

BODY AWARENESS: THE PROPER APPLICATION OF RELAXATION AND
BREATHING TECHNIQUE¹

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BODY AWARENESS: THE PROPER APPLICATION OF RELAXATION AND
BREATHING TECHNIQUE¹

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SAMENVATTING. Lichaamsbewustwording: de juiste toepassing van ontspannings- en ademhalingsstechnieken. Ontspanningstechnieken worden veel toegepast, maar vaak op een beperkte en eenzijdige manier. Indien men uitgaat van een ruimer begrip van ontspanning dan alleen "passieve rust", is toepassing van ontspanningstechnieken als een op zich zelf staande behandelwijze goed mogelijk.

De elementen van een multipele relaxatie training worden beschreven, die enerzijds nadruk vertonen op fysieke rust en bewegingsloosheid (passieve ontspanning, EMG-feedback en ESR-monitoring) en anderzijds op lichaamsbeweging en -beweeglijkheid (actieve ontspanning, manuele techniek, ademhaling). Deze elementen worden onderling verbonden tot een zinvol geheel door (1) de rol van de ademhaling, en (2) het begrip "lichaamsbewustwording".

Wanneer ademhaling en lichaamsbewustwording als integrerende factor worden herkend en benut, zal de toepassing van ontspanningstechnieken aan kwaliteit winnen en minder vaak eenzijdig en beperkt zijn. Dit is van bijzonder belang voor de gezondheidszorg, waar de specifieke problematiek van patiënten een standaard-methode nauwelijks toelaat. Een multipele relaxatietraining heeft bewezen goed te functioneren in de hartrevalidatie. Wat betreft het therapeutisch gebruik in het algemeen, is er behoefte aan aanvullende training van therapeuten, en aan onderzoek naar indicaties voor behandeling.

Relaxation techniques are widely used in medical, para-medical and psychological professions. They are commonly applied as an additional element to a treatment, in an abbreviated form. Although this favoured popularization of relaxation training, it led also to misunderstanding of its nature. Bruce Paul (1980) mentions six points where relaxation is often misunderstood and misapplied: (1) it is regarded as an extra that may be of some help when added to an existing program, (2) it is used routinely without regard for the time and manner of its introduction, (3) there is failure to give the client an understanding of its nature and how it works, (4) there is failure to motivate and

assist the client to practise regularly, (5) there is failure to employ methods to facilitate transfer to life situations, (6) there is failure to recognize its many applications.

Indeed, most relaxation methods were originally developed as rather complete systems, both for psychophysical re-education and for treatment of complaints. The work of Jacobson has been re-examined recently in this light and found to be much more effective than the actual use of progressive relaxation (Lehrer, 1982). Proper application can therefore be a treatment in its own right.

This type of application has been experimented with since 1974 in the Cardiac Rehabilitation Unit of St. Joannes de Deo Hospital in Haarlem, The Netherlands (Van Dixhoorn, 1975). Many different techniques have been tried for active and passive relaxation, including biofeedback, respiratory regulation, massage and manual technique, in individual and group sessions. It was found that a multiple relaxation training, not limited to a single standardized technique can be an important element of cardiac rehabilitation, especially if the team approach is truly comprehensive.

In this paper I would like to elaborate on the question how the concept of body awareness helps to apply properly different relaxation techniques. I will do this through a detailed description of techniques that shows the underlying principles. I will refer especially to myocardial infarction (M.I.) patients and to (1) passive relaxation, (2) active relaxation and (3) regulation of respiration.

TECHNIQUES FOR BODY AWARENESS

This description is based on experience gained in the department of Biofeedback as a member of the Cardiac Rehabilitation Team in St. Joannes de Deo Hospital. From 1977-1983 several hundred patients were treated, usually about 20% of the total number of patients attending the rehabilitation program. Treatment consists of four to eleven individual sessions, seven on average. Each session lasts almost one hour. Group sessions have also been held regularly, usually for 4-8 participants. It was found, however,

that the relaxation proper became secondary in this situation and that the group discussion took most of the time. Many individuals could not really be taught to practise correctly. Individual sessions are therefore chosen as the model for description. Its effectiveness is currently being assessed in a randomized controlled trial (Van Dixhoorn, De Loos & Duivenvoorden, 1983).

Passive Relaxation

One begins with a period of rest in the supine position on the bed. The patient is asked to do the same at home, when he wants to take a break and can lie down on a carpet, couch, bed or in a reclining chair. The purpose is to learn what actually happens when one rests. In order to quiet down, it suffices to recline in a well-supported position, not to move, to direct attention to the body and to simply continue this for 8-10 minutes. In this period a "relaxation response" may occur (Benson, Beary and Carol, 1974): muscle tension, heart and respiration frequency diminish, thoughts slow down, body sensations become more apparent, time perception changes and the electrical skin resistance increases. Subjectively, this period may seem quite long. To not to do anything at all, nor to even think about things, and still remain attentive is a real task for both the patient and the therapist. Relaxation "techniques" often have no other purpose than to fill this emptiness; the art of the technique is to make the relative emptiness bearable, without filling it completely with things to do (Ikemi, Ishkawa, Gogechi, Sasaki, 1978).

The first way to do this, is to *inquire about the experience*. Two or three times during the rest period the therapist starts talking, asking questions in a normal tone of voice: how the patient is doing and what he feels. In this way, silence does not create an overpowering atmosphere and the patient learns to understand better what is asked of him: just lie down and feel the body lying down. Also, he can mention things that bother him, which sometimes results in a remarkable drop of tension level.

Another way to make this rest period more acceptable and comprehensible is *electromyographic (EMG) feedback*. Usually electrodes are attached to the Frontalis muscle, sometimes to leg,

arm, shoulder or neck muscles. Knowing that one is connected to a technical device may help him to lie still. The auditory feedback signals provide a point of attention that facilitates concentration, and which may help, together with awareness of the electrodes, to perpetuate rest. Next, the feedback signals transmit information about tension changes in the recorded muscles. The meaning of the signals is explained without giving any explicit assignment towards slowing down the signals and decreasing the tension. Too much attention on the signals or the wish to master a task may increase the arousal of the patient and disturb his rest (Lo, Johnston, 1984). Therefore, the instrument is adjusted to provide a non-irritating, background signal.

A third way is to give *verbal instructions* aimed at focussing attention, for instance: on the backside of the body, where support is felt, or the soles of the feet, on breathing movement, tension in the jaw, tongue, eyes, etc. Sometimes the patient is asked to slightly contract and relax muscles, for instance through endorotation of the legs, stretching the achilles tendons, rolling the head or frowning. This facilitates contact with the body, it can illustrate the meaning of the feedback and it prevents stiffening of the muscles.

It is essential to perpetuate the immobility and to continuously notice bodily changes. This is the "royal" road to understand relaxation and the passivity, mentally and physically, it involves. It can all be applied at home, but it may be difficult to perpetuate silence and immobility, especially at home. The therapist should therefore watch for signs of bodily tension increases during rest. This paradoxical reaction is not uncommon: muscle tension may increase, or skin resistance decreases, respiration becomes irregular or quickens, and sometimes the patient is visibly relieved to get up again. It is of importance to discuss unexpected "negative" reactions: awareness of bodily discomfort, unrest, itches, pains, tightness as well as feelings of irritation, wasting one's time, etc. Relaxing implies to become aware of tension, so the signs of experienced tension cannot be avoided. One of the reasons that people do not apply relaxation at home routinely is that they do not accept this fact.

The relationship between patient and therapist is of importance as well. The therapist should be alert and attentive, but in a neutral way: not watching the patient fixedly, not being too intent on the patient's success or failure in achieving relaxation, not interfering too quickly or too much. On the one hand, the therapist is not imposing his presence, but on the other hand he behaves as a model to the patient, exemplifying the purpose of the training and showing unconditional acceptance of the patient and his experiences (Bram Amer, 1978).

Regulation of respiration

Respiration is intimately connected to relaxation and body awareness. During physical rest, i.e. successful immobility, ventilation decreases. Consequently, respiration rate and tidal volume decrease, and the pause after exhalation becomes longer. Sometimes, respiratory suspension periods may occur, especially when mental calmness is deep, as for instance during meditation (Badawi, Wallace, Orme-Johnson, 1984). If, however, the concentration to achieve immobility is too much of an effort, respiration does not decrease or may even become faster. On the other hand, when the rest period is accompanied by pleasurable body sensation, the pattern of breathing movement may change into a more diaphragmal type (Grossman, 1983). As a result, tidal volume will increase, respiration rate diminishes even more, the post-exhalation pause disappears and is replaced by a continuous, smooth and slow breathing rhythm. When a person can feel, for instance, the lower back, shoulder blades, hips, jaws, neck, etc., and these parts relax well, the trunk will allow an easier respiratory movement. The person may notice breathing movement along the whole length of the spine and in the whole of the trunk. This pattern of full, slow breathing is associated with active relaxation, and remains more or less the same in different postures. On the contrary, the slow, small breathing movement of passive relaxation disappears with body movement to sitting or standing or other physical stimulation. Therefore, these *respiratory changes are suitable indicators of passive and active relaxation.*

Also, techniques have been developed to modify breathing in order to stimulate these changes. Some of them will be outlined below.

1) Information about the respiratory movements is augmented when the patient or therapist lies his hands on the back, abdomen, chest or sides. In this way, respiration becomes a suitable focus for attention. Usually, fast and difficult breathing becomes slower and easier; shallow, high-thoracic breathing becomes deeper and more diaphragmal. If this does not occur, one can guide the movement manually or verbally.

2) Making the air passage audible. Pursing the lips a little will increase the resistance on the air passage. Consequently, the breathing becomes audible (which provides another feedback). Also diaphragmal inspiratory contraction is stimulated. The tidal volume increases and the pattern of movement shifts to a more costo-abdominal pattern in which the lower ribs expand sideways, more than being lifted up vertically. Sideway expansion occurs especially when the lumbar and abdominal muscles relax during inspiration. After some audible breathing cycles, one shifts to normal nose-breathing and compares the respiration that follows with the pattern previously (Van Dixhoorn, 1981). This comparison needs some repetition: it is necessary to let the breathing changes occur spontaneously. It is crucial that breathing regulation does not become an exercise, being performed mechanically.

Most cardiac patients experience a sense of relief and lessening of the pressure in the chest, which indicates the existence of tension in that area. Often these techniques suffice to significantly diminish anginal pain, shortness of breath and hyperventilation.

3) A more indirect approach: the therapist introduces pressure, massage or small movements into the respiratory rhythm. Or he asks the patient to, for instance, push away the heels during exhalation and relax the legs at inhalation. Usually inhalation is coupled with effort and exhalation with relaxation. Here, this connection is reversed and effort is made during exhalation, on purpose, to increase awareness and stop the effort at inhalation.

This approach fits in with active relaxation, to be described below. It may also serve as an aid, to facilitate relaxation in persons who experience no change with the first two techniques.

Active relaxation

Active relaxation consists of learning to apply relaxation in different postures and activities. This is important for the final phase of passive relaxation, where one should integrate relaxation in the daily life.

Systems for active relaxation *begin* with body movement itself (Brieghel-Müller, 1979; Feldenkrais, 1972; Gelb, 1981). They resemble exercise training, physiotherapy and gymnastics but differ basically in approach and purpose: active relaxation centers around the subjective perception of the body, the senses and the process of a movement, whereas the performance of an exercise is of minor significance.

As there is a countless number of body movements, and a large number of basic patterns and individual variations of them, it is not feasible to learn active relaxation in a few sessions or to standardize the sessions. However, a few examples to incorporate in relaxation training are necessary. Instructions are given in movement or posture, the concentration of attention, and breathing. Description of the "exercises" used can be found in publications by Balfoort & Van Dixhoorn (1979), Van Dixhoorn (1981, 1983b).

A few exercises are usually sufficient for the patient to understand the basic difference to his habitual pattern of action. He is recommended to regularly practise the exercises done, and also to notice breathing in relation to his normal activities. The purpose is, that when a movement or posture is relaxed, breathing will shift spontaneously to a costo-abdominal pattern.

Manual technique

As additional elements for body awareness two manual techniques will be described.

1) Touching parts of the body provides strong feedback to the patient about muscle tensions in his body and helps him make men-

tal contact with these parts. Therefore, touching with a knowing hand is a sure way for the therapist to guide the patient in his inner exploring of bodily tension. For instance, putting one hand on the small of the back prevents the patient from pushing out his abdomen, trying to "perform" diaphragmal breathing: he may then notice the ease of inhalation while relaxing the abdomen. Also, the small of the back relaxes, thus making the pull of gravity more obvious. The patient will start discovering, consciously and unconsciously, the alignment of body parts, best adjusted to gravity. The contact with the floor and the weight of the body becomes more apparent. Also the blood circulation to and from the legs increases, making them warm and tingling.

The therapist may add pressure or passive movement to mobilize or stretch muscles, but the primary purpose of increasing awareness is retained. In that way it is the patient who will change himself.

2) Some physical treatment may be very helpful and even necessary for achieving relaxation. There is a variety of treatments, ranging from massage, muscle facilitating techniques, treatment of reflex areas to manipulation of joints. Most of these constitute a specialty on their own, but some elements should be available in multiple relaxation training. First, it is important to observe the musculoskeletal structure in order to see what posture or movement allows relaxation, and what does not. Tensions mostly block the range of some motions in some respects. Second, the therapist should be able to alleviate these limitations somewhat by arranging the posture or applying treatment. One possibility is the treatment of "pressure points" as for instance, "myofascial trigger points" (Travell & Simons, 1983). A trigger point is considered to be a highly irritable focus within a muscle, that is sensitive to pressure and can be palpated as a small, hard nodule. The existence of such a trigger point prevents the muscle from lengthening. Its continued contraction may then result in radiating pain and discomfort, not infrequently mimicking organic pain patterns. Treatment of these muscles sometimes gives complete relief and restores the full range of motion.

ESR monitoring

As an adjunct to the EMG-feedback and an aid to the therapist, a small inexpensive instrument is used to measure the electrical skin resistance (ESR) during passive relaxation (Blundell & Maxwell Cade; Maxwell Cade, 1972). Commonly, a decrease of sympathetic arousal, resulting in higher levels of skin resistance and fewer electrodermal responses, is taken as a sign of relaxation and is used as a feedback signal (Patel, 1977).

Simultaneous measurement of ESR and EMG shows that the two indicators of physiological relaxation often don't match; it means that a person may successfully relax a muscle, but at the same time become aroused by the effort to do this. As some persons have low EMG levels from the beginning, the ESR then gives useful information about relaxation response. Therefore, the combined use of multiple indicators, including observation of motor and respiratory behaviour is desired for a reliable profile.

A pitfall in ESR measurement is that some patients have very high levels to begin with. This is not uncommon among cardiac patients (Van der Valk, 1958). If such a patient reaches a lower level during the rest period, it may also be taken as a positive sign, especially when he reports feeling refreshed. Therefore, the ESR is used as a monitoring aid and not as a feedback device.

Topics for discussion with the patient

Relaxation is primarily a non-verbal affair. However, some points merit explicit discussion.

- 1) The purpose of the relaxation sessions is introduced as a learning and training procedure to acquire a habit which is new but also natural and healthy. The practice of relaxation will become normal and automatic in the long run, if the patient becomes motivated. Cooperation is only asked for to try it out, now that the time and opportunity is provided in de post M.I. recovery period. The (psycho)therapeutic value is not put to the fore, as cardiac patients often resist to admit having problems.
- 2) Experiences during the session commonly are the main topic of conversation. The focus is on concrete, physical observations. The patient is helped to verbalize his experience and to distin-

guish between sense perceptions and thoughts about a relaxed state. Often "relaxation" is understood to be "feeling nothing", i.e. without discomfort or complaints. The point is made that sense impressions are always there, if one takes time to notice, and are valuable feedback for self-control.

3) The opinions and emotional reactions of the patient cannot be neglected, as far as they block or enhance the trust in the therapist and the practice of relaxation. However, psychosocial counseling is not meant for, nor is psychotherapy, although the motivation to that may grow and referral for joint treatment regularly occurs.

Understanding of tension phenomena and of relaxation and body awareness as an active coping strategy is central to the discussion during the sessions (Goldfried & Trier, 1974). It is hoped that continued practice becomes motivated by positive experience and finds a reward in itself. Although this may contribute to the secondary prevention after myocardial infarction, the fear for recidive should not remain the only motive to continue practice (Van Dixhoorn, 1984a).

SUMMARY AND CONCLUSION

Summarizing the techniques described we find on the one hand an emphasis on physical rest and immobility (passive relaxation, EMG-feedback and ESR-monitoring) and on the other hand physical movement and mobility (active relaxation and manual handling). The elements that connect passive and active relaxation and differentiate these from exercise training are (1) regulation of respiration, and (2) body awareness. For that reason they play a key role in the multiple relaxation training, described above. Awareness training is not designed for treatment but for teaching. Its use in therapy, and health care is a small but specialized part of its applications. It will have to be adapted to the setting of the health care institution and to the patient group one is dealing with. Also, new combinations with existing treatments will develop. Therefore, one should not equate (group) lessons in relaxation, breathing and awareness with therapy, on the

only ground that one works as a health care professional or that patients join the lessons.

Our training procedure is fitted to the psychosocial condition of the MI patient and to the rehabilitation setting. Individual sessions are necessary, but parts of the training may also be incorporated in the physical exercise program and/or in group meetings. The MI patient is in need of individual guidance and counselling because of the many problems and changes that face him or her after hospital discharge. However, this need is usually not dealt with directly because the patient often does not like to admit having problems and also because the aftercare is usually provided on a somatic level. Cardiac rehabilitation centers around exercise training, although most team members acknowledge that psychosocial effect is the main purpose. Relaxation training offers a solution to this paradoxical situation because it approaches the patient on a physical level, providing a skills training, whereas it equally deals with the subjective and emotional aspects. This dual approach is implied in the concept of "body awareness".

As to its general applicability, three main problems deserve to be mentioned: (1) the methodological coherence, (2) the qualification of the therapist, (3) the indications for application. *ad 1)* A multiple relaxation system allows for ample variation in techniques and procedures by the therapist. Obviously, standardization is only partially possible. The training system, however, should not be a random collection of techniques, or a so-called "eclectic" system, but show some degree of internal consistency. It should be possible to formulate a training criterion. In our approach this is given on a technical level by the role of respiration, which is used as an indicator and regulator of relaxation, during passive relaxation as well as in varying postures. Body awareness provides for a methodical consistency in the training. It determines the selection and sequence of techniques, as well as the topics for discussion. Therefore, the training criterion to rate success and relaxation ability consists of the ability to quieten the respiratory pattern and to adequately per-

ceive this. Our results show that about 40% of MI patients fulfill the criterion, 45% do so incompletely, and about 15% cannot learn it at all (Van Dixhoorn, 1984b).

ad 2) In a multiple relaxation training much depends on the skills of the therapist, whose task it is to match the tension pattern of the patient with the available techniques. The therapist should not only have adequate understanding of psychosomatic processes, as well as of the musculoskeletal system, and have sufficient knowledge about the illness of the patient, but also be well-trained himself. Failure to use expert therapists is one reason that efficacy studies of relaxation often show doubtful results (Steiner & Dince, 1981). As a treatment, body awareness shares elements with medical treatment, physical therapy and psychotherapy, without being identical to any of these. Practitioners may come from any of these fields, but for further special training, there is hardly any institutional facility available, yet.

ad 3) Indications for relaxation training are usually listed in terms of medical diagnosis. This is of little value, considering that (1) relaxation is often understood as a simple technique for passive rest, and (2) medical condition will hardly predict extent of effect. Medical diagnosis provides some indication as to treatment elements. In rehabilitation of hemiplegic patients for example, manual handling will play a large part because it effectively increases sensory input to the paralysed patient (Feldenkrais, 1977). In the case of chronic lung disorders, passive relaxation is important but respiratory control should be the first objective, either directly or indirectly (Konuk & Pepper, 1984). However, the choice of specific techniques largely depends on the expertise of the therapist.

The extent of effect would probably depend on psychosocial characteristics of the patient. Relaxation as a body awareness technique affects the patient on a physical-emotional level. It affects the body, as it is experienced. Therefore, results on physical disorders may be complicated by emotional reactions and

vice versa. Overall effect then, would depend on the patient's ability to change in both respects. Also, relaxation effect depends on generalization to daily life. The life situation as well as the motivation of the patient would determine effect. Until the issue of selection of suitable patients is clarified by further research, it is recommended to critically evaluate the treatment after 4-6 times and judge the progress in learning body awareness, next to improvement in specific complaints of the patient's disorder.

SUMMARY

Relaxation techniques are widely used, but often applied in a partial fashion. Proper application of relaxation may well be a treatment in its own right, if the concept of relaxation is not limited to "physical rest". Techniques for a multiple relaxation training are described, which show on the one hand an emphasis on physical rest and immobility (passive relaxation, EMG-feedback, and ESR-monitoring) and on the other hand on physical movement and mobility (active relaxation, manual handling, and breathing). These elements form a meaningful whole, through (1) the role of respiration, and (2) the concept of "body awareness". When breathing and body awareness are recognized and used as integrating factors, the application of relaxation techniques will gain in quality and will be less often partial and limited. This is of special importance for the health care, where standardized application to the manifold problems of patients is hardly allowed. A multiple relaxation program on this basis has proven to function well in a cardiac rehabilitation program. As to therapeutic use in general, there is need of further training of therapists and research into treatment indications.

NOTE

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REFERENCES

- Badawi, K., Wallace, R.K., Orme-Johnson, D., & Rouzere, A.M. (1984). Electrophysiologic characteristics of respiratory suspension periods occurring during the practice of the transcendental meditation technique. *Psychosomatic Medicine*, 46, 267-276.
- Balfoort, B., & van Dixhoorn, J. (1979). *Ademen wij vanzelf?* Baarn, Bosch & Keunig.
- Benson, H., Beary, J.F., & Carol, M.P. (1974). The relaxation response. *Psychiatry*, 37, 37-46.
- Blundell, G.G., & Maxwell Cade, C. *Self-awareness and ESR*. London: Audio ltd.
- Bram Amar, P. (1978). Role of the therapist in biofeedback training. *Psychotherapy & Psychosomatics*, 30, 179-186.
- Brieghel-Müller, G. (1979). *Eutonie*. Spanning en ontspanning in de juiste balans. Deventer: Ankh-Hermes.

- Dixhoorn, J. van (1975). *Een ontspanningstraining voor hartinfarctpatienten*. Amsterdam: Universiteit van Amsterdam.
- Dixhoorn, J. van (1981). Adembewustwording. In R. Lafaille, *Zelfhulptechnieken*. Deventer: Van Loghum Slaterus.
- Dixhoorn, J. van, Loos, J. de, Duivenvoorden, H.J. (1983a). The contribution of relaxation technique to the rehabilitation of myocardial infarction patients. *Psychotherapy & Psychosomatics*, 40, 137-147.
- Dixhoorn, J. van (1983b). Ademoefeningen voor mensen met een hyperventilatie-syndroom. In R. Lafaille, *Zelfhulptechnieken*. Deventer: Van Loghum Slaterus.
- Dixhoorn, J. van (1984a). Voorspelbaarheid van het effect van ontspanningstraining in de hartrevalidatie. *Rapportage verleende subsidies*. Den Haag: Nederlandse Hartstichting.
- Dixhoorn, J. van (1984b). Zur Effektivität eines Entspannungstraining in der Frührehabilitation von Myocardinfarktpatienten. In W. Langosch, *Krankheitsverarbeitung und Krankheitsbewältigung am Beispiel chronisch Herzkranken*. Berlin: Springer (in press).
- Feldenkrais, M. (1972). *Awareness through movement*. New York: Harper & Row.
- Feldenkrais, M. (1977). *The case of Nora*. Body awareness as healing therapy. New York: Harper & Row.
- Gelb, M. (1981). Body learning. *An introduction to the Alexander Technique*. London: Aurum Press.
- Goldfried, M.R., & Trier, C.S. (1974) Effectiveness of relaxation as an active coping skill. *Journal of Abnormal Psychology*, 83, 348.
- Grossman, P. (1983). Respiration, stress and cardiovascular function. *Psychophysiology*, 20, 284-300.
- Ikemi, Y., Ishikawa, H., Goyeche, J.R.M., & Sasaki, Y. (1978). "Positive" and "Negative" aspects of the "altered states of consciousness" induced by autogenic training, zen and yoga. *Psychotherapy & Psychosomatics*, 30, 170-178.
- Lehrer, P.M. (1982). How to relax and how not to relax: a re-evaluation of the work of Edmund Jacobson I. *Behavioral Research and Therapy*, 20, 417-428.
- Konuk, E., Peper, E. (1984). Developing multimodal procedures in asthma management through diaphragmatic breathing and EMG feedback. In: *Proceedings of the fifteenth annual Meeting of the Biofeedback Society of America*.
- Lo, C.R. & Johnston, D.W. (1984). The self-control of the cardiovascular response to exercise using feedback of the product of interbeat interval and pulse transit time. *Psychosomatic Medicine*, 46, 115-125.
- Maxwell Cade, C. (1972). Electrometric arousal measurement in the management of clinical hypnosis. *British Journal Clinical Hypnosis*, 3, 108-117.
- Patel, C.H. (1977). Biofeedback-aided relaxation and meditation in the management of hypertension. *Biofeedback & Self-Regulation*, 2, 1-49.
- Paul, B. (1980). Relaxation training - the misunderstood und mis-used therapy. In F.J. McGuigan, *Stress and Tension Control*. New York: Plenum.
- Steiner, S.S., & Dince, W.M. (1981). Biofeedback efficacy studies. A critique of critiques. *Biofeedback & Self-Regulation*, 6, 275-288.

- Travell, J.G., Simons, D.G. (1983) *Myofascial pain and dysfunction*. The trigger point manual. Baltimore: Williams & Wilkins.
- Valk, J.M. van der (1958). *Onderzoekingen over de elektrische huidweerstand*. Amsterdam: dissertatie.