INTRODUCTION

Various authors have reported that a pubovaginal sling is efficacious for correction of all types of female stress incontinence.\(^7\) Autologous, cadaver, and synthetic allografts have been utilized as supporting materials. Leach et al\(^{16}\) have suggested that autologous slings decay over time, resulting in recurrent stress incontinence. Badlani et al\(^ {10}\) have reported that synthetic materials are more durable in maintaining stable cure rates than autologous slings. Infectious and erosive complications of synthetic materials are well known. Urethral erosion is the most feared complication of synthetic sling surgery, causing many urologic surgeons to shy away from using synthetic biomaterials. However, not all synthetic materials result in equally unfavorable reaction to human host tissues. Various synthetic materials have differing inherent biochemical and surface characteristics that result in different biological outcomes. This chapter will review these characteristics.
OUTCOMES ANALYSIS OF AUTOLOGOUS SLINGS

Based on the reports of recent outcomes data, the continence rates after transvaginal bladder neck suspensions are significantly lower than the data obtained from retrospective chart reviews. The reported cure rates of transvaginal urethropexy at 2-year and 3-year follow-ups are 47% and 20%, respectively.2,11,24 Approximately 50% of transvaginal bladder neck suspensions are expected to fail at a mean of 2 years. The recent AUA Guidelines Panel reported that autologous slings produce an average cure rate of 83% more than four years after surgery. This information was based on meta-analysis of retrospective chart reviews. When an outcome’s data is reviewed prospectively, the actual cure rate for autologous pubovaginal sling decreases to 46 to 55% after 4 years.16,18,26

When a strict definition of “completely dry” is applied to the autologous fascial sling, the objective cure rate ranges from 46 to 49% at a mean follow-up of 3.4 to 4 years.16,18 Even when the loose definition of “socially continent” is applied to the vaginal wall in situ sling, the cure rate is only 55% at a mean follow-up of 2.6 years.26 Thus, it appears that although more durable than vaginal bladder neck suspensions, approximately half of autologous slings begin to decay four years after implantation. Implicit in this report is the fact that at least 50% of women who receive autologous slings will experience gradual return of their stress incontinence as they get older.

RECURRENT STRESS INCONTINENCE: WHY DOES IT OCCUR?

The question then becomes: Why does this occur and how can we prevent recurrent stress incontinence? Failure with autologous slings is divided into early and delayed failure. Early failure occurs within the first 3 months after surgery.33 Reasons for early failure include: suture breakage, incorrect sling placement, tying the sling too loosely, and incorrect diagnosis.33 Late failure occurs 6 months after surgery. Reasons for late failure include: loss of collagen and elastin, loss of striated muscle fibers, and localized disruptions of endopelvic fascia.10,13,17,27,31,32

Women with stress incontinence appear to have decreased amount of collagen, elastin, and skeletal muscle fibers in the levator ani and the endopelvic fascia, compared to socially continent women. Corujo et al10 and Falconer et al13 have independently reported that the loss of collagen and elastin result in generalized attenuation of pelvic fascial support. In another