EFFECTIVENESS OF MUSIC LISTENING ON PATIENTS WITH TOTAL KNEE REPLACEMENT DURING CPM REHABILITATION

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Aims

This study investigated the effects of music listening on the anxiety, heart rate variability (HRV), and range of motion of joints in patients who were implementation of continuous passive motion (CPM).

Method

An experimental design was adopted, and the participants were patients who received total knee replacement (TKR) surgery (experimental group = 49 patients; control group = 42 patients). The experimental group began listening to music 10 min before receiving CPM at 10 AM until the end of CPM (25 min in total) on the first and second days after the surgery, whereas the control group was required to rest in bed.

The anxiety levels of the patients were measured each time before and after the intervention. The two measurements of HRV were obtained 15 min after the intervention and the end of CPM). The increased CPM degrees were recorded after the end of each CPM treatment, and the active knee flexion angles were measured individually before surgery and discharge.

Table 1. Experimental intervention and the time of measurement

Time	Before surgery	OpD1 & D2			Before discharge
		T1	T2	T3	
Music listening (25 min)	⟶				
HRV			x	x	
Anxiety level		x		x	
Degrees of CPM angle				x	
Degrees of active ROM angle	x				x

T1: 10 min before CPM
T2: 5 min after CPM began
T3: the end of CPM
OpD1: postoperative day1; OpD2 : postoperative day1.

Results

(1) the low frequency/high frequency power (LH/HF) ratio, normalized low frequency (nLH), and normalized high frequency (nHF) HRV of the two groups differed statistically significantly, indicating that compared with the control group, the experimental group had superior parasympathetic nervous regulation.

Results:(2) the experimental group exhibited significantly lower anxiety levels than the control group did ($p < .05$).

Table 2. Comparison of the anxiety levels between the two groups of patients (N=91)

Variable	Experimental group M±SD	Control group M±SD	t	p
Preoperative anxiety	7.80±1.34	7.79±1.30	.037	0.971
OpD1				
Before the intervention	5.73±1.73	6.95±1.81	-3.28	0.001
After the intervention	1.49±1.02	4.07±1.20	-11.09	0.000
Difference before and after the intervention	4.24±1.25	2.88±1.11	5.43	0.000
OpD2				
Before the intervention	2.57±1.73	3.43±1.13	-3.54	0.001
After the intervention	0.04±0.20	1.24±1.05	-7.80	0.000
Difference before and after the intervention	2.53±1.12	2.19±0.77	1.71	0.092

Results: (3) the experimental group had significantly higher increase in angles for each CPM implementation compared with the control group ($p < .05$), and the active flexion angles of the experimental group were higher than those of the control group ($p < .05$) at discharge.

Table 3.Comparison of the knee flexion (degrees) of patients

Variable	Experimental group M ± SD	Control group M ± SD	t	p
OpD1 -Average increased CPM angles	24.29±5.00	12.98±4.43	11.45	0.000
OpD2 -Average increased CPM angles	21.22±2.98	16.07±4.49	6.34	0.000
Active knee flexion before surgery (degree)	109.80±9.46	110.00±8.83	-0.106	0.916
Active knee flexion before discharge (degree)	106.22±6.17	95.00±6.80	8.25	0.000

Note: On the first day of CPM, the flexion degrees were set at 50, and the increased degrees were obtained by deducting the initial CPM degrees from the final CPM degrees. The increased degrees of and after the second measurement were obtained by deducting the previous maximal degrees from the current maximal degrees.

Conclusions

Music listening can effectively lower patient anxiety levels and enhances the range of motion of joints during postoperative rehabilitation. Therefore, this study suggested that music be included as one of the routine practices for postoperative rehabilitation of orthopedic surgeries.