

## Surgical Outcomes and Patient Satisfaction after Dermal, Pericardial, and Small Intestinal Submucosal Grafting for Peyronie's Disease

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### ABSTRACT

**Introduction.** Peyronie's disease, a localized fibrosis of the tunica albuginea surrounding the penile corpora, results in penile curvature and sexual dysfunction. Surgical management involving grafting to straighten the penis is the treatment of choice in conditions unresponsive to conservative therapy where penile length preservation is important.

**Aim.** To determine surgical outcomes and patient satisfaction after dermal, pericardial, and small intestinal submucosal grafting for Peyronie's disease.

**Main Outcome Measures.** The International Index of Erectile Function (IIEF), postoperative self-reports, patient satisfaction, and clinical characteristics were used to measure outcomes.

**Methods.** We retrospectively reviewed charts of 36 patients who underwent surgery for Peyronie's disease requiring grafting from 1999 to 2005. Follow-up to subjectively assess outcomes was conducted.

**Results.** Average patient age at surgery was  $55 \pm 1$  years. Body mass indexes were similar among all groups. Erectile dysfunction risk factors were comparable with 36% reporting hypertension and 22% hypercholesterolemia. Overall patient follow-up time was  $673 \pm 98$  days. Self-reported resolution of penile curvature was noted in 60% of dermal, 100% of Tutoplast, and 76.9% of Stratasis graft recipients. Stratasis patients maintained presurgery length (54%) and rigidity (77%) more so than dermal (30%, 60%) and Tutoplast (23%, 39%) patients. Assessment of erectile dysfunction using the IIEF-5 captured significant improvements in patients receiving Stratasis grafts (preoperative:  $10.1 \pm 1.1$  vs. postoperative:  $17 \pm 1.6$ ). Overall, 89% of patients reported satisfaction following surgical intervention.

**Conclusions.** Surgical management of Peyronie's disease results in correction of penile curvatures and high rates of patient satisfaction. Loss of penile length and decreased rigidity occurred to a lesser degree with Stratasis grafts. While detailed informed consent is essential in this patient population, novel materials such as Tutoplast and Stratasis grafts improve outcomes following surgical correction of Peyronie's disease. **Kovac JR, and Brock GB. Surgical outcomes and patient satisfaction after dermal, pericardial, and small intestinal submucosal grafting for Peyronie's disease. J Sex Med 2007;4:1500–1508.**

**Key Words.** Penis; Graft; Penile Induration; Patient Satisfaction; Surgical Therapy

### Introduction

Peyronie's disease, a localized fibrosis of the tunica albuginea surrounding the penile corpora, results in penile curvature and sexual dysfunction [1]. Described clinically by Francois Gigot de la Peyronie in 1743 [2], the condition

afflicts 3.2% of adult men with an average age of onset at 57 years [3]. Surgical management is used in cases unresponsive to conservative, or local, therapies [1,4]. In the current study, we investigated the use of autologous dermal, cadaveric pericardial (Tutoplast, Mentor Corp, Santa Barbara, CA), and four-layer small intestinal submucosal

(SIS; Stratasis; Cook Biotech, Spencer, IN) grafts in the surgical management of Peyronie's disease.

The exact etiology of Peyronie's disease is unknown. The currently accepted hypothesis suggests that repetitive penile trauma incites inflammation [5]. The ensuing activation of downstream events results in the formation of fibrotic plaques within the tunica albuginea of penile corpora [1,5]. Should inadequate resolution of the initial lesion occur, pathological scar tissue develops [2,4,5]. This cascade of events relies on several factors, including genetic predisposition, autoimmune-type reactions, formation of free radicals, and fibroblast overproliferation due to excess p53 proteins [5,6]. Recent studies using a rat model suggest that fibrin, deposited as a normal component of wound healing, may act as a profibrotic protein to induce plaque formation via the local release of transforming growth factor (TGF)- $\beta$  [7]. Once acute changes occur, patients experience palpable fibrotic plaques (commonly on the dorsal surface), which results in penile curvature coupled with pain on erection [6].

Should spontaneous improvement not occur, the chronic phase of Peyronie's disease manifests, resulting in a stable deformity characterized by an unchanging fibrotic plaque [6,8]. While only moderately successful, conservative treatments with colchicines, vitamin E, tamoxifen, and verapamil remain the most appropriate initial options [1,2,6,9]. When conservative treatment fails and patients are unable to resume sexual function, surgery becomes a consideration [1]. The treatment options in these situations involve plication, grafting, or placement of a penile implant [1]. In patients with reasonable erectile function—large plaques that induce severe deformities, and/or short penises—plaque incision and graft replacement is appropriate [2].

Autogenic dermal grafts have been used since 1974 [10], with the application of human pericardial grafts [11,12] and SIS grafts [13] being recently evaluated. Grafting with newer biomaterials is advantageous over dermal grafting because it eliminates the need for an autologous graft harvest site and thus shortens operative time periods and may potentially lower patient morbidity [14]. The ideal graft should be affordable, easily available in a variety of sizes, strong yet compliant, and accepted at the recipient site without immunological rejection [15,16]. Commercially available prepackaged acellular grafts could provide such a source. It is critical to ensure that using such a material would still allow the goals of surgical

repair in Peyronie's disease (including correction of curvature, maintenance of presurgery length, and postoperative patient satisfaction) to be achieved.

The objectives of the current study were to examine the use of dermal, Tutoplast, and Stratasis grafts in the surgical management of Peyronie's disease. The specific goal was to determine whether the newer grafting biomaterials (Tutoplast and Stratasis) improved surgical outcomes and patient satisfaction. Our results show that Stratasis and Tutoplast grafts yielded gains over dermal grafts in penile straightening with high degrees of patient satisfaction. Although each grafting material resulted in loss of penile length and rigidity, Stratasis grafts did so to a lesser degree. Given these findings, a place for Tutoplast and Stratasis grafts in the surgical management of Peyronie's disease is suggested.

#### Materials and Methods

The charts of 36 patients who underwent reconstructive procedures for Peyronie's disease requiring grafting were retrospectively reviewed. Surgeries were conducted between 1999 and 2005 at St. Joseph's Hospital, London, Ontario, Canada. All patients had detailed sexual and medical histories, as well as physical examinations conducted prior to surgery. An abridged, five-item version of the International Index of Erectile Function (IIEF-5) was used to detect and grade the severity of erectile dysfunction both pre- and postoperatively. All patients were counseled on the operative risks as well as the possibilities for recurrent curvature, glans anesthesia, and penile shortening.

Exclusion criteria were established prior to questioning. A list of patients undergoing surgical correction for Peyronie's disease between 1999 and 2005 was compiled from hospital records. Patients with congenital curvatures, constriction bands, hour-glass deformities, unilateral indentations, and those who did not complete a preoperative IIEF-5 or obtained concurrent prosthesis implantations were excluded. Patient satisfaction following penile prosthesis implantation has recently been discussed elsewhere [17]. Patients whom we were unable to contact (N = 5) or, when contacted, refused participation (N = 1), were not included.

Dermal grafts were used between 1999 and 2003, Tutoplast grafts between 2003 and 2004, and Stratasis grafts between 2004 and 2005. Be-

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