

Warm up

Blinded by the light

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A recent American film—*21 grams*—made the assertion that at the precise moment of death each of us loses 21 grams of weight. My curiosity was aroused by this startling claim. Given that more than 2 million Americans claim to have been abducted by aliens at some stage in their lives, I assumed that this rather extraordinary statement was simply more American bunkum.

Believe it or not, such an experiment was actually carried out. In 1907, Duncan MacDougall MD of Haverham, Massachusetts performed a series of extraordinary experiments on dying patients.¹ He reported six cases where he was able to weigh the patients at the moment of their death. He did this by balancing the patient's bed on a beam balance, and selected patients with tuberculosis and diabetic coma who had died from "exhaustion" with little or no muscular movement apart from breathing in their terminal stages

of life. Having previously shown that respiration had no effect on his beam balance, he found that at the moment of death when patients took their last gasp, there was a sudden change in weight varying from 3/8 to 1 1/2 ounces (range 11–42 grams, mean 29 grams). This of course was in the absence of any obvious observed source of weight loss such as urine or faeces, and occurred too rapidly for insensible loss to be the explanation.

There were more than a few methodological issues glossed over, such as two of the patients' results being excluded because of "technical difficulties" and the weight loss varying on repeated measurement after death.

The most intriguing aspect of the study, however, lies in the explanation of the finding offered by Dr MacDougall. He postulated that at the moment of death, a hypothetical "soul substance" leaves the body. This substance he opines is necessary for the continuance

of personality or conscious ego in life. Interestingly he found that in euthanased dogs there was no change in weight at death, which he argued was evidence that dogs had no soul to lose. This "soul substance" has a physical weight that he estimated was less than that of the atmosphere and hence would ascend towards the heavens.

Such a scientific manuscript may well have gone into published obscurity but for the fact that the *New York Times* had previously published a story on Dr MacDougall and his theory. That fact alone probably had more to do with the 21 grams concept becoming urban myth.

So what can we learn from this subject. First, bad science will often be published providing it is sensational (note the converse does not hold). Second, always do press interviews—your fame will be magnified by the amount of press space devoted to your claim, however bogus. Third, lock up the film rights of whatever you publish—it is likely to be more lucrative in the long run than any royalties from manuscript reprints.

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REFERENCE

- 1 MacDougall D. Hypothesis concerning soul substance together with experimental evidence of such substance. *American Medicine* 1907;**13**:240–3.

ECHO

Arthrographic joint distension with saline and steroid improves function and reduces pain in patients with painful stiff shoulder: results of a randomised, double blind, placebo controlled trial

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Objective: To determine whether arthrographic distension with a mixture of saline and steroid, in patients with painful stiff shoulder for at least 3 months, is better than placebo in improving function, pain, and range of motion at 3, 6, and 12 weeks.

Methods: A randomised, placebo controlled trial with participant and outcome assessor blinding in which shoulder joint distension with normal saline and corticosteroid was compared with placebo (arthrogram). Outcome measures, assessed at 3, 6, and 12 weeks, included a shoulder-specific disability measure (SPADI), a patient preference measure (Problem Elicitation Technique (PET)), pain, and range of active motion.

Results: From 96 potential participants, 48 were recruited. Four withdrew from the placebo group after the 3 week assessment and three subsequently received arthrographic distension with saline and steroid. At 3 weeks, significantly greater improvement in SPADI ($p = 0.005$), PET, overall pain, active total shoulder abduction, and hand behind back was found in participants in the joint distension and steroid group than in the placebo group. At 6 weeks the results of the intention to treat analysis favoured joint distension, although the between-group differences were only significant for improvement in PET (difference in mean change in PET between groups = 45.9 (95% CI 3.2 to 88.7). Excluding the four withdrawals, the between-group differences for the disability and pain measures significantly favoured distension over placebo. At 12 weeks, both the intention to treat analysis and an analysis excluding the four withdrawals demonstrated a significantly greater improvement in PET score for the distension group.

Conclusions: Short term efficacy of arthrographic distension with normal saline and corticosteroid over placebo was demonstrated in patients with painful stiff shoulder.

▲ *Annals of the Rheumatic Diseases* 2004;**63**:302–309.