Facing challenges in penile prosthesis implantation

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Citation for published version (APA):
Mahmoud, O. K. Z. (2012). Facing challenges in penile prosthesis implantation
Chapter 6

Trans-Corporal Incision of Peyronie’s Plaques

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Published in J Sex Med 2011; 8(2):589-93
Abstract

Introduction. Patients presenting with Peyronie’s disease (PD) curvature and erectile dysfunction (ED) can achieve straightening and rigidity through penile prosthesis implantation and manual modeling, and, if necessary, a relaxing tunical incision with or without grafting. Unfortunately, this maneuver will not correct PD-induced shortening. In addition, incision and grafting after the prosthesis has already been implanted adds to operative time and risk and may indicate mobilization of the neurovascular bundle and possible a secondary skin incision.

Aim. This work describes trans-corporal incision (TCI), a minimally invasive endoscopic approach for plaque incision from within the corpora cavernosa, restoring straightness and length to the penis, before calibration of the corpora cavernosa, allowing implantation of a longer prosthesis in a straight penis, with neither mobilizing the neurovascular bundle nor a secondary incision.

Methods. Sixteen patients with PD deformity and refractory ED were operated upon. Intra-operative artificial erection demonstrated the deformity. Through a penoscrotal incision, the corpora were dilated. TCI was performed to incise Peyronie’s plaques at the point of maximum deformity. Artificial erection was re-induced and correction of curvature evaluated. Length was measured before and after TCI. Implantation proceeded as usual.

Main outcome measures. Penile straightness and length.

Results. Following implantation, the penis was straight in all cases. Pre-TCI length of the corpora was unequal on either side. Post-TCI, both corpora were of equal length with an average increase of 2.5 cm (11.9%) on the right side and 1.9 (9.1%) on the left.

Conclusion. TCI; corporoscopic incision of Peyronie’s plaques upon implantation of penile prosthesis is a minimally invasive approach that restores both straightness and length to patients with Peyronie’s disease and erectile dysfunction, with neither mobilization of the neurovascular bundle nor plaque incision and grafting.
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Introduction

Peyronie's disease (PD) is a state of fibrous transformation of the tunica albuginea of the corpora cavernosa with resultant curvature, hinging, hour glass deformity, narrowing, shortening, and painful erections. The accepted explanation for the transformation is repeated microtrauma and resultant abnormal wound healing. However, the molecular biology of this process remains incompletely understood, and no reliable and effective medical treatments exist to “cure” the penile deformity of PD.

PD may occur concomitantly with erectile dysfunction (ED). It was noted that PD patients with the hourglass deformity had the highest rate of ED due to pure arterial insufficiency, while veno-occlusive dysfunction was seen most commonly in those with ventral curvature. All patients with severe deformities likely requiring significant plaque excision and grafting or concomitant ED and PD should be counseled to consider penile prosthesis rather than deformity correction alone, considering that the deformity correction techniques have well documented negative effects on erectile function. Patients presenting with PD and ED can achieve correction of deformity and definitive mechanical erections through the placement of a penile prosthesis followed by manual modeling and, if necessary, a relaxing tunical incision with or without patch grafting in case of residual curvature after modeling.

Unfortunately, implantation and molding will not correct the shortening notorious for PD. Furthermore, the non-uniform shortening (especially with lateral curvatures) results in variance in the length of both corpora by 1-2 cm, indicating the use of an even shorter prosthesis to maintain equality of both cylinders. In addition, modeling on its own may not be sufficient for full correction of deformity. It may sometimes be necessary to perform a plaque incision and grafting procedure after the prosthesis has already been implanted, adding to operative time and risk. Incision and grafting may require mobilization of the neurovascular bundle with the possible consequent sensory deficit, or a secondary incision for dorsal access in cases of residual dorsal curvature which adds to morbidity risk.
This work describes a minimally invasive endoscopic approach for plaque incision from within the corpora cavernosa, restoring straightness and length to the penis, before calibration of the corpora cavernosa, allowing implantation of a longer prosthesis in a straight penis, with neither mobilizing the neurovascular bundle nor a secondary incision.

**Methods**

Sixteen patients with Peyronie’s deformity, erectile dysfunction and poor response to medical treatment were selected for the procedure. Mean age was 54 years +/- 4. 12 patients were diabetic. 7 patients had dorsal curvature (less than 60 degrees in 3 and more than 60 degrees in 4), 4 had ventral curvature of less than 60 degrees, and 5 had dorsal and lateral curvatures (Table 1). 5 patients had an hour-glass deformity. All patients complained of shortening. Patients were operated upon in the stationary phase of the disease beyond disappearance of pain, two or more years after the problem was first noted. Duplex examination demonstrated Peyronie’s plaques and the vascular etiology: arterial insufficiency in 9 patients and venous leakage in 7. All patients were poor responders to intracavernous injection of vasoactive drugs, phosphodiesterase inhibitors and testosterone replacement. Prior to surgery, blood sugar was controlled in diabetic patients. A written informed consent was obtained.

Surgery started with induction of artificial erection by saline infusion against a tourniquet applied to the base of the penis. This helped identification of the deformity, degree, direction, point of maximum curvature and erect shaft length (Figure 1).
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Length was measured by a sterile metal ruler from tourniquet to point of maximum curvature and from that to the tip. A penoscrotal incision was cut. Ventral corporotomies were incised. The corpora were dilated and their length measured. Inequality of the length on either side is expected especially in cases of lateral curvature. Trans-corporal incision (TCI) / Optical corporotomy commenced to incise Peyronie’s plaques at the point of maximum curvature / deformity, previously determined (Figure 2). TCI is incision of fibrous tissue under optical guidance by a cystoscope introduced into the corpora cavernosa (Figure 2). Plaques were incised by either the cold knife or a diathermy knife electrode. For more effective restoration of length and straightness, side to side incision across (rather than along) the corpora cavernosa is preferable and can be achieved by the diathermy knife electrode on low cutting current, rotating it sideways across plaques. Diathermy electrode was reserved to cases where cold knife incision did not suffice (n=8).
Since plaque incision was from within the corpora cavernosa, there was no need for mobilization of the neurovascular bundle. In addition to prior localization of the points of maximum curvature upon artificial erection, the sites of Peyronie’s plaques were easily identifiable by palpation. If needed, the extent of incision could be fine tuned by concomitant ultrasound guidance from without. In most cases, the incision is partial thickness. Breaking through the tunica albuginea is immediately indicated by fluid extravasation which alerts the surgeon. Fluid extravasation was noted in two cases with no alarming sequelae. After plaque incision, artificial erection was re-induced with the corporotomies sealed by suturing sterile glove material onto them. Length was measured as before. Correction of curvature was re-evaluated, and the need for further plaque incision decided. Full correction was also indicated by equality of the measured length of both corpora after TCI.

In 2 cases, fibrotic changes were extensive to the point that dilatation was difficult. In those cases, optical corporotomy and TCI were used to cut through the fibrous tissue and make way for dilatation. Repeated superficial slitting of the whole length of the interior of the tunica albuginea helped dilatation up to 13-14 Hegars in cases with narrow corpora.
After correction of deformity and dilatation, full length of the corpora was measured by the graded metal dilator from within. Implantation proceeded as usual. Average operating time was 100 minutes. Infection control measures for this procedure included the regular systemic antibiotic coverage and intra-operative irrigation, in addition to adding bacitracin to the irrigation solution, ethylene oxide sterilization, and preferably reserving a corporotomy set exclusively for such procedures, not to be used transurethrally \textsuperscript{21, 22}.

Postoperative instructions were no different than regular implantations except that a snug bandage is applied to the shaft for haemostasis in case plaque incision has resulted in minor extracorporal bleeding not detected on table, and that the prosthesis was left in the erect state for a longer period, 4 weeks on average. Theoretically, since the procedure involves incision without grafting, I opted to maintain the penis in an erect state for a longer time post-operatively until the incisions have passed the contracture state. Regular use of the prosthesis by the patient thereafter helps to maintain penile straightness because the prosthetic cylinder acts like an internal tissue expander \textsuperscript{16}. We have had no cases of recurrence with the exception of one very mild case that could be self corrected by modeling.

**Results**

Following implantation, the penis was straight in all cases (Figure 3). The 16 patients were followed up for an average of 14 months, during which they successfully resumed sexual activity. None of the patients had sensory deficit or residual curvature. One patient reported recurrence of a very mild degree of curvature that we managed by self-modeling \textsuperscript{17}. None of the patients suffered infection.
Length of the pendulous penis before plaque incision (pre-TCI length) was measured upon artificial erection from tourniquet to tip, and compared to post-TCI length measured in the same way. Post-TCI length was 2.1 cm (21%) longer than pre-TCI length. Full length of the corpora pre-TCI was 18.5 cm on the right side and 19.1 on the left, on average. Following TCI, length was equal on either sides with an average increase of 2.5 cm (11.9%) on the right side and 1.9 (9.1%) on the left (Table 1).
### Table 1: Degree of curvature and penile length measurements.

All patients expressed satisfaction with outcome especially with thorough preoperative counseling granting them full understanding of the condition and realistic expectations. Unfortunately, no particular questionnaire was applied to measure patient/partner satisfaction.

**Discussion**

Surgical decisions for PD are a therapeutic dilemma. A treatment algorithm was developed at Rush University Medical Center in Chicago, IL, recommends plication procedures for cases with adequate erectile function and a simple curve less than 60° with neither an hourglass nor
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hinge effect, an incision and grafting procedure in cases with adequate erectile function and a complex curve greater than 60° or presence of destabilizing hourglass or hinge effect, and penile prosthesis implantation with manual modeling and possibly a grafting procedure in cases with erectile dysfunction failing medical treatment. After placement of the implant and closure of the corporotomy incisions, the prosthesis is inflated, demonstrating curvature. The penis is bent in a direction opposite the curvature for 60 to 90 seconds with the tubing clamped. This is repeated until adequate straightening (residual curve ≤30°) is achieved, adding more saline to the cylinders. In case of a residual curve of more than 30°, a relaxing tunical incision is performed with or without grafting.

This very effective and widely accepted procedure however may have the following drawbacks. First of all, it does not address shortening, a common sequel of PD. While modeling over the rigid prosthesis breaks down the fibrous tissue plaques, relaxing contracture and possibly allowing for a longer prosthesis to be implanted, it is already too late by then, the prosthesis being already sized and in place. Similarly, although incision and grafting should restore length, in this setting it is performed after implantation of the sized prosthesis. The added length will therefore not be occupied by a longer prosthesis. In addition, performing incision and grafting while the prosthesis is already unsealed and implanted in place adds to the duration of exposure, possibly adding to the risk of infection. Furthermore, incision and grafting may require mobilization of the neurovascular bundle with the possible consequent sensory deficit, and possibly a secondary incision over the site of plaque incision if the plaque is dorsal and distal.

TCI / Corporoscopic incision of Peyronie’s plaques restores both straightness and length to patients with concomitant PD and ED, yet is minimally invasive and does not require ancillary maneuvers such as mobilization of the neurovascular bundle, plaque incision and grafting or secondary incisions, thereby avoiding sensory deficits and unnecessary exposure of the prosthesis. Caution should be exercised with the extent of incision (controllable by ultrasonography and occurrence of extravasation) to avoid injury of the neurovascular bundle. In cases with ventral curvature, keeping incision ventrolateral helps avoid urethral injury. With the plaques incised trans-corporally, straightness and length are restored.
before definitive measurement of corporal length. The measured length is accurate, equal on both sides and longer than could be without plaque incision. A longer prosthesis can therefore be implanted. In cases of PD, trial at restoration of penile length should be of similar importance to correction of curvature especially considering that implantation of a penile prosthesis per se undermines length \(^{32}\) in a patient already afflicted by Peyronie’s disease-induced shortening.

**Conclusion**

Corporoscopic incision of Peyronie’s plaques upon implantation of penile prosthesis is a minimally invasive approach that restores both straightness and length (to a variable extent) to patients with Peyronie’s disease and erectile dysfunction, with neither mobilization of the neurovascular bundle nor plaque incision and grafting.
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References