

**PERBANDINGAN ANTARA EFEK LATIHAN *RESISTANCE* DAN  
*ENDURANCE* TERHADAP PERSENTASE LEMAK TUBUH DAN  
KEBUGARAN KARDIOPULMONAL PADA REMAJA *OBESE***

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**Abstrak**

**Objektif :** Obesitas pada remaja berkaitan dengan ketidakcukupan aktifitas fisik dan kebiasaan makan yang tidak sehat. Intervensi aktifitas fisik yang sering disarankan pada remaja *obese* adalah latihan *endurance*, namun tingkat kepatuhannya rendah karena periode waktu yang panjang. Latihan *resistance* merupakan alternatif yang dapat diberikan namun memerlukan supervisi untuk menghindari risiko cedera. Tujuan penelitian ini adalah membandingkan antara efek latihan *resistance* dan *endurance* terhadap persentase lemak tubuh dan kebugaran kardiopulmonal pada remaja dengan obesitas.

**Metode :** Dua puluh lima remaja usia 14-18 tahun dengan indeks massa tubuh sesuai usia (grafik IMT CDC 2000)  $>P_{95}$  dibagi menjadi kelompok *resistance* dan kelompok *endurance*. Kelompok *resistance* diberikan latihan menggunakan *bodyweight* dengan target intensitas sesuai *Borg scale* 14-15, frekuensi 3x seminggu selama 8 minggu, sedangkan latihan *endurance* dimulai dengan intensitas ringan (THR : 57-64% HRMax) bertahap ditingkatkan hingga *moderate* (THR : 64-76 HRMax) dengan senam *aerobic* (*zumba fitness*) selama 60 menit (pemanasan 10 menit, inti 40 menit, pendinginan 10 menit), frekuensi 3x/minggu selama 8 minggu.

**Hasil :** Terdapat penurunan persentase lemak tubuh pada kelompok *resistance* ( $41.27 \pm 9.66$  menjadi  $25.89 \pm 8.83$ ;  $p\text{-value} = 0.00$ ) dan kelompok *endurance* ( $38.48 \pm 5.38$  menjadi  $17.78 \pm 7.60$ ,  $p\text{-value} = 0.00$ ). Peningkatan kebugaran kardiopulmonal yang dinilai dengan *maximal oxygen uptake* ( $VO_{2\max}$ ) ditemukan pada kelompok *resistance* ( $28.98 \pm 3.70$  ml/kg/menit menjadi  $35.20 \pm 4.74$  ml/kg/menit;  $p\text{-value} = 0.00$ ) dan kelompok *endurance* ( $29.65 \pm 2.25$  ml/kg/menit menjadi  $40.59 \pm 2.51$  ml/kg/menit;  $p\text{-value} = 0.00$ ). Tidak terdapat perbedaan bermakna pada perubahan persentase lemak tubuh antara kelompok *resistance* dan *endurance* ( $p\text{-value} = 0.10$ ), sedangkan terdapat perbedaan bermakna pada perubahan *maximal oxygen uptake* ( $VO_{2\max}$ ) antara kelompok *resistance* dan *endurance* ( $p\text{-value} = 0.00$ ).

**Kesimpulan :** Latihan *resistance* maupun *endurance* 3x/minggu selama 8 minggu dapat menurunkan persentase lemak tubuh dan peningkatan kebugaran kardiopulmonal pada remaja dengan obesitas.

**Kata kunci:** latihan *resistance*, latihan *endurance*, persentase lemak tubuh, remaja *obese*, kebugaran kardiopulmonal

## **COMPARISON EFFECT BETWEEN RESISTANCE AND ENDURANCE EXERCISES TO PERCENTAGE BODY FAT AND CARDIOPULMONARY ENDURANCE ON ADOLESCENT WITH OBESITY**

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### **Abstract**

**Objective:** Obesity in adolescents is associated with inadequate physical activities and unhealthy eating habits. Endurance exercises are physical activity interventions that are often recommended for obese adolescents. However, the level of compliance is low because of a long period. Resistance exercises are one of the alternative methods for physical activity interventions, but require supervision to avoid the risk of injury. The purpose of this study is to compare the effect of resistance and endurance exercises on body fat percentage and cardiopulmonary fitness in adolescents with obesity.

**Methods:** Twenty-five adolescents aged between 14 and 18 years old with body mass index according to age (BMI CDC 2000 chart)  $>P_{95}$  were divided into two groups (i.e., resistance and endurance groups). The resistance group was given the training using bodyweight with target intensity according to the Borg scale 14-15, and with a frequency of 3 times per week for 8 weeks. Meanwhile, the endurance group was given the exercises started with mild intensity (THR: 57-64% HRMax) and then gradually increased to moderate (THR: 64-76 HRMax) with aerobic exercise (Zumba fitness) for 60 minutes (i.e., **warming-up** for 10 minutes, core for 40 minutes, cooling down for 10 minutes), and with a frequency of 3 times per week for 8 weeks. The outcomes of this study are body fat percentage and maximal oxygen uptake ( $VO_{2max}$ ).

**Results:** The body fat percentage in both resistance and endurance groups decreased from  $41.27 \pm 9.66$  to  $25.89 \pm 8.83$  and  $38.48 \pm 5.38$  to  $17.78 \pm 7.60$ , respectively. The p-value was 0.00 in both groups. Furthermore, cardiopulmonary fitness increased as measured by maximal oxygen uptake ( $VO_{2max}$ ) for both groups. The  $VO_{2max}$  increased from  $28.98 \pm 3.70$  ml/kg/min to  $35.20 \pm 4.74$  ml/kg/min (p-value = 0.00) in the resistance group. Meanwhile, the  $VO_{2max}$  in the endurance group increased from  $29.65 \pm 2.25$  ml/kg/min to  $40.59 \pm 2.51$  ml/kg/min (p-value = 0.00). There is no significant difference in the changes in body fat percentage between the resistance and endurance groups (p-value = 0.10), while there is a significant difference in the changes in maximal oxygen uptake ( $VO_{2max}$ ) between the resistance and endurance groups (p-value = 0.00). Besides, the  $VO_{2max}$  results suggest that the endurance group had a higher increase in maximal oxygen uptake compared to that the resistance group.

**Conclusion:** The resistance and endurance exercise 3 times per week for 8 weeks can reduce the body fat percentage and increase the cardiopulmonary endurance in adolescents with obesity.

**Keywords:** resistance training, endurance exercise, body fat percentage, adolescent obesity, cardiopulmonary endurance.