Dr. Gottlob Testing

Test of selected strength training equipment from ***DAVID, Panatta*** and ***SportsArt***

For this test the FT editorial team has given us three quite different firms to look at. *SportsArt*, a Taiwanese company that established itself as a cardio equipment manufacturer and that introduced its first strength training line only 2 or 3 years ago in co-operation with the German firm *MEDEX*. *Panatta*, the Italian company managed by and which takes its name from company owner Rudy Panatta, has been manufacturing strength training equipment for 25 years. Initially focussing on the lower price bracket then later moving on to the cardio and children's fitness sector with its products now in the higher price bracket, the company is highly successful today. Finally comes *DAVID*, originally a Finnish strength training equipment manufacturer that has also been in existence for 25 years and has found its niche in the medical equipment market. *DAVID* consequently markets a comprehensive range of measurement, analysis and evaluation equipment for its machines. These elements were however, not taken into consideration as part of this test. Three very different firms then, for which Fitness Tribune has commissioned the Dr. Gottlob INSTITUT to carry out this equipment test. Prior to the test 6 strength training machines from each of the respective manufacturers' primary ranges were selected. The main focus of the test is on the functionality, biomechanics, handling and ergonomics of the machines – criteria that are valid and relevant in all segments of the market – which makes a direct comparison a little difficult, but perfectly legitimate from this point of view.

The test

The tests were all carried out openly and were announced in advance. The manufacturers either notified us of a fitness centre that they had fitted out or invited us to their showroom. At the prospering *Body Culture* fitness club in Darmstadt we were able to test the new strength training range from *SportsArt* (MEDEX). In the newly opened, fully renovated fitness club *Treiber´s Indoor Sport & Body* in Walldorf we could evaluate a mixture of equipment from *Panatta*, namely FitEvo and X-Pression. And at the modern *DAVID* showrooms in Neu-Ulm we were able to test some of their latest Future Line models. A warm thank you to all of these clubs and companies for making space available to us for testing and allowing us to use their excellent facilities. Each test was carried out over a full 10 to 12 hour day. Thereafter, the results, movement information, weights and all of the technical details were evaluated, analysed and finally rated.

It can of course be taken for granted that the tests were only carried out with no employees present from the companies with equipment under test. This condition clearly irritated the German management of *Panatta* however. In his words… "we find it regrettable that you are not prepared to allow a representative from *Panatta* to be present when the test is being carried out. We would have been pleased to have assisted in a supporting role…"

Of course every company whose equipment is undergoing testing would be pleased to "exercise its influence" over an objective test. But a product must be allowed to "speak for itself" during a proper test; there may be no kind of outside influence or manifestations.

It is exactly for these reasons of ensuring objective test conditions – and therefore an objective test report for our readers – that no representatives from any of the manufacturers undergoing testing are allowed to be present.

Dr Gottlob Testing

Fitness Tribune has exclusively commissioned the Dr. Gottlob INSTITUTE to test the equipment from selected equipment manufacturers (see FT 100 for the first test).

There has always been a wide range of tests available in the fitness industry but these have never really delved into greater depth than listings of catalogue information and the obvious technical details. Our requirement stipulates a "true comparison" that includes all the components of a real test, i.e. assessment criteria, further neutral information, points of criticism, assistance in making purchasing decisions and most importantly, a test rating.

These requirements do however conceal two rather tricky issues. First, a true and honest test means that there are bound to be losers. The problem here is that we risk alienating potential advertisers in the case of an "unfavourable" result. Second is the question of the right "tester". The qualities we are looking for here include a reputation for integrity and commercial neutrality together with a combination of expert knowledge in a wide range of specialist subject areas.

We are pleased to have found a partner for this highly challenging task in Dr. Axel Gottlob; one of Germany's leading strength training experts for many years now. Dr Gottlob's reputation and straightforwardness is well known in many circles and as a qualified mechanical engineer, graduate sports scientist and biomechanics expert he is certainly the best person to whom we can entrust this complex subject with all of its wide-ranging facets. He was not only a successful strength training athlete himself (German Champion, 1982) and gym owner, but is also a much quoted author (textbook "Differenziertes Krafttraining", currently in its 2nd edition) and has been associate professor of biomechanics and strength training at the University of Heidelberg since 1997. In his family business "Galaxy Sport" he spent over 12 years developing strength training equipment together with his father, Peter Gottlob. The firm patented several designs and had become market leader in Germany by the time it was sold in 1992. Last but not least, we should highlight the programs offered at his Dr. Gottlob INSTITUTE – courses such as the MASTER courses rate among the absolute top for instructors and therapists.

Jean-Pierre L. Schupp

Company Chart

Listed here and in the following tables in alphabetical order

	DAVID	Panatta	SportsArt
Brief company history	Established in 1982 by Arno Parviainen (Finland); primary focus on strength training equipment. In 1997 DAVID became a German company (taken over by Friedemann Uhl), trading as DAVID International 1998 3rd generation Future Line launched. 2001 German sales through DAVID GmbH & Co KG	Established in 1982 by Rudy Panatta (Italy); primary focus on strength training equipment. Introduction in 2004 of the Oasis strength training equipment range. Today Panatta Sport S.R.L. – the full-service provider. Panatta Sport Germany GmbH was established on 1.10.2006 (100% owned by Panatta Italy)	Established in 1977 by Paul Kuo (Taiwan), manufactures cardio fitness equipment under contract. From the beginning of the 1990s the company developed its own line of cardio fitness equipment. 2003 SportsArt develops, in co-operation with Medex (Medex GmbH was established in Germany in 2000) a strength training equipment range. Since 2005 markets "SportsArt Fitness" strength equipment.
Main office	Neu-Ulm, Germany	Apiro, Italy	Tainan City, Taiwan
Production location	Finland	Italy	Taiwan (Some welding and powder-coating work is carried out in Germany)
Strength training range	FUTURE Line REHAB Line MODULAR Line BASIC Line C-Line Prevention Line Free Equipment Test Equipment	Fit Evo Line X-Pression Line Free Weight HP Oasis Kids system and various cardio equipment lines	SportsArt Fitness and Cardiolinie
Address	DAVID GmbH & CoKG Nelsonallee 24 D-89231 Neu-Ulm www.david.de Tel: 0731 – 978 660	Panatta Sport Germany GmbH Saalburgstr. 157 D-61350 Bad Homburg www.panattasport.com Tel: 06172 – 680 400	Medex Fitnessgeräte GmbH Industriegebiet Muldenhütten D-09627 Hilbersdorf www.medex-gmbh.com Tel: 037324 – 829 839
Guarantee	10 years on frame and transfer belt, 2 years on the mechanical components of the analysis and training systems Limited guarantee on wearing parts, pads and grips	2 years on frame 1 year on chains, cables, belts, pulleys, pads, bearings, adjusting levers, springs, chrome parts Guarantee condition: The guarantee card must be sent to the Italian head office within 10 days of purchase	5 years on frame 3 years on belts, gas springs, protective covers, bearings, pulleys and mechanical functional components 1 year on pads On-site guarantee in each case
Certification	EN-957 certified Fulfils CE requirements, Medical Device Directive: article 14 (93/42 EEC)	EN-957 certified Manufacturing certified to ISO 14001 (environmental compliance)	EN-957 certified Manufacturing certified to ISO 9000 /9001
Delivery	Equipment is shipped fully assembled, packed in plastic wrapping, fastened to wooden pallets and in wooden boxes	Equipment is shipped fully assembled on wooden pallets, packed in waterproof plastic wrapping	Equipment disassembled or assembled, with protective cover and bubble wrap, on wooden pallets
Lead time	4 – 6 weeks	30 working days	4 – 6 weeks

All details according to manufacturers' or company representatives' statements

Imagine if, when cars or other equipment are being tested by a "Test" magazine, that a representative of the respective manufacturer was present when the test was being carried out – it would be considered a joke! They do not even announce tests. At least the companies have no influence over which products are selected for the test.

Surprises during the test

All three companies agreed to the test when they were approached by Fitness Tribune.

Equipment Test Table - Abdominal Machines

Dr. Gottlob Institut

Machine / Type	***DAVID*** Future Line IV. Generation F130 Abdominal Flexion	***Panatta*** Fit Evo Fit Upper Abdominal Machine	***SportsArt*** SportsArtFitness Abdominal crunch machine
Ergonomics & comfort			
Anthropometric contact points	☼☼☼ All pads very good; shoulder pads could be a little softer	☼☼☼ Seat base and pelvic support very good; shoulder pads good	☼ Seat base good, foot roller limited; thoracic back roller acceptable, lower back pad relatively hard and without pelvic stabiliser
Weights and weight increments	☼☼☼ Beginners ☼☼ Advanced users 2.5 to 100kg in 2.5kg increments (1 integr. adapter weight) (standard 5 to 70kg in 5kg increments is not sufficient)	☼☼☼ Beginners ☼☼ Advanced users 5 to 100kg in 5kg increments	☼☼☼ Beginners ☼☼☼ Advanced users 5 to 120kg in 1.5kg or 2kg increments (2 integr. adapter weights)
Suitable for both smaller/larger users	☼☼☼	☼☼☼	☼☼ Slightly limited for smaller users
Adjustment mechanism ergonomics	☼☼☼	☼☼☼	None
Adjustable while seated (in exercise position)	Only provided for hip lock and seat height	Provided for weight adjustment	Provided for weight adjustment
Test weighting 25%	**Very good (1.4)**	**Very good (1.5)**	**Good (2.0)**
Biomechanics			
Movement kinematics	Isolated abdominal flexion with adjustable pivot axis. Avoid rolling off and onto the curved padding; set the starting position such that the exercise can be commenced from the straight spine position. Completing several training exercises at different seat heights (and therefore different pivot axes) is recommended. Excellent pelvic stabilisation assured via the Hip-Lock System; at high loads however, an additional hip belt is necessary.	Classic abdominal flexion. The load is applied via automatically adjusting shoulder bar with grips. Very good execution of the exercises for the 3rd rectus abdominis compartment. When commencing the exercise the user should press his/her pelvis and/or spine firmly onto the padding. Always select a slightly bent forward starting position.	The movement is a flick knife movement and is therefore conceived as a hip/abdominal flexion exercise. The bending movement is limited due to the high-set and non-adjustable arm supports. The lumbar roller applies a thrust load to the spine and forces lumbolordosis; there is unfortunately no pelvic stabilisation. The arrangement of the pivot axis encourages users only to make short movements.
Pivot axis	☼☼☼	☼☼	☼
ROM [Range of motion]	☼☼☼ Wide range of start positions with fine adjustment of limits	☼☼ Possible for the first 3 rectus abdominis compartments	☼☼
Risk of constrained posture	☼☼ Possible to some extent if the hyperlordotic starting angle and the lordotic back cushion are used	☼☼ An adjustable starting angle would be beneficial (available on abdominal machines of the X-Pression line)	☼ An adjustable starting angle would be beneficial
Load dissipation	☼☼☼ Very good via Hip-Lock system and hip cushion. At high loads it is necessary to use the supplied hip belt.	☼☼ Via footrest and hip cushion. The position of the footrest does not allow ideal load dissipation however.	☼ Active hip flexor extension at the foot roller; hip stabilisation awkward. Risk of risk of lordosis when commencing the exercise due to load dissipation via the spine .
Target muscles	☼☼☼ Lateral abdominal muscles and 3rd or 2nd rectus compartment	☼☼ Lateral abdominal muscles and 3rd rectus abdominis compartment	☼☼ Hip flexor musculature, lateral abdominal muscles and 3rd rectus abdominis compartment
Required adjustments	☼☼☼ Possible for all machine settings Start/ end position and Hip-Lock system are recommended extras	☼ Seat height adjustment and start angle positioning are missing	● Seat height and arm support adjustment are missing; a foot roller adjustment would also be advantageous
Resistance curve	☼☼☼	☼ Undetectable at high loads; upper body weight is not suitably compensated	☼☼ Almost constant
Inertial resistance	☼☼☼	☼☼☼	☼☼☼
Friction coefficient minimisation	☼☼☼	☼☼☼	☼☼☼
Test weighting 75%	**Very good (1.5)**	**Good (2.4)**	**Satisfactory (3.4)**
Overall rating Biomechanics/ ergonomics/ comfort	**Very good (1.5) (with extras)**	**Good (2.2)**	**Satisfactory (3.0)**
Safety features [1, 2]			
Pinch, cut, trip or impact hazards	Potential impact hazard at footrest	There is a pinch hazard between the eccentric and the rear metal cover	There is a potential pinch hazard at the outermost seat attachment point due to the use of oval tubing
Technical data [1]			
Dimensions (LxBxH)[3] [cm]	176 x 86 x 133 120 x 95 x 165	135 x 112 x 178	
Gross weight[3] [kg]	285	160	260
Price [3] [Euro exc. VAT]	4,120 basic price, extra weights and Hip-Lock system extra	1,790	3,390

Equipment Test Table – Back Extension Machines

Dr. Gottlob Institut

Machine / Type	***DAVID*** Future Line IV. Generation F110 Back Extension	***Panatta*** Fit Evo Lower Back	***SportsArt*** SportsArtFitness Back extension machine
Ergonomics & comfort			
Anthropometric contact points	☼☼ Very good except for back cushion	☼☼ Seat and hip support good, back roller limited	☼ Increased local pressure at back roller; seat and hip support good
Weights and weight increments	☼☼☼ Beginners ☼☼☼ Advanced users 2.5 to 100kg in 2.5kg increments (1 integr. adapter weight) (Standard 5 to 70kg in 5kg increments)	☼☼☼ Beginners ☼☼☼ Advanced users 5 to 120kg in 5kg steps	☼☼☼ Beginners ☼☼☼ Advanced users 5 to 110kg in 1.5kg or 2kg steps (2 integr. adapter weights)
Suitable for both smaller/larger users	☼☼☼	☼☼	☼☼
Adjustment mechanism ergonomics	☼☼☼	☼☼ Back cushion adjustment awkward, start angle adjustment good	☼☼ Backrest height adjustment not quite ideal; start angle good
Adjustable while seated (in exercise position)	Only provided for hip lock and seat height	Weight and start position good	Weight and start position good
Test weighting 25%	**Very good (1.5)**	**Good (2.0)**	**Good (2.0)**
Biomechanics			
Movement kinematics	Very isolated back extension exercise for the lower lumbar erector spinae muscles Ideal for full-amplitude training (low bending position) of the lower segments of the spine with loads in the region of <60%FMax At higher loads only bending angles in the range from 20-25° should be used; could otherwise lead to problematic posture constraints. Exercise routine required.	Back extension exercise for the lower lumbar erector spinae muscles At lighter weights a very pleasant and effective form of exercise; at heavier weights on the other hand, clear anchorage and adjustment problems become apparent.	Due to the position of the pivot this machine presents a mixed hip and back extension exercise. The handbook discusses a back extension exercise (back bent with a fixed hip position). This causes an additional transverse force to be applied to the lumbar structures.
Pivot axis	☼☼☼	☼☼☼	●
ROM [Range of motion]	☼☼☼ Max. ROM of the pivot angle-relevant spine sections	☼☼☼ Limited however, at the lowest back cushion setting	☼☼☼ Possible at start and end positions
Risk of constrained posture	☼☼☼ At start position	☼☼ Possible for start angle setting – but limited (improperly installed!)	☼☼☼ Start setting
Load dissipation	☼☼☼ Via Hip-Lock system and hip belt	● Awkward position for footrest which limits hip restraint	☼☼ Front foot stirrups set too low; hip support on the other hand, is good
Target muscles	☼☼☼ Lumbar erector spinae muscles (various spine segm. via seat adjustment)	☼☼☼ Lumbar erector spinae muscles	☼ Depending on execution the gluteal and/ or lumbar erector spinae muscles
Required adjustments	☼☼☼ Possible for all machine settings Start/ end position and Hip-Lock system are recommended extras	● No seat height or footrest adjustment; Start angle adjustment fitted, but was incorrectly installed on the tested machine such that only 2 positions were useable and the exercise must be started from a deep bending position!	● No seat height adjustment; footrest and back roller limited
Resistance curve	☼☼	☼☼	☼☼
Inertial resistance	☼☼☼	☼☼	☼☼
Friction coefficient minimisation	☼☼☼	☼☼☼	☼☼☼
Test weighting 75%	**Very good (1.5)** Good at higher loads (2.0)	**Satisfactory (3.1)**	**Satisfactory (3.2)**
Overall rating Biomechanics/ ergonomics/ comfort	**Very good (1.5) (with extras)** Good at higher loads (1.9)	**Satisfactory (2.8)**	**Satisfactory (2.9)**
Safety features [1, 2]			
Pinch, cut, trip or impact hazards	Potential impact hazard at footrest	There is a potential pinch hazard where the cable enters the eccentric	No objections
Technical data [1]			
Dimensions (LxBxH) [3] [cm]	176 x 86 x 133	120 x 95 x 165	165 x 150 x 178
Gross weight [3] [kg]	285	160	220
Price [3] [Euro exc. VAT]	4,230 basic price, extra weights and Hip-Lock system extra	1,790	3,290

Rating: ☼☼☼ very good, ☼☼ good, ☼ satisfactory, ● fair, ●● unsatisfactory

The categories, with the percentage score stated, are incorporated into the calculation of the overall score.

1 Evaluations/results were not used in calculating the overall score.

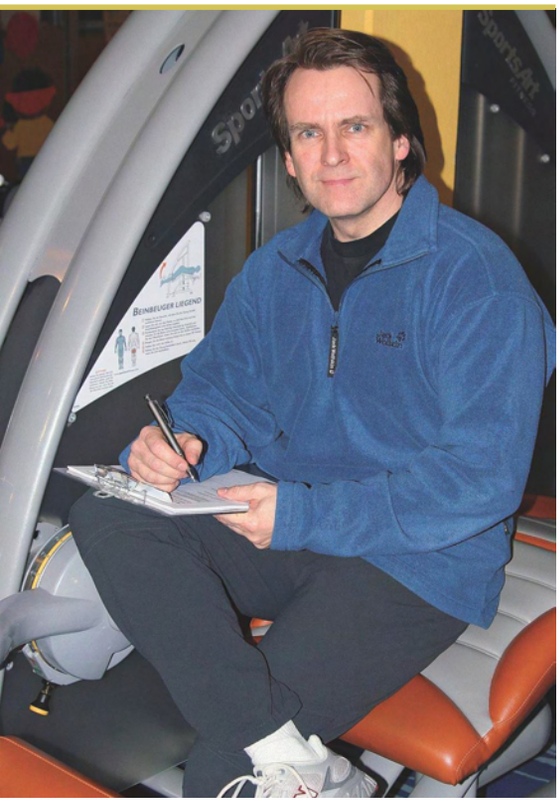
2 In terms of safety, only problems that could be visually detected by users were taken into consideration. Equipment was for example, not tested for load capacity, nor was compliance with binding European Standard EN 957, concerning the safety of stationary training equipment, checked.

3 According to manufacturer's information

All machine tests were carried out impartially and in good faith, however no guarantees of any type are given or implied.

However *SportsArt* was the only company that replied to our queries relatively quickly and for which the test location and all of the machines to be tested were provided with no problems. Praise is due here. It was not possible to maintain the initially announced publication date for FT 106 primarily because the equipment from *DAVID* was not provided on time. On the day of the test 6 machines from the 4th Future Line generation were then presented to us. But of these 6 machines only two were actually on our long completed list of equipment! The Fitness Tribune editorial team asked us to complete the test with the two machines and to inspect a third (leg press) in comparison with the report already published in FT 101.

With reference to the documentation we requested, *Panatta* made the test schedule rather difficult. The management of *Panatta Deutschland* was told (according to them) by their Italian head office, not to provide us with the requested technical information. This included information on the cable strength and surface finish, for example. The other firms such as *Nautilus, Technogym, Cybex, DAVID* and *SportsArt* had absolutely no problem in this respect. On the contrary! These companies even list the materials used in their documentation for all to read. By publishing their manufacturing and safety details they are actually demonstrating the quality of their products. Perhaps firms that attempt to score tactical points by keeping this information secret should rethink their corporate policy on this issue. Potential customers ought to pose relevant questions regarding materials and manufacturing methods before making their purchasing decision; these are important issues that affect the service life of the machines.



Technical details of the tested equipment

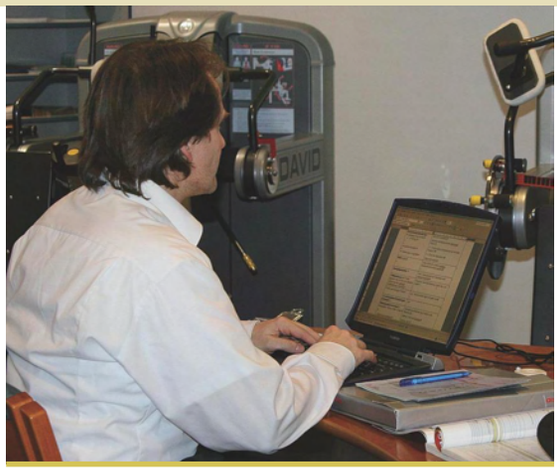
Apart from some small issues (see test tables) none of the machines that we tested from any of these three manufacturers exhibit any real technical deficiencies. In respect of the materials used *DAVID* scores top here with the highest quality because it has to fulfil the requirements relating to medical equipment. But *SportsArt* too uses good materials. There have just been some isolated cases of gas struts – used in the seat adjustment mechanism – that have, according to the fitness club management, had to be replaced after just 4 months – but still inside the warranty period. Had this not been a material or fitting fault it would have been preferable to use heavier duty systems. For the transmission of the resistance forces both firms sensibly employ highly flexible belt systems of very high tensile strength. The surface finish too, is of high quality powder coating for both *DAVID* and *SportsArt*.

As already explained above we were unfortunately unable to come to any conclusions about the materials used and the finish of the *Panatta* machines. Of note however, are the cushions used by *Panatta*. These caught our attention during the test because of their generally excellent body-hugging properties. It would be worth considering, and helpful for customers, supplying information on the tensile strength and especially the bending strength of the transmission cables used. These are subjected to continual deflection around pulleys on several levels.

The individual machines

The following 6 strength training machines were explicitly selected for testing:

- Abdominal machine
- Back extension machine
- Chest press
- Shoulder press machine
- Horizontal rowing machine
- Seated leg press



Abdominal machines

All of the manufacturers offer a bodyweight-independent abdominal exercise that is carried out in the seated position (see also the last abdominal machine test in FT 100). *DAVID* and *Panatta* employ the classic sit & reach exercise whilst *SportsArt* uses the jack knife variant.

Despite the very simple construction of the FitEvo model the *Panatta* design is a quite good abdominal machine. It stands out particularly because of its very pleasant cushion surfaces and its fast handling. The hip stabilisation, which is rather limited for higher loads, and the not quite ideal resistance curve mean that this machine gets a final rating of “fairly good.” The clear winner in this comparison is the *DAVID* machine. Happily, the highly curved back cushion on this IV generation abdominal machine has now been made considerably flatter. We reported in FT 100 that on and off rolling motions of the torso on machines with fixed pivot axes is clearly counterproductive in respect of loads on the facet joints and discus. With the *DAVID* machine it should therefore be ensured that the torso does not roll off and instead that the spinal segment that is directly positioned in the area of the pivot axis is bent and stretched. Stabilisation of the hip by the Hip-Lock system (available as an accessory) is also a very good method of stabilising the hips. At maximum loads however, it is necessary to use the hip belt supplied. This is the only machine tested that is fitted with a custom seat height adjustment, a start and end limit and an exact readout of the movement angle using a goniometer. It finds its way – proper handling assumed – into the “very good” category. The machine from *SportsArt* on the other hand, does not really impress – neither seen as a standalone unit nor in comparison with the others. It’s not the lack of a combined abdominal/ hip flexor extension that poses the problem, but unsatisfactory hip stabilisation, the lack of important

Equipment Test Table – Chest Presses

Dr. Gottlob Institut

Machine / Type	***DAVID*** Future Line F 510 Chest Press IV Generation not yet complete, III. Generation model was not made available! → **No on-site test!**	***Panatta*** Fit Evo Vertical Chest Press	***SportsArt*** SportsArtFitness Dual chest press
Ergonomics & comfort			
Anthropometric contact points	—	✿✿✿	✿✿✿ On the test machine the backrest was welded at a slight angle
Grips	—	Grips are good, diameter o.k.; different grip angles possible	Grip diameter is good. However the grips deviated by 1.5cm from the back cushion in respect of axis symmetry!
Weights and weight increments	Standard: 5 to 70kg in 5kg increments	✿✿✿ Beginners ✿✿ Advanced users 5 to 100kg in 5kg increments	✿✿✿ Beginners ✿✿✿ Advanced users 5 to 100kg in 1.5kg or 2kg stages (2 integr. adapter weights). For female beginners the lever weight could be an issue. For advanced users there are few possibilities for progression
Suitable for both smaller/larger users	—	✿✿ Good for small users; for larger people the grips are a little high	✿✿ Not so well suited for smaller users
Adjustment mechanism ergonomics	—	✿✿	✿✿✿ Comfortable
Adjustable while seated (in exercise position)	Seat height	Possible	Seat height good; weights are a little more difficult
Test weighting 25%	—	**Good (1.6)**	**Good (2.0)**
Biomechanics			
Movement kinematics	Characteristics: Permanently coupled, non-converging grips. There is certain to be an improvement when the IV generation appears.	Very good chest pressure movement with independent lever suspension. The low-momentum movement possess ideally converging grips.	Chest press movement with low-momentum independent lever suspension. The angled axle suspension causes the grips to describe a path that diverges by too great a degree.
Pivot axis	—	✿✿✿	✿
ROM [Range of motion]	—	✿✿✿ Comprehensive due to entry aid	✿✿
Risk of constrained posture	—	✿✿✿	✿✿✿
Load dissipation	—	✿✿✿	✿✿✿
Required adjustments	—	✿✿ A further seat height and backrest adjustment would be welcome additions	✿✿ For this arrangement a backrest adjustment would be advantageous
Resistance curve	—	✿✿✿	✿✿✿
Inertial resistance	—	✿✿✿	✿✿✿
Friction coefficient minimisation	—	✿✿✿	✿✿✿
Test weighting 75%	—	**Very good (1.3)**	**Good (2.5)**
Overall rating Biomechanics/ ergonomics/ comfort	—	**Very good (1.4)**	**Good (2.4)**
Safety features [1, 2]			
Pinch, cut, trip or impact hazards	—	No objections	No objections
Technical data [1]			
Dimensions (LxBxH) [3] [cm]	158 x 86 x 133	150 x 145 x 165	152 x 140 x 178
Gross weight [3] [kg]	—	250	260
Price [3] [Euro exc. VAT]	3,685	2,290	3,390

adjustments, awkwardly located pivot axes and cushion positions with localised pressure points which take away much of the pleasure of using the machine. The development department should take note and go back to the drawing board here.

Back extension machines

DAVID is also the clear leader in back extension machines. A wide range of essential positional adjustments helps to achieve precise execution of the exercises. Together with the various seat-height positions this allows different spinal segments in the lumbar region to be trained specifically. However the user must be made aware of the wide range of adjustments, correct use of the machine and differentiated training possibilities it offers.

Neither *Panatta* nor *SportsArt* are quite up to the standard of the others for this type of exercise. The *SportsArt* machine has a pivot axis that does not allow specifically targeted back extension exercises to be carried out at all, whereas the opposite is true for the *Panatta* machine. However *Panatta's* lower back machine does not provide the user with a functioning hip stabiliser, despite having a great contoured hip cushion. Furthermore the helpful start angle adjustment was incorrectly fitted to the tested machine – only two of the available start angles could be used with three further settings being completely unusable. A seat height adjustment would also be a good addition to both these machines.

Chest presses

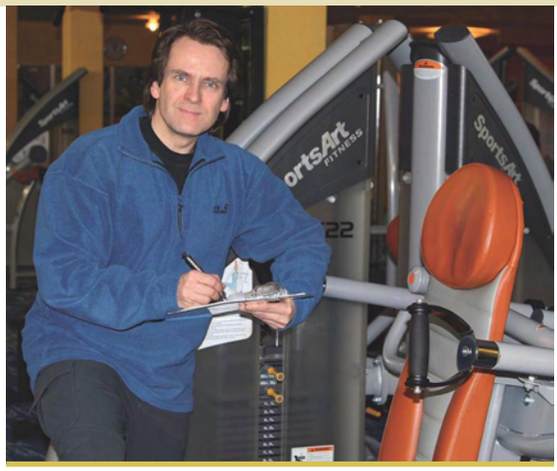
Derived from the classic barbell bench press, the first chest press machines appeared over 40 years ago. First as lying designs and then in the seated variant, the controlled press movement was carried out using a coupled pressure bar. Over the past 10 - 15 years chest presses fitted with independent suspension have become increasingly popular. Although there are good reasons in favour of designs that use permanently coupled levers, independent suspension is the better system for the particular kinematics involved here. On the one hand, each side of the body is subjected to identical resistances and forces. On the other, it is relatively easy to suspend the individual levers at an angle thereby achieving a converging grip path and greater ROM. Both *Panatta* and *SportsArt* therefore offer this system. *DAVID* too, is certain to upgrade for its new model range because the current "Future III Chest Press" is still fitted with a permanently coupled lever movement.

The chest presses from *Panatta* and *SportsArt* are fitted with an aid to easy access – a great help to many instructors. *SportsArt* does provide rotating, freely adjustable grips, but the chest press from *Panatta* is really in a class of its own in respect of the path described by the grips and the overall movement kinematics. The simple handling and press movement in particular, propel the machine into the exclusive "very good" category. A greater range of seat height adjustments, a slight increase to the weight stack and a marginal improvement to the available ROM would bring this machine to perfection. From a value for money point of view the machine is already top! In view of the frequent cable deflection over the many pulleys it only remains to hope that the transfer cable is strong enough to withstand the high loads placed upon it - and ensure a long service life.

Shoulder presses

Both *Panatta* and *SportsArt* offer a seated shoulder press machine with independently suspended, upward converging grips. The 3rd generation F610 shoulder press from DAVID is fitted with a permanently coupled linear grip movement. As already mentioned above, converging, independently suspended designs offer undeniable advantages in relation to increased ROM and guaranteed equal force application to the left and right sides of the body. Permanently coupled systems on the other hand, only provide a simulation of the barbell exercise.

Despite written agreement, *Panatta* Germany was unfortunately not able to provide a location for us to test its converging deltoid press – not from the company's Fit Evo nor their X-Pression lines. We therefore used the multipurpose chest press that was available in the test gym. As its name suggests this machine offers a range of functions. It can be used for chest press exercises – ranging from flat bench presses right through to a range of inclines. Finally, a really good shoulder press exercise can also be carried out. This excellent large range of exercises



does however, require a more complicated machine setup and some technical compromises must be accepted as far as the exercises themselves are concerned. Despite these clear handicaps this multipurpose machine from *Panatta* does offer the user a solid shoulder press exercise. The grips are arranged at the sides for a moment-reducing, direct application of the load and this simulates a pleasant dumbbell exercise for flexible shoulders. *SportsArt* takes the lead with its almost ideally converging grip path and tops the equipment test with an excellent machine. An adjustable backrest or an additional back cushion that could be inserted would further perfect the machine.

Rowing machines

Horizontal rowing machines that support the whole of the user's torso are central components of machine based strength training. All three manufacturers therefore offer such a system. However, a rowing machine is only to be found in *Panatta's* range of X-Pression Line equipment. The Lat Rowing System from *DAVID* was once again not available for us to test; we're waiting with bated breath for the improved 4th generation to appear! The lat rower dual from *SportsArt* has all the necessary adjustments, it has independent lever suspension and freely rotating grips. The pivot axis of the two levers is not quite perfect and this does limit the pure pulling movement of the grips towards the end of the movement range. This situation is particularly awkward for taller users. *Panatta* offers an interesting variation of the rowing machine on which the exercise commences from a 45° upward-angled incline and finishes in the horizontal position. The quality of the exercise is very good because the diverging grips have a positive effect on the ROM. *Panatta* clearly leads the field here.

Equipment Test Table – Shoulder Presses

			
Machine / Type	***DAVID*** Future Line F 610 Shoulder Press IV Generation not yet complete, III. Generation model was not made available! → **No on-site test!**	***Panatta*** Fit Evo Multipurpose Chest Press	***SportsArt*** SportsArtFitness Dual shoulder press
Ergonomics & comfort			
Anthropometric contact points	—	☼☼☼	☼☼☼
Grips	—	Grips good	Good grip diameter; rotation does not require much practice
Weights and weight increments	Standard: 5 to 70kg in 5kg increments	☼☼ Beginners ☼☼ Advanced users 5 to 100kg in 5kg steps	☼☼☼ Beginners ☼☼ Advanced users 5 to 130kg in 1.5kg or 2kg steps (2 integr. adapter weights)
Suitable for both smaller/larger users	—	☼☼☼	☼☼☼
Adjustment mechanism ergonomics	—	☼	☼☼☼
Adjustable while seated (in exercise position)	—	Only pressure lever, other adjustments are complicated	Possible
Test weighting 25%	—	**Good (2.0)**	**Very good (1.3)**
Biomechanics			
Movement kinematics	—	We had no opportunity to test the Deltoid Press from FitEvo or X-Pression and had therefore, to fall back on this multifunction apparatus. With this, various chest press exercises and pure shoulder press exercises can be carried out. We only tested the shoulder press exercise on this machine and, with its permanently coupled grips, this simulated a seated barbell shoulder press. Purely lateral grip positions at the mid shoulder position force high capsule stresses.	Shoulder press movement with independently suspended, low-inertia pressure levers. The upwards converging grips provide a clear increase in ROM. Unfortunately the grips are not horizontally adjustable (they are relatively far forward).
Movement path	Permanently coupled linear grip path	☼☼☼ Permanently coupled grip; grip describes a path slightly to the rear	☼☼☼ Grips converge at the top in an almost ideal manner
ROM (Range of motion)	—	☼☼☼	☼☼☼
Risk of constrained posture	—	☼☼☼	☼☼☼
Load dissipation	—	☼☼☼	☼☼☼
Required adjustments	Seat height adjustment	☼☼☼ Seat height	☼☼ Seat height; with this grip position a backrest adjustment would be beneficial
Resistance curve	—	☼☼☼ Constant	☼☼☼
Inertial resistance	—	☼☼☼ Direct load application	☼☼☼
Friction coefficient minimisation	—	☼☼☼	☼☼☼
Test weighting 75%	—	**Good (1.8)**	**Good (1.7)**
Overall rating Biomechanics/ ergonomics/ comfort	—	**Good (1.8)**	**Good (1.6)**
Safety features [1, 2]			
Pinch, cut, trip or impact hazards	—	No objections	Just a trip hazard at the entry aid
Technical data [1]			
Dimensions [cm]	134 x 86 x 133	198 x 110 x 180	160 x 145 x 178
Gross weight [3] [kg]	—	225	240
Price [3] [Euro exc. VAT]	3,130	3,140	3,390

A wider range of seat/ chest cushion adjustments would increase the machines' test score.

Leg presses

At first glance the design of the *Panatta* (X-Pression Line) and *SportsArt* leg presses are very similar. The user pushes him/herself backwards on a sliding seat along a gently rising rail. The angle of the sliding seat can be adjusted and the user is able to select various foot positions from a very passable foot pressure-plate. Both machines deserve praise because of the side-mounted steps that are intended to help the user when getting onto the machine. Unfortunately these have not been ideally positioned. The steps on the *SportsArt* are however, slightly better.

If the angle of the sliding seat is set to the horizontal position both the *Panatta* and *SportsArt* machines can be used to carry out leg press exercises as a sled lying leg press. The user has a much larger exercise spectrum at his disposal as a result of this enormous range of adjustments to the sliding seat.

If the *SportsArt* seated machines achieve a slightly better test rating, indeed a true 90° seated position can only be had on the *SportsArt* machine, with the lying leg press variant *SportsArt* finally pulls ahead of *Panatta*. Whether it's the arrangement of the shoulder cushion, lying surface or steps, the leg press from *SportsArt* is clearly superior and this is reflected in the evaluation. A higher capacity weight stack and greater ROM adjustments would however, still be desirable attributes. (If required these results may be compared with the benchmarks in FT 101).

The still current Future III Leg Press from *DAVID* is an older training variant in comparison and is in need of a re-design. The complete movement kinematics and all of the technical details of this machine may well require an overhaul, but the leg extension machine (4th generation) can easily rub shoulders right up there with the front runners

Leg extension

In the end *DAVID* only supplied 2 of the 6 machines that we requested for testing so, following consultation with the editorial team the now available 4th generation F200 leg extension machine was subjected to a stand-alone test. The result of this test can be compared with the tests in FT 101. The wonderful overall result of "good (1.7)" catapults DAVID to the top of the league here. The machine provides a good leg extension movement with pleasant cushioning and a good pivot axis position. The multi-stage start angle adjustment, available as an accessory, together with an increase in the weights, are however, required extras. There are some small points of criticism in respect of the hand grip arrangement, access to the machine and the limited leg roll adjustment, but the machine fulfils all of the relevant requirements with flying colours. With a basic price of 4,340 euros plus the extras the DAVID machine is placed squarely in the upper category.

Final comment

Following enquiries from some manufacturers please note the following: Equipment manufacturers can book objective tests with precise suggestions for improvements directly with the Dr. Gottlob INSTITUT. These tests will not be automatically published

All of the test results were arrived at in good faith, however no responsibility is accepted for the correctness of this information.

Dr. Axel Gottlob
Dr. Gottlob INSTITUT
Contact e-mail: gottlob@goft.de

Test criteria

What differentiates a good piece of fitness equipment from a lesser one? The machine's function is by far the primary factor here. A piece of fitness equipment must deliver the type of training for which it was created. It can be of top quality construction, it can be beautiful, it can be comfortable and it can exceed the most stringent safety standards. But if it doesn't provide the training function for which it is intended then the other advantages are of little value! A car may well have a large boot, comfortable seats, air conditioning and a classy design. However, if the brakes are not powerful enough, the engine starts unreliably or if the car becomes uncontrollable on a wet road surface, then all of the other qualities are of little interest. If you find this comparison between fitness machines and cars a little far fetched please remember that, in terms of functionality, the quality of fitness machines nowhere near approaches that of cars. As far as the equipment world is concerned then, this comparison between cars and fitness equipment is fully justified.

Equipment Test Table – Horizontal Rowing Machines

Dr. Gottlob Institut

Machine / Type	DAVID Future Line F 440 Lat Rowing IV Generation not yet complete, III. Generation model was not made available! → **No on-site test!**	Panatta X-Pression Rowing Machine Convergent	SportsArt SportsArtFitness Latruder Dual
Ergonomics & comfort			
Anthropometric contact points	—	☼☼☼	☼☼☼
Grips	—	The grips are relatively thick for a pulling movement	The grips are too thick for a pulling movement. On the other hand the free rotation of the grips is pleasant
Weights and weight increments	Standard: 5 to 100kg in 5kg increments	☼☼☼ Beginners ☼☼☼ Advanced users 5 to 100kg in 5kg increments	☼☼☼ Beginners ☼☼ Advanced users 5 to 100kg in 1.5kg or 2kg increments (2 integr. adapter weights)
Suitable for both smaller/larger users	—	☼☼	☼☼ Less suited to taller users because the pivot axis position becomes more and more awkward
Adjustment mechanism ergonomics	—	☼☼☼	☼☼☼ top
Adjustable while seated (in exercise position)	Chest cushion	Possible	Seat and chest rest together with weights
Test weighting 25%	—	**Good (1.6)**	**Very good (1.4)**
Biomechanics			
Movement kinematics	Permanently coupled linear grip path.	A purely horizontal rowing exercice with chest rest is unfortunately not included in either range. The angled rowing motion provided a low-inertia independent lever suspension with a variable pulling angle of between approx. 45° and the final horizontal position. The degree of divergence of the grips during pulling down/towards the body gives the user complete ROM with a favourable pull angle. Lack of seat height adjustment favours smaller users.	Comfortable horizontal rowing exercise with low-inertia independent lever suspension. During the pulling movement the diverging grips initially improve ROM and effectiveness. Over the last third of the movement range this does however, cause a considerable reduction in effectiveness. Sit as far forward as possible in order to overcome this.
Pivot axis	—	☼☼☼	●
ROM [Range of motion]	—	☼☼☼	☼☼ Very good; maximum contraction is limited by the diverging grips
Load dissipation	—	☼☼☼	☼☼☼
Required adjustments	—	☼☼ There is no seat height or chest cushion adjustment	☼☼☼ Seat height and chest cushion adjustment fitted
Resistance curve	—	☼☼	☼☼☼
Inertial resistance	—	☼☼☼	☼☼☼
Friction coefficient minimisation	—	☼☼☼	☼☼☼
Test weighting 75%	—	**Good (1.9)**	**Good (2.5)**
Overall rating Biomechanics/ ergonomics/ comfort	—	**Good (1.8)**	**Good (2.2)**
Safety features [1, 2]			
Pinch, cut, trip or impact hazards	—	No objections	No objections
Technical data [1]			
Dimensions (LxBxH) [3] [cm]	129 x 86 x 133	157 x 114 x 190	160 x 129 x 178
Gross weight [3] [kg]	—	251	260
Price [3] [Euro exc. VAT]	3,350	2,760	3,290

Rating: ☼☼☼ very good, ☼☼ good, ☼ satisfactory, ● fair, ●● unsatisfactory
The categories, with the percentage score stated, are incorporated into the calculation of the overall score.

1 Evaluations/results were not used in calculating the overall score.

2 In terms of safety, only problems that could be visually detected by users were taken into consideration. Equipment was for example, not tested for load capacity, nor was compliance with binding European Standard EN 957, concerning the safety of stationary training equipment, checked.

3 According to manufacturer's information

All machine tests were carried out impartially and in good faith, however no guarantees of any type are given or implied.

Equipment Test Table – Seated Leg Presses

Dr. Gottlob Institut

Machine / Type	DAVID Future Line F 210 Leg Press. IV Generation not yet complete, III. Generation model was not made available! → **No on-site test!**	Panatta X-Pression Horizontal Leg Press (pictured above without shoulder cushion and upper hand grips)	SportsArt SportsArtFitness Leg press
Ergonomics & comfort			
Anthropometric contact points	—	✿✿ Seat/ back cushion very good, the shoulder cushion is not contoured and is positioned awkwardly, the headrest forces the user into an uncomfortable position	✿✿✿ Seat/ back cushion very good; the shoulder cushion is not contoured
Weights and weight increments	5 to 100kg in 5kg increments	✿✿✿ Beginners ✿✿✿ Advanced users 10 to 200kg in 10kg increments The sled weight is rather heavy for beginners carrying out single leg presses .	✿✿ Beginners ✿✿ Advanced users 10 to 200kg in 10kg increments. Increases for weaker beginners is too large. From knee angle training <90° the load is too small for advanced users.
Suitable for both smaller/larger users	—	✿✿✿	✿✿ The lying design is somewhat limited for smaller users
Adjustment mechanism ergonomics	—	✿✿✿	✿✿✿ Very comfortable The widest position for the shoulder rest height can be accidentally unlocked by leaning on it (no risk)
Adjustable while seated (in exercise position)	—	✿✿✿ Start angle, seated/lying position and weight	✿✿✿ Weight, inclination angle and shoulder cushion can be very easily adjusted from the seat; start angle under seat o.k.
Test weighting 25%	—	**Good (1.9)**	**Good (1.5)**
Biomechanics			
Movement kinematics	This 3rd generation leg press is desperately in need of a redesign! Items such as a larger footplate area, entry aid, knee-load reducing press options, greater resistances etc., mast be taken into account in the design of the new, not yet available, 4th generation of this equipment line.	Sled guide mounted on roller bearings for lying and angles seated leg presses. The seated mode is preferred. The entry steps are poorly positioned.	Horizontal leg press movement that can be carried out at 8 different angles between approx. 70° and 6°. Hip position can be varied via a convenient backrest adjustment which contributes to a positive training experience. The entry steps are not ideal.
Movement path	Linear	✿✿✿ Linear on a slightly angled plane	✿✿✿ Linear on a slightly angled plane
ROM [Range of motion]	—	✿✿✿ Full ROM possible in both seated and lying modes. If heavy weights are used a sled lock should be fitted for the entry above the entry steps	✿✿ In the seated mode an almost full ROM is possible; in lying mode the movement is flexionwise limited. If heavy weights are used a sled lock should be fitted for the entry above the entry steps
Risk of constrained posture	—	✿✿✿ Possible at the start angle setting	✿✿✿ Possible at the start angle setting
Load dissipation	—	✿✿ Good when seated at an angle; in the lying mode the shoulder cushion is awkward. Awkward when entering the machine.	✿✿✿ Good when seated; acceptable when lying. Awkward when entering.
Footplate area	—	✿✿ A useful 75cm width is available to the user. The height is still acceptable at almost 50 cm.	✿✿ A pleasant 64cm height is balanced by a width of 57cm as an absolute minimum. The surface is rubberised and anti-slip
Target muscles	—	✿✿✿ Overall knee and hip flexor musculature	✿✿✿ Overall knee and hip flexor musculature
Required adjustments	—	✿✿✿	✿✿✿
Resistance curve	—	✿✿ Constant resistance	✿✿ Constant resistance
Inertial resistance	—	✿✿✿	✿✿✿
Friction coefficient minimisation	—	✿✿✿	✿✿✿
Test weighting 75%	—	**Good (2.4)**	**Good (2.0)**
Overall rating Biomechanics/ ergonomics/ comfort	—	**Good (2.3)**	**Good (1.9)**
Safety features [1, 2]			
Pinch, cut, trip or impact hazards	—	No objections	No objections
Technical data [1]			
Dimensions (LxBxH) [3] [cm]	172 x 86 x 133	210 x 125 x 180	216 x 110 x 201
Gross weight [3] [kg]	—	390	440
Price [3] [Euro exc. VAT]	4,240	3,990	5,790

Functionality

It is sometimes said that the performance of various machines is almost identical. The reason for this frequently stems simply from ignorance or sometimes company policy which reduces the criteria for comparing the machine's functionality to a limited set of points such as the basic movement, range of possible adjustments or to the cam.
A serious mistake! It's only the total score of approximately 40 parameters, the most important of which are listed in the tables, that can provide an adequate assessment of the performance and functionality of a particular piece of equipment. The core criteria here are ergonomics and biomechanical considerations.

At light weights, many machines exhibit very good performance. The biomechanical properties of the more sophisticated models only become apparent however, when higher weights are applied. When an athlete needs to call on his or her full reserves of energy to overcome the load then he or she is no longer in a position to cope with awkward axes, adverse resistance behaviour and generally poor positioning of the machine. In the case of smaller training loads, it requires great experience in movement analysis in order to detect biomechanical weaknesses. At higher weights, far more athletes and instructors will be able to recognise the machine's limitations.

Aside from functionality, "safety", "comfort in use", "ease of maintenance", "durability", "design", "quality of construction and materials" and of course, "price" were also taken into account as important evaluation criteria.

In the first instance the machine must exhibit proper movement kinematics. This means the actual movement must complement the user's joint movement. For example, during the course of controlled strength training movements under load, if a joint is being exercised that is only intended to flex or extend, then that joint should not be subjected to thrusting action or rotational forces. The position of the machine's pivot axes and/or the movement tracks of the levers/carriages are very important.

The muscle that is being trained should be correctly exercised and no unphysiological strains should be exerted. This means that joints that are not being exercised should either not be subjected to forces or they should be stabilised. The stabilised system should correctly channel away the forces generated in the body. Effective muscle training often requires a high degree of joint isolation and of course, a properly co-ordinated training program/cycle.

Ideally, muscles should be trained across their full contractile range in order to avoid issues such as muscle shortening, reduced joint protection and only partial strengthening of the articular cartilage. This range is expressed as ROM (range of motion). There is a risk that physical constraints may limit the maximum available ROM which may occur if joints or tendomuscular structures are subjected to unphysiological peak forces.

Various independent studies carried out during the 1990s indicated that a resistance curve artificially set by a machine and intended to simulate the body's own strength curve for the purpose of muscle development, is not automatically the most effective. A resistance curve does however makes sense if it enables peak forces to be reduced in relation to the movement path or position of the joint.

During strength training weights aren't just simply lifted and then lowered again, they also move at different speeds over the machine's range. Aside from the lifting effort alone kinetic energy is therefore also expended because pulleys, cams, and levers are also being moved. The more weights that are being moved and the faster they travel, the greater the inertia of the system. When the inertia of a system increases then the peak forces required for each repeated movement and for each training session are also correspondingly greater. High inertial resistance limits the machine's spectrum of use and reduces the range of resistances available for training.

The equipment comparison tables set out a number of important criteria that are significant in terms of effectiveness and comparability. For space reasons it has not been possible to list all of the aspects taken into consideration during the tests.

Further technical criteria are discussed in the test report in FT 100.

Test winner 2006: see www.fitnesstribune.com

Who will it be in 2007?