

Single Center Outcomes after Reconstructive Surgical Correction of Adult Acquired Buried Penis: Measurements of Erectile Function, Depression, and Quality of Life

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ABSTRACT

Introduction. Management of adult acquired buried penis is a troublesome situation for both patient and surgeon. The buried penis has been associated with significant erectile and voiding dysfunction, depression, and overall poor quality of life (QOL).

Aim. To identify outcomes following reconstructive surgery with release of buried penis, escutcheonectomy, and circumcision with or without skin grafting.

Methods. We retrospectively identified 11 patients treated by a single surgeon between 2007 and 2011, patient ages were 44–69; complete data review was available on all 11.

Outcome Measures. Validated European Organisation for Research and Treatment of Cancer 15 QOL, Center for Epidemiologic Studies Depression Scale (CES-D), and International Index of Erectile Function (IIEF) surveys assessed patient QOL, depression, and erectile function pre- and postoperatively.

Results. Mean body mass index (BMI) was 48.8 (42.4–64.6). Mean operative time was 191 minutes (139–272). Mean length of stay was 2.1 days. Ten of 11 patients required phallic skin grafting. There was one perioperative complication resulting in respiratory failure and overnight stay in the intensive care unit. Wound complications were seen in 2/11 patients, and 1 needed surgical debridement for superficial wound infection. Skin graft take was seen in 100% of the patients. Ninety-one percent of patients noted significant improvement in voiding postoperatively. Ninety-one percent of patients reported significant erectile dysfunction preoperatively. Subsequently, IIEF scores improved post surgery by an average of 7.7 points. Clinical depression was noted to be present in 7/11 patients preoperatively and 2/11 postoperatively based on CES-D surveys. QOL improved significantly in 10/11 compared with preoperative baseline; however, many patients noted significant difficulties based on their weight and other comorbidities.

Conclusions. Management of adult acquired buried penis is a challenging, yet correctable problem. In our series it appears that by using established surgical techniques we were able to achieve significant improvements in erectile function, QOL, and measures of depression. **Rybak J, Larsen S, Yu M, and Levine LA. Single center outcomes after reconstructive surgical correction of adult acquired buried penis: measurements of erectile function, depression, and quality of life. J Sex Med 2014;11:1086–1091.**

Key Words. Buried Penis; Erectile Dysfunction

Introduction

Buried penis is an uncommon condition in adulthood, which is most commonly a result of morbid obesity, radical circumcision, or penoscrotal lymphedema. It is complicated by patient comorbidities, particularly diabetes mellitus, which

likely contributes to the cycle of recurrent urinary tract infection, voiding dysfunction, and erectile dysfunction (ED) [1]. Buried penis has been studied more frequently in the pediatric population and several etiological factors have been described, including excessive suprapubic fat, abnormal dartos fibrous bands that tether and shorten the penis,

penoscrotal webbing obscuring the penoscrotal angle and entrapment by a phimotic ring caused by cicatricial scarring after penile surgery [2,3]. Poor skin fixation at the penile base can predispose to telescoping of the penile and abdominal skin distally resulting in shortening of the exposed penis. Concealment of the penis may have psychological consequences on account of decreased visible penile length both in the flaccid and erect states. This has been associated with distortion of body image, depression, abnormal voiding, hygiene, and impaired sexual function.

Materials and Methods

A retrospective chart review from our database of reconstructive surgery between 2007 and 2011, we identified 11 patients ages 44–69 years, where complete data were available on all 11. Informed consent was given to patients prior to participation in the study. Several validated questionnaires were used to assess psychosocial and quality of life (QOL) issues in this population. The European Organisation for Research and Treatment of Cancer (CES-D) is a validated self-report scale that is useful for research in the general population, a score >16 is associated with clinical depression [4]. The European Organisation for Research and Treatment of Cancer (EORTC)-15 is a multifaceted self-report instrument that assesses a variety of physical and psychological symptoms and overall health-related QOL [5]. The International Index of Erectile Function (IIEF) questionnaire is a validated instrument to analyze the domains of male sexual function and was used to assess pre- and postoperative sexual function and is scored in a range of 6–30 to stratify the severity of their ED [6].

The EORTC 15 QOL, CES-D, and IIEF surveys assessed patient QOL, depression, and erectile function pre- and postoperatively, respectively. Surgery was performed by a single surgeon. The IIEF questionnaire was scored as follows: no ED (EF score 26 to 30), mild (EF score 22 to 25), mild to moderate (EF score 17 to 21), moderate (EF score 11 to 16), and severe (EF score 6 to 10) [6]. All patients were morbidly obese, using the body mass index (BMI) criteria of >35.0. All patients were risk stratified, received preoperative medical clearance to undergo major reconstructive surgery. All patients were counseled and advised preoperatively to increase physical activity, improve diet, and hopefully achieve weight loss. Ten needed phallic skin grafting. The surgery

was performed based on previously published methods and is detailed below [7,8]. Wilcoxon rank-sum test was used to calculate *P* values for change in depression scales and QOL and were analyzed using commercially available statistical software.

Buried Penis Procedure

The surgical approach to exhuming the trapped penis includes delivering the glans and as much of the shaft as possible, by initially making a ventral slit through the phimotic surface tissue. Often times, the glans will have dense adhesions that need to be taken down to reveal the entirety of the corona circumferentially. If there is satisfactory shaft skin and not a significant amount of shortening as a result of previous circumcision, the ventral slit can be covered with a thick split thickness skin graft. Frequently, the available skin will have undergone irreversible scarring which will need to be excised likely down to Buck's fascia. In this case, a circumcising incision should be made at the distal end of the healthy shaft skin, which should allow full exposure of the shaft.

When there is redundant infrapubic tissue, which is frequently the case in the obese patient, an ellipsoid incision can be made over the pubis, typically 12–15 cm transversely and 6–8 cm vertically at the midpoint. This ellipsoid incision should be carried down so as to remove the fatty tissue down to the rectus fascia, above the pubic symphysis. With this exposure, the dermis of the tissue at the base of the penis can be fixed at four points to the pubis (2, 4, 8, and 10 o'clock position) with a 2-0 nonabsorbable Ethibond suture (Ethicon, Somerville, NJ, USA). This prevents retraction of the penis and reduces the likelihood of a recurrent trapped penis. It will also ensure that the shaft of the penis will remain exposed for proper hygiene, urination, and sexual function.

The tissue deep to the dermis at the upper and lower aspect of the previously made ellipsoid incision is fixed to the rectus fascia with the 2-0 Ethibond. Multiple interrupted sutures should be placed to provide elevation of the skin and subcutaneous tissue in this area.

If the shaft is exposed, it will need to be grafted, typically with a thick, split thickness graft of 0.016–0.018 inches, which is harvested with a dermatome from the anterior thigh. The graft is sized to the maximum length and girth of the penis to be covered. It is then secured to the penis

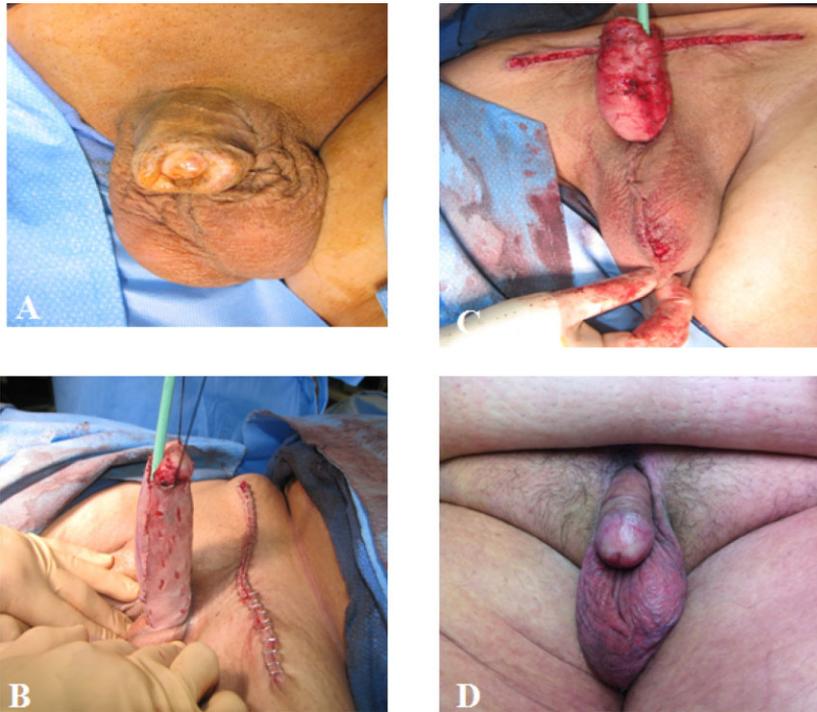


Figure 1 Preoperative, intraoperative, and postoperative photography. (A) Pre-op (supine). (B) Intra-op (after degloving, escucheonectomy, scotoplasty). (C) Intra-op skin grafting. (D) Post-op results (standing).

circumferentially with the suture line on the ventral aspect of the penis, mimicking the ventral raphe. Once the graft is secured to the shaft, small pie-crusting incisions are made (2–3 mm) in the graft, to allow drainage during the healing process. To enhance graft take, a bolster dressing is secured to the penis with an Owens dressing (Kendall, Mansfield, MA, USA) over the skin, which will prevent the dressing from sticking to the graft that is covered circumferentially with a mineral oil soaked, sterile cotton dressing. This bolster dressing is secured to the penis by placing interrupted 2-0 silk sutures at the proximal and distal aspect of the graft and then tied over the graft to maintain it in position for 7 days. It is best to leave a urethral catheter in place while the bolster is in place. Once the dressing is removed, the patient can be instructed on performing wet to dry dressings to ensure that the graft does not desiccate and allows debridement of the surface epithelium (Figure 1).

Results

All men in the study completed the questionnaires. Mean BMI in the cohort was 49.2 (42.2–64.5) (Table 1). The average age was 54.2 years (44–69). Mean operative time was 191 minutes (139–272). Average estimated blood loss was 161 mL (50–400 mL). The average length of stay postopera-

tively was 2.25 days. Ten of 11 patients underwent skin grafting. All patients had excellent graft take, there were no donor site complications. Complications were stratified using the Clavien Dindo classification, one class II, one class III, and one

Table 1 Patient demographics

Demographics	Value	P value
Average age (years)	54.2 (44–69)	
BMI (kg/m ²)	49.2 (42.4–64.5)	
Operative time (minutes)	191 (139–272)	
Blood loss (ml)	161 (50–400)	
Length of stay	2.25 days (1–3 days)	
Minor complications	2/11	
Major complications	1/11	
Skin graft utilized	10/11	
Graft take	10/10	
Voiding function improved	10/11	
Pre-op clinical depression	7/11	
Post-op clinical depression	2/11	0.035
Average change in CES-D	–8.3	
Pre-op quality of life	3.63	
Post-op quality of life	5.45	0.0021
Average increase in QOL on EORTC	1.81	
QOL improved	91%	
Erectile dysfunction pre-op IIEF < 24	91%	
Erection dysfunction post-op IIEF < 24	63%	
Average increase in IIEF	7.7 pts	
Average weight loss preoperatively	30 Lbs (0–100)	

Table 2 CES-D scores

Patient	Pre-op	Post-op	Change
1	18	10	-8
2	17	6	-11
3	24	7	-17
4	22	12	-10
5	26	14	-12
6	12	8	-4
7	22	18	-4
8	10	6	-4
9	3	3	0
10	23	10	-13
11	10	38	28

class IV complication [9]. Wound infections of the escutcheonectomy site were seen in 2/11 patients, 1 needed operative debridement, and the other was managed conservatively with a course of oral antibiotics. One had a complication requiring an overnight stay in the intensive care unit for re-intubation for respiratory failure; however, he was extubated post operative day#1 and discharged home post operative day#2. Baseline voiding characteristics were obtained and compared with the most recent postoperative visit. Ninety-one percent stated that they had significant improvement, i.e., could void standing with a satisfactory stream. When evaluating the depressive indices preoperatively, 7/11 (64%) of our cohort had clinical depression as defined as a CES-D score of >16 (Table 2). This decreased to 2/11 patients (18%) postoperatively. The average CES-D score decreased by 8.3 points compared with preoperative baseline ($P = 0.035$). Using the EORTC 15, QOL domain improved significantly in 91% of the cohort from a value of 3.63 preoperatively to 5.45 postoperatively ($P = 0.0021$) (Table 3). Ninety-one percent of the cohort had at least mild ED as defined as IIEF < 24 (no ED scored as 26–30). However, 63% of the cohort had IIEF < 24 postoperatively, with the average increase in IIEF of 7.7 points (Table 4).

Table 3 Table 1 EORTC QOL scores (0–7)

Patient	Pre-op	Post-op	Change +
1	5	7	2
2	3	6	3
3	4	7	3
4	3	6	3
5	2	5	3
6	3	5	2
7	5	6	1
8	3	5	2
9	3	5	2
10	5	6	1
11	4	2	-2

Table 4 Table 1 IIEF scores (0–30)

Pt	Pre op	Post Op	Change
1	12	14	2
2	19	28	9
3	11	22	11
4	7	17	10
5	18	29	11
6	9	21	12
7	19	25	6
8	14	23	9
9	15	20	5
10	25	27	2
11	16	10	-6

Discussion

Buried penis syndrome has been defined as a penile shaft buried below the surface of the prepubic skin and also to a partial or totally obscured penis caused by obesity or radical circumcision in adults [10]. In children, it is believed to be caused by dysgenetic dartos fascial bands that cause the phallus to retract into the suprapubic fat pad [2]. Adult acquired buried penis syndrome has been evaluated by others, the pathophysiology is thought to involve the obese pannus covering the phallus and subsequently leading to a chronically moist environment that promotes bacterial and fungal growth that subsequently leads to chronic inflammation with scarring, and contracture that leads to the buried penis [11]. Moreover, a majority of the patients have other potential complicating factors that may impact management, including recurrent urinary tract infection, voiding dysfunction, and ED [12]. The most recent data in 2009–2010 show that the prevalence of obesity in the United States worsening as 35.7% of adults were considered obese by the Centers for Disease Control, 37 million men over the age of 20 were considered obese [13]. The mean BMI in our cohort was 49.2 (42.4–64.5) (Table 1); all patients had strongly been encouraged by multiple physicians to lose weight prior to surgery. Despite this, mean weight loss preoperatively was 30 lb (0–100 lb) (Table 1).

Buried penis has been studied at in the rat model to try and elucidate some of the direct mechanisms that lead to ED. Cheng et al. examined rat corpus cavernosa by varying the duration that the corpora were buried. They found buried penis resulted in decreased smooth muscle content and increased fibrous connective tissue content compared with the normal and control groups and the effect is positively correlated with the buried time. Ultrastructural abnormalities of corpus

cavernosum were observed in the 6-month buried group including abnormal arrangement of endothelial and smooth muscle cells, massive hyperplasia of interstitial tissues, narrowed cavernous sinus, atrophic smooth muscle cells, degenerated mitochondria, dilated endoplasmic reticula, decreased dense bodies and contractile fibers, and cytoplasmic vacuolization [14]. There was also a significant decrease of NOS activity in groups buried for 4 and 6 months when compared with the normal and control groups ($P < 0.05$) [15].

Psychosocial aspects of reconstructive surgery has been studied in the reconstructive urologic literature; however, data for adult acquired buried penis syndrome are lacking [16,17]. In our experience, patients with adult acquired buried penis syndrome would complain of poor QOL and depression symptoms secondary to altered voiding and ED. Tang et al. reported a depression rate of 100% in their cohort of men undergoing surgery for obese adult acquired nontraumatic buried penis surgery and one reported contemplating suicide [18]. Recently, a phone survey was conducted for bariatric patients and weight loss surgery to assess willingness to undergo surgery to achieve desired weight or physical appearance (mean BMI was 46.5). Twenty-five percent of patients seeking weight loss surgery were willing to accept more than a 10% risk of death to achieve their most desired health/weight state [19]. In a related area, Tal et al. evaluated the psychosocial impacts of reconstructive surgery for congenital penile curvature using the IIEF and the Self-Esteem and Relationship (SEAR) questionnaire. They found significant improvements in the SEAR domains of sexual relationship (82 vs. 40, $P < 0.01$), overall relationship (86 vs. 62, $P < 0.01$), and confidence (88 vs. 58, $P < 0.001$) following surgical correction [20]. A study by Smith and colleagues evaluated psychosocial factors in the Peyronie's Disease population [21]. They found that emotional difficulties (odds ratio [OR] 6.9, $P < 0.001$) and ability to have intercourse (OR 0.4, $P = 0.004$) were independently associated with relationship problems. Relationship problems (OR 8.0, $P < 0.001$) and loss of penile length (OR 2.7, $P = 0.02$) were significant independent predictors of emotional problems after adjustment for the ability to maintain erections, low libido, and penile pain. Reconstructive surgery has been studied in other disciplines (i.e., breast reconstructive surgery, hip arthroplasty) and has been shown to have a positive impact on satisfaction and health-related QOL [22,23]. While we did not specifically

evaluate satisfaction, using the CES-D, IIEF, and QOL scores, we saw a significant improvement in all these domains in our population. Shaeer et al. assessed penile length in 64 patients with a concealed penis and surgical outcomes. They found an increase in the flaccid state of $7 \text{ cm} \pm 1.3$ (a 293% increase) and in the erect state of $18.4 \text{ cm} \pm 2.9$ (185.7% increase) [24]. We did not evaluate stretched penile length in our population preoperatively because of the entrapment and difficulty accurately recording a measurement secondary to body habitus. Moreover, we found that our cohort varied from the Schaeer et al. population in that our average IIEF preoperatively was 15, and postoperatively was 21.45. Our population clearly represents a different subset or more severe form of the disease. In our cohort, of those who had improvement in erectile function, there was an increase in IIEF of 7.7 points, which is clinically meaningful [6].

The CES-D is a 20-question self-reported depression scale that is used to screen for depression-related symptoms in the general population. It has shown high internal consistency, adequate test-retest repeatability and validity [4]. Our cohort had a significant improvement in CES-D scores with an average decrease of 8.3 points with one patient who scored 24 preoperatively, who decreased to a 7 postoperatively (Table 2). We did observe one patient who had a worsening CES-D score from 10 to 38. This patient was having difficulty coping with divorce, unemployment, and loss of health insurance.

Conclusions

Management of adult acquired buried penis is a challenging, yet correctable problem. In our series it appears that by using established surgical techniques we were able to achieve statistically significant improvements in QOL ($P = 0.0021$) and depression symptoms ($P = 0.035$). Clinical depression, as defined by CES-D criteria, was seen in 64% of patients preoperatively, which decreased to 18% postoperatively. Significant improvements in both voiding and sexual function were seen in 91%, with an average increase in their IIEF score by 7.7 points. Mild ED, as defined by IIEF scoring of < 24 , persisted in 63% of the cohort postoperatively, which is likely a reflection of the significant medical comorbidities seen in this patient population.

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Statement of Authorship

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(b) Acquisition of Data

James Rybak; Michelle Yu; Stephen Larsen

(c) Analysis and Interpretation of Data

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Category 2

(a) Drafting the Article

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(b) Revising It for Intellectual Content

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Category 3

(a) Final Approval of the Completed Article

Laurence A. Levine; James Rybak; Stephen Larsen

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