



KETTLEBELL SPORT & ATHLETE PREPARATION

By Thierry Sanchez



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Foreword

This is a free (and badly edited) manual. I do not own the rights to the pictures and graphs presented in this manual, only the written text and analysis tables (except where quoted) are my intellectual property.

Feel free to share this PDF, but if using parts of it, please refer to the original source as courtesy!

This manual was written in 2009 as my last graduation assignment for my strength and conditioning diploma with DIF, the Danish National Sport Institution.

In retrospect, some of the material is therefore a bit dated or not as accurate as it could be, and I do not feel like re-writing the whole thing ☺

However, **in this (briefly) 2014 revised edition**, I decided to remove some sections, like the original year plan and examples of sessions within a cycle, as they were included mainly as an academic exercise anyway.

This manual is not a training system. If you're looking for a system to follow step by step, I offer online coaching! Since 2009 I have learned a lot as an athlete and coach, including a trip to Siberia to compete and train with World Champion Anton Anasenko.

Praise for “ Kettlebell Sport and Athlete Preparation”

“Thierry Sanchez has assembled a valuable resource for Kettlebell lifters throughout the world! Through his tireless research and humble study, he was able to gather, translate, assemble, organize and then share a wealth of information on the history, techniques, methods and programs of girevoy sport and kettlebell lifting. All of us who appreciate good, clear information owe a debt of gratitude to Thierry for doing what the rest of us did not do, but all benefit from. Thank you very much Thierry!” -Steve Cotter, Founder and Director of the International Kettlebell and Fitness Federation <http://www.ikff.net/>

“Incredible! Thierry’s manual is extremely valuable to anyone interested in kettlebell sport. You get it all – history, technique, training programs, awesome diagrams/pictures, interviews with champions and much more.” -Ken Blackburn, Director of Operations for the International Kettlebell and Fitness Federation

“What a fantastic effort regarding the PDF and thanks for so generously sharing. Brilliant stuff. I will spread the word.” -Rannoch Donald <http://simplestrength.com/>



Introduction

Kettlebells are making a comeback in the strength training community. More and more people are training with kettlebells, but hardly anyone in Denmark participates in competitions, aka GS, or short for Girevoy Sport. Indeed it is only in 2008 that Denmark joined the IUKL (International Union of Kettlebell Lifting), an East European organization responsible for education, competitions and promotion of kettlebells. To top it up, Kettlebells are splitting opinions amongst enthusiasts as to which methodology is best, and people with financial interests are at war with each other. Whereas the IUKL and IGFSF (International Gira Sport Federation, based in Russia) have a long GS tradition behind them, private organizations are delivering trainer certificates and fitness gurus are popping up every day with their version of kettlebell training. No wonder, people are starting to call them Crazyballs.

One has to look in many places to find useful and valid information about kettlebell sport methodology and principles.

With this manual, I hope to create interest in the sport and attract other people to the sport.

Thierry Sanchez,
05 June 2009

Kettlebell History

Also known as a Girya in Russian, a kettlebell looks like a metal cannon ball with a flat bottom and a handle molded to it. Kettlebells have long been used as a dynamic tool to develop strength and endurance. Their origin is still a matter of speculation, but archaeological records show evidence of their use in Ancient Greece. [1] They made their way to Russia about 1700, where they happened to be used as a weight measure for grain and goods.

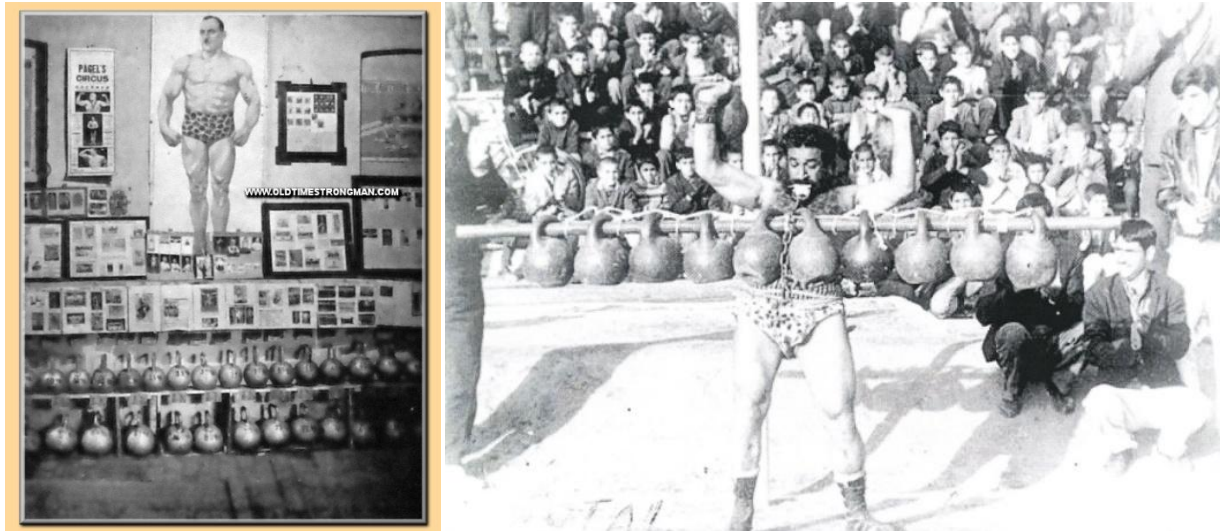


At the end of the market day, at folk festivals and fairs, farmers started swinging and lifting kettlebells to show their strength, and quickly found out health benefits related to this activity.



Development of kettlebell sport in Russia is related to the name of the founder of heavy athletics Doctor V. Kraevsky. [1] Through 1870 to 1880, he travelled around Europe, gathering information about physical culture and the development of sports in view to improve health and well being. He introduced exercises with kettlebells and barbells to the Russian athletic circles.

“The 10th of August 1885 is considered the date of birth of weightlifting in Russia. That day in St. Petersburg, under the leadership of Doctor Vladislav Kraevsky, the weights training hall was opened. The aim of such was the propaganda of muscle development. Training was held three times a week. The athletes executed the press with one and two hands, the snatch and the clean and jerk with the Doctor strictly controlling doses and loads.” [2]



In the early 1900's, circus performer, physical culturists and strong men from around the world (Arthur Saxon, Edgar Mueller and Eugene Sandow for example) trained with kettlebells just like the Russian strongmen and athletes. [1]

Slowly kettlebells fell out of favor in the West, but they began to flourish and spread in the former Soviet Union. Training with kettlebells became common practice for people in rural areas, the military and Olympic athletes. In addition to their training program, Soviet Olympic weightlifters utilized kettlebells unilaterally in order to strengthen their weaker side. To this day, countries of the old eastern bloc rely on kettlebells for supplementing the training of many of their athletes and armed forces.

Russian research concluded that kettlebells were an excellent and cheap tool for improving all around fitness and performance, and therefore kettlebells became the conditioning tool of choice for the Russian Army.

"Kettlebells improve coordination and agility (Luchkin, 1947, Laputin, 1973). Kettlebells develop professional applied qualities and general physical preparedness (Zikov, 1986, Griban, 1990). Lopatin (2000) has found a positive correlation between a soldier's kettlebell sport ranking and his obstacle course performance." [3]

The government recognized the multiple benefits kettlebells would provide its working citizens. In 1981, an official Commission enforced mandatory kettlebell training for the masses, relying on kettlebells as an effective and yet simple tool to increase productivity and decrease healthcare costs. (More studies are located in the appendix)

From being used as a weight for grain to a tool for athletic development and health, the kettlebell slowly developed into a sport of its own. By 1974 it had been officially declared the ethnic sport of Russia.

The needs for sport specialization lead to the modern kettlebell making its appearance in the 60's. Those bells are made of steel and have the advantage of coming in one standard size, regardless of the weight.



Dimensions and design were optimized for comfort and to improve snatch and jerk numbers.

- Height = 280mm
- Body diameter = 210mm
- Handle diameter = 35mm (110mm circumference)

In essence, the bell is a hollow shell filled up with plates. Kettlebells come in fixed weights. Weight usually increases per 4kg, with 2kg increments being hard to get. Some manufacturers have come up with adjustable designs.



Kettlebell Sport/ Girevoy Sport

Kettlebell sport/ GS is the traditional Russian sport of kettlebell lifting. The sport originally evolved from athletic and military circles. A girevik is a kettlebell lifter.



In 1948 the first kettlebell competition took place in Russia where the most repetitions, not 1 rep strength, made you champion. It was attended by 55 athletes, participating in 4 weight categories. Disciplines were: snatch and jerk with 32kg bells, and barbell press and barbell jerk. [4]

- 60kg Konavolov 28 snatches, 7 jerks
- 70kg Salomaha 23 snatches, 15 jerks
- 80kg Lavrentev 30 snatches, 13 jerks
- >80kg Bolshakov 33 snatches, 19 jerks [4a]

Up to through the late 90's rules have been in constant evolution, and specialized training for kettlebell sport competitions developed.

The first Russian biathlon championships were held in 1982.

In 1985 the first official championship of the USSR was held with athletes from 8 countries, and with it came the opportunity to win the prestigious and rewarding title of "Master of Sports". This helped attract new competitors and widespread the sport even more. Since then, many other nations have entered international competitions.

The first biathlon World Championships were held in 1993. The first long cycle Russian championships were held in 1998, and women competed in snatch for the first time in 1999. Team relays were also introduced that year.



Athletes compete according to weight category, and this can vary from organization to organization. Each organization has their own ranking table and rules.

Male athletes traditionally compete in: the two arm jerk and 1 arm snatch biathlon and/ or the long cycle. Female athletes traditionally only compete in the snatch event, but the sport is evolving and some participate in the one arm jerk and one arm Long cycle.

Each event is tested for repetitions in a 10 minute time period without setting the kettlebell(s) down. This time limit rule was installed in 1989.

The athlete performing the most repetition in an event, in his own division wins.

The jerk requires you to clean the kettlebells to your chest once, and then jerk them as many times overhead as possible.

The snatch is performed by swinging the kettlebell between your legs and brought up to the overhead position in one uninterrupted motion. Only one hand switch is permitted.

The long cycle calls for a clean before each jerk.

Men compete with 32kg kettlebells, 24kg for amateurs and over 40s, 16kg for juniors.

Women compete with a 16 or 24kg kettlebell.

Athletes lift in front of a judge who looks for certain criteria about fixation and alignment. To learn more about it, [watch this video](#).

In competitions, kettlebells are color coded. Yellow: 16kg – Green: 24kg – Red: 32kg.

The spirit of competition is enhanced by special feats such as odd lifts, juggling, and kettlebell relay races after the main program has been completed.

The Snatch

The kettlebell snatch uses a swing movement generated by the legs, hips and core to lift the bell from between the legs to an overhead lockout in one smooth motion. After marking the lockout, the bell is dropped using the corkscrew technique to reduce the lever arm.

Snatch technique can vary according to style preference, body type and mechanics, strength levels or even fatigue level when doing long sets (e.g.: single leg drive emphasis with rotation, double leg drive, dipping under the bell).

Phase 1 The swing. With the bell back between the legs, the athlete start extending powerfully his legs and back, pushing the hips forward, accelerating the bell up and forward away from the body. The arm remains straight and in close contact to the body so as to transfer as much momentum to the bell as possible/ as required. The handle is loosely gripped and resting in the fingers. The arm swings up, and usually the athlete is lifting the heel on the side he is holding the kettlebell. This sends a last impulse to the bell with the hip.



Table 1A: Major Muscles Used in Snatch – Phase 1: The swing

MUSCLES	CONTRACTION	ACTION
Lower body		
Gastrocnemius & Soleus	Static	Stabilization of lower leg
Quadriceps	Concentric	Knee extension
Hamstrings	Concentric	Hip extension
Gluteals	Concentric	Hip extension
Trunk		
Erector Spinae	Static	Trunk stabilization
Rectus Abdominis	Static	Trunk stabilization
Transversus Abdominis	Static	Trunk stabilization
Obliques	Concentric	Trunk rotation on the working side
Psoas	Concentric	Trunk rotation, on the working side
Upper Body		Working side
Trapezius	Static	Shoulder blade retraction
Rhomboid	Static	Shoulder blade retraction
Hand & Wrist Flexors	Static	Finger flexion



Phase 2 The pull. The legs and back are now fully extended. The movement goes from being a swing to a pull, initiated by the shoulder and elbow. At this stage the bell is in full free flight, moving up under its own momentum. The pull changes the trajectory of the bell. Now it is moving up and back.

The hand opens up to allow for the handle to shift lower down towards the thumb - without pulling on the skin- and to be received with a straight wrist at the lockout. (See picture 11)

Table 1B: Major Muscles Used in Snatch – Phase 2: The pull

MUSCLES	CONTRACTION	ACTION
Lower body		
Gastrocnemius & Soleus	Concentric	Plantarflexion on the working side
Quadriceps	Concentric	Knee extension
Hamstrings	Concentric	Hip extension
Gluteals	Concentric	Hip extension
Trunk		
Erector Spinae	Concentric	Hyperextension
Rectus Abdominis	Eccentric	Trunk stabilization
Transversus Abdominis	Eccentric	Trunk stabilization
Obliques	Static	Trunk stabilization
Upper Body		Working side
Trapezius	Concentric	Shoulder elevation & retraction
Deltoid	Concentric	Shoulder flexion & horizontal abduction
Biceps & Brachialis	Concentric	Elbow flexion
Rhomboid	Concentric	Shoulder blade retraction
Latissimus dorsi	Concentric	Horizontal abduction
Finger extensor	Concentric	Finger extension



Phase 3 The lockout. The athlete now extends the arm upwards rapidly and forcefully under the bell as the bell is flipping over the wrist. The arm is locked and straight as the bell is caught to a standstill. At the reception of the bell on the forearm, there can be a knee bend but most usually the athlete lowers the heel of the extended calf to help cushion the impact (as mentioned above), and marks the lockout. This is the only position an athlete can rest. Athletes with poor shoulder flexibility waste energy to stabilize the bell, and find it hard to breathe in this position.

Table 1C: Major Muscles Used in Snatch – Phase 3: The lockout

MUSCLES	CONTRACTION	ACTION
Lower body		
Quadriceps	Concentric	Knee extension on the working side
Gluteals	Static	Hip stabilization
Trunk		
Erector Spinae	Static	Trunk stabilization
Rectus Abdominis	Static	Trunk stabilization
Transversus Abdominis	Static	Trunk stabilization
Obliques	Static	Trunk stabilization
Upper Body		Working side
Trapezius	Concentric	Shoulder depression
Deltoid	Static	Shoulder stabilization
Triceps	Concentric	Elbow extension
Pectoralis	Static	Shoulder stabilization
Latissimus dorsi	Static	Shoulder stabilization

Phase 4 The drop. Lowering of the kettlebell is initiated by a slight leaning back of the upper body (and sometimes a slight rotation of the upper body), and a slight bending of the arm, while simultaneously bringing the elbow towards the midline of the body. This allows for the bell to unlock from the overhead position, roll around the forearm and start falling. This is known as the corkscrew. This method reduces the distance the bell falls away from the body, therefore reducing the forward pull that follows at the bottom of the drop, saving energy and grip strength. As the bell is falling, the hand rotates inwards, and grabs the handle loosely in the fingers. When the arm is about to make contact with the hips, the hips fold back and the legs start bending to follow the swinging trajectory of the bell and soften the drop.



Table 1D: Major Muscles Used in Snatch – Phase 4.1: The drop, initiation

MUSCLES	CONTRACTION	ACTION
Lower body		
Quadriceps	Static	Knee stabilization
Gluteals	Static	Hip stabilization
Trunk		
Erector Spinae	Concentric	Trunk hyperextension
Quadratus Lumborum	Concentric	Trunk hyperextension (& rotation)
Rectus Abdominis	Static	Trunk stabilization
Transversus Abdominis	Static	Trunk stabilization
Obliques	Concentric	Trunk rotation, opposite the working side
Psoas	Concentric	Trunk rotation, opposite the working side
Upper Body		Working side
Pectoralis	Concentric	Transverse adduction
Latissimus dorsi	Concentric	Shoulder adduction
Biceps & Brachialis	Concentric	Elbow flexion
Hand & Wrist Flexors	Static	Wrist stability
Rhomboid	Eccentric	Shoulder blade stability

Table 1E: Major Muscles Used in Snatch – Phase 4.2: The drop, back swing

MUSCLES	CONTRACTION	ACTION
Lower body		
Quadriceps	Eccentric	Knee flexion
Hamstrings	Eccentric	Hip flexion
Gluteals	Eccentric	Hip flexion
Tensor fascia latae	Concentric	Hip Flexion
Psoas	Concentric	Hip flexion
Trunk		
Erector Spinae	Static	Trunk stabilization
Rectus Abdominis	Static	Trunk stabilization
Transversus Abdominis	Static	Trunk stabilization
Obliques	Eccentric	Trunk rotation on the working side
Upper Body		
Trapezius	Static	Shoulder retraction
Rhomboid	Static	Shoulder retraction
Forearm pronators	Concentric	Wrist pronation
Hand & Wrist Flexors	Static	Finger flexion

The Clean

The clean is a technique that allows the bells to be lifted off the floor (initial lift) or from between the legs, and brought to the chest and held in the rack position. From there the athlete either goes on to do jerks or clean & jerks. In the clean & jerk, after each repetition, the bells are dropped and lowered between the legs and brought up again to the rack position.



Phase 1: The swing. With the bells back between the legs, the athlete start extending powerfully his legs and back, pushing the hips forward, accelerating the bells up. By leaning the shoulders back, the athlete shortens the lever arm and reduces the forces of the forward pull.

The arm remains in close contact to the body so as to transfer as much momentum to the bell as possible/ as required. The handle is loosely gripped and resting in the fingers. Unlike the snatch, the elbows stay bent and close to the body. This is a very short swing.

Table 2A: Major Muscles Used in Clean – Phase 1: The swing

MUSCLES	CONTRACTION	ACTION
Lower body		
Gastrocnemius & Soleus	Static	Stabilization of lower leg
Quadriceps	Concentric	Knee extension
Hamstrings	Concentric	Hip extension
Gluteals	Concentric	Hip extension
Trunk		
Erector Spinae	Static	Trunk stabilization
Rectus Abdominis	Static	Trunk stabilization
Transversus Abdominis	Static	Trunk stabilization
Obliques	Static	Trunk stabilization
Upper Body		
Trapezius	Static	Shoulder retraction
Rhomboid	Static	Shoulder retraction
Hand & Wrist Flexors	Static	Finger flexion



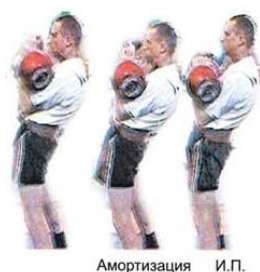
Phase 2: The pull. As the bells swing up into free flight, the athlete sharply pulls back on the bells as he raises on his toes for assistance, giving a new trajectory to the bells so that they fly towards his chest. The hands open up and the elbows shoot forward under the bells. The transition is kept as smooth as possible so that the bells roll around the wrists just before landing in the rack position, without banging on the forearms. Opening the hands allows for the simultaneously repositioning the handles and switching to a false grip to avoid smashing fingers.



Double clean: handle & false grip details

Table 2B: Major Muscles Used in Clean – Phase 2: The pull

MUSCLES	CONTRACTION	ACTION
Lower body		
Gastrocnemius & Soleus	Concentric	Plantarflexion
Quadriceps	Concentric	Knee extension
Hamstrings	Concentric	Hip extension
Gluteals	Concentric	Hip extension
Trunk		
Erector Spinae	Concentric	Hyperextension
Rectus Abdominis	Eccentric	Trunk stabilization
Transversus Abdominis	Eccentric	Trunk stabilization
Obliques	Static	Trunk stabilization
Upper Body		
Trapezius	Concentric	Shoulder retraction and extension
Deltoid	Concentric	Shoulder extension
Biceps & Brachialis	Concentric	Elbow flexion
Rhomboid	Concentric	Shoulder blade retraction
Latissimus dorsi	Concentric	Shoulder extension
Pectoralis	Concentric	Shoulder extension
Finger extensor	Concentric	Finger extension



Phase 3: The rack. When catching the bells in the crook of the arm, the hips are projected forward. This is to give support to the elbows. Some athletes use a small knee dip to absorb and soften the impact, others only a sharp exhalation. To complete a clean, knees have to be straightened as the bells come to a standstill. The false grip is essential for protecting the fingers when cleaning two kettlebells at the same time (Review figure 13). All the fine points of the rack are covered further down.

Table 2C: Major Muscles Used in Clean – Phase 3: The rack

MUSCLES	CONTRACTION	ACTION
Lower body		
Quadriceps	Static	Knee stabilization
Gluteals	Static	Hip extension
Trunk		
Erector Spinae	Static	Trunk hyperextension
Rectus Abdominis	Static	Trunk stabilization
Transversus Abdominis	Static	Trunk Stabilization
Obliques	Static	Trunk Stabilization
Upper Body		
Latissimus dorsi	Static	Shoulder depression
Serratus anterior	Static	Shoulder blade protraction
Pectoralis	Static	Shoulder blade protraction
Biceps & Brachialis	Static	Elbow flexion
Hand & Wrist Flexors	Static	Wrist stabilization



Phase 4: The drop. Shifting the hips slightly backwards is enough to initiate the drop of the bells. The arms actively accompany the fall to impart a forward trajectory to the bells, ensuring they are not falling vertically between the legs but rather into a back swing. As the bells are falling down, the hands open and catch the handle in the fingers.

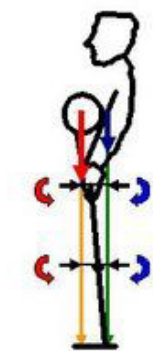
Table 2D: Major Muscles Used in Clean – Phase 4.1: The drop, initiation

MUSCLES	CONTRACTION	ACTION
Lower body		
Quadriceps	Eccentric	Knee flexion
Gluteals	Eccentric	Hip flexion
Psoas	Concentric	Hip flexion
Tensor fascia latae	Concentric	Hip flexion
Trunk		
Erector Spinae	Static	Trunk stabilization
Rectus Abdominis	Static	Trunk stabilization
Transversus Abdominis	Static	Trunk stabilization
Obliques	Eccentric	Trunk rotation
Upper Body		
Biceps & Brachialis	Eccentric	Elbow extension
Trapezius	Static	Shoulder blade stabilization
Rhomboid	Static	Shoulder blade retraction
Hand & Wrist Flexors	Static	Finger flexion

Table 2E: Major Muscles Used in Clean – Phase 4.2: The drop, back swing

MUSCLES	CONTRACTION	ACTION
Lower body		
Quadriceps	Eccentric	Knee flexion
Hamstrings	Eccentric	Hip flexion
Gluteals	Eccentric	Hip flexion
Tensor fascia latae	Concentric	Hip Flexion
Psoas	Concentric	Hip flexion
Trunk		
Erector Spinae	Static	Trunk stabilization
Rectus Abdominis	Static	Trunk stabilization
Transversus Abdominis	Static	Trunk stabilization
MUSCLES	CONTRACTION	ACTION
Obliques	Static	Trunk stabilization
Upper Body		
Trapezius	Static	Shoulder retraction
Rhomboid	Static	Shoulder retraction
Hand & Wrist Flexors	Static	Finger flexion

The rack position



The rack is an essential position to master since it is:

- a resting position
- the finish of a clean
- a platform to do jerks and overhead presses

This position is quite technical and feels unnatural at first, until one gets used to it.

While it is possible to hold a kettlebell in what “looks and feels like a rack” position (straight back, elbows not in contact with the body), it craves a lot of unnecessary tension in the whole arm all the way down to the hand.

Translation: By trying to muscle the bell into place the athlete won't be able to hold it in place for as long as he possibly could. While it is easy to do with a light kettlebell or in a short set, it quickly becomes tiring with a heavier bell or a long set. More importantly, it puts undue stress on the shoulder belt and back.

“Failure to relax the trapezius and deltoid muscles does not allow athletes to rest the elbows on the crest of the ilium. Thus, the novice weightlifter relies on excess bending of the back and knees. It creates excessive tension in the spine and knee joints”. [10]

Key points



- elbow(s) down on the hip bone
- hand(s) close to the centre line
- hips pushed forward
- knees locked
- handle facing down and neutral wrists
- false grip to protect the fingers

In the proper rack position there is only a minimal load distribution onto the back. Elbow(s) are kept tucked into the hip, just above the iliac crest, or at least as close to the body as possible. Athletes with good flexibility can rest the elbows snugly into the little hollow above the iliac crest. The weight is transferred directly onto the hip, not the back or shoulders. This close contact is essential for maximal upward drive of the bell when doing jerks.

“Resting the elbows on the crest of the ilium reduces the excessive forces of gravity and the resulting stress on the joints, as well as increases the efficiency of motor actions (leg drive).” [10]

In the rack position, the legs are straight. While the upper body is leaning back, the pelvis should be pushed forward by actively activating the glutes, which provide extra stability for the lower back.

Athletes with insufficient flexibility have the option of resting between reps in an alternated rack position called the side rack, where only one elbow is in contact with the hips.

The Jerk

The kettlebell jerk is an explosive movement that requires the athlete to generate power from the legs. After an initial clean into the rack position, the athlete transfers the forces he generated from the legs through the core to the arms, which assist in locking the bells overhead before the athlete straightens his whole body. A short hold in the lockout must be marked before the athlete drops the bells back to the rack position.



Phase 1: The rack position. Flexibility is of particular importance in the rack position. Here can the athlete rest and recuperate before starting a new repetition. Lack of flexibility in the hips and the spine does not allow deviating the trunk backwards without bending the knees. An athlete with limited flexibility has to perform static work with the knees bent, which taxes his leg strength. It is impossible to prevent the bells falling forward-down without deviating the trunk backwards, unless one uses additional effort of the arms, which is also inefficient.

Table 3A: Major Muscles Used in Jerk – Phase 1: The rack

MUSCLES	CONTRACTION	ACTION
Lower body		
Quadriceps	Static	Knee stabilization
Gluteals	Static	Hip extension
Trunk		
Erector Spinae	Static	Trunk hyperextension
Rectus Abdominis	Static	Trunk stabilization
Transversus Abdominis	Static	Trunk Stabilization
Obliques	Static	Trunk Stabilization
Upper Body		
Latissimus dorsi	Static	Shoulder depression
Serratus anterior	Static	Shoulder blade protraction
Pectoralis	Static	Shoulder blade protraction
Biceps & Brachialis	Static	Elbow flexion
Hand & Wrist Flexors	Static	Wrist stabilization



Phase 2: The first dip. The athlete bends the knees to about 120 degrees. At the same time bodyweight is distributed evenly on the soles of the feet. Athletes with strong legs tend to bend the knees a little less because they have enough strength to accelerate the bells during the shorter traveling distance. To avoid dropping the bells, the pelvis has to be kept tucked forward as the athlete dips. The upper legs and upper body almost form a straight line.

Table 3B: Major Muscles Used in Jerk – Phase 2: The 1st dip

MUSCLES	CONTRACTION	ACTION
Lower body		
Gastrocnemius & Soleus	Eccentric	Dorsiflexion
Quadriceps	Eccentric	Knee flexion
Gluteals	Static	Hip extension
Trunk		
Erector Spinae	Static	Trunk hyperextension
Rectus Abdominis	Static	Trunk stabilization
Transversus Abdominis	Static	Trunk Stabilization
Obliques	Static	Trunk Stabilization
Upper Body		
Latissimus dorsi	Static	Shoulder depression
Serratus anterior	Static	Shoulder blade protraction
Pectoralis	Static	Shoulder blade protraction
Biceps & Brachialis	Static	Elbow flexion
Hand & Wrist Flexors	Static	Wrist stabilization



Phase 3: The jerk. This is performed by sharply straightening the knees immediately after the dip and going on to the balls of the feet. Contact of the arms with the trunk and elbows with the pelvis during this phase should be maximal. The athlete has to transfer energy from the legs, onto the hips and onto the arms. Lack of contact between the arms and body creates leakage and wastes energy. Timing his breathing and hyper-extending his back, the athlete explosively bumps the bells overhead at the same time as he extends his legs. Arms are switched on only at the last moment, just before the second dip.

Table 3C: Major Muscles Used in Jerk – Phase 3: The jerk

MUSCLES	CONTRACTION	ACTION
Lower body		
Gastrocnemius & Soleus	Concentric	Plantarflexion
Quadriceps	Concentric	Knee extension
Gluteals	Concentric	Hip extension
Trunk		
Erector Spinae	Concentric	Hyperextension
Quadratus lumborum	Concentric	Hyperextension
Rectus Abdominis	Eccentric	Trunk stabilization
Transversus Abdominis	Eccentric	Trunk stabilization
Obliques	Static	Trunk stabilization
Upper Body	Minimally involved	



Phase 4: The second dip. The goal of this phase is to catch the bells with the straight arms. The athlete bends the knees and moves his body downwards by actively straightening his arms under the bells. Unlike during the first dip, here the pelvis moves not forward-down, but backwards-down, as in squatting. Flexibility of the spine and the shoulders again determine the efficiency of this phase.

Table 3D: Major Muscles Used in Jerk – Phase 4: The 2nd dip

MUSCLES	CONTRACTION	ACTION
Lower body		
Gastrocnemius & Soleus	Eccentric	Plantarflexion
Quadriceps	Eccentric	Knee flexion
Gluteals	Eccentric	Hip flexion
Tensor fascia latae	Concentric	Hip flexion
Iliopsoas	Concentric	Hip flexion
Trunk		
Erector Spinae	Concentric	Hyperextension
Rectus Abdominis	Eccentric	Trunk stabilization
Transversus Abdominis	Eccentric	Trunk stabilization
Obliques	Static	Trunk stabilization
Upper Body		
Trapezius	Static	Shoulder depression
Deltoid	Static	Shoulder flexion
Triceps	Concentric	Elbow extension
Latissimus dorsi	Static	Shoulder stabilization



Phase 5: The lockout. After having caught the bells, the athlete straightens his legs and marks the lockout. Athletes with good flexibility tend to have a brief rest in this position. Athletes with poor shoulder flexibility waste energy to stabilize the bells and find it hard to breathe in this position.

Table 3E: Major Muscles Used in Jerk – Phase 5: The lockout

MUSCLES	CONTRACTION	ACTION
Lower body		
Quadriceps	Concentric	Knee extension
Gluteals	Concentric	Hip extension
Hamstrings	Concentric	Hip extension
Trunk		
Erector Spinae	Static	Trunk stabilization
Rectus Abdominis	Static	Trunk stabilization
Transversus Abdominis	Static	Trunk stabilization
Obliques	Static	Trunk stabilization
Upper Body		
Trapezius	Static	Shoulder depression
Deltoid	Static	Shoulder stabilization
Triceps	Static	Elbow extension
Pectoralis	Static	Shoulder stabilization
Latissimus dorsi	Static	Shoulder stabilization



Phase 6: The drop. Going slightly onto the toes and pushing the hips forward initiates the drop. The bells are dropped fast to limit muscular involvement and use as little energy as possible. The arms just guide the bells in a straight line as they fall to land perfectly in the rack position. As the arms make contact with the upper body, the athlete sharply breathes out, and bends the knees to absorb and soften the impact.

Table 3F: Major Muscles Used in Jerk – Phase 6.1: The drop, initiation

MUSCLES	CONTRACTION	ACTION
Lower body		
Gastrocnemius & Soleus	Concentric	Plantarflexion
Quadriceps	Static	Knee extension
Gluteals	Static	Hip extension
Trunk		
Erector Spinae	Concentric	Trunk hyperextension
Quadratus Lumborum	Concentric	Trunk hyperextension
Rectus Abdominis	Eccentric	Trunk stabilization
Transversus Abdominis	Eccentric	Trunk stabilization
Obliques	Static	Trunk stabilization
Upper Body	Minimally involved	

Table 3G: Major Muscles Used in Jerk – Phase 6.2: The drop, landing into the rack position

MUSCLES	CONTRACTION	ACTION
Lower body		
Gastrocnemius & Soleus	Eccentric	Dorsiflexion
Quadriceps	Eccentric	Knee flexion
Gluteals	Static	Hip extension
Trunk		
Erector Spinae	Static	Trunk hyperextension
Rectus Abdominis	Static	Trunk stabilization
Transversus Abdominis	Static	Trunk Stabilization
Obliques	Static	Trunk Stabilization
Upper Body		
Latissimus dorsi	Static	Shoulder depression
Serratus anterior	Static	Shoulder blade protraction
Pectoralis	Static	Shoulder blade protraction
Biceps & Brachialis	Static	Elbow flexion
Hand & Wrist Flexors	Static	Wrist stabilization

The required qualities for GS

Coaches and top kettlebell athletes agree that strength, general endurance, special strength endurance, and flexibility are the 4 basic defining qualities of the Girevik.

Each athlete has to pay special attention to the development of those qualities, depending on his initial degree of preparation.

“Every lifter has different qualities. Without good flexibility, there will be no high level results (in jerks) as shoulders cannot stand the load without appropriate overhead rest. Also, core strength is vital and without endurance the girevik cannot last, obviously. So, all qualities are important to varying degrees, depending upon the athlete and his level of achievement.” (Paul Tucker, Australian kettlebell Federation)

In the article “Development of strength and power of endurance in sports girevom” [5] by Lopatin and Rudnev, there is a reference to a text by Vorotyntsev which estimates approximate strength requirements for gireviks. Lopatin, who is the Russian record holder in the 60 – 65 kg division (Refer to the appendix), compared his own strength with the numbers in the table.

	Bench press	Deadlift	Squat	Pressing 32kg bell	Running 3000 m
Required	80kg	110kg	110kg	1-2 times	Junior ranking
Lopatin	65kg	90kg	80kg	0 time	Adult ranking

What this study reflects is that the testing methods are not relevant to the demands of GS. With little research available, it is hard to determine what the requirements of the sport truly are. Strength level demands are quite different according to an athlete’s weight division, since the kettlebells weight is fixed.

GS is not a sport about maximal strength like weightlifting, but a power endurance sport much like rowing. Loads are sub-maximal, and repeated over 10 minutes.

What is certain is that GS is an explosive sport with a high aerobic component that relies mostly on type 1 fibers and 2A involvement. Lifts are achieved by synchronization of endurance fibers. This is determined not by the strength of the nerve impulse, but by its frequency.

Maximal strength is the amount of force that one can exert under voluntary effort. It is an important strength quality for athletes to develop.

“Maximal strength training leads to powerful neural adaptations, improving both intramuscular and intermuscular coordination” [6]

“Strength is a function of the muscles powerfully contracting by effective nervous stimulation, not by large bulky muscles” [7]

Maximal strength is best developed with loads between 80 – 100% 1RM, worked with 3 – 1 rep, in 8 – 10 work sets with rest intervals from 3-5 minutes.

At that intensity one gets stronger through neural adaptations, not increased mass. For someone who competes in a certain weight class this is important to keep in mind.

While maximal strength is an important prerequisite to explosive and ballistic activities like GS, it must not become the sole method of training. Strength is useless if the athlete lacks the ability to apply it throughout the whole duration of the contest!

Higher reps and lower intensities should also be trained given the nature of Girevoy Sport.

Explosive strength

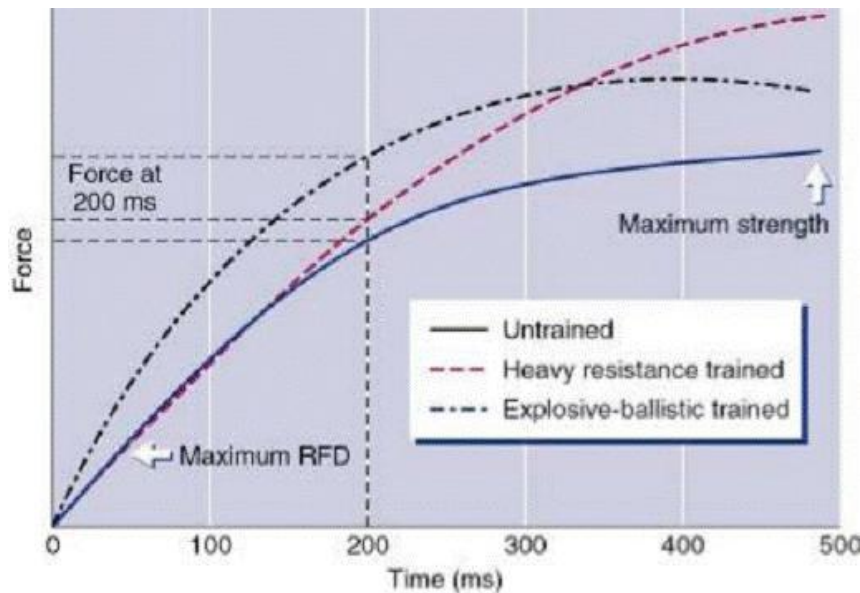
Power is the ability to express significant tension in minimal time. It is considered the strength quality most characteristic of athletic activities.

“Many athletes are unaware that the ability to produce maximal force and the ability to produce velocity are different abilities. The development of one does not ensure the development of the other”.
[6]

Power is somewhat dependent on maximal strength, to an extent. Power can be developed with supplemental training of the stretch-shorten cycle, using plyometric muscle actions prior to rapid shortening. Ballistic lifts are very efficient at developing explosive strength. Such drills can help in power development by emphasizing the velocity component of the power equation. (See figure 17)

Ballistic: relating/ characteristic to the motion of objects moving under their own momentum.

A ballistic move involves a burst of muscular activity followed by a phase of relaxation during which the motion of the kettlebell continues.



Source: National Strength and Conditioning Association, 2000, Essentials of Strength Training

“Movement velocity is the next important feature of strength exercises used to enhance power. The typical objective in this case is to increase the velocity of a performed movement against a given resistance. A substantial performance improvement requires exercises in the high-resistance, low-velocity domain as well as in the low-resistance, high-velocity domain. These considerations are confirmed by the training practice of elite athletes.” [6]

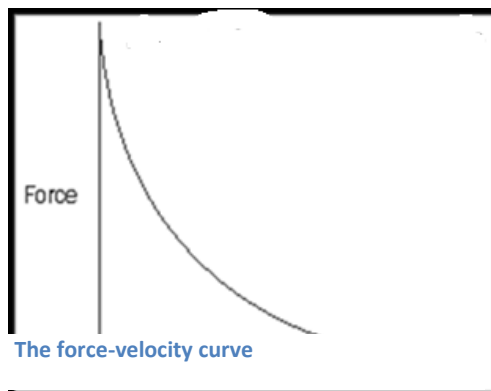
The following is very important for all athletes who train with kettlebells.

To be fair, this graph was not done after studying Gireviks, I use it to illustrate training concepts and methodology.

Therefore I would imagine the loads used to conduct this study were heavier than 24 or 32kg. If you are not competing in GS, the kettlebell is a great tool but should not be the only tool for improving your specific sport performance. Remember to mix it up!

What can be said is, as long as you do some heavy resistance training for assistance, the ballistic kettlebell lifts will help develop RFD and power.

To put it simply:



Low speed = High force/ resistance.

High speed = Low force/ resistance.

The optimal range of resistance for conventional power training with is in the 30-45% of 1RM range and up to 60-70% for some exercises such as clean pulls. The range for reps is 3 - 2 reps, done for 8 - 12 sets. Rest periods are kept short 45 – 60”.

Hypertrophy

Girevoy sport requires high volume training. Indeed some top athletes might accumulate 20 tons per training pass, and train 6 times a week.

Then how come most gireviks look like normal guys? What about hypertrophy? Well, actually if the bulk of the training is practicing the ballistic lifts there will be minimal hypertrophy.

Ballistic kettlebell exercises (such as snatch, jerk, clean and swing) have a short time under tension because the movement is explosive. Each rep lasts a second or less. About three-quarters of the rep is performed mostly by the initial burst, therefore the actual amount of time where the muscles are producing a forceful contraction is around one-third of a second. Not enough to produce hypertrophy.

Apart from volume, the important component when it comes to stimulating growth is the eccentric, or lowering, portion of the movement. It's during this phase that most of the muscle damage occurs, and this is one of the main stimulators of hypertrophy. With a ballistic kettlebell exercise, the eccentric portion is de-emphasized by allowing the bell to drop quickly to the rack position or into a swing.

The overhead press was contested in the early days of GS. This is a slow-speed strength movement, and to perform well on that lift, gireviks did a lot of accessory work like the incline bench press, military press, flat bench press, dumbbell press, close-grip bench press, etc.

"In the beginning the competitors pressed strictly. Up to 1973, the record was 42 reps with the 32kg. In 1973 Alexey Vorotyntsev used a new technique that became called the tempo press. He did 123 presses with 32kg!" (Source: Andrey Kuzmin)

Using a flexion and extension movement in the spine, the press had almost gone ballistic.

A few years later, almost all gireviks were using this technique.

One-arm press 32kg	370 reps
Two-arm jerk 2×32kg	150 reps
One-arm snatch 32kg	201 reps

GS records in 1979 (The 10 minute time limit was imposed in 1989)

The press was dropped in 1982 as the competitions were taking too much time.

Specialization affected strength training. Athletes started pressing less and increased their numbers in jerk.

While ballistic lifts are great for building power and RFD by enhancing the nervous system, hypertrophy requires more conventional training (eccentric training being the ultimate form). This fact has to be taken into account for athletes that compete in weight divisions.

General endurance

GS athletes pay a lot of attention to general endurance. When competing in the Biathlon, rest between the 2 disciplines can be as short as 30 minutes, depending on the number of participants. Giving 2 top performances of 10 minutes each within one hour requires a high level of stamina and endurance.

A high level of aerobic fitness also helps optimize restitution between sets and even between reps.

If we define endurance as the ability to overcome exhaustion over a long period of activity, one has to work up to exhaustion to raise general endurance.

“To improve aerobic performance, it is essential to include moderate intensity aerobic activities such as cross-country skiing, running, swimming. Intensity is around 70 to 80% of maximal heart rate.” [8]

This is supported by the training journals of top GS athletes who regularly run 10km cross country runs and engage in moderate intensity activities as part of their training.

The reason why GS athletes concentrate on steady state cardio is because it reflects the cyclic nature of GS. Athletes follow a certain lifting tempo (which varies according to cycles) in their training and competitions.

Interval training is nowadays accepted as being the fastest way to develop general endurance, and yet the gained benefits are also fastest to disappear when one stops training. Interval and LSD methods both offer benefits, depending on the level of conditioning of an athlete. All elite endurance athletes include high intensity intervals in their training, but the actual volume is relatively low. (Stephen Seiler, PhD)

Athletes use interval methods and fast tempos when lifting bells in the training cycles; this provides enough adequate hard interval training.

Keep in mind your heart is not a machine and solely relying on hardcore interval training will take its toll on your body eventually, stopping improvement of performance.

“Running is necessary for the development of the general aerobic qualities of an athlete. Therefore we practice running at an average or slow rate for a long time - from 30 to 90 minutes. It is better to alternate runs on stadium and cross-country. In any one session, only train 5-10' doing sprints. Running 10-15 minutes of short intervals at high speed, or repeated interval runs of 30-100 m are also good.



It allows enhancing the high-speed functions of the organism and interrupts the monotony of training. After sprinting, your organism will react again to long runs.” (World champion Vasily Ginko interview, see appendix)

Other aerobic activities besides from running are encouraged: rowing, rope skipping, biking, skating, cross country skiing and swimming. Some of these activities are low impact and can be used as active recovery.

To develop endurance, general recommendations are a minimum of 3 sessions a week. Duration should at least be 30 minutes with varying intensities, as discussed above.

I'd like to propose an alternative system for training general endurance based on the work of Veronique Billat, a French exercise physiologist, specialist in endurance sports and coach to many top runners. The Billat system has been described in Runners world.

Her system is built around a velocity vVO_2 max, which is the speed an athlete is running when he reaches his VO_2 max. vVO_2 is the actual minimal speed at which oxygen consumption starts to seemingly plateau despite an increase in running speed. Therefore, vVO_2 max is not the actual top speed.

vVO_2 max is an outstanding predictor of performance mainly because it combines aerobic capacity (the total amount of oxygen a runner can use) and running economy (how efficiently oxygen is used). Economy and efficiency are very important for Gireviks, so this way of training could be an option to more time consuming LSD sessions.

The beauty of the system is that it can be applied to other modalities as well, not only running, and that 2 sessions a week are sufficient to increase performance. Longer training times and lower intensities are also used as optional supplemental training.

What is good about her system is there are no super intensive killer workouts that totally exhaust the athlete. And while there is enough volume to cause specific adaptations, it is not over the top to negatively affect the hormonal profile, immune system and overall health. Short hard intervals are great a few weeks before a competition, but they should not be the foundation of endurance training for GS.

“At intensities above 100% VO_2 max, the stimulus for improving maximal oxygen consumption is actually reduced, due to dramatically decreased training volume, and the inhibiting effects of lactic acidosis on cellular oxygen utilization” Stephen Seiler, PhD



For a high volume sport like GS, frequently going all out is a sure way to impair progress. Remember it is easy to plan a killer workout that leaves an athlete tired and sore for days. It is harder to plan a smart workout that consistently helps improve performance. And by this, I do not mean only the endurance part of the equation, but kettlebell training and assistance strength training too.

The Billat system might prove too much to use all year round, but might be useful during some periods.

The Billat System

First, find your billat pace: run as fast as possible for 6 minutes, record the distance. The pace is the pace per mile averaged for the 6' (Refer to tables). Retest every 6 weeks.

vV02max doesn't apply only to runners. There's also a cycling vV02max (the cycling speed at which a cyclist reaches V02max), a swimming vV02max, a stair-machine vV02max, and so on. Like everything, it is activity specific.

Key session 1: 5 reps of 3' billat pace + 3' ½billat pace (warm up + 30')

BILLAT PACE (in min per mile)	DISTANCE COVERED IN 3 MINS' HARD	RECOVERY PACE (50% of Billat pace in min per mile)	DISTANCE COVERED IN 3 MINS' RECOVERY
5:00	960m	10:00	480m
5:30	870m	11:00	435m
6:00	800m	12:00	400m
6:30	740m	13:00	370m
7:00	685m	14:00	340m
7:30	640m	15:00	320m
8:00	600m	16:00	300m
8:30	565m	17:00	280m
9:00	535m	18:00	265m

Source: Runners world

Key session 2: 15' at 80% billat pace, 5' at 60%, 15' at 80% (warm up + 40')

BILLAT PACE (in min per mile)	80% OF BILLAT PACE (in min per mile)	DISTANCE COVERED IN 15 MINS' HARD	RECOVERY PACE (60% of Billat pace in min per mile)	DISTANCE COVERED IN 5 MINS' RECOVERY
5:00	6:15	2.4 miles	8:20	960m
5:30	6:53	2.2 miles	9:10	875m
6:00	7:30	2 miles	10:00	800m
6:30	8:07	1.85 miles	10:50	740m
7:00	8:45	1.71 miles	11:40	685m
7:30	9:22	1.6 miles	12:30	640m
8:30	10:37	1.42 miles	14:10	565m
9:00	11:15	1.33 miles	15:00	535m

Source: Runners world

Alternative session 1 or 2: 12 reps of 30" billat pace, 30" ½ billat pace. Increase up to 20 reps

Optional session 3-4-5: 60-90' at 60% billat pace

Alternative session 5: free leisurely tempo for up 2 hours

Special endurance

GS requires a special hybrid of strength endurance that is specific to the sport. The East Europeans call it special endurance. This is seen by many authorities as one of the main qualities of a girevik. Strength endurance as we defined by conventional strength training (loads 40 – 60% 1RM for 20 – 40 reps), is not a guarantee of achieving good results. The duration of strength endurance exercises rarely goes over 3 minutes, and repetitions are continuous. Research shows that strength endurance only allows an athlete to work at a fast pace for 1 – 3 minutes before performance decreases. [5] In GS, kettlebells are lifted over 100 times in a period of 10 minutes.

GS is a sport that involves pacing, meaning that there is a pause between reps which can be up to 20 seconds for some athletes. A short rest between reps allow for a certain amount of restitution.

Increasing the speed of repetitions per minute (RPM) does not guarantee to increase the overall numbers, quite the opposite. As more type 2A fibers become involved to increase the RPM, fatigue occurs sooner and forces the athlete to terminate the set prematurely.

Another fact to keep in mind is that as kettlebells come in fixed weight, lighter athletes are lifting close to 100% of their body weight and heavier athletes about 60% or less. Heavier athletes have the advantage of being able to work at a faster tempo, but up to a limit. Studying the present records, that limit seems to be about 17RPM for jerk, 22RPM for snatch and 11RPM for the long cycle when using the 32kg bells. [9]

Each athlete has to find and work at his optimal tempo.

This tempo depends on the weight category of the athlete and his experience. In any case, optimal tempo ensures completion of a 10 minute competition set. According to the opinion of Zatsiorsky, “a stable rate of performance is important for achieving results in cyclical sports” [5]

The IUKL instructor’s manual recommendations for developing the special endurance of GS is a load of 25 - 80% of 1RM, taken to failure between 50 to 100 reps, repeated 3 to 5 times with up to 5 minutes rest in between sets. In my opinion, 80% of 1RM for that many reps needs to be reconsidered!

Mobility and Flexibility

As mentioned earlier on, flexibility is essential for the technical development of a Girevik. Especially shoulder and back flexibility. Poor flexibility means an athlete will waste a lot of energy trying to stabilize the bell overhead and while holding the rack position. Finishing a long set will be a struggle, and even breathing will be impaired, increasing the heart rate at the same time.

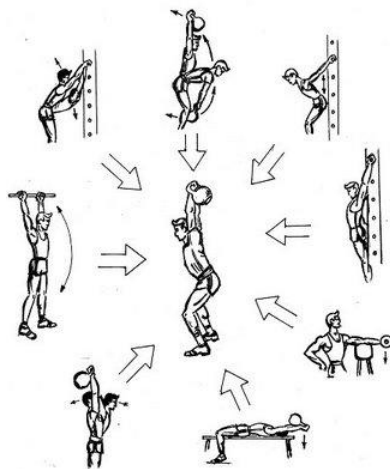
“Generally, athletes who do not pay enough attention to the development of the necessary flexibility and mobility in the joints do not achieve outstanding results.” [10]

For GS, flexibility requirements can be divided in two forms: passive and active.

Passive flexibility is associated with the leaning back that takes place when resting in the rack position, the first dip of the jerk and when dropping the bell(s) in both jerk and snatch. Holding the rack position for time with heavy kettlebells is a recommended assistance exercise which can be done standing or walking.

Active flexibility takes place in the humeral and elbow joint when fixing the bells in the overhead lockout. Better flexibility helps the second dip in the jerk, and the lockout position in the snatch and jerk.

Stretching exercises are used to improve flexibility which in the context of GS, is related to increasing range of motion to improve technique. All static stretching is to be done when the body's temperature is elevated, and at the of the strength training session. Research shows that static stretching (passive & active) done prior to strength training is detrimental to muscle activation and force production. [11]



Before dismissing static stretching, read on: "Static stretching has been used for centuries by practioners of hatha yoga and is time proven... Static stretching is scientifically based and is effective in enhancing ROM... Furthermore, static stretching is required for the optimal development of static flexibility (specifity of training)" [12]

Here is a drawing of suggested exercises that can be done with kettlebells and gym ladders to improve the second dip of the jerk and lockouts. Maximal range of movement (ROM) in joints is limited by the stretching reflex, which serves a protective purpose. If the maximal amplitude is held in static passive position this reflex fades and disappears in 25 – 30 seconds. [13]

Stretches should be repeated 3 – 5 times.

A way to improve a static stretch is to turn it into an isometric stretch, a form of PNF stretching.



“Regarding ROM, numerous investigators found that PNF techniques produced the largest gains in flexibility, as compared with other forms of stretching.” [12]

To perform a contract- relax/ isometric stretch:

Assume the position of a passive stretch for the desired muscle.

Next, tense the stretched muscle for 7-15 seconds (resisting against some force that will not move, like the floor or a partner).

Finally, relax the muscle for at least 20 seconds.

Passively move the body part being stretched into the new ROM, repeat the process 3- 5 times.

Refer to the appendix for a list of suggested stretches for gireviks

Those stretches will help improve your range of motion and flexibility. Remember to include in your program exercises (rows, pull aparts and face pulls) to balance anterior- posterior strength.

“For a variety reasons, internal rotation (IR) at the shoulder may become restricted. Overhead athletes often demonstrate a loss of shoulder IR on their dominant shoulder. A loss of IR may affect normal shoulder biomechanics and possibly contribute to shoulder injury.” Source: Jason Brumitt-Flexibility Exercises to Maintain Shoulder Health.

Shoulder pain

There can be many reasons for shoulder pain. Bad technique with the overhead lifts, too much too soon or high reps due to the training demands of GS come to mind.

Rotator cuffs are small muscles and prone to injury for overhead athletes. Especially if the athlete trains bench press, he needs to balance the anterior and posterior strength (rowing and pulling muscles) AND improve shoulder mobility.

Trigger points in the pectoralis minor and infraspinatus can be responsible for a frozen shoulder. Trigger points have to be dealt with before stretching!

The Infraspinatus is one of the 4 rotator cuff muscles. It acts as a dynamic stabilizer and assists in outward arm rotation. The infraspinatus covers the shoulder-blade. If an athlete has an injury in this



muscle, the other rotator cuff muscles will compensate for the weakness and stiffness, and lead to problems in the whole shoulder. Reaching back and overhead is not only difficult but painful.

What can be done

Self massage with a tennis ball. Massage the shoulder-blade area using a tennis ball against a wall, and work also the Rhomboids, located between the shoulder blade and spine. Switch to the front of the body and do the same on the pecs. Carry the tennis ball and repeat throughout the day. Keep the pain level bearable; do not go amok, it won't help!

Become aware of your posture. This bit of common sense is often overlooked yet so crucial!

If you are injured

Take it easy with your training. Do swings instead of snatches for example. Use that down time to work on other aspects you might have neglected, such as rack or overhead holds, farmers walk, core training and so on... Avoid pain killers. They never treat the issues behind the problem, only the symptoms.

Training Methodology

Here is the basic approach for each discipline and training methods to increase performance.

Biathlon is usually trained in as a split in the early stages, 4 times per week:

- Day 1: Jerk + assistance
- Day2: Cardio +Snatch
- Day 3: Jerk + assistance
- Day 4: cardio + Snatch

8 weeks out of competition, switch to jerk + Snatch on the same day, 3 times per week.

Extra days can be assigned to conditioning and maybe grip endurance.

Long cycle is usually trained 3 times per week, with xxtra days can be assigned to conditioning and maybe grip endurance.

Training for Kettlebell Sport can be generally divided into 4 basic phases, each with different priorities and building on the preceding one.

1. Technique and GPP (strength + cardio)
2. A volume-building phase
3. Pre-competition intensity-building phase and competitive intensity-maximising phase.
4. A short post competition phase

Phase 1

The back , legs and shoulders need the necessary strength, flexibility and stability to easily perform each rep with perfect form. The power comes from your legs and hips, your arms guide and stabilize the weight overhead. Therefore General Physical Preparedness (GPP) and overall strength have a high priority in this phase. It is the time to assess and really work on your main weaknesses - be it strength, flexibility, conditioning, or whatever. Prioritize what will have the most effect and likely to increase your performance, and do it first in the session.

Strength training and conditioning should include all the basic lifts like squat, deadlift, push press, bench, rows and core training. Also a good time to include variety kettlebell exercises like windmills, get ups and so on, to avoid training too much in the sagittal plane.



Include some regular trail running (a favorite with Russian athletes because it's free, done outside and does not require any equipment) or any activity you enjoy with an emphasis on developing a good cardio-pulmonary base.

Sled dragging is a great joint friendly activity. Having no eccentric phase, you can do lots of volume with minimal soreness or CNS fatigue while developing great cardio-pulmonary foundation and never quitting legs. (visit my blog at <http://thierrysanchez.com> to find out how to make your own)

Remember the goal of assistance training is to support the main goal, not to wear yourself out. ☺

Strength is only one component of kettlebell sport, with general endurance and specific power endurance becoming equally important in the long run.

A basic approach is to use the repeated method: multiple short sets with long/ complete recovery between sets. I recommend doing sets of 1-2 minutes at a certain tempo (RPM stands for Reps Per Minute) instead of counting reps. This will allow you to develop pacing which is essential for kettlebell sport. Find a tempo you can sustain for all sets across.

You can also use time ladders, still keeping the sets relatively short.

Phase 2

After establishing a solid base, you need to further increase your work capacity and develop the necessary mental toughness and special endurance. When you start getting uncomfortable under the bells, your mind will tell you to quit and sabotage your performance.

Now is time to gradually increase overall length of sets, and include the competition method: set from over 6 min. You should start testing yourself on 7-10min or even 12min sets (albeit at a slower tempo) every 4 weeks.

You can also include variations on the repeated method in this period.

It is a good idea to maintain strength levels (low volume and high intensity barbell lifts) but save most of your energy and intensity for longer kettlebell sets. Focus is now on power endurance, not on developing max strength. Do not get caught in the trap of doing too many assistance exercises.



Phase 3

This period focuses on higher intensity training, and boosting the overall conditioning while being careful not to overtrain. Volume should be maintained or even slightly decreased while tempo is increased. Strength and assistance training should be as minimal as reasonably possible.

The interval method can maybe be used twice per week, along with the competition method.

Some sessions should be short and fast, doing sets of 1-3 minutes alternated with sessions of sets of 3-6 minutes done at a faster pace than planned for competition.

The last 2 weeks before a competition should lead towards a peak. If you're not ready by then, no amount of punishing is going to help you, so chill!

This means no testing yourself just to see if you're good enough! Your sets should be a little shorter, your pace a little faster and rest intervals should be longer than usual. Have a couple of days of full rest leading to the event.

Phase 4

This period typically lasts 2-4 weeks, depending on the type of competition and amount involved in training up to it.

It is a general Deload period. You can still train but nothing too heavy or intense. Every training session should leave you refreshed and feel more like an extended warm up than actual training.

You can play other sports for fun or try some activities you rarely engage in. Mainly, enjoy life and take a mental break before resuming training.

There are three 3 main methods of training for Kettlebell Sport, and all the variations that come out of it.

Competition Method

This method involves 1 long training set, ranging from 6-12min according to pacing.

A back off set may follow after a full rest interval, or heart rate has dropped under 100 bpm.
The back off set may be a set with same weight done for 3-5min, or longer set done with a lighter weight.

Ex: Long Cycle @2*24kg x7min @ 6rpm
rest until HR <100
Long Cycle @2*20kg x4-6min @ 6rpm

Repeated Method

This method involves multiple sets of 3-5min, at a tempo slightly faster than the competition method.
Rest intervals between sets are long to allow a near full recovery.

Total training time can be increased progressively. 8-12min for beginners, and 15-20min for more advanced athletes.

Ex: Long Cycle @2*24kg x3min @ 8rpm, rest 5min *3-5 sets

Interval Method

This method involves multiple sets of 1-3min, at a fast tempo.
Rest intervals between sets are equal to the work intervals.

Total training time can be increased progressively. 8-12min for beginners, and 15-20min for more advanced athletes.

Ex: Long Cycle @2*24kg x1min @ 10rpm, rest 1min *10-12 sets

By manipulating kettlebell size, choosing a constant or variable tempo, length of sets, total volume and rest intervals it is possible to create hybrid training methods.

Those methods can be good to build up overall volume (and the physical qualities required) while offering variation, adaptation to new loads and can also help with the specific endurance aspect of GS. When employing those methods, the art is to make sure they fit the athlete at his current level in relation to competition.

Here are a few examples:

Time ladders

Ex: Jerk @2*16kg x30sec @10rpm, rest 30 sec
 Jerk @2*16kg x 1min @10rpm, rest 1min
 Jerk @2*16kg x1min30 @10 rpm, rest 2min, repeat 3 times
 =9min of total work

Wave loading

Ex: Jerk @2*16kg x1min @14rpm, rest 1min
 Jerk @2*20kg x1min @14rpm, rest 1min
 Jerk @2*24kg x1min @14rpm, rest 1min
 Jerk @2*28kg x1min @14rpm, rest 1min, repeat 3 times
 =12min of total work

Pyramids

Ex: LC @2*24kg x1min @8rpm, rest 1min
 LC @2*24kg x2min @8rpm, rest 1min
 LC @2*24kg x3min @8rpm, rest 1min
 LC @2*24kg x4min @8rpm, rest 1min
 LC @2*24kg x3min @8rpm, rest 1min
 LC @2*24kg x2min @8rpm, rest 1min
 LC @2*24kg x1min @8rpm, rest 1min
 = 16min total work

For one arm lifts, the following 2 hybrid methods also have their place.

Multi-switch sets

Ex: Snatch @24kg x10min @20rpm, switch every 30 sec

Dropsets

Ex: Snatch, all sets are done on the weak side first

Snatch @28kg x1min @16rpm, @24kg x2min @16rpm, @20kg x3min @16rpm

Rest 3min and repeat on the strong side

Assistance training after the initial preparation phase should address your specific issues. It can be a combination of general strength, leg endurance, grip endurance, cardio, mobility... Be smart about it, and try to only do the minimum required.

Proper Breathing Patterns

Technique and performance cannot be optimal with improper breathing patterns.

Deep breathing mobilizes the lower lungs, which contain the greatest surface area, enhancing respiratory efficiency by reducing the number of breaths required per minute. Due to the intense nature of kettlebell lifting, the average breath volume is about 30-40% of the vital capacity (IUKL instructor manual), and breathing is best conducted through the nose and mouth. It is important to keep in mind that for every extra millimetre the diaphragm stretches during inhalation, lung capacity increases by a volume of about 250 ml. GS technique relies on minimal effort to improve performance and requires the ability to breathe smoothly and as relaxed as possible.

The Valsalva manoeuvre is used to protect the spine when lifting very heavy weights for few repetitions, and as such, has no place in kettlebell Sport training. Holding the breath creates a spike in blood pressure and heart rate.

The anatomic breathing relies on timing the breathing with movement to make the most of the elasticity of the rib cage. This relaxed breathed method helps to maintain a stable heart rate.

Snatch: As there is only one position an athlete can rest in, coordination of breathing is extremely important. Inefficient breathing increases the heart rate and decreases the chances of top performance.

The method described here takes advantage of the natural opening and closing of the ribcage when the body is in motion. The purpose is to effortlessly assist the breathing, efficiently using the diaphragm and the intercostal muscles to help take fuller breaths. The ribcage and belly can expand as the body goes in full extension, and inversely, the ribcage and belly become compressed as the upper body follows the bell on the back swing.

The breathing pattern of successful gireviks is as follow:

- Swing and pull: breathe in
- Lockout: breathe out
- If resting overhead: breathe in and out
- The drop: breathe in
- The back swing: breathe out

It is possible to include extra breathing cycles for snatch especially when tempo is slow-ish with heavier kettlebells.

Jerk: In jerk, there are two resting positions. One of the factors that can limit how many jerks an athlete can take is the way he breathes. Inefficient breathing increases the heart, and interrupts the flow of the cycle.

“Beginners to GS and even some Masters of Sport in Kettlebell Lifting tend to hold their breath and flex breathing muscles while holding kettlebells at lock out position. It takes 6-8 breathing cycles to recover from such needless exertion and get ready to next kettlebell jerk.” [16]

“Diversion of breathing and movement patterns leads to extra movement of arms, legs and torso, which lead to early onset of fatigue and poor performance.” [16]

The mechanics behind the expansion and compression cycles of the ribcage throughout the jerk are taken into account, and the breathing patterns naturally follow those cycles. Going against the natural cycle puts extra strain on the breathing mechanics and increases the heart rate without necessity.

The breathing patterns of successful gireviks are described here:

Option 1: Short rest between reps

- First dip – exhalation
- Bumping to overhead fixation – inhalation
- Fixation, rising up – exhalation
- the drop – inhalation
- Cushioning the blow – exhalation
- Rack position- inhalation, (if resting :exhalation, inhalation)

Option 2: Longer rest between reps

- First dip – exhalation
- Bumping to overhead fixation – inhalation
- Fixation, Rising up- exhalation
- Fixation, overhead rest – inhalation – exhalation
- the drop – inhalation
- cushioning the blow – exhalation
- rack position- inhalation (if resting again: exhalation, inhalation)



Breathing is made even more efficient if the elbows are resting low on the hip bone, and not high on the abdominal muscles. In this position it is possible to take deeper breaths. Therefore, it is crucial to perfect the rack technique for an athlete to achieve high reps.

[VIDEO LINK FOR BREATHING PATTERNS IN GIREVOY SPORT](#)

Conclusion

There has been done very little research about kettlebell sport. In the West, research is practically non-existent.

The biomechanical analyses I presented here go far more in depth than what else I have come across, be it commercial work or material from GS organizations.

As for athlete preparation, the aspect of strength development is open to discussion. The research done about the required strength to be an elite girevik have been inconclusive. More work needs to be done in that field, because each weight class division has different requirements. That is because, when competing with the same fixed weight, demands vary according to the athlete's relative strength.

GS being mainly an endurance sport, the focus of training is on increasing numbers. While sources agree that strength is an important quality to develop, it has been impossible to find definite and optimal guide lines for strength training as assistance to GS.

From experience, I tried to come up with a model of periodization that includes both linear and non-linear approaches. I believe this is best, regardless of how few competitions an athlete participates in. Workloads with kettlebells can be very high, and a long linear progression is unrealistic if athletes are to remain injury free and keep training seriously and regularly.

Like mentioned before, these are early days for GS in Denmark. In my opinion, rules can and should evolve to make Girevoy Sport accessible and attractive to more athletes (ie: new ranking tables and kettlebell sizes depending on weight divisions, new lifts...).

On the international level, things are getting bigger and bigger, with the relatively recent introduction of new GS sporting organizations, and a growing worldwide interest. The goal of those organizations is to eventually take the sport to the Olympic stage.

In 2008, the IUKL demonstrated kettlebell Sport and juggling at the last TAFISA World Games in Busan. Response was very positive. The World Traditional Games are held every 4 years, and involve indigenous ethnic sports that are not included into the Olympic program. [16]

Let's hope all kettlebell enthusiasts can contribute to the promotion and development of the sport!

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Studies

(Source: [3])

“The official Soviet armed forces manual on strength training approved by the Ministry of Defense (Burkov & Nikityuk, 1985), declared kettlebell training to be “one of the most effective means of strength development”, representing “a new era in the development of human strength-potential”

“Vinogradov & Lukyanov (1986) found a very high correlation between the results posted in a kettlebell lifting competition and a great range of dissimilar tests: strength, measured with the three powerlifts and grip strength; strength endurance, measured with pullups and parallel bar dips; general endurance, determined by a 1000 meter run; work capacity and balance, measured with special tests.”

“Voropayev (1983) observed two groups of college students over a period of a few years. A standard battery of the armed forces PT tests was used: pullups, a standing broad jump, a 100m sprint, and a 1k run. The control group followed the typical university physical training program which was military oriented and emphasized the above exercises. The experimental group just lifted kettlebells. In spite of the lack of practice on the tested drills, the kettlebell group showed better scores in every one of them. “

“A study done in Siberia by Shevtsova (1993) revealed some interesting facts about the effects of kettlebell training on the heart. Seventy-five gireviks with three to five years of experience were studied. A long-term decrease in the heart rate and the blood pressure was recorded. The average resting HR was recorded at 56 beats per minute, the BP 110/70 in the summer and 114/74 in the winter. The heart rate took a dive not just at rest, but also during and after exercise. The time it took the heart to slow down back to normal also decreased. Some heart dynamics lead to the conclusion that experienced gireviks' systems also adapted to be better 'primed' and ready for upcoming action. Overall, the researchers registered "a normal adaptation of the cardio-vascular system to training stress" and "an increased functional capacity of the heart".

Interviews



Valentin Egorov, MS, Team Russia

60-65kg division. Born 1985. Started training with Kettlebells in 1996

1. What is the most important quality for GS?

I think endurance and strength...But most IMPORTANT it technique of exercises!!

2. How long does it take to make CMS and MS?

I think 1-2 years...

3. Do the best girevik train jerk and snatch sessions at separate sessions or on same session?

I do 4 trainings per week for jerk and 2 trainings per week for snatch.

4. Usually how old are kids they when they start?

from 10-12

5. What are typical injuries or problems in veterans?

typical injuries - knees and elbows

6. Do they ever do heavy strength training before KB training?

I think heavy strength training need after KB training..

7.What would be typical exercises with barbells?

I don't use BB for my training

8.I understand running is also very important for GS.

yes, of course. Very much so.

9.Typically, how many competitions a year would a girevik participate in?

It's different for all. I have 4-5 competitions for year..

10.Is it possible to find biomechanical analyses of GS in Russian?

No, not many analysis of KB sport... serious science work was start near 3-4 year ago...



Vasily Ginko, secretary and chief instructor IUKL

7 times World champion and holder of 2 World records in the Long cycle

Over 90kg division. Born 1973. Started training with kettlebells in 1999. Became World champion in 2002.

1. How important is strength training for GS?

Strength training is necessary, and it depends on the initial degree of preparation of the girevik. In level 2 course handbook you have the information on cycles of preparation of the girevik. In each of these cycles there was a part of strength exercises. Only strength preparation became the less, than competition were closer. Before competitions the basic attention was given to trainings on special endurance.

2. What is the most important quality?

It's the important complex development of all qualities. For example. If the sportsman comes from powerlifting - he requires flexibility and endurance. If the fighter comes - he requires the technique and skills of work with KB. If the sportsman from light athletics comes - it requires force and power endurance.

3. How long does it take to make CMS and MS?

The adult well developed sportsman who begins specialization in GS, can execute specification of CMS in a current of 1 year, specification of MS - in a current of 2-3 years. For unprepared people it is more difficult...

4. Do the best girevik train jerk and snatch sessions at separate sessions or on same session?

We train a jerk and snatch in different training days. But we unite a jerk and snatch in one training approximately for 2-3 weeks before competitions.

If we train a long cycle: one training - separately liftings on a chest and the short jerk, the second training - full movement a long cycle.

5. Usually how old are kids when they start?

Children can start to train with KB from 12-13 years. But before carrying out competitive exercises they pass a course of special preparation. They work on total development exercises and juggling.

With KB we begin competitive exercises approximately after a year. Weight of KB - from 8 kg. And gradually we increase the weight.

6. What are typical injuries or problems in veterans?

The basic problems for veterans - with cardiosystem. Problems with joints are often.

7. Typically, how many competitions a year would a girevik participate in?

The normal schedule - if you have on one great competition in each half of year.

And some more competitions of lower level - from 2 to 4 - in each half of year also.

However I know sportman which participated at 20-22 competitions for one year!!!

However, they had no good results in the end of this season....:))

8. I understand running is also very important for GS.

Run for kettlebell lifters is necessary for development of the general aerobic qualities of an organism. Therefore we practise run on the average and slow rate long time - from 30 till 90 minutes. It is better to alternate run on stadium and cross-country - but all it at small rate. And only one training from 5-10 you can spend in a sprint mode. Or the short interval of 10-15 minutes on very high speed, or repeated runnings on 30-100 m. It allows to support high-speed functions of an organism and interrupts monotony of training. After sprint your organism will react again to long run.

9. Do athletes with MS receive financial sponsorship ?

In Russia and in Ukraine, Masters of Sports of International Level receive money. In Belarus and Kazakhstan too. In Latvia, Lithuania and other countries we have no such privileges from the state...



Paul Tucker, CMS level, Team Australia

80kg division. Born 1962. Started training with KB in 2003

1.How important is strength training for GS and does weight class make a difference as to what strength training they do?

Very important and especially for older athletes with less tissue elasticity. Lighter athletes clearly need relatively more strength e.g. the leg dip for jerks is deeper.

2.What is the most important quality?

Depends upon level of girevik. Every lifter has different qualities. But without flexibility , there will be no high level results (in jerks) as shoulders cannot stand the load without appropriate overhead rest. But also , core strength is vital and without endurance – girevik cannot last (obviously!). So all are important to varying degrees depending upon individual and ability (level of achievement)

3.How long does it take to make CMS and MS?

CMS is possible in 6-12 months in athletes with strength/endurance background.

MS I would say – 2 years minimum , probably 3-5 years in young athlete. Older – depends upon many factors , esp coaching and time available for training/recovery.

4.Do the best girevik train jerk and snatch sessions at separate sessions or on same session?

I believe separate sessions are best for advanced gireviks. But for beginners – same session.

5. What are typical injuries or problems in veterans?

Overuse injuries (endurance athletes who train too hard because they have mental willpower, not listen to their bodies), injuries to previously injured muscles/joints (too much too soon or poor technique), cardiorespiratory restrictions (reduction of thoracic cage/lung elasticity with age, effects of smoking etc). General loss of mobility and effect of sedentary living (even active people eventually are put into desk jobs, because of seniority)..

6. Do you ever do heavy strength training before KB training?

Yes, it is good to prime the CNS and make subsequent lifts feel lighter. But, not excessively heavy. And not more than 1-3 reps per set so as not to exhaust muscles for subsequent endurance training.

7. What would be typical exercises with BB?

Deadlift, power clean, squat (all types), power jerk. Press behind/front of neck if shoulders are healthy. Choice depends on phase of training and ability of athlete.

8. Typically, how many competitions a year would a girevik participate in?

I would say 4 is ideal. More is certainly possible, less will reduce progress.