

قالوا سبحانك لا علم

لنا إلا ما علمتنا انك

انت العليم الحكيم

صدق الله العظيم

سورة البقرة الآية (٢٢)



***THORACOLUMBAR VERSUS INGUINAL  
TRANSCUTANEOUS ELECTRICAL NERVE  
STIMULATION IN ILIOHYPOGASTRIC  
POSTOPERATIVE NEURALGIA***

By

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**B.SC. "PHYSICAL THERAPY"**

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**مقدمة من**

**محمد رداد**

**بكالوريوس العلاج الطبيعي**

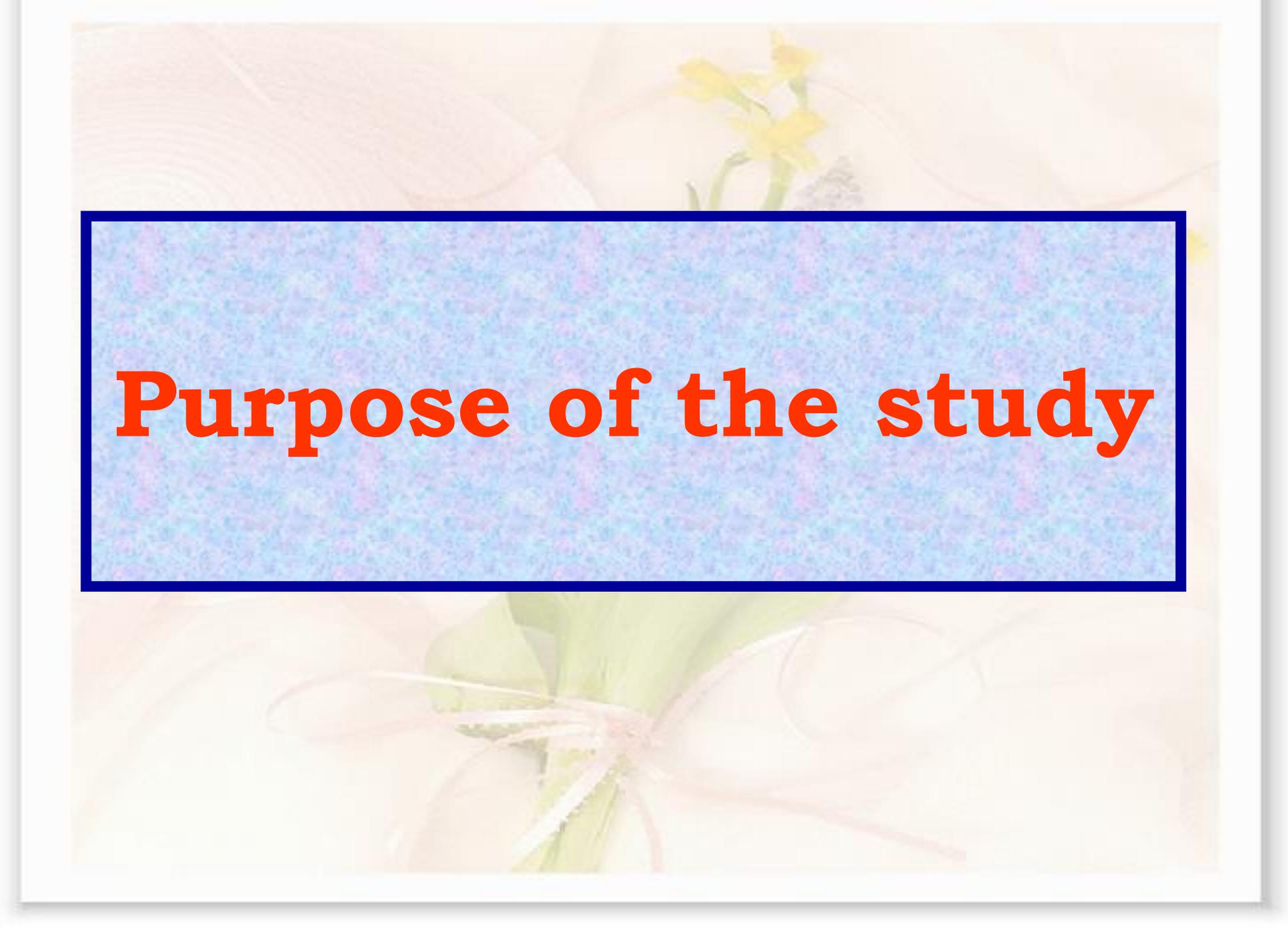
A decorative gold frame with a floral and leaf border surrounding the text. The frame is ornate and features a variety of green leaves and small flowers in shades of purple, red, and yellow. The text "Introduction" is centered within the frame in a bold, green, 3D-style font with a black outline.

# ***Introduction***

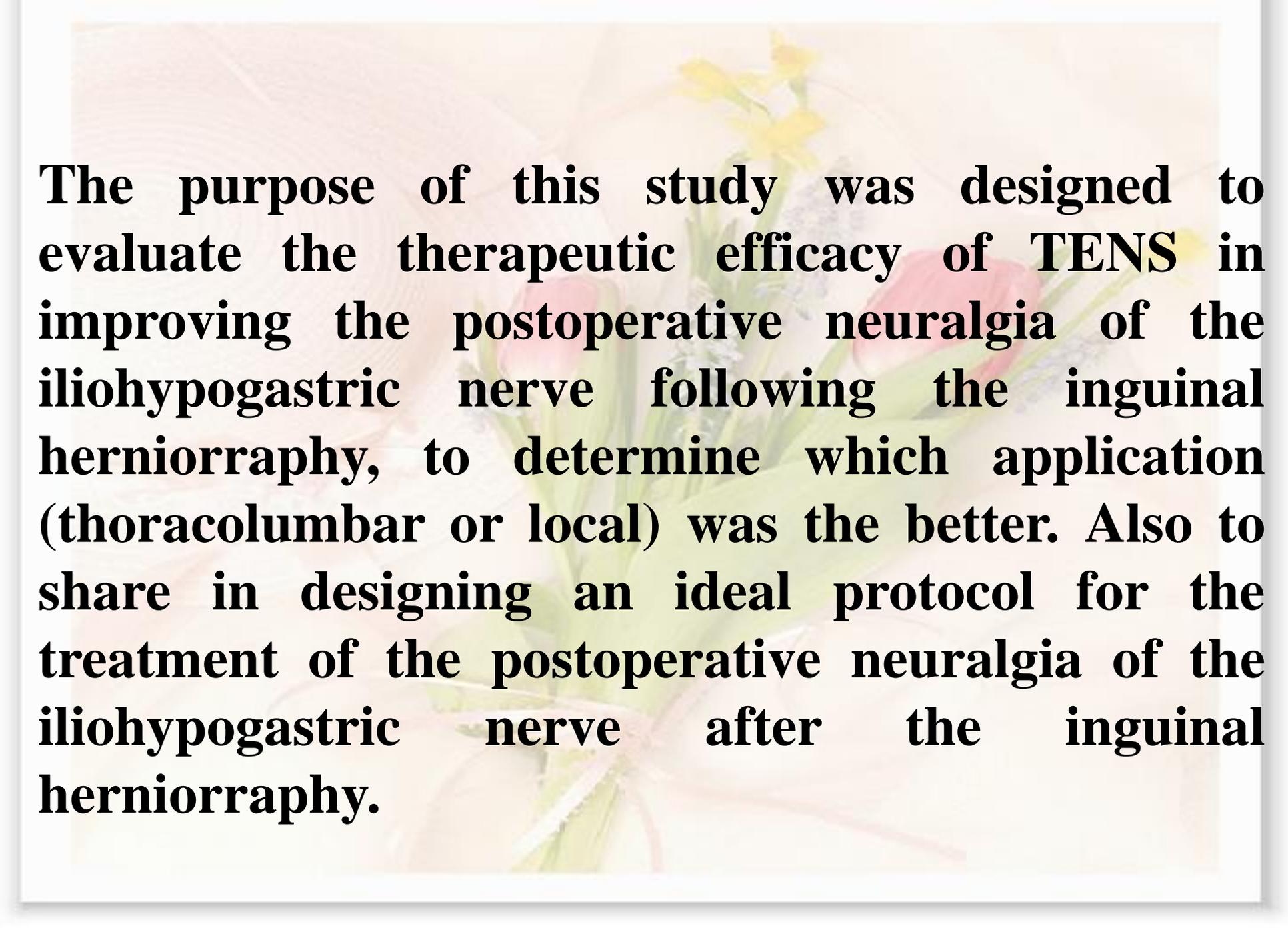
*Persistent pain (neuralgia) and burning sensations (paraesthesia) from the surgical incision of the inguinal herniorrhaphy extending laterally into the inguinal region and suprapubic region caused by iliohypogastric nerve entrapment after inguinal herniorrhaphy, appendectomy, or lower quadrant blunt trauma are intractable and when persistent may result in severe morbidity. It is well known that the iliohypogastric nerve can be inadvertently injured during the inguinal herniorrhaphy, and caution is stressed during the teaching of this common procedure to resident physicians. Persistent postoperative pain and / or paraesthesia in the distribution of the iliohypogastric nerve may occasionally occur. Entrapment of the iliohypogastric nerve may be caused by inadvertent suture placement, fibrous adhesions and cicatricial neuroma. Reexploration of an inguinal hernia incision to perform neurectomy, neurolysis, or remove a neuroma involving the iliohypogastric nerve is sometimes necessary.*

- **Symptoms include burning or lancinating pain immediately following the abdominal operation. The pain extends from the surgical incision laterally into the inguinal region and suprapubic region. Discomfort may occur immediately or up to several years after the procedure and may last for months to years. This discomfort is possibly because of the formation of scar tissue in the region. Occasionally, the pain may extend into the genitalia due to the significant overlap with other cutaneous nerves. Loss of sensation is usually minimal and not problematic. Iliohypogastric nerve entrapment causing symptoms similar to trochanteric bursitis refractory to conventional therapy has been reported**

TENS is an effective, noninvasive, nonaversive, nonaddictive method of managing pain, muscle guarding and dysfunction of the pain cycle as well as the internal changes that accompanied the pain cycle can be managed or at least reduced by TENS application. As pain produces a state of muscle tension that results in a diminished blood supply within the painful area (or a state of ischaemia), increased metabolites, decreased oxygen supply, decreased lymphatic clearing, decreased nutrient supply, increased muscle fatigue, inflammation and oedema. All these internal changes can lead to the progressive amplification of the pain cycle which can be prevented or reduced by TENS

The background of the slide features a soft-focus image of a gift box wrapped in light-colored paper with a pink ribbon tied in a bow. A small yellow flower is visible in the upper right corner. A central blue rectangular box with a dark blue border contains the text.

# **Purpose of the study**



**The purpose of this study was designed to evaluate the therapeutic efficacy of TENS in improving the postoperative neuralgia of the iliohypogastric nerve following the inguinal herniorrhaphy, to determine which application (thoracolumbar or local) was the better. Also to share in designing an ideal protocol for the treatment of the postoperative neuralgia of the iliohypogastric nerve after the inguinal herniorrhaphy.**



***MATERIALS AND  
METHODS***

## **Subjects**

**Forty patients of both sexes with postoperative neuralgia of the iliohypogastric nerve were referred from out-clinics of the general surgery departments in Cairo university hospitals (Kasr-El Aini hospital). Their ages were ranged from 30 to 50 years old. They were assigned randomly into two groups; the first experimental group (A) was composed of twenty patients who received the thoracolumbar TENS in addition to the traditional physical therapy and medical care for 3 months. The second experimental group (B) was composed of twenty patients who received the local (inguinal) TENS in addition to the traditional physical therapy and medical care for 3 months.**



# Equipment Used

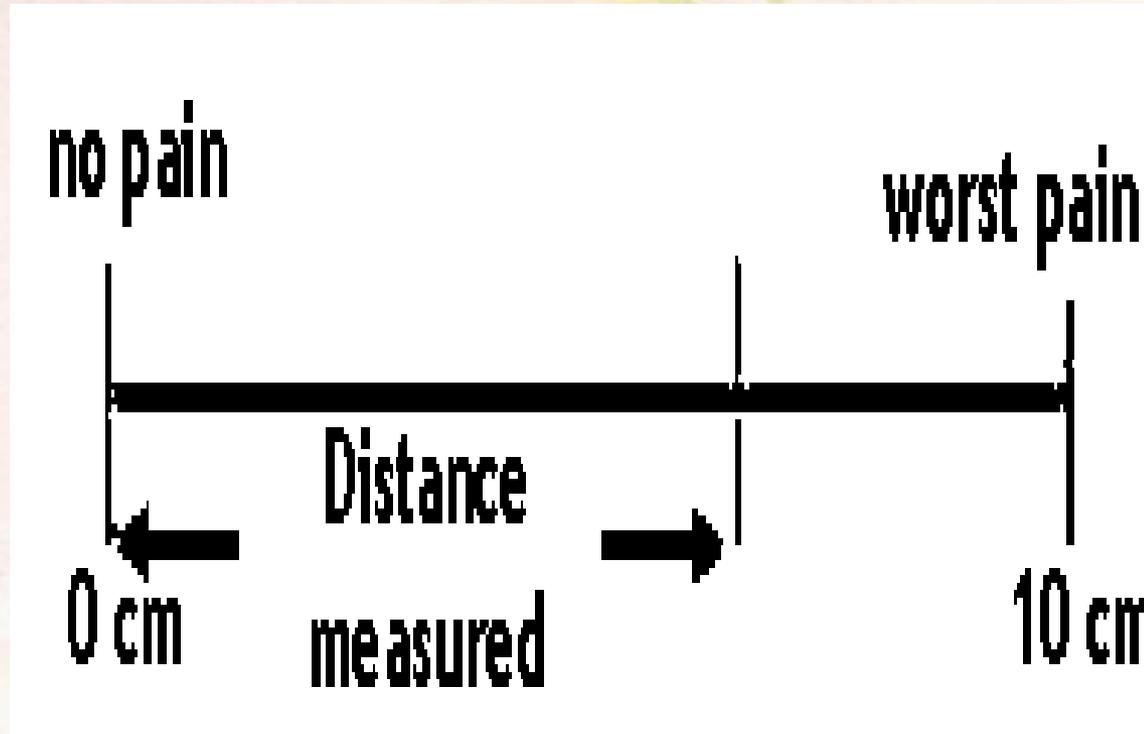
# Equipment Used

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graph TD; A[Equipment Used] --> B[Measuring Equipment]; A --> C[Therapeutic equipment];
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**Measuring  
Equipment**

**Therapeutic  
equipment**

**A- Visual analogue scale (VAS)**



**B- Calculation of the carbamazepin medicament intake (CMI) in mg:**



# **Therapeutic equipment**



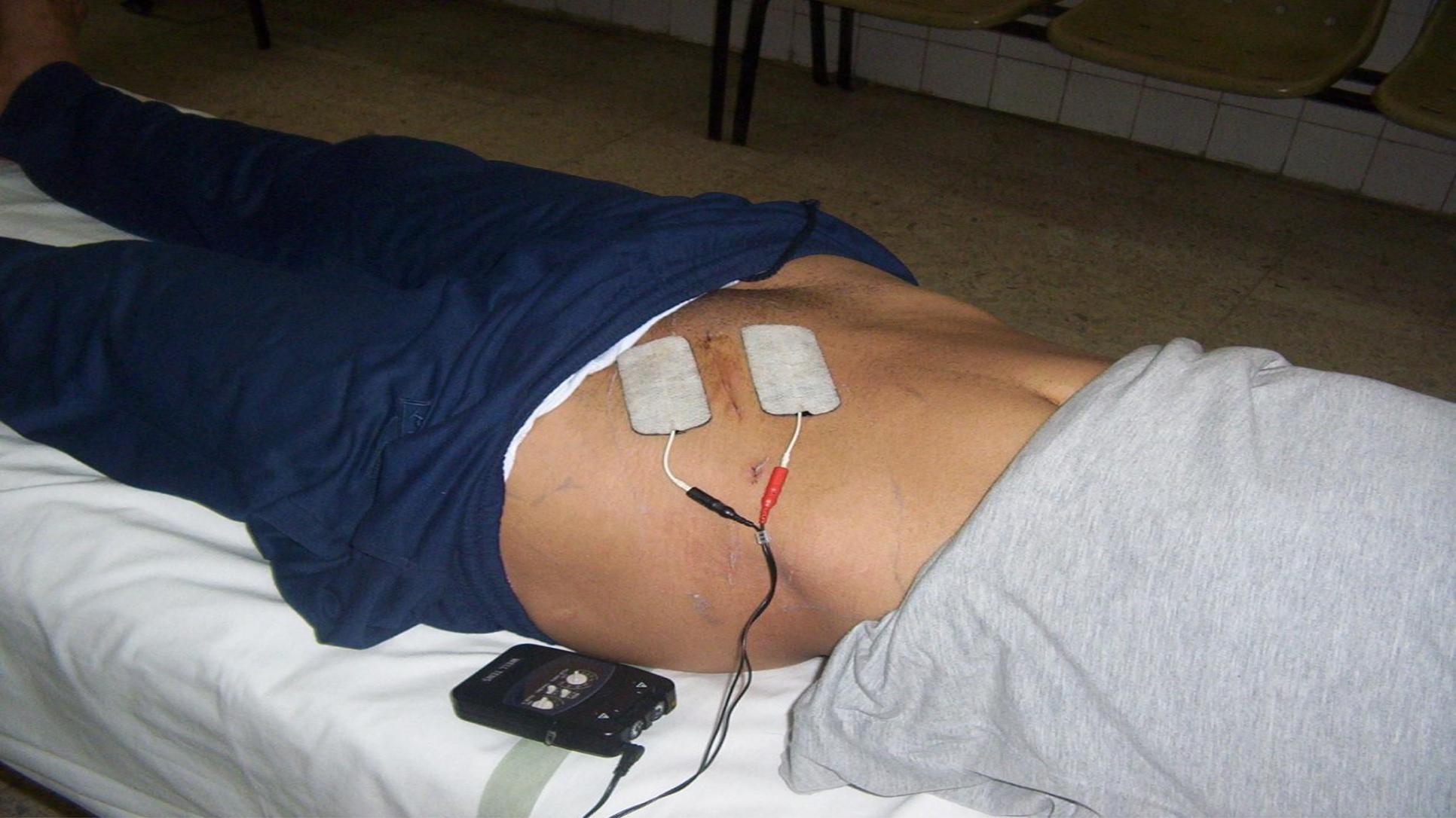
**Transcutaneous Electrical Nerve Stimulation device with self adhesive electrodes.**



# **Treatment procedures**



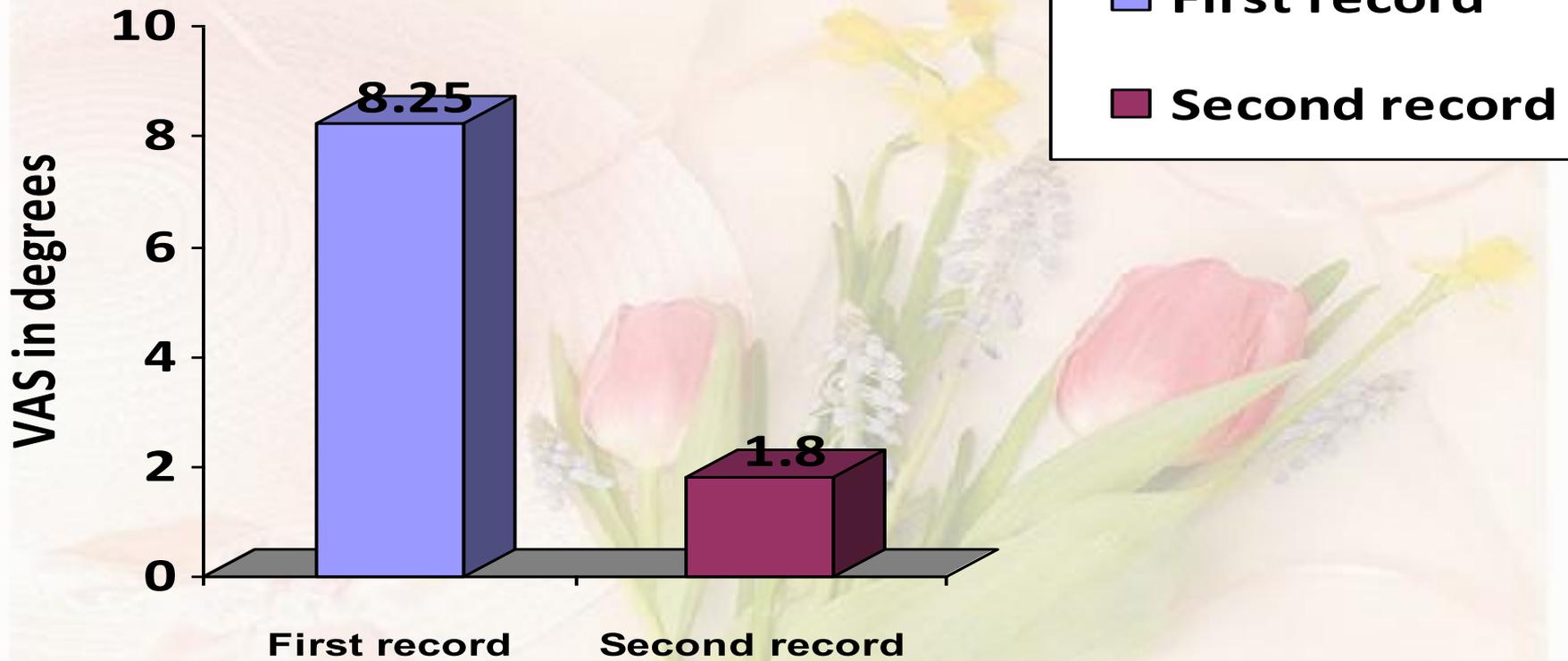
**Procedure of TENS for the paravertebrally application on the affected side.**



**Procedure of TENS for the local inguinal application.**



# Results



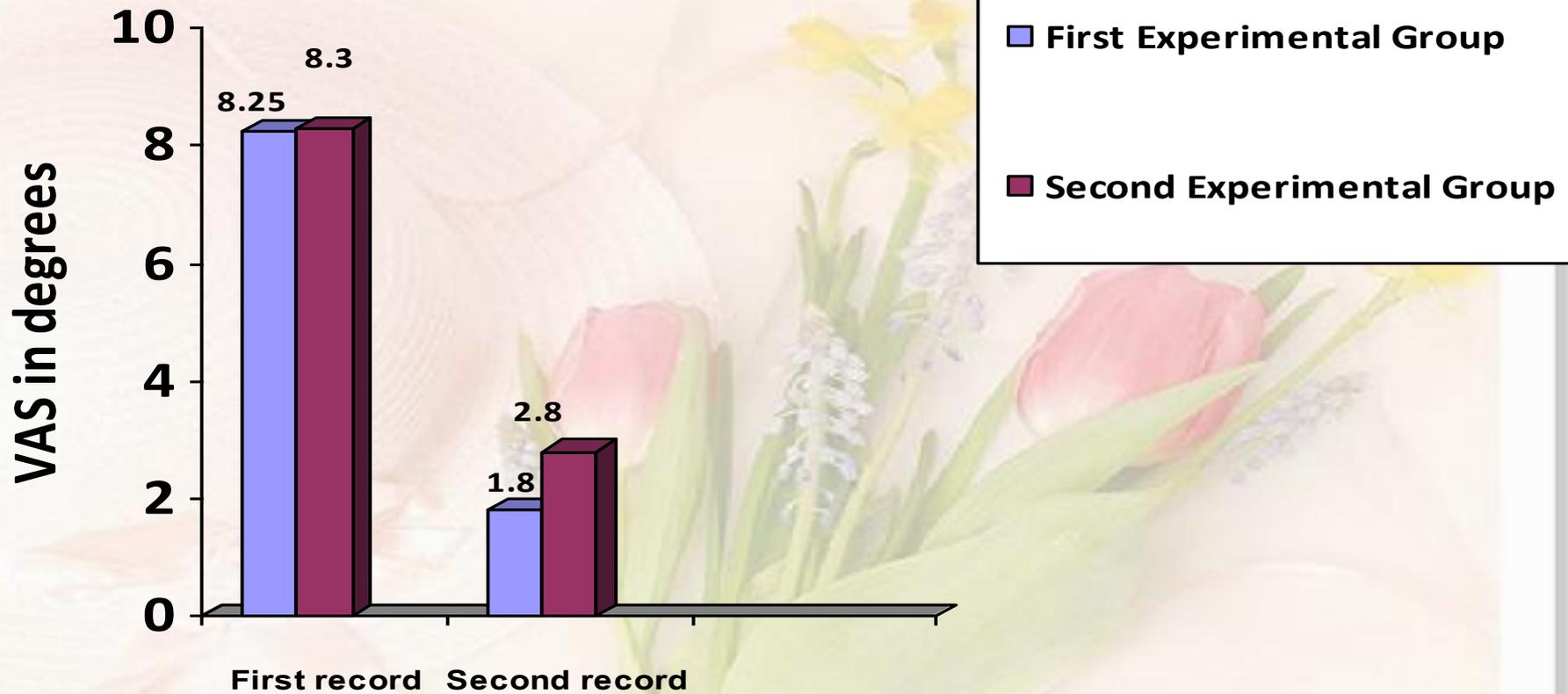
***Periods of evaluation.***

***Bars representing the mean values of the visual analogue scale in degrees of the 2 records of the first experimental group (Thoracolumbar TENS).***

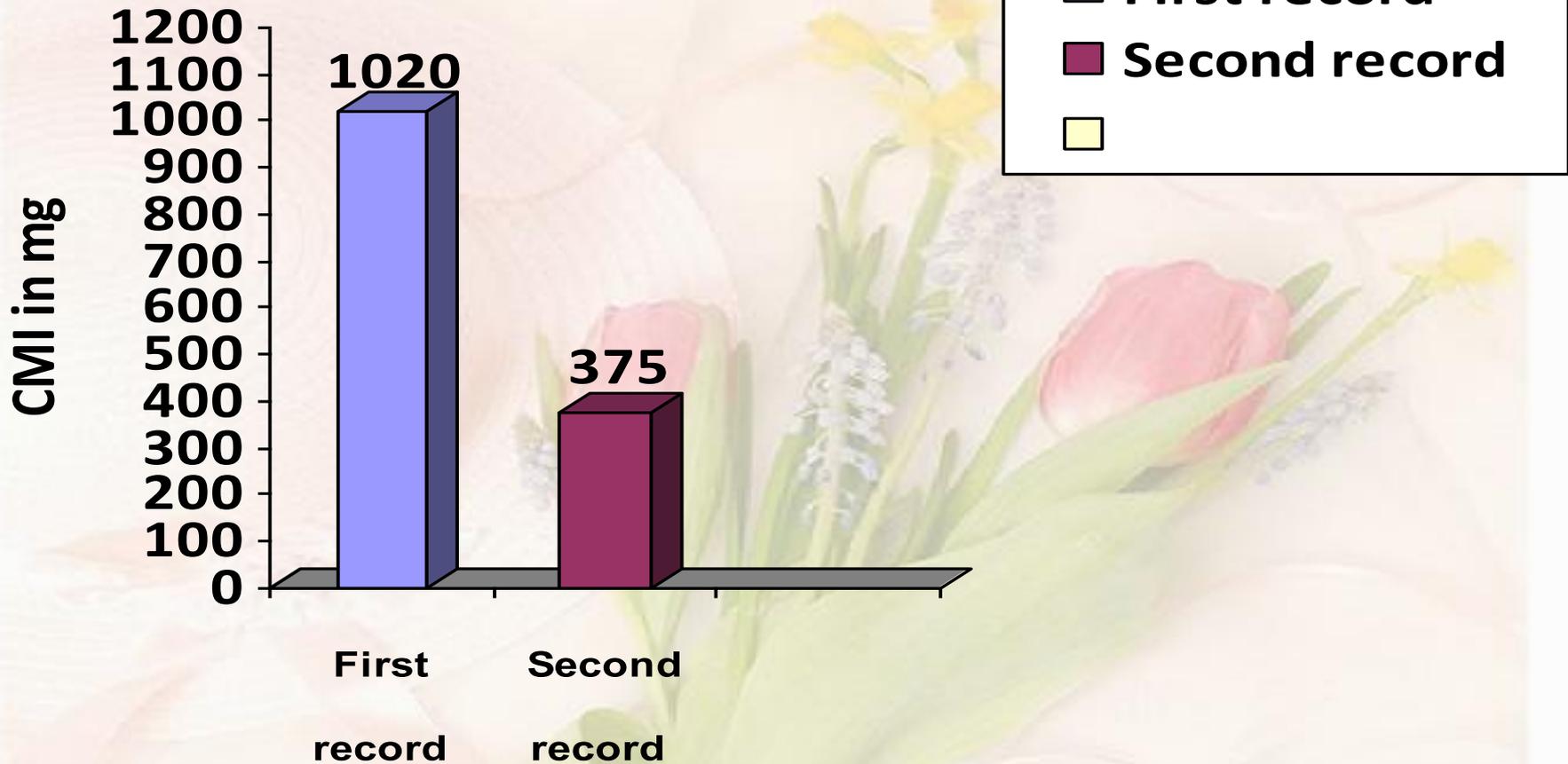


***Periods of Evaluation.***

***Bars representing the mean values of the mean values of the visual analogue scale in degrees of the 2 records of the second experimental group (Local inguinal TENS group).***

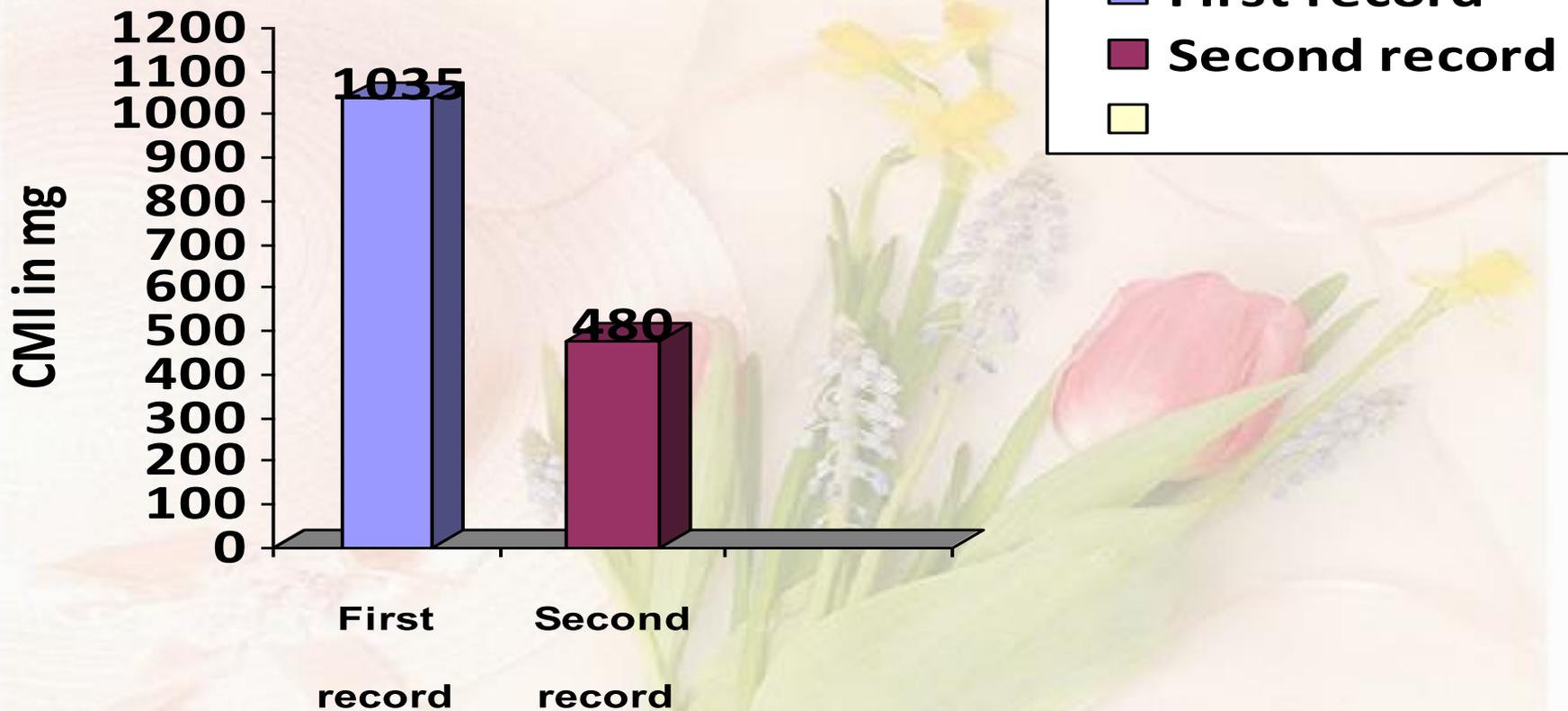


*Bars representing the mean values of the mean values of the Visual analogue scale in degrees of the 2 records of the first and second experimental groups.*



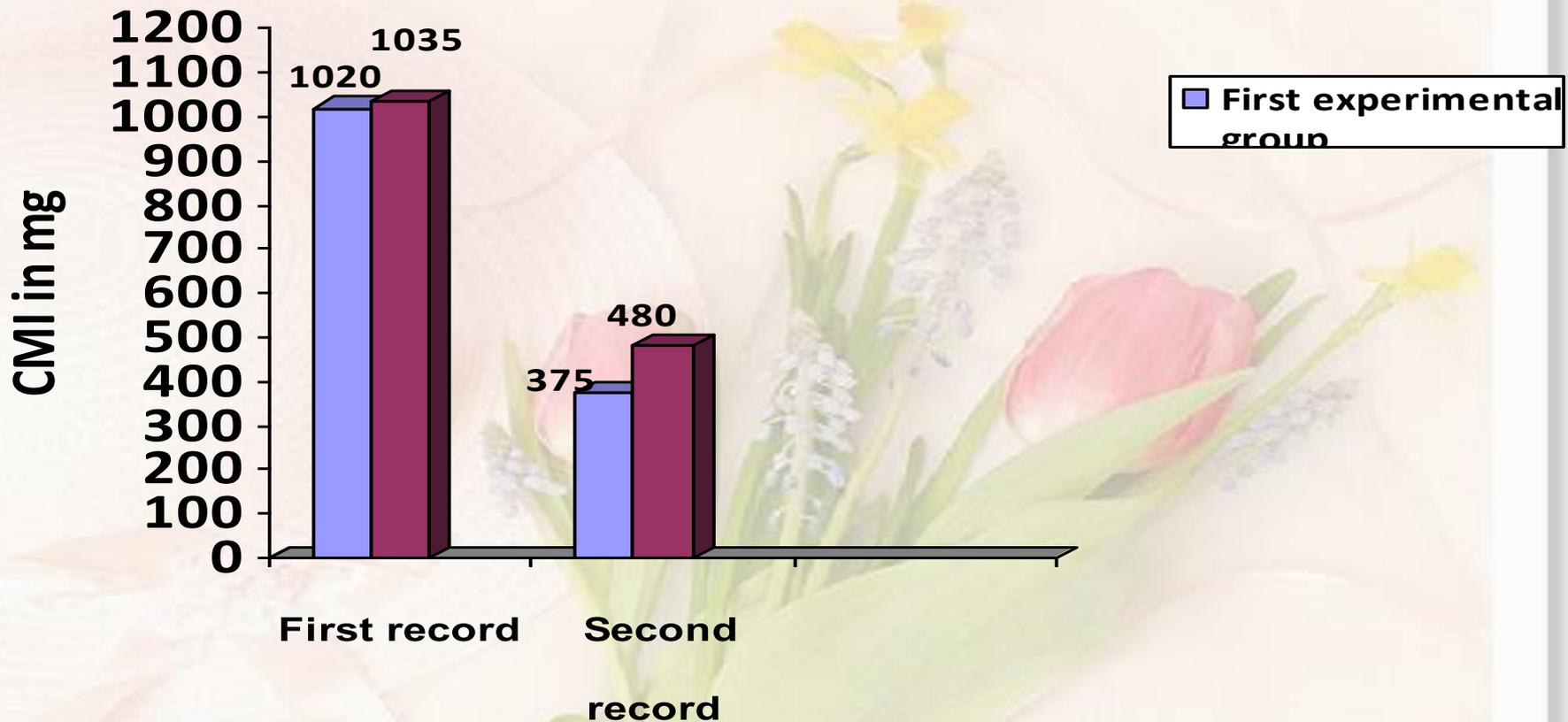
***Periods of evaluation.***

***Bars representing the mean values of the mean values of the carbamazepin medicament intake in mg in the first experimental group (Thoracolumbar TENS application).***



**Periods of Evaluation.**

***Bars representing the mean values of the mean values of the carbamazepin medicament intake in mg of the 2 records in the second experimental group (Local inguinal TENS application).***



**Periods of evaluation.**

***Bars representing the mean values of the mean values of the carbamazepin medicament intake in mg of the 2 records of the 2 experimental groups.***

A decorative gold frame with a floral and vine border surrounds the text. The border features green leaves, purple and red flowers, and a yellow sunflower in the bottom-left corner. The text "DISCUSSION" is centered within the frame.

***DISCUSSION***

**Significant differences, between the first experimental group (Thoracolumbar TENS application) and the second experimental group (Local inguinal TENS application), which were in the form of a significant decreases in the VAS and CMI, were consistent with those observed and recorded by Amit , 2002; Augustinson, 2007; Barr et al., 2005; Bay et al., 2006; Callesen et al., 2009; Callesen et al., 2005; Cameron and Cross, 2005; Chen et al., 2004; Chesterton et al., 2003; Chiu et al., 2009; Christman, 2005; Citron, 2005; Courtney et al., 2008; D'Amours and Ferronte, 2006; Hindmarsh et al., 2003; Ishimaru et al., 2005; Johnson et al., 2008; Poobalan et al., 2001; Schomburg and Carter, 2003; Serrato , 2001 and Wright et al., 2002.**

**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 application of both the thoracolumbar TENS (to greater extent) and the local inguinal TENS (to lesser extent) were effective and had a valuable effects in decreasing the postoperative chronic inguinal pain in the form of iliohypogastric postoperative neuralgia as evidenced by the highly significant decreases in VAS and CMI. But the thoracolumbar TENS was more fruitful than the local inguinal TENS, that could be attributed to the vasodilating effect of thoracolumbar TENS, which increased the peripheral circulation, increased oxygen and nutrient supply as well as decreased the postoperative neuralgia.**



*Summary*

*&*

*Conclusion*

**Application of both the thoracolumbar TENS (to greater extent) and the local inguinal TENS (to lesser extent) were effective and had a valuable effects in decreasing the postoperative chronic inguinal pain in the form of iliohypogastric postoperative neuralgia as evidenced by the highly significant decreases in VAS and CMI. But the thoracolumbar TENS was more fruitful than the local inguinal TENS, that could be attributed to the vasodilating effect of thoracolumbar TENS, which increased the peripheral circulation, increased oxygen and nutrient supply as well as decreased the postoperative neuralgia.**

