

FAKTUM 12

Short summary of study „Kieser Training works“

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The study “Kieser Training works” was conducted from April to October 2009 as a prospective, randomised, controlled and multi-centre study in 118 Kieser Training facilities in Germany. Using modern scientific methods suitable for multicentre studies, it sought to investigate thoroughly the health benefits of strength training. In particular, it focussed on the effects of regular machine-based strength training on strength, sensitivity to pain, performance and quality of life. Kieser Training trains staff in all facilities to a standard level and all facilities use identical training machines, standard training methods and standard load norms. As a result, a multicentre study was not only practical but capable of achieving reliable results.

The initial results became available in January 2010 and after more detailed analysis, it is planned to publish them in selected scientific journals. A stipulation with such articles is that results may not be published elsewhere in advance of publication. For this reason, we cannot publish detailed results at present but as soon as the articles have been accepted for publication, the full report will be available on our website www.kieser-training.com as a download.

The following comments are restricted to the design of the study and a summary of its main outcomes.

Design of study

The Research Department of Kieser Training AG in Zürich was responsible for the planning, overall coordination and analysis of the study. An independent group of experts¹ evaluated the criteria, selection of participants and results of the study.

The study reflected the twin-track approach offered by Kieser Training (training and therapy) and so participants were split into two intervention groups: a PST group, which did Preventive Strength Training for 6 months and a MST group, which initially did Medical Strengthening Therapy followed by PST, similarly for a total of 6 months. There was also a control group (C), who did not train during the study but were offered the opportunity to try Kieser Training after its completion.

Between mid February and the end of March 2009, we advertised publicly for participants. A total of 48,819 applicants responded, none of whom were Kieser Training customers. To assess general health,

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we asked applicants to answer five specific questions and based on their answers, we categorised applicants as either MST or PST. We then applied a process of random selection to the MST applicants in order to obtain the MST intervention group. Similarly, we applied random selection to the PST applicants and this formed the PST and control groups². The responses to the 5 questions only allowed an approximate allocation and so participants were examined by a Kieser-Training doctor and if necessary the allocation was amended.

The number of applicants was extremely high and so we could have increased the size of each group. However, the study involved additional work for participating facilities, work which had to be done and financed. For that reason, we used an optimum sample size, which was based on the study criteria and the envisaged effect sizes³. The sample size reflected a drop-out rate of 30%, which was distributed unevenly between the three groups: N=96 (MST), N=322 (PST), N=82 (C).

All participants underwent a thorough medical check before and after the six-month training period. In addition, we tested the back strength of partici-

pants using computer-aided machines and asked participants to complete written questionnaires.

Sample

From the 48,819 applicants, we selected a total 627 participants on a random basis, 531 of whom remained until the end of the study. The musculoskeletal system of 80% was causing pain at the outset, particularly the back.

Table 1 shows the size of each group and the male/female split. The gender distribution for the entire sample, the MST group and the PST group corresponded to the gender split for the German population as a whole. The control group had a higher percentage of females. The average age was 43.2 ranging from 18 to 87 years of age

Table 1: Sample size and distribution by gender

	Number	Female	Male
PST	317	49,2%	50,8%
MST	109	51,4%	48,6%
C	105	64,8%	35,2%
Total	531	52,7%	47,3%
Germany ⁴		51%	49%

The Body Mass Index (BMI) for all three groups was very similar and within the normal range. Table 2 compares the percentage of participants in each BMI category with percentages taken from official German health monitoring data (1998)⁵. The percentage of obese participants in the sample group was significantly lower than the norm in Germany; this is evidence of a degree of self-selection amongst

² Because previous studies have involved MST groups and control groups – studies by us and others – for efficiency reasons, we had no control group for the MST group but only for the PST group.

³ For most parameters, we were able to estimate the sample mean and its sample deviation. Similarly, we were aware from other studies of the expected effects of training intervention and so we used these values to calculate the required sample size (BORTZ, J. & DÖRING, N. (2002): Forschungsmethoden und Evaluation für Human- und Sozialwissenschaftler [Research methods and evaluation for human and social sciences. Heidelberg: Springer., Chap. 9.2.2).

⁴ <http://www.destatis.de> - population as at 31.12.2008

⁵ www.gbe-bund.de

study applicants. A fitness product is less attractive to those who are overweight. Clearly, the percentage of normal or underweight applicants was above average and so formed the majority of the sample.

Table 2: Comparison between BMI of sample group and that for the German population as a whole (GER)

	Male			Female		
	KTW		GER	KTW		GER
	N	%	%	N	%	%
Underweight/normal weight (BMI<25)	121	49,0	26,1	164	59,4	48,8
Overweight (BMI<30)	103	41,7	52,1	79	28,6	29,6
Obese (BMI 30)	23	9,3	21,8	33	12,0	21,6
Total	247	100	100	276	100	100

Drop-out rate

Of the 627 participants at the beginning of the study, 531 remained until the end. The drop-out rate was 15.3% (n=96). The average drop-out rate (% giving up) in German fitness chains is 35.3%⁶.

The most frequent reason cited for stopping training was illness or injury in daily life (N=24). 3 participants developed pain after training and stopped training. 6 participants had to stop for professional or private reasons. 11 participants said they no longer wanted to train and 22 trained irregularly or with long gaps. For 30 participants, we were unable to find out why they stopped training.

⁶ DELOITTE: Der deutsche Fitness- und Wellnessmarkt. [German fitness and wellness market] Study 2009

Results

The following table shows the changes in the various study criteria. A standard format is used throughout in that (+) is always a positive change, i.e. an improvement in health, more strength, less pain, etc. No group displayed a negative in any criteria.

Table 3: Summary of Results of "Kieser Training works"

Result Category		PST	MST	C
Pain	Severity (frequency, duration, grade of pain)	+	+	
	Effect (on mood, walking, sleep, recreation, enjoyment of life)	+	++	
Strength and mobility	Lumbar mobility		+	
	Back strength	+	++	
General physical and wellbeing	Body Mass Index			
	Self-efficacy (measures the ability to cope with difficult situations)			
	Negative view of body image (feeling in tune with one's body and at ease with oneself)	+	+	
	Vitality and dynamism (how strong, fit and healthy participants felt)	+	+	
	Overall satisfaction with life			
++ significant change with a moderate effect $\geq 0,5$ + significant change with a minor effect $\geq 0,2$ Blank fields: no change.				
Standard conventions were used in order to verify statistical significance, i.e. a significance level of $\alpha=0,05$. Effect sizes were calculated as a ratio, i.e. the difference between the mean divided by the pooled standard deviation.				
Questionnaires: RAND MOS (PS, EP), SWE, SWLS, FKB-20				

The main positive changes to physical health were reductions in the prevalence of pain and the constraints on daily life resulting from that pain. As expected, strength training increased back strength, particularly in the MST group, the group with the more serious muscle deficits at the start of the study. Anthropometric measurements did not change.

The main plus point in terms of psychological health was the improvement in the image participants had of their own body: a reduction in negative body images combined with an increase in vitality and dynamism. It would appear that concepts such as self-efficacy and overall satisfaction with life are more stable as these personality traits did not change. However, in the final analysis this could be the result of self-selection, i.e. these traits may have been generally more marked amongst applicants for the study. Only those who believed that training could actually achieve something and reckoned they had a good chance in applying, would have actually responded to the advertisements to participate in “Kieser Training works” in the first place.

Conclusion

The results for both intervention groups were as follows:

- reduction in pain and its effects
- increase in strength
- improvement in personal body image and
- increase in overall performance and quality of life.

In addition to these positive changes, a high percentage of participants also achieved their own personal training goals. There was a subjective perception that overall performance and quality of life had improved and participants regarded Kieser Training as a high quality service provider.