

Restoration of Penile Sensation after Dorsal Nerve Trauma Kevin M. Klifto, PharmD, A. Lee Dellon, MD, PhD Department of Plastic Surgery, Johns Hopkins University, Baltimore, Maryland. Department of Neurosurgery, Johns Hopkins University, Baltimore, Maryland.

ABSTRACT

Purpose: Loss of penis sensation or development of a painful penis can occur after injury to the dorsal branch of the pudendal nerve. Attempted relief of this problem through neurolysis of the dorsal nerve in the inferior pubic ramus canal has been reported rarely. While recovery of genital sensibility has been discussed frequently in transmen, this subject has been reported rarely in cismen. The purpose of this report is to review our experience with recovery of sensation after decompression of the dorsal branch of the pudendal nerve.

Methods: A retrospective chart review was carried out from 2014 to 2018, of cismen who have had decompression of the dorsal branch of the pudendal nerve bilaterally. Patients were included if there was a thorough Urologic evaluation for sources of penile pain other than pudendal nerve injury, trial of antibiotics if prostatitis was suspected, normal magnetic resonance imaging (MRI) of the pelvis, and underwent a successful pudendal nerve block if pain was part of the symptomatology. Patients were excluded if they had previous genital surgery. The changes in penile symptoms (erection, ejaculation, ejaculatory pain, erogenous sensation, numbness, pain) were evaluated postoperatively. Secondary measures included the mechanism of injury, mean length of penile symptoms, mean time to improvement of first symptom, symptom recurrence, post-operative complications, and mean follow-up time. **Results:** Mechanisms of injury in this cohort of 8 men were 3 cycling (38%), 3 falls (38%) and 2 prostatectomy (28%). The mean length of penile symptoms prior to surgery was 254 weeks. Mean follow-up time was 9 weeks.

Mean time to improvement in first symptom was 8 weeks. Of the 8 men included in this study, 6 (75%) had surgery bilaterally. Of the 3 men who had erectile dysfunction, normal erections were restored in 2 (67%) patients. Of the 2 patients unable to ejaculate, 1 (50%) patient regained ejaculatory function. Of the 5 patients with ejaculatory pain, complete relief of pain occurred in 3 (60%) patients, with partial relief in 2 (40%) patients. Of the 7 patients with loss of penile sensation, complete recovery of erogenous sensibility occurred in 6 (86%) patients, with partial relief in 1 (14%) patient. Of the 6 patients with penile pain, complete relief of pain occurred in 3 (50%) patients, with partial relief in 3 (50%) patients. Of the 4 patients with numbness, 1 (25%) patient had a complete return of feeling, with partial return in 3 (75%) patients. Complications: one patient had relief of pain but some residual penile numbness.

Conclusions: Neurolysis of the dorsal nerve to the penis can be successful in relieving pain, restoring sensation and erectile function in cismen who sustained an injury along the inferior pubic ramus. This approach may prove useful to transmen who have scarring about the dorsal nerve after transgender surgery.

INTRODUCTION

The dorsal nerve of the cismale penis or dorsal branch of the pudendal nerve is a sensory nerve that allows for normal erectile and ejaculatory reflexes in cismen. Cismen are naturally born males whose psychological gender identity is also socially male [1]. It originates from the pudendal nerve at the most inferior part of the greater sciatic foramen and travels across the pelvis beneath the obturator internus fascia to the medial border of the inferior ramus of the pubic bone, and then, within the sulcus nervi dorsalis penis into the penis itself [2-4]. Benjamin Alcock, in 1836, first described the pudendal artery traveling beneath the obturator internus fascia, but did not describe the course of the pudendal nerve in this region [5].

Pudendal nerve compression can develop from prolonged irritation of the dorsal branch of the pudendal nerve at the sulcus nervi dorsalis penis [2, 9]. The region from the exit of the canal of Alcock to the dorsum of the penis is susceptible to compression [4]. Irritation to the dorsal nerve in this region may result in decreased penile sensitivity, and erectile dysfunction [2, 3, 10-16]. Loss of penile sensation or development of a painful penis can occur after injury to the dorsal branch of the pudendal nerve [2, 8, 10]. Dorsal pudendal nerve compression can occur from iatrogenic lesions, chronic compression such as bicycle riding, pelvic trauma, perineal tears, and pelvic tumors, or a neuroma from prior surgery to the nerve, or diabetes [6, 12, 13, 17, 18].

Attempted relief of this problem through neurolysis of the dorsal nerve in the inferior pubic ramus canal has been reported rarely [18] (Figure 1). While recovery of genital sensibility has been discussed frequently in transmen, this subject has been reported rarely in cismen [19, 20]. The purpose of this report is to review our experience with recovery of sensation after decompression of the dorsal branch of the pudendal nerve in cismen.

MATERIAL AND METHODS

Patient selection

Inclusion criteria were 1) cismale patients referred for loss of penis sensation or the development of a painful penis of more than 24 weeks duration, who 2) had Urologic evaluation for sources of penile pain other than pudendal nerve injury, and who have had 3) trial of antibiotics if prostatitis was suspected, and 4) neuropathic pain and anti-anxiety medication treatment, and 5) normal magnetic resonance imaging (MRI) of the pelvis, and 6) underwent a successful pudendal nerve block if pain was part of the symptomatology. Patients were excluded if they had previous genital surgery.

Surgical technique

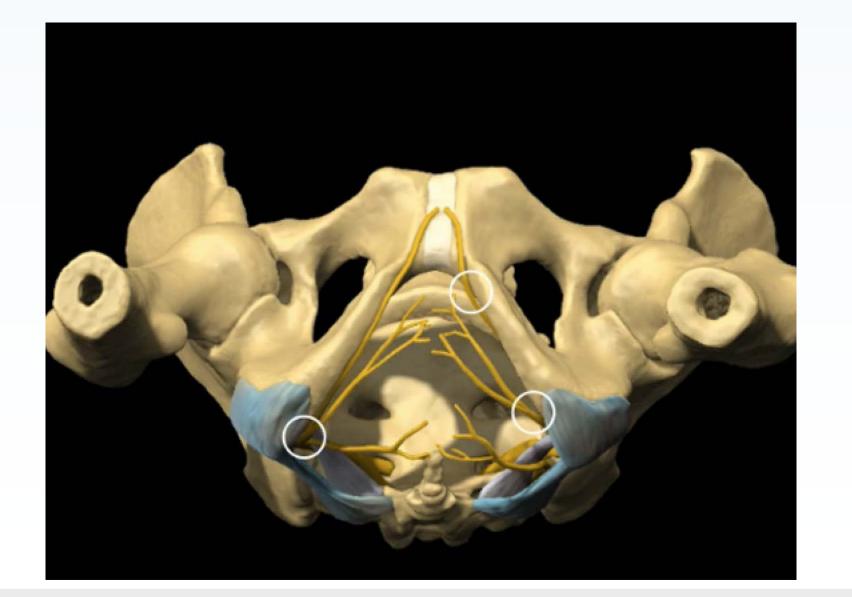
The patient is placed into lithotomy position, the perineal hairs are clipped and a betadine scrub and prep are done (Figure2). Loup magnification at 3.5X is utilized. A bipolar coagulator is used at the lowest possible voltage, especially when dissecting adjacent to the dorsal branch of the pudendal nerve at the inferior pubic ramus to avoid electrical injury to the nerve. The local anesthetic used is 1% Xylocaine injected into the incision site, which is located superior to the ischial tuberosity, and at an angle to the inferior pubic ramus, and lateral to the scrotum.

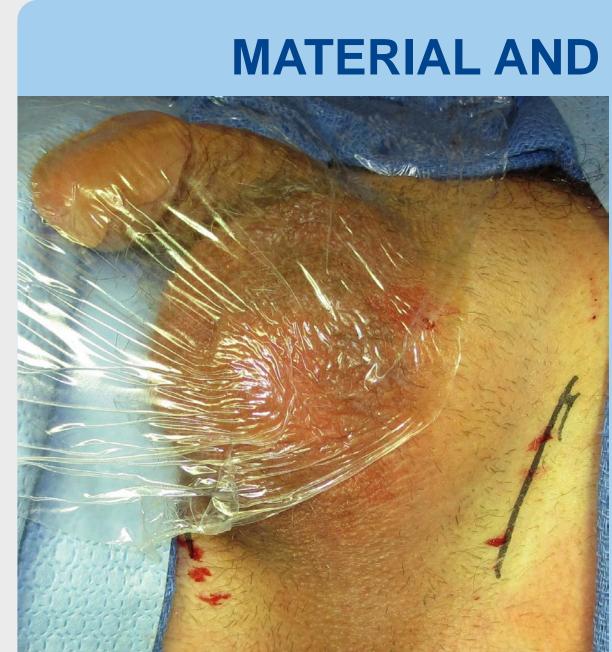
The incision is opened into the ischiorectal fossa and maintained open with a Weitlander retractor with blunt "teeth" (Figure 3A). Dissecting posteriorly and inferiorly, the perineal branches are identified, and preserved. In ten percent of patients the dorsal branch will exit through the canal of Alcock [5, 17], and so this variant must be identified. If it is present, then the scarring around the exit must be released, and this would complete the procedure. This has not proven to be the anatomic finding in any of the patients operated on in this series.

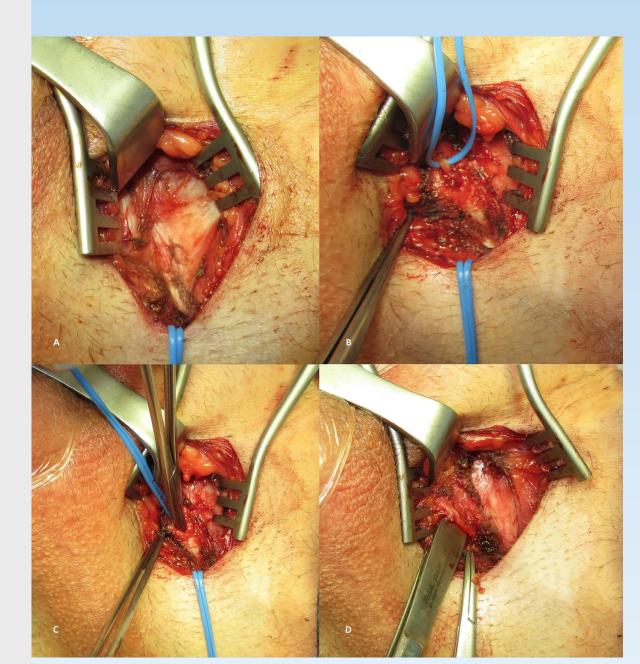
After confirming that there is no dorsal pudendal branch exiting the canal of Alcock, the Weitlander retractor is placed into the most superior aspect of the incision. In this location, the ischiocavernosus muscle is identified and its origin from the inferior pubic ramus is released using first the bipolar coagulation and then a sharp scissors. Care must be taken not to enter the corpora cavernosa to prevent venous bleeding. As the dissection approaches the juncture of the inferior pubic ramus with the symphysis pubis, a softer region is palpated, and spreading transversely with the scissors reveals a yellowish, almost fatty appearing 2 mm diameter dorsal branch of the pudendal nerve (Figure 3B). Care must be taken not to injure electrically this little nerve. The nerve will be in slightly tight fascia as it travels more superficially to the base of the penis. The nerve will still likely be entrapped by scar more proximally. A small right angle clamp or dissector can be placed between the nerve and remaining intact fibers of the inferior pubic ramus canal to delineate this tight region prior to cauterizing it and then sharply releasing it under direct vision while protecting the nerve. (Figure 3C)

The site of compression can often be observed, being narrowed, and often inflamed compared to the regions proximal and distal to the compressed nerve (Figures 3D and 4).

After checking for hemostasis, the wound is closed with interrupted, intradermal 4-0 monocryl, and the skin with interrupted and continuous 5-0 nylon sutures. The dressing is xeroform, gauze, and small Tegaderm.







Outcomes analyzed Primary outcomes measured were pre and post-operative penile changes of 1) ability to have an erection, 2) ability to ejaculate, 3) ejaculatory pain measured by visual analogue scale, 4) erogenous sensation, 5) numbress, and 6) pain measured by visual analogue scale defined as complete relief, partial relief, or no relief of symptoms. Secondary outcomes measured were: concomitant surgeries performed during neurolysis procedure; mean time to improvement of symptoms following surgery; mean length of time for patient follow-up; post-operative complications; symptom recurrence.

Statistical analysis Our primary and secondary outcomes were analyzed with descriptive statistics. All patients were assessed for demographic and clinical differences. A comparison between the pre-operative and postoperative groups was performed.

MATERIAL AND METHODS

Surgical technique

Ambulation and showering is allowed. The bandage is removed on post-op day #3 and then betadine is applied twice a day. Sutures are removed between the 12 and 14th day after surgery.

Rehabilitation consists of water walking in a heated pool, 3 to 4 times per week for 15 minutes each time. This can be continued if desired for 3 more weeks, increasing to 30 minutes and including swimming.

Demographics

Table 2 summarizes the demographics for all 8 men included in this study. Variables of interest include: patient age; gender; body mass index (BMI); race and ethnicity; if the patient was a current smoker, consumed alcohol or recreational drugs; marital status; number of prior pelvic surgeries for an unrelated cause; patient comorbidities; patient occupation; the cause of initial mechanism of injury; date of first presentation to peripheral nerve specialist, mean length of time of penile symptoms; mean number of pre-operative medications to treat penile symptoms at first visit.

Figure 2

Figure 3

1. Steinmetz K. This Is What 'Cisgender' Means. Time Magazine 2014 2. Sedy J, Nanka O, Belisova M, et al. Sulcus nervi dorsalis penis/clitoridis: anatomic structure and clinical significance. Eur.Urol. 2006;50:1079-85: Nov, doi:S0302-2838(06)00199-0 [pii] 3. Weech D, Ashurst JV. Anatomy, Abdomen and Pelvis, Penis Dorsal Nerve. Treasure Island (FL): StatPearls Publishing LLC, 2018 4. Hruby S, Ebmer J, Dellon AL, Aszmann OC. Anatomy of pudendal nerve at urogenital diaphragm--new critical site for nerve entrapment. Urology 2005;66:949-52: Nov, doi:S0090-4295(05)00756-9 [pii] 5. Colebunders B, Matthew MK, Broer N, et al. Benjamin Alcock and the pudendal canal. J.Reconstr.Microsurg. 2011;27:349-54: Jul, doi:10.1055/s-0031-1278705 [doi] 6. Dellon AL. Clinical use of vibratory stimuli to evaluate peripheral nerve injury and compression neuropathy. Plast.Reconstr.Surg. 1980;65:466-76: Apr 7. Pettersson LM, Danielsen N, Dahlin LB. 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•Mechanisms of injury in this cohort of 8 men were 3 cycling (38%), 3 falls (38%), and 2 prostatectomy (28%). The mean length of penile symptoms prior to surgery was 254 weeks (range: 28-780 weeks). Mean follow-up time was 17 weeks (range: 5-40 weeks). Mean time to improvement in symptoms was 8 weeks (range: 2-16 weeks). Of the 8 men included in this study, 6 (75%) had surgery bilaterally. Of the 3 men who had erectile dysfunction, normal erections were restored in 2 (67%) patients. Of the 2 patients unable to ejaculate, 1 (50%) patient regained ejaculatory function. Of the 5 patients with ejaculatory pain, complete relief of pain occurred in 3 (60%) patients, with partial relief in 2 (40%) patients. Of the 7 patients with loss of penile sensation, complete recovery of erogenous sensibility occurred in 6 (86%) patients, with partial relief in 1 (14%) patient. Of the 6 patients with penile pain, complete relief of pain occurred in 3 (50%) patients, with partial relief in 3 (50%) patients. Of the 4 patients with numbress, 1 (25%) patient had a complete return of feeling, with partial return in 3 (75%) patients. One patient (13%) had relief of pain but some residual penile numbress as a complication. There were no complications observed, however, one patient had residual numbness. There were no instances of symptom recurrence at the mean 17week (standard deviation: 15 weeks) follow-up.



RESULTS

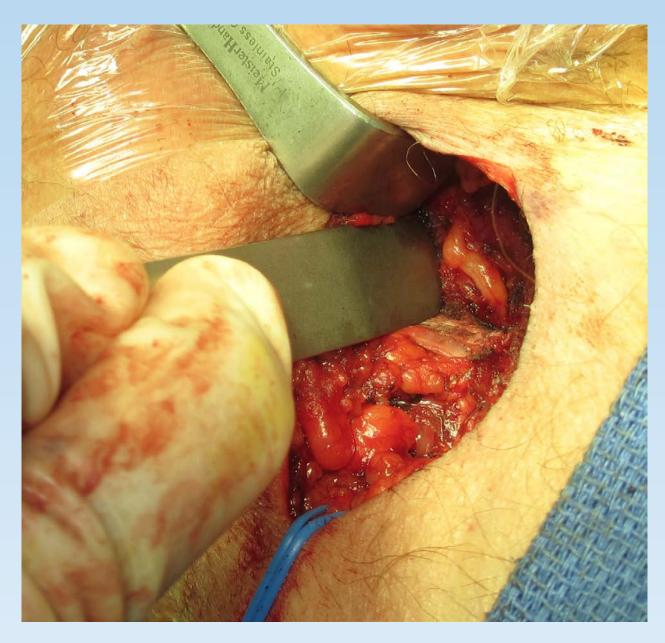


Figure 4

CONCLUSION

Neurolysis of the dorsal nerve to the penis can be successful in relieving pain, restoring sensation and erectile function in men who sustained an injury along the inferior pubic ramus. This approach may prove useful to transmen who have scarring about the dorsal nerve after transgender surgery.



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