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## Sling Exercise Therapy (S-E-T) : A total concept for exercise and active treatment of musculoskeletal disorders.

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### 슬링운동치료(Sling Exercise Therapy) : 근골격계 질환에 대한 능동적 운동과 치료의 총체적 개념

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#### 국문요약

슬링 운동 치료(Sling Exercise Therapy)는 근골격계 질환 환자의 영구적인 치유를 목적으로 슬링을 이용한 능동적인 치료와 운동법을 체계화한 접근법이다. 이 개념은 10 여년 전부터 노르웨이의 물리치료사들을 중심으로 발전되어 왔으며, 현재 뇌졸중 환자와 신경학적 질환자 그리고 소아 환자와 건강 증진 프로그램에서도 이용되는 방법들이 개발되어지고 있다. 현재 정형물리치료 분야에 대한 세계적인 흐름은 전기치료 기구나 물리치료사의 손에 의해 수동적으로 이루어지는 치료 접근에서 점차 환자가 스스로 물리치료사에 의해 특별히 고안된 운동방법에 따라 능동적인 치료적 운동을 통해 손상 치료와 건강 관리를 하는 방향으로 발전되어지고 있으면 많은 치료 분야에서 이러한 접근법을 채택하고 있다. 슬링운동치료 개념은 이러한 능동적인 운동법을 주된 목적으로 이용하고 있다. 이 논문은 근골격계 질환의 치료를 중심으로 쓰여졌다. SET 개념에는 체계적인 진단과 치료의 요소들이 포함되어져 있다. 진단 체계에는 열린 사슬과 닫힌 사슬을 이용하여 단계적으로 부하를 가해 줌으로서 근육의 상태를 검사하는 방식을 가지고 있다. 치료적 체

계를 구성하는 요소에는 근육의 안정화, 감각운동 훈련, 열린 사슬과 닫힌 사슬을 이용한 훈련법, 가동성 있는 연부 조직의 역동적 훈련, 심폐 강화 훈련, 단체 훈련, 가정에서의 개별적 훈련과 추후 관리 그리고 운동 프로그램을 제공하기 위한 컴퓨터 소프트웨어가 포함되어 있다.

*Key Words : Sling, Exercise, Active Treatment,*

Sling Exercise Therapy (S-E-T) is a total concept for active treatment and exercise with the aim of contributing to permanent improvement of musculoskeletal disorders. The model is based on what are assumed to be the key elements of active training and rehabilitation today (which are described and documented in this article). The concept, which has been developed in Norway over the past eight years, is also used in the treatment of strokes and other neurological conditions, for stimulating children and for fitness training. This article focuses on treatment of musculoskeletal disorders.

The S-E-T concept consists of a system of diagnosis and treatment. The system of diagnosis involves testing of the muscles' tolerance through progressive loading in open and closed kinetic chains, and is used together with conventional examinations in diagnosing musculoskeletal disorders. The treatment system contains elements such as relaxation, increasing the range of movement, traction, training the stabilizing musculature, sensorymotor exercises, training in open and closed kinetic chains, dynamic training of the mobilizing musculature, fitness training, group exercise,

personal exercise at home with long-term follow-up, and computer software for setting up and modifying exercises.

The concept has been developed in the light of current knowledge regarding active treatment and exercise for musculoskeletal disorders. Although clinical experience with the S-E-T concept has been positive, there is a lack of scientific evidence. Therefore research has been heavily emphasized. A randomized study of the effect of personal exercise at home on chronic back pain and a pilot study of the effect of active treatment and personal exercise at two companies in Norway have been published. A randomized study on the treatment of Whiplash Associated Disorders was implemented in 1999. During the current year studies on the effect of training of the elderly, on the effect of active treatment and exercise at the workplace combined with home exercise, exercises in the treatment of unstable shoulders and training of athletes will be initiated.

## History

Slings have been used for a long time in treating

and exercising patients. The precursor to the German treatment device, the “Schlingentisch” (sling table), was developed before the Second World War by Professor Thomsen in Bad Homburg, Germany, and was called the “Thomsen-Tisch.” During World War II such sling-table- like devices were used to treat wounded soldiers. The wave of poliomyelitis that affected Europe after the war led Guthrie-Smith of England to construct a sling table for treating patients with major paralysis (1). At the end of the forties, Ludwig Halter of Wilbad developed a form of therapy for patients affected by polio. He used a combination of the “sling table” and pool treatment and is today considered one of the key developers of this form of treatment (2).

Today’s “Schlingentisch” devices consist of various models that either stand on the floor or are suspended from the ceiling. With the aid of an ingenious sling system the individual body parts – or the entire body – can be suspended in the devices. Treatment and training exercises can in this way be performed unaffected by gravity.

In Norway, slings have been used for treating shoulder and hip disorders since the 1960s. In particular, Dr. Karl Hartviksen and physiotherapist Audhild S. Bøhmer at the department of Physical Medicine and Rehabilitation at Ullevål Hospital were instrumental in developing this treatment method (3,

4, 5, 6). This form of treatment has been used with favourable results in clinical studies (7, 8, 9).

The basic idea for the Norwegian-made Terapi-Master sling exercise device comes from Kåre Mosberg of Grimstad, Norway. He built a prototype that he used for training and stretching of his own back. The patent rights to further development, production and marketing were transferred to Petter, Grete and Tore Planke, who in 1991 founded the firm Nordisk Terapi AS in Kilsund, Norway, together with physiotherapists Rolf B. Johansen, Jan S. Hilden and Arvid D. Holst. A close collaboration with Norwegian physiotherapists and doctors was immediately established, and they have assisted in the further development of devices and treatment/exercise concepts. The author has been actively involved in this development for the past four years. In 1999 the S-E-T concept for active treatment and exercise for disorders of the musculoskeletal apparatus was launched.

Table 1. Definitions

**Proprioception:** The total neural input to the central nervous system from mechanoreceptors in the muscles, tendons, ligaments, joint capsules and skin (10).

**Kinesthesia:** The conscious perception of movements in the joints and of the movements' direction and speed (11).

**Sensorymotor function:** Includes proprioception (afferent signal stream), the perception of these signals (kinesthesia) and efferent impulses to the muscles for

correcting position and maintaining stability 12,13,14).  
"Weak link": A muscle that is too weak to perform its part of the effort when it is to function together with other muscles in an activity.

**Open kinetic chain:** The distal segment is not fixed and is not weight-bearing (distal segments are moved on a fixed proximal segment, such as a bench press with free weights) (15).

**Closed kinetic chain:** The distal segment is fixed and is weight-bearing (proximal segments are moved on a fixed distal

## The TerapiMaster device

The TerapiMaster is a suspension system with two ropes that can easily be adjusted and locked with a simple flick of the wrist. Slings of various kinds can be attached to the ropes, and there is also a large selection of additional equipment (see Fig.1). TerapiMaster can be mounted directly on the ceiling, on a sliding ceiling-mounted suspension system, on a portable suspension system or a wall-mounted suspension system.

The types of treatment that can be performed by using a "Schlingentisch" device (relaxation, active/passive mobility training and exercises in an open kinetic chain) can all be performed using the TerapiMaster device with the additional equipment. In addition, the TerapiMaster can be used for closed kinetic chain exercises, for sensorymotor exercises end for home exercise.

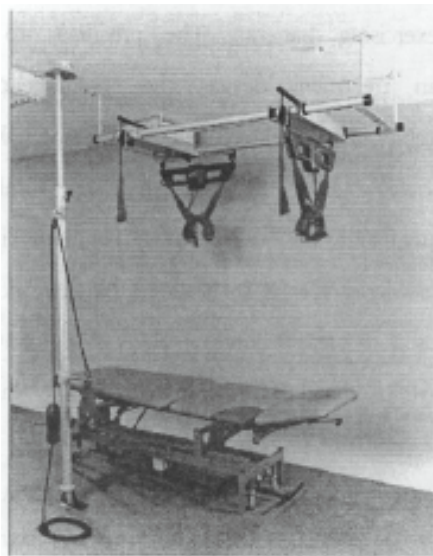


Fig. 1. TerapiMaster work station and the TerapiMaster device w/additional quipment

## Background of the S-E-T concept

In the western world, musculoskeletal disorders are the condition that most people suffer from and that costs society the most. We have had little to offer in the way of treatments that have a documented effect. Perhaps the time has come for a whole new concept. The background of S-E-T is to synthesize what are new research-based principles for treating

these ailments. In this article the background, development and the key theoretical elements of this concept will be reviewed. It is, for example, now documented that chronic ailments of the motor apparatus are linked to physiological changes in the body, such as reduced sensorymotor control and muscular strength (16, 17, 18, 19, 20, 21, 22). The most important changes are shown in Table 2. Even though it is not known with certainty how significant these changes are in connection with chronification processes, there is reason to believe that they play an essential role in sustaining ailments.

Table 2. Changes associated with chronic disorders

- |  |
|--|
| <ul style="list-style-type: none"> <li>• Reduced sensorymotor control</li> <li>• Reduced strength and endurance of the stabilizing musculature</li> <li>• Reduced strength and endurance of the mobilizing musculature</li> <li>• Muscle atrophy</li> <li>• Reduced cardiovascular function</li> </ul> |
|--|

The S-E-T concept aims at restoring sensorymotor control, strength, endurance and cardiovascular function in order to increase the body's tolerance for stress and strain. The Norwegian-made TerapiMaster system is an essential element of this system, since it is well-suited to training in both open and closed kinetic chains as well as for sensorymotor stimulation (see Table 1 for definitions). In addition, this system, which is easy to adjust, can be used for home exercise. A synopsis of the elements of the S-E-T concept is shown in Table 3.

Table 3. Elements of the S-E-T concept

- |  |
|--|
| <ul style="list-style-type: none"> <li>• Diagnostic system in open and closed kinetic chains</li> <li>• Relaxation</li> <li>• Mobility exercises</li> <li>• Traction</li> <li>• Training the stabilizing musculature</li> <li>• sensorymotor exercises</li> <li>• Training in open and closed kinetic chains</li> <li>• Dynamic training of the mobilizing musculature</li> <li>• Grading of exercises in a progression ladder system</li> <li>• Fitness training</li> <li>• Group exercise</li> <li>• Personal exercise at home with long-term follow-up</li> <li>• Computer software for setting up and modifying exercise programs</li> </ul> |
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### Diagnostic system in open and closed kinetic chains

A separate diagnostic system has been developed within the S-E-T concept for diagnosing so-called "weak links" (see Table 1 for definition). The patient is initially tested in a screening process using a progression ladder system with exercises in a closed kinetic chain. The load is gradually increased until the patient can no longer perform the exercise correctly or experiences pain. If this occurs at a low load, or there is a marked difference between the performance on the right and left sides, there may be reason to suspect one or more "weak links." The muscles are then tested individually in an open kinetic chain to locate the weakness. The testing in closed kinetic chain requires close monitoring by the therapist, since the body tries to compensate for "weak links" by using other muscles. This diagnostic

system has so far not been tested for reproducibility. Fig. 2 shows an example of testing the dorsal scapular muscles in a closed kinetic chain.

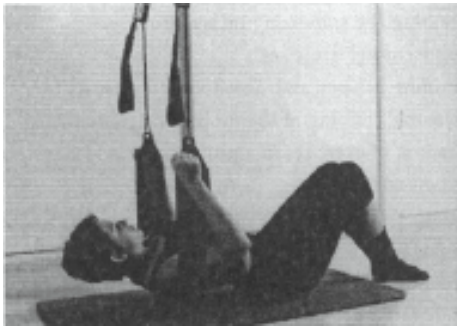


Fig. 2. Testing the dorsal scapular muscles in a closed kinetic chain

### **Relaxation**

One way to achieve muscle relaxation is to place the body part in question in the desired position in the sling device, then gently move the body part. The patient often experiences this as comfortable and soothing, and the procedure can be used both before and after treatment.

### **Mobility exercises**

Chronic disorders will often lead to reduced range of motion of muscles and joints. In addition to physiotherapy treatment, which includes joint articulation and muscle stretching, the patients themselves can perform mobility exercises by using the sling system. Since the effects of gravity are nearly eliminated, the patients feel that they are in control

and can move muscles and joints gradually towards the end of range, and eventually stretch a little further.

### **Traction**

Traction for the back can be performed with the patient suspended by the arms in the TerapiMaster straps, with his feet in contact with the floor. Gently bending the knees and transferring the weight to the arms creates a traction effect. Likewise, traction can be performed in the supine position by placing the straps around the ankles and suspending the lower extremities in the air, so that the buttocks are lifted from the support surface. Traction can also be performed on the neck, shoulders and hips, but in these cases the physiotherapist takes the active role.

Although experience has shown that many patients benefit from such treatment, the scientific evidence to prove it is lacking.

### **Training the stabilizing musculature**

Recent studies indicate that certain muscles have a particular stabilizing function. These muscles, called “local” muscles, are located in proximity to joints and have a large population of tonic muscle fibers. The “local” muscles are believed to be responsible for segmental stability, whereas “global” muscles perform movements (23). Examples of muscles believed to be involved in stabilizing in

peripheral joints are: the rotator cuff muscles of the shoulder (24), the vastus medialis obliquus in the knee (25, 26) and the posterior part of the gluteus medius in the hip (27). The most essential stabilizing muscles for the lumbar column are the transversus abdominis and the multifidus (28, 29, 30, 31, 32, 33, 34), and for the cervical column they are assumed to be the longus colli, longus capitis, multifidus and semispinalis cervicis (36, 37, 38).

In training the stabilizing musculature, low-graded isometric contractions (30-40% of 1 MVC) are emphasized (39, 40, 41). Gradually the holding time is increased rather than the weight load. In Australia two studies have been published documenting the effect of low-graded training of the transversus abdominis of patients with low back pain (42, 43, 44).



Fig. 3. Low-graded training of the transversus abdominis

In cases of sudden movements of the trunk or the

extremities, the body tries to stabilize the lumbar column with the assistance of a “feedforward” mechanism. The “local” stabilizing muscles receive efferent signals and contract before the “global” motor muscles are activated. Muscles that have been shown to be part of such a “feedforward” mechanism include: transversus abdominis (31, 32, 33, 34, 45), the diaphragm (46, 47), the muscles of the pelvic floor (48) and the neck muscles (49). There is documentation that patients with chronic back pain have lost the “feedforward” mechanism of the transversus abdominis (50, 51) .



Fig. 4. High-graded training of the transversus abdominis and phasic musculature of the trunk.

When under a heavy strain the body employs tonic as well as phasic muscles for stabilizing, and the importance of training both has been shown (52). In other contexts there has only been a focus on low-graded training of the “local” stabilizing musculature (41, 42, 43, 44).

A special exercise program has been developed within the S-E-T concept, focusing on graded training

of the stabilizing musculature. Initially low-graded isometric contractions of “local” stabilizing muscles are emphasized. An example of such exercises is shown in Fig. 3. Gradually exercises are added that activate “global” muscles, both as stabilizers (“bracing” effect) and as dynamic movers. However, this requires that the “local” muscles are capable of maintaining satisfactory stability. Examples of such exercises are shown in Fig. 4 and Fig. 5.

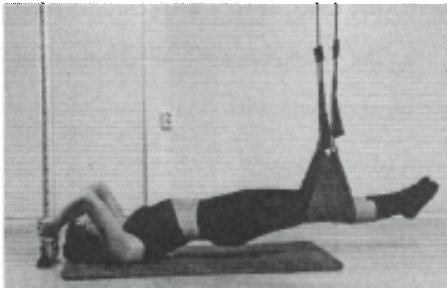


Fig. 5. High-graded training of the muscles of the lower back and pelvis

### **Sensorymotor exercises**

Terms such as proprioception, kinesthesia and sensorymotor function are often used interchangeably. In this article these terms are used as defined in Table 1.

Proper sensorymotor control is essential for maintaining a normal level of functioning. We have known for a long time that in cases of chronic disorders of the ankles and knees sensorymotor function is reduced (53, 54, 55). Treatment regimes that include sensorymotor exercises for these areas have been used for many years and are standard in

most rehabilitation programs. The effect of such training on the lower extremities is now well-documented (56, 57, 58, 59, 60, 61).

Recent studies have shown that chronic back pain is associated with reduced sensorymotor function (20, 21, 22, 63, 64, 65, 83). The same situation also applies to chronic neck pain (67, 68, 69, 70, 71) and shoulder disorders (72, 73, 74, 75).

There are studies showing that muscle fatigue reduces sensorymotor control in the lower extremities (76, 77, 78), in the shoulder (79, 80, 81) and in the back (66, 82).

A few studies have shown that sensorymotor exercises for patients with chronic back pain (84) and chronic neck disorders (70) is effective, but the number of studies in this particular area is very small.

Sensorymotor training is an essential element of the S-E-T concept, and a wide array of exercises has been developed for this purpose. The emphasis is on closed kinetic chain exercises on an unstable surface, thereby achieving optimum stimulation of the sensorymotor apparatus (85, 86). Training in the sling device is highly suited to this purpose. In addition, foam-rubber mats, balance boards and inflatable rubber cushions are often used. Examples of sensorymotor exercises are shown in Fig. 6. and Fig. 7.



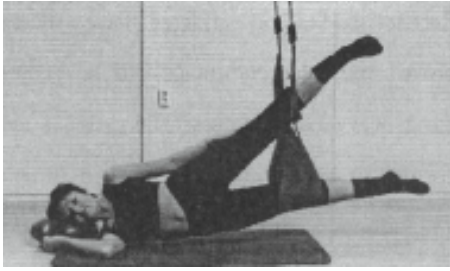


Fig. 6. Sensorymotor exercise for the back



Fig.7. Sensorymotor exercise for the lower extremities

### Training in open and closed kinetic chains

Training in an open kinetic chain is defined by the distal segment not being fixed and not being weight-bearing (distal segments are moved on a fixed proximal segment) (15). This form of training involves isolated activation of agonists and synergists, without co-contraction of antagonists (85).



Fig. 8. Internal rotation of the shoulder in an open kinetic chain

Training in a closed kinetic chain is defined by the distal segment being fixed and weight-bearing (proximal segments move on a fixed distal segment) (15). This form of training involves co-activation of antagonists, synergists and antagonists, and is thus well-suited as a foundation for ADL and sports activities (85).

The S-E-T concept utilises both open- and closed kinetic chain exercises. Open chain exercises can be performed as relaxing movements in slings, or strengthening exercises using free weights and/or pulley systems. A mobile, telescoping pulley device has been developed for this purpose. An example of an open kinetic chain exercise is shown in Fig. 8.

For closed kinetic chain exercises the sling system is primarily used. The loading is graded by changing

the leverage and thus the torque. This can be done by changing the placement of the sling on the body, changing the length of the rope, or moving the body in relation to the plumbline from sling's suspension point. An example of a closed kinetic chain exercise is shown in Fig. 9.



Fig. 9. Internal rotation of the shoulder in a closed kinetic chain

### **Dynamic training of the mobilizing musculature**

Once satisfactory stabilizing function of the “local” muscles is established, progressive training of “global” muscles can be initiated. Exercises in both open-and closed kinetic chain are used for this purpose.

For strength training, relatively high loads are used and the exercises are performed in 3-4 sets of 5-6 repetitions, with rest between sets.

Recent studies on athletes have shown that improved muscular endurance can be achieved by utilising heavy-load exercises. The exercises are to be performed as explosive contractions in three sets of 5-6 repetitions with 1-2 minutes rest between sets. The load should be gradually adjusted so that the athlete only manages 5-6 repetitions in each set (87,88). When exercising patients using this method, the therapist must consider pain and the ability to perform the exercises correctly. In Medical Exercise Therapy (MET) it is common to train for muscular endurance by using low weight loads and 3-4 sets of 30-50 repetitions (89).

### **Grading of exercises in a progression ladder system**

Training according to the S-E-T concept often follows a progression ladder system, in which exercises in open and closed kinetic chains are used. On the lowest levels the exercises are generally down-graded with the help of slings or in the form of “negative weight.” Here elastic cords, pulley systems or free weights are used to lessen the effect of gravity. On the highest levels on the progression ladders the exercises are usually performed in closed kinetic chain with a high torque. These levels are meant for athletes. The set-up is such that for all the progression ladders there is a level suitable for any patient, fitness enthusiast or athlete.

## **Cardiovascular exercises**

In general this mostly takes the form of cycling, running, rowing, brisk walking, skiing, swimming or other activities where large muscle groups are activated for long periods of time. Within the S-E-T concept exercises have been developed to be performed at home by those who cannot engage in the aforementioned activities. In these cases a portable “stepper,” trampoline or foam-rubber mat are used in addition to the sling system. Users can also apply the principles of interval training by performing a selection of relatively easy exercises at a high speed during given intervals, with rests between intervals.

## **Group exercise**

This is organized either by having the users perform identical exercises in which the load is adjusted to the individual’s level or by having the users each perform a different selection of exercises that are individually graded. Group exercise may be used in the treatment of patients as well as for fitness training, and makes the most of positive elements such as motivation, coping and social contact. Experience shows that this is a very popular form of training.

## **Personal exercise at home**

The S-E-T concept greatly emphasizes the importance of home exercise and long-term follow-up by the

therapist. Many patients have reduced strength, muscular endurance and cardiovascular function in addition to reduced sensorymotor control. Experience shows that it takes a long time to restore these elements often much longer than the number of prescribed treatments allows. By motivating patients to exercise on their own, therapists gradually transfer to the patients the responsibility for their own health.

It is often difficult to get patients to exercise on their own, and compliance has been low in a number of studies on personal exercise. However, an Australian study has shown that patients who received a written exercise program with illustrations of the exercises in addition to verbal instructions and demonstrations of the exercises, had significantly higher compliance (77%) with home exercise than a group that only received verbal instructions and demonstrations of the exercises (38%) (90). A Norwegian study on the effect of graded personal exercise at home has also shown good compliance. This study also showed that approx. 60% of the study participants still engaged in regular home exercise one year after the study was completed (91).

## **Computer software for setting up and modifying exercise programs**

Within the S-E-T concept computer software has

been developed for composing, modifying and upgrading exercise programs. In addition to brief descriptions of starting positions, number of repetitions, holding times, etc., each exercise is illustrated with drawings showing the starting and finishing positions.

The exercises are arranged in a system of progression ladders, in which each ladder contains a certain number of steps that are graded by weight load. The software allows adjustment within these steps, which makes setting up and modifying exercise programs easy. The software also contains so-called “protocols”, which contain exercises recommended for various conditions – such as Whiplash Associated Disorders, chronic pelvic pain, chronic low back pain – and for fitness training. This is to enable the therapist to get started easily with setting up and modifying training programs. The therapist may change and adapt the protocols as needed. A format for keeping a training journal is also incorporated in the software.

### **Indications and areas of use**

Today the S-E-T concept is used to treat musculoskeletal disorders, for rehabilitating stroke patients and patients with other neurological problems, and for stimulating children. The concept is also used for fitness training and for training athletes.

Although today this concept is used mostly in treatments of conditions such as chronic back pain, neck pain, pelvic pain and shoulder disorders, the author believes that the S-E-T model has a potential for treating most disorders of the musculoskeletal apparatus in which there is a loss of mobility, muscle strength, endurance and sensorymotor control.

In treatment situations in which the therapist wishes to perform stretching or manual mobilization of joints, the so-called “helping hand” principle is often very useful. The patient’s body part being treated is suspended in the sling system, which relieves the therapist and makes work easier by freeing one or both arms.

For rehabilitating “weak links” according to the S-E-T concept, a combination of exercises in open and closed kinetic chains is usually used. Experience shows that it may be beneficial first to train the muscles in isolation in an open kinetic chain until strength and endurance have improved and then in a closed kinetic chain to train co-functioning of agonists, synergists and antagonists.

### **Research**

Before research could begin it has been necessary to develop the model for this treatment- and exercise concept. The model is now ready and studies have

been initiated. A randomized, multi-center long-term study on the effect of two different forms of home exercise by patients with chronic low back pain has been published (92). One group performed exercises using the TerapiMaster device, and the other group performed conventional physiotherapy exercises. A significant reduction of absenteeism was found in both groups, without there being a statistically significant difference between the two groups. It is worth noting that the S-E-T concept had not been developed at the time the study was carried out.

A non-randomized pilot study encompassing 42 employees of two Norwegian companies looked at the effect of 12 months of home exercise combined with relaxation exercises at the work place, on absenteeism caused by neck, shoulder and back ailments (92). The average number of sick days per year caused by musculoskeletal disorders decreased from 11.2 to 0.2 (a 98% reduction). A follow-up 30 months after the conclusion of the project showed average absenteeism to be at the same level (0.2 days per year). The study lacked a control group, and the conclusions one can draw from this study are therefore limited.

In 1999 a study on the effect of two different treatment methods for Whiplash Associated Disorders was initiated. This is a randomized, controlled, multi-center long-term study to compare the long and

short-term effects of a recently developed overall treatment model (OTM), in which S-E-T is a key element, with traditional physiotherapy (TP).

During the current year a randomized, multi-center long-term study involving several Norwegian companies will begin. It will investigate the effect of home exercise in combination with relaxation exercises at the work place, on absenteeism due to musculoskeletal disorders. This study is a continuation of the earlier pilot study (92).

In the near future studies will be implemented on rehabilitation of the elderly, unstable shoulders and training of athletes. There are also plans to conduct a randomized, controlled, multi-center, multinational study of the effect of treatment and exercise on patients with chronic back pain. This study will encompass four countries in Europe.

### **Use today**

In Norway over 90% of the physiotherapy clinics have adopted the TerapiMaster system. Today the S-E-T concept is used both in Norway and internationally. In Japan a separate interest group called the "Japan Sling Exercise Therapy" (JSET) has been formed. The aim of this organisation is to study the effect of treatment according to the S-E-T concept, and now has about 200 members. In Korea

a similar interest group has recently been formed (KSETA), and the design of studies is in progress. Among other countries that have shown great interest in the concept are Germany, the Netherlands, Austria, Italy, Spain, Switzerland, Israel, Denmark and Finland. Today courses are being held in these countries, and gradually more countries are being added. Soon training and certifying course instructors will begin in Norway and internationally.

### Discussion

The author believes that the advantage of the S-E-T concept lies the overall approach that this model encompasses (see Table 3). Rehabilitating sensorymotor control in a closed kinetic chain on an unsteady support surface, training of “local” stabilizing muscles and personal exercise at home with long-term follow up seem especially important. The same training device can be used for all the various exercises, allowing users to train at home with the same selection of exercises used in treatment and training at the physiotherapy practice/institution. The device does not take up a lot of space and is not particularly expensive.

Although clinical experience with the S-E-T concept has been positive, at the present time there is not sufficient scientific documentation of the effect of such

treatment and training. The two studies that have already been published both have deficiencies in method and design (91, 92), and any conclusions that may be drawn must be viewed in light of this. To solidify the research involving the S-E-T concept a separate research group has been formed which is to contribute to optimizing this research activity.

### Summary and conclusion

S-E-T is a new concept that has been developed over a long time with a view to an overall approach to treating injuries and chronic pain. Key elements are range of motion (ROM) exercises, training the “local” stabilizing musculature and normalising sensorymotor control. Focus is also placed on exercises for strength, muscular endurance and cardiovascular function. Graded home exercise with a long-term follow-up is also an essential factor.

Several research projects of high methodological quality have been implemented to investigate the effect of treatment and exercise according to the S-E-T concept.

Disorders of the musculoskeletal apparatus are the most common condition in modern society. Unfortunately, there is a lack of documentation showing effect of treatments for these conditions. The time has now come for new approaches, and the S-E-T

concept has been developed with this in mind. Documentation of effect constitutes an essential part of this concept.

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