

IWF Coaching Symposium

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Personal notes by Karoliina Lundahl, CRC Deputy Chair



President Zhao Jinqiang

Welcome messages from the Chinese Weightlifting Federation

The secret of Chinese weightlifting is building a base from school age children and upwards. After training in their various local districts under various systems, the National Team collects the top athletes to train in Beijing. The combination of elite coaches and a scientific approach help athletes move up in their careers. The Chinese program supports research of various doctors, physical therapists and other sports specialists to enable high level training at minimal number of injuries. They focus on prevention (prehab), nutrition and rehab. For thirty athletes there are 17 doctors in the complex. An example of the money that China puts into their sports program is that they will hire a Physical Therapist to visit Beijing for one week out of the month for the next month, total 9 weeks of work during the next 9 months, at a very high market price.

Anti-doping has become a special focal point as doping was criminalized in China in December 2019. In 2018 the Chinese athletes were tested 1800 times by ITA and CHINADA without any positive occurrences. The goal of the national anti-doping work is zero tolerance and zero occurrence.



Dr. Jin Jia: Senbodi Inc.

Product presentation by Senbodi Inc.

Bar Track tracks the bar by sending information via Bluetooth to app on a smart phone. There is a motion sensor which is produced to work with extremely high speeds. The sensor reads real-time metrics during training and gives instant feedback through the smart phone app. Usually systems use a video speed of 30Hz. However, this not enough for the Bar Track system, a minimum of 50 Hz is needed. The product tracks the barbell at high speeds and measures parameters such as acceleration, velocity (power curve) and the trajectory of the bar.

The product has three parts (see pictures):

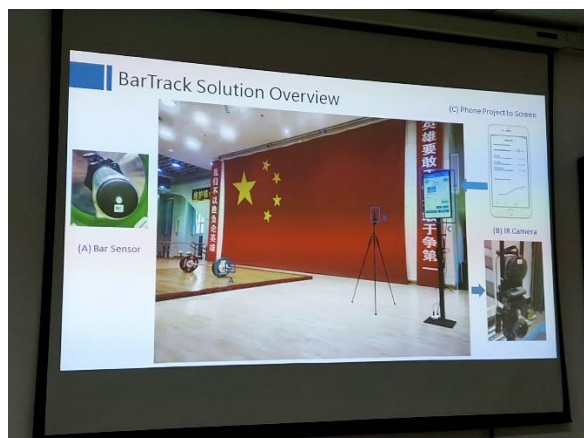
- 1) A sensor (100 Hz) at the end of the barbell, same size as the circumference of the sleeve of the bar. It weighs 15 g. The sensor is attached with double-sided tape.
- 2) A battery operated infrared camera (100 Hz) which is set camera on a tripod.
- 3) The app on one's smart phone can be read on the phone, or for easier viewing, it can be projected to a bigger screen with screen sharing.

The system has to be calibrated with Infrared points, by marking a cross of 25 cm into the system. The product is great for singles, however it is problematic for sets. The camera calibration is performed straight from the side, at least 2 m from the bar, height at ca 180 cm. This will help the camera to calibrate itself automatically. A suggestion for improvement of the product: place a camera on both sides; or in training place a sensor on the shoe.

Parameters - the bar trajectory, its acceleration and velocity - are read on the app in the phone. It is user-friendly since one can point the screen at any point with a pen and get a specific reading.

The manufacturers are planning to improve the product for the future. They are working on body sensors to be used in multiple joints without wires, such as the infrared marker. The infrared marker is active, other markers which use wires are passive. The passive markers are not as effective as the active markers since they need better lighting and better equipment. Infrared is the way to go in the future! It is very accurate as it can follow the bar with a 1 mm accuracy.

If one is interested in acquiring the whole package, please contact IWF for contact information to Senbodi Inc.



Mr. Cao Wenyan: Technique Analysis by Video

Presentation of Video Analysis System

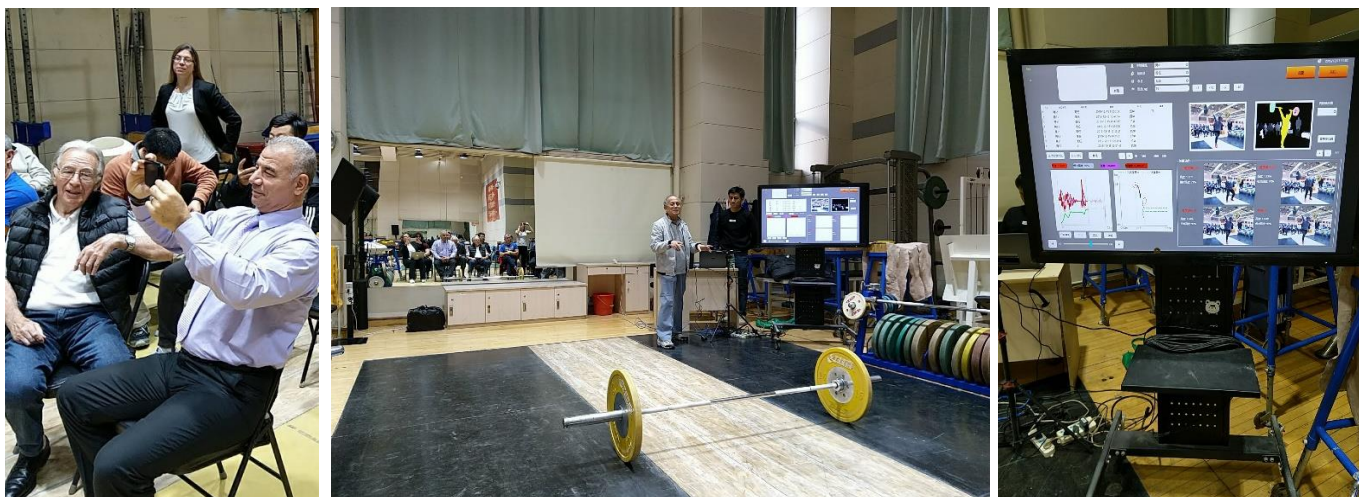
A video analysis system was introduced in the gym where the camera and TV screen were set up. Since 2014 a system has been in use in training and sometimes in competition, eg. for the first time at IWF Grand Prix in 2015. Mr Hu joined Mr. Cao Wenyan for the presentation, he represents the company that makes the system.

The system is comprised of computer software and two cameras, a regular camera and a laser camera. The lasers follow the known parameters, which are the 45 cm diameter of the plates and the bar width.

The system is very easy to use. After the lifter lists, the lift can be viewed on the TV screen with a slight delay. There are two pictures: one regular video and one colored which is used to follow the athlete (in yellow), left plates (in red) and right plates (in green). Two graphs are produced in four windows: maximum acceleration, maximum velocity (at 96 cm, or 57% of the athlete's height, in this instance), max height (usually 72%, top 69% lifters or 70-71%) and fixation (lowest point of bar at catch).

The system is only in Chinese, they are working on the English translation. It is sold only in China and no price is available at this moment. Coach Cao reported space limitations and some inaccuracy problems with the system.

In a discussion with Coach Cao how to use the system, Coach Cao named its strengths as the system can find the weak points of the lift. With this information the coach then makes his/her decisions on which training exercises are needed to improve these values. The adjustments are then made to the athlete's training regimen.



Mr. Li Qingzheng: WL Training Science, Nutrition

(Translator Dr. Li, physician) Five members in the Scientific Research of Chinese WL Team, all from the China Institute of Sport Science. They hold two positions – one with Sport Science and the other one with the Chinese Weightlifting Team – and they are very busy. However they feel that monitoring the training is very important which motivates them to work even harder.



At the Beijing Olympic Training Center an athlete-centered approach is used in coaching. Researchers work in a battle zone (see middle picture) because they don't know what the enemy is doing, they must be ready to fight constantly! All their energy goes to improving their own the athletes: it is about getting bigger, better and stronger. All assessments such as blood work are done once a week by the Scientific Team. The athletes and coaches will have information from morning practise to afternoon practise, for example why the athlete is not recovering. A chart was shown with Chinese text where the blue color represented CK (Creatine Kinase), Brown/Red -> BUN (Blood Urea Nitrogen). The imbalance of CK and BUN cause the athlete to experience fatigue. Then training will be adjusted by the coach.

An app Omega Wave has been used for seven years by the Scientific Team. Getting oxygen treatment means that the athlete naps in an oxygen tent. After a 30-minute nap the results have improved from 1 to 4 (on a scale of 7). After heavy training there is a mandatory nap in the tent. The research on the Oxygen Chamber's influence on the skeletal muscle is done by muscle biopsy. After 10, 20 and 30 minutes in the Chamber the numbers increase systematically as the rest heartrate goes down.



Bodyweight measurements are very important since the goal is that the bodyweight should be constant as the athlete's fat percentage changes. Changes in the athlete's fat percentage are done by increasing or decreasing aerobic exercises! The Scientific Team measures the muscle mass in the different areas of the athlete's body looking for imbalances. These must then be actively corrected through changes in the training regimen. Also athlete supplements are regulated by the China Sport Science. Every two years it gives new guidelines for nutritional supplements after they have performed tests on them.

There are various recovery equipment in the training center, and after each training the athletes are recommended a 15-20 minute visit to the Recovery Center. The oxygen tent described earlier was tested by CRC member Avenash Pandoo and it is well-used by the Chinese athletes. Game Ready compression sleeves (picture below in middle) with or without ice are mostly used for the hip area and lower extremities. Floating chambers are used for sensory free therapy (see picture below on left). They are placed in the athletes' living area so that they can easily use it in the evenings, one chamber for men and one for the women. The water in the floating chamber has high salt consistency so that a sensory free environment can be produced. The water temperature is the same as the body's so that the athlete doesn't feel his/her body temperature nor his/her body weight. They can only sense their head, ie. the brain. Athletes use sensory free therapy twice a week. It is said that the therapy gives a feeling of that the body is removed from the brain, which helps the brain's central system to renew thus causing pain to go away. The therapy uses both hot (38 degrees Celsius) and cold (8-14C) water pools as alternative treatment, which is very useful for injury prevention, known as prehab.

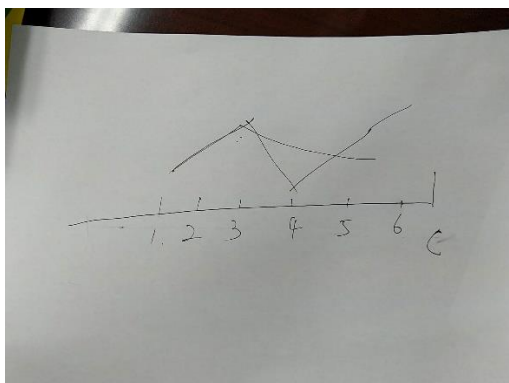


The Chinese weightlifters value the the concept of 'pre-hab' highly. As opposed to rehabilitation, rehab, which is used for injury recovery of injured athletes, pre-hab is meant for keeping the non-injured athletes healthy. Pre-hab consists of physical therapy and manual therapy when athletes perform mobility and core stability training. The Sport Science Team monitors the initial stage of the athlete, then later assesses it again in a scale of 1 (red) – 2 (yellow) – 3 (green). The athletes will take part in an extensive pre-hab program in order to increase their mobility and core stability so that they can increase their heavy training loads.

Psychological training is combined with the biochemical training for the past eight years now. Injuries, fears, levels of fatigue and competition stress are assessed. In order to name specific stress factors the athletes are simply asked how they feel, or for example, if there is monotony in training.

The Sports Science Team has used studies on dehydration and rapid weight loss for over ten years. In weightlifting a rapid weight loss without problems of dehydration is preferred. Training loads were studied on a Double Peak model (see picture). The Science Team found only one athlete in four years who didn't need weight loss before

competition. Their studies show that the Double Peak model works well for top athletes: the first peak is at three weeks before competition and the second peak at competition (=training intensity). In the first peak the athletes lift heavier than they have ever lifted since they don't have to lose weight. Volume stays steady – low – during the six weeks up to the competition.



Mr. Li reminded everyone that he and his co-workers are a team. They have most power as a team, which leads them to understand the need of communication between the different departments. The team must not keep secrets, on the contrary it must share information. This applies also to the foreign specialists which the Chinese Olympic Committee has hired in the past years.

As a sign of the athlete-centered coaching approach it was told that the National Management Division takes care of athletes after their sports career. China gives positions to medallists in the provinces, so that they have jobs after their sports careers. Top 8 finishers at Worlds or Olympics can be chosen to University studies.

Dr. Du Xiao-Ming

Presentation on Medicinal Food Pharmaceutical Sciences

Dr. Du Xiao-Ming is a Mongolian born doctor who studied at Kyushu University in Japan. His research areas are Medicinal Food Pharmaceutical Sciences and Traditional Chinese Medicine. He is currently studying Nucleotides, which are the basic units of DNA and RNA. Dr. Du presents that nucleotides are macromolecules of life, they can be called 'anti-stress nutrients' because they maintain homeostasis of the body in stressful situations. Nucleotides protect the liver by burning alcohol and regulating one's blood pressure, and they can also protect the brain, for example to improve one's memory. Nucleotides are widely used as supplements on prevention and treatment of lifestyle diseases since they are beneficial to intestinal flora and the immune system. They promote the growth beneficial bacteria and regulate intestinal flora. This is quickly becoming the new research topic in the field of Life Science.

Improved body functions like digestion protect the body from local infections. The gut microbiota (hundreds of trillions) is the largest immune system in our bodies. There are many clinical studies that show associations between the human microbiota and diseases. They affect our health since their role is to provide nutrients to our organs.

Dr. Du told about a study about twin sisters where the other one is heavy and the other thin. The doctors took intestinal flora from the thin twin and put in a mouse. The mouse was lean afterwards. They took the intestinal flora from the heavy twin and put it in a mouse causing the mouse to become obese. Thus it is the gut flora that causes many diseases like obesity and cardiovascular diseases. According to Dr. Du the gut is out second brain. The active components that affect the brain come from gut microbiota. It's a two-way street: as the gut flora can affect the brain, the brain can also affect the gut flora. These diseases are autism, Alzheimer's and Parkinson's; osteoporosis (in mice); good gut flora can also promote bone formation.

Dr. Liu HongLin: ZHEN-AO

Presentation of company Zhen-Ao

The company started in 1996 and it worked together with IWF for some years. The company is an international leading biotechnology producer. They make ingredients for life health products and for example the main nutrients for baby milk. They produce a series of sports nutrition foods, for which they have a license in China. It is noted that in China one can't make sports nutrition products without a licence. The Zhen-Ao company has worked together with the Chinese Olympic Committee for 20 years through four Olympic Games. The IWF and Xhen-Ao group started a working relationship in 2012 in the field of Sports Nutrition. The Cologne Laboratory has tested the Nucleic Acid Capsule produced by the company and has found no prohibited substances in it.

In Dr. Liu's presentation about proteins, he mentions that they have 9 protein products. Protein is the most important substance for recovery since it promotes muscle synthesis. For supplemental energy they make maltooligosaccharide solid drinks (2 products). Their two products of recovery after exercise includes peptides, like the branched chain amino acid peptide solid drink. To improve endurance Dr. Liu suggests their B1 and B2 solid drinks. For energy substitution he recommends their nutritional substitute powder, as for speed and strength a creatine solid drink.

Dr. Liu explains the role of nucleic acids in Sports Nutrition Supplements. The nucleic acids increase resistance to infection, they enhance immunity and regenerate cells. Since they are essential in our bodies, they can be used for improving and maintaining health as well as aid in recovery from stress. The nucleic acids regulate the immune system, slow down the aging process (antioxidation) and repair damaged cells (cell viability).

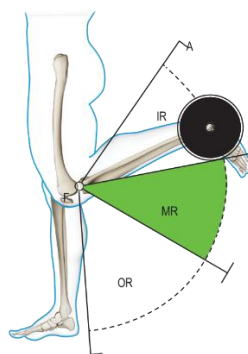
Mr. ZHANG PENG: Ironman

Presentation of Ironman Fitness and Sports products

The Ironman company started its business in 1996 in Nantong Port. They produce mainly pneumatic machines and lately they have focused on intelligent pneumatic resistant equipment.

The Intelligent Pneumatic Resistance Equipment stabilize the force production of the athlete. As an example of how one can train leg strength is that one can overload the Inner Range (IR) angle just before the stick point in Mid-Range (MR) when the levers are non-beneficial to the athlete (see picture from IWF Level 2 Coaching Education manual, page 22). Within the whole range of motion one can increase the weight after the stick point, otherwise the muscle does not work for the full range at high intensity.

Functional training means that the athletes train at the speed they perform their sport. You can only do it with the pneumatic machines since it is not slowed down by gravity. This can also 'decrease the risk of injury in joints and connecting tissue' (Ironman commercial).



Mr. Nathan Stockley: Performance Coach

Presentation of Strength and assistance training on top of weightlifting training.



Mr. Stockley was hired by the Chinese Olympic Committee to prepare Chinese athletes for Tokyo Olympic Games. Mr. Stockley is a Strength and Conditioning professional from Britain who applied for the position through the Chinese Olympic Committee. After his arrival Mr. Stockley was placed in the sport of Weightlifting where he hopes to be until the Olympic Games. He is also aware that the Chinese Olympic Committee may move him to other Olympic sports, even to winter Olympic sports. He is an example of many western coaches who are working in China with the Chinese athletes. They live in the same quarters as the athletes and move from one training center to another with the team. Mr. Stockley says that the pay is a little bit better than in Europe, and the work is definitely exciting. The Chinese weightlifting team is divided into smaller units and each unit has their own coach, doctor, S&C coach and physical therapist. Mr. Stockley hopes his athlete will make it to the Olympics, but he is aware of the tough competition amongst the athletes.

Here are key points from Mr. Stockley's presentation on how he works with his athlete:

- Assistance training: Manage injuries, improve movement efficiency and strength assistance. Power training: Other power training methods. Monitor performance: Strength and power key performance.
- Weightlifting injuries: Lower back, knee; 2.4 – 3.3 injuries per 1000 h of training (Aasa et al 2016); muscle soreness
- Movement efficiency: Poor movement leads to injury risk, energy leaks, unbalanced bar, missed lift
- Range of motion assessments: ankle, hips, Thoracic spine rotation, Shoulders, Elbow
- Joint strength assessments: various joints in relation to other joints
- Every 6-8 weeks work on an area that isn't symmetrical (assessment done by testing)
- Assistance training: 20-minute warm-up, work on flexibility, every workout
- Power training: jumping, throwing light resistance
- Monitoring performance:
 - 1) Identify effectiveness of training
 - 2) Identify limiting factors
- Strength and Power key performance indicators: peak force, peak power, rate force development
- Barbell key performance indicators: bar path, peak velocity, vertical displacement and drop distance
- Vmax pro-app: Bar speed, bar path, velocity of bar at any given moment
- MyJump-app: Power in Watts is average, not peak power.
- Movement errors / video: hip, upper back, longer leg
- Single leg exercises recruit more muscle fibers vs. doing them double legged
- Lots of hamstring training, single and double leg training. Vary the movements from weightlifting hamstring movements to assistance training.

Ms. Yan Quingping: CHINADA

Chinese Weightlifting Federation / Mr. Li Hao:

After 2018 when China was released from the ban, a rigorous testing routine was established. Athletes tested are National RTP and International RTP members. In 2018 CHINADA (Chinese National Anti-Doping Agency) performed more than 1800 tests in the NRTP group, 760 tests on National Team athletes and 246 on IRTP athletes. The numbers in 2019 are about the same (765 National Team, 231 IRTP) through 31 Oct, 2019.

Since 2018 there have been 26 anti-doping training seminars involving nearly 10 000 participants. Chinese Weightlifting Association claims that their athletes are the most tested athletes in the world.

Ms. Yang Quingping told about the current Anti-Doping work in China. The Chinese sports world's ecosystem has three swords:

- 1) Legal supervision Nov. 18, 2019 making it illegal to use doping in China
- 2) Instruction for sports bodies to follow 'Zero tolerance, Zero Presence' motto
- 3) Political Supervision: Economic supervision

According to Ms. Yang the goal of CHINADA is to win clean medals by building a long-term anti-doping management system in China. They have vowed that the national image must never be tainted by doping. To achieve this they have a strategic plan which includes increase of staff members in CHINADA (in 2019 staff size is 85, it is estimated to grow to 100 by 2022) and a focus on Provincial Anti-Doping Organs (PADO) in each of the 31 Chinese provinces (currently 21 PADOs) as well as separate national Teams Anti-Doping Organs (TADO). There are currently nine TADOs in China. They also have planned to perform a pilot program on Dried Blood Spot testing in 2020.

