

Applied Tension

A specific coping technique for blood-injury phobia

Lars-Göran Öst

Professor emeritus

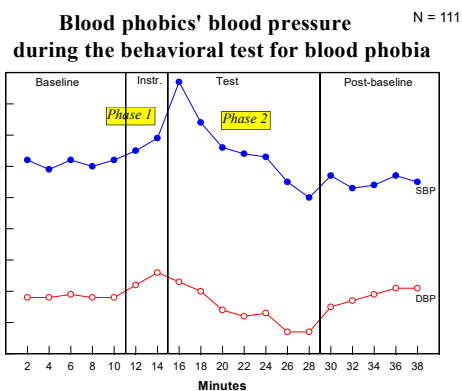
Department of Psychology, Stockholm University
Haukeland University Hospital, University of Bergen
Dept. of Clinical Neuroscience, Karolinska Institutet

Blood phobia test

- **Baseline (10 min)**
 - Patient is resting, BP assessed every 2 minutes.
- **Instruction (4 min)**
 - The patient is told that in a few minutes a video about thoracic surgery is going to be shown.
- **Test (max 30 min)**
 - The video is shown and the patient can stop it with the remote control at any time.
- **Post baseline (10 min)**
 - Patient is resting, BP assessed every 2 minutes.

Blood-injury phobia

- The physiological response pattern differs from other phobias with a *sharp decrease in blood pressure leading to fainting* if the patient does not escape from the situation.
- Blood phobia has the highest *family prevalence* (about 60%) of any anxiety disorder.

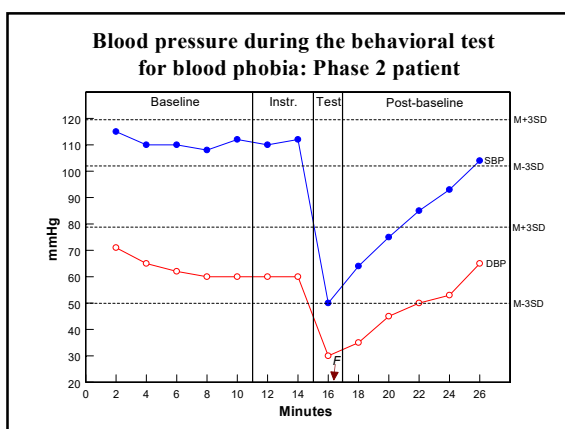
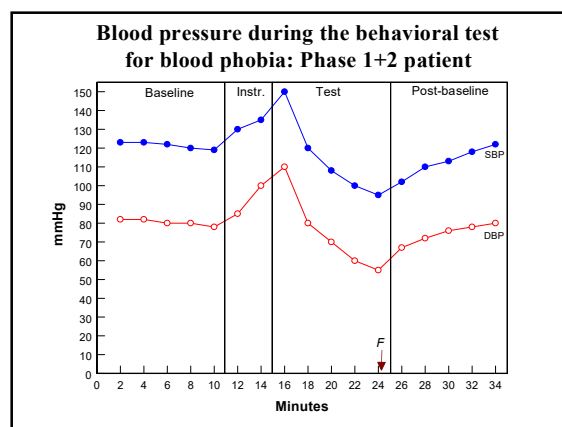
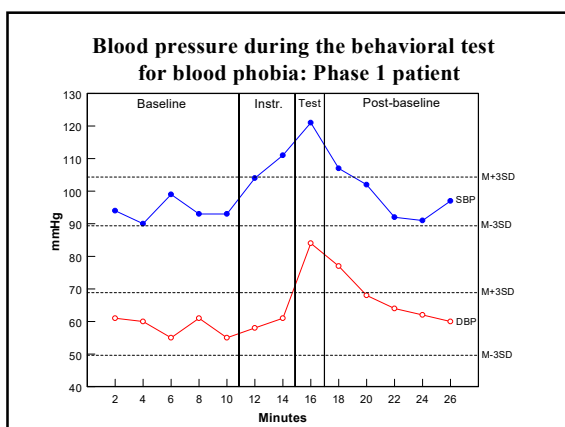
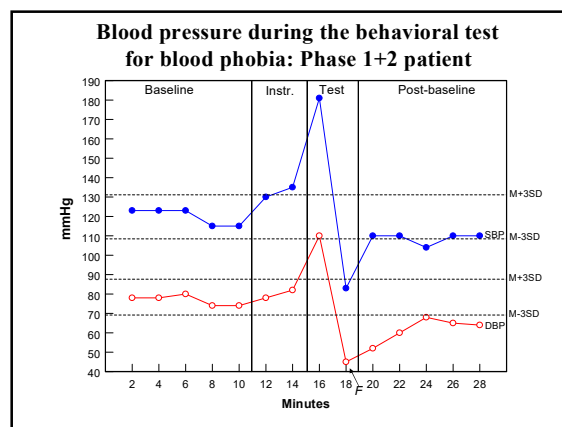
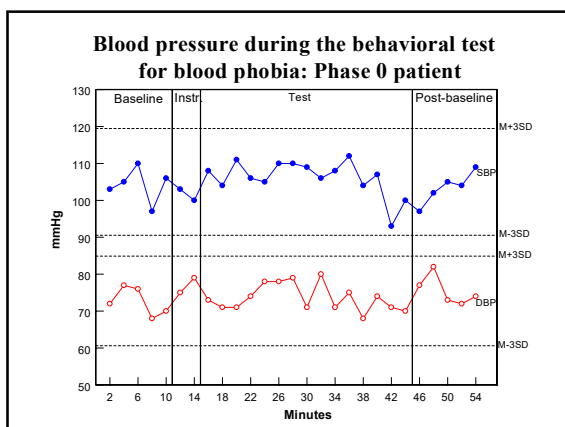


Biphasic response

- **Phase 1**
 - An initial increase in blood pressure and heart rate.
- **Phase 2**
 - A rapid decrease in blood pressure and heart rate.
 - This leads to reduction of cerebral blood flow and oxygenation.
 - When the blood flow has been reduced far enough (depending on the individual person) fainting occurs.

Definition of phases

- For each patient M and SD during the 10 min baseline were calculated.
- **Phase 1: Increase from baseline: $M + 3SD$**
 - At least one data point during the instruction phase 3rd-4th min, or during the test phase fulfills criterion.
- **Phase 2: Decrease from baseline: $M - 3SD$**
 - At least one data point during the test phase or during the post baseline phase 1st-4th min fulfills criterion.



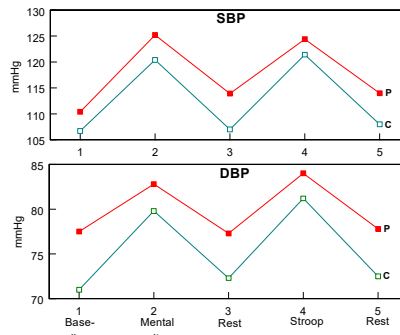
Distribution across phases

	SBP	DBP	HR
Phase 0 (neither increase nor decrease)	19%	30%	12%
Phase 1 (increase only)	38%	34%	37%
Phase 2 (decrease only)	11%	12%	11%
Phase 1+2 (both increase and decrease)	32%	24%	40%

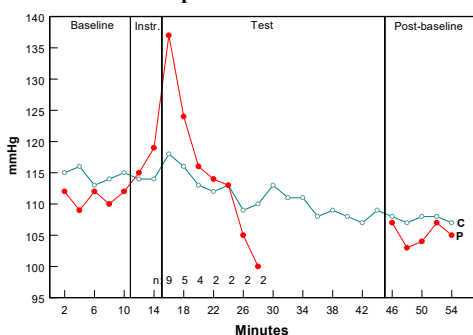
Is the reaction individually or situationally determined?

- 16 (10F, 6M) blood *phobics*, M age 30.3 (21-44)
- 16 (10F, 6M) blood *donors*, M age 31.5 (23-43)
- Two test situations:
 - Behavior test for blood phobia
 - Stress tests
 - Baseline (rest) 5 min
 - Mental arithmetic (counting from 2194 with -7) 3 min
 - Rest 4 min
 - Stroop test (naming the color the words are printed in) 3 min
 - Rest 4 min

Blood pressure during the stress tests



Systolic blood pressure during the behavioral test for blood phobics and normal controls

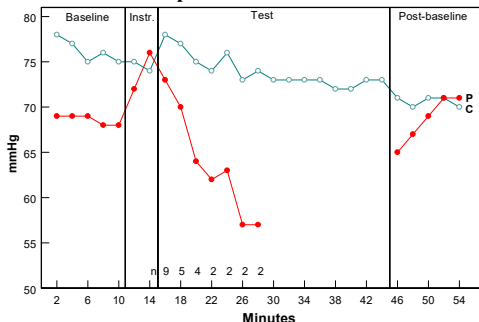


Applied Tension

A coping technique consisting of the following components:

1. The therapist interviews the patient about the *earliest symptoms* he/she usually experiences when fainting, or being close to fainting.
2. The patient learns a simple and effective technique to *increase the blood pressure* by tensing the body's big muscle groups.
3. The patient is *exposed to blood stimuli* in order to learn to recognize 1 and apply 2.

Diastolic blood pressure during the behavioral test for blood phobics and normal controls

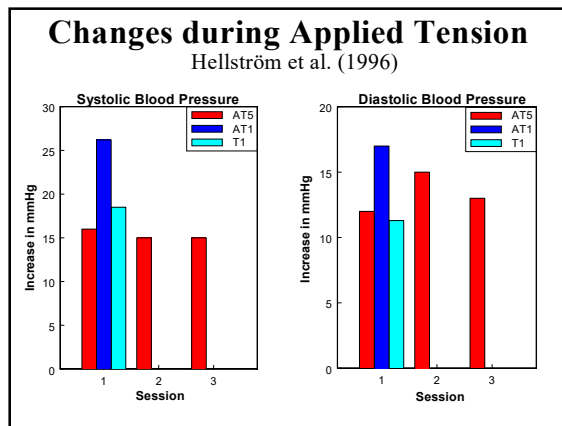


Applied Tension: 5 sessions

1. Instruction of *the tension technique*
Homework assignment: practice 5 times/day
2. Applying the tension technique while being
3. exposed to *slides of wounded people*
4. Applying the tension technique while visiting the *Blood donor center*
5. Applying the tension technique while visiting the *Department of Thoracic Surgery*
Maintenance program (e.g. blood donation)

The tension technique

- Tense the arm-, chest-, and leg muscles firmly
- Keep the tension for 15-20 sec (until you feel the warmth rising in your face)
- Release the tension and return to normal but don't relax
- Pause for 30 sec
- Repeat tension-release-pause 4 times
- Practice 5 times/day spread across the day



Does the tension affect BP?

- The patient is exposed to slides of blood, wounds, etc. and is instructed to *indicate* when feeling the first symptoms of the BP falling.
- The BP is assessed (1).
- The patient is instructed to *apply the tension technique* as much and as often as needed in order to be able to watch the slide without feeling the symptoms.
- The BP is assessed once more when the patient has stopped tensing (2).
- The difference between 1 and 2 is calculated.

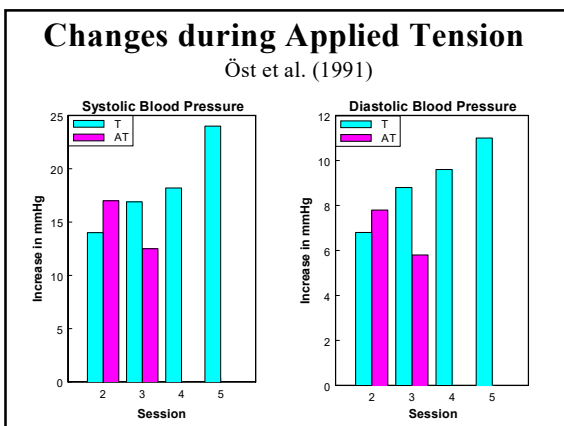
Influence on cerebral blood flow

- Foulds et al. (1990) 12 blood phobic patients

Mean Cerebral Blood Flow Velocity between conditions

Condition	Arithmetic	Rest 2	Tension	Rest 3
	2 min	4 min	2 min	4 min
Rest 1	+2.24**	+0.38	+4.40**	-1.08
Arithmetic		-1.96*	+2.16**	-3.32
Rest 2			→ +4.12**	-1.36
Tension				-5.48**
Rest 3				

* $p < 0.05$, ** $p < 0.01$



Conclusion

- These studies show that Applied Tension and Tension-only do what they are supposed to do:
 1. The patient's *blood pressure is increased* while being exposed to blood stimuli.
 2. The *cebral blood flow is increased*.

Thus, the treatment has the potential to prevent fainting from occurring.

Randomized Clinical Trials

- Öst et al. (1989). AT, AR, Combination
– *Behaviour Research and Therapy*, 27, 109-121.
- Öst et al. (1991). AT, T, Exposure
– *Behaviour Research and Therapy*, 29, 561-574.
- Hellström et al. (1995). AT5, AT1, T1
– *Behaviour Research and Therapy*, 34, 101-112.
- Vögele et al. (2003). AT1, Control (distraction)
– *Behaviour Research and Therapy*, 41, 139-155.

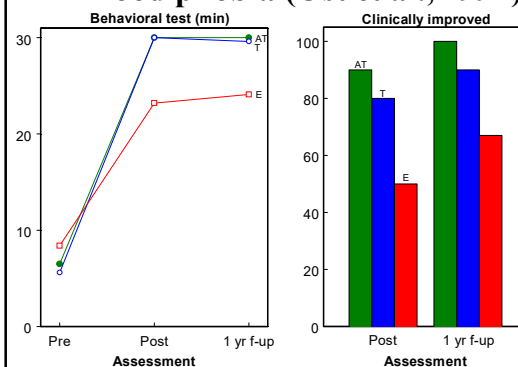
Which component in AT is the most important? (Öst et al., 1991)

- Applied Tension consists of:
 - Learning an effective tension technique.
 - Being exposed to a number of blood stimuli in order to obtain experiences of how it works when applying the technique.
- Are both components necessary to achieve a good treatment effect?
- Is only tension or only exposure enough?

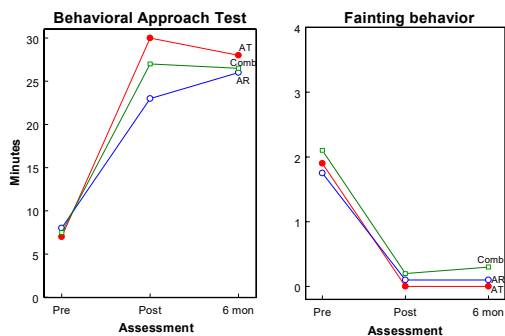
Comparison of two coping techniques (Öst et al., 1989)

- The purpose was to compare three treatments:
 - Applied Tension with focus on phase 2 (5 sess.)
 - Applied Relaxation with focus on phase 1 (9 sess.)
 - Combination with focus on both phases (10 sess.)

Blood phobia (Öst et al., 1991)



Blood phobia (Öst et al., 1989)



Can AT be done in shorter time? (Hellström et al., 1995)

- Two studies show that AT in 5 sessions gives a good treatment effect.
- In other specific phobias, e.g. spider, flying, and claustrophobia 1 session (max 3 hours) gives a good effect.
- Can AT be shortened to 1 session without the effect being worse than for 5 sessions?
- Can 1 session of tension-only yield as good an effect as AT for 1 session?

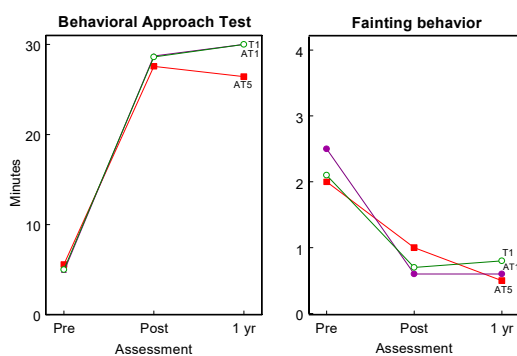
Applied tension: 1 session

1. Description and modelling of the technique
2. Tension training and assessment of blood pressure at even intervals (for 30 min)
3. Application training - 10 slides
4. Application training with other stimuli, e.g.
 - Pricking fingers, blood in test tube, bandages
5. Home work assignments:
 - Tension training 5 times/day
 - Application training - 10 photos

Within-group effect sizes

	Treatment conditions					
	AT5	AT1	T5	T1	Exp	AR
Number of groups:	3	1	1	1	1	1
Behavioral test	4.26	3.64	3.28	3.55	2.41	2.17
Assessor rating	2.75	2.38	1.90	1.70	0.70	1.29
S-R of anxiety	2.85	2.60	2.00	1.67	1.50	1.27
Mutilation Q.	2.73	2.58	2.49	1.12	1.72	1.04

Blood phobia (Hellström et al., 1995)



Clinical effects of AT

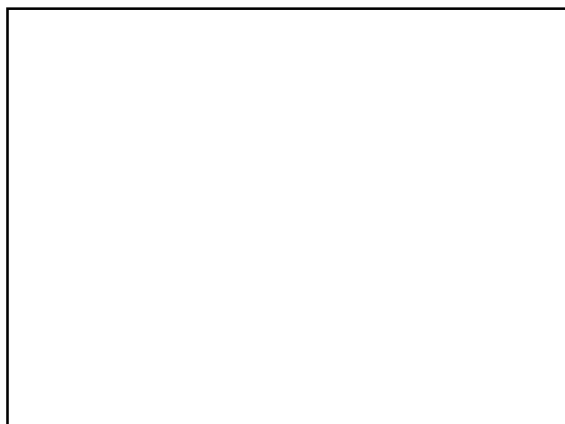
- Not enough studies to do a meta-analysis.
- Three of my studies (N = 60) show that **72%** achieve remission and the effect is maintained at 1-year follow-up.
- The results have been replicated by different research groups in England, Germany, Canada and USA.

English study (Vögele et al., 2003)

- 22 fainters at the sight of blood or injury.
- Randomly assigned to AT or control condition.
 - AT: practicing the technique for 7 minutes
 - Control: verbal interaction with the experimenter
- **Results**
 - HR (bpm): AT -4.9, Control -6.7 ($p < 0.05$)
 - SBP (mmHg): AT -11.6, Control -21.2 ($p < 0.01$)
 - DBP (mmHg): AT -2.0, Control -8.0 ($p < 0.01$)
 - Subjective ratings: No significant differences

Conclusions

- Applied Tension and Tension-only fulfill the criteria as *probably efficacious* treatments.
- Needs one *independent replication* showing that AT/T is significantly better than a placebo treatment, or another active treatment.
- Tension-only is the only example in specific phobias where a *non-exposure treatment* is more effective than exposure in-vivo.



Brief CBT analysis 1

T: What is the worst thing you fear will *happen* when you get an injection?
 P: I don't know. I always avoid it.
 T: Imagine that you need a necessary vaccination for a trip to a tropical country where you have got your dream job.
 P: Then I would have to do it.
 T: What do you think will happen?
 P: I would feel a strong pain.
 T: What will happen to you then?

1-session treatment of injection phobia

Lars-Göran Öst
 Professor emeritus

Department of Psychology, Stockholm University, Sweden
 Dept of Clinical Psychology, University of Bergen, Norway
 Dept of Clinical Neuroscience, Karolinska Institutet, Sweden

© L-G Öst, 2014

P: I don't know. It will be so awful?
 T: What do you think will happen in the long run?
 P: I fear that the pain will never dissipate.
 T: OK. The worst that you imagine could happen is that you will have a constant pain. How convinced are you (0-100%) *in the situation*, when you are in contact with the needle, that it will lead to constant pain?
 P: 100%.
 T: And how convinced are you *now when you are sitting here* talking rationally to me about it?
 P: 30%

Catastrophic beliefs in injection phobias

Category	freq.	%	Category	freq.	%
<i>Physical</i>	144	66.7	<i>Mental</i>	61	28.2
1. Dying	18.1		1. Going insane	8.3	
2. Fainting	6.9		2. Losing control; doing something actively	7.4	
3. Bodily harm	24.1		3. Losing control	7.4	
4. Continuous pain	7.4		4. Other	5.1	
5. Allergic reaction	1.9				
6. Other	8.3		<i>Social</i>	11	5.1

Öst et al. (2010). Unpublished data. Patients with intra-oral injection phobia.

Brief CBT analysis 2

T: What is the worst thing you fear will *happen* when you have a blood sample withdrawn?
 P: I don't know. I always try to avoid it.
 T: Imagine that you have contracted a serious illness and it is absolutely necessary for your treatment to give a blood sample.
 P: Then I would have to do it.
 T: What do you think will happen?
 P: I would faint.
 T: What will happen to you then?

P: I don't know. But I fear that I will not wake up?

T: What does that mean?

P: I will die.

T: OK. The worst that you imagine could happen is that you will die. How convinced are you (0-100%) *in the situation*, when you are giving a blood sample that you will die?

P: 90%.

T: And how convinced are you *now when you are sitting here* talking rationally to me about it?

P: 10%

Fainting experiences

- In our sample of injection phobia patients 56% has experienced fainting in injection situations.
- If this is revealed during the screening interview you should teach the patient how to do the tension technique and practice this at home.
- During the exposure sessions the patient is instructed to observe the first signs of blood pressure dropping.
- If this happens the therapist coaches the patient to apply the tension for as long as needed.

Brief CBT analysis 3

T: What is the worst thing you fear will *happen* when you get an injection?

P: I don't know. I always avoid it.

T: Imagine that you need a necessary vaccination for a trip to a tropical country where you have got your dream job.

P: Then I would have to do it.

T: What do you think will happen?

P: I don't know. But I fear that the needle will break when it is in my arm.

T: What will happen then?

Phases in exposure treatment

- **I: Pricking of fingers**
 - Psycho-education about pain cells.
 - All 10 fingers may be pricked.
- **II: Subcutaneous injections**
 - Psycho-education about the distribution of pain and pressure cells on the arms.
 - Three "sham" injections in each arm.
 - Three real injections with saline in each arm.
- **III: Venipunctures**
 - Psycho-education on how it works
 - 1-2 venipunctures in each arm.

P: The needle tip will flow in my veins.

T: What will happen then?

P: When it comes to my heart I will die.

T: OK. The worst that you imagine could happen is that you will die. How convinced are you (0-100%) *in the situation*, when you are getting an injection

P: 95%.

T: And how convinced are you *now when you are sitting here* talking rationally to me about it?

P: 20%

Psychologist ± a nurse

- A psychologist can do the procedures in the phases above providing he/she is trained by a person licensed to do such training.
- Intravenous injections are not allowed.
- Having a nurse as co-therapist can also work but is difficult in cases where the psychologist has to work cognitively to motivate the patient.
- There is often a small window of opportunity in which the procedure needs to be done.

Testing of catastrophic beliefs

- **The needle will break**
 - Take a subcutaneous needle (ca 30 mm) between the thumb and index finger. Bend it 90° and 180° to the right and then 90°, 180°, 270° to the left, and so on until it breaks. Let the patient describe how this could happen in the arm.
- **The pain will become constant**
 - Prick a finger and let the patient rate the pain (0-100). Talk about other things and get new ratings after 2, 5, and 10 minutes. Note how the rating goes down or completely dissipates.

Öst et al. (1992)

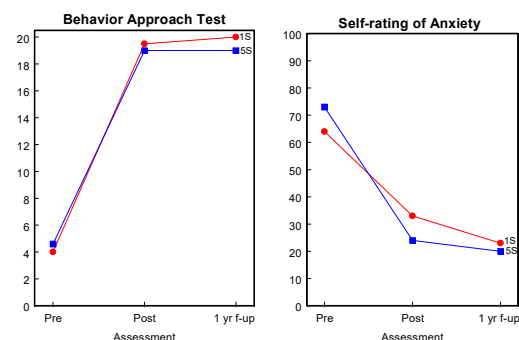
- 40 patients: 35 females and 5 males, fulfilling DSM-III-R criteria for specific phobia
- Mean age: 26.9 (18-51) years
- Mean duration: 18.8 (3-47) years
- Design: RCT 1 vs. 5 sessions of exposure

Variable	One	Five	p-value
Treatment time (hr)	2.0	3.5	0.0001
Pricking of fingers	10.0	16.1	0.0005
Subcutaneous injections	9.9	17.9	0.0001
Venipunctures	2.5	4.2	0.0001

Testing of catastrophic beliefs

- **I will lose control and become aggressive**
 - Have the patient describe in detail what he/she will do that is aggressive towards another person in the room. Do the procedure, observe what actually happens, and let the patient verbalise it.
- **I will faint**
 - Teach the tension technique. Do the procedure and help the patient to apply the tension at the early signs of the blood pressure dropping. Make sure that the patient uses the tension until the symptoms have dissipated.

Injection phobia (Öst et al., 1992)



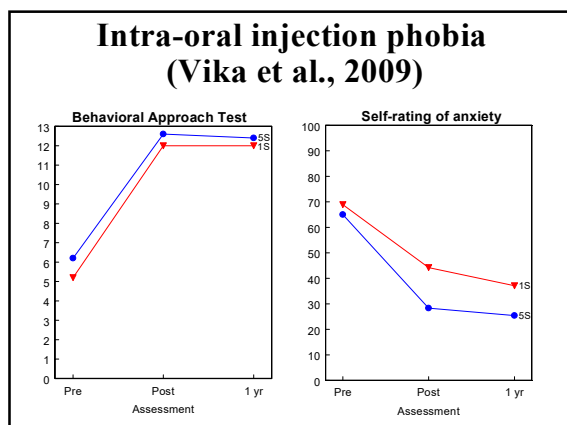
Generalization training

- Most patients need to learn that what they did together with the therapists also works with medical staff in general.
- They contact the primary care center where they are listed and ask to be allowed to come there to practice.
 - Once a week for four weeks and doing 2/3 procedures.
 - Once a fortnight for four weeks and doing all 3 procedures.
 - Ask for the possibility to meet different nurses if possible.

Vika et al. (2009)

- 55 patients fulfilling DSM-IV criteria for specific phobia (intra-oral injections)
- Mean age: 32.5 (18-62) years
- Mean duration: 7.0 years
- Design: RCT 1 vs. 5 sessions of exposure
- Therapists: 3 dentists trained in exposure

Variable	One	Five	p-value
Treatment time (hr)	2.8	4.4	0.001
Intra-oral injections	12.0	21.5	0.001



Conclusions

- Injection phobia can be treated effectively with exposure in-vivo, one or multiple sessions.
- Clinically significant improvement (%):

Study	1-session		5-sessions	
	Post	F-up	Post	F-up
Öst (1992)	80	90	79	84
Vika (2009)		82		96
- One session is as effective as five sessions and the effects are maintained at 1 yr follow-up.