

## COMPARATIVE STUDY BETWEEN KARYDAKIS LATERAL APPROACH AND EXCISION OF PILONIDAL SINUS WITH SUTURING SKIN TO PRE-SACRAL FASCIA

*Eissa Abdel Hamed Ibrahim<sup>1</sup> and Wael Morsy A. El-sayed<sup>2</sup>*

### ABSTRACT:

Consultant of General Surgery,  
Military Medical Academy,  
Cairo, Egypt.

#### Correspondence:

Eissa Abdel Hamed  
Mobile .01227687052

#### E.mail:

eissa.abdelhameed@gmail.com

Received: 25/8/2020

Accepted: 15/9/2020

**Online ISSN: 2735-3540**

**Background:** A pilonidal cystectomy is surgery to completely remove the cyst, along with the pilonidal sinus tracts. While this procedure is more complex than an incision and drainage, it's also more likely to be successful.

**Aim of the work:** evaluated the Karidakis lateral approach; and excision of pilonidal sinus with suturing skin edge to pre-sacral fascia

**Patient and methods:** This study was carried out on 40 patients with pilonidal sinus admitted to Kobry El-Kobba Military Campus during the period of (2017-2019) the patients were divided into two groups: GI included 20 patients treated by surgical excision of the sinus through lateral approach of Karydakis, and GII included 20 patients treated by surgical excision of the sinus with suturing of skin edge to pre-sacral fascia. All patients were male military patients with age ranged between (22-45) years with mean of 30 years.

**Results:** The results compared both techniques to patient's convenience, infection rate, hospital stay, recurrence rate, operative time, healing time, and histopathological outcome.

**Conclusion:** The choice of a particular surgical approach is dependent on the surgeon's familiarity with the procedure and perceived results in terms of low recurrence of the sinus and of quick healing of the resulting cavity or surgical wound

**Keywords:** Pilonidal sinus, suturing skin edge to pre-sacral fascia, Karidakis lateral approach, pre-sacral fascia.

### INTRODUCTION:

Pilonidal disease was first reported in 1833. This process was first described by Anderson in 1847 and later named pilonidal sinus<sup>1</sup>. The word pilonidal was derived from the Latin words *pilus* (hair) and *nidus* (nest). Sacrococcygeal pilonidal sinus is a common disorder among young adults aged 15-30 years, with a 3:1 male-to-female ratio, occurred after puberty, when sex hormones affect the pilosebaceous gland and change healthy body hair growth<sup>2</sup>.

Pilonidal disease is a type of skin infection which typically occurs as a

cyst between the cheeks of the buttocks and often at the upper end<sup>3</sup>. Symptoms may include pain, swelling, redness, and also drainage of fluid, but rarely a fever<sup>4</sup>. A variety of different surgical techniques were described for the treatment of pilonidal sinus disease and current practice remains variable and contentious, but some management options improved outcomes for some patients. The complications of surgery, particularly related to wound healing, often remain worse than the primary disease<sup>5</sup>.

The onset of sinus coincided with puberty, and de-novo pilonidal sinus is rare

after age of 40 years which explain earlier onset of condition in women, since puberty occurs earlier in females than in males<sup>6</sup>.

The congenital theory for pathogenesis suggested that a pit presents at birth resulting from the absence of coalescence of the primitive ectoderm<sup>5</sup>. The congenital track is situated cranially over the sacrum, and the pilonidal sinus did not contain hair, and often shown to be communicated with the spinal canal<sup>7</sup>. Pilonidal sinus is a very common inflammatory disease of the gluteal region, and the ideal method of treatment should have a low recurrence rate with minimum excision<sup>8</sup>.

Risk factors include: male, young age, obesity, hairiness, and deep natal cleft which facilitates the burial of the barbed shaped hairs into these sinuses exacerbating

infection acting as a foreign body<sup>5</sup>. The population affected are roughly (26/100000), with (16-25 years) exceptionally before puberty or after the age of 60, but predominantly affecting young males. The predisposing factor include: hairy body, thick skin, overweight, deep gluteal cleft, poor hygiene, long seated hours, repeated chafing and disease family history<sup>9</sup>.

Pathology: Pilonidal sinus is a particular form of foreign body granuloma, hair found with the track in roughly one-third in females and two-thirds of male cases, foreign body giant cells surrounding the hair fragments are frequently seen within the granulation tissue. The majority of the track and hair containing cavity are lined with granulation tissue (Fig. 1).



Fig. 1: Opened track showed hair and granuloma<sup>10</sup>

Risk of malignant change, very rarely squamous carcinoma can arise in a pilonidal sinus usually in long standing cases. Basal cell carcinoma and adenocarcinoma involving pilonidal sinus have also occasionally been reported. The incidence of any neoplasm is far too small for a pilonidal sinus was considered as a significant malignant potential<sup>11</sup>.

Movement of the buttocks exerts a suction i.e. when the patient is sitting, gluteal tissues were pushed against the sacrum, air blows out of the cavity as the patient stands, gravity pulls the gluteal tissue away from the sacrum, a vacuum was created and air was sucked into the cavity passing through the follicular remnant (Fig. 2a & b).

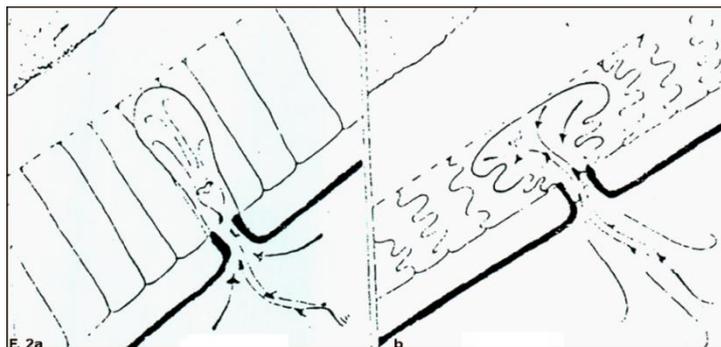


Fig. 2a &b: Suction created when patients are standing, and on sitting<sup>10</sup>

Clinically it can initially present as either an acute abscess with or without cellulitis, simple cyst, or a chronic discharging sinus, sometimes with pain in the natal cleft if inflamed<sup>12</sup>. From history, there was pain, discharge, dimple, sinus and induration representing the track and abscess cavity. Pain and discharge represent (84% and 78%) respectively, and are the most frequent symptoms of pilonidal sinus, while fever, chills and bleeding are rare symptoms<sup>13</sup>.

Pilonidal sinus is formed when granulation lined pilonidal cavity drains via a sinus track which opens away from the midline as an area of proud granulation on to the skin. During an interval between episodes of inflammation the diagnosis can be confirmed by identifying the epithelialized follicle opening within the natal cleft 4-8cm cephalad from this midline opening, and can usually be palpated as an area of induration deep to sacral skin<sup>14</sup>. There may be more than one epithelialized opening within the natal cleft, but the laterally situated granulation lined opening is single in case without previously underwent surgery<sup>15</sup>.

Treatment of pilonidal sinus: Regardless presentation, the ideal treatment for patients who suffered from the disease should allow a cure with a rapid recovery period allowing return to normal daily activities with a low level of associated morbidity<sup>5</sup>. Although various surgical methods have been described for the treatment of patients with

pilonidal sinus, to date; the ideal treatment remains debatable in a way that currently there is no widely available accepted method that decreases complications and recurrence rates, and provides cosmetically acceptable outcomes with short recovery period. There is no clear consensus as to which treatment approach yields the best result in patients with chronic non-infectious pilonidal sinus<sup>16</sup>.

There are many operations but none could guarantee a permanent cure, among these lines of treatment are: closed technique, laying open the track, marsupialization of pilonidal sinus, wide excision to sacrum and primary closure, excision and closure by plastic procedures which include: Z-plasty skin flaps and skin graft<sup>17</sup>.

This paper evaluated the results of Karidakis lateral approach; and excision of pilonidal sinus with suturing skin edge to pre-sacral fascia; to select the best surgical technique.

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## **PATIENTS AND METHODS:**

The study included 40 male military patients suffering from chronic pilonidal sinus, with pain, discharge, sometimes bleeding, and indurated area representing track's or abscess cavity with ages between (25-45) years.

The patients were admitted to the surgical department at Kobry El-Kobba Military Campus. Patients were divided randomly into two groups, GI included 20

male patients with chronic pilonidal sinus treated by surgical excision of the sinus and its track through “Karydaksi, lateral approach”. GII included 20 male patients with clinical manifestations of chronic pilonidal sinus treated by surgical excision of the sinus with suturing skin edge to pre-sacral fascia.

These patients were subjected to clinical examination, complete history especially their job and occupation with special attention to hair distribution, site and number of external openings, distance from anal verge; liver function tests, renal functions, complete blood picture, (PT, PTT & INR “Prothrombin time and concentration”), random blood sugar, chest x ray and ECG.

All excised tissue “sinus track, abscess cavity & covered skin” were examined histopathologically.

Diagnosis was by clinical examination, and patients were informed by diagnosis. The operation was done after obtaining informed written consent from patients, surgical operation was done under general endotracheal anesthesia.

Operative techniques: GI: 20 male patients with chronic pilonidal sinus treated by surgical excision of sinus and its track through “Karydakis lateral approach”. Under general endotracheal anesthesia in prone position marking the site of incision and sinus opening, skin prepared by antiseptic solution and draping the patient (Fig. 3).

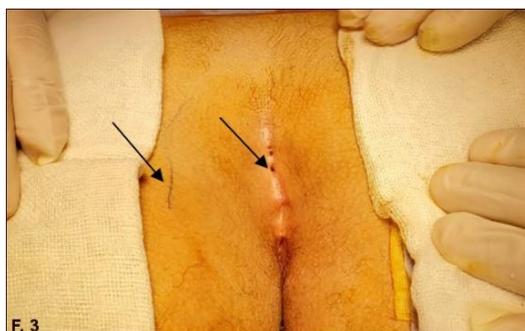


Fig. 3: Prone position, marking site of incision and sinus opening, sterilization and draping the patient.

An elliptical incision was done around the sinus opening and dissected from the skin i.e. sinus and its track, then a semi-lateral incision was done over the gluteal region at

the lateral marking, and cut through healthy fat up to gluteal muscles, then cut over the pre-sacral fascia crossing the midline up to contralateral gluteal muscles (Fig. 4).

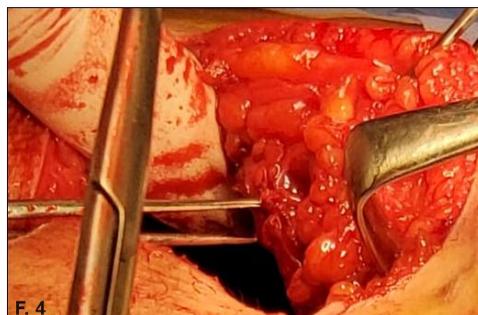


Fig. 4: Semi-lateral incision, dissection of sinus and its cavity from pre-sacral fascia up to contralateral gluteal muscles and elliptical incision around sinus opening and dissected from natal cleft skin.

Sinus track cavity was dissected by opening skin of the natal cleft and taking it out from lateral incision (Fig. 5).

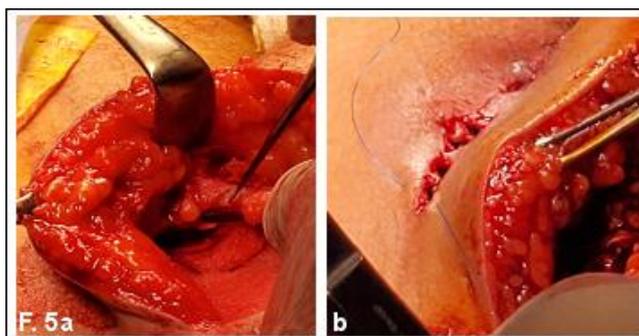


Fig. 5a & b: Dissection of sinus track cavity, sinus opening in natal cleft and taken by lateral incision

Diathermy coagulation of the bleeding points, insertion of suction drain, simple interrupted sutures to sinus opening, closure of lateral wound by simple interrupted

prolene suture no 3/0, washing the wound with saline and cover the wound by dry dressing (Fig. 6).



Fig. 6: Suturing wound by prolene no 3/0, insertion of suction drain and covered by dry dressing.

Post-operative: antibiotics, analgesics, discharge the patient from hospital second post-operative day, dressing wound and removal suction drain at 3<sup>rd</sup> post-operative day, sutures removal after 7 days

postoperative in out-patient clinic (Fig 7), and follow up the patient every 2 weeks up to 3 months, and then monthly up to 9 months. The results of the procedure were compared to GII.



Fig. 7: One week post-operative after removing stitches and drain.

GII: Surgical excision of the sinus with suturing skin edge to pre-sacral fascia including 20 male patients. Under general endotracheal anesthesia patients were placed in prone or Jack knife positions. The skin was prepared by painting with antiseptic solution,

and draping the patient. Elliptical incision, that includes all sinus openings, ellipse of skin, sinus track and abscess cavity; the knife cut through healthy fat up to the fascia covering the sacrum and coccyx (Fig. 8a & b).



Fig. 8a & b: Elliptical incision including sinus opening, sinus track, and abscess cavity.

Sinus with ellipse of skin and its track was separated from fascia by scissor dissection (Fig. 9).



Fig. 9: Ellipse of skin, sinus and its track separated from pre-sacral fascia by scissor dissection.

Diathermy coagulation of bleeding points was done and washing the wound with saline. A true pilonidal sinus invariably was superficial to the coccyx and sacrum, the wound had steep shelving edges. It may be dealt with by suturing skin to pre-sacral fascia

by transverse mattress sutures on either side to midline leaving 0.5 cm midline gap to heal with granulation tissue and broader scar, resulting from healing by second intention (Fig. 10 a & b).

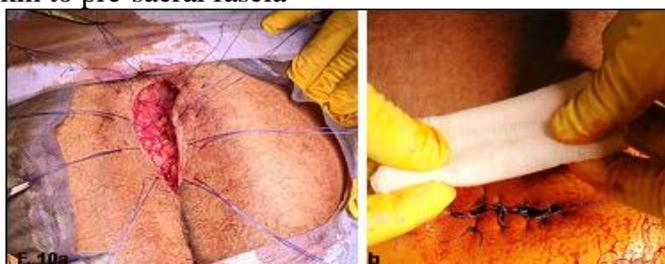


Fig. 10a: Suturing skin edge to pre-sacral fascia by interrupted transverse mattress sutures, Fig. 10b: 0.5cm mid-line gap, clean wound with saline and dry dressing.

**Comparative Study Between Karydakis Lateral Approach And Excision Of Pilonidal Sinus With..**

Postoperative: analgesics, antibiotics, the wound was dressed with dry dressing after being washed with saline, the gluteal region was approximated to each other by strapping, and the patient was nursed on his back to obtain a gentle compression on the wound.

Close observation of the wound by the surgeon himself is a must. Sutures were removed after 10-15 days post-operative, gap between skin edges was clean with minimal granulation tissue covered by epithelium from skin edges (Fig. 11).



Fig. 11: Gap between skin edges, showing healthy granulation tissue

The specimen was histopathologically examined and showed inflamed granulation tissue with sinus track formation and no malignancy, macroscopic examination showed sinus track filled with hair and granulation tissue (Fig. 1).

rate, recurrence rate, bleeding, healing time, hospital stay, removal of sutures, cosmetic appearance and pathological examination.

Results of the operation was compared to results of Karydakis lateral approach in terms of: age of patients, convenience, infection

**RESULTS:**

The outcomes of both operations and convenience to all patients were shown in the following Table.

Comparison of outcomes for the two procedures

Variants	GI	GII
Treatment	Karydakis lateral approach	Suturing skin to pre-sacral fascia
Operative time	40-60 min (mean=50 min)	50-70 min (mean=60 min)
Infection	4 patients with local cardinal signs of acute inflammation, one was treated with partial opening of the wound & 3 with antibiotics	2 patients with mild infection along suture line “raw area”, treated by antibiotics
Recurrence	2 patients with sinus opening at the site of natal cleft, and treated by curettage of the sinus	No recurrence
Bleeding	15-30 ml of blood collected in 1 <sup>st</sup> day and then serous fluid, no blood transfusion done.	Minimal bleeding, no blood transfusion, treated by saline washing and dressing
Healing time	7 days healing time, 2 patients 15 days	10-25 days, mean 15 days
Hospital stay	Next morning 1 day	2 to 3 days post-operative.
Stitch removal	7-10 days	10-15 days
appearance	Good cosmetic appearance	Proud of cosmetic appearance

Pathological examination: Macroscopic; showed granulation tissue and hair inside sinus track, and microscopic; showed

inflamed granulation tissue with sinus track formation without malignancy (Fig. 1).

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## DISCUSSION:

The insertion of hairs at the depth of the inter gluteal fold causes pilonidal sinus, but current treatment assists the free entrance of new hairs by opening portals of entry at the depth, and many cases were treated by an operation which places resistant skin at depth of the intergluteal fold, and follow-up showed a low recurrence-rate<sup>18</sup>. Allen-Marsh (1990)<sup>(11)</sup> in UK reported that pilonidal sinus management was unsatisfactory. For ideal treatment, there was quick healing, no hospital admission, minimal patient inconvenience, and low recurrence. But greater awareness of strengths and weaknesses of existing methods led to improved treatment. He added that early excision of the pilonidal pit at the time of treatment of pilonidal abscess reduced the high risk (40%) of subsequent sinus. The most important causes of pilonidal "disease" sinus, recurrence, and the planning of a good treatment needs to understanding the source and stages of pilonidal disease. Midline pits are a common finding in a pilonidal sinus, which stretched follicles and might assist the follicular theory that the highest incidence of the disease is among teenagers who suffer post pubertal hormonal imbalance which in turn affects the skin appendages and may cause acne vulgaris in the face (Elsaie, 2016)<sup>(19)</sup>. Moreover, the disease is common among people with deep natal cleft, and hairy subject as well. Even in people with non-hairy gluteal region, pilonidal abscess sometimes contain hairs that fall down from their scalp settling in the natal cleft (Ibrahim, 2020)<sup>10</sup>.

In the present study, the first 20 military patients suffered from chronic pilonidal disease (sinus) operative time was 40-60 min. with a mean of 50 min., and drain was removed on 3<sup>rd</sup> postoperative day. As to complications, six patients suffered seroma, no hematoma, drain: 15-30ml of blood in first day and then serum fluid, no blood transfusion done, no wound dehiscence, wound

infection in four patients treated by antibiotics, recurrence in two patients showed sinus at natal cleft opening site and treated by curettage. In the second group of patients, suturing skin to pre-sacral fascia, play a three role: initially good hemostasis of the wound, without wound infection, and they were proud of its cosmetic results with preservation of the intergluteal cleft.

In the present study, mild infection was recorded and treated by antibiotics, while all patients were satisfied with the cosmetic result. The prolene 2/0 sutures were used for the skin flaps to decrease infection rate and infected granulation tissue formation. Minimal bleeding occurred and treated by washing wound with saline and dressing, no need for blood transfusion. Holding pre-sacral fascia to sutures is weak, so early mobilization and return to normal activities was advised. Patients should be instructed not to do strenuous exercise for a period of at least 2 weeks; also dressing of the wound should be done by the surgeon himself keeping the two glutei side by side to decrease tension over the sutures.

Kareem (2006)<sup>20</sup> in Iraq compared between "primary closure" and "open technique" after chronic sacrococcygeal pilonidal sinus excision. He reported that excision and primary closure for chronic sacrococcygeal pilonidal sinus was superior to excision and healing by secondary intention, and that primary midline suturing was a useful method for management of chronic sacrococcygeal pilonidal sinus. Toccaceli *et al.* (2008)<sup>21</sup> in Italy found that complete excision of the pilonidal sinus with primary closure yields good results in terms of healing, morbidity, early return to work and recurrence rate, and can be considered the treatment of choice for pilonidal sinus.

Karaca *et al.* (2012)<sup>22</sup> in Turkey compared modified Karydakis flap (MKF) and modified Limburg flap (MLF) for pilonidal sinus surgery. They concluded that MLF procedure was more comfortable for

patients, lesser pain, lower complication and recurrence rates, with higher patient satisfaction.

Bessa (2013)<sup>23</sup> in Egypt stated that the modified Karydakis flap and the modified Limburg flap were commonly used in the surgical management of sacrococcygeal pilonidal sinus disease. He concluded that both techniques provide effective treatment for pilonidal sinus disease and can be performed safely as day-case surgery. The modified Karydakis flap is associated with significantly shorter operative time, lower full-thickness wound disruption rate, and a higher patient satisfaction rate. Varnalidis *et al.* (2014)<sup>24</sup> in Greece carried out a retrospective study among patients with pilonidal sinus treated surgically over three years. They reported that in the absence of inflammation and/or recurrence, marsupialization was the surgical method of choice with a low percentage of recurrence and an acceptably short healing period. But, in large ones, inflamed and recurrent situations, open excision was preferred. Rashidian *et al.* (2014)<sup>25</sup> in Iran stated that although various therapeutic modalities to manage patients suffering from sacrococcygeal pilonidal sinus disease, there remains controversy over a standard method to treat such patients. They added that, considering the earlier wound healing period, less days absence from work, lower complication and recurrence rates, simple primary closure or rhomboid flap techniques appear to be better options to treat the subsequent wound after a wide excision of pilonidal sinus when compared to the lay open method.

Kober *et al.* (2018)<sup>26</sup> in USA reviewed the management of pilonidal sinus disease, including conservative and surgical techniques as well as novel laser therapy. Given current evidence, off-midline repair is now considered the standard of care; however, no statistically significant difference was noted between primary versus secondary closure,

or between Karydakis flap and Limburg flap. They added that one must account recurrent disease, recovery time, and the surgeon's comfort with the procedure. Iesalnieks and Ommer (2019)<sup>27</sup> in Germany reported that pilonidal disease is an acute or chronic infection in the subcutaneous fatty tissue, mainly in the natal cleft, incidence in 2012 was 48/100 000 persons per year. Lamdark *et al.* (2020)<sup>28</sup> in Austria and Switzerland reported that the treatment strategies for chronic pilonidal diseases differed with more and longer inpatient care in Austria, increasingly minimally invasive approaches in Switzerland, and outdated procedures were performed in both countries.

#### **Conclusion:**

The outcome results showed that suturing skin to pre-sacral fascia technique as an option for treatment of pilonidal sinus provided patients with a satisfactory cosmetic result that allowed to an early and safe return to normal activities.

Both Karydakis lateral approach and excision of pilonidal sinus with suturing skin to pre-sacral fascia gave good and similar results. But, the suturing of skin edge to pre-sacral fascia had a longer hospital stay, and the wound dressing has to be done by the surgeon himself.

#### **Recommendations:**

1. Because of short hospital stay, low recurrence rate, and return to normal daily activities with a low level of associated morbidity, both techniques were used, but as in suturing skin to pre-sacral fascia the shape of natal cleft was near to normal; it is recommended.
2. Suturing skin to pre-sacral fascia must be dressed and followed up by surgeons themselves.

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## دراسة مقارنة بين استئصال الناسور العصعصى (العجزي) بطريقة كارداكس و بين استئصال الناسور العصعصى (العجزي) مع خياطة الجلد بالأنسجة الضامة فوق عظمة العجز.

عيسى عبد الحميد ابراهيم حسن , وائل مرسى عبد الرحمن السيد

**المقدمة :** تمت الدراسة بالمجمع الطبي بكوبرى القبة للقوات المسلحة للمرضى العسكريين (ذكور), و عدد الافراد التي تم عليهم اجراء البحث : ٤٠ فرد ذكر تتراوح اعمارهم من بين ٢٢-٤٥ سنة و قد تم عمل الأبحاث اللازمة لاجراء العملية الجراحية تم تقسيم المرضى الى قسمين "تقسيم عشوائى": ٢٠ فرد تم علاجهم بطريقة كارداكس و ٢٠ فرد تم علاجهم باستئصال الناسور العصعصى (العجزي) مع خياطة الجلد في الأنسجة الرخوية الضامة فوق عظمة العجز , تم متابعة المرضى لمدة ثلاث أعوام و كانت المتابعة تتلخص في الاتى :-

الوقت الذى استغرقته العملية كل على حدة

نسبة الألتهاب بعد العملية

نسبة الأرتجاع للمرض

النزيف بعد العملية

الوقت الذى يستغرقه الجرح للالتئام

بقاء المريض بالمستشفى

تعتبر المجموعة الأولى مجموعة كارداكس اما المجموعة الثانية فهي مجموعة استئصال الناسور مع خياطة الجلد في الأنسجة الضامة فوق عظمة العجز. و قد تم التعليق على البحث و مقارنته بالأبحاث الأخرى.

**هدف الدراسة :** هى دراسة بحثية لطريقتين لعلاج مرض الناسور العصعصى و هما طريقة كارداكس و استئصال الناسور العصعصى مع خياطة الجلد بالأنسجة الضامة فوق عظمة العجز- أختيار أفضل الطرق لعلاج مرض الناسور العصعصى (العجزي) للمرضى .

**نتائج البحث:** كانت النتائج مرضية لكل من الطرفين و لكن طريقة خياطة الجلد في الأنسجة الرخوية الضامة قوف عظمة العجز كانت أكثر ارضاء للمرضى من طريقة كارداكس حيث أنها تتميز بعدم ارتجاع الناسور و الحفاظ على شكل منطقة الاليه و العجز, الا أنها تحتاج الى متابعة من الطبيب المعالج بنفسه, و تحتاج الى فترة اطول للالتئام؛ أما طريقة كارداكس فانها تعطى نتائج مرضية الا أنها لها نسبة أرتجاع . و نحن نفضل طريقة خياطة الجلد في الأنسجة الرخوية الضامة فوق عظمة العجز.

و قد تم دعم البحث بالمراجعة اللازمة.