

Flooding In Vivo as Research Tool and Treatment Method for Phobias: A Preliminary Report

George Curtis, Randolph Nesse, Martin Buxton,
Jesse Wright, and David Lippman

FLOODING IN VIVO is a method of treating phobias by rapid exposure in real life to the feared object or situation, maintaining maximum tolerable anxiety until it begins to diminish, then continuing closer and closer exposure until the patient or client is comfortable in the situation which was previously feared.^{1,2} Informally, flooding in vivo is one of the most ancient of therapeutic methods, i.e., overcoming one's fears by facing them. Interestingly, one of its first public proposals by a mental health professional came from Freud³ in 1919, writing that the analysis of a phobia could only go so far without insisting that the patient enter the feared situation and struggle with the anxiety in real life. Though he did not use the term "flooding," Guthrie⁴ published several anecdotal accounts of successful application of the procedure. Systematic research on flooding under its current name was begun in the late 1960's by Marks and his colleagues at the Maudsley Institute in London.^{1,2,5,6} These early investigations showed flooding to be safe, effective, and acceptable to patients, in spite of the intense anxiety which it arouses. It may in fact be the most rapid and effective of all available methods for treating phobias.⁷

While a rapid and efficient method of treating phobias would be a noteworthy advance, this alone would be of limited import, since, from a public health standpoint, phobias are among the lesser problems facing psychiatry. However, the significance of flooding may not be limited to this. Several of its characteristics make it more researchable than almost any other procedure in psychiatry. It is intense, rapid, simple, and tied specifically to a definable and controllable stimulus situation. In psychiatry, clinical events with these properties are rare indeed. Among the phenomena occurring during flooding and offering themselves for systematic investigation, are: (1) anxiety: for experimental analysis by psychological, physiological, and pharmacological approaches; (2) other reactions by patients; (3) psychotherapeutic change: allowing investigation of biological and psychosocial factors effecting its rate, quality, and durability; and (4) therapist behavior and therapist-patient interaction.

The generality of findings arising from the study of flooding must of course be evaluated. If, as is often said, all psychotherapeutic methods have a common

From the Department of Psychiatry, University of Michigan Medical Center, Ann Arbor, Mich. Supported by the Department of Psychiatry, University of Michigan, Ann Arbor, Mich.

George Curtis, M.D.: Professor of Psychiatry and Research Scientist, Department of Psychiatry and Mental Health Research Institute, University of Michigan, Ann Arbor, Mich.; Randolph Nesse, M.D.: Resident in Psychiatry, Department of Psychiatry, University of Michigan, Ann Arbor, Mich.; Martin Buxton, M.D.: Fellow in Child Psychiatry, Department of Psychiatry, University of Michigan, Ann Arbor, Mich.; Jesse Wright, M.D.: Clinical Director, Norton Children's Hospitals, Inc., Louisville, Ky.; David Lippman, M.D.: Resident in Psychiatry, Department of Psychiatry, University of Toronto, Toronto, Ontario, Canada.

© 1976 by Grune & Stratton, Inc.

core, then the findings may be widely generalizable. If, as is claimed, behavior therapy methods are based in learning theory and basic research, then generalizability might be greater still.

Our initial goal in undertaking the study of flooding was quite narrow and specific: to identify neuroendocrine changes during acute anxiety. Clinical benefit was welcome, but nevertheless incidental to the purpose. During the course of the work, the broader possibilities rapidly emerged. These will be the major focus on this preliminary report, while neuroendocrine findings will be touched upon only briefly. Many of the findings to be presented are incidental, incomplete, or unsystematic, and are presented mainly for illustrative purposes, requiring validation by more complete and more systematic investigation.

MATERIALS AND METHODS

Patients. Classified advertisements were placed in local newspapers, offering free treatment for phobias of small physical objects in exchange for cooperation with the research efforts, which included donation of urine samples, multiple blood sampling through indwelling needles, and a total of 13 hr of nontreatment time devoted solely to collection of control observations. Treatment was offered only for the phobia and for complications, if any should arise out of participation in the project. Screening consisted of one or more psychiatric interviews, a mental status examination, a physical examination, an MMPI, a Wolpe-Lang Fear Inventory, and an occasional laboratory study to clear up unanswered medical questions. At a later stage of the work, behavioral avoidance testing was added to the evaluation procedure. Criteria for admission were that a phobia for a small portable and obtainable object be the primary disorder, that both patient and evaluating interviewer independently rated the severity of the phobia as four or higher on the rating scale described by Gelder and Marks⁸ (see footnote, Table 1). Subjects must also be free of significant medical or endocrine disease and be willing to observe all specified restrictions of diet and drug intake during the experimental studies.

To date, 12 patients meeting these criteria have been treated. Their clinical characteristics and treatment results are summarized in Table 1. There were 11 women and one man, ages 17-31. All phobias had been present without remission since childhood. The subjects all functioned adequately in their lives and did not consider themselves ill, though several had had therapy or counselling for interpersonal problems. Other than the chronic phobia, none give a history of an acute neurotic or psychotic episode. Most had several other phobias less severe than the one treated.

Table 1. Clinical Data on Patients Treated by Flooding

Patient #	Age	Sex	Phobia	Hours of Treatment	Severity of Phobia*			
					Pre Rx	End of Rx	6 mo	1 yr
1	30	F	Dead Birds	1.3	5	1		
2	27	F	Snakes	3	5	1	1	1
3	27	M	Wasps & Bees	2	5	2		3
4	22	F	Spiders	2	4	1	1	1
5	25	F	Spiders	2	4.5	1.5		1
6	20	F	Snakes	3	5	2	2	
7	22	F	Live Birds	2	5	2		
8	23	F	Spiders	4	5	1	1	
9	31	F	Snakes	5	5	2		4
10	17	F	Snakes	7	5	2	4	
11	26	F	Spiders	2†	4.5	3		
12	30	F	Feathers	2†	5	5		

*After Gelder and Marks:⁸ 1 = no uneasiness when meeting feared object; 2 = uneasiness but no avoidance; 3 = definite fear, tendency to avoid; 4 = strong fear, avoidance if at all possible; 5 = panic attack when avoidance impossible.

†Dropped out after 2 hr of treatment.

Procedure. The treatment procedure was essentially as described by the Maudsley workers.^{1, 2, 5, 6} Prior to treatment, patients were told that the phobia persisted because the frightening object was always avoided. If they would maintain contact with it steadily and for a long enough period of time, the anxiety would diminish and they would become comfortable with it. With variations as described below, the therapist maintained a basic stance of low key, matter-of-fact supportiveness, helpfulness, and nonjudgmental objectivity. The promise was made and kept that patients would know beforehand everything that was going to happen; there would be no surprises. They would not be forced to progress faster than they could tolerate, but would be constantly urged to push themselves to the limit, maintaining anxiety at the maximum tolerable level. The phobic object was then brought into the room and moved rapidly closer to the patient until she either refused to have it brought closer, or was judged to be on the verge of running away. (One patient did flee from the room, but returned promptly). Repeatedly throughout the treatment, patients were asked to rate the intensity of anxiety on a scale of 0 (none) to 100 (maximum). Modeling was regularly employed, meaning that the therapist demonstrated holding and handling the phobic object. All tendencies to withdraw or look away were discouraged, and each step of progress was praised enthusiastically. As soon as one step was completed, another was urged. The therapist initially handled and controlled the object, but transferred control as rapidly as possible to the patient.

THERAPIST BEHAVIOR DURING FLOODING

In this treatment the therapist is of necessity very active. His task is to prevent avoidance behavior, to stimulate approach behavior, and to preserve a therapeutic alliance with the patient. Without previously formulated intent, therapists found themselves responding ad hoc to various treatment situations in ways which are not covered in the above formal statement of procedure nor in those of other workers, but which nevertheless appeared to further the therapeutic task. We have retrospectively classified and caricatured therapist activities as navigation, command, seduction, cheerleading, and mothering behaviors.

Command Behavior

Command behavior refers to anything implying sternness, disapproval, or the arousing of shame or guilt. This would include remarks such as, "You're stalling. Let's get on with it." Patients sometimes ask pleadingly, "Do I have to do this?" To which therapists would reply, "No. Only if you want to get over the phobia." One patient exclaimed, "What in the hell am I doing here? This is the craziest thing I ever did in my life!" The therapist responded quietly but with a touch of sarcasm, "No it's the second craziest. The craziest was to be so afraid of snakes all your life."

Seduction

Although seduction has connotations which do not apply, it has others which do. Patients were not induced to do things which they did not consciously intend to do, nor were they lured unsuspecting into acts which served the ends of the therapist rather than their own. On the other hand, the therapist, like the seducer, always assumed that "No" meant "Maybe." He wheedled, cajoled, and negotiated, seeking alternate routes to his goal if the one he was pursuing appeared blocked. If the patient would not move any closer to a cage containing a snake, perhaps she would keep the same distance while the therapist removed the snake and held it in his own hands. If she would not touch the snake with her hand, perhaps she would allow the tail to lie in her lap while the therapist held the head. Another seduction type behavior is to move ahead faster than the patient fully

realizes or intended. For example, while allowing her to adapt to motion and changes of position of the object, as in moving it from her left to her right and back again, the therapist might simultaneously work his way gradually closer to her.

Cheerleading

Cheerleading behavior refers to enthusiastic and rapid-fire urging to greater effort such as, "That's it! Good! Keep going! No! Don't pull back! Keep going! Good! Now do it again!" Therapist would in fact at times literally break into cheers when a long-resisted goal was reached.

Navigation

Navigation behavior refers to giving orienting information. Many patients have tried to treat themselves by flooding, but gave up too quickly because they could see no progress and had no way of knowing that persistent effort would pay off. The therapist provides this information, and early in the treatment is usually able to demonstrate progress which the patient is not aware of. For example, she may have been near panic when the phobic object first entered the room. If she is still near panic, but now only a few inches from the object, she may not realize that progress has been made, but can readily do so if the object is taken again to the entrance of the room, demonstrating that her fear is now much less than originally. The numerical self-ratings of anxiety are a great aid to navigation. In the late phases of the treatment, navigation becomes unnecessary because the patient can readily see what ground has been covered and what remains to be done.

Mothering

Mothering behavior usually occurs at times when patient distress is especially high and effort especially intense. The tone and manner of the therapist become less rousing, commanding, or cajoling and more comforting and carressing. One patient, on being asked to enter the room where the phobic object was, halted just outside the door and burst into tears. The therapist put an arm around her and said "Don't worry it'll be okay. Now let's go in and see." Still sobbing the patient accompanied him into the room, and in a few minutes treatment was underway in a routine manner.

PATIENTS' RESPONSES DURING TREATMENT

Anxiety

Anxiety is usually quite pronounced and frequently truly dramatic during the course of this treatment. Manifestations include screaming, weeping, running from the room, gooseflesh, chattering of teeth, gross tremors, tachycardia, and hyperventilation.

Associations

Most of the patients did not produce much in the way of psychodynamic associations, but an occasional one did. One, for example, whose phobia was for

dead birds, especially if the feathers were plucked from the head and neck, began during the treatment to talk of male genitals, and recalled both fear and sexual excitement on an occasion when a man exposed himself to her on the bus. She also related the phobia to an early memory of a cat attacking a bird and biting its head off while she screamed and cried in terror. Some of the other types of behavior described below might, however, be taken in a psychodynamic sense and thus considered as indirect associations.

“Perceptual Defense”

Looking away is almost universal during the early part of treatment and was always discouraged. While looking at the object, patients frequently reported feeling as though it were not there, that they had “focused it out,” or were “looking through it” without actually seeing it. We have the impression that this experience sometimes comprises a true negative hallucination. As treatment progresses, these phenomena subside and finally disappear.

Hallucinations

Two patients, both with spider phobias, began to scratch vigorously as they approached spiders. Both reported that they felt spiders crawling under the skin. One patient, with serious intent, asked if the therapist felt it too. The sensations lasted only a few minutes, and the patients showed no other suggestion of psychosis.

Feelings and Behavior Toward Therapist

Most of the therapist-directed behavior and feelings seen in other forms of psychotherapy were also observed with this method. They included trust, distrust, affection, hostility, submissiveness, obstinacy, dependency, idealization, and belittling, in practically all combinations. Usually they were shifting and unfocused, but occasionally, rather specific experiences and feelings from the past were “generalized” or “transferred” to the therapist. For example, one patient as a little girl had repeatedly been chased with snakes by little boys who threw them on her and laughed at her terror. At the end of the treatment, she remarked, “You know, I had the feeling all the way through that you were going to throw it on me and laugh, and I would be humiliated.” This patient had come for treatment because she feared her young son would bring a snake home some day.

Transformation of Affect

Fear of the object was often mixed with disgust, revulsion, affection, anger, pity, or fascination. In the midst of the procedure the affect of two patients shifted abruptly and dramatically from intense anxiety to intense anger, during which they reported an urge to seize the object and tear it to bits or pound upon it. Within a few minutes, these feelings subsided or shifted back to anxiety. Two patients continued to experience affection or fascination for the object long after treatment was finished and the anxiety response had been eliminated.

RESULTS OF TREATMENT

Outcome

These are summarized in Table 1. Total treatment time ranged from 1.3 hr to 7 hr. All patients who remained in treatment experienced dramatic relief of the phobia at the end. Treatment was considered complete when the patient could tolerate unlimited contact with the object, with little or no discomfort or anxiety. In the case of snake phobias, this meant holding live snakes, wrapping them around the wrists and arms, allowing them to crawl up the sleeves, and inside blouses or shirts, and so forth. Patients with spider phobias were worked with until they could comfortably allow spiders to crawl on their arms, legs, faces, necks, and in their hair.

Relief of the phobia within the treatment setting carried over into the rest of life. A patient who avoided even pictures of snakes and who was constantly apprehensive while walking in fields or woods was able to continue fishing without apprehension after seeing a real snake wriggle across her path. Previously she would have run to the house and not come out for 2 or more hr. Patients with spider phobias, who never entered a room without examining it for spiders, ceased to notice or think about them.

Follow-up studies are in progress, but are incomplete at present. In three patients the cure remains complete after 1 yr, and in a fourth patient, it remains complete after 6 mo. Two patients have had partial recurrence after a year, but declined retreatment. Another had an apparent full relapse within 2 mo. However, testing and partial retreatment at 6 mo revealed that the recurrence was not as complete as it appeared. In about 45 min of retreatment, she regained about as much ground as had been covered initially in about 4 hr of treatment. Further retreatment is contemplated at the time of her 1-yr follow-up.

Problems other than the phobia were affected either very slightly or not at all. A few patients reported feeling generally more self-confident, self-respecting, and independent after treatment. One patient treated for a spider phobia also lost her fear of insects but retained her fear of heights. It was our general impression that such slight spill-over effects as did occur were in a positive direction.

Complications and Symptom Substitution

Patients occasionally, but not frequently, experience nightmares after the first treatment session, but these have all been transient. No new symptoms have been observed in any patient other than the transient ones described above. Three patients made an initial commitment to undergo treatment, but dropped out on various pretexts before it ever got underway. Two dropped out after 2 hr of treatment, even though their phobias seemed much improved.

DISCUSSION

The purpose of this article has been to illustrate some of the ways in which flooding may be used to investigate significant issues in psychiatric research, all this apart from its usefulness as a treatment method. Not all possible uses have been illustrated, nor have substantiated findings in most instances been pre-

sented. Some ways in which flooding can be used as a research tool have, however, been demonstrated.

Psychological, physiological, and pharmacological studies of acute human anxiety have been seriously limited in the past due to a lack of methods for reliably producing acute anxiety under controlled conditions. If results did not come out as predicted, doubt could be cast upon them because of the possibility that the anxiety was not powerful enough or not "real" enough. If studies of flooding are carefully planned and designed, these limitations are all overcome. There can be little doubt that the anxiety is real. It is usually powerful, and it can be turned on and off at will.

To illustrate a single psychophysiological point, measurements of plasma cortisol during flooding (which will be reported in detail elsewhere) demonstrate that adrenal cortical activation is not ordinarily part of the acute phobic anxiety reaction, if it occurs during the evening hours and if the effects of new and novel environments are controlled or eliminated. This is only one of many physiological systems which can be studied with experimental control for contaminating variables.

Flooding would appear to be an excellent test system for antianxiety drugs or for drug modification of specific components of anxiety. Studies of this type are underway in our center.

Patient reactions during flooding appear to throw light on psychodynamic processes such as defenses and "underlying" affects and thoughts, to name only a few. They are at least compatible with the concept that phobias give expression to underlying conflicts. Thus flooding may provide a tool for investigating some of these issues.

The results of this treatment cast doubt upon the notion that phobias always serve a necessary psychological function or that their removal necessarily requires treatment for underlying conflicts. Two "functions" of phobias may, however, create the impression that they are necessary. One is that avoiding the phobic object prevents anxiety. It is now clear that exposure ultimately reduces, rather than increases, this anxiety, thus eliminating one reason to "need" the phobia. The anxiety-reducing property of neurotic symptoms is clearly enunciated both in behavioral theory and in psychoanalytic ego psychology, though not in the earlier topographical psychoanalytic concepts. The other possible function of phobias is what psychoanalysts call "secondary gain" and behaviorists call "social reinforcement" of the symptom. Possibly some patients may encounter difficulty in giving up these gratifications, but as a rule the advantages to the patient seem to outweigh the losses.

Although flooding appears to be radically different from other forms of therapy on the surface, it has a number of common elements with other behavioral as well as psychodynamic methods. One common element is exposure to what is feared, i.e., to physical stimuli in behavior therapy and to internal stimuli (wishes, impulses, fantasies) in psychodynamic therapy.

A plausible but unproved hypothesis is that extinction of conditioned anxiety is a basic mechanism of change in all forms of psychotherapy. Thus the feared stimulus, whether external or internal, would be considered as a conditioned stimulus which has been paired sometime in the past with some unspecified un-

conditioned anxiety stimulus. The response of the symptom to flooding and the tendency for partial spontaneous recovery resemble the behavior of conditioned anxiety responses. The extinction of conditioned anxiety in laboratory animals is known to be enhanced or retarded by a number of drugs and hormones. If flooding should be affected similarly, the extinction hypothesis would be strongly supported. This line of investigation could have practical usefulness as well. Possibly, some drugs may be clinically beneficial in making the treatment more rapid, more tolerable, or more lasting.

The role of the patient-therapist relationship in producing the "cure" is of interest. It seems plausible that the main function of the relationship is to strengthen the patient's motivation to approach and expose himself to the feared situation, but that exposure per se eliminates the anxiety.

Finally, we would suggest that command, navigation, cheerleading, seduction, and mothering behaviors, which are done overtly in flooding, are done covertly in other types of therapy including psychoanalysis, and that they form an essential part of the "therapeutic alliance" and the "realistic part of the relationship" as distinguished from the transference.

SUMMARY

Flooding in vivo is a rapid, safe, simple, and effective method for treating phobias. Since it is specifically tied to a defined stimulus situation and can be turned on and off at will, it also lends itself to experimental investigation of a number of clinically significant problems. Among these are the psychology, physiology, and pharmacology of anxiety and therapeutic change and the behavior of therapists and patients during therapy. Among the early substantive findings with the technique are that cortisol is not necessarily secreted during anxiety, and that phobias do not "protect" against other, possibly more serious disorders.

ACKNOWLEDGMENT

This work was supported by the Department of Psychiatry, University of Michigan. The senior author learned the flooding technique with the aid of Dr. Joseph Wolpe.

REFERENCES

1. Boulougouris JC, Marks IM: Implosion (flooding)—a new treatment for phobias. *Br Med J* 2:721-723, 1969
2. Watson JP, Gaid R, Marks IM: Prolonged exposure: A rapid treatment for phobias. *Br Med J* 1:13-15, 1971
3. Freud S: Lines of advance in psychoanalytic therapy. *Standard Edition* 17:159-168, 1919
4. Guthrie ER: *The Psychology of Learning*. New York, Harper and Brothers, 1935
5. Marks I, Boulougouris J, Marset P: Flooding versus desensitization in the treatment of phobic patients: A crossover study. *Br J Psychiatry* 119:353-375, 1971
6. Marks IM, Viswanathan R, Lipsedge MS, et al: Enhanced relief of phobias by flooding during waning diazepam effect. *Br J Psychiatry* 171:493-505, 1971
7. Marks I: Perspective on flooding. *Semin Psychiatry* 4:129-138, 1972
8. Gelder MG, Marks IM: Severe agoraphobia: A controlled prospective trial of behaviour therapy. *Br J Psychiatry* 112:309-319, 1966