

# Recovery advantages of transverse skin crease incision in uncomplicated inguinal hernia repair in federal teaching hospital abakaliki, nigeria

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**Introduction:** Inguinal hernia repair is one of the most frequently performed surgical procedures in general surgery. Over millions of hernia repairs are performed per year globally. In Africa due to poor documentation, the number of inguinal hernia repair per year is unknown. Estimated values showed 175 per 100000, per year. In spite of this number, in Africa the most appropriate repair technique (including incision choice) is yet to be decided. In open inguinal hernia repair, two known incisions are commonly used: Transverse and Oblique groin incisions. Statistical evidence has not shown any added advantages in choosing any of the incisions except for a better scar appearance in using transverse skin crease incision.

**Objective:** To determine whether a transverse or oblique incision conferred any advantages to the patients, who underwent inguinal herniorrhaphy in terms of operating time, and quality of life.

**Method:** All patients aged 16 years or older with uncomplicated inguinal hernia presenting at surgical outpatient clinic, who were physically stable

and gave informed consent were recruited. These patients were grouped into TEST and CONTROL. An open and close-ended proforma was used both from the clinic, morning of surgery and during follow-up visits to assess the outcome measures.

**Results:** Of the 107 patients recruited, 90 (84.1%) were males while 17 (15.9%) were females. Their ages ranged from 16 years to 85 years with median age of 48 years (53.3%) of these 55 (51.4%) had direct hernia, 39 (36.4%) had indirect and 13 (12.2%) had both. Same surgeon operated on all the patients. Fifty four (54) patients were recruited for the transverse group while fifty three (53) patients had their hernias repaired with oblique incision. Mean operating time for transverse group was 46.89 minutes while that for oblique group was 61.17 minutes ( $p=0.000$ ). Postoperative pain assessment was not significantly different between the two groups ( $p=0.148$ ). Patients in the transverse group had better quality of life than the oblique group ( $p=0.011$ ).

**Conclusion:** Transverse skin incision affords shorter operating time, and better quality of life compared to oblique skin incision in inguinal herniorrhaphy surgeries.

**Key Words:** *Inguinal hernia; Transverse skin crease incision; Oblique incision; Recovery advantages*

## Introduction

Abdominal wall hernias are common [1]. It has a prevalence of 1.7% for all age groups and 4% for ages 45 years and above [1]. Inguinal hernias are more common, accounting for 75% of them [2]. Ninety five percent of inguinal hernias are seen in males. Pain is the most common symptom, patients with hernia present with [2]. Among those that had repair, 10% will have a significant wound infection or hematoma and 3% will have severe chronic pain [2].

Surgery is the treatment of choice, although gentle manipulative reduction has been advocated to reduce the incidence of intestinal ischemia that may occur as a result of delay in surgical intervention [3]. The latter approach has its side effects as ischemic or gangrenous intestine may be reduced into the abdomen, also reduction en-masse may occur [3]. At least three fundamental distinctions in hernia repair can be made: (1) Open vs. Laparoscopic technique; (2) Tension vs. Non-Tension Repair (3) Anterior vs. posterior approaches.

Inguinal hernia repair is one of the most frequently performed surgical procedures in general surgery [2,4]. Over millions of hernia operations are performed each year in the United States [5]. This makes inguinal hernia surgery an important area of research, not only for patients and their clinicians, but also for all authorities responsible for the health economics of any given population [5]. Changes in repair methods over the last century have led to decrease in recurrence rates, and an increased concern for patient satisfaction [6,7]. Although often considered a minor procedure

performed as a day-case surgery, serious events do occur during and after repair and scientific research plays an important role in finding and analyzing uncommon events that occasionally occur [8]. Due to the number of repairs performed daily, with added problems of poverty, ignorance, and costly transportation that negatively influence health care delivery in this part of the world, every recurrence adds an extra burden to the patients [5,6]. Repeated surgeries for complications e.g. secondary wound closures, scar revision also increase cost for the patients and specific complications like testicular atrophy [5]. Therefore, every surgeon should know and perform the recent and more successful methods in their daily practice and this starts by choice of appropriate skin incision [5].

The choice of surgical incision in any part of the abdomen is determined by access [9]. Other goals when planning surgical incisions are to re-establish soft tissue function and structural support and to give the most natural aesthetic appearance with minimal distortion after healing [10]. It has been suggested that other parameters such as early recovery and complication rate may be influenced by mode of incision used (transverse or oblique incision). However there is little consensus in the literature as to whether a particular incision confers any advantage [9]. Two common incisions for inguinal hernia repair are oblique and transverse skin crease incisions. Each of these incisions provides adequate access for surgery and can be extended when need arises and also permits subsequent closure [11]. Postoperative preservation of functions of abdominal organs and respiration should also be considered [12]. Additional considerations in choosing the incision are the speed of entry, presence of scars, possibility for haemostasis and a cosmetically acceptable outcome [11]. Brown and Tiernan in their work

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showed that transverse abdominal access appeared to affect pulmonary function less and may be less prone to wound breakdown [9]. There is also a suggestion that a transverse incision is less painful but this result is less clear, although no similar studies have been found to establish the above relationship. They also noted that recovery and other complication rates showed no difference in both study groups [9]. Incisions for groin hernia repair can be oblique especially when the hernia extends fully to the scrotal sac [12]. In 1944, Babcock advocated a near transverse skin crease incision [12]. While many general surgeons follow this trend, some still repair hernia through oblique incision and others through transverse without really appreciating any other advantages other than scar outcome. The transverse skin crease is placed on the Langer's line and is supposed to cause less damage to tissues. It provides good access to the operation field [12]. It is associated with less pain postoperatively as fewer tissues are damaged, and the scar is aesthetically pleasing [13]. Its limitations are in the repair of groin hernias that extend fully to the scrotal sac and in complicated hernias. The oblique incision is supposed to give better access in such cases. However, oblique incision is associated with a lot of tissue damage, and is prone to more postoperative pain because of extensive tissue dissection [14].

In Africa, due to poor research of documented hernia surgeries, the most appropriate repair technique (including incisions) is yet to be decided because of inadequate clinical and epidemiological data to inform surgeons on the most appropriate repair procedure [11]. This study hopes to determine whether a transverse or oblique incision conferred any advantages to the patients, who underwent inguinal herniorrhaphy in terms of operating time, and quality of life.

## Objective

To determine whether a transverse or oblique incision conferred any advantages to the patients, who underwent inguinal herniorrhaphy in terms of operating time, and quality of life.

## METHODOLOGY

In this study, one hundred and seven patients had their hernias repaired over the period of one year. The ages of the patients ranged from 16-85 years with median age of 48 years. There were 90 males accounting for 84.1% and 17 females (15.9%) recruited for the study (Table 1).

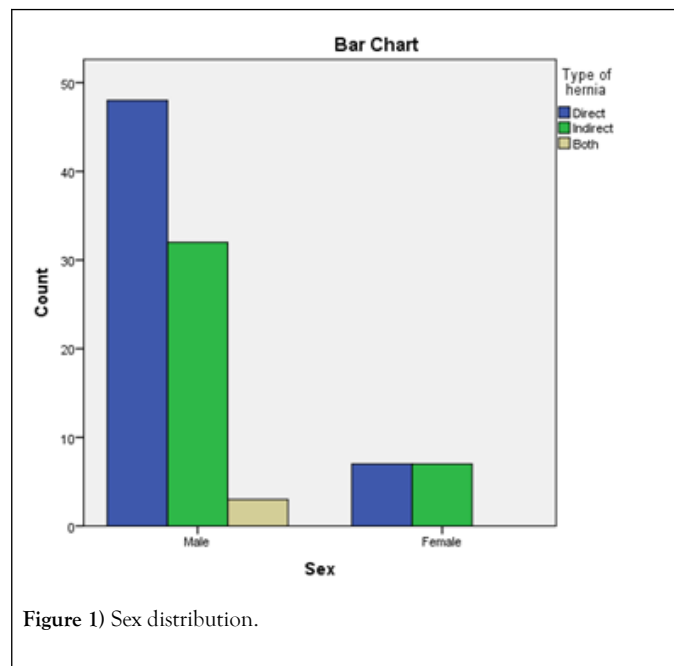
**TABLE 1: Demographic distribution of patients.**

	Affected side						Total
Age group	Left		Right		Bilateral		
	Oblique e	Transverse	Oblique e	Transvers e	Oblique e	Transvers e	
16-25 yrs	0	2	5	4	0	2	13
26-35 yrs	8	1	3	2	1	2	17
36-45 yrs	1	5	4	7	1	0	18
46-55 yrs	2	4	8	6	0	0	20
56-65 yrs	6	8	5	3	2	0	24
66-75 yrs	3	2	3	3	0	1	12
76-85 yrs	1	1	0	1	0	0	3
Total	21	23	28	26	4	5	107

Direct hernia was the commonest occurring in 75 patients, 46 (61.9%) were for oblique and 39 (38.7%) for transverse groups. Indirect hernias were

recorded in 29 patients among whom 19 (65.5%) had oblique incision for their surgery while 10 (34.5%) had transverse skin incision. Three patients had pantaloon hernia, one (33.3%) of whom had oblique incision while 2 (66.7%) were operated on with transverse incision (Figure 1).

Fifty four (50.5%) inguinal hernias were on the right, 44 (42.2%) were on the left side while 9 (8.4%) were bilateral (Table 1). Patients aged 36 to 65 years had more hernias in both study groups (Figure 1).



**Figure 1) Sex distribution.**

Sixteen patients were hypertensive with blood pressure of over 140/90 mmHg. This was noted in those aged 46 years and above across both study groups. Seven of them were in the oblique incision group while 9 of them were in the transverse incision group (p value=0.367). The mean incision length for transverse incision group was 6.89 cm while that for oblique group is 7.03 cm.

The mean operating time for transverse group is 46.89 minutes while that for oblique group is 61.17 minutes. The relationship between the incision length and the duration of surgery was compared in each group. The duration of surgery when compared with length of incision for the transverse group was not statistically significant as p value=0.356. For the oblique group, longer incision lengths had shorter duration of surgery. However p value=0.538 was not statistically significant.

## Operating findings

The mean operative time for those who had oblique incision was 61.17 minutes and that for transverse incision was 46.89 minutes as shown in (Table 2).

**TABLE 2: Duration of surgery.**

Patient group	Number patients	of	Mean	p value
Duration of surgery in minutes	Transverse	53	46.89	0
	Oblique	54	61.17	-

This is statistically significant as p value is 0.000. Scar outcome and patient's quality of life/satisfaction were also studied. Patients whose hernias were repaired using oblique incision had longer scar than those in whom transverse incision was used (p=0.008).

This could be explained by the longer mean incision length of 7.03 cm noted for oblique group as against 6.89 cm for the transverse group (Table 3).

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**TABLE 3: Length of incision.**

		Length (cm)								Total
		5	6	6.5	7	7.5	8	8.5	9	
Group	Oblique	0	16	2	17	2	14	1	1	53
	Transverse	2	13	0	28	0	11	0	0	54
	Total	2	29	2	45	2	25	1	1	107

More of the patients in the transverse group were satisfied with their surgery than those in the oblique group ( $p=0.007$ ) as shown in (Table 4).

**TABLE 4: Patients' quality of life/Satisfaction.**

		Patients' quality of life/ Satisfaction		Total (%)	p value
		Yes	Indifferent		
Group	Oblique	27 (50.9)	26 (49.1)	53 (100)	-
	Transverse	41 (75.9)	13 (24.1)	54 (100)	-
Total		68 (63.6)	39 (36.4)	107 (100)	0.007

## RESULTS AND DISCUSSION

Hernia repair is a common surgical procedure. The surgical load is increasing every day. Greater numbers are performed as day-case surgery except when complicated. Routine longtime follow-up visits after repair are generally not considered after repair to be necessary. For this reason, complications may pass unidentified except in severe cases necessitating representation at the accident and emergency department or outpatient clinic. Most times these patients seek attention of the general practitioners who may improve/worsen their condition before getting to the surgeons. For the above reasons, surgeons (from time of presentation) are concerned with choosing the most convenient and cost-effective method of hernia repair. This entails methods (with short operation time, and good surgical outcome) that will help decrease the length of hospital stay, encourage early return to pre-morbid state and better quality of life.

The incidence of inguinal hernia rises after age 24 years up to 200/100000. In this study, subjects aged 36 years to 65 years had more hernias in both study groups. In Ghana, Ohene-Yeboah and Abantanga worked on over 2000 external hernias and noted that the number of inguinal hernias increased sharply after the age of 20 years [15].

Generally, more males are affected than females [1,3] in the ratio of 4.5:1. In our study, the male to female ratio was 5.3:1. Ohene-Yeboah also stated that hernias are 10 times more common in males than in females [15].

The ratio of direct to indirect hernia in this study was 1.4:1; this is in contrast with what was stated by Jenkins and O'Dwyer in their work that indirect hernias accounted for about 80% of inguinal hernias. This could be explained by the age range of patients recruited; the latter study worked on all age groups. This study recruited subjects aged 16-84 years, with more direct hernias noted between the ages of 36 years and 65 years.

Right-sided hernia predominance was also noted in both study groups. This conforms with findings in existing literature that inguinal hernias are two times more common on the right than on the left [15-18].

This study showed that the operating time varied between a consultant and a senior registrar; however the difference was not statistically significant. Operating time reduces with increase in surgical experience, and therefore varies between surgeons. It is important to consider other factors that could affect operating time of a surgeon, like the intraoperative adverse events, the technical difficulty in cases of recurrence and coexisting pathology as seen in the index study [19]. Considering the goal of improving patient care, respective outcomes would drive decision between transverse and/or oblique incisions in inguinal hernia repair. Comparing the incisions is subject to bias due to pre-existing familiarity with either incision. The study

also showed longer operating time for those hernias repaired with conventional oblique incision than transverse incision [20]. This could be attributed partly to the intraoperative complications which were more frequent with oblique incision. Although operating time is less important to the patient than a successful outcome, it can have cost implications [21].

In comparing the adverse events with the duration of surgery, it showed that those surgeries with intraoperative adverse events lasted longer than those without such events in both study groups. Also the difference was not statistically significant [22].

Patients with uncomplicated inguinal hernias (without pain and strangulation) were recruited to avoid the possibility that memory of preoperative pain would influence the postoperative pain assessment [23]. Postoperative pain evaluation was done using both objective and subjective criteria. Pain evaluation was for both acute and chronic pain. Acute pain is pain experienced during normal tissue healing while chronic pain is pain persisting three months after inguinal hernia repair. Pain was evaluated on the day of surgery and 1st postoperative day, and thereafter as patient was being followed up in outpatient clinic. This study showed no significant difference in postoperative analgesia requirement between the two incisions [24]. No data has been published on postoperative analgesia using transverse and oblique incisions in inguinal hernia repair. Visual Analogue Score was used to objectively assess the postoperative pain. The study required that patient remained in hospital for 48 hours after surgery for postoperative pain monitoring and wound inspection. Pain was also assessed at six weeks and six months during follow-up [25].

Significant postoperative wound infection rate after hernia repair accounts for 10% [2]. This study had 1.9% rate of significant wound infection noted from two patients in the oblique group. Risk factors for postoperative wound infections are both local and systemic factors [26]. Wound class is the commonest; other factors are duration of surgery, comorbidities in patients, elderly patients and surgical technique [27]. This study showed longer operating time for the oblique group: the maximum duration of surgery for patients in the oblique group was 109 minutes. Seven patients had co-morbidities; this could have accounted for the infection rate [28].

The cosmetic appearance was assessed independently by the patient and other doctors that were not involved in the study using Patient and Observer Scar Assessment Scale (POSAS). The cosmetic appearance was better with transverse group than with the oblique group after six months of follow-up [29]. This is similar to the findings in a study by Zomorodian and Walker on transverse and oblique skin incisions in inguinal hernia repair, which showed good cosmetic results for those that had transverse incisions [30]. There are considerable differences in scar formation between individuals and even within the same individual [31]. Scars are usually worst in the deltoid and sternal regions. Abnormal scars are also noted in injuries had during adolescent period than with similar injuries in elderly people because of altered inflammatory and cytokine profile in elderly [32].

Most of the patients who had transverse incisions were satisfied with the surgery. This is similar to the findings of Lawrence et al. on the quality of life after hernia repair [33]. which showed significant improvement between preoperative and postoperative scores in pain and physical function. This work, however, was not specifically on incisions for hernia repair but on quality of life following hernia repair.

Adverse events after groin hernia repair have been reported including hematoma, wound infection, severe pains, anesthetic complications and others [34]. In the analysis of the risk factors for these adverse events, young age and laparoscopic hernia repair were associated with an increased risk of complication [35]. Type of hernia did not significantly affect the risk of postoperative complication [36]. This study recorded 12.1% rate of other complications outside the common listed ones, comparable with another study with 11.7% amongst those that have presented to a health facility [37]. These other complications could range from injury to the herniating contents (gut) to injury to the contents of the inguinal canal.

It was also found that more adverse events occurred with the oblique group than with the transverse group [38]. This could be explained by more tissue damage, and dissection of many segmental vessels and nerves seen with use of oblique incisions [39]. The use of transverse incision in inguinal hernia

repair is not new. Longer time of follow-up is required to statistically evaluate its recovery advantages [40]. Some weaknesses and limitations exist in this study. Full scar maturation takes two to five years. Longer duration of follow-up is therefore needed to assess scars and hernia recurrence.

# CONCLUSION

Transverse incision has advantages in terms of shorter operating time, shorter incision length, and better quality of life when used to repair inguinal hernia.

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