Podium Session 2: Andrology & Pediatric Urology
Saturday, June 27, 2026 • 16:40–17:40

Cite as: *Can Urol Assoc J* 2026;20(6Suppl1):S7-10. http://dx.doi.org/10.5489/cuaj.9809

POD 2.1

Prospective cohort study of somatic-autonomic nerve grafting technique to restore erectile function in patients with persistent erectile dysfunction post-radical prostatectomy

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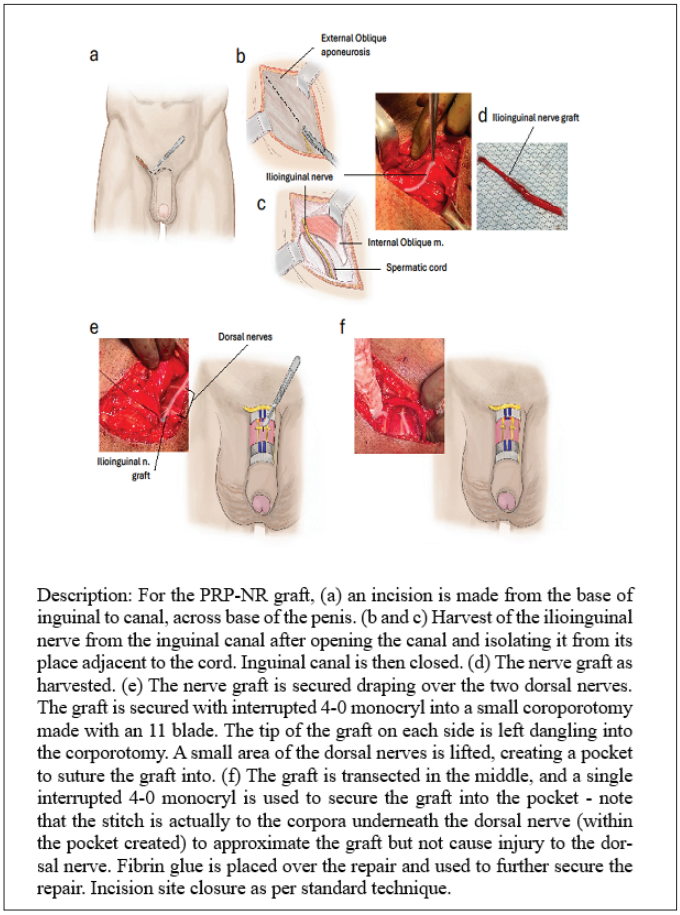
Introduction: Erectile dysfunction (ED) remains a significant complication of radical prostatectomy (RP), despite advances in nerve-sparing techniques. These approaches are often constrained by the need to preserve oncologic safety. Recent studies suggest promise in somatic-to-autonomic nerve grafting for persistent post-RP ED, but procedural complexity and the need for plastic surgery collaboration have limited adoption. This single-arm, prospective, phase 1 trial evaluates the safety and feasibility of a novel somatic-to-autonomic nerve-grafting technique for ED restoration in men with persistent ED following RP.

Methods: Ten patients with normal preoperative erectile function and persistent ED for more than 18 months post-RP were enrolled. A novel, bilateral, end-to-side neurorrhaphy was performed between the dorsal penile nerve and the corpora cavernosa using an ilioinguinal nerve graft harvested from the inguinal canal (Figure 1). Baseline assessments included the International Index of Erectile Function-5 (IIEF-5) and our institution's validated short-form pain questionnaire. Postoperative evaluations are scheduled at four weeks, and at three, six, 12, 18, and 24 months. Safety is assessed through documentation of any perioperative or postoperative complications. Data collection includes demographics, perioperative outcomes, and both primary (safety/feasibility) and secondary (erectile function) endpoints.

Results: Mean patient age was 63.1 years (SD±6.6). Mean pre-RP IIEF-5 score was 24.7, dropping to five post-RP. Three patients had no nerve-sparing, three had unilateral partial, two had unilateral complete, and two had bilateral complete. Time from RP to nerve grafting averaged 32.3 months (SD±12.3); mean operative time was 79.4 minutes (SD±18.7). Postoperative incisional pain was minimal. Six patients reported mild ipsilateral hemiscrotal numbness. One patient developed a Clavien-Dindo grade II complication; two had grade I hematomas. At the six-month followup, all patients experienced a significant improvement in subjective erection from an average of 0/10 to 7.1/10. Improvement in IIEF at the six-month followup was 11.5, which was statistically significant (p=0.0013), and five patients had achieved penetrative intercourse.

Conclusions: Preliminary findings from this ongoing phase 1 trial suggest that bilateral end-to-side neurorrhaphy using an ilioinguinal nerve graft is feasible, safe, and associated with minimal morbidity. Early data on erectile function recovery are promising, showing meaningful improvements from baseline. This technique may offer a novel therapeutic avenue for post-RP ED and warrants further investigation in larger trials.



Description: For the PRP-NR graft, (a) an incision is made from the base of inguinal to canal, across base of the penis. (b and c) Harvest of the ilioinguinal nerve from the inguinal canal after opening the canal and isolating it from its place adjacent to the cord. Inguinal canal is then closed. (d) The nerve graft as harvested. (e) The nerve graft is secured draping over the two dorsal nerves. The graft is secured with interrupted 4-0 monocryl into a small coroporotomy made with an 11 blade. The tip of the graft on each side is left dangling into the corporotomy. A small area of the dorsal nerves is lifted, creating a pocket to suture the graft into. (f) The graft is transected in the middle, and a single interrupted 4-0 monocryl is used to secure the graft into the pocket - note that the stitch is actually to the corpora underneath the dorsal nerve (within the pocket created) to approximate the graft but not cause injury to the dorsal nerve. Fibrin glue is placed over the repair and used to further secure the repair. Incision site closure as per standard technique.

POD 2.1. Figure 1. Schematic of the postoperative recovery autonomic-somatic nerve graft procedure.

POD 2.2

A novel regenerative therapeutic approach for the restoration of physiologic testosterone production using 3D bioprinted human-induced pluripotent stem cell-derived Leydig cells: An in-vitro first look

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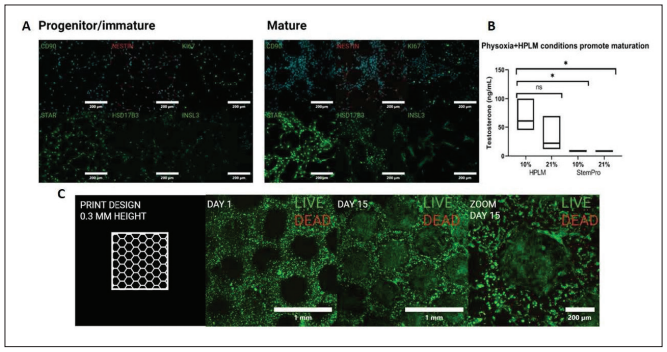
Introduction: Testosterone deficiency is a prevalent condition in urologic practice and is commonly treated with testosterone replacement therapy, which suppresses endogenous hypothalamic-pituitary-gonadal signaling and impairs fertility. Regenerative restoration of Leydig cell function represents a potential alternative that could provide physiologic androgen production while preserving reproductive endocrine regulation. This study evaluates the feasibility of generating functional Leydig cells from human-induced pluripotent stem cells (hiPSCs) and delivering them using a 3D bioprinted platform.

Methods: hiPSCs were differentiated toward the Leydig lineage using steroidogenic induction and maturation protocols. Analysis of key mature Leydig markers and testosterone production quantifications (normoxic vs. physioxic conditions in human plasma-like medium) were performed. Mature Leydig cells were incorporated into gelatin methacrylate-based hydrogels using 3D bioprinting. Cell viability and construct integrity were evaluated using live/dead imaging.
Results: Differentiated cells demonstrated robust expression of mature Leydig cell markers (Figure 1A). Optimized culture conditions significantly increased testosterone production compared to standard media, with sustained secretion over time (Figure 1B). Leydig cells embedded within 3D hydrogel constructs exhibited high viability and maintained structural integrity for at least 15 days in culture, supporting the feasibility of an implantable endocrine construct (Figure 1C).
Conclusions: These findings demonstrate the successful generation of functional hiPSC-derived Leydig cells and their incorporation into viable 3D bioprinted constructs capable of sustained testosterone production. This regenerative approach represents a promising step toward physiologic treatment of testosterone deficiency and establishes a translational platform for future urologic endocrine therapies.
Funding: American Urologic Association Rising Star Award, Canadian Urologic Association Career Development Award, Michale Smith Foundation for Health Research – Health Professional Investigator Award, Canadian Foundation for Innovation JELF Award.



POD 2.2. Figure 1. (A) Immunocytochemistry staining for stage markers in hiPSC-Leydig cells cultured in progenitor/immature growth factors versus mature growth factors. (B) Testosterone production of hiPSC-Leydig cells under maturation conditions. HPLM vs. StemPro medium conditions and physoxia (10% oxygen) vs normoxia (21% oxygen) shows that HPLM and physoxia are necessary for testosterone production. (C) Viability of mature hiPSC-Leydig cells following bioprinting. Cells were bioprinted into human gelMA (HumaBiologics) and cultured 15 days without any loss of viability.

POD 2.3

Is epididymectomy for chronic scrotal pain effective?

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Introduction: Chronic scrotal pain due to epididymal pain is a challenging condition that significantly impacts quality of life. Epididymectomy is an established surgical option when conservative managements fail. This study aimed to assess the effectiveness of epididymectomy in achieving durable pain relief and to identify clinical factors associated with successful outcomes.
Methods: This was a retrospective review of patients who underwent epididymectomy for chronic scrotal pain at a tertiary andrology center following failed conservative management (including analgesics, antibiotics, neuropathic agents, and nerve blocks). The primary endpoint was the proportion of patients with no or mild pain, defined as a visual analog scale (VAS) score <4/10 postoperatively. Secondary endpoints included changes in quality of life (QoL), predictors of success (laterality, symptom duration, preoperative pain intensity, etiology, and the need for further surgical intervention (denervation or orchiectomy). Univariate analyses were performed using the Chi-squared test.
Results: We reviewed 42 patients. The etiology of pain included post-vasectomy pain syndrome (PVPS) in 43%, idiopathic in 38%, infectious or inflammatory causes in 14%, and trauma-related in 5%. All patients had a minimum followup of three months (median 14 months; range, 3–24). The preoperative mean pain score was 7.4±1.8 on a 10-point VAS. Postoperatively, 64% (27/42) reported no or mild pain, while 36% (15/42) continued to experience moderate or severe pain. Additional surgery for persistent pain was required in 31% (13/42) of patients (orchiectomy or cord denervation). Quality of life, assessed by patient-reported improvement, significantly improved in 59.5,%, minimally improved in 19%, and remained unchanged in 21%. No significant predictors of success were identified for laterality, preoperative pain level, or symptom duration.
Conclusions: Epididymectomy provides meaningful pain relief in approximately two-thirds of men with chronic scrotal pain, although nearly one-third required additional surgical intervention. No preoperative variable reliably predicted success in this cohort, underscoring the importance of individualized patient selection and counseling.

POD 2.4

A randomized, phase 2 study of repeat dose ST-01 (lidocaine polymer solution) vs. lidocaine for spermatic cord block in men with chronic scrotal content pain

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Introduction: Spermatic cord block with local anesthesia provides short-lived pain relief in some men with chronic scrotal content pain (CSCP). We conducted a randomized, phase 2 study (NCT05707208) of ST-01, a sustained-release polymer solution of lidocaine, to assess safety, efficacy, and tolerability of repeat doses in men with CSCP.
Methods: This is a prospective, randomized, multicenter, single-blind, three-arm, active-controlled, phase 2 trial, with repeat doses approximately every 28 days. Study arms include a standard of care (SoC) test injection of 5 mL 1% lidocaine hydrochloride plus 1) 3 mL 1% lidocaine hydrochloride (control); 2) 3 mL ST-01 (70 mg/mL); or 3) 3 mL ST-01 (140 mg/mL). The primary endpoint was magnitude of pain reduction from baseline at 28 days after the second injection (C2D28) or 56 days after the first injection if only one study injection was received (C1D56) compared to control. Males ≥19 years old with CSCP lasting ≥3 months who reported an average daily maximum pain score of ≥4/10 over seven consecutive days were enrolled. At least one injection and up to four injections at least 28 days apart were planned. Participants randomized to control were offered crossover to ST-01 after receiving two SoC treatments and reaching C2D28.
Results: Sixty-three men were enrolled in eight sites across Canada, and the first 54 evaluable are reported here. Response to control, ST-01 70 mg/mL, and ST-01 140 mg/mL, defined as ≥2 point pain reduction using three-day average at C1D56 or C2D28, was noted in 6/19 (32%), 12/17 (71%), and 6/18 (33%), respectively (70 mg/mL vs. control p=0.044; 140 mg/mL vs. control p=1). Clinical response (≥2 point pain reduction using cycle average pain scores) was noted in 7/19 (37%), 15/17 (88%), and 9/18 (50%), respectively (70 mg/mL vs. control p=0.002; 140 mg/mL vs. control p=0.515). After crossover to ST-01, 60% and 63% in the 70 and 140 mg/mL arms reported ≥2-point pain reduction. Forty-seven of 54 men reported at least one adverse event, which were mostly mild or moderate and related to bruising, swelling, or pain at the injection site; three serious adverse events occurred.
Conclusions: Repeat dosing of ST-01 is well-tolerated and demonstrates promising efficacy in men with CSCP at the 70 mg/mL dose compared to SoC alone. Pain relief is durable, and crossover responses further support a therapeutic effect of ST-01 in prior non-responders. These results support the evaluation of ST-01 in phase 3 studies for CSCP.
Acknowledgements: UBC has licensed patents for the invention "polymeric paste compositions for drug delivery," listing Dr. Gleave as co-inventor. The invention has been out-licensed to Sustained Therapeutics, an early-stage biotech company founded by Dr. Gleave.
This abstract was given as a podium presentation at the AUA 2026 Annual Meeting.

POD 2.5

Preliminary evaluation of infrared thermography and visible-light imaging with machine learning to predict post-torsion testicular viability

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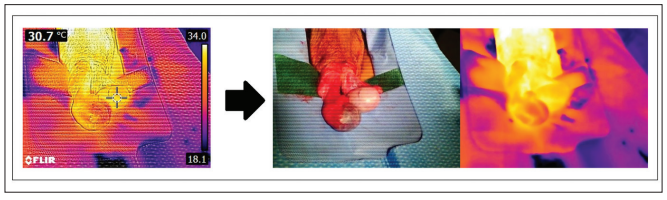
Introduction: Intraoperative decisions to preserve or remove a torsed testis remain largely subjective. We evaluated whether intraoperative infrared thermography, analyzed with machine learning (ML), can objectively predict long-term post-torsion testicular viability.

Methods: In this single-center, prospective, observational study, boys ≤18 years undergoing operative detorsion and bilateral orchidopexy had paired intraoperative thermal and visible-light color images captured (FLIR E8xt). Testicular viability was assessed at 6–12 months by examination and ultrasound, defined as preservation of a parenchymal ratio >80% compared with the contralateral testis. We fine-tuned a pretrained ResNet-50 classifier separately for thermal and color images using a held-out validation split without overlap. As an interpretable physiologic benchmark, we also fit a univariate logistic regression model using the lowest recorded testicular temperature.

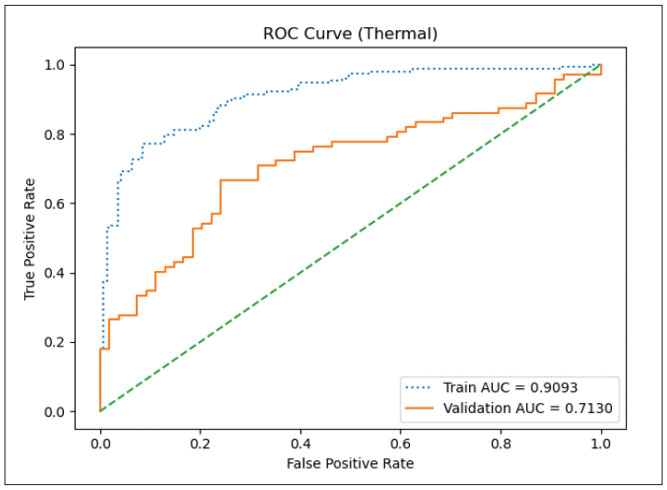
Results: Across 420 images, the color-image classifier outperformed the thermal-image classifier on validation (F1 0.916; AUC 0.966 vs. F1 0.722; AUC 0.713). The temperature-only logistic regression demonstrated intermediate discrimination (validation F1 0.81; AUC 0.842) and supported temperature as an informative predictor (Wald p=0.017) (Figures 1–4, Tables 1–3).

Conclusions: ML analysis of intraoperative imaging can predict long-term testicular viability after torsion. While thermography showed physiologic signal and feasibility, visible-light images provided superior and more stable performance. Protocol standardization and multicenter validation are needed before clinical deployment.

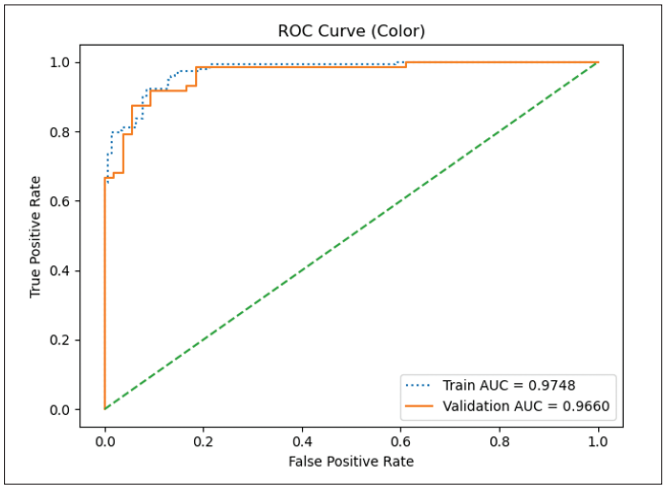
Acknowledgements: The authors would like to thank the clinical staff and fellows whose invaluable contributions made this study possible, and also the University of Toronto's Master of Science in Applied Computing Program.



POD 2.5. Figure 1. FLIR MSX data separation.



POD 2.5. Figure 2. Thermal image classifier ROC plot.



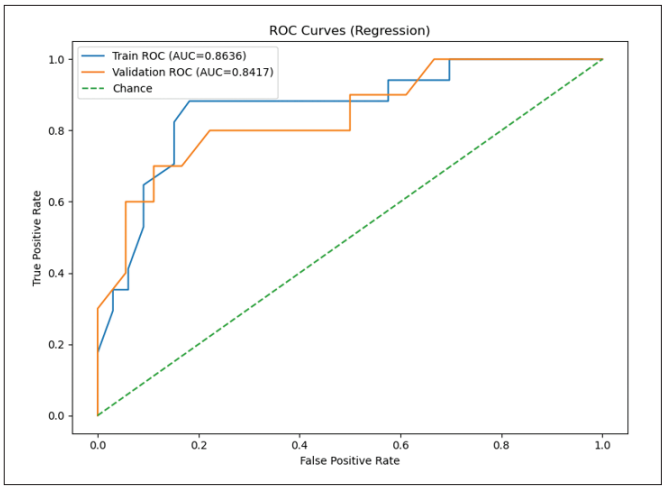
POD 2.5. Figure 3. Color image classifier ROC plot.

POD 2.5. Table 1. Thermal image classifier results

Split	Precision	Recall	F1 Score	AUC
Train	0.801	0.817	0.809	0.909
Validation	0.787	0.667	0.722	0.713

POD 2.5. Table 2. Color image classifier results

Split	Precision	Recall	F1 Score	AUC
Train	0.958	0.902	0.929	0.975
Validation	0.929	0.901	0.916	0.966



POD 2.5. Figure 4. Univariate logistic regression ROC plot.

POD 2.5. Table 3. Univariate logistic regression results

Label	Precision	Recall	F1-Score	Support
Train				
0	0.83	0.91	0.87	33
1	0.79	0.65	0.71	17
Both	0.82	0.82	0.82	50
Train AUC		0.864		
Validation				
0	0.83	0.90	0.86	21
1	0.78	0.64	0.7	11
Both	0.81	0.81	0.81	32
Validation AUC		0.842		
p (Wald test)		0.017		

POD 2.6

Do alpha-blockers work in girls? A comparison between female and male children with neurogenic and non-neurogenic dysfunctional voiding

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Introduction: Alpha-blockers are used to improve bladder emptying in children with dysfunctional voiding, urinary retention, and neurogenic bladder dysfunction, but most supporting data come from male-predominant studies or the sex distribution were not reported.[1-3] Given assumptions that shorter female urethral length and lower α-adrenergic receptor density may reduce benefit, we compared treatment response between males and females receiving alpha-blockers for bladder emptying dysfunction.

Methods: We retrospectively reviewed 83 children treated with tamsulosin or silodosin for neurogenic bladder (without catheterization), dysfunctional voiding, or mixed dysfunction. Baseline characteristics, indications, duration, adverse effects, and treatment discontinuation were recorded. Bladder emptying efficiency was measured as percent change in postvoid residual (PVR) relative to bladder volume from baseline to last followup. Sex-based comparisons were performed using appropriate parametric and non-parametric tests.

Results: The cohort included 40 males and 43 females. Age, diagnosis distribution, reasons for initiating therapy, treatment duration, and discontinuation patterns were similar between sexes. Both boys and girls demonstrated significant improvement in bladder emptying after alpha-blocker therapy (males p=0.03; females p<0.001). Median percent reduction in PVR did not differ between sexes (60.1% vs. 50.4%, p=0.38). Adverse effects were uncommon and comparable (10% vs. 11.6%) (Table 1).

Conclusions: Alpha-blockers improve bladder emptying in children regardless of sex, with similar efficacy and tolerability in boys and girls. Despite anatomical and receptor-density differences, clinical response appears sex-independent. These findings support the use of alpha-blockers in appropriately selected female patients and emphasize the need for prospective, sex-stratified studies.

References:

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POD 2.6. Table 1. Sex-based comparison of baseline characteristics, indications, and outcomes of alpha-adrenergic therapy in pediatric bladder dysfunction

Baseline variable	Male (n=40)	Female (n=43)	p
Age (months), mean ± SD	115 ± 44	125 ± 53	0.36[a]
Duration (months), median (IQR)	13.9 (8.1–26.3)	7.4 (3.4–17.8)	0.06[a]
Diagnosis, n (%)			0.68[b]
Neurogenic bladder	13 (32.5)	16 (37.2)	
Dysfunctional voiding	23 (57.5)	23 (53.5)	
Mixed dysfunction	4 (10)	4 (9.3)	
Reason to start, n (%)			0.38[b]
High PVR	29 (72.5)	27 (62.8)	
HN/worsening renal function	1 (2.5)	2 (4.6)	
Urine retention	0 (0)	1 (2.3)	
Urinary incontinence	6 (15)	7 (16.3)	
Others	4 (10)	6 (14.0)	
Reason to stop, n (%)			0.18[b]
Not discontinued	31 (77.5)	27 (62.8)	
Ineffectiveness	3 (7.5)	4 (9.3)	
Side effects	1 (2.5)	4 (9.3)	
Resolution of symptoms	3 (7.5)	6 (14.0)	
Other	2 (5.0)	2 (4.6)	
% change in PVR, median (IQR)	60.0 (-0.31–85.5)	50.4 (2.3–94.2)	0.38[a]
Adverse effects, n (%)			0.85[c]
Yes	4 (10)	5 (12)	
No	36 (90)	38 (88)	

[a]Independent t-test. [b]Mann Whitney U test. [c]Fisher's Exact test.