Complex Peyronie’s Deformities: The Case for Penile Plication

Wayne JG Hellstrom, MD, FACS
Professor of Urology; Chief, Section of Andrology
Department of Urology
Tulane University School of Medicine
New Orleans, Louisiana
Variety of Penile Deformities

- Republican
- Hourglass
- Democrat
- Dorsal
- Shortening
- Ventral
Peyronie’s Disease: Background

Scarring/plaque of the tunica albuginea with excessive abnormal collagen deposition\(^1\)

Potential symptoms\(^2\): penile curvature/deformity, pain, shortening, or indentation, erectile dysfunction, difficulty with sexual intercourse, loss of self-esteem and depression

In literature estimated prevalence for adult men of 4-5\(^1\); average age of disease onset is 57 yrs\(^1\)

Higher association with diseases such as diabetes, erectile dysfunction and others\(^2\)

Surgery is typically the definitive treatment of last resort, but up until recently (with entry of CCH) most patients had been treated with FDA unapproved and unproven medical therapies

\(^1\) Bella A, Peyronie’s Disease J Sex Med 2007;4:1527-1538
\(^2\) Nyberg L, J Urol. 128 48, 1982
Pre-op Evaluation of Peyronie’s Disease

**History**
- Medical issues, psychological status, familial trait
- Previous penile trauma or surgery, medications
- Mode of onset (gradual or sudden), progression
- Penile rigidity, pain, ability to have intercourse

**Physical**
- Penile dimensions (**record** flaccid & stretched length)
- Plaque size, location and number
- Penile erection to evaluate anatomical deformity (intracavernous injection, home photograph)
Preoperative Assessment (PD)

- Assessment of penile vascular (erectile) status mandatory for optimum decision on surgical management

- Penile duplex Doppler ultrasonography (PDDUS): assesses structure of corpus cavernosum, tunica albuginea (plaque) & penile vascular function (collateral vascular communications)

- Alternative – in office intracavernosal injection of a vasoactive agent to evaluate condition

- Additional objective tests: DICC, MRI
Treatment Options

• Spontaneous resolution
• Oral therapy - Vitamin E, PABA, PTX, L-Arginine
• Intraleisional injection therapy
  – Calcium channel blockers (verapamil)
  – Interferon alpha 2b (IFN)
  – Xiaflex (collagenase, Auxilium, Malvern, PA)- only FDA approved agent
• Surgical options
  1. Plication of contralateral corpora side (Nesbit principle)
  2. Incision & Grafting procedures
  3. Prosthesis option with possible modeling or ancillary procedures
Prerequisites for Surgical Correction of PD

- Stabilization of acute inflammatory phase (>12 months)
- Failure of medical/intralesional therapy
- Patient psychologically ready & has realistic expectations about surgery
- Has anatomic deformity that precludes sexual intercourse, e.g. curvature, indentation, dyspareunia
- If ED (vascular insufficiency) – prosthesis implantation + penile straightening procedure
Surgical Approaches for PD

1. Tunical Plication Techniques -
   Reconstructive procedure on convex side (opposite to the plaque)

2. Incision/Excision & Grafting Procedures -
   Reconstructive procedure on concave side (same side as plaque) -
   incision/excision & grafting

3. Penile Prosthesis & any ancillary procedures
   (manual modeling, tunical incision/excision ± grafting)
Indications for Plication Procedures

• Stable disease, defined as at least 1 year from onset and at least 3 months of stable deformity
• Compromised ability to engage in sexual activity due to deformity or inadequate rigidity
• Extensive plaque calcification
• Failure of conservative/medical therapy i.e. Xiaflex (CCH, Endo)
Contraindications to Plication Procedure

- Penile curvature > 90°
- Hourglass or complex deformities (hinge defect)
- Severe plaque calcification
- Severe ED- non responsive to oral or intracavernosal vasoactive agents
- Predicted loss of erect penile length > 20%
  (baseline penile length < 13 cms)

Plication Approaches For Correction of Penile Curvature

1) **EXCISIONAL CORPOROPLASTY** i.e. Nesbit
   
   Excise ellipse(s) of tunical tissue

2) **INCISIONAL CORPORPLASTY** i.e. Yachia
   
   Incisional corporoplasty using Heineke- Mikulicz technique

3) **NON-INCISIONAL CORPOROPLASTY**
   
   i.e. Essed- Schroder or Lue technique

Chan and Lewis; Trans Androl Urol; 2016
1. EXCISIONAL CORPOROPLASTY

- Nesbit Procedure (1965) – initially described for correction of congenital abnormalities of penis
  - Pryor (1985) applied technique to Peyronie’s deformities
  - Technique – circumcision incision, artificial erection, ellipse(s) excised – 1 mm for every 10° curvature
  - Results – simple, safe, 80% success rate
  - Drawbacks – Penile shortening (13-37%), urethral injury, glans numbness, hematoma, ED
2. INCISIONAL CORPORPLASTY

  - Allis clamps used to straighten penis with artificial erection, longitudinal incision, closed horizontally (Heineke-Milkewitz principle)
  - Results – 90% successful straightening, 95% preservation of erections, 80% satisfaction
  - Drawback – Penile shortening in 67%
3. NON-INCISIONAL CORPOROPLASTY

- Plication Procedures (Essed-Schroder; Lue)
  - No excision or incision, but non-absorbable sutures (2-0 Ethibon, Ticron or Tevdex) placed (reeved) on opposite side to curvature & knots buried (Knispel, H, 1991)
  - 2-3 pairs of sutures usually used
  - Results: Success 40-100%
  - Drawbacks – Recurrence of curvature, penile pain and shortening
Essed-Schroeder plication technique

- Tourniquet at the base of the penis
- Penis injected with normal saline to visualize degree of curvature
- Circumcision with penile degloving with indwelling Foley catheter
- Dissection of the urethra off corpora cavernosa
- Placement of non-absorbable sutures after identification of points that will result in penile straightening

Essed, E, Schroder, FH; Urology 1985
Essed – Schroeder Technique for PD

- Artificial saline erection to identify penile curvature
  - No tunical excision or incision, but reeving with non-absorbable sutures (2-0 Ticron or Tevdex) placed on opposite side to curvature and knots buried
  - 2-3 pairs of sutures usually used

- 5 patients with severe PD underwent this modification of Nesbit procedure – 4 successful

Essed, Schroeder, Urology 25; 5827 1985
Long-term Results of Essed-Schroeder Plication Procedure

- 35 patients (mean age 23 yrs) with congenital ventral penile curvature (mean 54 degrees, range: 30-90 degrees)

- 25/35 available for long-term FIU (mean 34.3 months)
  17/23 – remained straight
  15/23 – penile shortening (1.8 cm; 0.5 – 4 cm)
  6/23 – recurrent curvature (mean 23°)
  2/23 – plication nodules (Gortex suture used)

Hauck EW, et al. IJIR, 2002, 14:146
<table>
<thead>
<tr>
<th>Authors</th>
<th>Number of patients (congenital/ Peyronie)</th>
<th>Follow-up months (mean)</th>
<th>Postoperative recurrent deviation*</th>
<th>Postoperative erectile dysfunction</th>
<th>Postoperative complications</th>
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<tbody>
<tr>
<td>Essed et al. [3], 1985</td>
<td>5 (−/5)</td>
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<td>Ebbehøj et al. [4], 1985</td>
<td>25 (+/−)</td>
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<td>4 (16%)</td>
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<td>Ebbehøj et al. [13], 1987</td>
<td>140 (140/−)</td>
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<td>6 (4%)</td>
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<td>3 (2%)</td>
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<td>Reis et al. [14], 1988</td>
<td>16 (16/−)</td>
<td>3–6</td>
<td>1 (6%)</td>
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<td>1 (6%)</td>
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<td>Mufti et al. [15], 1990</td>
<td>13 (−/13)</td>
<td>9–72 (31)</td>
<td>5 (38%)</td>
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<td>Erpenbach et al. [16], 1991</td>
<td>40 (39/1)</td>
<td>6–120 (60)</td>
<td>2 (5%)</td>
<td>0</td>
<td>4 (10%)</td>
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<td>Knispel et al. [12], 1991</td>
<td>37 (20/17)</td>
<td>12</td>
<td>0 or 2/17 (12%)</td>
<td>0</td>
<td>4 (11%)</td>
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<tr>
<td>Klevmark et al. [17], 1994</td>
<td>105 (48/57)</td>
<td>(22)</td>
<td>5 (5%)</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Nooter et al. [11], 1994</td>
<td>55 (22/33)</td>
<td>2–103 (42)</td>
<td>1 (2%) or 0</td>
<td>6 (11%)</td>
<td>8 (15%)</td>
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<td>Kummerling et al. [18], 1995</td>
<td>54 (−/54)</td>
<td>(36)</td>
<td>(10%)</td>
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<td>no data</td>
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<td>Geertsen et al. [19], 1996</td>
<td>28 (−/28)</td>
<td>9–72 (34)</td>
<td>5 (18%)</td>
<td>1 (4%)</td>
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<td>Poulsen et al. [20], 1996</td>
<td>32 (23/9)</td>
<td>3–60 (36)</td>
<td>13/23 (57%) or 4/9 (44%)</td>
<td>0 or 5/9 (56%)</td>
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<td>Richter et al. [21], 1996</td>
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<td>Vatne et al. [22], 1996</td>
<td>51 (27/24)</td>
<td>(33)</td>
<td>7/27 (26%) or 9/24 (38%)</td>
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<td>Levine et al. [10], 1997</td>
<td>22 (−/22)</td>
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<td>2 (9%)</td>
<td>2 (9%)</td>
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<td>Thiounn et al. [23], 1998</td>
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<td>6–120 (18)</td>
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<td>Padilla Nieva et al. [24], 1998</td>
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<td>Brake et al. [25], 1999</td>
<td>11 (7/4)</td>
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<td>Benejam Gual et al. [26], 1999</td>
<td>44 (27/17)</td>
<td>no data</td>
<td>0</td>
<td>no data</td>
<td>‘low’</td>
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<td>Own data, 1999</td>
<td>61 (40/21)</td>
<td>12–75 (40)</td>
<td>9/40 (23%) or 9/21 (43%)</td>
<td>2 (3%)</td>
<td>14 (23%)</td>
</tr>
<tr>
<td>Authors</td>
<td>Number of patients (congenital/ Peyronie)</td>
<td>Follow-up months (mean)</td>
<td>Postoperative recurrent deviation&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Postoperative erectile dysfunction</td>
<td>Postoperative complications&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>Kelami [27], 1987</td>
<td>100 (100/-)</td>
<td>no data</td>
<td>4 (4%)</td>
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<td>no data</td>
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<tr>
<td>Porst [28], 1989</td>
<td>62 (26/36)</td>
<td>6–42</td>
<td>0</td>
<td>0</td>
<td>2 (3%) complications demanding surgical revision</td>
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<td>Schreiter [8], 1991</td>
<td>42 (25/17)</td>
<td>no data</td>
<td>2/25 (8%) or 3/17 (18%)</td>
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<td>3/25 (12%) or 5/17 (29%)</td>
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<td>Poulsen et al. [20], 1995</td>
<td>143 (95/48)</td>
<td>3–48 (15)</td>
<td>9/95 (9%) or 2/48 (4%)</td>
<td>1/95 (1%) or 11/48 (23%)</td>
<td>7 (5%)</td>
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<td>Ralph et al. [9], 1995</td>
<td>359 (359/-)</td>
<td>2–108 (21)</td>
<td>38/359 (11%)</td>
<td>2/185 (1%)</td>
<td>41 (11%)</td>
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<td>Andrews et al. [29], 1999</td>
<td>106 (106/-)</td>
<td>3–24 (18)</td>
<td>4/106 (4%)</td>
<td>7 (7%)</td>
<td>12 (11%)</td>
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</table>
Congenital and Acquired Penile Deviation Treated with the Essed Plication Method

• 1991-96 Essed procedure on 61 patients – mean age 31.1 yrs with mean curve 47.4 degrees (40 congenital curvature & 21 PD)

• 40 month F/U: 18 (29.5%) had recurrence of curve (PD 42% & congenital 22%); 2 reported ED with PD; 38% complained of palpable plication sutures; 45% noted penile shortening, but only 21% bothered by it

• Conclusion: Nesbit procedure superior (mainly because of palpable, non-absorbable knots with Essed-Schroder technique)

16-dot Plication - Lue

- Artificial erection induced by ICI of papaverine or alprostadil
- Low tension sutures
  - air knots preferred
- Multiple-paired, permanent sutures
  - braided 2-O Ticron or Tevdex
  - do not use Nylon or Prolene

Results of the 16-dot method

- F/U: 124 patients, 7 months to 6 years (mean 2.6 years)
- 85% perfectly straight
- Recurrence: 15% slight curve, only 3% were severe
- Worsening erections: 6%
- **Shortening: 41%** (0.5 cm to 1.5 cm)
- Bothered by suture knots (12%)
- Decreased penile sensation (6%)
- Persistent pain > 4 months (6 men)

Dear Sirs: I am returning the remaining portion of your "GROW-A-FOOT" penis creme.
Patient Case

- 55 yo M with no significant past medical history
- Curvature for >12 months
- No pain with erections
- Minimal shortening
- No erectile dysfunction
- PDDU 55 degree dorsal curve – non-vascular
Use “near far- far near” technique to bury knot
Essed- Schroeder Plication (dorsal curve)
Ventral Peyronie’s Disease

• ~9% of all PD plaques are located on the ventral aspect of the penis
• Due to its infrequent prevalence, there is a little data regarding management
• In patients with ventral PD & poor erectile function not responding to PDE5i, IPP insertion is recommended

Ventral Peyronie’s Disease

• One of the IMPRESS studies’ exclusion criteria was ventral location of Peyronie’s plaque due to fear of urethral injury

• As such, CCH is currently not FDA-approved in this cohort of patients.
Non-vascular 90° ventral curve

- 57 yr old male with PD x > 2 yrs
- CC: Unable to penetrate
- No antecedent trauma, infections, surgeries, etc.
- No erectile dysfunction
- PDDU: 90° distal ventral curve with no cavernosal arterial insufficiency and no venous leak
- Tried 1 round of Xiaflex- disaster
- Extremely motivated to do anything – prefers no prosthesis
Plication procedure for ventral curve
Surgical Correction of Persistent PD Following CCH

Some CCH pts not sufficiently improved with penile deformity

• **Aim:** Evaluate intra-op and post-op outcomes

• **Methods:** Retrospective review of 7 men who underwent plication or incision/excision & grafting

• **Results:**
  - Mean days from CCH to surgery: 182 ± 118 days
  - Mean curve 58° pre-op to <20° post-op
  - No significant operative difficulties (time or procedural) or complications (sensory deficit or ED)

• **Conclusion:** Prior CCH not a contraindication to surgical correction of PD

Levine L & Larson S. J Sex Med; 2015
Complications of plication procedures

- Curve recurrence (7.7-10.6%)
- Erectile dysfunction (0-22.9%)
- Penile indurations or narrowing (0-16.7%)
- Suture granuloma (0-1.9%)
- Glans hypoesthesia (0-21.4%)

Cost Effectiveness

• Probability of treatment success after injection of CCH was 49.5% for moderate curvature (30-60°) and 12% for severe curvature (61-90°)

• Cost of plication $3,039

• Cost of CCH $25,856 for moderate disease, $26,375 for severe disease

Cordon et al. Urology Practice. 2016 (4) 118-125
Penile Plication for PD: Summary

- Penile plication procedures for PD are relatively safe and simple to do, with an overall low morbidity
- Success rates of tunical plication procedures, as defined by improvement in or resolution of penile curvature, range from 92%-99%, & serious adverse events are rare
- Use of penile plication compared to IL CCH is cost-effective and compared to grafting is increasing in frequency

Take Home Message : Peyronie’s Disease

- Peyronie’s Disease affects 4-5% of adult male population
- PD is a heterogeneous condition in regards to etiology, presentation, and treatment
- No statistical benefit from any oral therapies (ICSM 2015)
- Intralesional Xiaflex (CCH, Endo) only FDA approved agent with documented efficacy
- Surgery is still gold standard for definitive correction of PD
- Penile plication procedures are overall safe, easy to perform, & provide excellent results with minimal morbidity

Hellstrom, WJG; AUA 2017