

EFFECTIVENESS of VISION THERAPY

AS INFLUENCED BY THE DELIVERY MODE

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Abstract

There are two methods to deliver vision therapy: clinic/office based (CBVT) and home based (HBVT). There is little research comparing the effectiveness of each mode. The files of 50 CBVT and 50 HBVT patients in an Australian private practice were sequentially and retrospectively evaluated along several variables. All patients had completed the vision therapy treatment plan or self-discharged. The purpose was to compare the effectiveness of the two modes of treatment. The results indicate that CBVT produced more successful results, and in a shorter time period.

Key Words

clinic/office based vision therapy (CBVT), compliance, home assistant, home based vision therapy (HBVT), home therapist, train the trainer, vision therapy

INTRODUCTION

The goal of optometric vision therapy (VT) is to develop visual abilities so that the patient can meet the visual demands of variable and complex situations with greater efficiency, endurance and economy of effort. The treatment plan is directed at rehabilitation and enhancement of diagnosed visual inefficiencies. It incorporates activities that seek to ensure the transfer of the enhanced visual abilities into areas of special importance to the patient; be it during learning, earning or play.¹ Although most VT treatment plans are primarily conducted in an optometric office or clinic, there is the option of a system that is primarily conducted in the patient's home.

MODES OF VT DELIVERY CARE Clinic/office based vision therapy (CBVT)

In this system, the major aspects of therapy are primarily delivered in an optometric clinic or office by a trained staff of vision therapists, who act under the supervision and guidance of the optometrist. The optometrist develops a treatment plan with accompanying VT procedures that are applied during a consecutive series of in-office sessions. These sessions are supplemented by planned and supervised home practice sessions, aided by a designated home assistant. The basics of CBVT in my practice are summarized in Appendix A.

Home based vision therapy (HBVT)

The essence of this system is the delegation of VT delivery to a home therapist (usually a parent). The optometrist devel-

ops the treatment plan, selects appropriate procedures, demonstrates and discusses each of the procedures with the child and the home therapist. This is done after the initial VT evaluation and after all succeeding office visits. The office visits are planned to occur at four to five week intervals. The implementation of the therapy then becomes the responsibility of the home therapist. Consequently, the optometrist and vision therapist do not directly supervise or modulate the child's performance.

The optometrist is now mostly dependent on written communication from the daily diary kept by the home therapist. The essentials of HBVT as practiced in my office are summarized in Appendix B.

LITERATURE OVERVIEW

Current opinion, as expressed in a number of optometric VT texts, indicates that CBVT is the delivery mode of choice.²⁻⁹ Additionally, the joint organizational policy statement by the College of Optometrists in Vision Development reflects the choice of CBVT as the treatment modality for VT delivery by most specialist VT practices.¹⁰ One text,¹¹ written for primary care optometrists without facilities for CBVT, details an HBVT management approach for a variety of visual conditions. However, no data regarding the effectiveness of the approach was provided.

In a recent paper which surveyed the treatment modalities used for convergence insufficiency, Scheiman et al¹² noted that many articles indicated that CBVT was an effective treatment modality, he was unable to find reports on the outcomes of HBVT. However there was

one pilot study on pencil push-up training (PPT) that was delivered by HBVT.¹³ The effectiveness of VT for convergence insufficiency reported in these papers is summarized in Table 1.

PURPOSE

A VT retrospective outcome audit was conducted to compare the effectiveness of CBVT and HBVT for patients who had been treated in the same private clinic. An overview of the essentials of each delivery system used in this study are in Appendix A and Appendix B.

SUBJECTS

All subjects were selected from the clinical records of my private clinical practice located in an inland rural city of South East Australia. The clinic's computer data base was used to obtain the last 50 CBVT patients who had completed or discontinued therapy, and the last 50 HBVT completed or discontinued patients. This provided two groups of patients retrospectively and successively chosen from each of these treatment delivery modalities. Table 2 lists the gender and age demographics of each group. Appendices C and D list the individual patients in the CBVT and HBVT groups respectively.

All subjects had received a comprehensive initial optometric assessment and VT work-up. A post VT assessment was given for all subjects who did not self-discharge. In addition to detailed health, ocular/visual and social histories, each assessment evaluated the following areas:

1. Visual pathway integrity including eye health, visual acuity and refractive status.
2. Visual inspection skills, including assessments of accommodation, binocular vision and ocular-motor efficiencies.
3. Visuo-cognitive operations: including assessments of spatial awareness; visual directional concepts; visual analysis of size, form, motion, color, distance; visual intersensory integrations.

The overall philosophy for VT used at my clinic has been detailed elsewhere.^{1, 14} The particular treatment plan was tailored to the patient's diagnosis and was in accord with currently published protocols.²⁻¹⁰

Modality	N	Studies	Cure	Improve	Fail	Lost to Follow-UP
CBVT	2149	17	78%	15%	5%	0
HBVT	0	0				
HBVT (PPT)	25	1	4%	24%	20%	52%

	N	Males	Females	Mean Age	Age Range
CBVT	50	30 / 60%	20 / 40%	11.10 yrs	5.32 to 15.08yrs
HBVT	50	36 / 72%	14 / 28%	9.95 yrs	6.40 to 17.08yrs
Total	100	66%	34%		

METHOD

The hard copy patient records were then retrieved. They were analyzed according to the following parameters:

1. Patient ID: Initials
2. Age
3. Gender
4. Duration of VT
 - a) CBVT: the number of clinic sessions attended and the number of weeks between the first VT session and the self or clinic discharge date.
 - b) HBVT: the number of office progress visits, and the number of weeks between the first VT instruction visit and the self or clinic discharge date.
5. Diagnosis:

The following categories were used:

VCD: Visuo-Cognitive Disorder: This area included the following entities of visual information processing disorders:

- Visual Spatial
- Visual Analysis;
- Visual Motor Integration;
- Visual Auditory Integration.

VCD/ SK: This is a combination of the above and the below categories; **SK: Visual Skills**. These include the non-strabismic anomalies of binocular vision, i.e., accommodation, vergence, oculomotor.

AMB: This category is limited to refractive amblyopia.

STRAB: Strabismus with or without amblyopia.

6. Treatment : CBVT or HBVT
7. Outcomes: These were rated by the author according to the following categories:

Cure: The child achieved normalization of objective clinical findings and resolution of the presenting visually related symptoms and signs.

Improved: Positive changes in the objective clinical findings and/or significant performance changes and symptoms relief were obtained.

Failure: The patients discharged because of their failure to improve have been labeled (F) in the last columns of Appendix C and D. All others in this category either discharged themselves or failed to return for follow-up.

8. Discharge feedback. When self-discharge was elected, the clinic staff sought to determine the reasons for discontinuing.

RESULTS AND DATA INTERPRETATION Demographics

Complete data obtained for each of the 50 CBVT case files are presented in Appendix C, and those of the 50 HBVT files in Appendix D. Table 2 shows that males predominated in both groups; 30 (60%) in CBVT and 36 (72%) in HBVT. The mean age was greater in the HBVT group.

Outcomes Success of treatment

In the CBVT group, 29 (58%) patients met the criteria for cure, 18 (36%) patients met the improvement criteria, and 3 (6%) met one of the failure to complete criteria. See Appendix C and Table 3. In the HBVT group 9 (18%) patients met the criteria for cure, 23 (46%) patients met the improvement criteria, and 18 (36%) met one of the failure criteria. See Appendix D and Table 3. Thus, CBVT produced approximately three times more cures than HBVT, and HBVT produced six times more failures than CBVT. It is also noteworthy that 1 of the 3 CBVT failures was because of a lack of progress, while 5 of the 18 HBVT were failures for the same reason.

Table 3. Outcomes as a Function of Diagnosis.
The numbers in parentheses are percentages.

	N	Cure	Improvement	Failure
VCD				
CBVT	13	5 (38.5)	7 (53.8)	1 (7.7)
HBVT	17	3 (17.6)	7 (41.2)	7 (41.2)
VCD/SK				
CBVT	21	13 (62)	6 (28.5)	2 (9.5)
HBVT	20	5 (25)	10 (50)	5 (25)
SK				
CBVT	10	9 (90)	1 (10)	0
HBVT	8	1 (12.5)	4 (50)	3 (37.5)
AMB				
CBVT	4	2 (50)	2 (50)	0
HBVT	2	0	1 (50)	1 (50)
STRAB				
CBVT	2	0	2 (100)	0
HBVT	3	0	1 (33.3)	2 (66.6)
Totals:				
CBVT	50	29 (58%)	18 (36%)	3 (6%)
HBVT	50	9 (18%)	23 (46%)	18 (36%)

Success of treatment as a function of diagnosis

Table 3 indicates that the number of subjects for each diagnosis was virtually the same for both groups. The VCD/SK category contained the greatest number of subjects; 41 of the total sample were so diagnosed. The next most frequent category was VCD with 30 of the total sample. The best outcome percentage wise was SK cases treated by CBVT. It was interesting to notice that the HBVT results for this diagnosis were far less effective.

Duration of treatment

Each case file was inspected to determine two indicators related to the duration of treatment. For the CBVT group these were the number of clinic VT sessions and the number of weeks between the first VT visit and the date of self or clinic discharge; for the HBVT group these were the number of office progress visits, and the number of weeks between the first VT visit and the date of self or clinical discharge. Tables 4 and 5 provide an analysis of the length of treatment provided for

each diagnostic category and treatment mode.

All patients in each of the diagnostic categories were not of equal complexity or difficulty. Indeed, several patients in each category were post-strabismic surgery, or were incomitant strabismics. The cure outcomes were achieved in the shortest treatment period when the patient's visual dysfunction was less severe and not complicated by other personal or environmental limitations. Alternatively, some of the most enthusiastically satisfied patients and professionally rewarding cases achieved their best visual efficiency at the improvement level after the most protracted treatment period.

The responses to our questioning as to the reasons for failure to complete are summarized in Tables 6 and 7.

DISCUSSION

The purpose of this study was to gain data on the outcomes, and compare the effectiveness of the two methods of VT delivery. HBVT has not been previously extensively evaluated.

This study shows that:

1. There was a 58% cure for CBVT compared to 18% for HBVT.
2. CBVT favorable outcomes were achieved in less time than in HBVT.
3. The rate of failure for CBVT was 6% while it was 36% for HBVT. It is note-

Table 4. CBVT: The number of visits and duration of treatment by diagnosis and treatment success.

CBVT	Cure:			Improvement:			Fail:		
	N	Mean No. Visits	Duration of Tx	N	Mean No. Visits	Duration of Tx	N	Mean No. Visits	Duration of Tx
VCD	5	8.8 (8-9 visits)	12.2 (12-14 wks)	7	11.3 (9-21 visits)	14.6 (12-26 wks)	1	3	5 weeks
VCD/SK	13	11 (9-18 visits)	14.9 (10-22 wks)	6	9.3 (8-11 visits)	13 (12-15 wks)	2	5	5 weeks
SK	9	10.2 (6-12 visits)	12.9 (10-15 wks)	1	4 visits	7 wks	0		
AMB	2	12 (9-15 visits)	23.5 (21-26 wks)	2	13 (9-17 visits)	20.5 (15-26 wks)	0		
STRAB	0			2	9.5 (7-12 visits)	12.5 (10-15 wks)	0		
Totals:	29	6-18 visits	10-26 weeks	18	4-21 visits	7-26 weeks	3	3-5 visits	5 weeks
		Mean 10.44	Mean 14.41		Mean 10.20	Mean 14.06		Mean 4.33	

Table 5. HBVT: The number of visits and duration of treatment by diagnosis and treatment success.

HBVT	Cure:			Improvement:			Fail:		
	N	Mean No. Visits	Duration of Tx	N	Mean No. Visits	Duration of Tx	N	Mean No. Visits	Duration of Tx
VCD	3	3.3 (3-4 visits)	(16-22 wks)	7	3.6 (2-7 visits)	(10-48 wks)	7	1.1 (1-2 visits)	.8 (0-8 weeks)
VCD/SK	5	3.4 (3-4 visits)	(16-23 wks)	10	2.8 (2-4 visits)	(10-24 wks)	5	1.6 (1-2 visits)	(0-8 weeks)
SK	1	4	21	4	2 (2 visits)	(11-13 wks)	3	1.4 (1-2 visits)	5 (0-8 weeks)
AMB	0			1	3	18	1	1	
STRAB	0			1	3	26	2	1	
Totals:	9	3-4 visits	16-23 weeks	23	2-7 visits	10-48 weeks	18	1-2 visits	0-8 weeks
		Mean 3.43	Mean 19.4		Mean 2.92	Mean 17.60		Mean 1.27	

Table 6. Reasons given for failure to complete CBVT

1. Child would not comply with clinic therapy, home practice and Rx wearing instruction.
2. Family break-up: mother and child left area.
3. Diagnosed as epileptic after commencing VT. Advised to discontinue until medication stabilized the condition.

Table 7. Reasons given for failure to complete HBVT

Failing to return for office progress visits were:

1. Child will not participate.
2. VT sessions end up in a fight between parent and child.
3. There is not enough time, or, when time permits, the child is too tired.
4. Conflict between parents.
5. Inability to manage an adverse response.
6. Elected an easier treatment.
7. VT too hard - unable to become involved.
8. Cost (travel, parent's time off work).

worthy that the relatively higher failure rate for HBVT was in spite of a plan that was formally structured and included detailed verbal and written instructions for the home therapist.

These results confirm the opinions expressed by a number of authors of contemporary text books about VT delivery.²⁻⁹ I agree with Griffin and Grisham⁸ that because VT is a complex instructional process, the most effective VT cannot be provided strictly on a home-training basis. I propose that optimal CBVT involves the provision of VT by trained therapists who work under the direct supervision of an optometrist. Further, the treatment plan should include structured home practice, where these procedures are used to reinforce and to facilitate automaticity in the newly developed skills. Guiding the patient through the many levels of self-awareness and reorganizations that eventually leads to efficient visual function is best delivered by CBVT.

While home practice is an important element in CBVT, it is the key element in HBVT. Consequently, the home therapist in HBVT fulfills a more prominent role; he or she must be capable of administering

the assigned therapy. Further, this type of delivery system requires supportive family dynamics; the demands on the home assistant, on the family and on parent/child relationships are much less complex with CBVT.

Patient compliance to the instructions given by health care providers is known to be a problem.¹⁵⁻¹⁷ A rule of thumb is that about one third of patients will follow instructions exactly, another one third will follow some instructions and the final one third will not follow any of the instructions. The results of HBVT of the present study somewhat approximate this rule. In terms of the total sample, 38% achieved a cure, 41% achieved improvement, and 21% either failed to return or showed no improvement.

CONCLUSIONS

The sequentially and retrospectively selected outcomes of 50 CBVT and 50 HBVT patients have been described. The essential difference between the two groups was the VT delivery system. Demographics and outcomes along several variables have been described for each group. The HBVT delivery system sought to minimize some of the apparent weaknesses of the system by using computer VT software and training the trainer. Even so, HBVT was significantly less effective than the CBVT which was primarily delivered by a trained visual therapist. CBVT gave a three times better cure rate; 58% , compared to 18% for HBVT. The better CBVT outcomes were achieved in less time, and with significantly less failures. Only 6% failure rate was found for CBVT, compared to a 36% failure rate for HBVT. We anecdotally found that compliance was less of an issue with CBVT than with HBVT, and that family dynamics often supported CBVT, but provided stress in HBVT.

This report is intended as a pilot study, in an area where little investigation has been done. It recognizes that there are instances where geographical and/or financial considerations make CBVT unfeasible. In these cases HBVT is preferable to no VT, and I have provided guidelines to maximize its effectiveness.

Future research of this type should more specifically define outcome criteria and provide for an examination of the project's validity, reliability, and more detailed statistical analysis.

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Appendix A. The essentials of CBVT

The optometrist prepares the overall treatment plan. This is implemented by the following:

1. Weekly visits of one hour duration are conducted at the clinic. Four procedures are pre-assigned by the optometrist. The viewing conditions and areas of emphasis are specified. The vision therapist conducts some 45 minutes of active VT with the patient; 15 minutes are utilized to review the progress of previously assigned home practice procedures that are kept in a diary, and to assign new home practice procedures, as appropriate.
2. Three new home practice procedures are each to be conducted 10 minutes per day, during a total of five days prior to the next weekly clinic visit.
3. The home assistant's role is to ensure that the practice procedures are conducted for the designated times and days.
4. Review of each case is on going but comprehensive reassessment is done after 10 clinic visits or sooner if indicated by lack of progress, symptoms or performance changes.
5. Clinical staff must have knowledge of child, his visual and cognitive development, the technical aspects of VT delivery and the overall goals the patient. The vision therapist acts in partnership with the optometrist, who is always available for consultation.

Appendix B. The Essentials of HBVT

The optometrist develops a treatment plan. At the various office visits twelve procedures are assigned. These procedures are grouped into a program of four successive weeks, with three procedures allocated for each week. Thirty minutes of daily supervised instruction (10 minutes for each procedure) is assigned. The optometrist demonstrates how each assigned procedure is to be conducted, and provides written instructions. These instructions designate specific requirements such as instructional set, viewing conditions, methods to modify the task demand, and the process to be emphasized. Computer VT software is assigned when appropriate to reduce demands on the home therapist. A daily diary is provided for the home therapist to record a running account of the HBVT for the optometrist to review prior to the next office visit. Some patients successfully complete all the assigned procedures in the programmed four weeks, while others required more time because of geographical and/or fiscal circumstances.

The home therapist is informed of the reason each task has been assigned, how to conduct each procedure, and how to modulate the level of demand. At the initial VT visit, the home therapist is given orientation and instruction on the key aspects of VT delivery. A summary of this "Train the Trainer" part of the program is provided below.

"6 P s" for Training the Trainer

1. **PATIENCE**—The home therapist must appreciate that performance changes can be rapid, but are more usually slowly achieved with persistence and regular practice.
2. **POSITIVE**—Positive comments from the home therapist during practice build motivation, sustain involvement and foster the progression to the next level of task difficulty. Alternatively negative comments can destroy the moment and may make the child unwilling to participate. The home therapist is instructed to focus more on the positives, and not to overemphasize the negatives.
3. **PLANNING**—This involves deciding; "who" will be the home therapist, "where" the VT will be conducted, "when" it will be conducted, "how" record taking will be done and returned to the clinic at least 3 days prior to the next visit.
The home therapist determines a suitable location and time for the daily VT. It is best conducted in a quiet environment, away from distractions, interruptions and siblings. The selection of a suitable time requires consideration of both the home therapist's other roles and responsibilities, and the child's needs. Before school can be optimal for the child, but is often a very busy time for parents. After the evening meal can be optimal for the parent, but the child is often too tired for best participation.
4. **PARTNERSHIP**—It is emphasized that the home therapist is in partnership with the optometrist; the home therapist is a vital part of the therapy program. The optometrist provides the treatment plan and guides the home therapist in the implementation of the VT procedures. Communication between the home therapist and the optometrist or vision therapist is essential for on-going management. Consequently, scheduled home telephone interviews are conducted between the home therapist and a clinic representative. However, if a problem arises, the home therapist is instructed to phone the clinic. Some common problems that may occur follow:
 - confusion on how a procedure should be done.
 - inability to follow the written instruction.
 - child behavior concerns.
 - adverse symptoms, e.g., headache, double vision, eye strain, red eyes.
5. **PROCESS**—The home therapist is made aware of various processes or skills that are to be coordinated to perform any of the assigned VT procedures. An analogy is given in terms of golf: improving performance is facilitated by coordinating a number of interactive processes, including the grip, posture, a balanced interaction of the two sides of the body, motor planning, and eye/hand coordination. Facilitating the control and sequential organization of each of the related processes contribute to skilled performance of the targeted behavior. The same paradigm is then applied to the patient's visual dysfunction(s).
6. **PRACTICE**—The need for task or procedure repetition in order to develop automaticity in executing the task is a key aspect in successful VT. Some find demands of repetition boring and seemingly unrewarding. However, this is the time that the child should develop the awareness of his ability to increasingly gain control, expend less effort and energy, and master the particular procedure.

Appendix C – CBVT Patients						Outcome		
I.D	G	AGE in years	Visits	Weeks	Dx	Cure	Improvement	Failure. (F)= no progress. Others failed to complete
1.	JS	F	7.75	9	12	VCD	1	
2.	RE	M	8.5	9	13	VCD	1	
3.	BC	M	13.08	8	12	VCD	1	
4.	RG	F	8.32	9	12	VCD	1	
5.	JS	M	10.32	9	12	VCD	1	
6.	CH	F	10.16	10	14	VCD/SK	1	*
7.	PF	M	9.32	9	13	VCD/SK	1	
8.	MA	M	11.16	10	15	VCD/SK	1	
9.	JO	M	11.58	18	22	VCD/SK	1	
10.	BA	M	8.25	10	14	VCD/SK	1	
11.	AH	F	8	12	15	VCD/SK	1	
12.	JB	M	8.5	9	14	VCD/SK	1	
13.	BH	M	14.58	12	15	VCD/SK	1	
14.	RA	F	14.58	12	16	VCD/SK	1	
15.	JH	F	8.75	12	15	VCD/SK	1	
16.	TE	M	10.08	9	12	VCD/SK	1	
17.	JT	M	9.16	10	15	VCD/SK	1	
18.	ST	M	11.25	10	14	VCD/SK	1	
19.	AV	F	10.5	8	11	SK/G	1	
20.	LS	F	10.58	12	14	SK	1	
21.	AW	F	12.64	12	14	SK	1	
22.	SC	M	12.8	9	12	SK	1	
23.	AB	M	8.08	6	10	SK	1	
24.	KA	F	13.32	9	12	SK	1	
25.	HA	F	12.75	12	15	SK	1	
26.	FC	F	13.16	12	15	SK	1	
27.	CS	F	13.25	12	14	SK	1	
28.	GW	M	16.58	15	26	AMB	1	
29.	HB	F	17.16	9	21	AMB	1	
30.	CB	F	9.75	9	12	VCD		1
31.	JW	M	9.83	9	12	VCD		1
32.	KF	M	8.75	12	15	VCD		1
33.	JS	M	7.83	9	13	VCD		1
34.	EW	F	9.92	10	12	VCD		1
35.	CM	M	14.25	21	26	VCD		1
36.	NA	M	13.58	9	12	VCD/STRAB		1
37.	EW	M	9.4	9	13	VCD/SK		1
38.	DT	M	9.4	9	12	VCD/SK		1
39.	MH	F	12.58	11	15	VCD/SK		1
40.	SK	F	16.64	8	12	VCD/SK		1
41.	DM	M	14.58	10	14	VCD/SK		1
42.	GP	M	12	9	12	VCD/SK		1
43.	AA	M	13.92	4	7	SK/STRAB		1
44.	JD	M	9.32	7	10	STRAB		1
45.	DH	M	9.58	12	15	STRAB		1
46.	HJ	F	13.64	17	26	AMB		1
47.	BF	M	8.58	9	15	AMB		1
48.	NS	M	8.64	3	5	VCD		1
49.	KF	F	9.16	5	5	VCD/SK		1
50.	MC	M	9.75	5	5	VCD/SK		1 (F)
		Mean 11.10	10	13.78		58%	36%	6%

* These patients were originally in the HBVT program, but switched to CBVT

Appendix D – HBVT Patients							Outcome		
I.D	G	Age - Years	Duration Visits Weeks		Dx	Cure	Improvement	Failures (F)=no progress. Others failed to complete	
1.	PZ	F	9.32	4	22	VCD	1		
2.	JC	M	8.64	3	16	VCD	1		
3.	JE	M	7.16	3	17	VCD	1		
4.	OF	M	12.08	3	16	VCD/SK	1		
5.	SM	M	8.32	4	23	VCD/SK	1		
6.	SC	M	12.16	3	16	VCD/SK	1		
7.	DG	M	10.4	4	23	VCD/SK	1		
8.	NA	M	10.5	3	18	VCD/SK	1		
9.	PS	M	10.4	4	24	SK/G	1		
10.	LW	F	8.92	3	17	VCD		1	
11.	GP	F	5.64	3	18	VCD		1	
12.	BN	M	10.4	3	17	VCD		1	
13.	LC	F	8.83	2	10	VCD		1	
14.	JW	F	6.75	3	16	VCD		1	
15.	DG	M	9.58	4	26	VCD		1	
16.	CF	F	8.92	7	48	VCD		1	
17.	WH	M	12.92	3	18	VCD/SK		1	
18.	BW	M	10.75	3	17	VCD/SK		1	
19.	J	M	13.08	4	23	VCD/SK		1	
20.	P	M	12.4	2	11	VCD/SK		1	
21.	AE	M	10.64	4	24	VCD/SK		1	
22.	RO	M	8.92	2	12	VCD/SK		1	
23.	KJ	F	7.32	2	10	VCD/SK		1	
24.	DY	M	6.8	4	22	VCD/SK		1	
25.	KE	F	12.92	2	13	VCD/SK		1	
26.	NC	M	10.16	2	12	VCD/SK		1	
27.	KL	M	13.32	2	13	SK		1	
28.	DK	M	10.92	2	11	SK		1	
29.	AL	M	15.92	2	12	SK		1	
30.	CM	F	10.64	2	11	SK		1	
31.	PI	M	13.58	3	18	AMB		1	
32.	AI	M	9.58	3	25	STRAB		1	
33.	JB	M	8.64	1	*	VCD		1	
34.	RS	M	7.83	1	*	VCD		1	
35.	PS	M	9.32	1	*	VCD		1	
36.	JC	M	7.75	1	*	VCD		1	
37.	CD	F	7.25	1	*	VCD		1	
38.	DS	M	8.08	2	8	VCD		1 (F)	
39.	JS	M	8.5	1	*	VCD		1	
40.	DL	M	13.16	2	8	VCD/SK		1 (F)	
41.	RW	F	11.58	1	*	VCD/SK		1	
42.	MC	F	8.16	2	8	VCD/SK		1 (F)	
43.	OS	M	8.75	1	*	VCD/SK		1	
44.	JG	M	7.25	1	*	VCD/SK		1	
45.	GK	M	10.32	2	7	SK		1 (F)	
46.	JW	F	14.92	1	*	SK		1	
47.	SA	M	11.25	2	8	SK		1 (F)	
48.	AB	M	9.16	1	*	AMB		1	
49.	MM	F	10.32	1	*	STRAB		1	
50.	JS	M	7.58	1	*	STRAB/AMB		1	
		Mean 9.95					18%	46%	36%