

# *The Use Of Swiss Balls In Athletic Training--An Effective Combination Of Load And Fun*

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Swiss Balls are an effective training tool for increasing strength, improving joint and body stability and increasing joint flexibility. The un-stable ball activates muscles to stabilize and balance the body. The use of this implement demands creativity from the athlete and coach.

Swiss or Pezzi Balls (other names: gymnastic ball, fitball) are widely used in physiotherapeutic treatments (e.g. Konerding/ Sedelmaier 1994, Balk 1996, Kempf 1997, Lauritis 1997, Meier 1997) and can be a part of each program in general training in athletics (Foxhoven/Plate 1996). Exercises with the ball can also be tailored to the specific demands of the different competition movements.

Swiss Ball exercises can be executed at an advanced level in combination with exercises with rubber bands (so-called "stretchies," e.g., Thera or Deuser bands), or to complement a training program using weight machines and free weights (dumb-bells, barbell).

Balls are manufactured to a very high quality and are available around the world in shops for sporting and physiotherapeutic goods. Their size ranges from 0.45m up to 1.2m in diameter (differences of 10cm). Anti-burst balls made from Krylon (Check 1997) will not rip in case of piercing. "Norroal" balls can split wide open, which can be unsafe. Balls of an oval shape ("egg balls") serve a similar purpose and are especially useful for beginners because they roll only in a forward-backward direction.

## **SOME PRECONDITIONS**

Training measures in general require a knowledge of the specific neuromuscular and biomechanical demands of the competition movements (e.g., the function of the pelvic stabilizers in sprinting, jumping and throwing). It is recommended that a musculoskeletal assessment be made, before starting a targeted general strengthening program. Together with the balance of strength (e.g., quadriceps-hamstrings ratio, left-right balance), the flexibility around the main joints has to be checked. Weak abdominal muscles in relationship to the back muscles are often found (Norris 1994). As accurate diagnosis and correct therapeutic treatment need a specialist (physician or physiotherapist), they cannot be the focus of this study.

As in every training session, the athlete has to be well warmed up (15- 20min), with a good cool down after the training session. The ball can be used also during the warm up (with the ball: balancing/juggle on the head and with the feet, squatting, arm swings, sitting with pelvis forward-backward movements, rollings, shoulder shrugs, dynamic stretching exercises, etc. See Figures 2-6). The athlete will gradually become confident with the new implement, checking its ability to take advantage of the elasticity. It is

helpful to exercise in front of a mirror to get a visual feedback about body position.

For most of the exercises, the right ball size is being used if, in a sitting position, the thighs are raised slightly above the horizontal (the ball has to be pumped up correctly-it should always feel firm but not tight. See Figure 2). The minimum sizes are, e.g., for a 1.65m-tall athlete, 65cm in ball diameter (correct ball diameter = body height in centimeters minus 100).

The exercises shown must be part of the entire training program for a period of at least several weeks, as designed by the coach and ideally under the supervision of a physiotherapist (e.g., to check the correct position of the vertebrae).

The goal of using the Swiss Ball is to decrease muscular imbalance, to promote neuromuscular and proprioceptive development, and to develop muscular control, especially of lumbopelvic movements.

It is especially important, for safety reasons, for the beginner to have the assistance of a partner. Some exercises must to be executed with a training partner or with the coach. The training principle "specificity" guides the selection of exercises. The athletes, therefore, need to judge their skill level-beginner, intermediate and advanced.

## THE EXERCISES

Imaginative names have been given by different experts to the main exercises, such as "figurehead" (Figure 6), "windscreen wipers" (Figure 9), "goldfish" (Figure II) and "sea urchin" (Figure 11), based on the characteristic images of the exercises. Other names, invented by the athletes, will help to promote a close personal relationship with the exercises.

Most of the exercises are shown in the side view. All the exercises act on the entire body rather than on single muscle groups. Nevertheless, with respect to the targeted main training effect in this study, they are classified as arm/shoulder, trunk and hip/leg complexes. When training with the ball, the following rules should apply:

- Use 3-6 series of 5-12 repetitions per exercise.
- Select a group of about 5 exercises, from simple to more complex exercises.
- Systematically increase the duration, intensity and frequency of the exercises. Include both sides of the body in the exercise program.
- At least 3 ball sessions should be completed per week to reach the desired training effect (in combination with other general training routines).
- The exercises must be executed in a controlled manner, avoiding hasty, jerky movements.
- Breathe in during the relaxing part of the exercise-breathe out during the loading part. Never compress the air in the lungs during the isometric portion of some exercises.
- Exercises with the ball are normally pain-free. In case of any pain during the exercise, consult your physician.

For some exercises a bigger ball is more effective (e.g., for stretching, rolling over the ball, etc. See Figures 3, 11. For other exercises, a smaller ball is not a handicap (e.g., pushups on the ball. See Figure 10.

The following measures can be used to increase the training load, and thus also the training effect:

- the use of balls with different diameters,
- variations in the width of the leg base (sitting on or rolling over the ball),
- additional weights such as discs, dumbbells or a bar held in the hands, disc on the back, additional rubber bands on the legs or arms (see Balk 1996, Kempf 1997),
- using a partner to give resistance to different areas (e.g., on knees or shoulders) or to upset the balance,
- feet on the wall (see Figure 14), simultaneous use of 2 or 3 balls (e.g., exercises presented in Figure 10),
- variation of the air pressure inside the ball.

A void fixed feet: if the feet are fixed (e.g., by the coach or under a bench), the athlete can pull into the fixed placement with the help of the dorsiflexor of the ankle joint. In case of weak abdominals, the athlete can sit up using only activity of the iliopsoas (Norris 1994), which is not the training target.

The exercises presented below are basic and easy for beginners to execute (Figures 2-4, 6-9, 12-13, 15-16). The exercises presented in Figures 5, 10, 11, 14 are to be used by advanced athletes.

If Swiss Balls are not available, similar training effects can be achieved by improvisation with other implements and tools, for example by executing pushups with the hands supported on soccer or rugby balls.

Exercises for the abdominal muscles can be executed on pumped up car tire inner tubes.

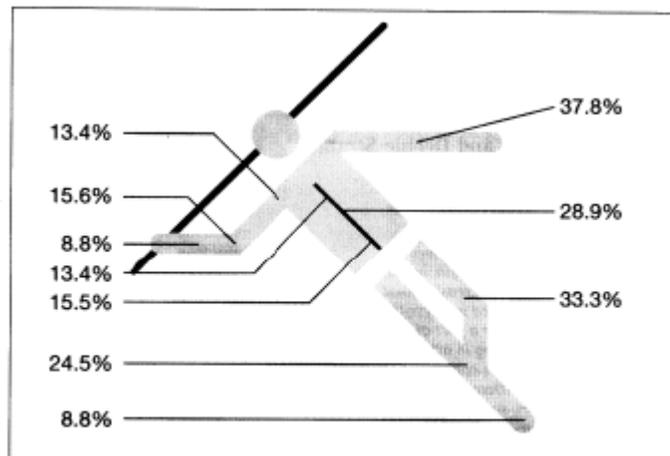
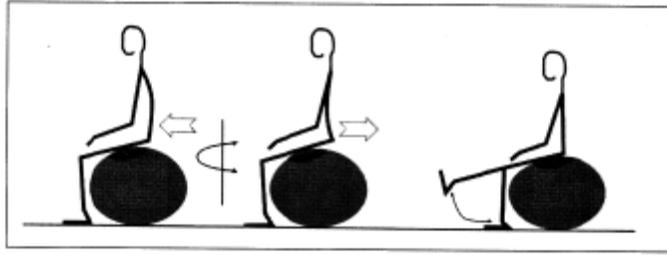
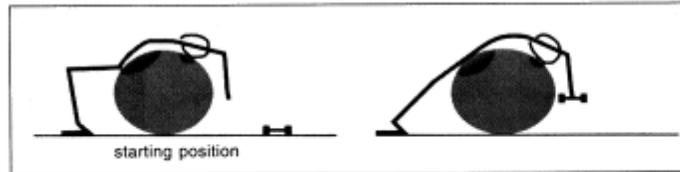


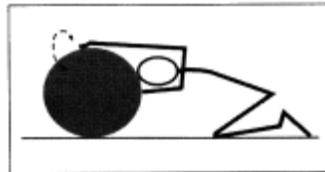
Figure 1: Injury localization in the throwing events (after Pfürringer/Rosemeyer/Bär 1985).



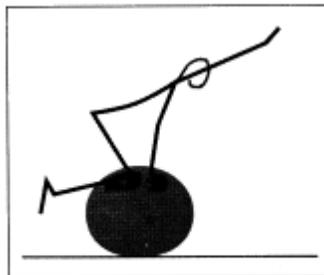
**Figure 2: Pelvis tilt and rolling** (side to side, forward and back)      **Lift and leg extension** (hold 5 second)  
 Advanced level: place supporting foot on a small ball.



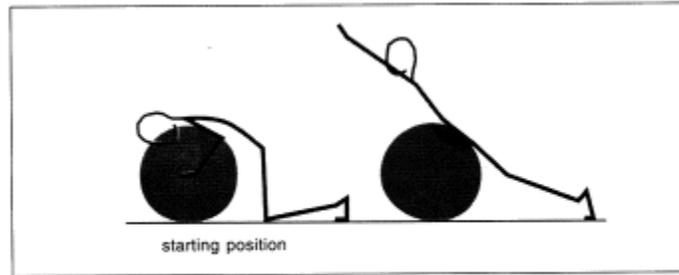
**Figure 3: Basic stretch (back arch)**—additional load given by a partner.  
 Adapt positions for lateral raises (butterflies), dumbbell press, medicine ball throws.



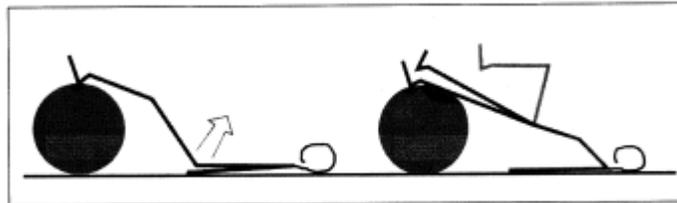
**Figure 4: Upper body stretch** (rolling the ball).



**Figure 5: Knee balance**



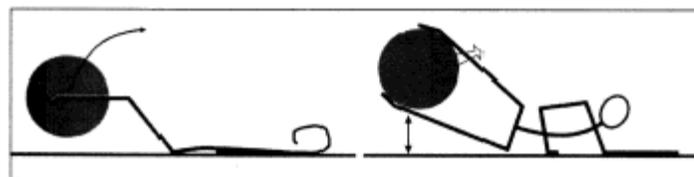
**Figure 6: "Figurehead."**  
 Advanced level: balance on the ball on stomach, arms and feet off the ground ("scale").



**Figure 7: Hip lifts (trunk and leg stabilization).**  
 Advanced level: balancing on one heel, flexing knee and hip.



**Figure 8: Curls and crunches.**  
 Feet apart or crossed, short trunk amplitude.



**Figure 9: "windscreen wipers" (lateral, left picture) and leg lifts (over head, left), lateral leg lifts (right).**

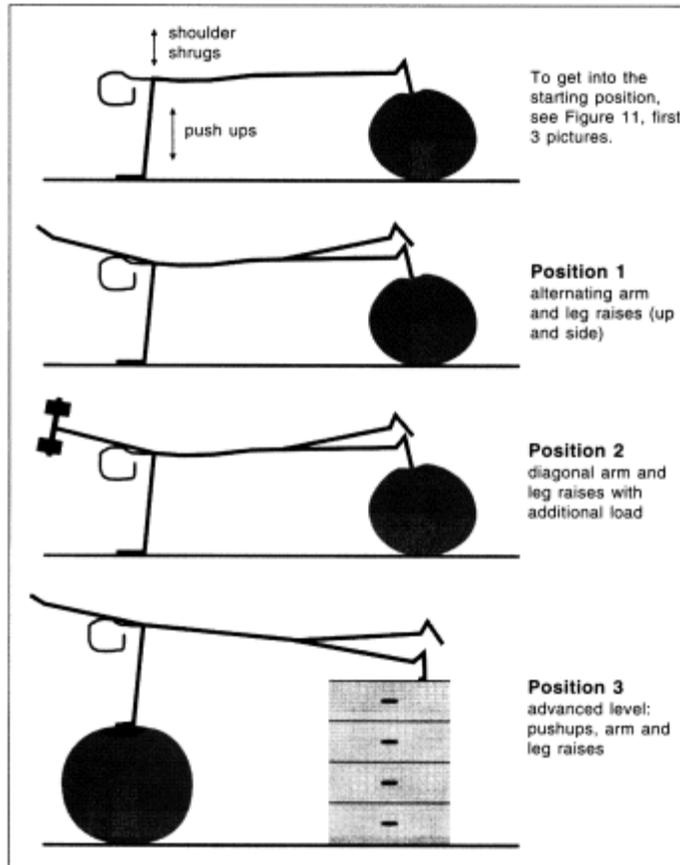


Figure 10: Exercises for leg, trunk and arm/shoulder stabilization and strengthening (1 or 2 Swiss Balls).

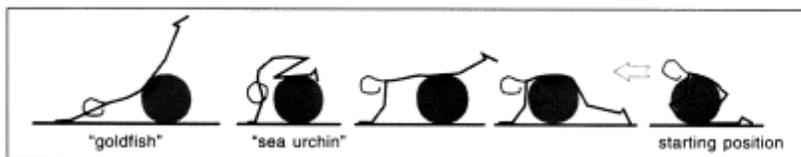


Figure 11: Roll out and back. Advanced level: roll out and back using single leg on ball.

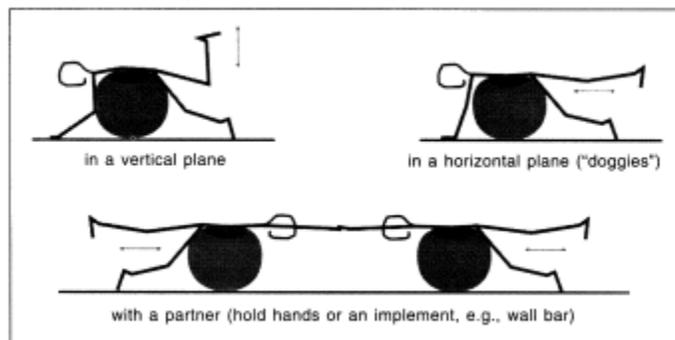


Figure 12: Back leg extension.

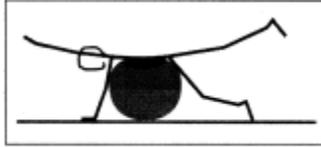


Figure 13: Arm and leg raises  
(up front, to side).

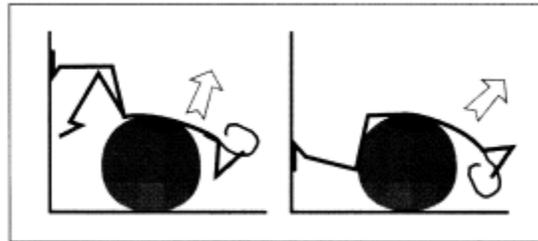


Figure 14:  
Crunches  
and back  
extensions  
with feet on  
wall.

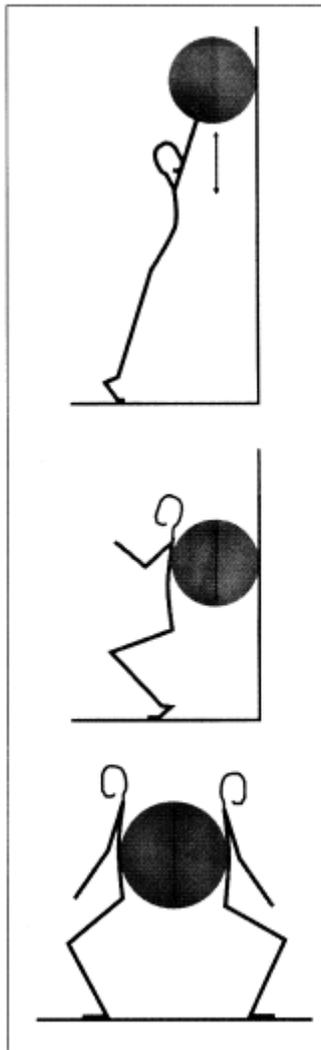
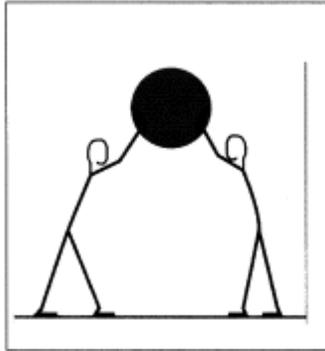


Figure 15: Rolling the ball up  
and down against a wall.



**Figure 16: Pushing against partner.**

- variations in leg base (parallel, stride),
- balancing and stretching.

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