Table 3

Author, date, country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Beattie <i>et al</i> , 1986, UK	111 consecutive patients (age range 16–89) presenting to an accident and emergency department with an anterior dislocation of the shoulder without a fractured neck of humerus or neurovascular damage	RCT with crossover design. Patients were randomised based on whether they presented on an odd or even date. Manipulation was performed by one of four investigators, all of whom were “experienced in each technique”. It is not stated whether analgesia ± sedation had been given to the patients. On even dates a single attempt of Kocher’s method was performed (n = 55) and on odd dates a single attempt of Milch’s method was performed (n = 56). If the first of either technique was unsuccessful, a single second attempt was made using the alternative method. If the second attempt failed, then further manipulation was performed under GA. Reduction was confirmed both clinically and radiologically	Successful reduction	Kocher’s technique was slightly more successful than Milch’s technique (77% compared to 75% including first and second attempts (ie, combining pre and post cross over attempts)), however this failed to reach statistical significance	1. No sample size estimates were performed, perhaps leading to the results failing to reach statistical significance 2. There is no mention of ethical approval 3. The method of randomisation used may have introduced bias 4. The lack of information regarding analgesia and sedation makes it difficult to ascertain whether the results are valid and reliable 5. The trial was unblinded, but this seems to have been unavoidable 6. It is unclear whether the groups were comparable at baseline 7. The results are largely presented in the form of percentages which have been rounded to the nearest whole number. There is a discrepancy in the number of patients documented to have gone on to require GA (n = 11) and the number seeming to have had a failed reduction on the second attempt (n = 6.104) (based on calculations performed using the percentages given in the paper) 8. The statistical methods used have not been defined 9. The authors’ conclusions are not based on statistically significant results

GA, general anaesthesia.

Hyperbaric oxygen therapy in acute fracture management

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Abstract

A short cut review was carried out to establish whether hyperbaric oxygen therapy (HBOT) is advantageous in fracture healing. A total of 26 citations were found of which one answered the three part question. The clinical bottom line is that there is insufficient evidence to support the use of hyperbaric oxygen therapy for fracture healing.

Three part question

[In patients with acute fractures of the metatarsals] does the use of [hyperbaric oxygen] enhance [fracture healing and reduce the time to return to normal activity]?

Clinical scenario

A footballer presents to the emergency department having sustained a foot injury in a blatant and unnecessary foul

on the edge of the opponents’ penalty box. X ray confirms a fracture of the 4th metatarsal which you decide can be treated conservatively. The patient mentions to you that he has heard of certain footballers with similar injuries having “oxygen therapy” to speed up their recovery. You wonder if there is any evidence to support this form of treatment.

Search strategy

Cochrane Database Issue 2, 2006. Medline 2003 to May 2006: [bone fracture.mp. or exp Fractures, Bone/ or exp “Bone and Bones”/ or bone break.mp. or fracture.mp. or exp Fracture Healing/] AND [oxygen.mp. or exp Oxygen/ or exp Oxygen Inhalation Therapy/ or exp Hyperbaric Oxygenation/ or hyperbaric oxygen.mp. or barotherapy.mp. or exp Atmosphere Exposure Chambers/ or HBOT.mp.] limit to (humans and english language and yr = “2003–2006”)

Search outcome

There was one Cochrane review first published in January 2005 (searched to 2003) (table 4). Therefore, Medline was searched from 2003. A total of 206 papers were found in the Medline search, but none were relevant to the question.

Table 4

Author, date, country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Bennett <i>et al</i> , 2005, Australia	RCTs comparing HBOT with no, or sham HBOT in any patient with a bone fracture	Systematic review	1. Bone union, 2. time to bone union	No RCTs were found to support or refute the use of hyperbaric oxygen in fracture healing	None

HBOT, hyperbaric oxygen therapy; RCT, randomised control trial

Comment(s)

HBOT consists of intermittently administering 100% oxygen at pressures greater than 1 atm in a pressurised vessel. HBOT aims to increase the supply of oxygen to the fracture site and subsequently improve healing. There is one Cochrane Systematic Review addressing this clinical question. This review found only one small RCT which had no clinically important outcome measures. The conclusion of the review was there is no evidence from RCTs to support the use of this treatment, which may, rarely, result in serious long-term

adverse effects, that is barotrauma to the ears, lungs, and sinuses.

► CLINICAL BOTTOM LINE

There is insufficient evidence to support the use of hyperbaric oxygen therapy for fracture healing.

Bennett MH, Stanford R, Turner R. Hyperbaric oxygen therapy for promoting fracture healing and treating fracture non-union. Cochrane Database of Systematic Reviews (1) CD004712, 2005.