



12 WEEKS OF HOME-BASED RESISTANCE TRAINING DECREASE VISCERAL FAT AREA DURING THE COVID-19 LOCKDOWN: A CASE REPORT

12 semanas de treinamento de resistência em casa decrescem a
área de gordura visceral durante o lockdown da covid-19: um relatório de caso

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ABSTRACT

Background: The covid-19 lockdown demands several spaces for physical exercise to be closed. However, physical exercise produces physical and mental health benefits and an adequate health state. Home-based resistance training emerges as a viable alternative. We report a case of the effects of home-based resistance training on the visceral fat area in a middle-aged woman during the covid-19 lockdown. **Methods:** One middle-aged woman (42 years old; body mass = 53.3kg; Height = 1.61m; Body mass index = 20.6kg/m²) carried out a home-based resistance training program in a city in the interior of the state of São Paulo. The visceral fat area was analyzed through bioimpedance. **Results:** There was a decrease in visceral fat area, in a large magnitude (baseline = 85.9cm² vs. follow-up = 71.3cm²; $\Delta\%=-17\%$). The home-based resistance training program was effective in decreasing the visceral fat area of a middle-aged woman. **Conclusions:** Therefore, it is concluded that the home training program with few resources can enable the reduction of visceral fat area.

Keywords: covid-19; exercise; cardiovascular health

RESUMO

Introdução: O confinamento da covid-19 obrigou pausar vários espaços de exercício físico. No entanto, o exercício físico produz benefícios para a saúde física e mental e um estado de saúde adequado. O treinamento de resistência domiciliar surge como uma alternativa viável. Relatamos um caso dos efeitos do treinamento de força domiciliar na área de gordura visceral em uma mulher adulta durante a pandemia da covid-19. **Métodos:** Uma mulher de meia idade (42 anos; massa corporal = 53,3kg; estatura = 1,61m; índice de massa corporal = 20,6kg/m²) realizou um programa de treinamento de força domiciliar em uma cidade do interior do estado de São Paulo. A área de gordura visceral foi analisada por bioimpedância. **Resultados:** Houve diminuição da área de gordura visceral de grande magnitude (início = 85,9cm² vs. pós-treinamento = 71,3 cm²; $\Delta\%=-17\%$). O programa de treinamento de força em casa foi eficaz em diminuir a área de gordura visceral de uma mulher de meia-idade. **Conclusões:** Portanto, conclui-se que o programa de treinamento domiciliar com poucos recursos pode possibilitar a redução da área de gordura visceral.

Palavras-chave: covid-19, exercício, saúde cardiovascular

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1. INTRODUCTION

In March 2020, the World Health Organization (WHO) recognized a pandemic, caused by the new coronavirus, originating in Wuhan, China⁽¹⁾. Infected people may have respiratory symptoms similar to the common flu or be asymptomatic but still, transmit the disease⁽²⁾. Symptoms range from fever, dyspnea, cough, myalgias, and fatigue⁽³⁾. In this sense, to prevent the spread of the virus, restrictive measures (i.e., lockdown) were implemented in various parts of the world, including Brazil. Since the disease is transmitted through contact with other people, social distancing is necessary to prevent the spread.

The lockdown caused by covid-19 caused several spaces for physical exercise to be closed (walking paths, gyms, parks, and clubs). This reduced possibility for the population to remain physically active during this period⁽⁴⁾. However, knowing the benefits of physical exercise on the physical and mental health of the population, adjustments were made to maintain a good general state of health^(4,5).

An alternative to physical exercise adopted during the lockdown period was home-based resistance training⁽⁶⁾. The home-based resistance training has been proposed as simple, easy, and practical exercise interventions⁽⁷⁾. One of the effects of training is the reduction of fat mass, in special the visceral fat area⁽⁸⁾.

During covid-19 pandemic and lockdown, the visceral fat area increased⁽⁹⁾. The accumulation of visceral fat area leads to an increased risk of developing cardiovascular diseases⁽⁸⁾. In this sense, strategies such as home-based resistance training) was adopted to reduce this accumulation and decrease the odds of having cardiovascular disease.

Given this scenario, we report a case of the effects of home-based resistance training on the visceral fat area in a middle-aged woman during the covid-19 lockdown.

2. Materials and Methods

2.1. Study design and sample

This is a case report study. The study was conducted between March to August 2020 (pandemic and lockdown period). One middle-aged woman (42 years old; body mass = 53.3kg; Height = 1.61m; Body mass index = 20.6kg/m²) carried out a home-based resistance training program in a city in the interior of the state of São Paulo.

This study was approved by Human Research Ethics Committee of Universidade Paulista (CAAE: 51670321.5.0000.5512). The researchers in this study also committed to complying with the recommendations of Resolution 466/2012 of the National Health Council and the declaration of Helsinki. The participant expressed her consent by signing the Free and Informed Consent Form.

2.2. Inclusion and exclusion criteria

The participant should have: a) age above eighteen years; b) be apparently healthy; c) not have medical restrictions; d) no motor restrictions or amputated body parts; e) comply with physical assessments and physical exercise practices at home. Exclusion criteria were: a) not having performed at least 80% of the planned measurements; b) if affected by illnesses or occurrence of physical limitation during the study; c) having voluntarily decided to leave the study.

2.3. Anthropometry

Body mass (kg) was determined using a Filizola[®] anthropometric scale (up to 150 kg), in which the participant was measured wearing light clothes (with shorts, a T-shirt and barefoot). Height (m) was measured with the aid of a Sanny[®] aluminum stadiometer (Professional - ES2020), fixed to the wall, with a precision scale of 0.1 cm. All these procedures followed conventional standardization⁽¹⁰⁾.

2.4. Visceral fat area measurement

The measure of the visceral fat area was acquired through the bioimpedance scale (InBody, 720, Seoul-Korea).

2.5. Home-based resistance training program

Detailed home-based resistance training protocol is present in Table 1. From a general view, the training consisted in a full-body routine with exercises for major muscle groups. The number of series ranged to 1-12 series of pre-established repetitions (some exercises were performed until failure).

ADDENDUM

2.6. Statistical analysis

Descriptive and comparative analysis of the measure of visceral fat area before and after the intervention was performed. For the analysis, was used the absolute values and the delta of change ($\Delta\%$). We performed this analysis on SPSS 23, and the GraphPad Prism 9 for build the graphics.

3. Results

Figure 1 shows the effects of 12-week of home-based resistance training in visceral adipose tissue of the participant of this study. As observed, there was a decrease in visceral fat area (85.9 to 71.3 cm²), in a large magnitude (-17%).

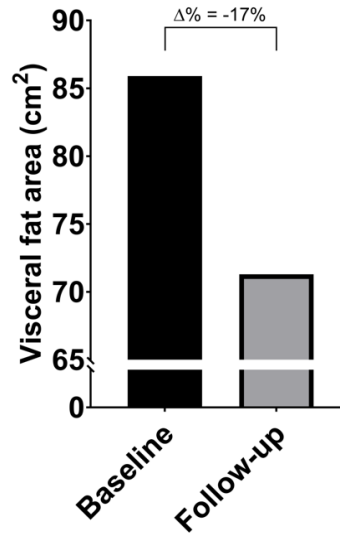


Figure 1. Visceral Fat Area (showed in cm² and Δ%) of the participant before and after 12 weeks of home-based resistance training.

4. DISCUSSION

The reduction obtained in the visceral fat area after 12 weeks of home-based resistance training (86 to 72 cm², or -14 cm²) occurs near according to expected with the reduction showed by a systematic review(11) with includes 65 studies. The systematic review shows a reduction of 26.3 cm² with the execution of a structured exercise alone. If the exercise was accompanied by a caloric restriction (not controlled in the present study) the reduction is greater (51.6 cm²), but similar if the caloric restriction was made without exercise execution (33.6 cm²). In a 12-week multicenter randomized controlled trial that tests the effects of a home-based exercise intervention(12) in the visceral fat area of children with a rare vasculitis (high risk of mortality) showed a significant

reduction (from 274.3 to 253.7g; -20.6%). These studies showed that physical exercise, in a home-based format is effective to reduce visceral fat and can be utilized if the pandemic situations were repeated. The positive visceral fat modifications obtained with physical exercise and lifestyle modifications can be sustained to until 12 months after intervention stops(13,14). The reductions in the visceral fat area were reported with lifestyle interventions also for patients with Nonalcoholic fatty liver disease, and with coronary artery disease(15).

5. CONCLUSIONS

The home-based resistance training program was effective in decreasing the visceral fat area of a middle-aged woman. Also, because of the pandemic, many people have adopted remote work, moving from the big cities, and living in bigger houses with

more comfort. In this way, a home exercise is an option for those who cannot attend gyms due to distance or other restrictions. It is concluded that the home training program with few resources can enable the reduction of visceral fat area.

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OBSERVAÇÃO: Os autores declaram não existir conflitos de interesse de qualquer natureza.

Table 1. Home-based resistance training program for 12 weeks, stratified by days and each training per week.

Days	Week 1	Week 2	Week 3	Week 4
	Exercise (sets x reps)	Exercise (sets x reps)	Exercise (sets x reps)	Exercise (sets x reps)
Monday				Bench press (3 x 30,20,15)
	Military press (3 x 15, 20,30)			
		Bench press (2 x 15,20,15)	Bench press (3 x 15)	Forehead triceps (2 x 30,20,15)
	Trapezius with bar (3 x 20)	Forehead triceps (2 x 30,20,30)	Forehead triceps (3 x 15)	Abdominals (3 x 80)
	Bent-over row (3 x 30)		Abdominals (3 x 60)	Squat (1 x 30)
	Plank (3 x 1min)	Abdominals (3 x 80)		
	Abdominals (3 x 30)	Squat on the ball (1 x 2min) with isometric contraction (50seconds)	Squat on the ball with isometric contraction (1 x 40seconds)	Squats with the leg spread (1 x 20)
	Squat on the ball (1 x 2min)	Squat (1 x 25)	Squat (1 x 15)	Squat on the ball with isometric contraction (1min)
	Squats with the leg spread (1 x 100)	Lunge (2 x 16, 20,16)	Lunge (2 x 10, 20,10)	Squat (1 x 25)
	Calf-raise (4 x 60)		Stiff (4 x 25)	Lunge (3 x 12, 20,12)
Tuesday				Calf-raise (5 x 50)
		Biceps curl (2 x 20,15,20)		Biceps curl (3 x 21)
			Biceps curl (3 x 30)	
	Abdominals (5 x 20,30)	Bent-over row (2 x 15,20,35)	Bent-over row (3 x 15)	Unilateral dumbbell row (3 x 30)
	Squats with the leg spread (3 x until failure)	Abdominals (6 x 30,50)	Abdominals (6 x 30,60)	Abdominals (3 x 50)
	Lunge (2 x 30, 20, 10)	Hip thrust (3 x 20,35,20)	Hip thrust (2 x 100)	Hip thrust (3 x 30)
		Stiff (3 x 25)	Calf-raise (2 x 100)	Stiff (3 x 30)
		Calf-raise (2 x 100)		Quadruped hip extensors (6 x 20)
Wednesday	Push-up (3 x 15)	Front-raise (20second of isometric contraction, following by 3 x 20)	Front-raise (3 x 15)	Military press (3 x 15, 20,30)
	Triceps dip (3 x 12)			
	French press (3 x 20)	Trapezius with bar (3 x 20)	Trapezius with bar (3 x 20)	Trapezius with bar (3 x 20)
	Plank (3 x 30, 40, 60seconds) and abdominals (3 x 30) – bi-set	Plank (3 x 1min)	Abdominals (3 x 30)	Bent-over row (3 x 30)
		Quadruped hip extensors (2 x 100)	Quadruped hip extensors (2 x 15,20,15)	Plank (3 x 1min)
	Hip thrust (1 x 100)			Abdominals (3 x 30)

Days	Week 1	Week 2	Week 3	Week 4
	Exercise (sets x reps)	Exercise (sets x reps)	Exercise (sets x reps)	Exercise (sets x reps)
Thursday	Quadruped hip extensors (1 x 100)			Squat on the ball (1 x 2min)
	Squats with the leg spread (1 x 100)			Squats with the leg spread (1 x 100)
				Calf-raise (4 x 60)
			Plank (3 x 1min)	Front-raise (30seconds of isometric contraction, following by 3 x 20)
	Military press (3 x 15)	Hip thrust (2 x 15,30,15)	Abdominals (3 x 30)	
	Trapezius with bar (3 x 20)	Squat on the ball (1 x 30-40seconds)	Squat on the ball with isometric contraction (1 x 40seconds)	Trapezius with bar (3 x 15)
	Abdominals (3 x 30)	Squat (3 x 20)		Abdominals (12 x 50)
		Lunge (2 x 10,20,10)	Squat (3 x 20)	Hip thrust (30seconds of isometric contraction, following by 3 x 20)
	Squat on the ball (1 x 30-40seconds)	Calf-raise (2 x 100)	Lunge (2 x 10,20,10)	
			Calf-raise (2 x 100)	Trunk flexion (3 x 20)
Friday	Push-up (3 x 15)			
	Triceps dip (3 x 12)			Bench press (3 x 30)
	Hip thrust (3 x 15,20,30)	Push-up (3 x 15)	Push-up (3 x 12)	Biceps curl (3 x 30)
	Squat on the ball (3 x 1min)	Biceps curl (3 x 15)	Biceps curl (3 x 15)	Forehead triceps (3 x 30)
		Triceps dip (3 x 12)	Triceps dip (3 x 15)	Bent-over row (3 x 15)
	Squats with the leg spread (3 x 15,20,30)	Bent-over row (3 x 15)	Bent-over row (3 x 15)	Abdominals (12 x 50)
	Lunge (3 x 30, 20, 15)	Abdominals (6 x 50,60)	Abdominals (6 x 55)	Calf-raise (5 x 50)
	Calf-raise (until failure)			