

<u>CONTENTS</u>	<u>Page</u>
2-11- 1 Administrations without complications	443
2-11- 2 Operating complications	449
2-11- 3 Respiratory complications	459
2-11- 4 Crying	477
2-11- 5 Operator induced complications	484
2-11- 6 Venous complications	488
2-11- 7 Delayed recovery	489
2-11- 8 Excitatory	498
2-11- 9 Allergic reactions	499
2-11-10 Vomiting and nausea	503

2-11: COMPLICATIONS

A detailed list of possible complications is presented in Section 2-4a(v & vi).

The frequency of administrations, which resulted in one or more complications, is presented in Table 211-1.

TABLE 211-1 FREQUENCY OF ADMINISTRATIONS WITH ONE OR MORE COMPLICATIONS		
DETAILS	ADMINISTRATIONS	
	NO	%
None	3744	85.5
Complication/s	635	14.5
Total	4379	100.0

The types of complications have been placed into nine groups. Details are presented in Table 211-2. The groups are ranked in decreasing order of frequency.

Statistics are compared to a sample, chosen at random, of 200 administrations without complications.

TABLE 211-2 COMPLICATION GROUPINGS			
RANK	COMPLICATION GROUP	FREQUENCY OF ADMINISTRATIONS	% OF ALL ADMINISTRATIONS
1	Operating	292	6.7
2	Respiratory	241	5.5
3	Crying	73	1.7
4	Operator Induced	72	1.6
5	Venous	50	1.1
6	Delayed Recovery	45	1.0
7	Excitatory	22	0.5
8	Allergic	10	0.2
9	Vomiting & Nausea	8	0.2
	Total	(813) 635*	(18.5) 14.5*

* More than one complication occurred in 178 administrations

2-11-1: ADMINISTRATIONS WITHOUT COMPLICATIONS

A sample of 200 administrations without complications was chosen at random. The statistics are presented in Tables 211-3 to 211-9, and Diagram 211-1.

The statistics were compared to those of each complication group.

TABLE 211-3						
SEX AND AGE DISTRIBUTION SAMPLE OF NO COMPLICATIONS						
AGE GROUP (YEARS)	MALES		FEMALES		TOTAL	
	NO	%	NO	%	NO	%
0-10	1	1.4	-	-	1	0.5
11-18	4	5.6	8	6.3	12	6.0
19-26	27	37.5	54	42.2	81	40.5
27-35	23	31.9	45	35.1	68	34.0
36-50	13	18.0	15	11.7	28	14.0
51 +	4	5.6	6	4.7	10	5.0
Total	72	36.0	128	64.0	200	100.0

TABLE 211-4			
MEAN AGE (YEARS) SAMPLE OF NO COMPLICATIONS			
	MALES	FEMALES	TOTAL
Mean Age	29.82	28.74	29.13
S.D.	9.76	9.43	9.54

TABLE 211-5 HEALTH STATUS SAMPLE OF NO COMPLICATIONS	
MEDICAL CONDITION	FREQUENCY
Myocardial Infarct* ¹	1
3 Months Pregnant	1
Asthmatic	2
Methodone	1
Total	5 (2.5%)

*¹ 2 years previously

Details: Patient No.2120, female aged 66 years
on alprenolol and haloperidol.

Treatment: 80mg methohexitone for 1 extraction.

TABLE 211-6 TYPES OF TREATMENT SAMPLE OF NO COMPLICATIONS		
TYPE OF TREATMENT	FREQUENCY	
	NO.	%
Conservation* ¹	123	61.5
Surgery	39	19.5
Endodontics	21	10.5
Other	5	2.5
Combined	12	6.0
Total	200	100.0

*¹ 110 administrations for fillings
 Mean = 2.52 (± 1.64) fillings/session

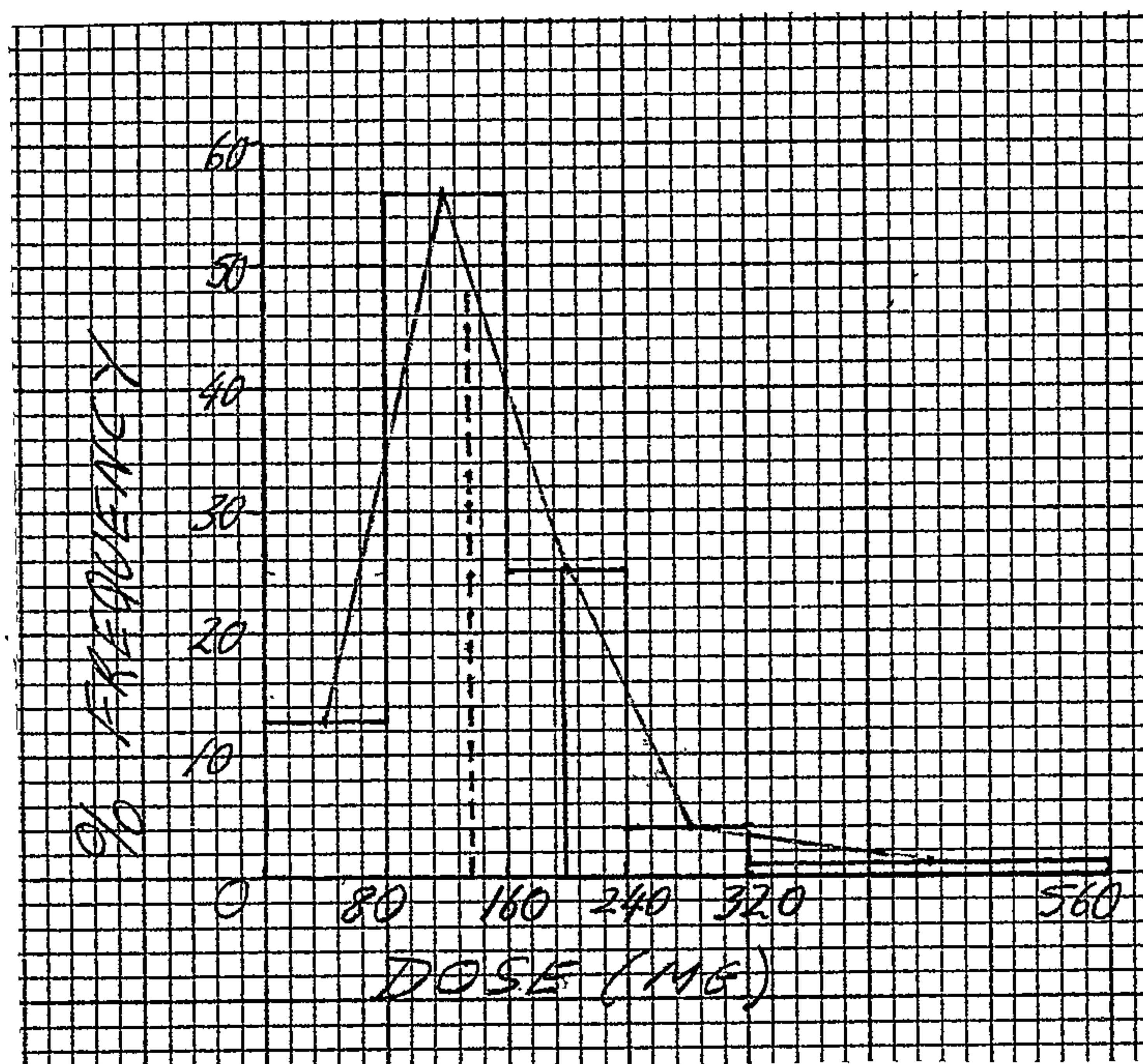
TABLE 211-7 DURATION OF TREATMENT SAMPLE OF NO COMPLICATIONS	
Mean (mins)	20.98
S.D.	14.32
Range	5-70

TABLE 211-8 SUPPLEMENTS SAMPLE OF NO COMPLICATIONS		
SUPPLEMENT	FREQUENCY	
	NO.	%
Diazepam* ²	64	32.0
L.A.	19	9.5
None	130	65.0
Total	200* ¹	100.0* ¹

*¹ In 13 administrations both diazepam
and L.A. given.

*² Mean dose = 5.59 ($\pm$ 1.71)mg.
Range = 2.5-20mg.

DIAGRAM 211-1
DISTRIBUTION OF METHOHEXITONE DOSAGE
SAMPLE OF NO COMPLICATIONS



Mean Total Dose (149.10mg):-----

Maximum Recommended Dose (200mg):-----

TABLE 211-9 MEAN DOSE OF METHOHEXITONE SAMPLE OF NO COMPLICATIONS			
DOSE (MG)	MALES	FEMALES	TOTAL
Lowest	40	60	40
Highest* ¹	400	380	400
Mean	153.61	146.56	149.10
S.D.	70.48	63.15	65.79

*¹ Above 200mg in 22% of administrations

2-11-1a: Discussion

1. The statistics in the samples do not vary significantly from those of all administrations without complications.
2. The sample size provides for good working comparisons to the groups of complications.

2-11-2: OPERATING COMPLICATIONS

These were the most frequent of all the observed complications. The statistics are compared to the sample of 200 administrations without complications and appear in Tables 211-12 to 211-19 and Diagram 211-2.

TABLE 211-10 DETAILS OF OPERATING COMPLICATIONS		
COMPLICATION	DETAILS	FREQUENCY
Slightly Restless	Operating stimulus caused reflex movement of head away from operator. Not severe enough to interfere with good working conditions	187
Required Larger Dose	Restlessness was controlled by larger increments of methohexitone	40
Very Restless	Reflex movement interfered with good working conditions	24
Restless as dose wore off	Became restless during recovery phase (i.e. placement of restoration stage - see Section 2-3-13)	18
Gagging on pack	During recovery phase pack stimulated gag reflex; sometimes its removal was necessary	18
Pack Rejected	Patient would not tolerate the presence of the pack and continually attempted to reject it with tongue thrusts - throughout entire session	11
Vocal	Painful stimulus caused patient to cry out	4
TOTAL		302*

* More than one operating complication was observed in 10 administrations

TABLE 211-11 SEX & AGE DISTRIBUTION OPERATING COMPLICATIONS						
AGE GROUP (YEARS)	MALES		FEMALES		TOTAL* ⁴	
	NO.	%	NO.	%	NO.	%
0-10.	-	-	-	-	-	-
11-18	13	8.8	17	11.7	30	10.3
19-26	73	49.7	77	53.1	150	51.4
27-35	50	34.0	44	30.3	94	32.2
36-50	11	7.5	6	4.1	17* ²	5.8
51 +	-	-	1	0.7	1* ³	0.3
Total	147	50.3* ¹	145	49.7* ¹	292	100.0

*¹ Male proportion > sample. Difference is significant
($t = 3.191$, $0.01 > p > 0.001$).

*² Less than expected. Difference is significant
($\chi^2 = 8.685$, $0.01 > p > 0.001$)

*³ Less than expected. Difference is highly significant
($\chi^2 = 11.525$, $0.001 > p$)

*⁴ Distribution significantly different to expected
($\chi^2 = 27.289$, $0.01 > p > 0.001$)

TABLE 211-12 MEAN AGE (YEARS) ADMINISTRATIONS WITH COMPLICATIONS			
	MALES	FEMALES	TOTAL
Mean	26.22	25.26	25.74* ¹
S.D.	6.94	7.07	7.01

*¹ Less than sample. Difference is highly significant ($t = 4.294$, $0.001 > p$)

TABLE 211-13 HEALTH STATUS OPERATING COMPLICATIONS	
MEDICAL CONDITION	FREQUENCY
Asthmatic	4
Heroin or methodone	3
Heavy smoker	1
6 months pregnant	1
Total	9 (3.1%)

TABLE 211-14 TREATMENT TYPES* ¹ OPERATING COMPLICATIONS		
TYPE	FREQUENCY	
	NO.	%
Conservation* ⁵	233* ²	79.8
Surgery	14* ³	4.8
Endodontics	12* ⁴	4.1
Other	5	1.7
Total	292	100.0

*¹ Distribution different to expected
Difference is highly significant
($\chi^2 = 38.812$, $0.001 > p$)

*² More than expected. Difference may
be significant ($\chi^2 = 5.493$,
 $0.02 > p > 0.01$)

*³ Less than expected. Difference is
highly significant.
($\chi^2 = 23.843$, $0.001 > p$)

*⁴ Less than expected. Difference is
significant ($\chi^2 = 7.237$, $0.01 > p > 0.001$)

*⁵ 227 administrations for fillings.
Mean/session = 2.54 (± 1.65) fillings

TABLE 211-15 DURATION OF TREATMENT OPERATING COMPLICATIONS (Minutes)	
Range	5-90
Mean	25.57* ¹
S.D.	14.55

*¹ Higher than sample mean
Difference highly significant
($t = 3.470$, $0.001 > p$)

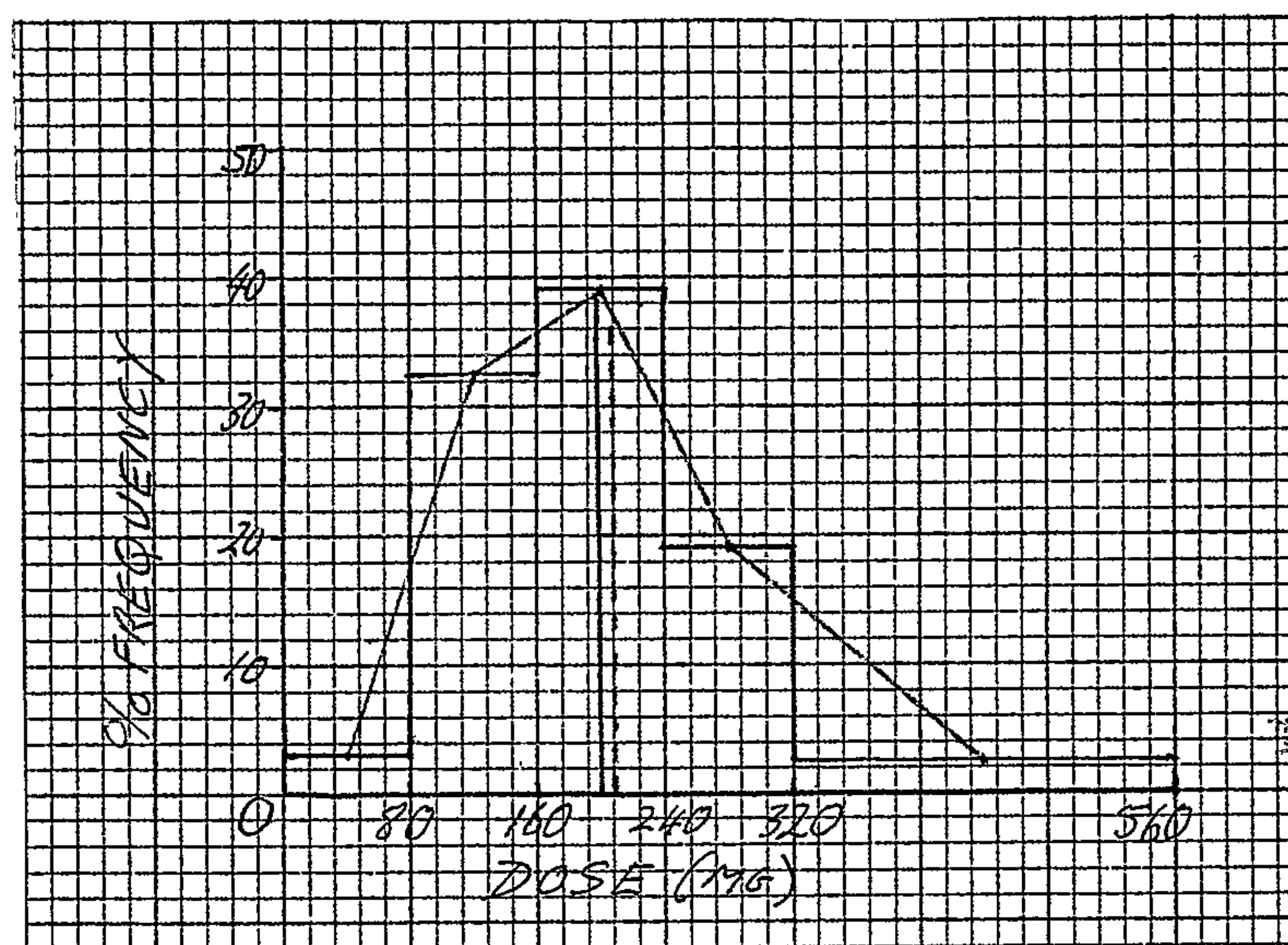
TABLE 211-16 SUPPLEMENTS OPERATING COMPLICATIONS		
DRUG	FREQUENCY	
	NO.	%
Diazepam* ³	164* ²	56.2
L.A.	45	15.4
R.A.	3	1.03
None	119	40.8
TOTAL	292* ¹	100.0* ¹

*¹ In 39 administrations more than 1 supplement given

*² More than expected. Difference highly significant
($\chi^2 = 27.868$, $0.001 > p$)

*³ Mean Dose = 6.13 (± 2.78)mg
Range = 2.5 - 25mg

DIAGRAM 211-2
 DISTRIBUTION OF METHOHEXITONE DOSAGE
 OPERATING COMPLICATIONS



Maximum recommended dose (200mg)—————

Mean total dose (207.88mg)-----

TABLE 211-17 MEAN TOTAL DOSE (MG) OPERATING COMPLICATIONS			
DOSE	MALES	FEMALES	TOTAL
Lowest	80.0	80.0	80.0
Highest* ²	500.0	500.0	500.0
Mean	206.53	209.24	207.88* ¹
S.D.	81.53	82.19	81.73

*¹ Higher than sample mean. Difference highly significant ($t = 8.810$, $0.001 > p$)

*² Above 200mg in nearly 50% of administrations

TABLE 211-18 OTHER COMPLICATIONS ASSOCIATED WITH OPERATING COMPLICATIONS	
GROUP	FREQUENCY
Respiratory	25
Operator Induced	11
Delayed Recovery	5
Crying	4
Venous	4
Vomiting & Nausea	3
Excitatory	2
Allergic	1
TOTAL	55

2-11-2a: Discussion

1. The higher proportion of males may be related to increased dosage requirements (see Section 2-10-10).
2. The smaller proportion of older patients may be related to decreased dosage requirements (see Section 2-10-10).
3. The incidence of operating complications observed in the 11-18 year group represented 17.24% of all administrations to this group. Because of the small numbers, no significance could be attached to this result. However, the value of the technique must be questioned for this age group because all procedures were short and easy.
4. Operating complications are more likely to occur in administrations for conservation than for surgery or endodontics.
5. The increased duration of treatment may have been as a result of operating complications rather than as a result of the type of treatment. (e.g. for fillings, there was no significant difference in mean number completed per session compared to the sample.)
6. The frequency of administrations supplemented with diazepam was higher than expected. It would have been reasonable to have observed a reduction in incidence of administrations supplemented by diazepam because it was used to prevent anticipated complications. The use of diazepam for this purpose is questioned.
7. Local analgesia was used after an operating complication had developed. If it had been used more frequently it is possible that mean total dosage of methohexitone may have been reduced.
8. The high mean total dosage was a result of having to control the complications by more frequent or larger increments of methohexitone.

9. Some operating complications may be a result of the associated complications (especially if hypoxia was present due to respiratory obstruction).
10. Some of the associated complications may have been as a result of the high mean total dosage of methohexitone (e.g. delayed recovery).
11. Compare with results of others, Sections 1-5-4h and 1-5-8b.

2-11-2b: Conclusion

1. Operating complications are more likely to occur in male patients under 36 years of age who are receiving methohexitone, supplemented by diazepam, for conservation work.
2. The M.I.T. should not be used on the 11-18 year age group.
3. Diazepam will not prevent operating complications in the dosage range used.
4. Operating complications increase treatment time and dosage requirements.
5. Local analgesia should be used more frequently.

2-11-3: RESPIRATORY COMPLICATIONS

In 241 administrations (5.5%), a respiratory complication was observed. The details are presented in Table 211-19.

TABLE 211-19 DETAILS OF RESPIRATORY COMPLICATIONS		
COMPLICATION	DETAILS	FREQUENCY
Slight Respiratory Obstruction	Greater jaw thrust than that normally required to maintain a free airway. Results in Section 2-11-3a	115
Severe Respiratory Obstruction	Inadequate airway despite greater jaw thrusts. Results in Section 2-11-3a	14
Hiccoughing	See Section 2-11-3b	98
Laryngeal Spasm	Partial: See Section 2-11-3c	15
Apnoea	Assisted ventilation required. See Section 2-11-3d	2
Sneezing	Non-allergic. See Section 2-11-3e	3
TOTAL		247* ¹

*¹ More than one complication in 6 administrations

2-11-3a: Respiratory obstruction

The statistics are compared to the sample of 200 administrations without complications and appear in Tables 211-20 to 211-26, and Diagram 211-3.

TABLE 211-20						
SEX & AGE DISTRIBUTION RESPIRATORY OBSTRUCTION						
AGE GROUP (YEARS)	MALES		FEMALES		TOTAL	
	NO	%	NO	%	NO	%
0-10	1	2.1	1	1.2	2	1.6
11-18	1	2.1	2	2.4	3	2.3
19-26	14	29.8	30	36.6	44	34.1
27-35	17	36.2	31	37.8	48	37.2
36-50	13	27.7	13	15.9	26	20.1
51 +	1	2.1	5	6.1	6	4.7
Total	47	36.4	82	63.6	129* ¹	100.0

*¹ 2.9% of 4,379 administrations

TABLE 211-21			
MEAN AGE (YEARS) RESPIRATORY OBSTRUCTION			
	MALES	FEMALES	TOTAL
Mean	31.15	30.07	30.65
S.D.	9.40	9.96	9.94

TABLE 211-22 HEALTH STATUS RESPIRATORY OBSTRUCTION	
MEDICAL CONDITION	FREQUENCY
Asthmatic	1
Bronchitis	1
Heavy Smoker	7
TOTAL	9 (7%)

TABLE 211-23 TREATMENT TYPES RESPIRATORY OBSTRUCTION		
TYPE	FREQUENCY	
	NO.	%
Conservation* ²	99	76.7
Surgery	10* ¹	7.8
Endodontics	7	5.4
Combinations	9	7.0
Others	4	3.1
TOTAL .	129	100.0

*¹ Less than expected. Difference is significant
($\chi^2 = 7.263$, $0.01 > p > 0.001$)

*² Mean No. of fillings per session = $2.5(\pm 1.46)$

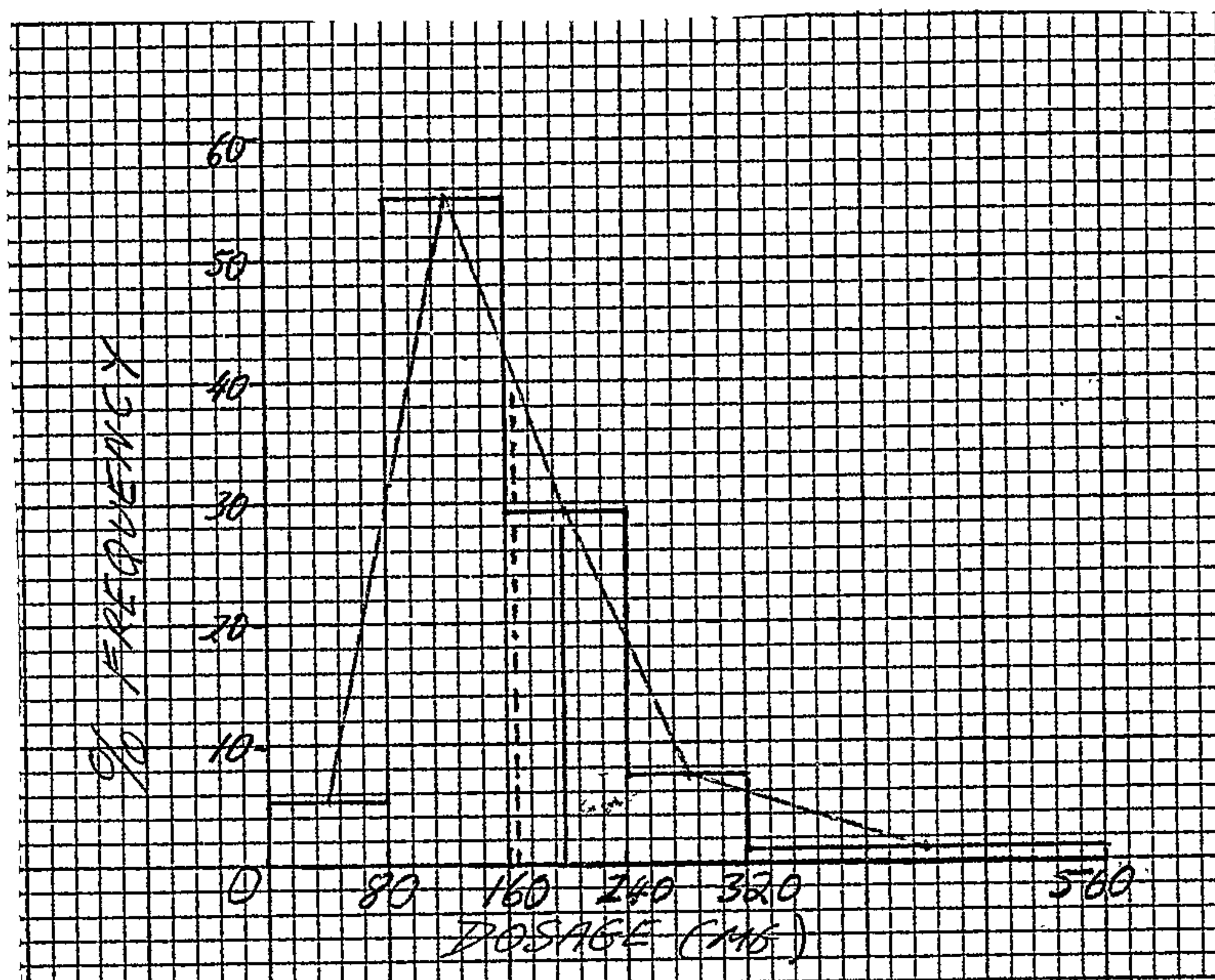
TABLE 211-24 SUPPLEMENTS RESPIRATORY OBSTRUCTION		
DRUG	FREQUENCY	
	NO.	%
Diazepam* ¹	76* ³	58.9
L.A.	13	10.1
None	50	38.8
TOTAL	129* ²	100.0* ²

*¹ Mean Dose = 5.17 ($\pm$ 1.03)mg
Range = 2.5-10mg

*² In 10 administrations, both
diazepam and L.A. were given

*³ Greater than expected.
Difference highly significant
($\chi^2 = 23.247$, $0.001 > p$)

DIAGRAM 211-3
 DISTRIBUTION OF METHOHEXITONE DOSAGE
 RESPIRATORY OBSTRUCTION



Mean Total Dosage (167.44mg)-----

Maximum Recommended Dose (200mg)—————

TABLE 211-25 MEAN TOTAL DOSE (MG) RESPIRATORY OBSTRUCTION			
DOSE	MALES	FEMALES	TOTAL
Lowest	100	80	80
Highest* ²	400	500	500
Mean	175.32	162.93	167.44* ¹
S.D.	70.68	69.29	69.78

*¹ Higher than sample mean. Difference may be significant ($t = 2.380$, $0.02 > p > 0.01$)

*² Above 200mg in 32% of administrations

TABLE 211-26 OTHER COMPLICATIONS ASSOCIATED WITH RESPIRATORY COMPLICATIONS	
GROUP	FREQUENCY
Other Respiratory	5
Operating	18
Operator Induced	3
Recovery	1
Venous	2
TOTAL	29

2-11-3a(i): Discussion

1. There was no statistical significance in the number of patients with a medical condition. However, all medical conditions were respiratory and may have contributed to the complication in those patients.
2. The lower incidence for surgery is because of the brief nature of the procedure - allowing for early removal of the bite block. In conservation cases, the presence of the bite block for longer periods allows for more chance of respiratory obstruction (see also Section 1-7-4a).
3. The use of diazepam may have been a factor in a significant number of administrations with respiratory obstruction. Therefore its value as a supplement is questioned (unlike the observation of Young 1970, Section 1-7-4a).
4. Associated with respiratory obstruction were a number of other complications which reasonably could be expected as a cause of - or from - respiratory obstruction: e.g. in 14 administrations, the patient was restless and it is reasonable to assume that the restlessness was caused by hypoxia resulting from respiratory obstruction.
5. The incidence of respiratory obstruction (2.95%) is very much lower than that reported in the literature. This must be dose related (see Table 7-11, Section 1-7-4a).

2-11-3a(ii): Conclusion

1. Respiratory obstruction is more likely to occur in patients with a respiratory condition, for treatment other than surgery, when diazepam has been given and when high doses of methohexitone have been used.

2. The value of diazepam as a supplement is questioned.
3. An experienced team can recognise respiratory obstruction.

2-11-3b: Hiccoughing

The statistics are compared to the sample of 200 administrations without complications and appear in Tables 211-27 to 211-33 and Diagram 211-4.

TABLE 211-27 SEX & AGE DISTRIBUTION HICCOUGHING						
AGE GROUP (YEARS)	MALES		FEMALES		TOTAL	
	NO	%	NO	%	NO	%
0-10	-	-	1	1.5	1	1.0
11-18	5	17.2	1	1.5	6	6.1
19-26	11	37.9	36	52.1	47	48.1
27-35	10	34.5	21	30.4	31	31.6
36-50	3	10.4	8	11.6	11	11.2
51 +	-	-	2	2.9	2	2.0
TOTAL	29	29.6	69	70.4	98* ¹	100.0

*¹ 2.24% of 4,379 administrations

TABLE 211-28 MEAN AGE (YEARS) HICCOUGHING			
	MALES	FEMALES	TOTAL
Mean	26.00* ¹	28.15	27.51
S.D.	8.13	8.84	8.65

*¹ Less than mean for sample. Difference may be significant.

($t = 2.013$, $0.05 > p > 0.02$)

TABLE 211-29 HEALTH STATUS HICCOUGHING	
MEDICAL CONDITION	FREQUENCY
Hypertension	1
Heavy Smoker & Alcoholic	1
TOTAL	2 (2%)

TABLE 211-30 TREATMENT TYPES HICCOUGHING		
TYPE	FREQUENCY	
	NO	%
Conservation* ¹	75	76.5
Surgery	11	11.2
Endodontics	4	4.1
Combinations	5	5.1
Others	3	3.1
TOTAL	98	100.0

*¹ In 70 administrations for fillings the mean number of fillings per session = 3.2 (± 1.9) fillings. This is more than the sample mean. The difference may be significant.
($t = 2.466$, $0.02 > p > 0.01$)

TABLE 211-31 SUPPLEMENTS HICCOUGHING		
DRUG	FREQUENCY	
	NO	%
Diazepam* ²	61* ³	62.3
L.A.	8	8.2
None	35	35.7
TOTAL	98* ¹	100.0* ¹

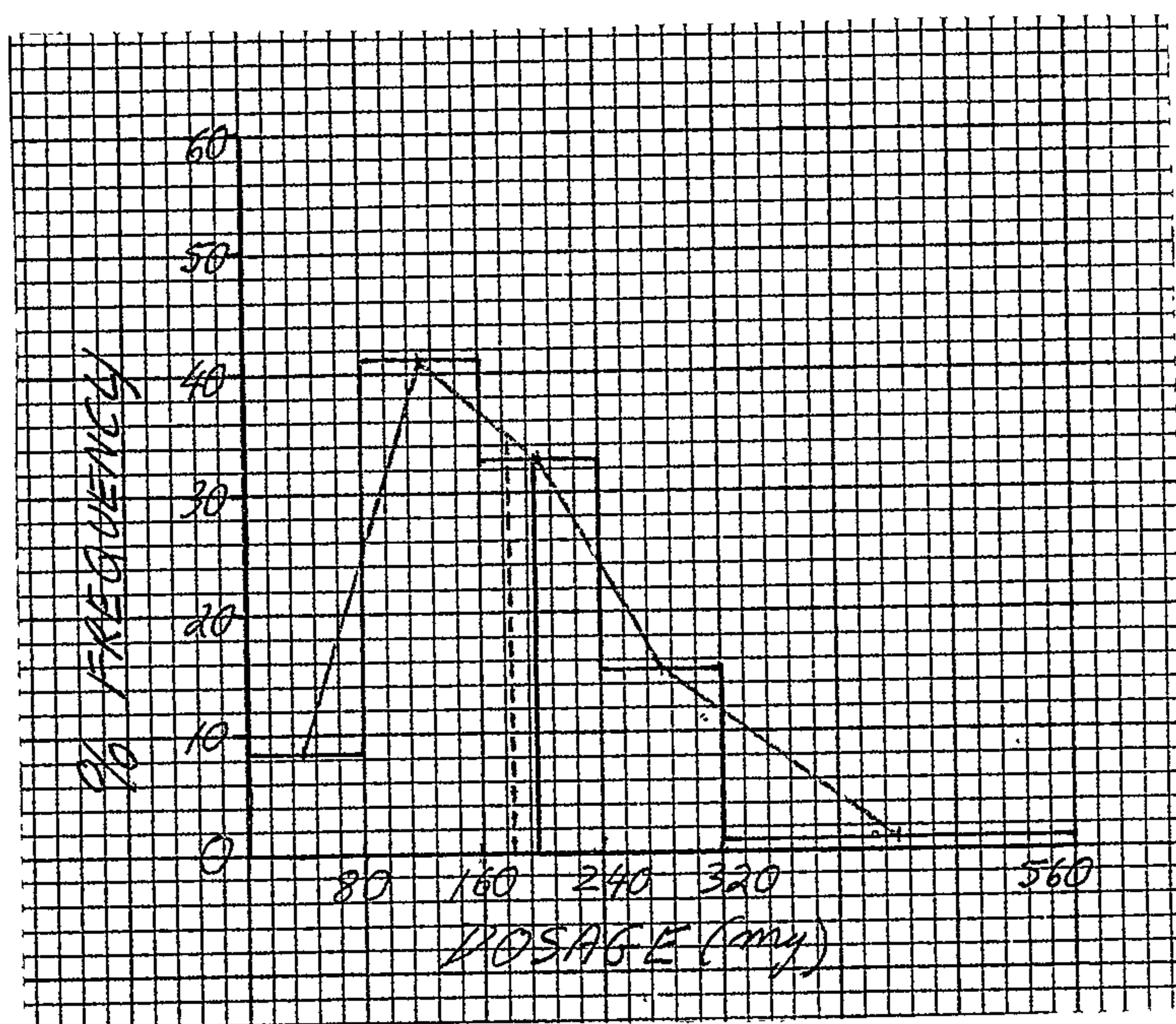
*¹, *², *³, see p.469

From Table 211-31, p.468

- *¹ In 6 administrations both L.A. and diazepam given.
- *² Mean Dose = 5.25 ($\pm$ 1.09)mg
Range = 5-10mg
- *³ More than expected. Difference highly significant.
($\chi^2 = 24.700, 0.001 > p$)

DIAGRAM 211-4

DISTRIBUTION OF METHOHEXITONE DOSAGE
HICCOUGHING



Mean Total Dose (180.61mg): - - - - -

Maximum Recommended Dose (200mg): —————

TABLE 211-32 MEAN DOSE (MG) HICCOUGHING			
DOSE	MALES	FEMALES	TOTAL
Lowest	60	60	60
Highest* ²	400	400	400
Mean	193.79	175.07	180.61* ¹
S.D.	70.33	73.20	72.51

*¹ Higher than sample mean. Difference highly significant ($t = 3.631$, $0.001 > p$)

*² Above 200mg in 40% of administrations

TABLE 211-33 OTHER COMPLICATIONS ASSOCIATED WITH HICCOUGHING	
GROUP	FREQUENCY
Operating	7
Other Respiratory	4
Operator Induced	3
Recovery	1
Venous	2
Excitatory	2
TOTAL	19* ¹

*¹ In 16 administrations (16.3%)

2-11-3b(i): Discussion

1. Supplementation with diazepam will increase the incidence of hiccoughing. This is probably due to a potentiation effect. Its value as a supplement is therefore questioned. (This is opposed to the finding of Young (1970), Section 1-2e(v)3.)
2. The incidence of hiccoughing is associated with a high mean total dosage of methohexitone. (This is in accord with the findings of others. See Section 1-2e(v)4).
3. Buxton (1971a) observed that the same patient will hiccough each time he receives treatment (Section 1-7-2e).

In 29 administrations resulting in hiccoughs, the patient received at least one other administration (total of 58 other administrations). Of the twenty five patients involved, four females hiccoughed at another administration.

In Tables 211-34 and 211-35, some comparisons are shown.

TABLE 211-34 MEAN DOSE OF METHOHEXITONE (MG)		
	WITH HICCOUGHS (29 Admins)	OTHER ADMINS WITHOUT HICCOUGHS (58 Admins)
Lowest	80	60
Highest	300	400
Mean	175.17	148.62
S.D.	66.90	63.92

TABLE 211-35 DIAZEPAM SUPPLEMENTATION			
	NUMBER OF ADMINISTRATIONS		
	WITH HICCOUGHS	WITHOUT HICCOUGHS	TOTAL
Diazepam	19	22* ¹	41
None	10	36	46
TOTAL	29	58	87

*¹ Less than expected. Difference may be significant ($\chi^2 = 5.897$, $0.02 > p > 0.01$)

Although there was no significance in the difference of mean total dosage of methohexitone (small numbers), it was higher for administrations resulting in hiccoughing.

The results for diazepam support the discussion in (1) above.

4. The incidence (2.24%) can be compared with that of others (see Table 7-7, Section 1-7-2e(iii)).

2-11-3b(ii) Conclusion

1. A patient who hiccoughs once is not necessarily likely to hiccough again.
2. Hiccoughing is associated with high total mean doses of methohexitone, especially if supplemented by diazepam.

2-11-3c: Laryngeal Spasm

The details of 15 administrations with partial laryngeal spasm are shown in Table 211-36.

TABLE 211-36
LARYNGEAL SPASM

NO	PATIENT	AGE	SEX	MEDICAL HISTORY	DRUG DOSE(MG)			LA	OTHER COMPLICATION	TREATMENT
					M	A	D			
1	55	26	F	-	120	0.6	-	✓	Slight respiratory obstruction	1 FG
2	123	25	F	-	180	0.6	5	-	Cough due wet pack	Combined
3	610	22	F	-	260	0.6	20	-	Nausea	Deep FG
4	1688	33	F	-	300	0.6	10	✓	-	Third Molar Surgery
5	2272	30	F	-	160	0.6	5	✓	Slight respiratory Obstruction	4 FGs
6	2331	46	F	Antihistamine	120	0.6	-	-	Delayed Recovery	1 FG
7	9003	49	F	-	80	0.6	-	-	-	C + B
8	2556	24	F	-	140	0.6	-	-	Hiccough, cough due to wet pack, pain in vein	1 FG
9	332	54	F	-	80	0.6	-	-	Cough due to wet pack	2 FGs
10	814	28	M	-	100	0.6	5	-	Mucous cough	1 FG

TABLE 211-36 continued

NO	PATIENT	AGE	SEX	MEDICAL HISTORY	DRUG DOSE(MG)			LA	OTHER COMPLICATION	TREATMENT
					M	A	D			
11	936	24	M	-	200	0.6	-	-	Cough due to wet pack	Other
12	1223	20	M	-	200	0.6	5	-	Cough due wet pack	5 FGs
13	1947	22	M	-	180	0.6	-	-	-	3 FGs
14	815	24	M	-	120	0.6	5	-	Vomit	1 FG
15	1768	25	M	-	180	0.6	5	-	Mucous cough	3 FGs

(1) Mean age = 30.13 (± 10.72) years

(2) Proportion of females = 60%

(3) Proportion with medical condition = 6.67%

(4) Mean dose methohexitone = 161.33 (± 63.00)mg

(5) Proportion with diazepam = 53.3%

(6) Proportion with L.A. = 20%

(7) Proportion with other complications = 80%

(8) Proportion conservation = 80%

2-11-3c(i): Discussion

The numbers are too small for statistical analysis, therefore no significance is attached to the discussion below:

1. The incidence (0.34%) is similar to other studies of the M.I.T. (See Table 7-6, Section 1-7-2d(ii)).
2. The proportion of administrations supplemented with diazepam is higher than for administrations without complications.
3. The proportion of administrations supplemented with local analgesia was high. In these cases, local analgesia was used to complete treatment following the spasm.
4. Laryngeal spasm is caused by soiling of the vocal cords (see Section 1-7-2d) and is most likely to occur in conservation work if the pack is allowed to become saturated with coolant.

Laryngeal spasm may occur if the patient's throat has not been cleared sufficiently before induction.

5. The one case of delayed recovery could have been due to hypoxia following the spasm: Although the patient was also taking anti-histamine which may also have reacted synergistically with methohexitone to produce the delay.
6. In all cases corrective treatment was limited to clearance of the airway. (Also see Foreman (1967), Section 1-7-2d(ii).)

2-11-3d(ii): Conclusion

1. Better attention to the pack and ensuring that the patient had cleared his throat prior to induction, may have prevented almost half the spasms seen.
2. Corrective treatment can be kept simple.

2-11-3d: Apnoea

In two administrations, assisted ventilation was required. The details are presented in Table 211-37.

TABLE 211-37 APNOEA									
NO	PATIENT	AGE	SEX	MEDICAL HISTORY	DRUG DOSE(MG)			OTHER COMPLICATIONS	TREATMENT
					M	A	D		
1	2710	26	F	Hepatitis	80	0.6	-	Excitatory	1 FG
2	358	26	M	-	320	0.6	5	-	3 FG

2-11-3d(i): Discussion

1. In Case No. 1, the patient received a low total dose of methohexitone. From the medical history it is reasonable to assume that the liver may have been damaged. Therefore, metabolism of methohexitone may have been slower than normal. This may also account for the excitatory complications observed.
2. In Case No. 2, the patient had a high total dose of methohexitone together with diazepam supplementation. Potentiation may have resulted in apnoea. (Also see Table 7-10, Section 1-7-3c.)

2-11-3e: Sneezing

In four administrations the patient sneezed (not thought to be part of an allergic reaction). The details are presented in Table 211-38.

TABLE 211-38 SNEEZING									
NO	PATIENT	AGE	SEX	DRUG DOSE(MG)			LA	OTHER COM- PLICATIONS	TREATMENT
				M	A	D			
1	153	21	F	180	0.6	10	✓	Slightly Restless	Other
2	2484	20	F	100	0.6	-	✓	-	2 FG
3	2578	25	F	200	0.6	5	-	-	3 FG
4	103	29	M	100	0.6	-	✓	-	C + B

2-11-3e(i): Discussion

In three of the administrations, local analgesia was also given - in the upper incisor area. Sneezing was caused by too rapid an infiltration under the cover of methohexitone.

2-11-4: CRYING

In 73 administrations, the patient wept uncontrollably during recovery. The statistics are compared to the sample of 200 administrations without complication and appear in Tables 211-39 to 211-44 and Diagram 211-5.

TABLE 211-39 AGE & SEX DISTRIBUTION CRYING						
AGE GROUP (YEARS)	MALES		FEMALES		TOTAL	
	NO	%	NO	%	NO	%
0-10	-	-	1	1.5	1	1.4
11-18	2	33.3	5	7.4	7	9.6
19-26	1	16.7	39	58.2	40	54.8
27-35	3	50.0	15	22.4	18	24.6
36-50	-	-	6	9.0	6	8.2
51 +	-	-	1	1.5	1	1.4
TOTAL	6	8.2	67	91.8* ¹	73* ²	100.0

*¹ Higher than expected. Difference highly significant
($\chi^2 = 20.231, 0.001 > p$)

*² 1.72% of 4,379 administrations

TABLE 211-40 MEAN AGE (YEARS) CRYING			
	MALES	FEMALES	TOTAL
Mean	23.50	25.28	25.14* ¹
S.D.	7.97	8.06	8.01

*¹ Less than sample mean. Difference is
highly significant ($t = 3.455, 0.001 > p$)

TABLE 211-41 TREATMENT TYPES CRYING* ⁶		
TYPE	FREQUENCY	
	NO	%
Conservation* ¹	12* ⁴	16.4
Surgery* ²	44* ⁵	60.3
Endodontics* ³	8	11.0
Combined	8	11.0
Other	1	1.3
TOTAL	73	100.0

*¹ Mean No. fillings/session = 2.2 (± 1.1) fillings

*² 26 administrations for third molar surgery;
5 administrations for retained root surgery

*³ Either vital pulpectomies or to establish drainage
of acute abscess

*⁴ One third of the expected frequency. Difference
highly significant ($\chi^2 = 21.962$, $0.001 > p$)

*⁵ Twice the expected frequency. Difference highly
significant ($\chi^2 = 29.224$, $0.001 > p$)

*⁶ Difference, compared to expected distribution, is
highly significant ($\chi^2 = 53.296$, $0.001 > p$)

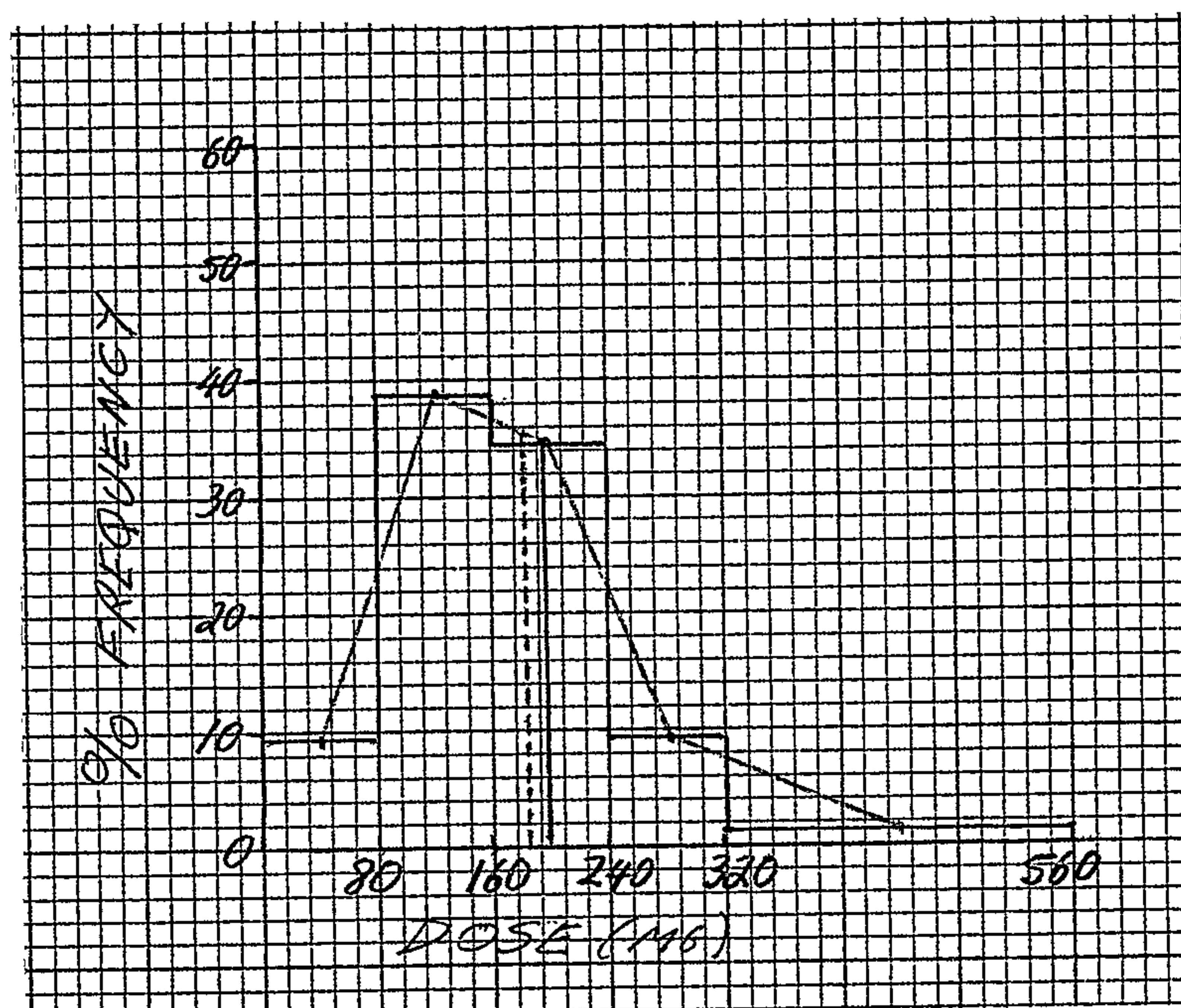
TABLE 211-42 SUPPLEMENTS CRYING		
DRUG	FREQUENCY	
	NO	%
Diazepam* ²	33	45.2
L.A.	17* ³	23.3
None	33	45.2
TOTAL	73* ¹	100.0* ¹

*¹ In 10 administrations both diazepam and L.A. were given

*² Mean Dose = 5.46 ($\pm$ 1.46)mg
Range = 5-10mg

*³ More than expected. Difference is significant ($\chi^2 = 8.870$, $0.01 > p > .0.001$)

DIAGRAM 211-5
DISTRIBUTION OF METHOHEXITONE DOSAGE
CRYING



Mean Total Dose (188.77mg)-----

Maximum Recommended Dose (200mg)-----

TABLE 211-43 MEAN TOTAL DOSE (MG) CRYING	
DOSE	TOTAL
Lowest	80
Highest* ²	560
Mean	188.77* ¹
S.D.	98.15

*¹ More than sample mean.
Difference significant.
($t = 3.201$, $0.01 > p > 0.001$)

*² More than 200mg in 45% of
administrations.

TABLE 211-44 OTHER COMPLICATIONS ASSOCIATED WITH CRYING	
GROUP	FREQUENCY
Operating	5
Respiratory	3
Excitatory	1
Venous	3
Recovery	1
TOTAL	13* ¹

*¹ In 11 administrations (15.1%)

2-11-4a: Discussion

1. In 29 administrations which resulted in crying, the patient received one or more other administration which did not result in crying.

However, two patients received methohexitone twice and cried each time. Another two patients cried at two administrations each but did not cry subsequently (see Bourne (1967c) and Foreman (1967) in Section 1-12-13b).

2. Methohexitone produces a lowering of the normal emotional inhibitions (see Section 1-12-13b). It is not unreasonable that most patients who cried were younger females and the results are in keeping with those of others (see Section 1-12-13a).
3. Crying was associated with painful surgical or endodontic treatments. I assume that pain control was inadequate, even in the administrations supplemented by local analgesia. Perhaps in these cases the use of pentazocine may have helped to reduce the complication (see Section 1-11-6g(i)).
4. The high mean dose of methohexitone was a result of the painful procedures involved.
5. Because of the nature of treatment, local analgesia was used more frequently.

2-11-4b: Conclusion

Crying postoperatively is a result of inadequate pain control. It was mostly observed in young female patients.

2-11-5: OPERATOR INDUCED COMPLICATIONS

The complications occurred in 72 administrations and details are shown in Table 211-45.

The statistics are compared to the sample of 200 administrations without complications and appear in Tables 211-46 to 211-49.

TABLE 211-45 DETAILS OF OPERATOR INDUCED COMPLICATIONS		
COMPLICATION	DETAILS	FREQUENCY
Coughing due to wet pack	Inadequate suction which allowed sponge mouth pack to become saturated with coolant	23
Mucous cough	Patient was not requested to swallow prior to induction - mucous secretions present stimulated cough reflex	49
TOTAL		72

TABLE 211-46						
SEX & AGE DISTRIBUTION OPERATOR INDUCED COMPLICATIONS						
AGE GROUP (YEARS)	MALES		FEMALES		TOTAL	
	NO	%	NO	%	NO	%
0-10	-	-	-	-	-	-
11-18	-	-	2	4.2	2	2.8
19-26	12	50.0	14	29.2	26	36.1
27-35	6	25.0	23	47.9	29	40.3
36-50	4	16.7	6	12.5	10	13.9
51 +	2	8.3	3	6.3	5	6.9
TOTAL	24	33.3	48	66.7	72	100.0

TABLE 211-47			
MEAN AGE (YEARS) OPERATOR INDUCED COMPLICATIONS			
	MALES	FEMALES	TOTAL
Mean	31.29	31.24	31.26
S.D.	11.98	10.53	10.95

TABLE 211-48 TYPES OF TREATMENT* ¹ OPERATOR INDUCED COMPLICATIONS		
TYPE	FREQUENCY	
	NO	%
Conservation	57	79.2
Surgery	6* ²	8.3
Endodontics	2* ²	2.8
Combined	6	8.3
Other	1	1.4
TOTAL	72	100.0

*¹ Different to expected distribution.

Difference may be significant.

($\chi^2 = 9.494$, $0.05 > p > 0.02$)

*² Less than expected. Difference is significant ($\chi^2 = 6.591$, $0.02 > p > 0.01$)

TABLE 211-49 SUPPLEMENTS OPERATOR INDUCED. COMPLICATIONS		
DRUG	FREQUENCY	
	NO	%
Diazepam	39* ¹	54.2
L.A.	1	1.4
None	32	44.4
TOTAL	72	100.0

*¹ More than expected. Difference may be significant. ($\chi^2 = 8.151$, $0.05 > p > 0.02$)

2-11-5a: Discussion

1. In each case, once the cause of the complication was removed and the patient allowed to swallow, the coughing stopped and treatment could proceed.
2. These complications result from inadequate suction or pack placement. Therefore it is to be expected that no significant changes in sex proportions, mean ages and age distribution were observed.
3. Significant reductions in the frequency of these complications were observed when treatment did not necessitate the use of the high speed drill with water coolant (e.g. surgery and endodontics).

4. Diazepam may be implicated. Because of synergistic action with methohexitone, the reflexes may have been reduced enough to allow material to collect on the vocal cords and thus initiate a coughing attack.

2-11-5b: Conclusion

1. Great care is required at all times to ensure the pack is kept dry and in place.
2. Patients must clear their throats by coughing and swallowing before induction.
3. Diazepam may be a causative factor.

2-11-6: VENOUS COMPLICATIONS

The details are presented in Table 211-50.

TABLE 211-50 VENOUS COMPLICATIONS		
COMPLICATION	DETAILS	FREQUENCY
Slight pain vein	On injection of methohexitone the patient commented on pain along the vein but was not distressed	41
Severe pain vein	The pain evoked a bitter complaint from the patient	4
Thrombo-phlebitis	It was impossible to examine each patient postoperatively. These patients however, returned with a specific complaint	5
TOTAL		50

2-11-6a: Discussion

1. There were no significant differences in any of the statistics compared to administrations without complication. This is expected from the results of Hewitt et al (1966) (Section 1-7-13c(i)).
2. These results should be compared to those of the patient survey (see Section 2-13-3a).

2-11-7: DELAYED RECOVERY

The details of 45 administrations with a delayed recovery are presented in Table 211-51. The statistics were either compared with expected proportions (calculated from the whole study) or from a random sample of 45 administrations without delayed recovery, and appear in Tables 211-52 to 211-61.

TABLE 211-51 DELAYED RECOVERY		
COMPLICATION	DETAILS	FREQUENCY
Delayed	5 minutes after completion of treatment, patient unable to walk, even with assistance, to the recovery room	32
Disorientated	5 minutes after completion of treatment, patient was disorientated, hallucinating; etc	10
Tired that day	Patient felt very tired for the remainder of the day	4
TOTAL		46* ¹

*¹ Only 45 administrations: in one administration a delayed recovery was recorded and the patient felt very tired for the rest of that day. (1% of 4379 administrations.)

TABLE 211-52 AGE & SEX DISTRIBUTION DELAYED RECOVERY						
AGE GROUP (YEARS)	MALES		FEMALES		TOTAL	
	NO	%	NO	%	NO	%
0-10	3	21.4	-	-	3* ¹	6.7
11-18	1	7.1	2	6.5	3	6.7
19-26	3	21.4	17	54.8	20	14.4
27-36	4	28.6	8	25.8	12	26.6
37-50	2	14.4	2	6.5	4	8.9
51+	1	7.1	2	6.4	3	6.7
TOTAL	14	31.1	31	68.9	45	100.0

*¹ Expected frequency = 0.28 calculated from overall proportions. Difference is highly significant.
 $(\chi^2 = 26.700, 0.001 > p)$

TABLE 211-53 DELAYED RECOVERY MEAN AGE (YEARS)			
	MALES	FEMALES	TOTAL
Mean	25.29	28.23	27.31
S.D.	15.59	12.14	13.20

TABLE 2111-54

DELAYED RECOVERY
HEALTH STATUS*²

NO	PATIENT	SEX	AGE	HEALTH STATUS	DRUG DOSE (mg)			TREATMENT TYPE	TREATMENT TIME (Mins)	COMPLICATION	COMMENT
					M	A	D				
1	597	M	27	Methodone	100* ³	0.6	-	1 FG	5	Delayed	Okay for other sessions
2	685	F	25	Very nervous?	140	0.6	-	1 FG	10	Disorientated	See Appendix No. 1
	685	F	25	"	80	0.6	5	1 XO	5	"	
	685	F	25	"	200	0.6	5	1 FG	10	"	
3	2331	F	25	Premed with 40mg diaze- pam orally	200	0.6	-	1 FG	10	Delayed	
				* ¹	120	0.6	-	1 FG	10	Spasm, delayed	
4	2453	F	35	Very nervous premed with 2mg oral diazepam	80	0.6	5	2 XO	5	Delayed	

*¹ Taking *Migral* (2mg ergotamine tartrate, 50mg cyclizine HCl & 100mg caffeine)

Avil Retard (pheniramine maleate)

*² 7 administrations (15.6%) higher than expected (1.26%, calculated from whole study)

Difference is highly significant ($\chi^2 = 26.902$, $0.001 > p$)

*³ Mean Total Dose = 131.43 (± 51.46)mg

TABLE 211-55 TREATMENT TYPES DELAYED RECOVERY		
TYPE	FREQUENCY	
	NO	%
Conservation* ¹	27	60.0
Surgery	9	20.0
Endodontics	8	17.8
Combined	1	2.2
Other	-	-
TOTAL	45	100.0

*¹ Mean number of fillings per session
= 2.3 ($\pm$ 1.8) fillings

TABLE 211-56 DURATION OF TREATMENT (MINS) DELAYED RECOVERY	
Mean* ¹	17.44
S.D.	13.34
Range	5-60

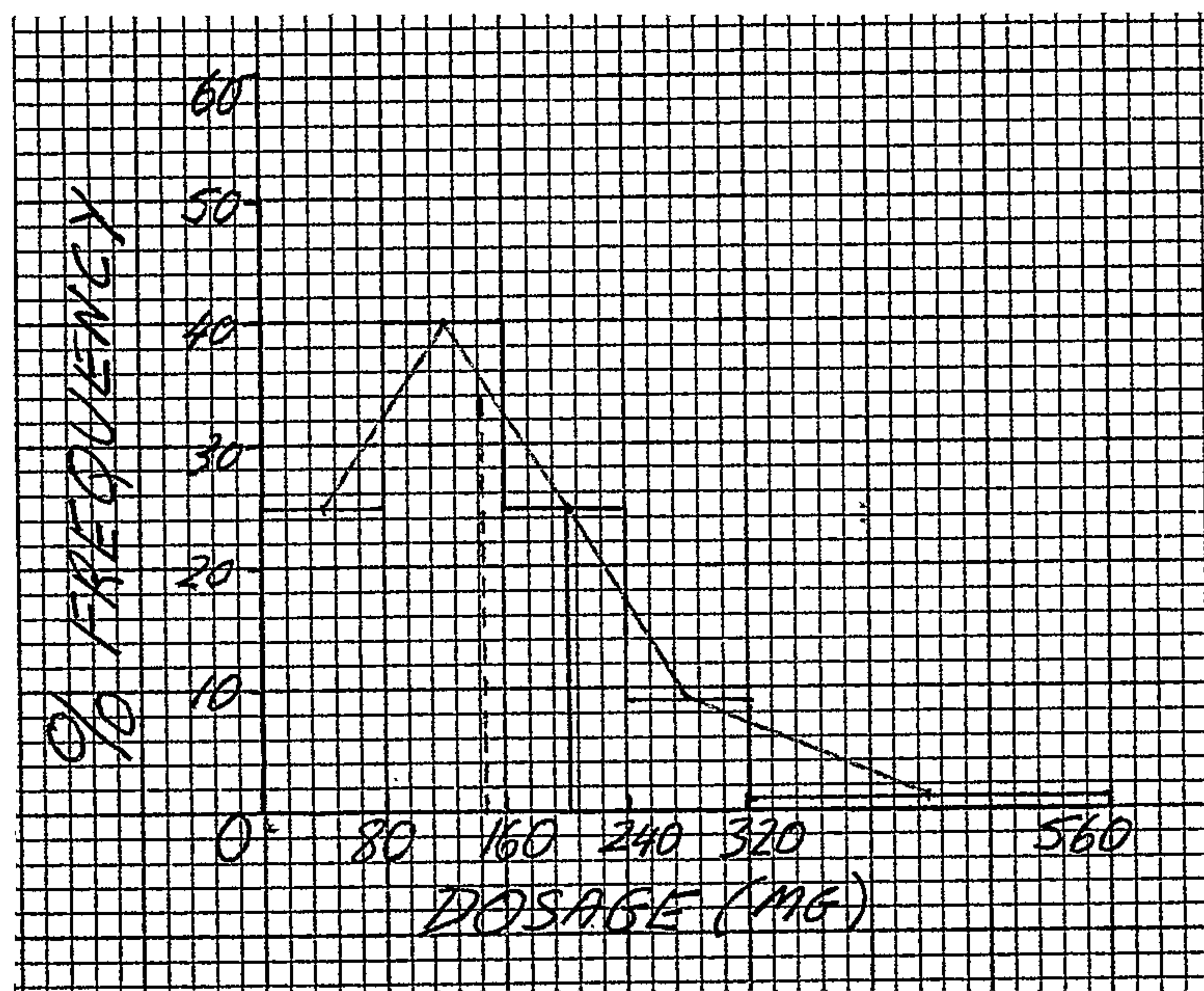
*¹ Less than mean for 45 administrations
without a delayed recovery (21.02 mins
 $\pm$ 15.40) (Not significant)

TABLE 211-57		
SUPPLEMENTS DELAYED RECOVERY		
DRUG	FREQUENCY	
	NO	%
Diazepam* ²	19	42.2
L.A.	3	6.7
None	24	53.3
TOTAL	45* ¹	100.0* ¹

*¹ In one administration both diazepam and L.A. given

*² Mean dose = 5.26 ($\pm$ 1.42)mg
Range = 2.5-10mg

DIAGRAM 211-6
DISTRIBUTION OF METHOHEXITONE DOSAGE
DELAYED RECOVERY



Mean Total Dosage (148.44mg)-----

Maximum Recommended Dosage (200mg)-----

TABLE 211-58 MEAN DOSE OF METHOHEXITONE (MG) DELAYED RECOVERY			
DOSE	MALES	FEMALES	TOTAL
Lowest	60	60	60
Highest* ¹	340	300	340
Mean	144.29	150.32	148.44
S.D.	85.28	65.29	71.16

*¹ Above 200mg in 24% of administrations

TABLE 211-59 0-10 YEAR AGE GROUP DOSAGE DELAYED RECOVERY								
NO	PATIENT	AGE	SEX	DRUGS(MG) M A * ²		TREATMENT TYPE TIME		APPROX WEIGHT* ¹ (KG)
1	1980	4	M	60	0.6	1 FG	5	17* ³
2	2160	8	M	80	0.6	1 XO	5	25* ⁴
3	2446	4	M	100	-	1 XO	5	17* ³

*¹ Kay (1972).

*² Mean total dose = 80 ($\pm$ 20.0)mg. Close to mean of whole study (78mg - see Table 210-4).

*³ If dose had been calculated at 2mg/Kg then 34mg should have sufficed.

*⁴ Similarly, 50mg should have sufficed.

TABLE 211-60: OTHER COMPLICATIONS ASSOCIATED WITH DELAYED RECOVERY

NO *1	PATIENT	AGE	SEX	MEDICAL HISTORY	DRUG DOSE			LA	OTHER COMPLICATIONS	TREATMENT TYPE TIME Mins		TYPE OF DELAYED RECOVERY
					M	A	D					
1	260	27	F	-	240	0.6	-	-	Slightly Restless	3 FG	10	Delay
2	384	23	F	-	100	0.6	-	-	Very Restless	Endo	10	Delay
3	971	26	F	-	300	0.6	5.0	-	Slightly Restless	8 FG	60	Delay
4	1381	14	M	-	300	0.6	5.0	-	Vomit	2 FG	30	Tired That Day
5	1758	20	F	-	180	0.6	5.0	-	Slightly Restless	3 FG	30	Delay
6	2215	30	F	-	260	0.6	-	✓	Gagged on Pack	2 FG	30	Disori- entated
7	2331	46	F	Antihis- tamine	120	0.6	-	-	Spasm	1 FG	10	Delay
8	2335	38	M	-	220	0.6	7.5	-	Cough due to wet pack. Restless as dose wore off	4 FG	40	Delay

*1 17.8% of all administrations with delayed recovery

TABLE 211-61 STATISTICS ON ADMINISTRATIONS WITH OTHER COMPLICATIONS & DELAYED RECOVERY	
STATISTIC	DETAILS
Mean Dose Methohexitone	215.0 ($\pm$ 76.16)mg
Mean Duration	27.5 ($\pm$ 17.5)mins
Mean No. Fillings in 7. Administrations for Conservation	3.3 ($\pm$ 2.29)fgs
% Administrations with diazepam supplement.	50%

2-11-7a: Discussion

1. In all cases the patients were able to leave the premises within one hour of completion of treatment.
2. The cause of delayed recovery in the 0-10 year age group was most likely the dosage of methohexitone used. (Not significant.)
3. Patients with a medical history had a shorter mean treatment time and a lower mean dose of methohexitone. In four of these administrations the delayed recovery is most likely related to prior oral sedation used.
4. The other complications associated with delayed recovery may have produced hypoxia and hence the delayed recovery. However, these complications were also associated with a high mean dose of methohexitone and it is more likely that this was the cause.
5. In patient 685, the disorientation may have been as a result of hyperthyroidism. This case is discussed in the Appendix.

2-11-7b: Conclusions

1. A delayed recovery was most likely due to:
 - (a) Overdosage in the 0-10 year age group.
 - (b) Patients taking oral tranquilizers and sedatives.
 - (c) Large doses of methohexitone associated with other complications.
2. Delayed recovery was not a result of:
 - (a) Types of treatment.
 - (b) Length of Treatment.
 - (c) Diazepam supplementation.

2-11-8: EXCITATORY COMPLICATIONS

In 22 administrations (0.5%) jactitations were observed. These were of a non-convulsive nature.

2-11-8a: Discussion

1. There were no significant differences in:
 - (a) Sex proportion.
 - (b) Age group distribution.
 - (c) Treatment types.
 - (d) Supplemented administrations.
2. Comparison of incidence (see Table 7-5, Section 1-7-1k) is difficult because different definitions and classifications of severity.

3. No ill-effects occurred and the complication was not clinically significant.

2-11-9: ALLERGIC REACTIONS

In ten administrations, an allergic reaction was observed. The details are presented in Table 211-62.

TABLE 211-62

ALLERGIC REACTIONS

NO	PATIENT	AGE	SEX	MEDICAL HISTORY	DRUGS (MG)			LA	REACTION	TREATMENT	COMMENTS
					M	A	D				
1	635	22	M	-	240	0.6	-	✓	Urticaria for 30 minutes	-	-
2	1710	28	F	-	120	0.6	-	-	Rash on hands & stomach	-	No reaction at subsequent administration
3	112	16	F	-	220	0.6	-	-	Slight rash on face 30 minutes later	-	No reaction at previous or subsequent adminis.
4	2386	20	M	-	180	0.6	-	-	Rash on legs later that day	-	-
5	2043	26	F	Asthma	180	0.6	-	-	Asthmatic attack during recovery	Orciprenaline inhaler	-
6	54	23	F	-	160	0.6	5	-	Asthmatic attack during recovery	-	No reaction at previous or subsequent adminis. (With diazepam too)

TABLE 211-62 continued

NO	PATIENT	AGE	SEX	MEDICAL HISTORY	DRUGS (MG)		LA	REACTION	TREATMENT	COMMENTS
7	1117	21	F	-	140	0.6 5	-	Slight rash	-	No reaction at subsequent administration. No diazepam
8	1116	25	F	-	100	0.6 5	-	Slight rash	-	No reaction at previous or subsequent admin. No diazepam
9	2250	20	F	-	180	0.6 5	-	Pruritis	-	Drugs given at 7 a.m. Symptoms at noon
10					200	0.6 5	-	Pruritis	* ¹	Drugs given at 7 a.m. Symptoms at noon

*¹ R_x dextro-chlorpheniramine maleate 2mg q.i.d

2-11-9a: Discussion

1. Diazepam, or its vehicle, is implicated in reactions 6-8 because no reaction was observed in previous and subsequent administrations when it was not used.
2. Most reactions were minor and required no treatment. The asthmatic attack (No.5) resolved immediately the patient used her inhaler.
3. Reactions 9 & 10 represent a true drug sensitivity because the subsequent administration (No.10) again produced the same symptoms and the reaction occurred more quickly. The symptoms resolved later the same day.

The symptoms could have been a reaction to any of the drugs used. (N.B. A second administration was given because the symptoms observed following the first administration were thought to be unrelated to the treatment.)

4. No follow-up skin patch tests were performed. However, it is reasonable to estimate the incidence of allergic reaction to methohexitone to be less than 0.002% (i.e. < 2:1000). (Compare to results in Section 1-8-2e.)

2-9-11b: Conclusions

1. Patients with a history of asthma should bring their inhalers with them.
2. The incidence and severity of allergic reactions is low.
3. Once an allergic reaction is observed, measures should be taken to correctly identify the antigen.

2-11-10: VOMITING AND NAUSEA

In eight administrations (0.2%), vomiting or nausea was observed. The details are presented in Table 211-63.

TABLE 211-63
VOMITING & NAUSEA

NO	PATIENT	AGE	SEX	MEDICAL HISTORY	DRUGS (MG)			LA	REACTION	COMMENTS
					M	A	D			
1	278	44	M	-	120	0.6	10	✓	Restless vomited	Airway cleared Treatment completed under LA
2	815	24	M	Asthmatic. heavy smoker	120	0.6	5	✓	Vomit spasm	"
3	1624	35	M	-	160	0.6	5	-	Gagger vomit	Treatment completed O.K. at subsequent administration. (still gagged)
4	236	25	M	-	160	0.6	-	-	Vomited during recovery	-
5	1932	29	F	-	200	0.6	5	-	"	*1
6	1224	35	F	-	160	0.6	-	-	Vomit induced by sucker	Treatment completed
7	1987	29	M	Heavy smoker	260	0.6	5	-	Hiccough slight- ly restless nausea on recovery	

(continued)

TABLE 211-63 continued

NO	PATIENT	AGE	SEX	MEDICAL HISTORY	DRUGD (MG)			LA	REACTION	COMMENTS
					M	A	D			
8	610	22	F	Psychi- atric treatment in past	260	0.6	20	-	Spasm nausea on recovery	

*¹ Prochlorperazine 12.5mg I.M

2-11-10a: Discussion

1. Where regurgitation occurred during treatment, the airway was cleared and treatment did not continue until the patient was able to swallow on command.
2. In cases 1 & 2, it was necessary to administer local analgesia to enable completion of treatment.
3. Because of fasting rules, regurgitation was limited to gastric secretions. No sequelae were recorded.
4. In the two administrations resulting in nausea during recovery (Nos 7 & 8), there were other complications which may have contributed towards a hypoxic episode - which in turn could explain the nausea.
5. The incidence is in the range observed by others for the M.I.T. (see Table 7-15, Section 1-7-14b).

2-11-10b: Conclusion

1. Since vomiting or nausea is a complication (0.2%) of the M.I.T., the rules of fasting must be adhered to.

2-12

HURRIED, INCOMPLETE OR
ABANDONED PROCEDURES

CONTENTS

Page

2-12-1	Discussion
2-12-2	Conclusions

509

510

2-12: HURRIED, INCOMPLETE OR ABANDONED PROCEDURES

Fifty two patients, some of whom had more than one administration, could not be treated satisfactorily under the M.I.T. as used in the study.

The types of complications causing unsatisfactory working conditions are presented in Table 212-1.

The management of these patients is outlined in Tables 212-2 to 212-4.

TABLE 212-1 COMPLICATIONS RESULTING IN HURRIED, INCOMPLETE OR ABANDONED PROCEDURES		
COMPLICATION	NUMBER OF PATIENTS	% OF ALL PATIENTS
Restlessness and/or respiratory obstruction	36	1.3
Coughing and gagging	11	0.4
Vomiting and gagging	5	0.2
TOTAL	52	1.9

TABLE 212-2 RESTLESSNESS AND RESPIRATORY OBSTRUCTION	
MANAGEMENT	NO. OF PATIENTS
Treatment completed subsequently by intubation G.A.	21
Treatment completed with large doses of methohexitone	4
Various supplemental techniques all fail to provide good conditions	1
Treatment satisfactorily completed after administration of L.A.	9
Treatment subsequently completed with diazepam and L.A. only	1
TOTAL	36

TABLE 212-3 COUGHING AND GAGGING	
MANAGEMENT	NO. OF PATIENTS
Treatment completed subsequently by intubation G.A.	7
Treatment completed after administration of L.A.	2
Subsequent administrations with 5mg diazepam supplementation provided good working conditions	2
TOTAL	11

TABLE 212-4 VOMITING AND GAGGING	
MANAGEMENT	NO. OF PATIENTS
Treatment completed subsequently by intubation G.A.	1
Subsequent M.I.T. administration all right	1
Treatment completed after administration of L.A.	2
Treatment completed subsequently with supplementation of diazepam	1
TOTAL	5

2-12-1: DISCUSSION

1. 1.9% of all patients treated in the study could not be treated satisfactorily by the M.I.T. as used in this study.

The real incidence is probably higher because many patients (particularly in the 0-10 year and 11-18 year age groups) were excluded because of anticipated poor working conditions.

2. Where the M.I.T. has failed to produce good working conditions, successful completion of treatment can be attained by alternative techniques.

Local analgesia was particularly helpful in retrieving some hopeless cases.

3. The type of treatment also played a part in some of these cases. Some patients who were difficult to treat at one session were treated successfully at a subsequent session with the M.I.T. when the work was not painful or less complex.
4. High dosages of methohexitone were not a factor because once the M.I.T. proved unsuccessful, the procedure was abandoned.

2-12-2: CONCLUSIONS

1. The M.I.T. is not suitable for long or painful procedures.
2. Some patients will be unsuitable for the M.I.T. With experience it is possible to recognise these patients.
3. Local analgesia may be helpful in such cases. Many apprehensive patients can be successfully treated with local analgesia which has been given after induction with methohexitone. No further methohexitone is necessary.
4. A section of the patient population is best treated by intubation general anaesthesia.

CONTENTSPage

2-13-1	Number of questionnaires posted	513
2-13-2	Number of questionnaires returned	513
2-13-3	Analysis of answers to questionnaire	515
2-13-4	Conclusions	530

2-13: PATIENT SURVEY

There have been very few surveys designed to find out patient attitudes to dental treatment under methohexitone (see Appendix 2).

I designed a questionnaire (Table 213-2) which, with an explanatory letter (Table 213-1), was posted to a group of patients included in the study.

TABLE 213-1 COPY OF COVERING LETTER
Dear . . . I want to make dentistry as comfortable and pleasant as possible. Will you help me by completing the enclosed questionnaire and returning it in the enclosed stamped, addressed envelope? Your reply is completely confidential and will be used only for a university controlled statistical analysis. Your promptness in replying will make all the difference in producing a meaningful result. Thank you.

TABLE 213-2
COPY OF QUESTIONNAIRE

Code (Male or Female)

Try to remember the last time you came for dental treatment with an injection in the arm and, if you can, answer the following questions

SECTION A (Please circle your answer)

- | | | |
|---|-----|----|
| 1. Was the injection in your arm painful at the time? | Yes | No |
| 2. Was your arm bruised or sore afterwards? | Yes | No |
| 3. Afterwards, did you drive a car? | Yes | No |
| 4. Afterwards, did you go straight to work, school or shopping? | Yes | No |
| 5. Afterwards, did you go home and rest? | Yes | No |
| 6. Afterwards, did you feel tired? | Yes | No |

SECTION B (Please circle your answer)

1. If you had this type of treatment, how long had it been since you had sought dental treatment?

Less than 1 year 1-2 years More than 2 years

2. Why did you seek this type of treatment?

Convenience Fear Don't know

3. Regarding your future dental treatment, has this type of treatment made you:

More anxious Just as anxious Less anxious

SECTION C

1. How many times have you had this type of treatment
 2. Do you know what drugs you received? Yes No
 3. If your answer is yes, please specify

SECTION D

Would you now be happy to stay awake for future treatment? Yes No

2-13-1: NUMBER OF QUESTIONNAIRES POSTED

All patients treated over a three month period were sent the questionnaire by mail. A return stamped addressed envelope was enclosed. The details are presented in Table 213-3.

TABLE 213-3 NO. OF QUESTIONNAIRES SENT		
SEX	NO.	% OF TOTAL
Males	110	37.4* ¹
Females	184	62.6* ²
TOTAL	294	100.0

*¹ 95% confidence limits = (31.87 - 42.93)%
Proportion for whole study (40%) lies within limits.

*² 95% confidence limits = (57.07 - 68.13)%
Proportion for whole study (60%) lies within these limits.

2-13-2: NUMBER OF QUESTIONNAIRES RETURNED

The number returned are shown in Table 213-4 and the number of those suitable for analysis are shown in Tables 213-5 and 213-6.

TABLE 213-4 NUMBER OF QUESTIONNAIRES RETURNED		
DETAILS	NO.	% OF TOTAL RETURNED
Suitable for use* ¹	140	94.5
Informal	1	0.8
Returned unknown at address	7	4.7
TOTAL	148	100.0

*¹ Of these, 3 were incomplete because a section was unanswered

TABLE 213-5 SUITABLE RETURNS		
SEX	NO.	% OF TOTAL RETURNED SUITABLE
Males	48	34.3
Females	92	65.7
TOTAL	140	100.0

TABLE 213-6 RETURNS AS % OF POSTED	
SEX	%
Males	43.6
Females	50.0
TOTAL	47.6

2-13-2a: Discussion

1. The number of returns was disappointing but was higher than is usual for postal surveys (see Appendix 2).
2. The questionnaire was not difficult to answer, as is shown by the high percentage of correctly completed returns.

2-13-3: ANALYSIS OF ANSWERS TO QUESTIONNAIRE2-13-3a: Question 1 in Section A

Was the injection in your arm painful at the time?

TABLE 213-7 ANSWERS* ¹			
SEX	YES	NO	TOTAL
Males	1 (0.25)	47 (47.75)	48
Females	9 (1.26)* ²	83 (90.74)	92
TOTAL	10 (1.50)* ³	130 (138.5)	140

*¹ Expected values appear in parenthesis and were calculated from proportions who complained at the time - 0.514% for men, 1.370% for women and 1.028 for total - see Section 2-11-6.

*² More than expected. Difference is highly significant ($\chi^2 = 48.206$, $0.001 > p$).

*³ More than expected. Difference is highly significant ($\chi^2 = 48.688$, $0.001 > p$).

2-13-3a(i): Discussion

1. It has been claimed that patients who complain at the time usually do not remember the pain afterwards (see Section 1-7-3d(ii)).
2. The results show that either:
 - (a) Far more patients have a memory of a painful injection than would be expected, or
 - (b) My original record was incomplete because patients who may have felt pain did not complain and the injection was recorded as painless.
3. The figures in Table 213-7 tend to support the latter argument because it was only females who showed a significant difference. Perhaps they were too afraid to complain at the time. Later they remembered the pain and under the anonymity of the survey were prepared to complain about it.

2-13-3b: Question 2 in Section A

Was your arm bruised or sore afterwards?

TABLE 213-8 ANSWERS.			
SEX	YES	NO	TOTAL
Males	1* ¹	47	48
Females	15* ¹	77	92
TOTAL	16	124	140

*¹ More females than expected and less males.
Difference may be significant
($\chi^2 = 6.335$, $0.02 > p > 0.01$).

2-13-3b(i): Discussion

1. Sixteen patients (11.43% of those surveyed) complained of a bruised or sore arm. From this proportion I calculated that an expected number of 501 administrations could have been associated with local vascular effects in the whole study.
2. In fact, only 5 cases of thrombophlebitis were recorded (see Section 2-11-6). It would appear that only the extreme cases were recorded either because patients did not return for postoperative checks or, if they did, no discomfort was complained of or seen.
3. As in 2-13-3a above, this result shows that patients will put up with minor discomfort without complaining.

2-13-3c: Question 3 in Section A

Afterwards, did you drive a car?

TABLE 213-9			
ANSWERS			
SEX	YES	NO	TOTAL
Males	26	22	48
Females	42	50	92
TOTAL	68	72	140

2-13-3c(i): Discussion

1. All patients were specifically instructed not to drive for 24 hours following treatment (see Section 2-3-2). The question was designed to discover how many patients disregard the warning.
2. 68 patients (48.6%) admitted to driving afterwards. Of these, two drove a motor bike and one stated that she drove, *but not very safely*.
3. The results are disturbing because patients have chosen to disregard the warning. The percentage is probably higher because some patients who completed the questionnaire may not have held a driver's licence.
4. Also see discussion in Section 2-13-3f(i).

2-13-3d: Question 4 in Section A

Afterwards did you go straight to work, school or shopping?

TABLE 213-10 ANSWERS			
SEX	YES	NO	TOTAL
Males	30	18	48
Females	62	30	92
TOTAL	92	48	140

2-13-3d(i): Discussion

1. This question was asked to discover how many patients felt they were capable of working afterwards.
2. 92 patients (65.7%) felt fit enough.
3. See conclusion (Section 2-13-3e(ii)).

2-13-3e: Question 5 in Section A

Afterwards, did you go home and rest?

TABLE 213-11 ANSWERS			
SEX	YES	NO	TOTAL
Males	14	34	48
Females	29	63	92
TOTAL	43	97	140

2-13-3e(i): Discussion

1. This question was asked to discover how accurate the answer to the previous question was.
2. 43 patients (30.7%) rested at home after treatment. This answer is almost the mirror image of the previous answer.

2-13-3e(ii): Conclusion

Approximately two-thirds of patients return to work (etc.) after treatment, whilst the remainder go home and rest.

2-13-3f: Question 6 in Section A

Afterwards, did you feel tired?

TABLE 213-12			
ANSWERS			
SEX	YES	NO	TOTAL
Males	16	32	48
Females	34	58	92
TOTAL	50* ¹	90	140

*¹ Of these, 18 (36%) said they drove a car.

2-13-3f(i): Discussion

1. The question was designed to relate to the previous three.
2. 50 patients (35.7%) felt tired afterwards. This proportion is approximately the expected following the answers to the previous two questions.
3. The apparent quick recovery, coupled with the thought that dental treatment should not interfere with the normal daily routine, has led a great number of patients to disregard postoperative instructions.

2-13-3g: Question 1 in Section B

. . . how long since your last treatment?

TABLE 213-13				
ANSWERS				
SEX	< 1 YEAR	1-2 YEARS	> 2 YEARS	TOTAL
Males	14	14	20	48
Females	16	30	46	92
TOTAL	30	44	66	140

2-13-3g(i): Discussion

1. Patients are unreliable and conservative about their estimation of how long it has been since their last dental visit. For this reason, the *under one year* estimate which may be more reliable, was included.
2. Foreman (1970a) gave, as a mean time, 4 years since his patients had received treatment - excluding emergencies (see Introduction to thesis).

In my survey, 66 patients (47.1%) stated that they had not been treated for more than two years. One female stated that it had been 20 years since her last treatment.

However, the results cannot be compared because Foreman did not include emergency treatment in his figures.

2-13-3h: Question 2 in Section B

Why did you seek this type of treatment?

TABLE 213-14				
ANSWERS				
SEX	CONVENIENCE	FEAR	DON'T KNOW	TOTAL
Males	20	24	4	48
Females* ¹	29	59	3	91
TOTAL* ¹	49	83	7	139* ¹

*¹ One less because one form incomplete.

2-13-3h(i): Discussion

1. Previously I had thought that more males would seek this type of treatment for convenience rather than fear, compared to females. However, there is no significant sex difference in the way the question was answered.
2. Litchfield & Gerard (1971) reported that 8.4% of their patients sought this type of treatment because of convenience.
3. The difference between their figure and mine is probably due to the different interpretation by dentist and patient of what constitutes *fear* and *convenience*.

Some patients may prefer to put down *convenience* rather than admit to *fear*.
4. Again, these results highlight the difference in thinking between dentist and patient.

2-13-3i: Question 3 in Section B

. . . anxiety re future treatment

TABLE 213-15				
ANSWERS				
SEX	MORE	JUST AS	LESS	TOTAL
Males* ¹	1	5	40	46* ¹
Females	7	6	79	92
TOTAL	8	11	119	138* ¹

*¹ Males 2 less because forms incomplete

2-13-3i(i): Discussion

1. The purpose of the question was to find out if methohexitone helps reduce a patient's anxiety about future treatment.
2. The majority of patients (86.2%) said that they felt less anxious about their future treatment.
3. This proportion is in keeping with the results of Mann et al (1971). Of their patients, there was a *considerably higher proportion who expressed 'delight' with this type of treatment as compared with patients under local analgesia. There is obviously a demand from a number of patients for some form of sedation.*

However, in their other paper (Thornton et al 1971) on the same study, they state that their patients were examined by a psychologist who found *no significant differences on the beneficial effects of (methohexitone or local analgesia) on the emotional status or the attitudes of patients to dental care.*

4. The psychologist, Fox (1972), states that . . . *where the patient is permitted to remain dentally ignorant the use of sedation techniques does not provide a direct attack on the patient's anxiety . . .* She insists that a dental education session should be included in the programme.
5. 8 of the patients surveyed (5.8%) felt more anxious regarding future treatment. One patient stated that she was more anxious, *because I had to sign a statement saying I wouldn't hold you responsible - I wondered if the drug was dangerous.*

Consent forms apparently generate their own kind of anxiety. In this case, better education may have reduced the patient's uneasiness. (See also the discussion in Section 2-13-3k, 2-13-3m.)

2-13-3j: Question 1 in Section C

How many times have you had this type of treatment?

TABLE 213-16 ANSWERS* ³		
STATED NUMBER OF ADMINISTRATIONS	FREQUENCY STATED IN ANSWER	EXPECTED FREQUENCY* ¹
1	25	86.0
2	32	26.0
3	21	10.0
4	14	4.6
5 & more	38	3.4
TOTAL	130* ²	130.0

*¹ Expected frequency calculated from proportions of whole study (see Section 2-6-4).

*² 10 answers excluded because patients did not specify a number in answer.

*³ Difference between stated number and expected is highly significant ($\chi^2 = 428.067$, $0.001 > p$).

2-13-3j(i): Discussion

1. The reason for the discrepancy may be because some of the patients had received methohexitone by another practitioner other than myself.

2. One female stated she had received 40 administrations. The reliability of such estimates must be questioned.

2-13-3k: Question 2 in Section C

Do you know what drugs you received?

TABLE 213-17 ANSWERS			
SEX	YES	NO	TOTAL
Males	18	30	48
Females	22	70	92
TOTAL	40	100	140

2-13-3k(i): Discussion

1. 100 patients (71.4%) did not know what drugs they received.
2. Some patients may be anxious about the drugs they receive (see Section 2-13-3i(i)5) but they may not necessarily ask about them.

2-13-3L: Question 3 in Section C

If you know what drugs you received, please specify

TABLE 213-18 ANSWERS	
DRUG MENTIONED	FREQUENCY
Valium	12
Brietal	10
Brietal & Valium	2
Pentothal	6
Valium & Pentothal	1
Pethidine	1
Forgotten	8
TOTAL	40

2-13-3L(i): Discussion

1. Forty patients said they knew what drugs they received. Only twelve mentioned methohexitone (*Brietal*).
2. Patients had a pretty good idea of the type of drugs received.

2-13-3m: Section D

Would you now be happy to stay awake for future treatment?

TABLE 213-19			
ANSWERS			
SEX	YES	NO	TOTAL
Males	4	44	48
Females	12	80	92
TOTAL	16	124	140

2-13-3m(i): Discussion

1. 124 patients (88.6%) said that they would not be happy to stay awake for future treatment.
2. One patient said that although he now has sufficient confidence to stay awake, he would still prefer *to go to sleep*.
3. Several questions arise from these results:
 - (a) Do we produce patients who are psychologically dependent on drugs like methohexitone for all dental treatment - no matter how trivial?
 - (b) If so, is this necessarily a bad thing?
 - (c) Should there be a concerted effort to wean patients off sedative techniques (by first producing a decay free mouth and a dentally educated patient) in favour of local analgesia for future treatment?

I tend to the view that the patients' wishes are paramount. I personally feel that dental treatment is unpleasant and if the use of a drug, such as methohexitone, renders the treatment acceptable then this is justification for its use.

I think it is unreasonable to expect that eventually all patients should have local analgesia only.

2-13-4: CONCLUSIONS

1. Very few surveys have been made. The exercise is expensive and the number of replies disappointing. However, the number of replies I received was more than is usual for postal surveys.
2. Patients are prepared to put up with some minor discomforts without complaint (e.g. painful injections and bruised or sore arms).
3. Patients disregard the warning of no driving postoperatively. Greater emphasis must be given to this problem.
4. Patients seek treatment with methohexitone because they are fearful of routine dentistry.
5. Treatment with methohexitone reduces the anxiety about future treatment.
6. Most patients prefer to have future treatment carried out this way.

2-14

GENERAL DISCUSSION OF
SCIENTIFIC RESULTS

CONTENTS

Page

2-14-1	Numbers	531
2-14-2	Treatment Types	532
2-14-3	Diazepam Supplementation	532
2-14-4	Local Analgesia Supplementation	533
2-14-5	Dose Limits	534
2-14-6	Complications	535
2-14-7	Patient Attitude	536

2-14: GENERAL DISCUSSION OF SCIENTIFIC RESULTS

A detailed discussion of results appears at the end of each section. The most important results are summarised below.

2-14-1: NUMBERS

1. The results of 4,379 administrations of methohexitone, administered by the minimal incremental technique (M.I.T.) for general dentistry, were analysed.
2. Of 2,722 patients studied, 74.2% were aged 19-35 years and 58.5% were females.
3. The smallest group of patients was those aged 0-10 years. This group received the lowest mean total dose of methohexitone (78mg) and the simplest treatment (usually a single extraction).
4. The 11-18 year group received methohexitone for relatively simple procedures and yet 17.24% of administrations resulted in operating complications (e.g. restlessness). The value of the M.I.T. for this age group is questioned.
5. In 122 administrations, the patient had a medical condition:
 - (i) Patients with a history of drug addiction will have operating complications which may result in hurried or incomplete work.
 - (ii) Respiratory conditions (including heavy smoking) were associated with 7% of respiratory complications.
 - (iii) Patients on oral tranquillizers or sedation may have a delayed recovery.

(iv) Heavy smokers tend to vomit or obstruct easily, probably due to excessive mucous stimulating laryngeal reflexes.

(v) The six epileptics had no complications.

(vi) One asthmatic developed an attack immediately after treatment.

2-14-2: TREATMENT TYPES

1. 65.8% of administrations were for conservation. Of these, 88.5% were for simple fillings (mean number per session = 2.45).

Conservation work was associated with more operating complications, respiratory obstruction and operator induced complications than other forms of treatment.

2. 15.8% of administrations were for oral surgery. Of these, 76.9% were for simple extractions.
3. 10.4% of administrations were for endodontics. Endodontics appeared well suited to the M.I.T. technique - relatively few complications and low dosage.
4. For endodontics, one simple filling or one simple extraction, it is possible to keep dosage below 200mg and duration less than the recommended maximum.

2-14-3: DIAZEPAM SUPPLEMENTATION

In the literature, there have been good reports of diazepam supplementation in the dose range 5-10mg (Section 1-11-6h(i)). Its use is supposed to produce good working conditions (Section 1-11-6h(v)) and reduced incidence of restlessness (1-11-6h(vii)); although disappointing

results have been found with children (1-11-6h(iv)). Its use may lower peripheral resistance (1-7-9b) and the combination may depress circulation (1-11-6h(ix)).

1. In 88.2% of administrations supplemented by diazepam, the dosage was 5mg. This is the dosage suggested to achieve good baseline sedation (see Section 1-11-6h(iii)).
2. In the dose range used, the value of diazepam as a supplement is questioned because:
 - (i) For all administrations supplemented by diazepam, the total dosage of methohexitone exceeded 200mg in 39% of administrations.
 - (ii) More administrations supplemented by diazepam resulted in operating complications (and of these, 50% exceeded 200mg methohexitone), respiratory obstruction, hiccoughing, laryngeal spasm and operator induced complications, than would be expected.
3. The value of diazepam as a supplement, in the dose range 5-10mg, is questioned.

2-14-4: LOCAL ANALGESIA SUPPLEMENTATION

Local analgesia supplementation has been shown to reduce the incidence of tachycardia (1-7-6b(iv)), arrhythmias (1-7-7b), blood pressure elevations (1-7-10c), restlessness, respiratory obstruction and coughing (1-11-4a, 1-11-4b). The philosophy of its use is discussed in Section 1-11-4d.

The results of my study (Section 2-14-4) suggest that local

analgesia should be used routinely with the M.I.T. because:

- (i) Local analgesia helped to reduce dosage of methohexitone in administrations for conservation.
- (ii) Local analgesia helped to resolve many problem cases, e.g. operating complications, laryngeal spasms and hurried and difficult procedures.
- (iii) Its routine use probably would help to prevent most of these complications.

2-14-5: DOSE LIMITS

1. The maximum recommended dosage of 200mg methohexitone was exceeded in:

- (i) 50% of administrations supplemented by local analgesia for oral surgery.
- (ii) 40% of administrations which resulted in hiccuping.
- (iii) 39% of administrations supplemented by diazepam.
- (iv) 33% of administrations supplemented by local analgesia.
- (v) 32% of administrations which resulted in respiratory obstruction.
- (vi) 31% of administrations, supplemented by diazepam, for oral surgery.
- (vii) 23% of all administrations.

2. However, the recommended dosage was exceeded in only 5% of unsupplemented administrations, and even less for endodontic treatment.

3. If the treatment was restricted to one simple extraction or one simple filling, and other variables removed, the maximum recommended dosage was not exceeded.

2-14-6: COMPLICATIONS

1. 14.5% of all administrations resulted in one or more complications.
2. 6.7% of all administrations resulted in an operating complication (e.g. restlessness). This was the most frequent of all groups.
3. 5.5% of all administrations resulted in respiratory complications.
4. Respiratory obstruction was usually associated with conservative work and was associated with restlessness, probably due to hypoxia.
5. Hiccoughing was associated with high doses of methohexitone and diazepam supplementation. Patients who hiccoughed once did not necessarily hiccough again.
6. Crying was usually the result of painful surgery or painful endodontics.
7. Delayed recovery was caused by pre-operative sedatives or tranquilizers acting synergistically with methohexitone, or high doses of methohexitone, or possible hypoxic episodes as a result of other complications.
8. The incidence of allergy was low ($< 2:1000$), of a minor nature and easily treated.
9. Vomiting was rare. The necessity for fasting rules is confirmed.

10. Patients may not complain about venous pain at the time, but they will remember it afterwards.

2-14-7: PATIENT ATTITUDE

1. 65.7% of patients surveyed said that they felt fit enough for work afterwards, and 48.6% of patients surveyed said they drove a car.

Patients will not heed postoperative warnings.

2. The M.I.T. has helped patients feel less anxious, but 88.6% surveyed still prefer to *go to sleep* for future treatment.

GENERAL CONCLUSIONS

These should be read in conjunction with Conclusions at the end of the Review (Part 1) and Scientific Results (Part 2).

1. Conservative dentistry presents many problems for the M.I.T. The greatest difficulty is learning to work with a pack. It must be kept dry and correctly in position. Many complications (e.g. operator induced and laryngeal spasm) would have been prevented with greater attention to this problem.
2. The M.I.T. is unsuitable for patients aged 18 years and under. They are too restless and obstruct easily.
3. The M.I.T. is unsuitable for about 1.9% of the population. These patients create impossible working conditions. Alternative techniques should be used.
4. The M.I.T. is unsuitable for heavy smokers because of respiratory complications and gagging.
5. The use of diazepam did not prevent restlessness or reduced total dosage of methohexitone.
6. Local analgesia should be used routinely for conservation work. In this way, many complications would be prevented and dosage reduced.
7. Dosage of methohexitone can be kept within the maximum recommended limits, only if treatment is restricted to one simple extraction, one simple filling, or endodontics, preferably supplemented by local analgesia.

8. Respiratory obstruction can be prevented by learning to recognise patients with difficult airways and using alternative techniques.
9. Patients must not be given the impression that they can go about their daily routine.

RECOMMENDATIONS

From my conclusions, drawn from the review of the literature and my scientific results, a table of recommendations for the safer use of methohexitone in dentistry is presented.

TABLE 215-1 RECOMMENDATIONS	
DO:	DONT:
Adequate training and experience. Learn airway control. Learn safe mouthpacking. Have surgery set up to minimum equipment standards. Ensure that pre and postoperative rules are adhered to. Treat patients supine. Use oxygen supplementation routinely. Use local analgesia supplementation routinely. Keep treatment simple (e.g. 1 filling or 1 extraction or endodontics). Be prepared to use alternative drugs and techniques.	Use M.I.T. for about 1.9% of patients who prove unsuitable. Use M.I.T. for patients aged 18 years or under. Plan long, difficult or painful procedures for the M.I.T. Use diazepam as a supplement. Use M.I.T. on patients who are addicted to drugs of abuse (including heavy smokers and alcoholics).

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APPENDIX SECTION

CONTENTS

Page

- | | |
|--|-----|
| 1. Case history: Disorientation on recovery -
possible hyperthyroidism. | 586 |
| 2. Patient Survey - further details. | 589 |
| 3. Emergency Drugs. | 592 |

APPENDIX 1

CASE HISTORY

DISORIENTATION ON RECOVERY - POSSIBLE HYPERTHYROIDISM

Patient 685 was a 25 year old female of slight build and in apparent good health. She appeared to be extremely nervous but would not admit to it.

0.6mg atropine and incremental methohexitone, to 140mg, were administered. One restoration was completed. Total treatment time was ten minutes.

At this stage the patient was escorted to the recovery room. However, she would not lie on the bed. She was extremely disoriented and appeared to be hallucinating.

She had to be restrained for at least 25 minutes before she was cognizant of her surroundings.

She again presented for treatment at a second appointment. Because of her previous recovery problem and her apparent gross nervousness, I gave her 5mg diazepam before induction with methohexitone. My assumption was that the diazepam might help reduce the recovery complication which I thought was due to apprehension.

0.6mg atropine and 80mg methohexitone were next given. An extraction was performed. Treatment was completed within 5 minutes.

However, a similar reaction occurred during recovery as occurred after the first administration, only this time the reaction was worse.

About a year passed before the patient presented for a third appointment. She still appeared to be highly nervous. 0.6mg atropine and 5mg diazepam were administered. Incremental methohexitone, up to 200mg, was administered and one restoration was completed. Total treatment time was 10 minutes.

A recovery identical to those before, took place and it was then that I decided to refer her back to her physician for tests for hyperthyroidism.

Her apparent extreme apprehension, coupled with her indifference to it, her slight build and the disorientation during recovery were possible signs of this disorder.

About seven months later she returned for a fourth session. She had a note from her physician which stated that tests for hyperthyroidism were not indicated as she was suffering only from *dental phobia*. He had prescribed oral diazepam and instructed her to take 40mg prior to this visit.

Because of the large dose of diazepam taken before attending the surgery, she did not appear to be nervous.

One tooth was causing pain so it was decided to go ahead with treatment. 0.6mg atropine and incremental methohexitone, to 200mg, was given and one restoration completed within ten minutes.

During recovery, the same disorientation occurred.

The patient refused to pursue the matter further and has not been seen since.

Discussion

1. Diazepam was not helpful in reducing the incidence or the severity of the recovery hallucinations and disorientations.
2. It is unfortunate that this patient's physician ignored my request for tests and also that he was prepared to allow her to take a very high dose of diazepam before travelling on her own to the surgery.
3. It is a pity that the patient refused to have the problem resolved.
4. I am prepared to assume that this was a case of untreated hyperthyroidism. In hindsight, methohexitone should not have been used (see Section 1-9-8a).

APPENDIX 2

PATIENT SURVEY

There have been very few surveys designed to find out patient attitudes to dental treatment under methohexitone.

Some other surveys

1. In his report of 2,500 administrations of methohexitone, Hubbell (1960) asked patients on waking to evaluate their feelings (e.g. normal, sad, etc.).
2. Coleman & Green (1960) sent 100 consecutive patients a questionnaire following extractions under methohexitone. Most felt recovered enough to go to work that day (as opposed to 16 who had to go home and rest).
3. Hellewell & Hutton (1967) questioned 122 recipients of methohexitone for extractions. They found that 61.5% preferred this type of treatment compared to 4% who preferred local analgesia.
4. Mann et al (1971) analysed 357 completed questionnaires following 595 administrations of methohexitone for conservative dentistry. Amongst other things, they found that 17.6% felt drowsy or slept that day, and 9.3% complained of bruising at the site of the injection.

Discussion of number of returned questionnaires

The total number of returns suitable for use, represented 47.6% of those posted (see Table 213-6). The number of returns was disappointing because it did not represent a majority of those posted.

However, the number of returns is more than double the 20% normally expected from a postal survey (Reichmann 1971).

In Table Appendix 2 below, I have listed the response rate of the other surveys.

TABLE APPENDIX 2 RETURN RATE OF OTHER SURVEYS		
NAME OF STUDY	DETAILS OF SURVEY	RETURN RATE
Coleman & Green (1960)	Patients given form and asked to post back the next day	100%
Hubbell (1960)	Patients interviewed during recovery	N.A.
Hellewell & Hutton (1967)	Patients interviewed during recovery	N.A.
Mann et al (1971)	Patients interviewed at subsequent visit	N.A.

The 100% return rate reported by Coleman & Green (1960) is surprisingly high. Such return rates to postal surveys are usually possible only if the completion of the form is compulsory (Reichmann 1971).

One explanation might be that the patients were actually handed the form and instructed verbally to return it. Another explanation could be that since the treatment was carried out under the British National Health Service, some form of compulsion was applied.

The other questionnaires were not postal and cannot be compared. It should be noted that a postal survey is more likely to be free of bias (if questionnaires are sent randomly) than a personal interview (Reichmann 1971).

APPENDIX 3

EMERGENCY DRUGS

1. In addition to the drugs recommended by the N.S.W. Health Commission (Newsletter 1976b; Wright et al 1978) the following drugs were available:
 - (a) Aminophyllene (250mg in 10ml amps) for bronchospasm.
 - (b) Xylocaine (100mg in 10ml amps) for cardiac arrhythmia.
 - (c) Calcium gluconate (10% in 10ml amps) as a positive inotrope.
 - (d) Diazepam (10mg in 2ml amps) for convulsions.
 - (e) Naloxone (0.4mg in 1ml amps) for respiratory depression especially caused by pentazocine.
2. Concern has been expressed about the desirability of keeping dangerous drugs in the dental surgery particularly where personnel may be inexperienced in their use (Sheridan et al 1978).
3. During the whole of this study it was never necessary to administer emergency drugs. However, dentists who use the M.I.T. should be conversant with their use.

