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Histological changes in free jejunal grafts used in pharyngeal reconstruction

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Abstract
A histological study was performed of biopsies taken from jejunal free grafts used in pharyngeal reconstruction. The main findings were a decreased crypt/villi ratio and a mild chronic inflammatory infiltrate. There was no evidence of metaplastic or dysplastic transformation.

Introduction

The free jejunal graft has become an increasingly accepted method of pharyngeal reconstruction since its original description by Seidenberg *et al.*, (1959). The advantages of a single stage operation with early restoration of swallowing have led to its being advocated as the treatment of choice for pharyngeal reconstruction in many centres (McConnell *et al.*, 1981).

The aim of the study was to obtain specimens of the transplanted jejunum for histological examination from patients who had undergone this procedure in our centre.

It was intended that microscopic evaluation would reveal what changes, if any, result from the non-physiological use of jejunum as a neo-pharynx.

Materials and methods

Biopsies were taken from five patients in whom free jejunal grafts had been used for pharyngeal reconstruction. In four of the cases, the grafts had been inserted following pharyngolaryngectomy for squamous cell carcinoma. In the fifth, the patient had undergone pharyngectomy with jejunal replacement preserving the larynx (Stafford and Mathias, 1986). At the time of biopsy the grafts had been *in situ* for periods ranging from 12 months to nine years.

It was possible to obtain the samples under direct vision using a small pair of aural biopsy forceps. The procedure was painless.

The specimens were fixed in buffered formal saline and parafin wax sections (5 um) were prepared in standard manner and stained with haematoxylin and eosin.

Each biopsy was assessed as to the overall architectural appearance (assessment of crypt to villus ratio, crypt hyperplasia or atrophy), cytological abnormalities of the surface enterocytes (including gastric and squamous metaplasia) and any evidence of an immunological (cellular) reaction within the surface enterocytes or lamina propria.

Results

The histological findings of each jejunal biopsy are shown in Table I. A typical specimen is shown in Fig. 1 with a reduction in the crypt to villus ratio with some crypt hyperplasia. There is no evidence of an increase in intra-epithelial lymphocytes, although an excess of lym-

TABLE I

Operation requiring pharyngeal reconstruction	Time since operation	Histological features
1 Pharyngolaryngectomy	7 years	Reduced crypt/villi ratio Increased number of crypts Enlarged enterocytes Slight increase of mononuclear cells
2 Pharyngolaryngectomy	9 years	Reduced villi Slight hyperplasia of crypts Slight increase in mononuclear cells Normal enterocytes
3 Pharyngolaryngectomy	2 years	Increased number of crypts Lamina propria had increased plasma cells
4 Pharyngolaryngectomy	12 months	Increased number of crypts Lamina propria contained increased number of lymphocytes and plasma cells
5 Pharyngectomy	6 years	Short villi Normal crypt numbers Normal enterocytes

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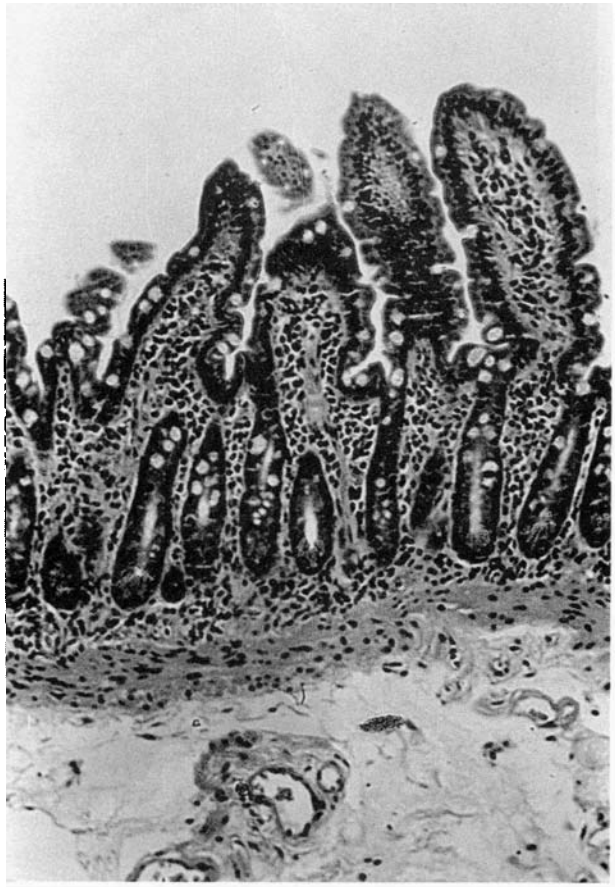

FIG. 1
Jejunal biopsy (×320) after six years of use as a neopharynx.

phocytes is noted within the lamina propria. No metaplasia or dysplasia is visible.

Discussion

The technique of free jejunal grafts for pharyngeal reconstruction has been recommended on the grounds of rapid post-operative recovery (Robinson and MacLeod, 1982) and low complication rate (Theile *et al.*, 1986) but little is known of the fate of transplanted jejunum.

Studies on the post-operative function of free jejunal grafts were carried out by Meyers *et al.* (1980). They found that the jejunum maintained an intrinsic myo-electrical activity and was able to contract in response to local distension and to the physiological hormonal controls of intestinal motility. They also obtained one biopsy of jejunum 24 months after transplantation which they described as being normal in appearance. In our study the most obvious finding in all five specimens was the change in crypt/villi ratio with a reduction in the height and number of villi and an increase in the number of crypts. These changes mirror those found in ileum when it is used to create ileal reservoirs (O'Connell *et al.* 1986).

There was also evidence of a chronic inflammatory infiltrate in four of the five specimens. However, unlike ileal reservoirs in which a severe 'pouchitis' is commonly seen (Madden *et al.* 1990) histologically the inflammation appears mild.

Finally, there was no evidence of squamous metaplasia or dysplasia in any of the biopsies obtained despite the longevity of some of the grafts studied. This suggests little risk of neoplastic change in the graft due to longstanding use in a non-physiological site. This compares favourably with reports of both benign and malignant neoplastic lesions arising in skin flaps used for pharyngeal reconstruction (Johnson *et al.*, 1983; Deans *et al.*, 1990).

Conclusion

The use of jejunum as a neopharynx for periods of up to nine years results in comparitively little histological change. The alteration in morphology with a decrease in villus height, could be anticipated as a response to the increased local trauma. The mild chronic inflammatory infiltrate may reflect the exposure of the heterotopic tissue to a wide variety of chemical and bacterial agents.

The absence of any significant pathological change indicative of malignant transformation is reassuring.

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