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Reduction of Thigh Circumference by Interferential Current Therapy in Obese Women

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Abstract : The purpose of this study was to investigate whether thigh circumference could be reduced by applying interferential therapy on thigh. Twenty-two obese adult women with BMI of 25 to 33.3 kg/m² were recruited from Dongsan Medical Center, Korea. The trial was cross-over designed, and consisted of 500 calorie deficit diet for 8 weeks and application of interferential therapy for 4 weeks. A half of the studied subjects (Group A; 12 subjects) was assigned at random to application of interferential therapy for the first 4 weeks, and the remaining half of the subjects (Group B; 10 subjects) were subjected to interferential therapy for the last 4 weeks. Interferential therapy was applied on the right thigh in 2 sessions a week for 4 weeks. In order to study difference in thigh circumference, both thigh circumferences were measured at 20 cm above the patellar upper margin in knee extension of supine position. In the group A, differences of right thigh circumferences during 4 weeks period between before and after application were significantly greater than that of left thigh circumferences (P=0.031). Also in the group B, differences of right thigh circumferences during the period between 4 week and after application (8 week) were significantly greater than that of left thigh circumference (P=0.047). Nevertheless there was a significant difference between the group A and B in the reduction of right thigh circumference (P=0.003 vs. P=0.024 respectively). Based on the above results, we suggest that application of interferential current therapy on the region of interest is a useful method of topical fat reduction in obese women.

Key Words: Interferential current therapy, Obesity, Thigh circumference, Topical fat reduction

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hormone sensitive lipase (triacylglycerol) , hormone sensitive lipase cAMP proteine kinase-A [1]. [2-5] Kral [6] 가 가

1. 2001 11 12 20-60 (body mass index, BMI) 25 kg/m² 24 2 1, 2 12 8 2 (1 , 1) A 12 B 10 22

2. 가 A B A 4 500 kcal () 4 B 4 가 4 [7,8]. 4

1 400 kcal

8 가 가

Mann-Whitney U test Friedman test

0.05

가

(Nemectron GmbH,)

2 , 1 45 , 4

1.

8 A 36.4 ± 12.1

3 Hz 30 50 B 39.9 ± 11.1 , BMI A

Hz 5 10 Hz 10 29.0 ± 3.4 kg/m², B 29.4 ± 3.1

kg/m² 가 ,

8 가

(Table 1).

2.

3. A

, BMI, , 4 , 8

가 가 (P < 0.01), B

가 가 (Table 2).

Table 1. Physical characteristics of studied subjects

Parameter	Group A (n=12)	Group B (n=10)
Age (years)	36.4 ± 12.1 (23 60)	39.9 ± 11.1 (21 53)
Weight (kg)	72.2 ± 12.0 (60.2 84.2)	75.8 ± 9.3 (66.5 85.1)
Body mass index (kg/m ²)	29.0 ± 3.4 (25.6 32.4)	29.4 ± 3.1 (26.3 32.5)
Waist circumference (cm)	94.5 ± 9.9 (84.6 104.4)	97.2 ± 9.8 (87.4 107.0)
Hip circumference (cm)	102.8 ± 6.1 (96.7 108.9)	104.4 ± 2.8 (101.6 107.2)
Right thigh circumference (cm)	55.1 ± 4.5 (50.6 59.6)	54.2 ± 2.6 (51.6 56.8)
Left thigh circumference (cm)	54.6 ± 5.1 (49.5 59.7)	55.5 ± 3.4 (52.1 58.9)

Group A, subjects with 500 kcal deficit diet for 8 weeks and interferential current therapy for the first 4 weeks; Group B, subjects with 500 kcal deficit diet for 8 weeks and interferential current therapy for the latter 4 weeks; Values are presented as mean ± SD.

3. 4 8 4. 4 A 4
 가 2.20 cm 가 0.23 cm 가 (P<0.05),
 B A B (P<0.01). , BMI, 8 4 가
 가 (Table 3). 4 8 4 B
 가 1.00 cm 가 (A) 4 4 8
 3.50 cm 가 (B) 4 가
 (P<0.05). , BMI, (P<0.05) (Table 5).
 가 (Table 4).

Table 2. Comparisons of anthropometric data

Group Parameter	0-week	4-week	8-week	P value
A (n=12) Weight (kg)	67.6(62.0 106.9)	66.6(57.4 106.9)	65.5(55.5 108.5)	0.001
BMI (kg/m ²)	27.5(26.10 38.4)	26.7(24.8 38.4)	26.1(23.9 39.0)	0.009
Waist (cm)	91.6(83.1 116.0)	85.0(78.5 105.5)	85.5(71.2 111.1)	0.001
Hip (cm)	101.7(93.0 115.4)	99.2(91.6 115.7)	98.6(91.5 116.0)	0.091
Right thigh (cm)	53.5(49.0 66.2)	52.0(46.7 64.1)	53.0(46.5 67.0)	0.006
Left thigh (cm)	53.2(48.6 66.6)	52.0(48.0 63.5)	52.8(47.0 68.8)	0.009
B (n=10) Weight (kg)	77.4(63.1 93.1)	74.7(60.3 94.5)	73.7(58.9 94.4)	0.150
BMI (kg/m ²)	28.7(26.4 36.3)	27.7(25.0 37.0)	27.4(24.7 36.4)	0.132
Waist (cm)	94.9(85.5 112.9)	91.8(85.4 108.9)	93.1(83.0 113.0)	0.061
Hip (cm)	104.5(100.5 109.1)	103.5(86.2 110.9)	101.6(93.6 109.2)	0.223
Right thigh (cm)	52.9(52.3 59.8)	53.4(50.6 59.6)	52.9(50.3 61.3)	0.687
Left thigh (cm)	55.4(53.2 62.3)	53.8(50.4 60.1)	54.3(48.6 62.8)	0.156

A, subjects with 500 kcal deficit diet for 8 weeks and interferential current therapy for the first 4 weeks; B, subjects with 500 kcal deficit diet for 8 weeks and interferential current therapy for the latter 4 weeks; P values were the result of Friedman test; Values are presented as median (range).

Table 3. Comparisons in changes of anthropometric data between 0 week and 4th week

Parameter	Group A (n=12)	Group B (n=10)	P value
△ Weight (kg)	-3.00(-4.70 0.00)	-2.30(-5.80 2.20)	0.159
△ BMI (kg/m ²)	-1.30(-2.20 0.00)	-0.85(-2.10 0.70)	0.123
△ Waist (cm)	-4.60(-12.30 -0.50)	-3.35(-10.80 5.50)	0.283
△ Hip (cm)	-2.10(-7.50 0.30)	-1.85(-6.50 2.20)	0.582
△ Right thigh (cm)	-2.20(-5.40 -0.30)	-0.25(-2.40 1.5)	0.003
△ Left thigh (cm)	-1.30(-3.00 0.20)	-0.90(-5.00 -2.0)	0.837

Group A, subjects with 500 kcal deficit diet and interferential current therapy; Group B, subjects with 500 kcal deficit diet only; Compared by Mann Whitney U test; Values are presented as median (range).

Table 4. Comparisons in changes of anthropometric data between 4th week and 8th week

Parameter	Group A (n=12)	Group B (n=10)	P value
△ Weight (kg)	0.00(-4.80 1.60)	-0.20(-1.80 1.60)	0.492
△ BMI (kg/m ²)	-0.20(-1.70 0.80)	-0.20(-1.10 0.90)	0.605
△ Waist (cm)	-0.20(-11.10 8.80)	-0.05(-3.00 10.90)	0.512
△ Hip (cm)	0.30(-4.10 7.40)	-1.30(-3.20 3.20)	0.152
△ Right thigh (cm)	1.00(-2.10 4.10)	-3.50(-2.50 1.80)	0.024
△ Left thigh (cm)	1.30(-4.70 5.30)	0.30(-2.20 2.70)	0.705

Group A, subjects with 500 kcal deficit diet only; Group B, subjects with 500 kcal deficit diet and interferential current therapy; Compared by Mann Whitney U test; Values are presented as median (range).

가 [7].
 가 (4,000 Hz)
 1-100 Hz (beat)
 가
 가
 가 [9].
 가

4

가

CT MRI 가

BMI 25 kg/m²
22

A 4

4

, B 4

2 1 45 , 8

4 A B

(A) 2.2 cm

(B) 0.25 cm

가 . 4 8

가 (B) 3.5

cm (A) 1.0 cm

가 가 . A

4

가 , B 4

- 8
- 가
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