TRAINING

BENCH PRESS SHIRTS

What's the use of a BP shirt for the athlete?

as told to Powerlifting USA by Boris Sheiko, Vladimir Fetisov, and Boris Lukyanov

If we analyze the powerlifting development since the moment of its appearance at the world arena up to our days, we can see that the exercise techniques as well as the training methods have made great progress. The competition rules have improved, the revolution in athlete's equipment has also taken place.

The progress of the physical exercises techniques in powerlifting is conditioned by different factors. So, the perfecting of special sport equipment and clothing is the condition of no little significance in the performing of one of three exercises – the bench press. The bench press shirt is a powerlifter's special sport clothing. Originally the bench press shirt's purpose consisted only in minimizing possible traumas of the chest and shoulder muscles. The first bench press shirts at the world and Europe championships were permitted in the Federation IPF (the International Powerlifting Federation) in 1983. These were the bench press shirts Inzer Blast Shirt, Frantz Shirt, Pacifico Power Elite Shirt and Titan "The Fury". In 1984 under the pressure of the representatives' majority the IPF International congress prohibited the use of bench press shirts at the IPF international tournaments. Only 8 years later (in 1993) the IPF Federation permitted once again the use of the bench press shirts not only during the trainings, but also at competitions.

Boris Sheiko *– head coach for the Russian powerlifting team*

The bench press shirts differ by their thickness. The thicker it is, the stronger muscular support is. In this connection the more efficient elaborations of the bench press shirt cut appeared. The shirt's fabrics itself also changed: it became more high-quality. So, the companies Inzer, Titan, Metal, producing the powerlifters' clothing and competing between themselves, started to develop and release the bench press shirts made of thick and hard material with reinforced seams on the chest, the neckband and sleeve were strapped onward. As a consequence, the bench press shirts started to create the certain resistance during the barbell's descent on the chest and to possess a very good "ejecting" effect upwards: from the chest of an athlete. During the trainings process it was revealed that the athlete doing exercises in the bench press shirt, can press great weights more easily, providing in this manner an additional muscular support while moving the weight, and all this allows him to train with greater intensity. Thereby, during competition this athlete can show higher results and even set up new world records. In short, he has greater advantage of the lifters, competing without bench press shirts.

We want also to note that some powerlifting coaches are convinced that there is a big difference in the bench press execution technique in the bench press shirt and without it, so during the competition month they recommend to their sportsmen to do this exercise only in the bench press shirt. They explain that the functional possibilities of an organism can not be at the maximum high level for a long time. Besides, an athlete must always improve his technique. Moreover, in order to overcome each new sport peak, it is necessary to pawn a new base, and every time this base must be more powerful, than a previous one.

But there are also such incontestable facts, when the high-class athlete puts on the bench press shirt only 1-2 times before the competitions, but herewith at the championships he also shows the high results.

These two diametrically opposite facts and the contradictoriness of opinions on the bench press shirt using have forced us to think who is right? Are there any differences in bench press technique in a bench press shirt or without it? How does a bench press shirt influence on the execution technique of this exercise and on the competition results increasing? What else additional advantages does an athlete get, using a bench press shirt?

In order to make clear this question, taking into account the contradictoriness of opinions, we have selected the group of 15 athletes of different qualification (from candidate masters up to world-class athletes), training in the School of the highest sportsmanship of the Republic of Bashkortostan and have defined the following experiment problems:

a) to make a biomechanical analysis of the bench press technique without a bench press shirt or in a bench press shirt;

b) to reveal the bench press shirt influence on the apparatus peak speed in the bench press.

By the way, for the bench press technique analysis, we compared the trajectories of the centre of the barbell's butt (CBB), time sweeps of the change of this point's vertical coordinate, as well as time sweeps of its velocity and speed-up. In order to analyze the named features we used the computer program Motion Trace/Weightlifting, elaborated by authors especially for the analysis of video segments made by video cameras at competitions and trainings. During the experiment the lifters were provided with single-layer bench press shirts of companies Inzer and Titan, approved by the IPF Federation.

Before starting the experiment the following task was assigned athletes: after the initial warming-up they must do one bench press ascent of the barbell first without a bench press shirt lifting the weights making 70%, 80% and 90% of the limit. Then (after a small break) the same athletes were to bench press in shirts with the same weights' percentage (but the 100% weight limit was already to be pressed in a shirt).

In the course of the experiment the following features and parameters were brought under control: the CBB's trajectory, the ascent height, the peak speed of the descent and ascent of the barbell, the maximum speed-up (hereinafter the pictures 1-4 present the examples, in which all the graphs correspond to one video segment):

1) The CBB's trajectory. Its example is shown on the picture 1. The red line designates the so named initial vertical, where the motion begins. The small circumference on this vertical is the trajectory beginning. The black points correspond to the video segment's frames. The small circumference on the trajectory corresponds to the current frame chosen for the special observation.

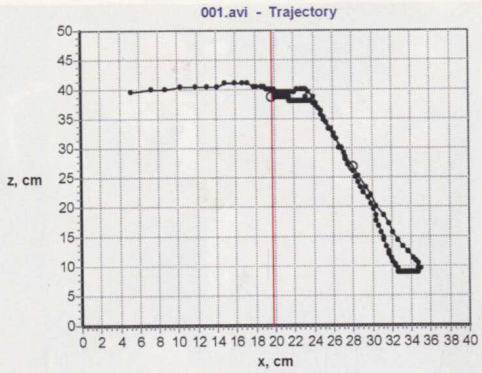
2) The ascent height (H_{cm}) corresponding to the ascent peak velocity. This parameter was valued in percents from the full height of the ascent H (refer the picture 2). The graph presents well the descent phase (between the time references 2.0 and 3.4 seconds), the pause phase (between the time references 3.4 and 4.2 seconds) and the ascent phase (between the time references 4.2 and 5.2 seconds). The peak velocity point is a point of the graph's maximum rate of rise on the ascent area. Certainly, it is rather complicated to define by eye this point, so we defined its position, using the following graph—the time sweep of the vertical velocity (picture 3).

3) The descent peak velocity ($V_{d.max}$) cm/sec, and the ascent peak velocity ($V_{a.max}$) cm/sec. The picture 3 shows the time sweep of the vertical velocity (practically this is the first derivative with time from value, presented on the previous graph). The named parameters are easily defined by the maximum negative and positive velocity peaks. The ascent peak velocity ($V_{a.max}$) marked by the black point, is the most interesting.

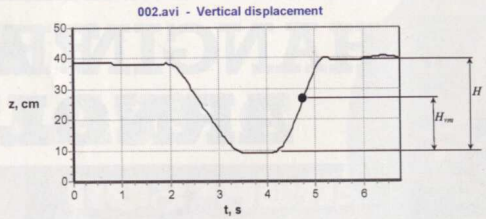
4) The maximum speed-up a_{max} preceding the velocity peak, cm/sec^2.

It is well known, that the speed-up is the second derivative with time from displacement and the first derivative with velocity. Besides, the instant speed-up, as it follows from the second Newton's law, is straightly connected with the force, applied to the apparatus at the current moment. So it was interesting to observe the speed-up changes at the time period, directly preceding the ascent peak velocity, as, in essence, it describes the time position and characterizes the effort, imposed by an athlete while pulling a barbell upwards.

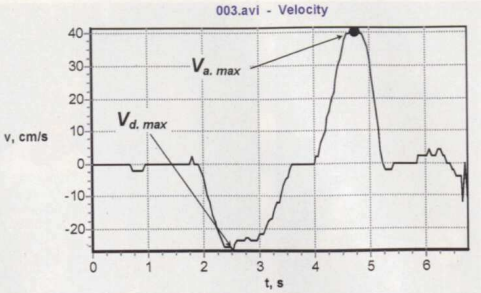
The typical results for athletes' different categories are presented on the pictures 5-8. For each example, the graphs corresponding to the bench press performing without a bench press shirt are grouped in the left column, and in the right column, performing in bench press shirts. The graphs



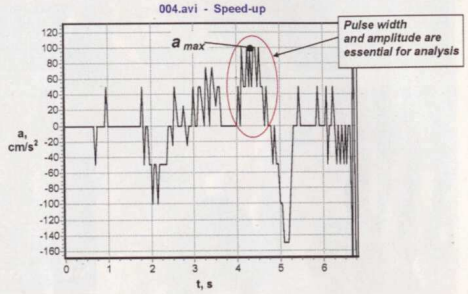
Picture 1. Example of the CBB's trajectory



Picture 2. Example of the time sweep of the CBB's vertical displacement. The black point designates the moment of the ascent peak velocity achievement.



Picture 3. Example of the time sweep of the CBB's vertical velocity



Picture 4. Example of the time sweep of the CBB's vertical speed-up

of displacements, velocities and speed-ups are on purpose placed one under another with observance of the time reference correspondence, in order to present in better manner the parameters' change through time. The collective results on these three examples are put in the table 1. On the graphs of displacements and velocities the black points mark the achievement moments of ascent peak velocity.

So, on the ground of our research results we are able to do the following findings:

1. The analysis of presented dependencies shows that the forms of the CBB's trajectories while doing exercises in the bench press shirt and without it beside the athletes of high athletic skill (world-class athletes and merited masters of sports) do not differ noticeably (refer to the pictures 7 and 8). Thus we can surely say that the higher the lifter's qualification is, more automated his bench press technique is. The exercise technique of the highly skilled athletes is characterized by high stability and also by flexible adaptability to different variable factors. During the reexecution of the same motion the world class lifters of Russia are typified by the kinematical features stability of the exercise performing. It is sure to say that all mistakes, made by athletes while pressing without a bench press shirt, are also present while bench pressing in a shirt.

The athletes with minor experience and lower qualification are defined by changes of trajectories forms in passing from bench pressing without shirt to the pressing in a shirt. (refer to fig. 5 and 6).

It was also marked that the trajectories forms change depending on the apparatus weight increasing. We can clearly see the observable differences of the trajectories forms while lifting an apparatus weighting 90-100% of weights from the ascent of 70-80% of weights.

2. The main athlete's advantage, making bench press in a shirt, is that that he gets the additional help lifting the barbell from the chest. The bench press shirt plays the role of " an additional spring", helping the athlete to achieve the peak speed more quickly: "to eject" that allows him to pass the "dead" point zone more easily and to finish the exercise successfully.

3. In exercises without a bench press shirt the barbell's descent velocity is at the average 15-20% higher, than the same velocity in the exercises,

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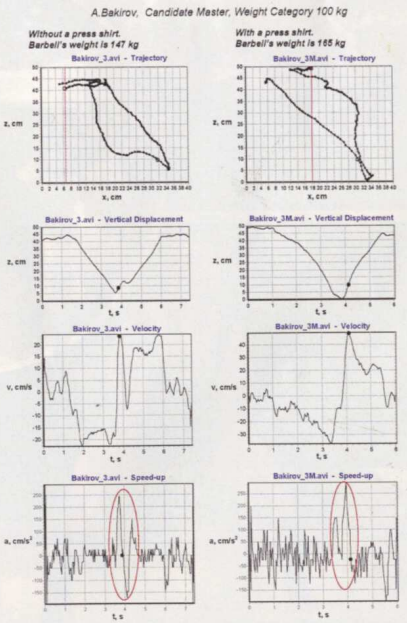


Picture 5. Comparison of BP execution of A. Bakirov without a shirt and in it

(continued from page 13)

which are done in the bench press shirt.

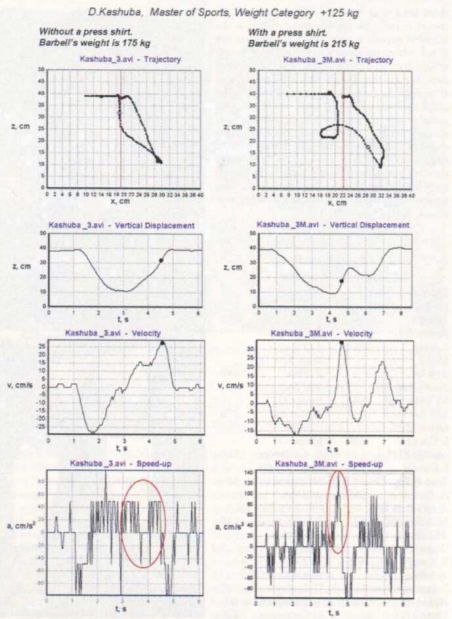
4. In exercises without a bench press shirt the speed-up, preceding the peak speed, as a rule, is below than the same speed-up in exercises done in the bench press shirt. Moreover, the exercises done in the bench press shirt are characterized by more stable speed-up, in other words its high values are being saved for a bit longer time and that's why there is a little number of break-ups on the graph.

5. In exercises without a bench press shirt the peak speed is nearly always noted in the second half of the ascent, while then in exercises done in the bench press shirt - in the first half, regardless of the athlete's skill.

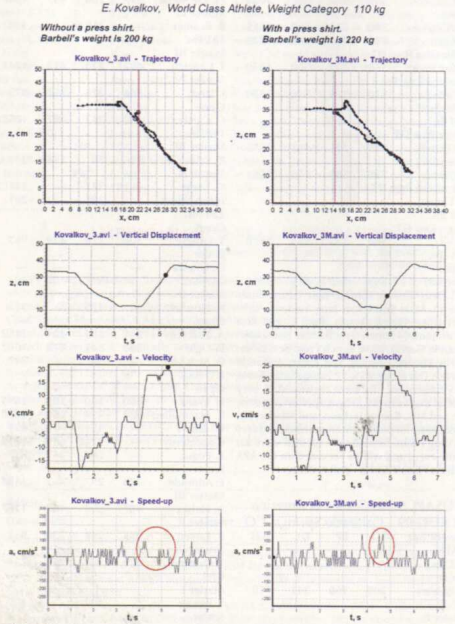
The more qualitative a bench press shirt is, the thicker its material is, the more it helps to an athlete "to eject" that allows him to pass the "dead" point zone more easily and to finish the exercise successfully. The majority of athletes of the Russian team level use two bench press shirts in their workout session. One burn-in bench press shirt, a bit stretched, easily dressing, is used by athletes to make bench press with 80-percent weights and higher. And the second – a competition bench press shirt, not stretched, of smaller size, than the burn-in one, which is dressed with difficulty, envelops the body very tightly, this shirt is used also at competitions but only during "passing" to maximum and submaximum weights. The trainings in bench press shirts allow the athletes to execute bench press on higher percents (80-90%) that brings into the training process monthly average intensity increasing and, consequently, into the own results improvement at competitions.

Even a very stiff bench press shirt, having good "ejecting" effect, is not capable to help the athlete to develop such speed, which must be enough to finish bench press. So the athlete's task is to exercise bench pressing in the second half of the barbell's way.

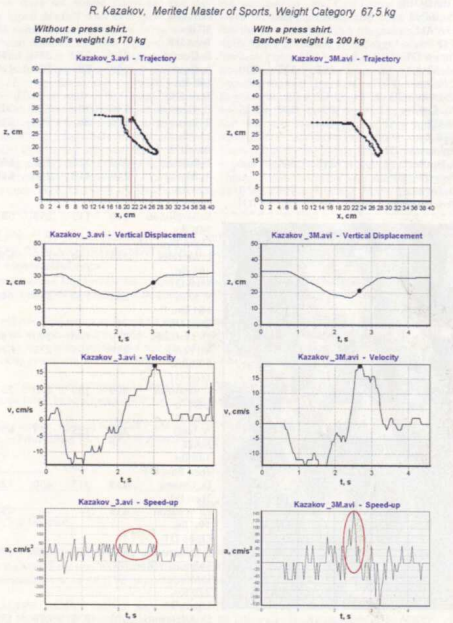
During the trainings we recommend paying more attention to finish the barbell's press in "frame" and to press from a board from different height levels, as well as to bench press with chains. These exercises will help the athlete to increase the arm's strength in the bench press final part as well as near the "dead" point. But if during the trainings a lifter uses a bench press shirt constantly, his chest and shoulder ligaments can gradually weaken. In order to fortify these ligaments it is necessary to include corresponding exercises 1-2 times a week in a drill.



Picture 6. Comparison of BP execution of D. Kashuba without a shirt and in it



Picture 7. Comparison of BP execution of E. Kovalkov without a shirt and in it



Picture 8. Comparison of BP execution of A.Bakirov without a shirt and in it