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Summarized Expert Opinion XCO-Trainer

Re.: Lawsuit: Flexi-Sports GmbH vs. Verband Sozialer Wettbewerb e.V.
District Court of Munich I, Case #: Az.: 4HK09725/06

At the request of Mr. Brackmann, Presiding Judge at the District Court, to assist in the findings related to the litigation involving the exercise device Xco Trainer, I offer this brief written statement from an expert's point of view. If required, a more comprehensive opinion will be provided verbally before the court. I affirm that I have no connection or relation whatsoever to either of the parties involved.

My statements are based on documents provided by the court (e.g. opinion of Dr. Herrmann, position of Counselor Burchert, correspondence between plaintiff and defendant), publications and scientific analyses by the Institute of Medical Physics (Private Lecturer Dr. Kemmler and Dr. S. von Stengel) and the Institute for Sports-Science and Sports of the University of Erlangen, literature research as well as first-hand trials of the equipment.

The Xco Trainers consist of aluminum tubes filled with granules, to be used as hand-held exercise equipment. According to the manufacturer's claims, they are on the one hand supposed to engage the upper body musculature more extensively into the training process for endurance activities (walking and running) and thus increase the effectiveness of the exercise by boosting cardiovascular performance. On the other hand, the manufacturer recommends the equipment's use in targeted strength training, which is stated to result in augmented performance of the active and passive musculoskeletal system.
Fundamentally, the question under discussion is to what extent a tool with a shifting mass is more effective in the accomplishment of respective training goals than a solid weight tool, such as a traditional dumbbell.

A study by the Institute of Medical Physics confirms a heightened metabolic and cardiac response with the use of Xco Trainers while walking and running, when compared with solid dumbbells or no equipment at all. These randomized cross-sectional studies with cross-over design, in which 24 test subjects completed standardized performance tests each under three different sets of conditions, conform in all respects to any criteria of a

legitimate scientific study. Thus it can be established as certain that Xco Trainers do have an effect on the organism's response during walking and running. During first-hand personal tests using solid weights vs. Xco Trainers (with identical weight), it was easy to ascertain that with regard to their dynamics, there is indeed a significant difference between them. The study team led by Private Lecturer Dr. Kemmler explains this enhanced effectiveness as compared to solid weights by referring to the physical model of a rotating pendulum, where Kemmler concedes that the magnitude of the increased effect recorded in the study cannot be totally explained by applying the physical model. Kemmler surmises that in spite of standardized instructions, the use of the equipment was not in all cases identical. With the Xco Trainer the movements should be executed in a manner that causes the granulate matter to oscillate, which perforce results in a sustained higher load on the arms. Thus, an exact execution of movements is a prerequisite for the achievement of the advised surplus load.
In summary, it can be concluded up to this point that the results of the above-mentioned IMP study clearly confirm that use of Xco Trainers in endurance exercises promotes a higher metabolic and cardiac response, which leads to a higher rate of calorie burn-off. This is due to increased arm- and upper body activity induced by the Xco Trainer (also when compared to solid dumbbells with identical weight). Based on physical considerations one can assume that the Xco Trainers, on account of their unique dynamics, have a marked advantage over solid weights in regards to their relative strain on joints (broadly distributed, time-delayed impact with lower peak force). Finally, the dynamics of the Xco Trainer add a further benefit compared to solid weights in that it requires increased arm activity to effect the coordinated motions required to bring the "oscillating movement of the granulate" (and its rhythmic feedback) into play. For many users, the increased coordinative demand alone could enrich the appeal for using this equipment instead of dumbbells (which have their own effects).
A recently completed thesis by Mr. Axel Brandt at the Institute for Sport Science and Sports addresses the question of the extent to which heightened metabolic and cardiac response of Xco-Walking vs. walking without tools can be measured more tangibly as they relate to medium-term increases in endurance performance. The controlled, randomized study of 29 women, who over the course of 10 weeks were monitored twice weekly while conducting walking training *without* vs. *with* Xco Trainers, verifies a significant high impact on the end-phase of maximal oxygen intake (VO_2max) as a gross criterion for potential endurance performance by the use of Xco Trainers as compared to walking without the device.
On the basis of actual material evidence, use of Xco Trainers while walking can be endorsed to promote an increase of energy expenditure and improved training results.

A second application of the Xco Trainer is in exercises for the improvement of neuromuscular performance. To this end the equipment is utilized to execute ballistic movements. The intensity as it relates to the strength of muscular contractions depends on the degree of acceleration of the equipment and the resultant impulse generated, and can be varied according to the user's objective. Furthermore one can establish a determined focus by realizing desirable amplitudes. With wide ballistic swinging motions, an alternating activation of agonist and antagonist muscles is realized and at the tail end of the motion the antagonist is subjected to an active dynamic expansion. More narrow oscillating motions, as recommended for the elderly and for physical rehabilitation, promote stabilization of the musculature surrounding the shoulder joints.

As previously described by Private Lecturer Dr. Kemmler, with such exercises significant hypertrophic effects (bulging growth) of the musculature should not be expected, due to their muscular demand profile. Rather, the primary effect should be noticed in the metabolism (lactates, endurance performance) and in inter- and intramuscular coordination. With a given exercise it may take only 10-20 seconds for pronounced muscular acidity or exertion to set in. From a training methodology point of view there is therefore no doubt that the realized load represents an above-threshold stimulus, which on a structural and functional basis can trigger certain adaptations which lead to the overall improvement of motor skills. To exactly specify these effects on the active and passive locomotive system will require additional scientific study, which should be undertaken in the future. Private Lecturer Dr. Kemmler, as a noted scientist in the field of sports, has already extensively commented on the contested advertised claims by the Flexi-Sport Company. I can concur with his conclusions to a large extent. Even though the advertised claims are not scientific per se -- they frequently make claims without substantiating them -- the majority of these claims cannot be challenged from a scientific point of view and are neither nonsensical nor assailable. Some of the statements, however, are not tenable from a medical sports-scientific point of view and should be revised accordingly. After having viewed the written correspondence, the attendant literature and also having tried the equipment first-hand, I can summarize that the Xco Trainer represents a device that can be of value in the support of endurance and strength training, as well as in the training activities of discrete user groups.

In closing, it must be stated that the resolution of the dispute before the court is not being advanced by sagacious assumptions and argumentation, such as has in part been the case with both Dr. Herrmann, a gentleman trained in sports-medicine, and Attorney Burchert. Instead, only statistically proven and genuinely conducted sports-scientific studies should be taken into consideration. These studies have been conducted exclusively by the nationally and internationally recognized members (most notably for osteoporosis research) of the *Institute of Medical Physics,* Private Lecturer Dr. Kemmler and Dr. von Stengel.

Kunreuth, Jan. 27. 2009

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