Gluteal Myoneurovascular Flap Transfer (GMFT) for Anorectal Sphincter Reconstruction in Faecal Incontinence

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Objective: To assess the surgical procedure bilateral gluteal myoneurovascular flap transfer (GMFT) in the treatment of faecal incontinence.

Design: Four patients were operated upon and their postoperative continence was assessed.

Setting: GMFT was carried out on four patients who became incontinent for faeces following repair of anorectal malformation.

Subject: Most of the corrective operations are based on striated muscle transposition from regional gracilis and glutaeus maximus muscles. The rationale of this myoplasty is to provide a contractile muscle ring around the rectum for active voluntary continence control.

Intervention: We used a bilateral gluteal myoneurovascular flap transfer to encircle the rectum to treat faecal incontinence in four children. The technique and postoperative evaluation score system are described.

Results: Three of the four children had almost normal continence after the procedure.

Conclusion: The GMFT is a valuable treatment in the management of faecal incontinence.

Keywords: Anal incontinence. Faecal incontinence. Gluteal myoplasty.


Many remedial operations have been described for faecal incontinence following failed anorectal pull-through procedures for high imperforate anus correction. These operations replace the external sphincter and strengthen the puborectalis sling by utilizing regional natural synergistic striated muscle to create a voluntary muscular ring around the rectum. Gluteal, tendon fascia as lata and gracilis muscles have all been used.

The results of these operations are disappointing as too often it is the terminal tendinous portion of the muscle which surrounds the newly formed anal canal, producing a constrictive ring which lacks the contractibility necessary to create a sphincter-like effect.

There are two essential considerations in achieving anal continence: 1) the anal occlusion caused by the compressive action of the sphincter contraction should be associated with the creation of a kinking mechanism of the anorectal canal; 2) a functional muscle flap can be utilized to create a satisfactory sphincter-like action by preserving its neurovascular supply.

The lower half of both glutaeus maximus muscles with their neurovascular bundles preserved, provide us with a strong, anatomically ideal and effective muscle for reconstruction of a new anorectal sphincter.

Material and Methods

Four children (three males and one female) with high imperforate anus who subsequently developed faecal incontinence after primary anorectal pull-through operations.

One patient was referred to our centre with multiple abdominal faecal fistulae following an unsuccessful
abdomino-perineal pull-through procedure at a different centre.

The other three patients had undergone posterior sagittal anorectal pull-through (PSARP) procedures. In all, poor pubo-rectalis muscle complex was documented during the original PSARP and pre-GMFT CT scan. Anorectal manometry was not available for assessment.

**Technique**

It is advisable to perform a diverting colostomy 6 weeks prior to this procedure. A muscle relaxant is preferably avoided during the operation and an indwelling urinary bladder catheter should be introduced. The patient should be positioned in a jack-knife position and lateral sacral borders and both ischial tuberosities should be marked.

a) An inverted U-shape incision is made starting from the ischial tubercle and extending across the lower 2 cm of the sacrum to end at the contralateral ischial tuberosity (Fig. 1). The skin flap is mobilized inferiorly, and the lower third of both gluteal maximum muscles are identified. The lower 3–4 cm of the muscle with its periosteal attachment is mobilized laterally. With the use of a Pena-nerve stimulator, the inferior gluteal neurovascular bundle is identified (Fig. 2). Sharp dissection may be needed to separate the sacro-tuberosous muscle attachment. Division of the mobilized flap into two halves, longitudinally, avoids injury to its neurovascular supply.

b) Two incisions are made (2–3 cm in length) lateral to the anal opening, creating a space, deeper around the lower rectum.

c) The split muscle flaps are delivered on each side through the peri-anal incisions, and wrapped around the lower rectum in two planes (proximal and distal) (Fig. 3).

These wrapped muscle flaps are tightened around a Hegar dilator number 14, placed in the rectum, and are sutured to each other with 30 vicryl (Fig. 4).

The skin is closed with interrupted 40 nylon sutures. Two median size suction drains are left in the ischio-rectal and gluteal spaces to be removed after 24 hours.

The patient is instructed not to bend the hip joints and to lie prone or supine for 10 days postoperatively. Gradual ambulation is allowed but there should be no stair climbing for another 10 days. During the third week after the operation, rectal examination should be done

*Figure 1. An inverted U shape incision.*

*Figure 2. Mobilization of the lower 3–4 cm of the muscle showing the neurovascular bundle (see arrow).*
and the child started on ‘gripping’ or ‘tightening’ exercises. The colostomy then may be closed normally at around 6 weeks.

**Results**

Postoperative evaluation was based on two scoring systems (Tables 1 and 2). Patients 1 and 3, are fully continent, attending school. Patient 2, has good active control; however, still wears a nappy during school time.

Early evaluation of patient 4 revealed a poor result, possibly because of the patient’s mental status.

### Table 1

<table>
<thead>
<tr>
<th>Patient no.</th>
<th>Score</th>
<th>Results</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>Good</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>Fair</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>Fair</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>Poor</td>
</tr>
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**Discussion**

The gluteus maximus muscle has commonly been used to reconstruct the anorectal sphincter, because of its proximity to the anus and its function as an accessory muscle of anal continence.

In 1951, Pickrell et al. described their experience in using gracilis muscle for reconstruction of the rectal sphincter. Subsequently published experience suggests that gracilis sphincter reconstruction became favoured over previously described methods. However, results were not uniformly successful for many reasons including normal physiological length. Hertz in 1981, after cadaveric studies and intra-operative stimulation of the inferior gluteal nerve supplying the gluteus maximus muscle, was encouraged to re-examine the capabilities of this muscle for anal sphincter reconstruction. Since then, several authors have published their experience using gluteus maximus muscles.

Our sphincter reconstruction is based on the Hertz principle, using the lower portion of the gluteus maximus muscle after its detachment from the coccygeal and lower sacral origin, including an edge of periosteal attachment which will protect the muscle flap from damage and trauma during manipulation, easing its splitting, wrapping and suturing of both ends around the rectum, sparing the muscle fibres. Hence there is less postoperative muscle scarring and a better functional result. By suturing the two halves of the flaps to each other in different planes an effective muscular tunnel sphincter will be created and it will also increase the forward angulation of the lower rectum.

The U-shaped skin incision was preferred to those described previously as it provides easy and confident identification of the lower gluteus maximus muscles with their neurovascular supply. In addition, it permits the re-use of the puborectalis muscle complex in the region to augment future continence.

Gluteus maximus muscle has been used in the treatment of faecal incontinence due to causes other than anorectal malformation. We believe our results are comparable with other authors’ experience. However, together with other
authors we consider that stress on the postoperative ‘gripping’ or ‘tightening’ of the buttocks by exercise training and close follow-up are essential to improve the degree of control.\textsuperscript{4}

Recently, because of the introduction of electronic implantation devices\textsuperscript{11} and the advances in microsurgical techniques\textsuperscript{12} hopes have been raised for the establishment of new and more efficient ways of sphincter reconstruction procedures.

References


