World Congress of Cardiology 2006
Barcelona, Spain

MEXICO

Dance-hall dancing can improve exercise tolerance like cycling training in patients with Cardiovascular Disease.

DanCE

(Dance for **C**ardiovascular **E**xercise)

Rius S, María Dolores; Ilarraza L, Hermes; Barrera-Ramírez CF, Prior O, Yara; Viveros R, María Alicia; Montero, Irma; Alvarez C, Margarita, A Valdez R.
Instituto Nacional de Cardiologia “Ignacio Chavez”, Mexico City, Mexico.

MEXICO

Purpose

- Cardiovascular diseases are the mayor cause of morbility and mortality in the world.

- Effectiveness of exercise training for patients with cardiovascular disease has been well established, as an important part of cardiac rehabilitation integral programs.

- Patients' succes depends mainly on exercise compliance, wich is often inadequate, due in part because they find it boring.

- As a solution, we think that dance therapy could be an effective and funny way to train patients with cardiovascular disease.

MEXICO

Methods

-Study:

-Randomized, prospective, prolective, comparative and open.

-Patients

- Included: Patients reffered to a Cardiac Rehabilitation Program at the National Institute of Cardiology “Ignacio Chavez” in Mexico City.

- Excluded: Patients with a clinical contraindication to perform exercise (ACSM’s Guidelines) or who did not want to participate.

- Eliminated: Four patients did not accomplished dance training period because of an acute upper airway infection (1) and other 3 patients could not accomplished therapy because they had to return to work.

- Thirty nine patients were randomly assigned into two groups: One performed dancing therapy, and the other cycling therapy. (Demographics showed on Table 1)

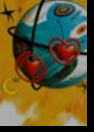


Table 1. Demographic variables between groups

Characteristic	Dancing	Cycling	p value
N	19	20	
Age (mean ± SD)	61 ± 11	58.8 ± 13	ns
Gender (n, female:male)	2:17	8:12	ns
Height (cm, mean ± SD)	166 ±8	161 ±10	ns
Weight (kg, mean ± SD)	73 ±8	67 ±10	ns
BMI (mean ± SD)	26 ±3	25.7 ±3	ns
LVEF (%, mean ± SD)	47 ± 13	41 ±18	ns
Coronary Heart disease (n,%)	17 (89)	15 (78)	ns

BMI: Body mass index. LVEF: Left ventricular ejection fraction.

Methods

- Initially, every patient was evaluated by a cardiovascular risk stratification routine. (Stratification table, 2)

-To measure training induced changes, all patients performed two symptom limited treadmill stress-testing with a ramp protocol (baseline and after a 4 week training period). Hemodynamic, metabolic and ECG variables were measured at rest, exercise and recovery.

Table 2. Risk Stratification

RISK STRATIFICATION	Dancing	Cycling	
Low (n (%)	2 (10)	0 (0)	ns
Moderate (n (%)	3 (16)	4 (20)	ns
High (n (%)	14 (74)	16 (80)	ns

Methods

- Every patient was assigned on different training groups depending on their maximal exercise tolerance on baseline stress testing.

- Music kinds and tempo were selected from several genres such as “salsa”, “rock & roll”, “cuban danzon”, “big band music” according their exercise tolerance. Dancing program was designed together with a professional dance hall dancing teacher.

-Patients danced during 30 minutes per day, five days a week during a 4 week period. Each dancing session was composed by three phases: warm-up, training phase (intensity was set on 12 using the 6 to 20 Borg’s perceived exertion scale), and cooling-down phase. The music was adapted to increase or decrease dancing speed according to the session’s phase.

- Training session performance is displayed on table 3.

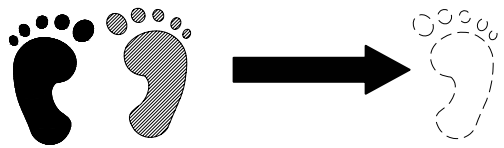
Steps

Methods

“Dancing figure steps”

Variables:

- Number of steps (4 to12)
- Selected foot (left/right)
- Movement type and tempo
- Twisting (allowed/restricted)
- Arm position (up / down)
- Arm movement (allowed/restricted)



Methods

MEXICO

In dancing group, patients were monitored with continuous telemetry.

Cycling group patients performed a standard training program, with an Ergoline ® electromagnetic indoor cycloergometers.

On both groups, blood pressure and clinical assessment were performed 3 times during training.

Both groups complemented their therapy with risk factors control sessions, psychological relaxation therapy sessions, kynesiotherapy (balance, coordination, flexibility and strength) routines, and nutritional advice.

Training sessions were supervised by a physical therapist, a nurse and a cardiologist, all of them specialized in Cardiac Rehabilitation.

Methods

Table 3. Training session performance.

Variable.	Dancing	Cycling	p value
Sessions (n)	334	356	
Sessions per patient (mean ±SD)	18±2	17.8 ± 1.7	ns
Resting HR (mean ±SD)	68 ± 11	75 ± 15	< 0,001
MaximaL HR (mean ±SD)	80 ± 16	98 ± 17	< 0,001
Resting SBP (mean ±SD)	112 ± 13	114 ± 14	,017
Maximal SBP (mean ±SD)	120±13	131 ± 17	< 0,001
Resting DP (mean ±SD * 1000)	7.7 ± 1.5	8.7 ± 1.9	< 0,001
Maximal DP (mean ±SD * 1000)	9.6 ± 2.2	12.9 ± 2.8	< 0,001
Work load during sessions (mean ±SD)	Not measured	36.5 ± 17	
RPE (Borg scale 6-20 scale)	11.7±0.8	12.2 ± 1	< 0,001
Frequent ventricular ectopy patients (%)	5 (26)	3 (15)	ns
Presence of ischaemia(sessions (%)	95 (28)	101 (25)	ns

Heart rate (HR), Systolic Blood Pressure (SBP), Double Product (DP, HR * SBP), Rating of perceived exertion (RPE), 2 Independent samples Student Test.

Results

Table 4. Training induced changes (stress testing comparison)

Characteristics.	Dancing			Cycling			
	Baseline	*4 weeks*	*p**	*Baseline*	*4 weeks*	*P**	*p***
Resting HR (bpm ± DE)	70 ± 19	63 ± 10	< 0.01	75 ± 16	67 ± 10	<0.05	ns
Resting DP (mmHg*bpm)	8.2 ± 1.4	7.2 ± 1.1	<0.05	9.5 ± 2.9	7.9 ± 1.4	<0.05	ns
Maximal HR (bpm)	126 ± 24	131 ± 21	ns	131 ± 23	129 ± 20	ns	ns
Maximal DP ($x10^3$)	17.3 ± 3.9	18.9 ± 3.4	ns	18.7 ± 3.6	19.9 ± 5.3	ns	ns
Maximal RPE (Borg 6-20 scale)	16.7 ± 1.1	17.3 ± 0.8	ns	16.2 ± 2.1	16.6 ± 0.9	ns	ns
Veterans Affairs score	-1.9 ± 4.6	-4 ± 5	< 0.05	-1 ± 3.3	-3.5 ± 4.1	<0.01	ns
Duke's score	5.8 ± 4.5	6.5 ± 5.2	ns	5.3 ± 3.1	6.7 ± 5.2	ns	ns

* Within group, ** between groups

Results

Table 4. Training induced changes (stress testing comparison), continue

Characteristics.	Dancing			Cycling			
	Baseline	*4 weeks*	*p**	*Baseline*	*4 weeks*	*P**	*p***
Maximal predicted HR reached (%)	78 ± 13	84 ± 12	ns	81 ± 13	80 ± 12	ns	ns
Exercise tolerance (METs)	**6 ± 2**	**7.7 ± 2**	**< 0.01**	**5.4 ± 1.4**	**7.1 ± 2.1**	**<0.01**	**ns**
SBP_{max}/SBP_{rest} Index	1.2 ± 0.2	1.27 ± 0.2	ns	1.21 ± 0.1	1.31 ± 0.2	<0.05	ns
Chronotropic Index	9.4 ± 3.1	9.4 ± 3.2	ns	10.8 ± 4.2	9.1 ± 2.6	ns	ns
HR at 1^{st} minute recovery	12 ± 8	17 ± 12	ns	18 ± 13	17 ± 8	ns	ns
$SBP_{3rd\ min\ recov}/SB_{maximal}$ Index	0.96 ± 0.1	0.86 ± 0.1	<0.05	0.91 ± 0.1	0.85 ± 0.1	0.01	ns
Cardiac Power in exercise $_{(x10^3)}$	10 ± 3.7	13.4 ± 3.7	<0.01	10.7 ± 3.2	14.4 ± 5.1	<0.01	ns

* Within group, ** between groups

Results

Table 5. Incidence of Arrhythmias and ischaemia on stress testing

Characteristics.	Dancing			Cycling			
	Baseline	*4 weeks*	*p**	*Baseline*	*4 weeks*	*P**	*p***
Arrhythmias, n (%).							
Frequent Ventricular Arrhythmias	5 (26)	2 (11)	ns	2(6)	4 (21)	ns	ns
Ischaemia.	4 (21)	7 (37)	ns	4 (20)	4 (20)	ns	ns

* Within group, ** between groups

Conclusion

Dancing therapy improves maximal exercise tolerance on stress testing after 4 weeks of training. This improvement is similar to that observed after a conventional cycling therapy.