

## WHEN TO REPAIR? A COST-EFFECTIVENESS ANALYSIS OF PRIMARY AND DELAYED SPHINCTEROPLASTY FOR ANAL SPHINCTER INJURY

### Hypothesis / aims of study

Obstetric trauma is a common cause of faecal incontinence (FI) in young women<sup>1,2</sup>. The majority of women who complain of FI after vaginal delivery have demonstrable anatomical defects in the anal sphincter<sup>3-5</sup>. This is described as obstetric anal sphincter injury (OASI). This may result in faecal incontinence. Sphincteroplasty is usually performed as a primary immediate procedure. Delayed sphincteroplasty can be performed if there is significant trauma or soiling, if the primary procedure has failed, and occasionally if the injury was not recognized initially. This study aims to determine the cost to patient and health service in the event of a delayed sphincteroplasty is performed compared with a primary repair.

### Study design, materials and methods

An economic model was constructed and decision analysis performed using a decision tree based on a Markov process (Figure 1). Results were assessed as incremental cost-effectiveness ratios. Simulations were run over 10 and 15 years. People with anal sphincter injury, having undergone either primary or delayed sphincteroplasty were identified from the published literature (Primary n=103; Delayed n=777) using Medline, Embase, Ovid and Cochrane databases for studies published between 1976 and 2006. Studies included described at least one of the measured outcomes - probability of functional success/failure and quality-of-life. The main outcomes were quality-adjusted life years (QALYs) gained from each strategy, costs incurred and incremental cost-effectiveness ratio (ICER).

### Results (Table 1)

Over a 10-year period, primary sphincteroplasty produced a gain of 5.72 quality-adjusted life years (QALYs) for an estimated £2,750, giving an ICER of £487 per QALY. Delayed sphincteroplasty produced a gain of 3.73 QALYs for a cost of £2,667, giving an ICER of £719 per QALY. Primary sphincteroplasty produced the highest QALYs overall but procedures performed poorly beyond the 10 year mark. The decision analysis calculation estimated 80.8% of patients having primary repair and 97.2% of those having delayed repair needing further management at 10 years.

### Interpretation of results

The cost-effectiveness of delayed sphincteroplasty, when performed, is significantly lower than if primary sphincteroplasty were successfully performed at the time of injury.

### Concluding message

In the event that delayed sphincteroplasty has to be performed, the resultant cost is greater with concurrently lower QALYs gained. Successful primary sphincteroplasty substantially improves quality-of-life and reduces overall cost-of-treatment. Early recognition, diagnosis and good operative technique may be crucial for clinicians in order to maximise primary sphincteroplasty success.

### References

1. Kamm MA. Obstetric damage and faecal incontinence. *Lancet*. Sep 10 1994; 344(8924):730-733.
2. Madoff RD, Williams JG, Caushaj PF. Fecal incontinence. *N Engl J Med*. Apr 9 1992; 326(15):1002-1007.
3. Bartram C. Anal endosonography in faecal incontinence. *Endoscopy*. Feb 1996;28(2):259-260.
4. Law PJ, Kamm MA, Bartram CI. Anal endosonography in the investigation of faecal incontinence. *Br J Surg*. Mar 1991;78(3):312-314.
5. Sultan AH, Kamm MA, Talbot IC, Nicholls RJ, Bartram CI. Anal endosonography for identifying external sphincter defects confirmed histologically. *Br J Surg*. Mar 1994;81(3):463-465.

**Figure 1:** Decision tree for a patient with faecal incontinence caused by anal sphincter injury. Squares indicate points where management decisions are made, and circles indicate chance events. Markov branches are indicated by the circle and M symbol, with Markov trees shown by curved branches representing a single time cycle, with final outcomes, represented by triangles, defining the state at the start of the subsequent cycle.

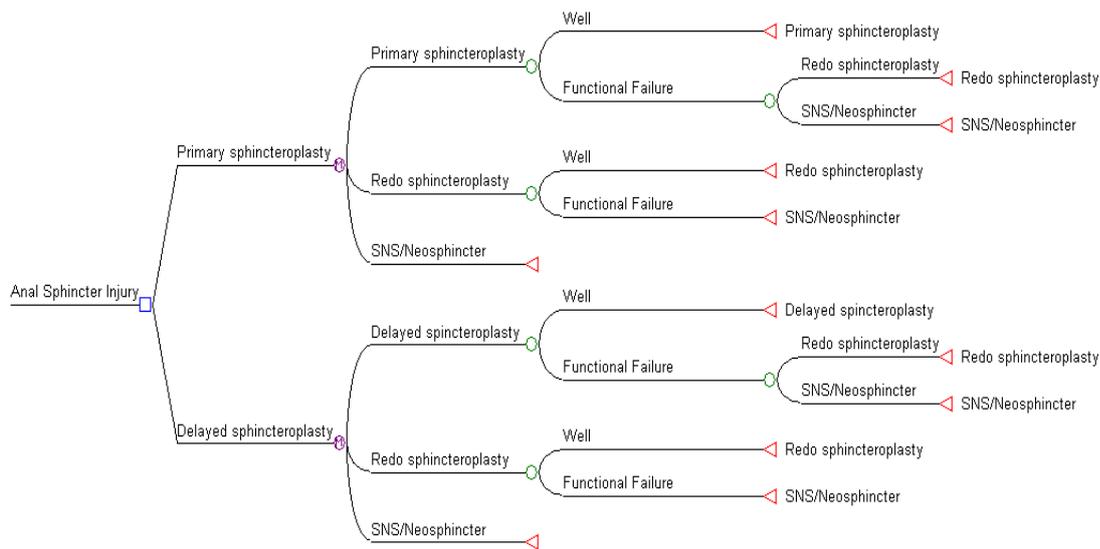


Table 1: Estimates of benefit, cost and incremental cost-effectiveness ratios for primary compared with delayed sphincteroplasty

	Clinical Benefit (QALY)	Cost (£)	ICER (£/QALY)
<b>Base Case</b>			
<b>Time horizon 10 years:</b>			
Primary sphincteroplasty	5.72	2,750	487.09
Delayed sphincteroplasty	3.73	2,667	718.85
<b>Time horizon 15 years:</b>			
Primary sphincteroplasty	6.10	2,750	453.08
Delayed sphincteroplasty	3.77	2,662	708.96

**FUNDING: None**