due to a serious reduction in the level of consciousness and seems to focus rather on retrieval.

Whereas the patient's responses in terms of blood pressure changes were of no great clinical significance when the patients received methohexitone, diazepam, or local analgesia in the recumbent posture, tachycardia was a pronounced feature with the methohexitone technique. From the respiratory standpoint the methohexitone technique employed was inferior in almost every aspect to the diazepam technique. With diazepam, loss of memory was obtained without the expense of loss of consciousness. The problems of thrombophlebitis, and recovery following diazepam, remain to be fully assessed. Methohexitone, an otherwise valuable intravenous agent, lacks the pharmacological properties which would make it a suitable agent for the purpose of sedation for conservative dentistry.

REFERENCES
Ryder W (1970) *Proc. roy. Soc. Med.* 63, 32
Shafto C E (1969) *Brit. J. Anæsth.* 41, 407
Wise C C, Robinson J S, Heath M J & Tomlin P J (1969) *Brit. med. J.* ii, 540

Dr T E J Healy and Dr M D Vickers
(Dudley Road Hospital, Birmingham 18)

Laryngeal Competence under Diazepam Sedation

During out-patient dental procedures under local analgesia, reliance is placed upon protective reflexes to prevent soiling of the lungs with mouth contents. Under general anæsthesia the absence of these reflexes is countered by the appropriate use of posture, packing or endotracheal intubation.

Conscious but sedated patients are in an equivocal position. Reflexes are clearly present, since the patients may gag, cough or swallow. On the other hand, their condition also resembles that of patients who have recently recovered consciousness from general anæsthesia and who have been shown to have an impairment of the glottic closure reflex (Tomlin *et al.* 1968). This paper records some observations on the efficiency of this reflex in patients sedated with diazepam.

Method
The efficiency of glottic closure was assessed on one occasion only in each patient at different intervals after diazepam. Ten millilitres of Lipiodol was placed on the back of the tongue and the patient then asked to swallow. An antero-posterior chest X-ray was taken at the end of treatment to identify contrast medium in the lungs.

Diazepam was given intravenously to a total dose of 0·2 mg/kg body weight. The drug was given slowly at a rate of 10 mg/minute. If the total calculated dose exceeded 10 mg, there was a pause of one minute after the first 10 mg, before the remainder of the dose was given at the same rate. In all, 74 patients were tested at various times after receiving diazepam. Twelve patients were similarly tested undergoing dental procedures solely under local analgesic blocks comparable to those used in the sedated patients.

The X-rays were reported upon by a consultant radiologist who was not informed of the nature of any medication received by the patient.

Results
The number of patients tested and the results of the subsequent chest X-ray are shown in Table 1. Eight out of the 19 patients tested at the time of maximum sedation aspirated contrast medium into the lungs. Two out of 8 tested five minutes after diazepam did so, but none after any longer interval. None of the unsedated patients aspirated.

The 19 patients who were tested immediately after the administration of diazepam were all tested before the administration of any local anæsthetic. In all other cases there was no correlation between the inhalation of contrast medium and the type of local anæsthetic block administered.

Discussion
Although patients sedated in this way are apparently conscious and can talk, it is clear that for a period of 5–10 minutes they are able to aspirate foreign material into the trachea during the act of swallowing. Many of the patients taking part in this study have been extremely anxious, and would have refused treatment unless they could be anæsthetized or heavily sedated. The dosage and method of administration which we have adopted has therefore been designed to produce a period of intense sedation and amnesia during which adequate local analgesic blocks can be placed. It would be unusual for any dental operation to take place during the danger period. Nevertheless, for the first 10 minutes after administration of this dose of diazepam, adequate

Table 1
Results of chest X-rays after intravenous diazepam

Time after diazepam (min)	*No. of cases tested*	*No. with contrast medium in lungs*
1	19	8
5	8	2
10	9	0
20	15	0
60	22	0

Of the 12 patients tested after local analgesia alone, none aspirated contrast medium into the lungs

isolation of the pharynx is clearly indicated. It should also be noted that an adequate cough reflex does not necessarily afford protection. Two of the patients coughed vigorously immediately after swallowing Lipiodol and yet had contrast medium in the bronchial tree.

Summary
The competence of the laryngeal closure reflex is impaired for 5–10 minutes after the intravenous administration of 0·2 mg/kg of diazepam.

REFERENCE
Tomlin P S, Howarth J & Robinson J S (1968) *Lancet* ii, 1422

Mr J D Parsons (*Chesterfield*) commented that after the injection of a local anæsthetic one normally waited for approximately ten minutes before commencing dental surgery. It would appear, therefore, that this delay would eliminate the ten-minute danger period of absent laryngeal reflex with diazepam.

Dr R A Green (*St George's and The Royal Free Hospitals, London*) asked, in view of the amnesia recorded with diazepam, if Dr Healy and Dr Vickers would give their views on the period necessary for patients to be accompanied and restricted from returning to work or driving cars following its use intravenously.

Dr Vickers said patients were now discharged accompanied by an adult, one hour after receiving the dose of diazepam, but were warned against returning to work, taking alcohol or driving a car until the following day.

Dr P J Verrill (*University College Hospital, London*) mentioned two patients who had experienced patchy amnesia for several hours after receiving diazepam. He felt that the total duration of amnesia required further investigation.

Dr Ryder said that a patient of his had recently had dental conservations under diazepam at 9.30 a.m. and in the afternoon had bought a new outfit she had long needed but been unable to afford. A week later she had had a further dental conservation session under diazepam at 9.30 a.m. In the afternoon she again went shopping and bought the same clothes as before.

Professor R A Cawson (*Guy's Hospital, London*), said occasional cases of persistent amnesia after diazepam were difficult to assess. 'Absentmindedness' was very common and patients were prone to blame a drug rather than themselves.

Dr J G Bourne (*Salisbury*) questioned whether the reflex cardiac arrhythmias described by Dr Ryder were other than a red herring. Unaccountable collapse in young, healthy patients anæsthetized sitting up in the dental chair was common but it never occurred in such patients anæsthetized lying down.

Dr Verrill recalled a case of a young patient undergoing dental treatment who fainted whilst lying flat and supine.

Dr Bourne also pointed out that Dr Thornton was reporting on the abuse of the incremental methohexitone method as many of his patients were under treatment for 20 to 30 minutes or longer. The method was both valuable and safe when restricted (as it should be) to brief, trivial treatments in the many patients who would default unless asleep.

Dr Thornton replied that if the induction-to-last-increment time was considered, then only 71 out of 584 patients had durations of over 30 minutes. In fact, 200 administrations had an induction-to-last-increment time of 10 minutes or less, 200 administrations 10–20 minutes, and 100 approximately 20–30 minutes.

Dr R Binning (*Brighton*) asked what suggestions the speakers had for an anæsthetic technique to deal with such new procedures as implants and full mouth reconstruction which could only be undertaken in a well-equipped dental surgery but might last as long as 2½ hours.

Dr Thornton replied that if the full co-operation of the patient was not required then general anæsthesia with endotracheal intubation was the most suitable method. However, if the painful procedures were carried out at the commencement of the dental reconstruction then diazepam (intravenously) and a full local analgesic block would be of value.

Dr Vickers emphasized that, although they were contributing to a meeting concerned with adverse effects, in a fairly detailed study of diazepam sedation transient impairment of glottic closure was the only adverse effect discovered. He felt that the ability to complete treatment in only one or two sessions represented an advantage over the intermittent methohexitone technique, whose proponents now advocated 10 minutes as the optimum duration of treatment and 20 minutes as the maximum. One other unexpected advantage had been that seriously anxious patients who successfully underwent treatment required progressively less sedation on subsequent occasions.