Comparative study of penile size before and after penile prosthesis implantation

Thesis

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ABSTRACT

Erectile dysfunction is defined by the National Institutes of Health as the inability to attain and/or maintain penile erection sufficient for satisfactory sexual performance**.** **The aim** of the study was to test the penile length and girth before and after malleable penile prosthesis implantation, to prove if there was actual decrease in the penile size or no. 30 patients complaining of erectile dysfunction were enrolled in the study. The patients were > 40 years of age, being involved in a stable relationship for at least one year, complaining of erectile dysfunction for at least the past 6 months, failed medical treatment including phosphodiestrase 5 inhibitors or intracavernosal injections. Our study excluded patients with Peyronie's disease, Patients who have had radical prostatectomy, Post priapetic erectile dysfunction. Flaccid stretched penile length was recorded. Length was determined from pubis to tip (true length) and from skin surface to tip (visible length). Prior to surgery, penile length and girth was measured after induction of artificial erection. Upon implantation, the maximum girth possible was implanted following maximum dilatation. Measurements were repeated on table, 6 weeks post-operative and 4 weeks after first intercourse. All patients filled in a questionnaire indicating their satisfaction with penile size post-operative. **The results** showed Visible length was shorter postoperative (whether stretched (5.8% difference) or erect (9.5% difference)) than preoperative visible length, a statistically significant difference. True length, however, showed no statistically significant difference preoperative to postoperative, whether stretched or erect. Postoperative girth was 4.9% less than the preoperative erect girth and 11.6% more than the preoperative stretched girth. On answering the questionnaire; 80% of the patients reported decrease in the penile size (length and girth) postoperatively, 17% reported no length or girth changes while 3% reported increase in the penile size. **Conclusion;** It is likely that prosthetic erection provided by PPI is not quite as long as a natural erection due to artificial sensation or persistent erection. Clinicians must guard against unrealistic expectations with penile size and patients' and partners' sexual satisfactions. The dissatisfaction with penile size following surgery may not be proportionate to the actual loss in size, indicating a psychological element for dissatisfaction that can be alleviated by preoperative and postoperative counseling.

Key words; erectile dysfunction, penile prosthesis, patient satisfaction and complications, penile size changes

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Index

List of abbreviations

ED	: Erectile dysfunction**.**
NIH	: National Institutes of Health.
MMAS	: Massachusetts Male Aging study projections.
WHO	: World Health Organization.
ICI	: Intra Corporeal Injection
PPI	: penile prosthesis implantation.
PP	: penile prosthesis.
PGE1	: prostaglandin E1.
CC	: Corpora Cavernosa.
N	: Newton
S	: Sacral vertebral cord segment
L	: Lumbar vertebral cord segment
T	: Thoracic vertebral cord segment
NOS	: Nitric oxide synthase.
NO	: Nitric oxide.
NANC	: Non-adrenergic, non-cholinergic.
cGMP	: Cyclic guanosine monophosphate.
PDE	: Phosphodiesterase enzyme.
CAD	: Coronary artery disease.
CV	: Cardiovascular
CVS	: Cardiovascular system
DM	: Diabetes Mellitus
CVD	: Cardiovascular diseases
CHD	: coronary heart diseases
SBP	: systolic blood pressure.
IIEF	: The International Index of Erectile Function.

HDL : high density lipoprotein

TC : total cholesterol

LDL : low density lipoprotein

TAG : Triglycerides.

CRF : chronic renal failure

GRH : gonadotropin releasing hormone

SHBG : Sex hormone–binding globulin.

TRH : thyrotropin releasing hormone

DHEA : dehydroepiandrosterone

LH : leutinizing hormone.

FSH : follicular stimulating hormone

MRI : magnetic resonance image

BMI : body mass index

SHIM : Sexual Health Inventory for Men.

LUTS : lower urinary tract symptoms

BPH : benign prostatic hypertrophy

VCD : vacuum constricting device

FDA : Food and Drug Administration

AMS : American Medical Systems

PYP : polyvinylpyrrolidone

IPP : Inflatable penile prosthesis

EDITS : Erectile Dysfunction Inventory of Treatment Satisfaction

List of tables

Table **page**

Penile Prosthesis

Results

List of Figures

Figure **page**

Aim of the work

The aim of the study was to test the penile size (length and girth) before and after malleable penile prosthesis implantation, to prove if there was actual decrease in the penile size or it was false patient’s perception.

Introduction

Erectile dysfunction (ED) is defined by the National Institutes of Health (NIH) Consensus Development Conference as the inability to attain and/or maintain penile erection sufficient for satisfactory sexual performance **(NIH 1993)**.

It is a widespread and very common health problem affecting the quality of life of men of all ages **(NIH 1993; Moreira et al. 2003),** 5–20% of men have moderate to severe ED **(Hatzimouratidis et al. 2011).** According to the Massachusetts Male Aging study projections (MMAS), ED could affect up to18 million men, and its current prevalence is10–50% in the USA. In all, 52% of men between the ages of 40 and 70 report some degree of ED **(Feldman et al. 1994)**. The general prevalence of ED was 45.1%: mild ED: 30.5%, mild to moderate ED: 12%, moderate ED: 2.4%, and severe ED: 0.2% **(Rosen et al. 1999).** Adjusted to the World Standard Population by World Health Organization (WHO) **(WHO 1995),** the collective prevalence was 47% **(Shaeer and Shaeer 2011).**

The incidence of ED is increasing in our region, which is mainly attributed to the high incidence and prevalence of diabetes and hypertension which are the etiological factors in ED **(Mittawae et al. 2006; Bener et al. 2007).**

The treatment of ED has advanced significantly in recent years; most patients are managed increasingly with oral medication or intraurethral alprostadil, with intracavernosal injection (ICI) of pharmacotherapy, and vacuum tumescence devices used as second line treatment. Penile prosthesis (PP) surgery is reserved for those who fail conservative treatment and is required in approximately 5% of patients **(Jain et al. 2000).** Contemporary clinical series of penile prosthetic implants (PPI) report good surgical results with a failure rate of 5% at 5 years **(Lewis 1995).**

In selected patient populations, satisfaction with erectile function and treatment is significantly higher after PPI than after treatment with sildenafil citrate or after ICI of prostaglandin E1 (PGE1) **(Sexton et al. 1998; Rajpurkar and Dhabuwala 2003).** Studies including partners have also shown high satisfaction rates when men undergo PPI **(Beutler et al. 1984; Pedersen et al. 1988; McLaren and Barrett 1992).**

Nevertheless, some studies have reported dissatisfaction with penile size following PPI, regardless the preexisting pathology. This was particularly evident in a study that compared preoperative erect length as induced by ICI of papaverine, phentolamine and PGE1 to the post-implantation length which showed shortening in the range of 0.74 +/- 0.15 cm at 1 year **(Wang et al. 2009)**. The entity of "pencil like penis" was also suggested to describe dissatisfaction with penile girth following surgery **(Montorsi et al. 1993).**

Men choosing to treat ED with PPI surgery may suffer from loss of penile length following the surgery. Evaluation of penile size during erection is considered by some as a routine clinical procedure in the diagnosis and prognosis of patients who are candidates for reconstructive surgery of the penis. Since postoperative variations in penile size may follow different types of penile surgery, such as the Nesbit procedure and Peyronie's plaque removal **(Lue and El-Sakka 1998)**.

Information on penile dimensions is essential in the planning process of penile operations and during patient counseling. Pre-surgical information of penile dimensions is therefore important for both the surgeon and the patient, in terms of realistic expectations **(Mulhall and Honig 1996).**

Anatomy

Human penis is a pendulous organ, uniquely suspended from and strongly adherent to the pubic ramus and ischium via the tenacious periosteum. The organ is supported by a suspensory ligament that is an extension of the linea alba **(Hsu et al. 2001).**

Results of measured penile size vary across studies and depend on the method of measurement and on study populations. Moreover the length of the penis is highly variable, especially in the flaccid state depending on the degree of contraction of the cavernosal smooth muscle tissue. There is considerably less variation in length of the fully erect penis. Erect length corresponds favorably with stretched penile length, as measured from the pubopenile junction to the meatus, mean flaccid length was 8.8 cm, stretched length 12.4 cm and erect length 12.9 cm. The adult men with penile length of greater than 4 cm in the unstretched flaccid state or greater than 7.5 cm in the stretched flaccid state or the erect state have a normal penile length, no parallel suggestions were made for penile girth or volume **(Wessells et al. 1996).** Among adult Europeans the erect penis is between 11 and 15 cm long **(Baker 1995).** The reported normal length and girth of an adult flaccid penis ranges between 7.6 cm and 13.0 cm in length and 8.5 cm and 10.5 cm in circumference, and the reported normal length and girth of an erect penis ranges between 12.7 cm and 17.7 cm in length and 11.3 cm and 13.0 cm in circumference **(Francoeur R 1991; Wessells et al. 1996; Klein 1999).**

The penis is essentially a tripartite structure, with bilateral corpora cavernosa (CC) and the midline ventral corpus spongiosum and glans, all three of which are surrounded by loose subcutaneous tissue and skin that can be moved freely over the erect organ **(Wessells et al. 1996).** In the CC the skeletal muscle structures and the continuing tunica albuginea completely surround and contain smooth muscle structures, which intermingle with fibrous tissue