

Material and type of suturing of perineal muscles used in episiotomy repair in Europe

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Abstract: None of the trials evaluating episiotomy repair clearly focused on perineal muscles. The aim of this study was to describe suture material and styles of suturing perineal muscles in Europe by using an email and postal questionnaire. From 34 European countries, 122 hospitals agreed to participate. Thirteen different types of sutures are currently used. The most common material is polyglactin 910 (70%) followed by polyglycolic acid. Fifty one hospitals (46%) use only short-term and 49 hospitals (44%) use only mid-term absorbable synthetic sutures. In 8 hospitals both types of sutures were used. The most common size of suture is 2-0 USP. Thirty percent of hospitals use continuous and 47% hospitals interrupted sutures for perineal muscle repair. In 23% of the hospitals there is not a uniform policy. The technique of suturing perineal muscles is diverse in Europe. It is unclear whether short-term absorbable synthetic suture should substitute mid-term absorbable synthetic material in the perineal muscle layer.

Key words: Episiotomy; Practice variation; Perineum/Surgery; Episiorrhaphy; Suture technique.

INTRODUCTION

Episiotomy, the incision of the perineum during the last part of the second stage of labour or delivery is still considered a controversial procedure. Long-term complications after episiotomy repair are common. A large proportion of women suffer short-term perineal pain and up to 20% have longer-term problems (e.g. dyspareunia).¹ Other complications involve the removal of suture material, extensive dehiscence and the need for resuturing.²

According to an Italian study, episiotomy is associated with significantly lower values in pelvic floor functional tests, both in digital tests and in vaginal manometry, in comparison with women with intact perineum and first- and second-degree spontaneous perineal lacerations.³ In another prospective trial of 87 patients, the pelvic floor muscle strength, assessed with the aid of vaginal cones, was significantly weaker in the episiotomy subgroup compared to a subgroup with spontaneous laceration.⁴ A German study did not reveal any difference in the pelvic floor muscle strength between groups with restrictive and liberal use of episiotomy.⁵ None of these trials are specific about the type of suturing material used.

Some of the trials evaluating episiotomy and its consequence regarding suturing material, focus on the type of sutures and a technique used for suturing the superficial layers (skin or subcuticular).⁶

If mid-term absorbable polyglycolic acid sutures were used for repairing perineal muscles, a comparison to catgut^{7, 8, 9, 10} or chromic catgut^{11, 12} was usually made.

One trial compared mid-term absorbable polyglycolic acid (Dexon II) with a new monofilament suture glycomer 631 (Biosyn).¹³ There were significantly more problems associated with monofilament material at 8-12 weeks postpartum (suture removal due to discomfort and pain) which might be explained by the longer absorption time of glycomer 631.¹³

In a recent trial, in which only a short-term absorbable polyglactin 910 (Vicryl RAPIDE) is used, a continuous suture is compared to an interrupted technique and a continuous suture is found to be superior.¹⁴

To our knowledge, three trials have compared short- and mid-term synthetic absorbable suturing material.^{15, 16, 17} In these, either only a standard mid-term absorbable polyglactin 910 (Coated Vicryl) or only a short-term absorbable polyglactin 910 (Vicryl RAPIDE) was used for all layers (vaginal mucosa, perineal muscles, subcuticular/skin). All

of them focused on perineal pain and short-term complications of the repair and did not follow the pelvic floor muscle function.

A small Danish randomized control trial (RCT) showed no difference in short- and long-term perineal pain, with a reduction in pain when walking on day 14 in a Vicryl RAPIDE group. Also, no difference was found between groups regarding episiotomy dehiscence.¹⁵

An Ulster study compared the same materials (Coated Vicryl and Vicryl RAPIDE).¹⁶ 78 women were completed after birth with Coated Vicryl and 75 with Vicryl RAPIDE. At six and twelve weeks, a significant difference in the rates of wound problems (infection, gaping, pain, material removed) was found in favor of Vicryl RAPIDE.¹⁶

Kettle et al. performed a very well designed RCT with 1542 women.¹⁷ These were randomized into groups where either a standard mid-term absorbable polyglactin 910 (coated Vicryl) or a short-term absorbable polyglactin 910 (Vicryl RAPIDE) was used. The sutures of the perineal muscles and the skin were either, only interrupted, or only continuous, non-locking. The vaginal mucosa was always sutured continuously. This trial shows a clear benefit of the continuous technique compared to the interrupted. The pain at day 2, 10 and onwards up to 12 months postpartum was significantly lower in the continuous group. Also, all the other followed parameters (suture removal, uncomfotability, tightness, wound gaping, satisfaction with the repair and a return to normality within 3 months) were in favor of the continuous technique.¹⁷

Comparing the standard mid-term absorbable and short-term absorbable polyglactin 910, in the parameter which differed most (suture removal), if sutures needed to be removed only visible transcutaneous sutures were removed from the continuous group. So the rate for suture removal, which was significantly lower for those who had received short-term absorbable polyglactin 910, is related to vaginal mucosa or skin and not to the sutures of perineal muscles.¹⁷

Pain at day 10 was not significantly different; however, some secondary pain measures (pain walking) were significant.¹⁷ The reduction in pain is achieved by inserting the skin sutures into the subcutaneous tissue and so avoiding nerve endings in the skin surface.¹⁸ So the difference at day 10 might be explained by a different rate of absorption between Vicryl RAPIDE and Coated Vicryl and irritating nerve endings in the skin (and not in the muscles) by the remaining Coated Vicryl sutures. Vicryl RAPIDE is

absorbed in 42 days and its tensile strength is none (0 lb from original 10 lb) after two weeks. The suture begins to fall off in just 7 to 10 days. So this is ideal material if no wound tension after 7-10 days is acceptable. Coated Vicryl is absorbed in 56-70 days and its tensile strength is at 75% (10 lb from original 14 lb) after two weeks.¹⁹

No study has been clearly focused on the layer of perineal muscles. No study has as yet explored the advantage of new sutures with antibacterial properties for suturing the perineal muscles.

DeLancey and Hurd show that urogenital hiatus is sealed by the vaginal walls, endopelvic fascia, and urethra. Once the urogenital hiatus has opened up, the vaginal wall and cervix lie unsupported. The constant vector of abdominal pressure on the fascia can cause its failure. It is ultimately the perineal body that is the mechanism for preventing prolapse beyond the urogenital hiatus.²⁰

The layers traversed during uncomplicated mediolateral episiotomy are: epithelium, bulb of vestibule, Bartholin's gland (occasionally), bulbospongiosus, superficial transverse perineal, perineal membrane, urethrovaginal sphincter and transversus vaginae.²¹ Puborectalis muscle is rarely ever involved in this incision and so not afflicted by this procedure. When repairing an episiotomy, the suture of perineal muscles seems to be the crucial step for an obstetrician or midwife in preventing a decrease in the pelvic floor muscle strength.

The aim of this survey was to map the current situation in Europe and to describe common types of material and styles of suturing perineal muscles after episiotomy in European hospitals.

MATERIALS AND METHODS

In the year 2006, an email or postage questionnaire study was sent to different European hospitals. The question related to this project was as follows:

Which type of material and methods of suturing are used in your hospital for perineal muscles?

Hospitals of 27 EU countries, of 3 countries which had initiated entrance talks to the EU, plus Iceland, Israel, Norway and Switzerland, were asked to answer a mediolateral episiotomy questionnaire.

RESULTS

A total of 122 hospitals in 34 European countries participated in this project and sent back their answers. Sixty eight hospitals are situated in the original 15 EU countries, 44 hospitals are from countries which entered the EU later or are involved in entrance talks, and 10 hospitals are located in the four remaining countries: Iceland, Israel, Norway and Switzerland.

Type of suturing material

A total of 110 hospitals reported that one type of suture material is used for perineal muscle repair while 12 hospitals answered that they use alternatively two types of sutures. None of the hospitals uses more than two different sutures in their standard approach.

Altogether 13 different types of sutures are currently in use across Europe. These are shown in table 1.

The most common suture type is a polyglactin 910 suture (Coated Vicryl, Vicryl RAPIDE or Vicryl PLUS Antibacterial), that is used in 96 hospitals (more than 70%). Polyglactin 910 is followed by polyglycolic acid (Safil, Safil Quick, Dexon II), used by 16 hospitals (12%) and traditional gut sutures (catgut, chromic catgut) are used in 13 hospitals (10%). Non-absorbable suture was reported by only one

TABLE 1. – Material for suturing of perineal muscles.

Material	Mention	
	(N)	(%)
1 Catgut	8	6
2 Chromic catgut	5	3.5
3 Dexon II	5	3.5
4 Safil	7	5
5 Safil Quick	4	3
6 Coated Vicryl	40	29.5
7 Vicryl RAPIDE	55	41
8 Vicryl PLUS Antibacterial	1	1
9 Monocryl	1	1
10 Chirlac rapid braided	2	1.5
11 Assucryl synthetic	1	1
12 Polysorb	1	1
13 Ethilon	1	1
14 Not exactly specified absorbable material	3	2
Total	134	100

NB.: The total number amounts to 134 (12 hospitals use two materials alternatively).

institution that also uses some other absorbable material. Catgut and/or chromic catgut are used as the only suture in 11 hospitals (9%).

Considering short- and mid-term absorbable synthetic sutures, we found that short-term absorbable sutures (Safil Quick, Vicryl RAPIDE, Chirlac rapid braided) are used by 61 hospitals (50%). Mid-term absorbable sutures (Dexon II, Safil, Coated Vicryl, Vicryl PLUS Antibacterial, Assucryl synthetic, Polysorb) are used for suturing the perineal muscles in 55 hospitals (46%). Monocryl, whose absorption time is somewhere between short- and mid-term is used by one hospital. Only one hospital reported using a new absorbable synthetic suture with Triclosan (Vicryl PLUS Antibacterial), that has antibacterial properties.

Fifty one hospitals (46%) use only short-term absorbable synthetic sutures and 49 (44%) use only mid-term absorbable sutures for perineal muscle repair. In 8 hospitals (8%) both types of sutures were used and 3 hospitals (2%) were not specific about their absorbable material.

Size of the suturing material

As for sizes of the sutures, we received 96 answers of which 3 hospitals referred to two alternative sizes. In 26 remaining responses (8 using catgut only) the hospitals did not give details regarding the size of sutures used for perineal muscle repair.

Among the hospitals which use only one type of material and only one size, the most frequent response was 2-0 Vicryl RAPIDE - 32 cases, followed by 0 and 2-0 Coated Vicryl, both reported by 13 institutions. All details are shown in table 2.

Method of suturing of perineal muscles

In the catgut group 5 hospitals did not answer. From the remaining 6 hospitals, only one hospital uses both techniques (continuous or interrupted), and a remaining 5 hospitals suture perineal muscles with interrupted stitches only.

From 111 hospitals which use an absorbable synthetic material for suturing the muscles, 89 hospitals answered in full with 27 (30%) hospitals use continuous sutures, and 42 (47%) hospitals interrupted sutures. Twenty (23%) hospi-

TABLE 2. – Sizes for sutures of perineal muscles.

Size (USP)	short-term absorbable sutures		mid-term absorbable sutures	
	(N)	(%)	(N)	(%)
0	11	22	19	42
2-0	38	74	21	47
3-0	2	4	5	11
Total	51	100	45	100

NB.: Only answers for absorbable synthetic material shown.

tals do not have a uniform policy and leave the method of suturing to the discretion of the individual doctors (or midwives).

DISCUSSION

The choice of the suture depends on: properties of suture material, absorption rate, handling characteristics and knotting properties, size of suture, and the type of needle.

Nearly a half of all European hospitals cooperating in this project use a mid-term synthetic absorbable suture for the suturing of perineal muscles. The other question put to participants in this questionnaire was analyzed in another article.²² In order to keep the question simple, there was not an additional request, if the same mid-term absorbable synthetic suture is used for all layers or for perineal muscles only. The majority of hospitals use interrupted sutures to approximate perineal muscles; the latter possibility is not excluded.

It was also noted that a new synthetic material with antibacterial properties (Vicryl PLUS Antibacterial) is currently used by one institution.

According to the meta-analysis, mid-term absorbable synthetic material for perineal repair is associated with less short-term pain compared to traditional gut sutures but with increased rates of removal. Further research with alternative suture materials is needed.² This disadvantage is reduced with short-term synthetic material and with a subcuticular continuous non-locking technique of episiotomy repair.¹⁷ However, the information regarding suturing material of perineal muscles is not extensive.

There is a recommendation that a short-term synthetic absorbable suture (Vicryl RAPIDE) is a preferential material for all three layers in an episiotomy repair and so episiotomy can be sutured in a loose continuous non-locking technique with only two knots (at the beginning and at the end).²³

However, according to Ethicon Sutures Homepage, a short-term absorbable suture (Vicryl RAPIDE) is suggested for superficial closure of mucosa or skin closure for patients not returning for another check-up.¹⁹ A mid-term absorbable suture (Coated Vicryl) should be used for general tissue and muscle approximation.¹⁹ A new mid-term absorbable suture (Vicryl PLUS Antibacterial) has the same indication as Coated Vicryl and should be used when extra caution is desired (i.e. potentially high risk surgical sites).¹⁹ More information is needed to find the potential benefit of Tri-closan in perineal repair.

On the other hand the Aesculap web page recommends a short-term absorbable suture (Safil Quick) for an episiotomy repair in Gynaecology and Obstetrics without further specification.²⁴

In the review of the management of obstetric sphincter injury, great care should be exercised in reconstructing the perineal muscles to provide support to the sphincter repair. Muscles of the perineal body should be reconstructed with Vicryl 2-0 sutures.²⁵

It might happen that a short-term absorbable synthetic suture does not necessarily hold the approximated torn muscles for a sufficient time. However this assumption is not based on any evidence.

There is a consensus that a short-term absorbable synthetic suture is the best choice for vaginal mucosa and perineal skin. The suturing the mucosa and perineal skin with a short-term absorbable synthetic suture and perineal muscles with a mid-term absorbable synthetic suture would bring additional expenditures for any institutional budget. The production of a prefabricated episiotomy set, where both sutures would be available, could reduce this increase in costs. An episiotomy set already exists in several hospitals. Also, in this era of reducing adjacent episiotomies, this additional expenditure would not be so dramatic compared to the financial implications of anal sphincter repair.

Currently, the type of material, its size and the technique of suture is not a controversial topic regarding vaginal mucosa and perineal skin. However, the style of suturing of perineal muscles has not yet been fully explored. This European survey serves to document this ambiguity. Further well designed RCTs are required to focus on the real role of the perineal muscles after vaginal birth and the best method of their repair. These RCTs must also comprise the exact depiction of cutting of episiotomy and all details with regards to the repair.

This survey shows that there is much diversity in the technique of suturing of perineal muscles across Europe. It is not clear enough if short-term absorbable synthetic suture should substitute mid-term absorbable synthetic material in this layer, as it did for vaginal mucosa and perineal skin.

On the basis of information obtained from 122 European hospitals, the authors of this survey would like to cooperate in a multicentric trial to obtain more information.

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6 – INCONTINENCES

The impact of fecal (FI) and urinary incontinence (UI) on quality of life 6 months after childbirth. *Handa VL, Zyczynski HM, Burgio KL et al. Am J Obstet Gynecol. 2007;197:636.* With validated questionnaires 759 primiparous women were assessed for FI and UI six months postpartum, measuring QOL with SF-12 summary scores, health utility index score (a measure of self-rated overall health), and the modified Manchester Health Questionnaire. Women with FI and those with UI had worse scores than women without incontinences or flatal incontinence only. FI and UI together have a greater impact than either condition alone.

The impact of tension-free vaginal tape on overactive bladder symptoms in women with stress urinary incontinence: significance of detrusor overactivity. *Choe JH, Choo MS, Lee KS. J Urol. 2007 Nov 12; epub.* Evaluating the results of the TVT in 549 women (2003 to 2004) it is concluded that the tension-free vaginal tape procedure can be performed in women with stress urinary incontinence and overactive bladder including urge incontinence even if the patient has detrusor overactivity on urodynamic study. However, patients should be fully advised of the possibility of persistent overactive bladder symptoms and treatment for those symptoms after tension-free vaginal tape should be

Myoblast and fibroblast therapy for post-prostatectomy urinary incontinence: 1-year followup of 63 patients. *Mitterberger M, Marksteiner R, Margreiter E et al. J Urol. 2007 Nov 12; epub.* Transurethral ultrasound guided injections of autologous fibroblasts and myoblasts obtained from skeletal muscle biopsies were done in 63 patients with stress urinary incontinence after radical prostatectomy were treated with. One year after implantation 41 patients were continent, 17 showed improvement and 5 failed. Thickness and contractility of the rhabdosphincter were significantly improved postoperatively.

Behavioral comorbidity differs in subtypes of enuresis and urinary incontinence. *Zink S, Freitag CM, Gontard AV. J Urol. 2007 Nov 13; epub.* Different subtypes of enuresis and urinary incontinence demonstrate differences in behavioral problems and psychiatric comorbidity. The highest rates of psychiatric comorbidity were found in the group of children with voiding postponement and the lowest were in children with monosymptomatic nocturnal enuresis. Screening for comorbid psychiatric disorders in children with enuresis and urinary incontinence is highly recommended, and further investigations in large groups of children are necessary.

Evaluation and outcome measures in the treatment of female urinary stress incontinence: International Urogynecological Association (IUGA) guidelines for research and clinical practice. *Ghoniem G, Stanford E, Kenton K et al. Int Urogynecol J Pelvic Floor Dysfunct. 2008;19:5.*

The age distribution, rates, and types of surgery for stress urinary incontinence (SUI) in the USA. *Shah AD, Kohli N, Rajan SS, Hoyte L. Int Urogynecol J Pelvic Floor Dysfunct. 2008;19:89.* The distribution of SUI surgery across age groups in the USA in 2003 was studied: 129,778 women underwent 165,776 surgical procedures. Of these women, 12.2, 53.0, 30.4, and 4.5% belonged to reproductive, perimenopausal, postmenopausal, and elderly age groups, respectively. Surgical rates (per 10,000 women) were 4, 17, 19, and 9 in these age groups, respectively. Complications occurred most frequently in reproductive age women. Women at all stages of reproductive life may seek surgical treatment for SUI, but the greatest percentage of surgical procedures occurred in perimenopausal women.

Clinical and urodynamic outcomes of pubovaginal sling procedure with autologous rectus fascia for stress urinary incontinence. *Mitsui T, Tanaka H, Moriya K et al. Int J Urol. 2007;14:1076.* Pubovaginal sling surgery with autologous rectus fascia was done in 29 consecutive women with SUI. Overall SUI was cured in 23 patients and improved in 3 patients. Three patients who developed persistent urinary retention or severe voiding difficulty after surgery underwent urethrololysis. Of 17 patients who had urgency before the pubovaginal sling, urgency was cured postoperatively in seven, while de novo urgency appeared in one patient. Postvoid residual urine volume (PVR) >100 mL and Qmax <=20 mL/s before surgery are risk factors for postoperative voiding difficulty.

Mixed urinary incontinence: continuing to confound? *Hockey J. Curr Opin Obstet Gynecol. 2007;19:521.* Mixed incontinence is a complex clinical problem for urogynaecologists and generalists alike, as research for new treatments tend to focus on single-symptom groups. Those with mixed symptoms form a diverse group, which is difficult to study precisely. Recent studies, however, have aimed to classify the subgroups into predominant types to determine the response to treatment with greater accuracy.

Transobturator tapes for stress urinary incontinence: results of the Austrian registry. *Tamussino K, Hanzal E, Kolle D et al. Am J Obstet Gynecol. 2007;197:634.* Data on a total of 2543 operations with 11 different tape systems were collected. Intraoperative complications were noted for 120 procedures (4.7%): increased bleeding, vaginal, bladder and urethral perforations. Reoperations attributable to the tape procedure were reported for 57 patients (24 tapes cut or loosened for voiding dysfunction, 11 vaginal erosions, 7 abscesses with erosions). Significant postoperative pain was reported for 12 patients (0.5%).

National audit of continence care for older people: management of urinary incontinence. *Wagg A, Potter J, Peel P et al. Age Ageing. 2007 Nov 21; epub.* A national audit was conducted across England, Wales and Northern Ireland. The results indicate that assessment and care by professionals directly looking after the older person were often lacking. There is an urgent need to re-establish the fundamentals of continence care into the practice of medical and nursing staff and action needs to be taken with regard to the establishment of truly integrated, quality services in this neglected area of practice.

The inside-out trans-obturator sling: a novel surgical technique for the treatment of male urinary incontinence. *de Leval J, Waltregny D. Eur Urol. 2007 Nov 20; epub.* A new polypropylene sling procedure for treating stress urinary incontinence (SUI) after radical prostatectomy (RP) is pulled for compressing the bulbar urethra upward and tied to each other across the midline. Patients with detrusor overactivity are excluded. At 6 months 45% patients were cured and 40% improved (1pad/d), so this procedure appears to be safe and efficient at short term. Further studies are warranted to determine long-term outcome.

Long-term follow-up of a transvaginal Burch urethropexy for stress urinary incontinence. *Rardin CR, Sung VW, Hampton BS et al. Am J Obstet Gynecol. 2007;197:656.* A vaginal Burch urethropexy for urodynamic stress urinary incontinence with urethral hypermobility was performed in 66 women using a suture carrier device. Concurrent prolapse repairs were performed as indicated. Mean follow-up time was 20.9 +/- 18.9 months. Objective failure was observed in 16 patients (24.2%). Subjective failure was reported by 21.2% of patients, with 50% and 28.8% reporting success and improvement, respectively. Six patients (9%) experienced febrile illness, 4 (6%) intraoperative hemorrhage, 1 pelvic abscess, 12 (18.2%) suture erosion; half required surgical revision or excision. It is concluded that vaginal Burch urethropexy is well tolerated but is associated with poor long-term success and high suture erosion rates.

Complication rates of tension-free midurethral slings in the treatment of female stress urinary incontinence: a systematic review and meta-analysis of randomized controlled trials comparing tension-free midurethral tapes to other surgical procedures. *Novara G, Galfano A, Boscolo-Berto R, Secco C, Cavalleri S, Ficarra V, Artibani W. Eur Urol. 2007 Nov 8; epub.* To evaluate the complication rates of tension-free midurethral slings compared with other surgical treatments for stress urinary incontinence a systematic review of the literature using MEDLINE, EMBASE, and Web of Science identified 33 randomized controlled trials reporting data on complication rates. Tension-free slings were followed by lower risk of reoperation compared with Burch colposuspension, whereas pubovaginal sling and tension-free midurethral slings had similar complication rates. With regards to different tension-free tapes, voiding LUTS and reoperations were more common after SPARC, whereas bladder perforations, pelvic haematoma, and storage LUTS were less common after transobturator tapes. The quality of many evaluated studies was limited.

Botulinum toxin A (Botox(R)) intradetrusor injections in adults with neurogenic detrusor overactivity/neurogenic overactive bladder (NDO/NOAB): a systematic literature review. *Karsenty G, Denys P, Amarenco G et al. Eur Urol. 2007 Oct 16; epub.* A total of 18 articles evaluating the efficacy or safety of Botox in patients resistant to antimuscarinic therapy, with or without clean intermittent self-catheterisation (CIC), were selected. Most of the studies reported a significant improvement in clinical (approximately 40-80% of patients became completely dry between CICs) as well as urodynamic (in most studies mean maximum detrusor pressure was reduced to <=40cm H(2)O) variables and in the patients' quality of life, without major adverse events. However, more adequately powered, well-designed, randomised, controlled studies evaluating the optimal dose, number and location of injections, impact on antimuscarinic regimen and CIC use, duration of effect, and when to perform repeat injections are warranted.

Urinary incontinence at orgasm: relation to detrusor overactivity and treatment efficacy. *Serati M, Salvatore S, Uccella S, Cromi A, Khullar V, Cardozo L, Bolis P. Eur Urol. 2007 Nov 20; epub.* This is the first study showing an inferior efficacy of antimuscarinic treatment in women with DO complaining of incontinence at orgasm or at penetration.

Intermediate-term outcome of the simplified laparoscopic antegrade continence enema procedure: less is better. *Nanigian DK, Kurzrock EA. J Urol. 2007 Nov 13; epub.* The Malone antegrade continence enema procedure revolutionized the surgical management of fecal incontinence. Laparoscopic antegrade continence enema is an effective means of treating intractable fecal incontinence and constipation. Our technique of using in situ appendix without cecoplication requires minimal mobilization and manipulation of the blood supply. Secondary ischemia, adhesions and scar formation are reduced, alleviating the most common complication, stomal stenosis. Our results show that cecoplication is not necessary to maintain stomal continence.

A patient-centered approach to developing a comprehensive symptom and quality of life assessment of anal incontinence. *Cotterill N, Norton C, Avery KN et al. Dis Colon Rectum. 2007 Nov 15; epub.* To identify question items required for a comprehensive symptom and quality of life assessment for individuals with anal incontinence is rather difficult. A consensus is reached that assessment should include the type, frequency and severity of incontinence, whether passive or associated with urgency, ability to delay and discriminate stool type, and "normal" bowel pattern with five key issues: unpredictability, toilet location, coping strategies, embarrassment, and social activity restriction. The currently available questionnaires do not capture comprehensive information on the issues identified as important by patients.

Surgical strategies for faecal incontinence - a decision analysis between dynamic graciloplasty, artificial bowel sphincter and end stoma. *Tan EK, Vaizey C, Cornish J et al. Colorectal Dis. 2007 Nov 12; epub.* Artificial bowel sphincter (ABS) and dynamic graciloplasty (DG) and a permanent end stoma (ES) are surgical options for faecal incontinence (FI). All three procedures are cost-effective: ABS is the most cost-effective after 10 years, ES is most cost-effective over 5 years, DG maybe considered as an alternative in specialist centres.

The ProTect device in the treatment of severe fecal incontinence: preliminary results of a multicenter trial. *Giamundo P, Altomare D, De Nardi P et al. Tech Coloproctol. 2007 Dec 3; epub.* ProTect consists of a pliable, silicone catheter with an inflatable balloon that seals the rectum at the anorectal junction, acting like an anal plug. The proximal part of the catheter incorporates two contacts that monitor the rectum for the presence of feces. The patient is alerted to an imminent bowel movement and, hence, a potential fecal accident, through a beeper. In 11 subjects an overall significant improvement in the quality of life and a significant reduction in incontinence scores were demonstrated.

Correlation between anal sphincter defects and anal incontinence following obstetric sphincter tears: assessment using scoring systems for sonographic classification of defects. *Norderval S, Markskog A, Rossaak K, Vonen B. Ultrasound Obstet Gynecol. 2007 Dec 5; epub.* There is a positive correlation between the extent of sphincter defects and the degree of anal incontinence following primary repair of obstetric sphincter tears. Our findings highlight the importance of adequate reconstruction of the anal sphincters during primary repair.