

with guidelines. A joint report from two BMA committees has suggested a similar committee for each health district with legal authority to act on behalf of mentally incapacitated adults.⁴ Decisions on minor treatment would be left to doctors and carers. The existing guardianship framework could be reformed to allow a guardian to consent to medical treatment provided the patient did not object. A more radical solution, increasingly popular in other countries, is a more flexible guardianship scheme, based on a court or tribunal. The new institution might have the power to deal with legal and financial, as well as personal, affairs, replacing the Court of Protection.

Present laws pose other difficulties for mentally handicapped people and their carers, as Gunn points out in a new edition of *Sex and the Law*, a guide for care staff.⁵ Laws designed to protect the mentally impaired from exploitation

may make it difficult for them to fulfil their sexual needs and engage in non-exploitive sexual relationships. For instance, care staff who help couples to have sexual intercourse could face prosecution for aiding and abetting a criminal offence. Perhaps this is something the Law Commission could take on board as well.

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- 1 In particular Re F [1990] 2 Appeal Cases 1.
- 2 Law Commission. *Mentally incapacitated adults and decision making: an overview*. London: HMSO, 1991. (Consultation paper No 119.)
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- 4 BMA Medical Ethics Committee and Mental Health Committee. *Proposals for the establishment of a decision making procedure on behalf of the mentally incapable*. London: BMA, 1991.
- 5 Gunn MJ. *Sex and the law: a brief guide for staff working with people with learning difficulties*. 3rd ed. London: Family Planning Association, 1991.

Cardiomyoplasty

Putting muscle into heart failure

The idea of using skeletal muscle to augment the failing heart is at least 50 years old.^{1,2} Renewed enthusiasm for this idea is based on interesting new developments. These include the understanding of muscle transformation^{3,4} and the finding that skeletal muscle, if stimulated by pacing in a specific manner, can be made to act as cardiac muscle, with rhythmic contraction that is resistant to fatigue.⁵⁻⁷ This process of muscle transformation involves alterations in the three major subcellular systems of muscle. The metabolic system becomes up regulated from a primary anaerobic (glycolytic) type of metabolism to an aerobic (oxidative) system.^{8,9} The calcium regulatory system becomes down regulated, with expression of a slow Ca²⁺ ATPase,¹⁰ while the contractile system undergoes shifts of its myosin isoforms from type 2 or "fast" fibres to type 1 or "slow" fibres, which are virtually indistinguishable from the β myosin isoforms of cardiac muscle.¹¹⁻¹³

At the fourth world symposium on transformed skeletal muscle for cardiac assist (Palm Springs, October 1990) it was reported that over 100 patients worldwide have undergone the operation of "cardiomyoplasty." In this procedure the latissimus dorsi muscle, with its neurovascular bundle intact, is transposed to form a wrap around the heart either to reinforce the myocardium or to substitute for a damaged area.¹⁴⁻¹⁶

After the muscle is mobilised it is connected by electrodes, placed in the muscle close to the branches of the thoracodorsal nerve, to a pulse generator, whose timing is triggered by impulses from a myocardial sensing electrode. The pulse generator delivers a short burst of five impulses to the latissimus dorsi muscle at the onset of cardiac systole, the burst lasting 240 ms. This is long enough to recruit the muscle into a sustained contraction and short enough to allow the muscle to relax before the next cardiac cycle. Some six to eight weeks, which includes a "vascular delay" when the muscle recovers from the effects of manipulation and is transformed by electrical stimulation, is currently required before the muscle is able to act as a biological assist device.

Most patients undergoing the procedure have had an ischaemic or dilated cardiomyopathy and have been classified as being in New York Heart Association's functional class III or, intermittently, in class IV. Most groups operating on these patients have found that, though subjective improvement is

common and remarkable, objective haemodynamic evidence of improved cardiac function is much more difficult to obtain. Exceptionally, a series of 15 patients with dilated cardiomyopathy reported on in Brazil have shown significant improvement in cardiac output and concomitant reduction in pulmonary capillary pressure on exercise.¹⁷ Several centres in Europe and America are currently taking part in studies that will enable us to evaluate this potentially very useful procedure.

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