Aerobic exercises and laser liypolysis versus liposuction in treatment of outer female thigh adiposity

By

EMAD MAKRAM GHTTAS

Master in "PHYSICAL THERAPY"

التمرينات الهوائية وتفتيت الدهون بالليزر مقابل شفط الدهون في علاج السمنة الموضعية بمنطقة الفخذ الخارجية للسيدات

مقدمة من

عماد مكرم غطاس

ماجستير العلاج طبيعي


Introduction

Obesity can be defined as deposition of fat tissue that is sufficiently large to impair health. Enlargement of central, abdominal fat tissue is associated with increased risk of ischemic heart disease, stroke and non-insulin dependent diabetes. Enlargement of fat tissue in the buttocks and thighs is less medically serious, carrying an increased risk for varicose veins, joint problems and possibly diabetes. Overweight and obesity are a result of energy imbalance over a long period of time. The cause of energy imbalance for each individual may be due to a combination of several factors. Individual behaviors, environmental factors and genetics, all contribute to the complexity of the obesity epidemic

- **The rise in prevalence of obesity and metabolic syndrome in recent decades shows that obesity has become a major threat for public health. Non pharmacological treatments such as nutritional intervention and regular physical activity are the key components of therapy of the metabolic syndrome. Obesity is associated with numerous health complications which range from non-fatal debilitating conditions such as osteoarthritis, to life threatening chronic disease such as coronary heart disease, and from lowered self-esteem to clinical depression. Recent estimates suggest that between 2 to 8% of the total sick care costs in Western countries are attribute to obesity**

Aerobic exercise has increased work capacity, improved cardio respiratory fitness, improved ventilatory muscle endurance, enhanced the immune function and brings favourable changes in body mass and body composition, even without dietary restriction. The aerobic conditioning phase of the exercise sessions utilized several modalities; treadmills, lower-extremity ergometers, arm ergometers, combined upper and lower ergometers, were used. Aerobic exercise therapy consisting of a track or treadmill walking, upright or recumbent cycling, rowing, stair-stepping, elliptical trainer exercise, and arm-ergometer training

- As with any surgical procedure, liposuction is associated with certain expected side effects such as bruising, swelling and temporary numbness. Although irregularities of the skin are possible following liposuction, this is minimized by the tumescent technique. Major complications tend to be rare and can be minimized by adhering to the 5 pillars of safety i.e. properly trained and educated surgeon in liposuction techniques, well trained anesthesiologist, completely equipped facility where the procedure is performed, trained support staff working in the operating room and recovery room, proper selection of the patient

- Many clinicians also pinch the skin up to ensure that laser energy is applied to the deep subcutaneous fat and then release the pinched skin and treat more superficially at the deep dermis to facilitate neocollagenesis. Pinching the skin is also used to evaluate the treatment area after laking to ensure a smooth and even removal of fatty tissue. An infrared thermometer (some devices come equipped with an internal subcutaneous thermometer) should be used to monitor temperature during laser administration, being careful not to exceed 38 to 40oC

Purpose of the study

Purposes of this study were the following:

To evaluate the therapeutic efficacy of the laser lipolysis and aerobic exercises on the subcutaneous adipose tissue on the female's outer thigh region.

To evaluate the therapeutic efficacy of the liposuction surgery on the subcutaneous adipose tissue on the female's outer thigh region.

To evaluate effects of the laser lipolysis and aerobic exercises on thickness of the thigh fatty pad by pinching or folding method (skin folder).

To evaluate effects of the liposuction surgery alone on thickness of the thigh fatty pad by pinching or folding method (skin folder).

To detect effects of the laser lipolysis and aerobic exercises on depth of the fatty layer by the ultrasonography.

To detect effects of the liposuction surgery alone on depth of the fatty layer by the ultrasonography.

To gain knowledge about the laser lipolysis and aerobic exercises application as well as their implementations in obese females.

To share in designing the optimal and ideal protocol for the treatment of the localized subcutaneous adipose tissue in obese females.

MATRIALS AND METHODS

Subjects

Sixty female patients with ages ranging from 20 to 40 years and suffering from localized fat deposits at the thigh area and their weights were ranged from 60 to 80 Kg. They were selected from the outpatient clinic of the plastic surgery department at Cairo University Hospitals. They were free from any other health problems that may affect results of the study as pregnancy, lactation, active kidney or hepatic disease, diabetes mellitus, thyroid disease, previous surgeries and the presence of fibrosis or adherence in the areas to be treated.

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Patients groups.

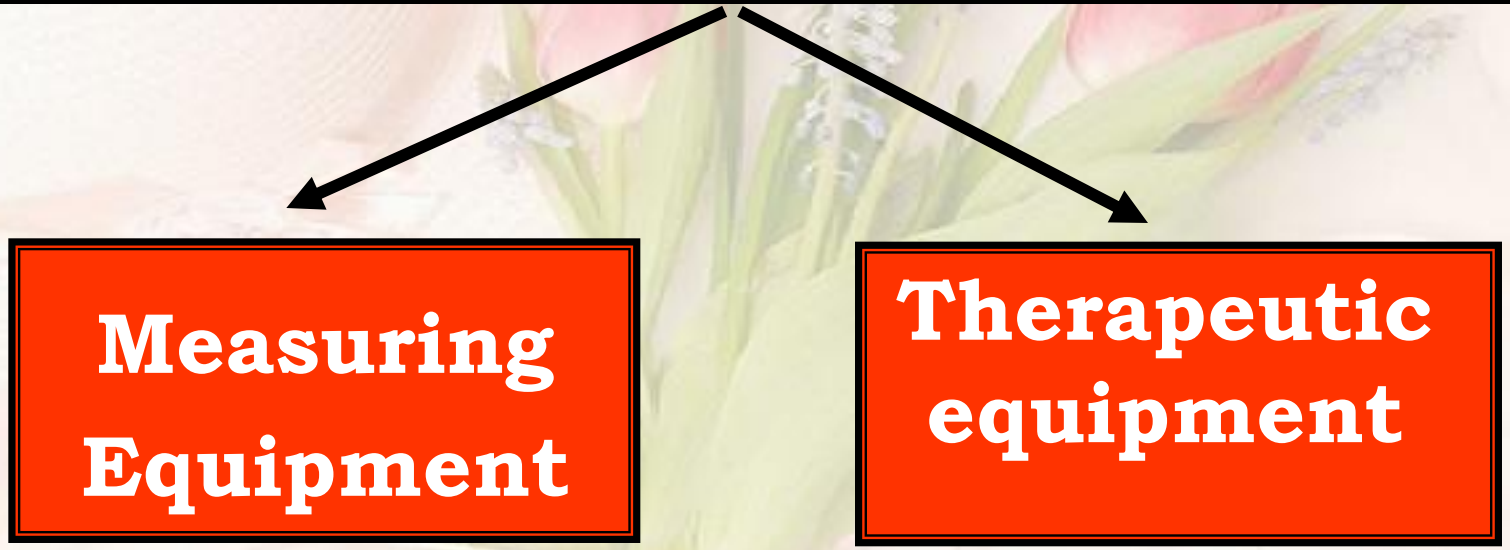
Patients were randomly assigned into two experimental groups; each group consisted of 30 patients .The first experimental group who received the laser lipolysis and aerobic exercises (aerobic programme was 45 minutes session day after day for three successive months), while the second study group who underwent the liposuction surgery. Measurements were conducted before starting the treatment as a first record and at the end of the third month of treatment as a second (final) record.

Group (1): 30 female patients who had localized fat deposits at the thigh area, and they received the laser lipolysis and aerobic training session day after day for three successive months.

Group (2): 30 female patients who had localized fat deposits at the thigh area, who underwent the liposuction surgery only .

Equipment Used

Equipment Used



Skin Fold Caliper.

Ultrasonography equipment to measure thickness (depth) of the fatty pad in cm .

Therapeutic equipment

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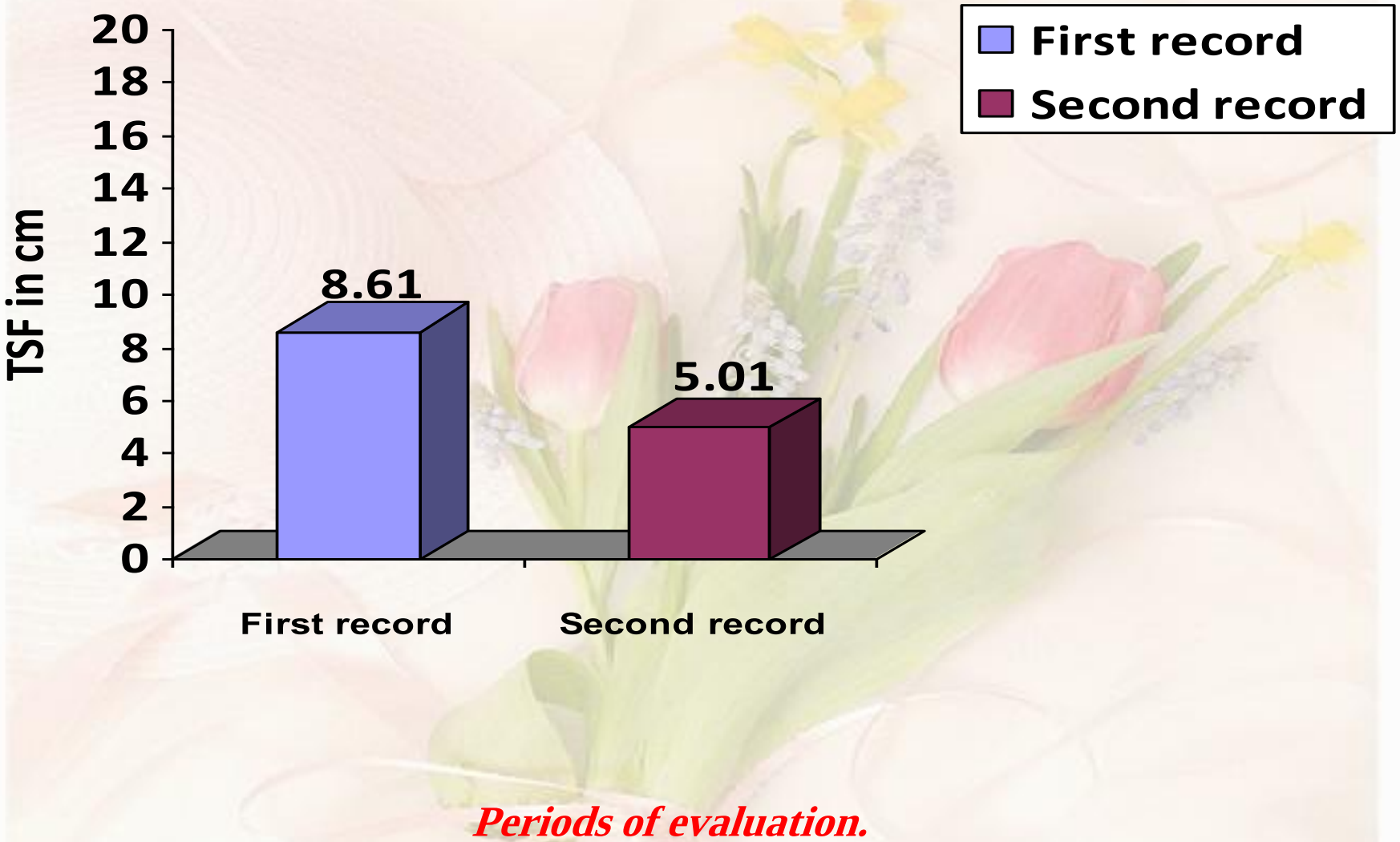
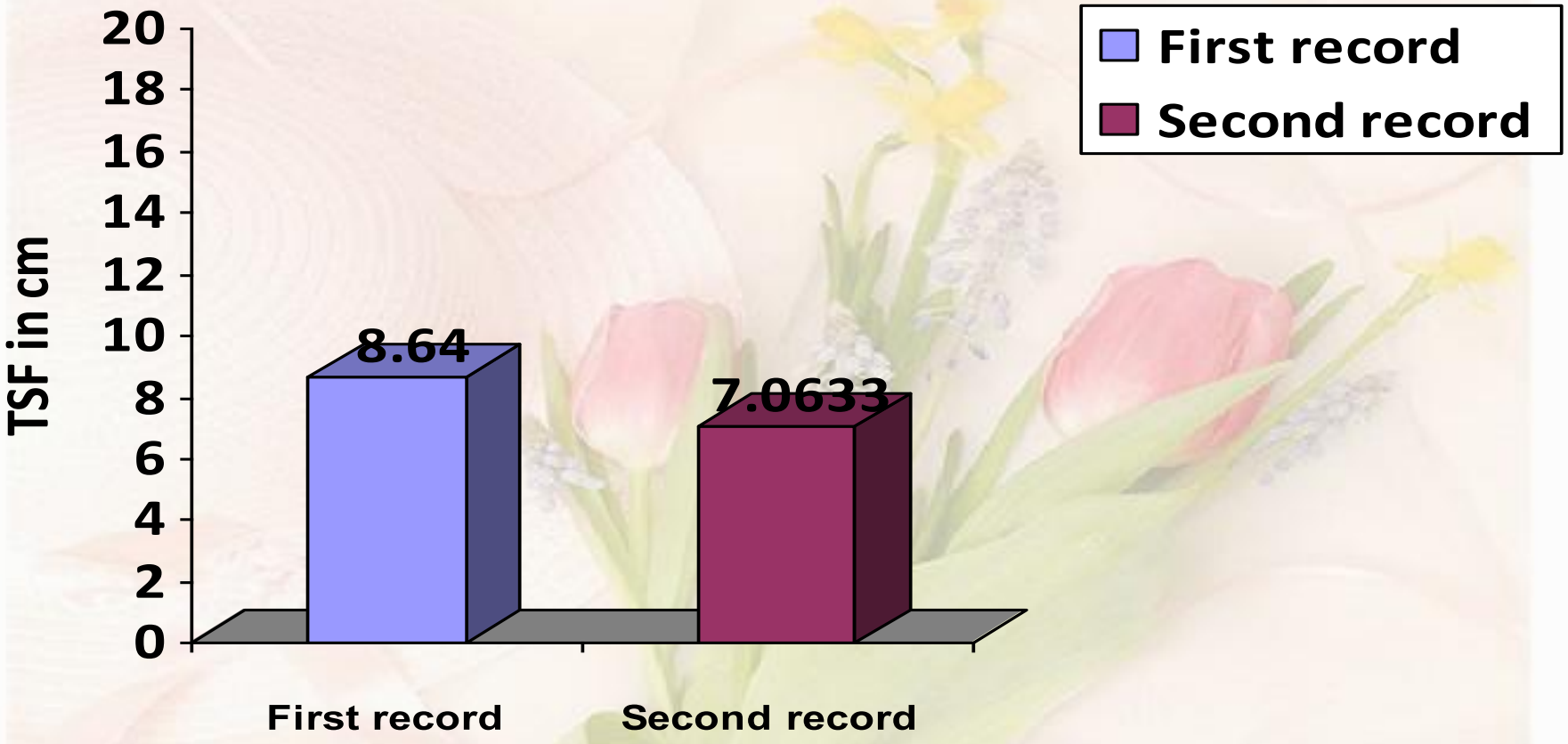
980-nm diode laser for the subcutaneous laser lipolysis.

. ***Bicycle ergometer for the aerobic training.***

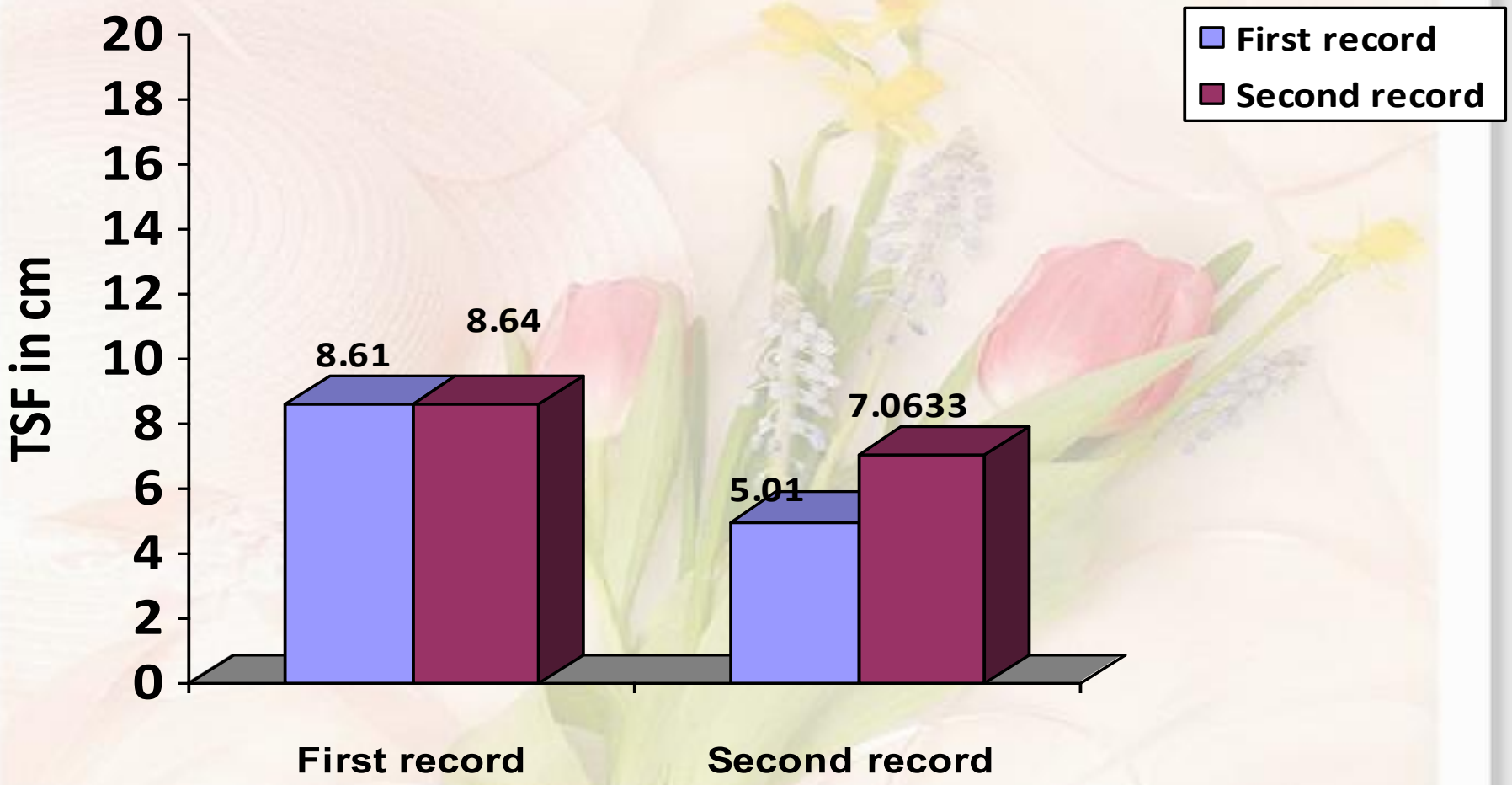
Results



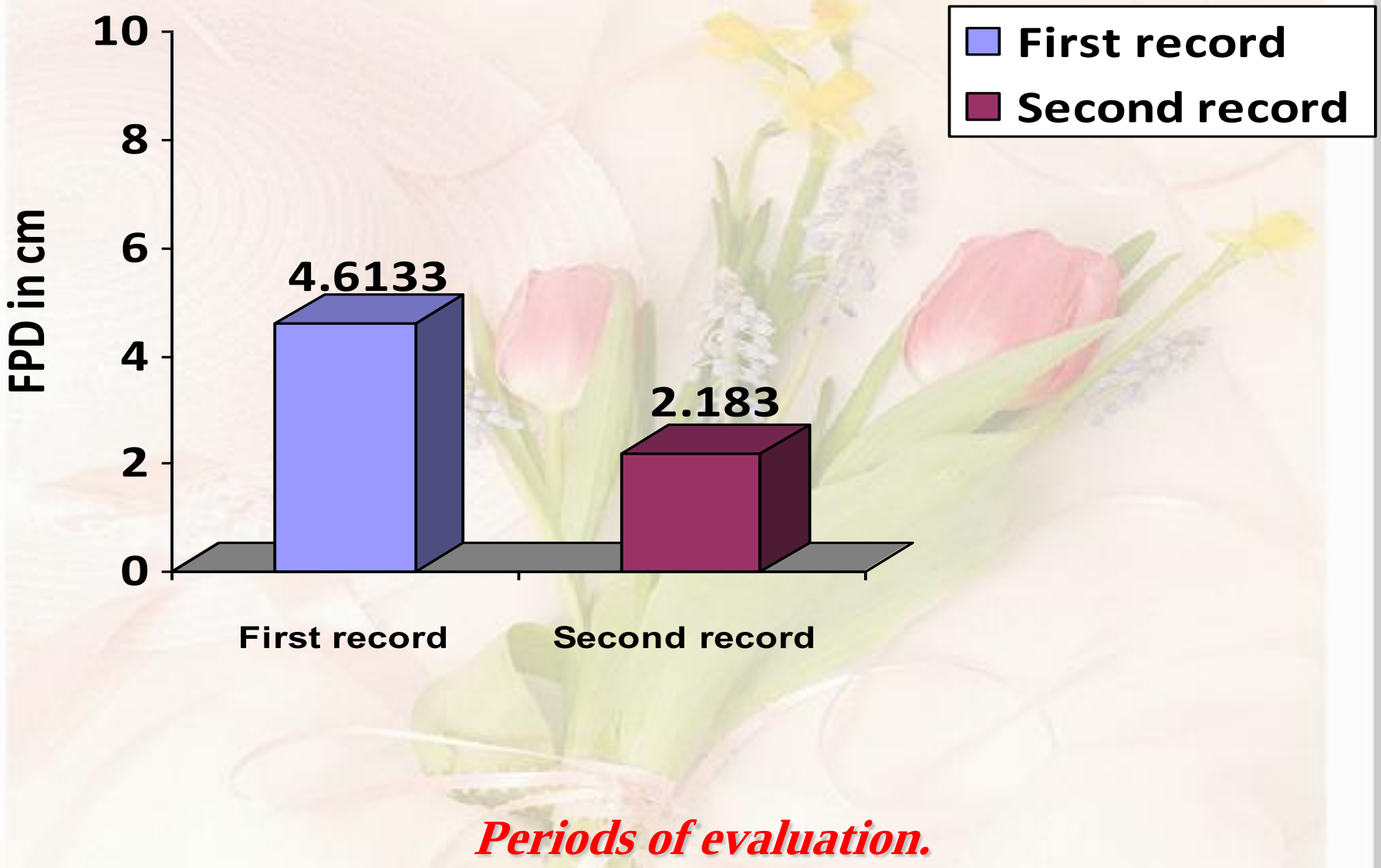
Bars representing the mean values of the thigh skin fold in the first experimental group (Laser lipolysis and aerobic exercises training).



Bars representing the mean values of the thigh skin fold in cm of the 2 records in the second experimental group (Liposuction and postoperative care application).

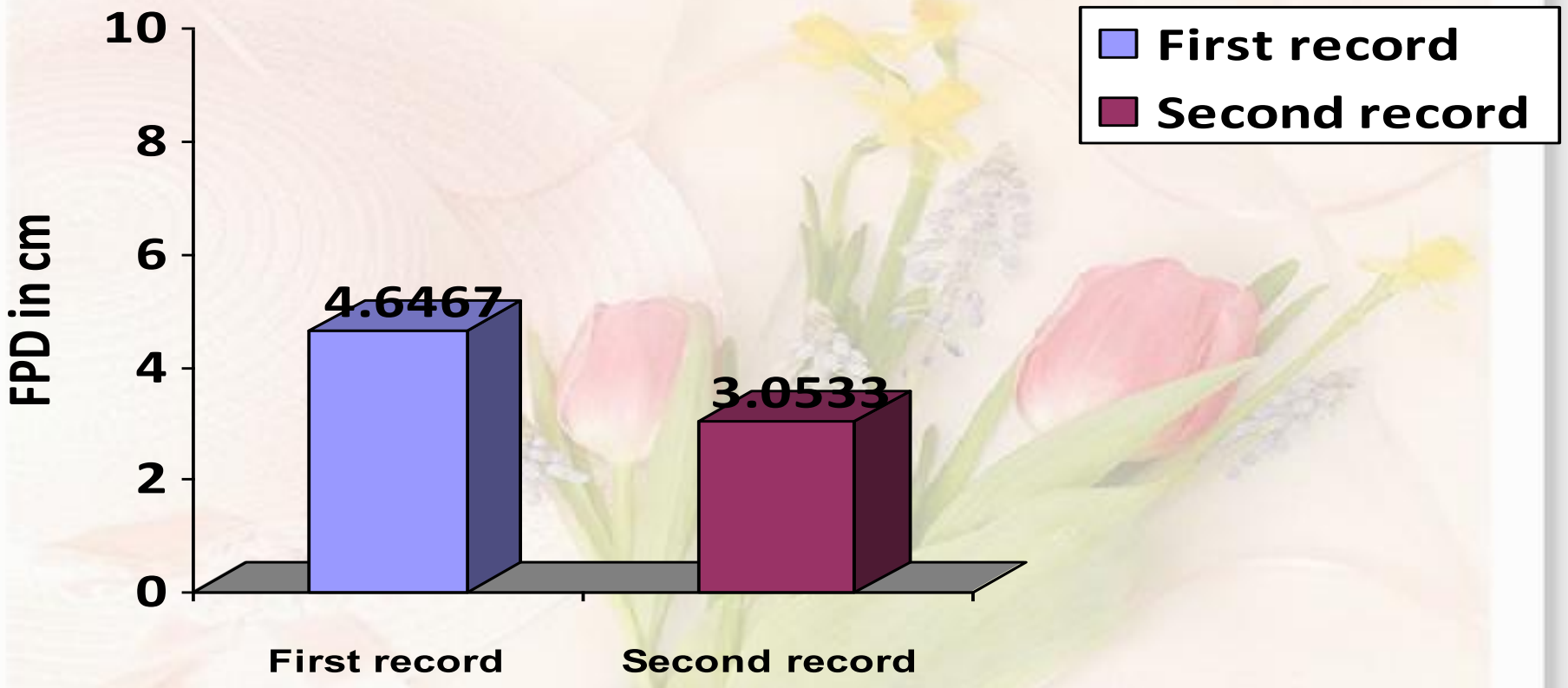


Bars representing the mean values of the thigh skin fold in cm of the 2 records of the 2 experimental groups.



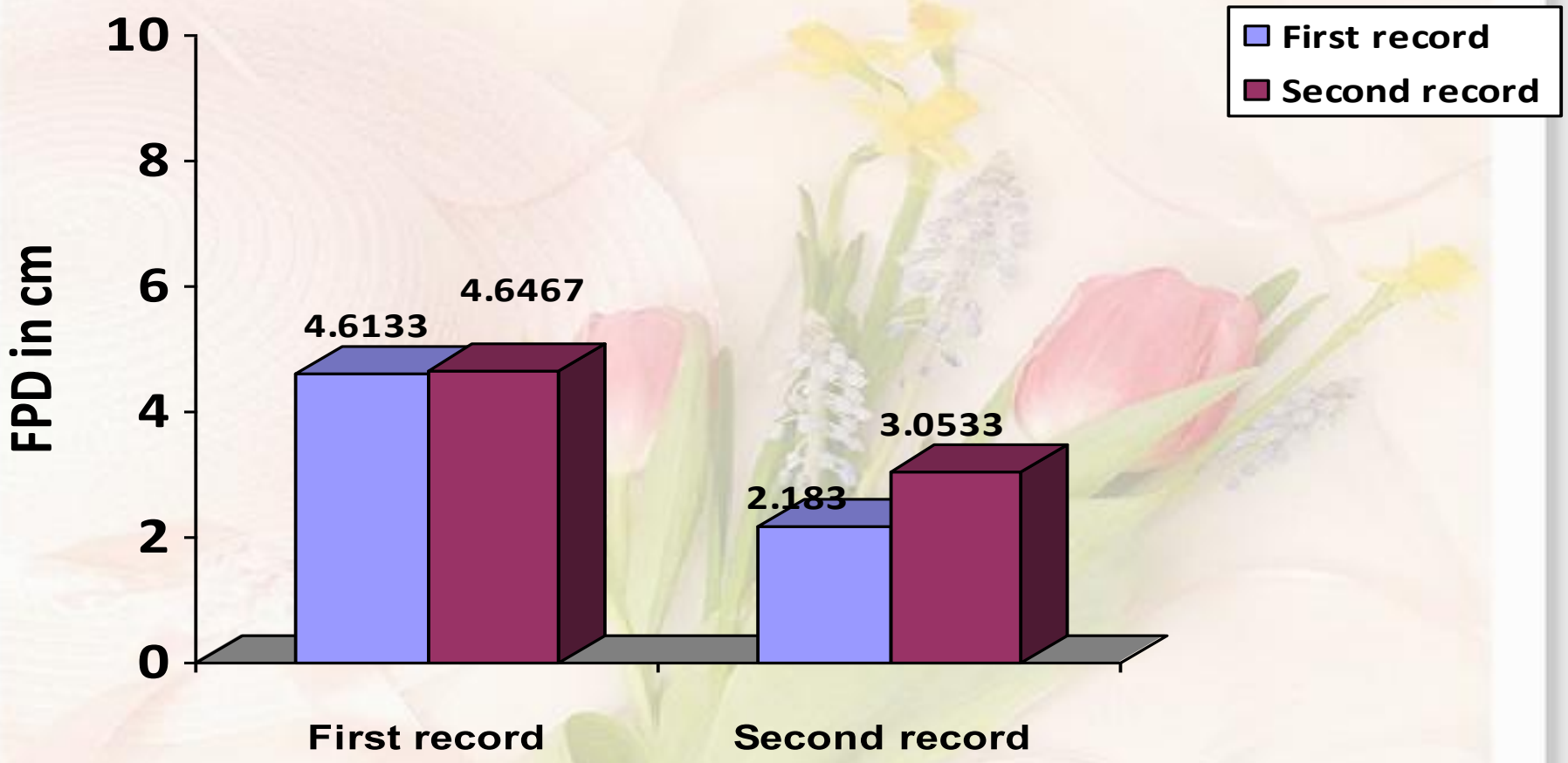
Periods of evaluation.

Bars representing the mean values of the ultrasonographic fatty pad depth in cm of the first experimental group (Laser lipolysis and aerobic exercises training).



Periods of Evaluation.

Bars representing the mean values of the ultrasonographic fatty pad depth in cm of the 2 records in the second experimental group (Liposuction and the postoperative care application).



Periods of evaluation.

Bars representing the mean values of the ultrasonographic fatty pad depth in cm of the 2 records of the 2 experimental groups.


DISCUSSION

Significant differences, between the first experimental (Laser lipolysis and aerobic exercise training) and the second experimental (Liposuction and postoperative care application) groups, which were in the form of a highly significant decrease in the TSF and FPD, were consistent with those observed and recorded by Adamu et al., 2006; Alberga, 2013; Argus, 2010; Badin, 2002 and 2003; Benatti, 2011; Bingol and Cinar, 2014; Botero, 2014; Boudou, 2003; Coleman, 1999 and 2001; Davidson, 2007; De Glisezinski, 2003; DeStefano, 2000; Dudelzak et al., 2009; Fernandez et al., 2004; Goldman, 2006 and 2008; Horowitz, 2003; Katz and McBean, 2008; Khoury, 2008; Kim and Geronemus, 2006; Mordon, 2008; Venkataram and Mysore, 2013 and Yoho et al., 2005.

Eventually, after the discussion of the results and according to reports of the previous investigators in fields related to this study, it can be claimed that the application of both treatment protocols (laser lipolysis and aerobic exercise training) in the first experimental group as well as (liposuction and the postoperative care) in the second experimental group had a valuable effects on the localized adipose tissue as evidenced by the highly significant decreases in TSF and FPD. But the laser lipolysis and aerobic exercise training treatment protocol was more fruitful than the liposuction and the postoperative care treatment protocol.


Summary
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Conclusion

Both treatment protocols (laser lipolysis and aerobic exercise training) in the first experimental group as well as (liposuction and the postoperative care) in the second experimental group had a valuable effects on the localized adipose tissue as evidenced by the highly significant decreases in TSF and FPD. But the laser lipolysis and aerobic exercise training treatment protocol was more fruitful than the liposuction and the postoperative care treatment protocol.


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