family. I feel very good about it, because I've done better than I could have before." (B6).

One participant who had lost their right arm described their experience as follows: *"My husband is often away, so I take care of everything for my children, their food, clothing, and daily needs. I started learning from the small things in life. I taught myself to write with my left hand, practice picking up soybeans with chopsticks, and doing other tasks, like cooking. People thought it was impossible, like cutting vegetables or meat, but I kept practicing. I wanted to prove to myself that I could do these things. Now, I can do many things on my own. Disability is not an excuse to burden others; I must rely on myself and strengthen my mindset. If normal people can do it, I can do it too. Things that others think are impossible, I want to turn them into possibilities."* (B15).

"I don't mind if others see my prosthesis. Even though I wear a prosthetic, I can still do the same things as you. I can earn money, support my family, and happily go anywhere." (B22).

Gratitude and cherishing the present life

When we approach life with a sense of gratitude, we tend to face challenges with an optimistic and positive mindset. As some participants expressed:

"Now, my mental resilience is definitely stronger. Since I survived the disaster, I feel that I must cherish the life I have now. I support myself and no longer burden my family, and that is the best I can do." (B2).

"I am still very grateful and cherish the life I have now. I deeply appreciate the support from the country, the Hong Kong Red Cross, and all the selfless people who helped us. Without them, as we Sichuan people say, the grass on our graves would have grown very tall by now (meaning we would no longer be alive)." (B3).

"Now that I'm living in a new house, I feel better in many ways. With the help of some social workers and teachers, I've been able to get my life back on track. I am very grateful for the current state of my life, and I cherish my life, trying to do more public welfare work." (B5).

"There are many reasons why've managed to hold on. One is my own effort and not giving up, and the other is the support and help from kind-hearted people and the government." (B9).

"I am grateful to those who have cared for us. Life is short, and we have to figure out how to adapt to change. If we can be independent, we should, and if we can help ourselves, we will." (B17).

It is uplifting to see them begin to accept themselves and move forward with their lives after such tremendous trauma. Though they have endured pain unimaginable to most, life is like this, no matter what happens, it must be accepted, and one must continue to move forward. Certainly, there are also individuals who, through profound insight, have transformed the challenges and hardships they endured into greater life wisdom, which they now share to inspire others.

Sharing experiences to benefit others

Some participants described their efforts to give back and help others:

"One has to do something meaningful to make life fulfilling. For example, the school invited me to give a report to the teachers to encourage them; I helped organize performances for the Disability Arts Festival; I was elected as a representative in the Mianzhu People's Congress to advocate for people with disabilities, and many of my proposals were implemented, which made me very gratified." (B1).

"Before, I was living in my own world, not caring much about others or helping anyone. The biggest change now is that I help others! I truly believe this is the greatest change in me." (B4).

"Before the earthquake, people lived very simply, only considering their own lives and affairs. After the disaster, we received so much help. Now, we think more broadly, considering others, and aiming to help people in need. We want to help others with a more positive attitude." (B5).

"The theme of the activity we organized this year specifically addresses the mindset of 'waiting, relying, and expecting.' In designing the activity, we incorporated examples of good practices within our team, sharing them with others in the hope that those who are facing similar challenges can absorb positive energy and make changes in their own lives." (B7).

While they have actively adapted to their current life and seem to possess a resilience stronger than most, it is important to remember that people are not devoid of emotion. Some painful memories cannot be erased; they are merely hidden. At times, these memories can resurface unexpectedly, triggering physical or psychological discomfort.

Development period (years 11–16)

The "Development Period" refers to the process in which amputee survivors, after undergoing psychological adaptation and self-reconstruction, gradually achieve internal growth and external expansion during a stage of life stability. This phase is characterized by increasingly clear life goals and a hopeful outlook for the future, despite the continued presence of certain practical limitations.

During this period, most participants have moved beyond the shadows of the earthquake, although a few still harbor sadness, resentment, dissatisfaction, and helplessness deep within. Occasionally, old memories resurface in their minds.

Enriching the self

Although life remains challenging, participants continue to live with purpose, striving to enrich themselves. Two participants described:

“We’ve still kept our craft workshop running, and the sisters are all receiving their retirement pensions! The business isn’t doing well, but nobody really minds. If there’s work, we do it, and if there isn’t, we take care of things at home. Life in the small town isn’t expensive, and everyone is living more clearly, in a better mood. We’re all happy!” (B9).

“At home, I make beadwork, watch TV, play on my phone, and when I get bored, I video call and chat with my sisters. Every day, I learn fitness routines on my phone.” (B20).

The pandemic is a thing of the past

The anxiety brought on by the pandemic has gradually faded with time:

“During the pandemic, when we were restricted from going out, some people were a bit anxious! But now, everyone has made it through, and we’re all doing well.” (B2).

Helplessness and limitations

While they have cultivated a positive and optimistic spirit during the recovery period, the limitations brought by their trauma are still evident, especially when dealing with new health issues.

One participant with a lower limb amputation shared:

“My main frustration is my spinal injury, and I’m also a diabetic. Last time I went out to travel and didn’t control my blood sugar well, and when I returned, I developed a small bump on my sciatic nerve. I didn’t pay attention to it, and in four days it turned into a large abscess. When I went to the hospital, doctors said it was a stage three pressure sore. Today, I finally put on my prosthesis again after over a month without it. It feels very uncomfortable, and now I have to relearn how to walk.” (B7).

A participant with an upper limb amputation commented: *“There are things like doing complex tasks, such as tying my hair, which I can’t do; others help me with that. I can wash my hair and take a shower, and I can do simple tasks like washing clothes and cooking.” (B3).*

“I’ve also mentioned that I experience phantom limb pain. The phantom pain constantly reminds me of the injury I endured. I used to love dancing and singing, and now when I see others dancing, I feel a bit sad. Also, it’s not as easy to go out for fun anymore. These are the challenges I face, but aside from that, I don’t have many complaints.” (B4).

Another participant said:

“I used to be able to run around, but now after walking for a while, I can’t go any further. Whether it’s for leisure or work, I am limited. My prosthetic leg is not as flexible as my natural leg, and it starts to hurt after walking for a while.” (B2).

Filled with hope for life

Despite the challenges in life, most participants maintain a positive outlook, as described by some participants:

“It doesn’t affect me anymore; I’ve long forgotten the hardships of life.” (B20).

“I think I’m still very happy now, my family loves me, and my friends like me.” (B9).

“Yes, every day is sweet and joyful now.” (B2).

“May our lives in the future be as sweet as honey.” (B4).

While the reality remains as it is, and the road ahead may be full of obstacles and difficulties, life must go on. They need to face and overcome these challenges with courage.

Discussion

Through in-depth interviews, this study described the psychological adaptation and transformation processes of 25 amputee survivors of the Wenchuan earthquake over a 16-year post-disaster period. Earthquakes, as sudden and unpredictable natural disasters, often result in significant physical and psychological trauma. Amputation, one of the most severe traumatic injuries sustained during earthquakes, has profound impacts on survivors’ physical functioning, self-identity, and overall quality of life^{36,37}. While traumatic amputation has long been regarded as a severe physical disability in the aftermath of such events, from a psychological perspective, the trauma extends far beyond the loss of a limb, it presents a profound challenge to personal identity, social functioning, and the meaning of life. Traditional research has primarily focused on the early post-disaster phase, emphasizing acute psychological responses such as depression, anxiety, or post-traumatic stress disorder (PTSD), and highlighting the immediate impact of traumatic events on mental health^{14,38}. However, an increasing body of recent studies suggests that psychological adaptation is a prolonged, multi-phase process, with effects that extend far beyond the initial moment of disaster^{16,17}. In contrast to studies by Wang and Li^{39,40}, which examined quality of life among Wenchuan earthquake survivors primarily from the perspective of physical recovery or prosthetic adaptation, the present study emphasizes the psychological processing and reconstruction of traumatic meaning.

The findings of this study indicate that the 16-year psychological journey of amputee survivors of the Wenchuan earthquake can be broadly divided into four distinct phases. The trajectory of psychological recovery was not linear but characterized by phase-specific fluctuations and adaptations, with each stage exhibiting unique psychological features and coping patterns. This process reflects the dynamic transformation from trauma response to self-reconstruction. In the initial “Trauma and Conflict Period,” participants experienced pronounced feelings of helplessness and crises of self-identity, resembling the state of “identity rupture” described by Senra⁴¹. However, upon entering the “Psychological Rehabilitation Period,” individuals gradually began to rebuild hope and adapt with the support of their families and the guidance of role models⁴². Notably, in the later stage, around eight years after the disaster, participants began to show signs of psychological integration

and self-transcendence. Although not systematically addressed in all existing literature, this phase represents a core aspect of what Park⁴³ describes as “growth within limitation.”

Phase one: trauma and conflict period

During this phase, participants experienced a significant emotional downturn, characterized by pessimism, depression, despair, and a loss of enthusiasm and joy for their previous work and life. Even after being fitted with prosthetics, the initial discomfort and inability to live independently led to intense feelings of self-blame, guilt, helplessness, worthlessness, and a diminished sense of value. These findings are consistent with those reported by Horgan¹⁴.

In our study, participants faced substantial difficulties and challenges in psychosocial adjustment during the first one to two years following the earthquake. These included changes in family relationships and the home environment, psychological issues stemming from altered body image, and employment difficulties. Beyond regaining independence in daily life, participants also needed to actively reintegrate into society to improve their overall quality of life. Consequently, most participants exhibited psychological reactions such as prolonged low mood, emotional pain, feelings of life being worse than death, and a sense of hopelessness during the first one to two years after amputation. Previous studies have reported that amputation can lead not only to the physical loss of a limb but also to phantom limb sensations^{12,44} and various psychological disorders. Depression, in particular, has been commonly observed during the initial two years post-amputation, with relatively high levels of depressive symptoms found among amputees⁴⁵. In our interviews, nearly all participants reported experiencing phantom limb pain and/or stump pain. Furthermore, the discomfort, distress, and helplessness associated with the early stages of prosthetic use significantly interfered with their daily lives.

It is particularly noteworthy that while this phase was marked by widespread emotional difficulty among participants, we recognize that individual responses varied considerably. The themes identified represent shared patterns rather than a uniform or sequential psychological process experienced by all. As noted in other trauma literature⁴⁶, not all individuals follow the same trajectory of despair followed by stabilization; psychological reactions may be highly heterogeneous depending on personal, social, and contextual factors.

During this difficult period, social and familial support served as a critical source of strength. Most participants in this study reported feeling loved and cared for, which enhanced their confidence and ability to cope with their condition. They commonly cited receiving substantial support from parents, spouses, friends, and peers, particularly emphasizing the pivotal role of family support. Social factors, especially familial support, play an essential and effective role in psychological well-being. Numerous studies have highlighted the importance of family in maintaining health and strengthening social bonds, suggesting that social support may serve as a protective buffer against stress and depression⁴⁷. Participants specifically mentioned the positive impact of mutual aid groups in their rehabilitation process. As noted in the study by Chan⁴⁸, peer-paired groups facilitated experience-sharing and were guided by collective spirit, enabling members to better cope with illness. Additionally, group processes such as social comparison, social learning, and communication accelerated patients' recovery and adaptation. Participants also shared how parents and spouses supported them in their daily routines, provided financial assistance, offered psychological comfort and encouragement during difficult times, and helped them emerge from the emotional low points in life. However, it is important to note that the degree to which support was internalized and utilized differed among individuals, depending on personal coping mechanisms and relational contexts. As Valizadeh⁴⁹ pointed out, the feeling of being needed and valued within one's family contributes positively to psychological well-being, though this too can vary.

Phase two: psychological rehabilitation period

During this phase, participants gradually integrated with their prosthetics and, with the support of family, peers with similar experiences, a sense of responsibility, and motivation drawn from role models, they began to accept their reality and reignite hope for life. This aligns with the findings of Gallagher⁵⁰ and Hanley⁵¹. However, it is essential to emphasize that this was not a universal experience, nor did it follow a fixed timeline. While several participants described reaching a psychological turning point around the two-year mark, others did not exhibit this change or did so at different times. We therefore interpret the notion of a “psychological rehabilitation phase” as a general theme that reflects a common yet non-uniform process of psychological adaptation. For some, depression decreased around two years post-amputation¹⁴, but others continued to struggle, highlighting the importance of recognizing non-linear and individualized trajectories in trauma recovery.

In our study, 88% of participants were users of lower-limb prosthetics. Lower-limb amputation has a highly disruptive impact on survivors' lives, manifesting as a loss of independence, inability to care for oneself or work, and feelings of isolation, which result in a lower quality of life³⁹. Previous research has shown that wearing a prosthesis brings about many physiological, social, and psychological challenges⁵². Individuals must overcome the physiological differences between the real limb and the prosthetic in order to engage in daily activities, while also maintaining work roles and social relationships and dealing with complex psychological issues. Support from healthcare professionals and individuals who have successfully adapted to prosthetics may assist individuals in the early stages of adapting to their prosthetic⁵³. Similarly, research on peer support for breast cancer survivors by Taleghani⁵⁴ demonstrated that meeting volunteers who had experienced breast cancer helped reduce feelings of loneliness during treatment and increased hope for the future. Likewise, during this phase, peer support was crucial, with some participants noting that the support and actions of friends strengthened their confidence when facing challenges, making them feel less isolated⁵⁵.

Research has shown that the physiological and aesthetic benefits of prosthetics may help restore functionality and body image^{56,57}. Wearing a prosthesis can assist amputees in maintaining a functional body pattern similar to their pre-amputation state. Participants described the prosthesis as an integral part of their attire, like clothes or shoes, something they naturally wear when leaving the house. However, the external attention to their physical

condition made them feel uncomfortable. Participants expressed a desire to avoid drawing special attention and wished to be treated like ordinary people. It is evident that amputee survivors in this phase are sensitive and emotionally volatile. Accordingly, the experiences of the participants in this study should not be viewed as representative of a standardized psychological progression, but rather as diverse manifestations of coping with profound life changes.

Therefore, in the rehabilitation process of amputees, a multi-dimensional support system should be established, integrating peer experience exchange, professional psychological interventions, and social function reconstruction interventions to promote the positive reconstruction of body image and identity. Additionally, public education should be strengthened to reduce social biases, thereby enhancing amputees' social participation and overall quality of life.

Phase three: psychological integration and self-reshaping period

After several years of psychological adjustment and adaptation, most participants in this phase had developed a positive and optimistic mindset. They gradually accepted themselves, adapted to new roles, and actively addressed the challenges in their lives, emerging as stronger individuals, akin to “butterflies breaking out of the cocoon.” This finding is consistent with the research of Livneh⁵⁸. The study demonstrated that positive coping strategies (such as actively solving problems) were associated with lower levels of depression and internalized anger, indicating that positive coping mechanisms help amputees achieve psychological integration and self-reshaping over the long term.

Research also indicates that, following catastrophic injuries, individuals who can construct positive meaning from their experiences show significant improvements in life satisfaction and psychological resilience⁵⁹. Those who continue to maintain positive coping strategies years after the disaster are more likely to experience profound psychological transformation⁶⁰. During this phase, participants had emerged from early stages of denial, struggle, and rejection, demonstrating higher levels of self-acceptance and a sense of control over their lives. They gradually restored hope and courage for life by establishing stable routines, regaining social roles (such as employment, family responsibilities, and social contributions), and ultimately adopting a more positive and optimistic mindset. The trauma of the earthquake had given them increased confidence, independence, and resilience. According to the “Post-Traumatic Growth (PTG) Model” proposed by Tedeschi and Calhoun⁶¹, after experiencing major trauma, some individuals not only regain functionality but also experience positive transformations in cognition, emotions, and interpersonal relationships. It is evident that the psychological growth during this stage marks the individual's transition from mere “survival” to “growth,” and suggests that the focus of rehabilitation and psychological intervention should gradually shift from functional recovery to meaning-making and self-actualization.

Phase four: developmental period

During this phase, most participants have emerged from the shadow of the earthquake and are actively engaged in daily life. Although a few continue to experience feelings of sadness, helplessness, and the challenges associated with functional limitations, the majority of survivors have completed the psychological processing of the trauma and have moved from “adaptation” toward “self-actualization.” However, it is noteworthy that participants generally exhibit a positive attitude toward life and hope for the future. They strive to enrich themselves and improve their quality of life through activities such as engaging in crafts, maintaining social connections, and interacting with family.

Thus, it is evident that over more than 10 years of psychological adaptation following the disaster, amputee survivors have gradually transitioned from trauma recovery to life reconstruction. Despite continuing challenges such as limited physical function and chronic pain, individuals are able to move forward with hope and resilience through a positive life attitude and effective social support. Therefore, the “Developmental Phase” not only represents stability in both physical and psychological aspects but also signifies a new state of life: actively enriching oneself, reshaping life meaning, and approaching the future with a more mature mindset.

In this interview, we made several meaningful discoveries.

Divorce after amputation may affect psychological recovery

We found that participants who experienced divorce after amputation had difficulty adjusting for an extended period. The spouse of a person with a disability plays a significant role in their mental health, as the challenges arising from the spouse's disability can introduce different stressors. Although medical conditions and marital unhappiness are generally related, the likelihood of separation or divorce when the wife is ill is six times higher than when the husband is ill⁶². In our study, we found that lower satisfaction in marital relationships post-trauma can lead to divorce, further complicating the post-amputation life. Female participants described feelings of loneliness and how these experiences made coping with amputation more difficult⁶³. In contrast, participants with harmonious marriages and sufficient family support were more likely to regain confidence. The research by Harden⁶⁴ also indicated that the spouse is often the first source of support during illness, enhancing a sense of unity and belonging between couples, which significantly impacts the recovery of health and function. Additionally, a cross-cultural study by Kagawa-Singer⁶⁵ showed that women in three cultural groups (European-American, Chinese, and Japanese) highly appreciated their husbands' support, as the husbands made efforts to protect them and help them face illness positively. In our study, female participants also noted that their husbands were the most important source of support when facing illness.

Personal resilience is key to adapting to adversity

Personal protective factors influence each amputee's psychosocial adaptation, coping skills, and adaptation to new physical limitations. These protective factors include maintaining a positive attitude, social support,

personal courage, a sense of humor, and finding meaning in the loss of a limb⁴². Some participants in our study mentioned that when facing adversity, it is important to motivate oneself and to be self-reliant, as one can only rely on themselves and not on family and friends, as the Chinese saying goes: “No filial son stays by the bedside of a long-suffering parent.” Therefore, facing difficulties with an optimistic attitude and embracing challenges is key to better integrating into family and society.

Pets are an important source of stress relief

A few participants also mentioned that their pet dogs were an important source of support, which aligns with the findings of Stutts⁴². Previous studies have generally found that dog ownership is linked to family cohesion and provides social support to alleviate stress. Dogs are seen as enhancing a person's self-confidence, offering a sense of accomplishment, or improving coping skills⁶⁶. The research also found that participants who owned dogs had significant improvements in pain, mood, and other levels of distress. Our study also confirmed that pets helped participants in coping with illness or injury.

Implications for future research

Early psychological interventions are crucial for survivors of amputation, especially during the first 1–2 years. Community nurses should continue to monitor both the physical and psychological changes in survivors and provide timely care and support.

Nurses and community rehabilitation staff should collaborate across disciplines to provide post-disaster reconstruction follow-up services, complementing each other's strengths.

Future research could focus on the caregiving experiences of family members of amputees, providing experiential guidance for others with similar.

Limitations of the study

This study may have the following limitations: First, it relies on participants' recollections of their experiences over a span of 16 years, and potential recall bias may affect the results¹⁷. Second, qualitative research is highly interpretive, and the researcher may be influenced by their own subjective experiences during the process of theme extraction and analysis, leading to variations in understanding among different interviewers. Third, semi-structured interviews may lead participants into predefined areas, introducing bias into the results. Finally, the interviews were limited to the Mianzhu region and may not fully represent the experiences of all amputees from the Wenchuan earthquake.

Conclusion

This study investigated the life experiences of earthquake amputees 16 years after the Wenchuan earthquake. Participants described the physical, psychological, and sociocultural distress they faced, along with the strategies they employed to cope with these challenges. Family support, peer support, and other forms of social support were identified as crucial resources in their coping process, as they alleviated the severity of post-traumatic stress reactions and compensated for feelings of diminished self-efficacy. Although 16 years have passed since the earthquake, the trauma it caused has not been completely erased, and continued attention is needed to truly listen to and address the needs and voices of the participants.

Data availability

The datasets generated and/or analyzed during the current study not publicly available due to the sensitive nature of the interviewed population. To protect the rights and interests of the participants, we have decided not to share the data. However, the datasets may be obtained from the corresponding author on reasonable request.

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Author contributions

Dirui Yan and Yixiu Liu: study concept, design and supervision. Dirui Yan and Tingting Tang: statistical analysis. Dirui Yan and Yixiu Liu: study implementation. Dirui Yan and Tingting Tang: drafting of manuscript. Yixiu Liu: important intelligence input. Dirui Yan and Tingting Tang: critical revision of the manuscript. Dirui Yan and Tingting Tang contributed equally to this work and share first authorship.

Declarations

Competing interests

The authors declare no competing interests.

Additional information

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