ApplicationofAcceptance CommitmentTherapy inPatients afterAmputation

ABSTRACT

Purpose: ToinvestigatetheeffectofAcceptanceandCommitmentTherapy(ACT)onpatient safteramputation.

Methods: Atotalof100patientshospitalizedafteramputationintheDepartmentofTraumatic Hand andFootSurgery ofX HospitalfromOctober2022toApril2023wereselectedusingaconvenientsamplingmethod. Participants were randomly divided into a control group and an experimental group using the random number table method, with50participantsineachgroup.Thecontrolgroupreceivedroutinenursingandtheexperimentalgroupreceivedacceptancecommitmenttherapyintervention.Psychologicalflexibility,Stigma,andDisabilityacceptancewereevaluatedbeforetheintervention and atthreeandsixmonthsafterthe intervention.

Results: Finally, 48 cases in the control group and 47 in the experimental group completedthe study. After the intervention, the scores of the experimental group on theAcceptance and Action Questionnaire (AAQ-II) score and Social Impact Scale score (SIS) were lower than those of the control group, and the difference was statistically significant (P<0.05). The score for disabilityacceptance(ADS-R) was higher in the intervention group than in the controlgroup. Furthermore, the difference was statistically significant (P<0.05). Acceptancecommitment therapy can improve

patients' mental flexibility and acceptance of disability afteramputation, and reduce their stigma.

Conclusion: Acceptance commitment therapy can improve patients' psychologicalflexibility and disability acceptance after amputation, reduce their stigma, and promotetheir return to society.

The trial registration number:ChiCTR2200066164

Date of registration number:2022/11/25

Data Access Statement: The datasets generated and analyzed during the current study are not publicly available as the experimental data are related to other experiments that are progressing, but are available from the corresponding author on reasonable request.

Keywords: Amputation,Surgical,China,DisabledPersons, Therapeutics

1. Introduction

Currently,thenumberofpeoplewithphysicaldisabilitiesinChinaisapproximately 8 5 million,accountingfor6.21%ofthetotal population,andthistrendisincreasing yearly[1]. Amputationsurgeryresultsinpermanentlossoflimbfunction,changes inself-image,profoundimpactonpsychologicalflexibility,anddifferentdegreesofstigma[2].Studieshave shown that disability acceptance isclosely relatedtostigma, which canaffectthementalhealthofpatients[3].However,therearefewstudiesonthementalflexibilityofpatientsafteramputationinChina,andinterventionmethodslack reliability andvalidity.

Therefore,thedevelopmentofvalidinterventionmeasuresforthementalflexibilityofpatientsafteramputationisurgentlyneeded.AcceptanceandCommitmentTherapy(ACT)iso

neoftheusualpsychotherapymethodsforthird-generationcognitiveandbehavioraltherapy. ItwasfoundedbyStevenC.Hayes,aDoctorofAmericanpsychology,inthe1980s[4].Therapy isphilosophicallybasedinafunctionalcontext,incorporatingEasternphilosophy andaimingtoimprovementalflexibilitythrough self-acceptance,commitment,andactionsbasedonself-worth.Thistherapyhasbeenwidely usedto treatvariouspsychologicaldiseasesandmalignanttumors[5].Basedonthis,thisstudyapplied acceptanceandcommitmenttherapytorehabilitatepatientsafteramputationandachievedgo odresults,providinganewdirectionandtargetforpsychologicalinterventioninpatientsafter amputation.

2. Methods

2.1. ResearchDesign

ThisStudyconceptualizesthreephases:InterventionMethodsoftheintervention group, thecontrolgroupintervention method, andtheevaluation method.

2.1.1.Setting and sampe

FromOctober2022toApril2023,theresearchsubjectsusedtheconveniencesamplingmetho dtoselectpatientshospitalizedafteramputationintheDepartmentofTraumaHand-FootSur geryofX Hospital.Based on the sample size estimation formula: N=4[(U2/ α +U β)2 σ 2]/ δ 2, where α =0.05, β =0.10, δ difference in scores between two clinically significant groups, δThe larger of the estimated values representing the standard deviation of the two groups of populations, based on the pre-experimental results and considering a 10% loss of follow-up rate, was obtained

as a sample size of 100 cases per group, andwererandomlydividedinto a control group (50 patients) and an experimentalgroup (50 patients).

The inclusion criteria were as follows: (1) patients withamputation; (2) age ranging from 18 to 65 years; (3) stable condition and ability tocommunicate normally; and (4) informedconsent and voluntary participation in thisstudy.The exclusion criteria were as follows: (1) patients receiving other psychological treatments, and (2) patientswith severe cardiovascular and cerebrovascular complications. In addition,twopatientswereinthecontrolgroupandthreewere intheexperimentalgroup.Finally,95patientscompletedthe study:controlgroup(48patients)and experimentalgroup(47patients).

2.1.2.Intervention Methodsofthe intervention group

Thefollowinginterventionswereperformed:(1)Programformulation: Aninterventionteamforacceptanceandcommitmenttherapywasestablished,withthehexagonalpsychotherapymodelofacceptanceandcommitmenttherapyasthetheoreticalframework[6],andreferredtoLiuJune[7].Theresearchteamdevelopedaninterventionoutlineforacceptanceandcommitmenttherapy, anddesignedaninitialinterventionplan.Finally,theexpertfocusmeetingmethodobtainedthefinalinterventionplan;(2)interventiontime–thebaselinedatasurveywascompletedbeforesurgery,andacceptanceandcommitmenttherapyinterventionbeganonthesecond dayaftersurgery for fourweeks, witheachinterventionlasting about60-90 minutes;and(3)theintervention planwas asfollows:

Intervention plan

(1) **Acceptance (1week)**

Intervention goals: To promote mutual understanding between the intervener and the patient and familiarize themselves with the intervention content, to help patients understand the knowledge of rehabilitation after amputation, and to promote their acceptance of the stump.

Interventions:

a. First, introduce yourself and the patient to ACT therapy to establish a therapeutic relationship (approximately 10 min).The intervention objectives were clearly defined and informed consent was obtained.

b.Discuss current concerns and thoughts with the patient. Guide patients to self-acceptance and help them face their current life status with a positive attitude.

c.Mindfulness practice. Systematic understanding of postoperative precautions (approximately 30 min). By playing relevant videos and introducing them by researchers or nurses, patients can systematically master the knowledge related to the postoperative rehabilitation of amputation, postoperative stump care, phantom limb pain, maintenance of functional position, and other contents to promote the acceptance of the stump.

d.Week 1: Effect feedback (approximately 10 minutes). Patients shared the harvest in the first week, and the intervener encouraged the patient to provide comments and suggestions for the first week.

(2) Cognitive dissociation, experience the present moment (2 week)

Intervention goals: Through the patient's description of the pain caused by the stump and the coping effect, the intervener introduced the method of "cognitive

dissociation" to enable the patient to learn cognitive dissociation and reduce the psychological pain caused by the stump.

Interventions:

a.Patients expressed the effects of surgery on limb function and psychological society and were encouraged to share their feelings, coping styles, and effects (about 30 minutes). Help patients realize that "life is full of ups and downs," accept the fact of the stump, and face the changes brought by the stump after surgery with a positive attitude.

b.Introduction to "Cognitive Dissociation" method. Through the principle of ACT treatment, patients can be helped to accept the fact that they have lost their limbs, take active remedies, wear prosthetic limbs to recover certain self-care abilities, and get out of negative emotions as soon as possible. min (approximately 30 min), respectively.

c.Week 2: Effect feedback. Patients shared the harvest in the second week; they were encouraged to make comments and suggestions at week 2 (about 10 minutes).

(3) Focus on yourself and learn about mindful breathing and mindfulness meditation.

(3 week)

Intervention goals: Promote awareness of the present and situational self and learn mindful breathing and meditation.

Interventions:

a.The researchers instructed the patients to learn about mindful breathing and mindfulness meditation and encouraged them to practice daily to improve their ability to be aware of the present moment (about 30 minutes).

b.Take oneself as a scene. Members share measures to improve limb function with each other face-to-face or through WeChat groups, actively cooperate with treatment and rehabilitation exercises, and change painful emotions, such as impaired dignity and fear (about 40 minutes).

c.Homework: Practice mindful breathing and mindfulness meditation, and experience yourself in different situations.

d.Week 3: Effect feedback. Patients shared the harvest in the third week; the intervener encouraged the patient to put forward the comments and suggestions of the third week (approximately 10 minutes).

(4) Clarify values and commit to action (4 week)

Intervention goals: Guide patients to apply acceptance actions to real life, deal with bad emotions in life through mindfulness, and change their current life through commitment to action.

Interventions:

a.Through the first few interventions, patients shared changes, such as emotional pain, sense of worth, and sense of dignity, to further clarify their self-worth and establish confidence in accepting and coping with disability. (about 30 min)

b.Commit to action. Each patient who underwent surgery for limb function change, lifestyle changes, and the impact of psychosocial function put forward

feasible measures and promised action; researchers encouraged patients to live in the present moment, maintain normal, reduce emotional distress, and at the same time, follow their own interests and hobbies, and meaningful valuable life. min (approximately 40 min), respectively.

c. Homework: Encourage patients to keep a diary of their disability coping.

d.Week 4: Effect feedback ① Patients shared the harvest in week 4; ②The intervener encouraged the patient to put forward the comments and suggestions of the fourth week (about 10 minutes).

2.1.3. Controlgroup intervention method

Thecontrolgroupunderwentroutinenursingmeasures,whichmainlyincludedpost-operativestumpnursing,phantomlimbpain,maintenanceoffunctionalposition,prosthesis,andcomplicationguidance.Dischargeeducation, regulartelephonefollow-up,and regularre-examinationinthe hospital.Allpatientsinthe controlandexperimentalgroupscompletedthebaseline datasurvey beforesurgery andwerefollowed-up at 3 and6monthsafter surgery.

2.1.4. Evaluation method

(1)TheAcceptanceandActionQuestionnaire-2ndEdition (AAQ-II)wasdevelopedbyBondetal.[8].Preparationmeasuresthe degreeofempiricalavoidance.The questionnaireconsistsofsevenitemsratedas1-7points,withoneindicatingneverand7indicatingoften.Thetotalscoreforthesevenitemswas7-49points.The higher the score, the

higherthedegreeofexperientialavoidanceandthe lower thepsychologicalflexibility is lower(JingTsengetal.)[9]TheCronbach'sαcoefficientofthequestionnaireis0.88,whichhas goodreliabilityandvalidityandcanbeusedintheStudy ofEmpiricalAvoidanceandCommitmentTherapy.

(2)TheChineseversionoftheSocialImpactScale(SIS)wascompiledbyFileetal.[10],Panetal.[11], and Sinicization was carriedout.The24itemsincludedfourdimensions:economicdiscrimination,socialexclusion,socialisolation,andinternalshame.Theformerareinternalstigmaanddiscrimination,whereasthe latterarerealstigmaanddiscrimination.Thetotalscoreforthefourdimensionswas24– 96points.Thehigherthescore,thestrongeris theperceivedshame.TheCronbach' s αcoefficientsofthescalerangedfrom0.85to0.90, with goodreliabilityandvalidity.

(3) The AcceptanceofDisabilityScale-Revised(ADS-R)wasdeveloped byGroomesetal.[12] andChenNietal.[13].Itisoftenusedtoinvestigateacceptanceof disabilityin patientswithlimbinjuries.Therewere32itemsintotal,includingfourdimensions:expansion,inclusion,subordinate,andtransformation.From"stronglydisagree"to"stronglyagree,"thescoreis1-4,andthetotalscoreis32-128.Thehigherthescore,thehigherthepatient'sdisability acceptancelevel.TheCronbach's αcoefficientof this scale was0.83, indicatinggoodreliability andvalidity.

2.2. Data Collection

From October 2022 to April 2023, the intervention results were evaluated by conducting a questionnaire survey before and after the intervention in the control and experimental groups attheDepartmentofTraumaHand-FootSurgeryofX Hospital.Finally, 95 patients completed the study:control group (48 patients) and experimentalgroup (47 patients). The 2 losse patients of control group were ruled out due to the occurrence of new complications. The reason why 3 patients in the experimental group were excluded was that they automatically discharged from the hospital and were unable to contact the patients.

2.3.Statisticalmethods

SPSSsoftware (version 23.0) was used for the statistical analysis. statistical method using$\chi 2$ -test tocomparison of basic information between the two groups of patients.An Independent sample t-test was usedtocomparebaselineAAQ-I I ,SIS,andADS-Rscoresbetweentheexperimentalandcontrolgroups.RepeatedmeasuresANOVAwasusedtocomparetheeffectsatdifferenttimepointsbetweenthetwogroupsafterthe intervention.*P≤0.05wasconsideredstatistically*.

2.4. Ethical Consideration

The present study was registered(no. **ChiCTR2200066164**)at the Chinese Clinical Trial Registry and its ethical document review(Approval no.**20X2**), thestudy wasapprovedbytheX Hospital andagreeduponbythe relevant participants.

3. RESULTS

Comparison of the general information between the two groups of patients

In this study, the χ2 test was used to compare basic information between the two groups of patients.The differences were not statistically significant in age, sex, professional post, marital status, education level, time after amputation(days), amputation reasons, amputation level, and perceived pain level between the two groups (P > 0.05). Further details are provided **Table 1** for details.

Table 1Comparison of General Information Between the Two Groups of Patients

Project	Experimental group (*n*=47)	Control group (*n*=48)	*Test statistic*	*P-value*
Gender			0.268[1)]	4.851
Men	27(57.4)	27(56.3)		
Women	20(42.6)	21(43.7)		
Age (years)			0.121[1)]	7.415
⩾18	7(15.0)	8(16.8)		
19～＜40	20(42.5)	20(41.6)		
40～＜65	20(42.5)	20(41.6)		
Professional post			0.113[1)]	7.532
Famer	7(14.8)	7(14.5)		
Merchant	8(17.0)	9(18.7)		
Teacher	10(21.2)	10(20.8)		
Accounting	5(10.6)	5(10.4)		
Nurse	2(4.2)	2(4.1)		
Worker	9(19.1)	9(18.7)		
Freelance	6(13.1)	6(12.8)		
Marital status			0.034[1)]	9.561
Married	19(40.4)	12(25.0)		
Divorced	17(36.0)	19(39.5)		
Single	21(44.6)	27(35.5)		
Educational level			1.621[1)]	3.191
Diploma	17(36.1)	18(37.5)		
Associate degree	10(21.2)	10(20.8)		
Bachelor’ s degree	20(42.7)	20(41.7)		
Time after amputation(days)			0.020[1)]	9.891

31-＜180	17(36.1)	18(37.5)		
181-＜365	9(19.1)	10(20.8)		
≥365	21(44.8)	20(41.7)		
Amputation reasons			0.031[1)]	7.121
Trauma	16(34.0)	17(35.4)		
Vascular disease	10(21.2)	11(22.9)		
Diabetes	21(44.8)	21(41.7)		
Amputation level			0.067[1)]	10.113
Proximal thigh (left side)	6(12.7)	3(6.2)		
Proximal calf (left side)	9(19.1)	7(14.5)		
Foot (left side)	7(14.8)	6(12.5)		
Distal thigh (right side)	5(10.6)	5(10.4)		
Distal leg (right side)	5(10.6)	5(10.4)		
Foot (right side)	6(12.7)	7(14.5)		
Proximal thigh (bilateral)	7(14.8)	9(18.7)		
Proximal calf (right side)	2(4.7)	6(12.8)		
Perceived pain level			0.021[1)]	9.891
Severe	27(57.4)	28(58.3)		
Moderate	10(21.3)	9(18.7)		
Mild	10(21.3)	11(23.0)		

Note：1）χ^2-*value*

Comparison of the baseline of all scales's scores

Baselinecomparisonofthe scoresofallscalesbetweentheexperimentalandcontrolgroupsshowednostatisticalsignificanceinthe scoresofallevaluationindexesbetweenthetwogroups (*P*> 0.05). Further details are provided**Table2**for details.

Table2 The Baseline Scores of Each Scale Were Compared Between the Experimental Group and the Control Group(X±s)

Total score of each scale	Experimental group （n=47）	Controlgroup （n=48）	*t*	*P*
AAQ-Ⅱ	39.12±9.146	37.78±7.377	1.567	0.218
SIS	53.30±10.328	55.08±8.380	0.818	0.338
ADS-R	51.120±7.380	50.120±7.310	1.871	0.518

Note: t = two-group t-test; AAQ-II:Acceptance and Action Questionnaire;SIS:The stigmascore;ADS-R:DisabilityAcceptance score.

Comparison of the AAQ-Ⅱscores

The comparison of AAQ-II scores between the two groups before and after intervention indicated that there was a statistically significant difference in the time effect of the AAQ-II score between the experimental group and control group ($P<$ 0.01), and the psychological flexibility of patients gradually improved with the extension of postoperative time.

See **Table 3**.

Table3Repeated Measures ANOVA of Psychological Flexibility (AAQ-Ⅱ) Between Two Groups

Group	*n*	Base line	3months	6months	F_{time}	P_{time}	F_{group}	P_{group}
Experimental group	47	39.12±9.146	26.33±5.680	20.26±7.621	11.143	＜0.01	6.234	<0.05
Control group	48	37.78±7.377	28.06±7.232	24.22±6.777				
t		1.567	-0.917	-3.149				
P		>0.05	<0.05	＜0.01				

Note.*t*=two group t-test;*F*=repeated measures ANOVA

Comparison of the stigma scores

The comparisonofstigmascoresbetweenthetwogroupsbeforeandafterinterventionshowedthat therewasastatisticallysignificantdifferenceinthetimeeffectofSISscalescoresbetweenthee xperimentalgroupandcontrolgroup(P<0.05), andthepatients'stigmagraduallydecreased withtheextensionofpost-operativetime（**Table4.**

Table4 SIS Repeated Measures ANOVA Between Two Groups (X±s)

Group	*n*	Base line	3 months	6 months	F_{time}	P_{time}	F_{group}	P_{group}

Experimental group	47	53.30±10.328	43.88±8.715	38.96±11.292	8.817	＜0.01	6.212	<0.05
Control group	48	55.08±8.380	51.72±10.390	49.88±8.655				
t		0.818	-2.002	-3.241				
P		>0.05	<0.05	＜0.05				

Note.t=two group t-test;*F*=repeated measures ANOVA

Comparison of disability acceptance scores

Thecomparisonofdisabilityacceptancescoresbetweenthetwogroupsbefore Afterthe intervention, thetimeeffectofthe ADS-Rscoreofthetestgroupandcontrolgroupwasstatisticallysignificant(P<0.05),andthe disabilityacceptanceofpatientsincreasedgradually with theextensionof post-operativetime, asshownin**Table5**.

Table5 ADS-R Repeated Measures ANOVA of Two Groups (X±s)

Group	***n***	**Base line**	**3 months**	**6 months**	F_{time}	P_{time}	F_{group}	P_{group}
Experimental group	47	51.120±7.380	59.18±8.115	68.96±11.292	9.117	＜0.01	5.132	<0.05
Control group	48	50.120±7.310	54.32±10.370	59.88±10.655				
t		1.871	-2.102	-2.241				
P		>0.05	<0.05	＜0.05				

Note.t=two group t-test;*F*=repeated measures ANOVA

4. Discussion

4.1.Acceptanceandcommitmenttherapycanimprovethepsychologicalflexibilityofpatientsafteramputation

Mentalflexibilityistheabilityofindividualstofocustheirattentiononthecurrentrealistic environmentandtakemeaningfulactionsbasedonthe correctvaluestoachievetheiraspirations.Mentalflexibilityisat

thecoreofacceptanceandtherapy[14].Thisstudyshowedthatthe AAQ-II score of theexperimentalgroupwassignificantly lowerthanthat of thecontrolgroupaftertheintervention(P<0.01).Thissuggeststhatthe nursingintervention flexibilityofpatientsafteramputationisconsistentwithHanetal.[15].Accrding to acceptanceandcommitmenttherapycanimprovepsychology, andtheresultswereconsistent.Afteramputation,patientsnotonlyhavetofacetheinconvenience oflifeandworkbroughtabout bylimbdeformity,butalsofaceotherpeople'sstrangeeyes.Inthelongrun,itcanleadtoreduced socialactivitiesandpersonalitychanges,resulting inavoidancebehavior.Inaddition,post-operativestumppain,phantomlimbpain,stumpdeformitycontracture,andothercomplicationstendtocauseanxiety,depression,irritability,andotheradverseemotions,resultinginageneraldecreaseinpsychologicalflexibility.Acceptance andcommitmenttherapy improvespatients’mentalflexibility.

4.2.Acceptanceandcommitmenttherapycanreducethestigmaofpatientsafteramputation

Stigmaisanegativeemotionalexperienceinwhichpatientsfeelshameandself-stigmatization duetoimagechangesandsocialdiscriminationcausedbythedisease[16].Thestudyindicated thatTheSISscoreoftheexperimentalgroupwaslowerthanthatofthe controlgroupafterthe intervention(*P*<0.05).Nursinginterventions basedonacceptanceandcommitmenttherapy canreducethestigmaofpatientsafteramputation,similartothe findings of

Bettlachetal.[17].Thes e resultswereconsistent.Thereasonsforthisareasfollows:acceptanceandcommitmenttherapyguidespatientstoacceptobjectivefacts,helpsthemadjusttheirmentality,cognitivelydissociates themselves,andobjectivelyinterpretscurrent events.

Moreover,mindfulnessmeditationtrainingeliminatespatients'shame,avoidance,andotherunspeakablepainfulexperiencesandreducestheirsenseofshame.Atthesametime,byclarifyingtheirvalue,patientsareguidedtosummarizetheirownexperienceinstumprehabilitationtrainingandabsorbindirectexperiencesofpatients,topromotetherecoveryofstumpfunctionassoonaspossible,and to encouragepatientstomakecontributionstosocietybyrelyingontheirabilityandmakingtheirvaluetothefamilyandsociety.Finally,they committoaction tochangethecurrentlife situation.

4.3AcceptanceandCommitmenttherapycanimprovedisabilityacceptanceofpatientsafteramputation.

Thedegreeofdisabilityacceptancereferstothedegreetowhichanindividualacceptshisorherdisabilitystatusandhowthedisabledindividualrespondstophysicalchangesandtheimpactonexistinglifethroughvaluesandadaptabilitytosociallife [18].TheStudy indicatedthattheADS-Rscalescoreofthe experimentalgroupwassignificantly higherthanthatofthe control groupafterthe intervention(P< 0.05). Ithas beensuggested thatnursinginterventionsbasedonacceptanceandcommitmenttherapycanimprovedisabilityacceptanceinpatientsafteramputation[17].Theresearchresultswereconsistent.Withthedevelopmentofsocialpsychology,disabilityacceptancehasbecomeanewresearchperspectiv

eandahotresearchtopicforscholarsworldwide.Studieshaveshownthat[19], Becauseofthephysicaldisabilitycausedbytraumaanddisease,patientsnegatetheirvalueandsocialvalue,oftendevaluingtheirhealthandability.Throughacceptanceandcognitivedissociation,thepatientcanperceivetheevaluationoftheoutsideworldandhimselfasanobserverandhelpthepatientadjusttherelationshipbetweenhimselfandtheevaluationratherthanclosely associating himself or herself withtheevaluation.Cognitivedissociationtechnologyenablespatientstounderstandthatthesevaluationsarejustexternalopinionsanddonotrepresentthemselves.Itguidesthemtokeepadistancefromthemselves,sothat theycanseethemselvesmore truly andreducetheir experienceof stigma.

5. Conclusion

Withthechangeinthemodernmedicalmodel,fromsimplesymptommanagementtotheoverallhealthofthe bodyandmind,nursingstaffshouldmastercutting-edgepsychologicalinterventionskills,actively pay attention to the psychological state of patients, and implement corresponding interventions for patients with different types of psychological disorders to achieve their overall health and spiritual growth. In addition, acceptance and commitment therapy can improve patients' psychological flexibility and disability acceptance after amputation, reduce the stigma of patients, and promote their return to society; however, due to time constraints, this study only observed the experimental effect six months after the intervention, and the long-term effect of intervention remains to be further studied.

Patient Consent Form: Allparticipantswereinformed aboutthe subjectof theStudy.

Ethical Approval: Please refer to the attached Ethical Approval for details.

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