

# Orchidopexy for palpable undescended testis: Is one cut not enough?

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**Introduction:** Undescended testes (UDTs), is a prevalent congenital abnormality in male newborns, affecting 1.0–4.6% of full-term boys and showing a higher incidence in preterm boys. This condition poses a well-established independent risk for infertility, testicular cancer, testicular torsion, and other related diseases. Early correction of undescended testes is crucial to prevent subsequent testicular degeneration. The traditional two-incision inguinal orchidopexy remains the preferred method for correcting cryptorchidism. Alternatively, scrotal orchidopexy uses a single incision to deliver the testis, divide the gubernaculum if needed, mobilize the cord, and dissect the vas and vessels to the proper length, then fixates the testicle in the scrotum.

**Aim of work:** Our primary objective was to compare the outcomes of these two approaches, specifically looking at recurrence and atrophy rates, with a particular emphasis on operative time.

**Patients and methods:** Over a five-year period from October 2018 to October 2023, we conducted a retrospective analysis of our surgical practices, focusing on the frequency of using Scrotal Orchidopexy (SO) versus Inguinal Orchidopexy (IO).

**Results:** 261 patients were included. We looked into 306 performed orchidopexies. 37 were operated upon by scrotal incision, while 309 had surgery with the traditional 2 incision orchidopexy. There were 45 bilateral procedures, with 39 performed inguinally and 6 through the scrotal approach. 1 case (2.7%) of testicular recurrent ascent observed in the scrotal incision group, whereas there were 5 cases (1.8%) of recurrent ascent in the inguinal approach group, all of which required redo inguinal orchidopexy. Median operative time for scrotal orchidopexy was 37 minutes, while for inguinal orchidopexy it was 48 minutes. No atrophy was seen in both groups.

**Conclusion:** the scrotal approach is safe and effective to use and offer some merits including shorter operative time among other variables.

**Key words:** Single incision orchidopexy, palpable undescended testis, two incision orchidopexy.

## Introduction

Cryptorchidism, also known as undescended testes (UDTs), is a prevalent congenital abnormality in male newborns, affecting 1.0–4.6% of full-term boys and showing a higher incidence in preterm boys.<sup>1</sup> This condition poses a well-established independent risk for infertility, testicular cancer, testicular torsion, and other related diseases.<sup>2</sup>

Early correction of undescended testes is crucial to prevent subsequent testicular degeneration. Approximately 80% of UDT cases are palpable and located in the inguinal canal, external inguinal ring, or even upper scrotal region.<sup>3</sup>

The traditional orchidopexy involves two separate incisions, an inguinal incision to expose the external oblique fascia and inguinal canal, allowing for the visualization and dissection of the cord structure and processus vaginalis; and a second scrotal incision to secure the descended testis within the scrotum.<sup>4-6</sup> The rationale behind the use of the traditional two-incision Inguinal orchidopexy (IO) is based on the perceived convenience and effectiveness in facilitating the ample mobilization of the spermatic cord. This approach also entails the separation and high ligation of the processus vaginalis or hernia sac, aiming to prevent subsequent hernia or hydrocele.

The (IO) is believed to ensure a sufficient vessel length for the placement of the cryptorchid testis in the scrotum without causing tension.<sup>7,8</sup>

As a result, the preferred surgical approach for correcting cryptorchidism is the traditional two-incision inguinal orchidopexy.<sup>3,4</sup>

In single incision scrotal orchidopexy (SO), the surgeon makes an incision, typically in upper or mid scrotum and creates a dartos pouch, while maintaining caudal traction on the testis. The incision is extended to the tunica vaginalis, which is then opened to deliver the testis through the wound. While gubernaculum can be divided at this point, there may be no need to divide it since the testis is already in the scrotum. If the processus vaginalis is patent, peritoneal fluid may be visible. The processus vaginalis is then separated from the cord structures, similar to the routine for an inguinal approach, and a suture ligature is applied if necessary. If the processus vaginalis is closed, simply dividing this layer is usually sufficient to release the testis from cephalad retraction. After this step, the testis is released and should remain in the scrotum without tension. Finally, the testis is positioned within the dartos pouch and secured with an absorbable stitch into the tunica albuginea.

to ensure proper orientation.<sup>16</sup>

Over a five-year period from October 2018 to October 2023, we conducted a retrospective analysis of our surgical practices, focusing on the frequency of using Scrotal Orchidopexy (SO) versus Inguinal Orchidopexy (IO). Our primary objective was to compare the outcomes of these two approaches, specifically looking at recurrence and atrophy rates, with a particular emphasis on operative time.

### Patients and methods

A retrospective analysis was conducted on patients who presented to our center, all of whom underwent surgery from October 2018- October 2023 for palpable undescended testis, Ascending testis, and ectopic testis. The decision to employ a scrotal approach was made selectively based on the patient's clinical examination. All patients underwent a minimum of one follow-up. Exclusions from the study included cases with a history of prior inguinal surgery, simultaneous procedures during orchidopexy, incomplete data, or insufficient follow-up information.

Data extraction was performed using a prospectively maintained database. The baseline characteristics, including the age of patients, the surgical technique employed (inguinal or scrotal), the laterality, and the location of the testes. Additionally, operative time and complications—both short-term (such as wound infection or dehiscence, scrotal hematoma, or severe swelling) and long-term (including testicular atrophy, testicular reascent, hernia, or hydrocele)—were extracted. This information was utilized for a comparative analysis of the two surgical approaches for palpable undescended

testis (PUdT).

### Results

In this study, 261 patients were included. We looked into 306 performed orchidopexies. 37 were operated upon by scrotal incision, while 309 had surgery with the traditional 2 incision orchidopexy. There were 45 bilateral procedures, with 39 performed inguinally and 6 through the scrotal approach. The mean age for surgery was 5.9 for inguinal approach and 7.6 for the scrotal one. The basic characteristics of both groups are compared in **Table 1**.

There was 1 case (2.7%) of testicular recurrent ascent observed in the scrotal incision group, whereas there were 5 cases (1.8%) of recurrent ascent in the inguinal approach group, all of which required redo inguinal orchidopexy. The testis that had recurrent ascent had further ascent following the inguinal re-do surgery and ended up with an orchidectomy on a 3rd groin exploration as couldn't be brought to a scrotal position. No instances of testicular atrophy were noted among any of the patients.

One case from the scrotal incision group required conversion to a two-incision inguinal approach during surgery to obtain a comfortable position of testis in scrotum without tension.

Furthermore, operative time was recorded for both groups. Median operative time for scrotal orchidopexy was 37 minutes, while for inguinal orchidopexy it was 48 minutes.

The operative time and complications were compared and tabulated in **Table 2**.

**Table 1: Comparison of basal characteristics between inguinal and scrotal incision orchidopexy**

Variables	Inguinal Approach	Scrotal Approach	p-value
No. of patients (n)	230	33	
<b>Laterality (n)</b>			
Unilateral	191 (191 testes)	27 (27 testes)	0.954 <sup>a</sup>
Bilateral	39 (78 testes)	6 (12 testes)	
<b>Location of testes (n)</b>			
Inguinal canal	78 (93 testes)	1 (2 testes)	< 0.001 <sup>a</sup>
Distal to external ring	71 (83 testes)	28 (32 testes)	
Ectopic	2 ( 2 testes)	0	
Other	4 (7 testes)	1 (2 testes)	
Mean age at operation (years)	5.95 ± 8.05	7.76 ± 7.95	0.027 <sup>b</sup>
Mean follow-up period (months)	7.71 ± 56.6	5.44 ± 4.75	0.224 <sup>b</sup>

a: Chi-square test. b: Student's t-test.

**Table 2: Comparing surgical outcomes between traditional and single incision orchidopexy**

Variables	Inguinal Approach	Scrotal Approach	p-value
Operation time (Minutes)	48.2 ±15.8 <sup>c</sup>	36 ±12.0 <sup>c</sup>	<0.001 <sup>a</sup>
Conversion to traditional surgery (n)		1	
Long term complications (n)			
Testicular ascension	5	1	
Testicular atrophy	0	0	
Re-operation required	5	1	

a: Chi-square test. c: mean ±SD.

## Discussion

In 1989, Bianchi and Squire introduced the concept of single-incision scrotal orchiopexy (SO) as an approach for palpable undescended testes (PUOT), aiming to minimize potential morbidity and achieve improved cosmetic outcomes.<sup>9</sup> Subsequently, numerous authors have highlighted the benefits of SO, noting shorter operative times and reduced postoperative pain. However, it is essential to acknowledge that SO is associated with notable complication rates when compared to the traditional two-incision inguinal orchiopexy (IO).<sup>10-15</sup> This trans-scrotal surgical technique has also found applicability in addressing hydrocele, and even cases of indirect hernias.<sup>16</sup>

In 2016 and 2022, Feng et al. and Yu C et al. separately conducted systematic reviews and meta-analyses comparing single-incision scrotal orchiopexy (SO) and inguinal orchiopexy (IO). The findings from both reviews revealed no significant difference between the two approaches in terms of effectiveness or safety. Notably, it was unsurprising that (SO) exhibited advantages such as shorter operative time, reduced postoperative pain, and superior cosmetic results.<sup>17,18</sup>

The results of our study are consistent with these findings, particularly emphasizing operative time as a key variable among other factors.

The recurrence or re-ascend rate after inguinal and scrotal orchidopexies varies among studies with an incidence between 2-4% with no difference between the two approaches.<sup>17,18</sup> Similar findings is seen in our study, with re-ascend rate of 1.8 % for the inguinal approach and 2.7% for the scrotal approach. Nevertheless, a recent retrospective study across 10 years that included 662 testes showed an incidence of higher recurrence rate among inguinal group in comparison to scrotal one (7.2 % vs 3.1%).<sup>19</sup> the author attributed this difference to other variables related to surgical expertise, surgical technique used or definition of re-ascend as well as duration of follow up.

The rate of testicular atrophy in our patients was 0%, which is much lower than what is reported

across other studies of around 2 %.<sup>20,21</sup> This is maybe due to the small sample size, the inclusion criteria of this study or the surgical expertise of operating surgeons. Another explanation could be the definition of atrophy. A Methodological weakness in this study was that atrophy is only reported from medical records if it stated so, based on clinical examination. There was no objective test, such as a pre- and postoperative ultrasound of the testis, to quantify the atrophy. This is likely due to the impracticality of scheduling such tests given the heavy workload in the radiology department.

The operative time in our study, was shorter and statistically significant between the scrotal and inguinal approaches, with a mean of 36 and 48 minutes, respectively. A finding that is inline and reported in nearly all studies that looked at this variable when comparing the two approaches.<sup>17-19</sup> The observed differences can likely be attributed to the single incision required in the scrotal orchidopexy (SO), which simplifies the closure process. In contrast, the inguinal orchidopexy (IO) involves a more complex closure procedure. Additionally, the cohort of patients undergoing the scrotal approach may have testes positioned relatively lower initially, thereby reducing the overall operative time.

This study contributes to the existing literature by demonstrating the effectiveness and safety of the scrotal approach for both short-term and long-term outcomes. However, the study's retrospective design introduces certain limitations. Specifically, there is a selection bias, as surgeons often prefer the scrotal approach for more distally positioned undescended testes (UDT). This bias could only be mitigated through a randomized controlled trial.

## Conclusion

The scrotal approach is safe and effective to use and offer some merits including shorter operative time.

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