Sphincteroplasty for fecal incontinence in the era of sacral nerve modulation

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Abstract
The role of sphincteroplasty in the treatment of patients with fecal incontinence due to anal sphincter defects has been questioned because the success rate declines in the long-term. A new emerging treatment for fecal incontinence, sacral nerve stimulation, has been shown to be effective in these patients. However, the success rate of sphincteroplasty may depend of several patient-related and surgical-related factors and the outcome from sphincteroplasty has been evaluated differently (with qualitative data) from that after sacral nerve stimulation (quantitative data using scoring systems and quality of life). Furthermore, the data available so far on the long-term success rate after sacral nerve modulation do not differ substantially from those after sphincteroplasty. The actual data do not support the replacement of sphincteroplasty with sacral nerve stimulation in patients with fecal incontinence secondary to sphincter defects.

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Key words: Fecal incontinence; Sacral nerve stimulation; Sphincteroplasty

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Altomare DF, De Fazio M, Giuliani RT, Catalano G, Cuccia F. Sphincteroplasty for fecal incontinence in the era of sacral nerve modulation. World J Gastroenterol 2010; 16(42): 5267-5271
Available from: URL: http://www.wjgnet.com/1007-9327/full/v16/i42/5267.htm DOI: http://dx.doi.org/10.3748/wjg.v16.i42.5267

INTRODUCTION
Sphincteroplasty was first described by Lockhart-Mummery[1] in 1923, who reported only on the end-to-end apposition of the margins of the damaged anal sphincter, however, the operation become popular following a publication by Parks et al[2], who first described the overlapping sphincteroplasty. Since then, this operation is generally believed to be the treatment of choice for incontinent patients with external anal sphincter defects in whom conservative management has failed. However, this operation has recently been questioned because of its long-term success rate, which like many other operations for functional diseases of the gastrointestinal tract, declines with time. On the other hand, the new procedure of sacral nerve modulation has been demonstrated to benefit patients, even those with damaged anal sphincter, and has raised the question of whether sphincteroplasty still has a role in the management of patients with fecal incontinence after sphincter damage. In this editorial, the reason for the failure of sphincteroplasty and the matter of using sacral nerve stimulation (SNS) instead of sphincteroplasty in patients with sphincter damage are discussed.
PROGNOSTIC FACTORS OF SPHINCTEROPLASTY

Sphincteroplasty is usually indicated after obstetric damage to a normal anal sphincter during childbirth or after an iatrogenic lesion to cure an abscess or a complex anal fistula. It is uncertain whether the etiology of the sphincter lesion can affect the outcome. One of the few papers dealing with this topic suggests that patients with surgical trauma do better than those with obstetric trauma[11]. However, we did not find similar results in the Italian registry of fecal incontinence (data not shown). Of course, the extent of sphincter damage plays an important role in the outcome. It is easier and probably more effective to close a small gap of 30° than a gap of 120°, and in most of the papers dealing with this operation, patients with a gap in the anal defect greater than 120° are usually excluded from this procedure[26]. Another possible factor influencing the success rate after sphincteroplasty could be the occurrence of pudendal neuropathy. Nowadays, the pudendal nerve terminal motor latency test is not generally considered to be predictive of the outcome of several procedures for fecal incontinence such as sacral nerve modulation, however, most of the papers on this topic[3-5] demonstrated that patients without pudendal neuropathy did significantly better than patients with neuropathy (Table 1). The problem is that, almost all these studies are retrospective and it is not possible to demonstrate whether neuropathy existed prior to surgery. Another important factor potentially affecting the outcome is the age of these patients. The literature shows that patients less than 40 or even 50 years old do much better than older patients[14].

Further possible factors which can influence the outcome of this operation are related to the surgical technique. There are many tips on the surgical techniques used which could play a role in the outcome of these patients. For example, early vs delayed repair. A recent study[13] demonstrated that early repair, whenever possible, has better cost-effectiveness than delayed repair. In addition, a study by Sultan et al[14] indicated that suturing the internal and external anal sphincter separately could give better results, although this data has never been confirmed.

It is generally believed that sphincter overlap is the preferred way to perform a sphincteroplasty. However, in the literature there are only 2 papers on this topic. In particular, the study by Fitzpatrick et al[3], which had a very short follow-up, found no difference in outcome. However, the study by Fernando et al[14], in a large group of patients, found a significantly better outcome at one year follow-up when the overlapping technique was used.

Other surgical details include the use of resorbable or nonresorbable sutures. Some older studies on sphincteroplasty were performed using catgut to approximate the sphincter margins, and this is of major importance when we look at the long-term results. The literature suggests that the use of PDS or prolene is better than Vicryl or Dexon because they need a longer time to be resorbed[13].

Some authors[9] have advocated the need for a diverting stoma to protect the sphincteroplasty, but there is no evidence for this; on the contrary, there is evidence of morbidity following stoma closure and stoma-related disability[11]. Almost all colorectal surgeons do not use a diverting stoma or bowel confinement after a sphincteroplasty and usually these patients can resume oral feeding immediately after surgery[18].

Another interesting factor which potentially affects the outcome of sphincteroplasty, is the puborectalis sling contraction. Roche’s group in Ginevra[20] demonstrated that patients with good function of the puborectalis sling measured by perianal echography do better. This means that patients who still have some functionality of pelvic floor muscles have a better chance of obtaining a good result after sphincteroplasty.

FUNCTIONAL OUTCOME AFTER SPHINTEROPLASTY

Patients with fecal incontinence have a normal life-expectancy, so we must look at the long-term results rather than the early results. Table 2 lists the studies dealing with the short-term results of sphincteroplasty, in most cases after obstetric trauma, indicating a very interesting rate of excellent/good results[6]. However, if we look at the long-term results, after a follow-up ranging from 5 and 10 years (Table 3), the number of excellent/good results falls to 40%.

Why does the success rate deteriorate with time after sphincteroplasty? Some suture breaks in the muscle can occur in the postoperative period, and other patients may have an undetected cause of fecal incontinence. Furthermore, it is supposed that in women, a deteriora-

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**Table 1** Effects of pudendal neuropathy on the outcome of sphincteroplasty for fecal incontinence

| Author         | n     | Success without neuropathy (%) | Success with neuropathy (%) | P value |
|----------------|-------|--------------------------------|----------------------------|---------|
| Lauberg et al[8], 1989 | 18 | 42                             | 5                          | < 0.05  |
| Londono-Schimmer et al[9], 1994 | 94 | 60                             | 14                         | < 0.001 |
| Zorcolo et al[18], 2005 | 90 | 62                             | 17                         | < 0.01  |

**Table 2** Short term outcome after sphincteroplasty for fecal incontinence

| Author         | n     | Obstructive surgery | Results (%) | Excellent/good | Fair | Poor |
|----------------|-------|---------------------|-------------|----------------|------|------|
| Fleshman et al[11], 1991 | 55 | 100                  | 72           | 22             | 6    | 6    |
| Weissner et al[13], 1991 | 16 | 100                  | 76           | 19             | 5    | 5    |
| Engel et al[14], 1994 | 55 | 100                  | 79           | 21             | -    | -    |
| Oliveira et al[20], 1996 | 55 | 99                   | 71           | 9              | 20   | -    |
| Felt-Bersma et al[22], 1996 | 18 | 94                   | 72           | -              | 28   | -    |
| Nikiteas et al[3], 1996 | 42 | 88                   | 60           | 17             | 24   | -    |
| Sitzler et al[25], 1996 | 31 | 87                   | 74           | -              | -    | 26   |
| Torment et al[26], 1997 | 16 | 100                  | 44           | 31             | 25   | -    |
| Zorcolo et al[27], 2005 | 93 | 100                  | 65           | 9              | 27   | -    |
| Bartisic et al[28], 2006 | 65 | 86                   | 74           | 17             | 9    | -    |
tion in muscle trophism and innervation occur with age, particularly after the menopause due to the fall in estrogen levels\textsuperscript{[39]}.\textApi\n
WHAT TO DO IN CASE OF EARLY OR LATE FAILURE OF SPHINCTEROPLASTY?\textApi

The first question is whether the same operation can be re-done. In the literature, there are two papers on this topic\textsuperscript{[31,36]}, both claiming that 50% of these patients can recover their continence after a repeat sphincteroplasty, and that continence can be maintained in the long-term.

Table 3 Long term outcome after sphincteroplasty for fecal incontinence

| Author                | n  | Median FL (mo) | Results (%) | Fair | Poor |
|-----------------------|----|----------------|-------------|------|------|
| Pezim et al\textsuperscript{[6]}, 1987 | 40 | 67            | 62          | 38   |
| Londono-Schimmer et al\textsuperscript{[4]}, 1994 | 94 | 59            | 50          | 26   |
| Malfouf et al\textsuperscript{[3]}, 2000 | 46 | 77            | 50          |      |
| Halverson et al\textsuperscript{[4]}, 2002 | 49 | 69            | 14          | 32   |
| Vazey et al\textsuperscript{[4]}, 2004 | 21 | 52            | 10          | 38   |
| Bravo Gutierrez et al\textsuperscript{[3]}, 2004 | 130 | 120          | 22          | 19   |
| Zorcolo et al\textsuperscript{[34]}, 2005 | 62 | 70            | 45          | 10   |
| Barisic et al\textsuperscript{[31]}, 2006 | 65 | 80            | 48          | 13   |
| Maslekar et al\textsuperscript{[31]}, 2007 | 64 | 84            | 80          | 20   |
| Oem et al\textsuperscript{[32]}, 2009 | 120 | 111          | 38          | 23   |

Table 4 Long term outcome after sacral nerve stimulation for fecal incontinence

| Author                | n  | Success (%) | Length of follow-up (yr) |
|-----------------------|----|-------------|--------------------------|
| El-Gazzaz et al\textsuperscript{[30]}, 2009 | 22 | 42          | 2.5                      |
| Altomare et al\textsuperscript{[30]}, 2009 | 52 | 62          | 7                        |
| Matzel et al\textsuperscript{[30]}, 2009 | 12 | 75          | 9                        |
| Vallet et al\textsuperscript{[30]}, 2010 | 32 | 53          | 3                        |

We refer to mixed causes of incontinence, in both sexes, with those of sphincteroplasty? When dealing with SNS, however, is this long-term outcome data truly comparable after the enthusiasm surrounding the early results of SNS. The long-term was observed. This was quite unexpected the success rate is measured. Four papers dealing with sphincter defects by performing SNS directly? There are several issues that make this option questionable because the data available on sphincteroplasty and SNS have been poorly compared. There are two major issues that must be considered; the short- vs the long-term outcome and how the success rate is measured. Four papers dealing with the first topic were published in 2009 (Table 4)\textsuperscript{[30,34]}.\textApi

When the data was amalgamated a 58% success rate in the long-term was observed. This was quite unexpected after the enthusiasm surrounding the early results of SNS. However, is this long-term outcome data truly comparable with those of sphincteroplasty? When dealing with SNS, we refer to mixed causes of incontinence, in both sexes, and, most importantly, the criterion used to define suc-

SACRAL NERVE STIMULATION VS SPHINCTEROPLASTY

In 1995, Matzel et al\textsuperscript{[37]} opened a new chapter in coloproctology, showing that sacral nerve stimulation can benefit patients with fecal incontinence. Since then, the indication for this procedure has been extended, even to patients with sphincter defects which were originally excluded. In the literature, there are already 7 papers\textsuperscript{[26,27,28-30,34-36,38-39,41-42]} published on this topic showing that there is a very interesting percentage of early success with SNS without doing anything to the damaged sphincter. The question now is, are we justified in skipping sphincteroplasty in the ideal “algorithm” to treat patients with sphincter defects by performing SNS directly? There are several issues that make this option questionable because the data available on sphincteroplasty and SNS have been poorly compared. There are two major issues that must be considered; the short- vs the long-term outcome and how the success rate is measured. Four papers dealing with the first topic were published in 2009 (Table 4)\textsuperscript{[30,34]}.\textApi

A very interesting recent paper\textsuperscript{[38]} reviewed 160 patients who had undergone sphincteroplasty, with a very long follow-up of about 10 years. The outcome was classified using the two main systems: categorical (excellent, moderate and poor results) and quantitative (number of incontinence episodes/week). The authors found that 37% of patients had an excellent/good result, 23% had a moderate result and 40% had a poor result. However, the group of patients with a moderate result had more than a 50% reduction in incontinence episodes. This means that, if we analyze the data on sphincteroplasty using the criteria generally adopted for patients undergoing SNS, the long-term success rate is 60%, which is at least comparable to that of SNS.

Another argument based on the definition of success is related to the treatment of fecal incontinence, as the success of the techniques is defined by the statistically significant reduction of incontinence scores, however, this information does not give us what we need to know: how many of our patients have had their problems fixed, not the statistical changes in the global scores.

A good way of measuring the outcome of surgery for fecal incontinence would be patient satisfaction and quality of life, but few papers focus on these measurements. Most papers on sphincteroplasty just classify the outcome into categories of incontinence. In contrast, in all of the papers on SNS, incontinence scores are used. However, even in these cases confusion can arise due to the use of different incontinence scores (Wexner Score\textsuperscript{[38]}, Vaizey’s score\textsuperscript{[45]}, Pescatori’s score\textsuperscript{[46]}, and many others), making the results between SNS and sphincteroplasty difficult to compare. Furthermore, the criteria for defining success used in SNS studies (< 50% of incontinence episodes) have never been adopted in sphincteroplasty studies.

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CONCLUSION

From the literature, overlapping sphincteroplasty can achieve satisfactory long-term results, and, at the moment, they are at least comparable to SNS. Repeat sphincteroplasty may be performed and should be considered as the treatment of choice in the case of failure of previous sphincter repair. Sacral Nerve Stimulation is an effective,
fascinating but expensive technique which should be offered to patients who have failed a previous surgical attempt to repair the sphincter.

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