EHF Competence Academy & Network

2016 EHF "Rinck" Convention
Open Master Coach and Licensing Course
1st module

14 – 17 January 2016 in Krakow / POL

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CORE TRAINING

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video

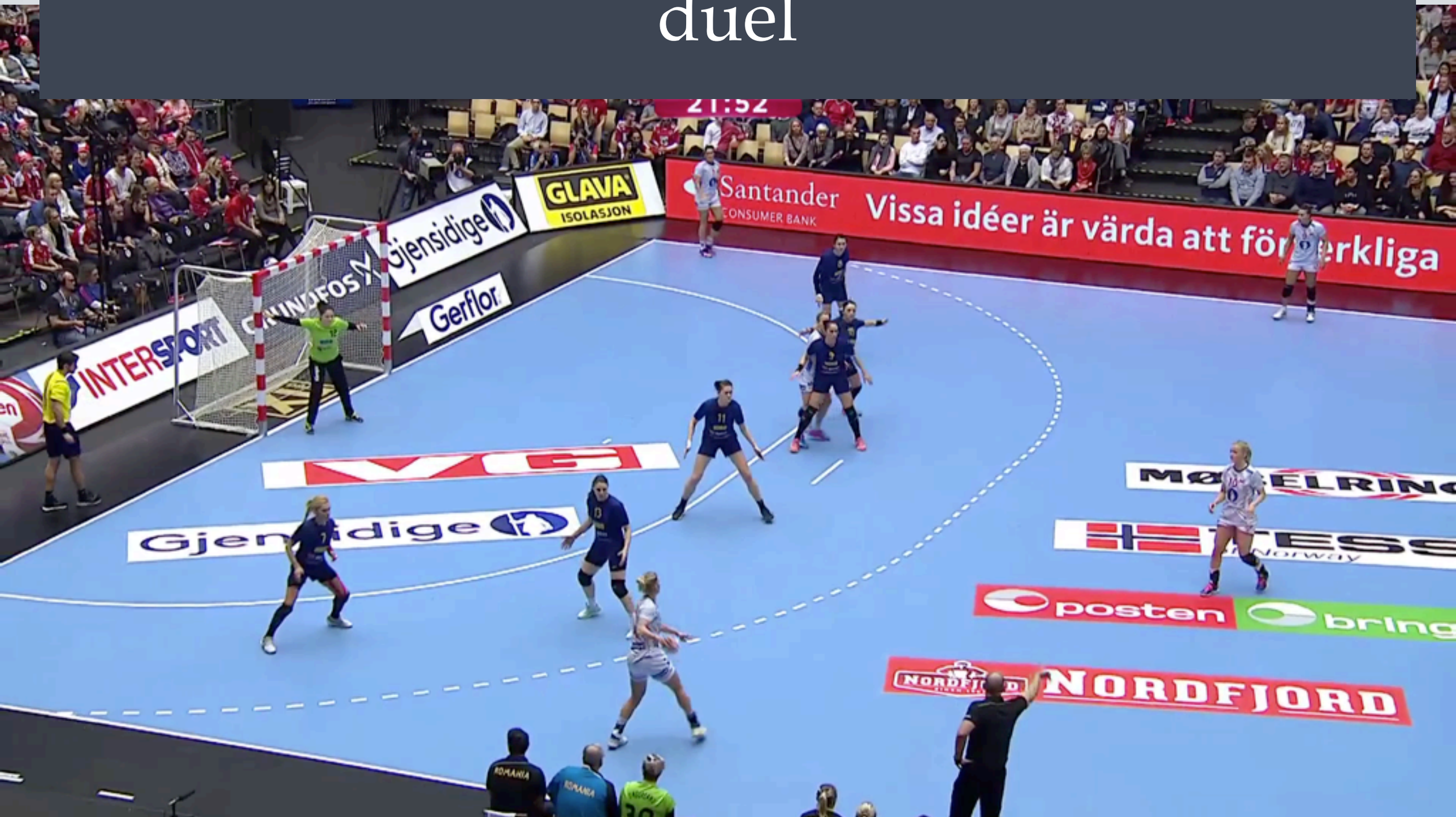
handball spec situation / Core

handball spec situation and Core

duel

handball spec situation and Core

duel



handball spec situation and Core

long step shot

handball spec situation and Core

one on one / shot

game's evolution

Research and notational analysis of international games:
- clearly indicates that handball players perform a large number of high intensity actions during a game.
- those actions are characterised by:
  - accelerations and decelerations in various directions (including cutting movem jumps and landing activities.
  - can be repeated more than 100 times during the course of one game.

For this reason, it is important to consider the strength requirements of these typical movement patterns in order to define the most appropriate approach to implement a successful specific core training program strength training programme.

Furthermore, due to the fact that physical contact is allowed within the rules of the game, strength requirements are quite high in order to sustain the physicality of the game and the high risk of injury as observed during the London 2012 Olympic Games.

VIDEO GK

Focus on Goalkeepers

- goalkeepers perform a lot of quick and short movements in the goal to perform saves.
Such movements are mostly performed from static positions and require explosive actions generated by the lower limbs with a good specific balance.

Goalkeepers typically perform 14 to 17 saves per game at international level.

Considering that the typical shot can be faster than 100 km/hour, it is clear that quickness combined with anticipatory skills are necessary physical attributes needed to excel at the elite level.

- high level of speed reaction and coordination/agility
- specific balance/imbalance and speed movement

handball spec situation

Fast break / long shot

Jump shots

Jump shots are the most used shooting technique by handball players (more than 70% of the shots are performed while jumping)

- are performed with a run-in, planting of the foot and take off, usually on the opposite leg to the throwing arm (while some players at times will perform jump shots taking off with both lower limbs and/or jumping on the leg on the same side of the shooting arm).

Ground reaction forces measured in handball players performing one leg take off after a run-in have shown values larger than 3× the player's body mass with ground contact times shorter than 300 milliseconds.

This means that muscles of the lower limbs are required to produce large contractile forces in a relatively short period of time in order to facilitate longer fly times.

VIDEO

« core »

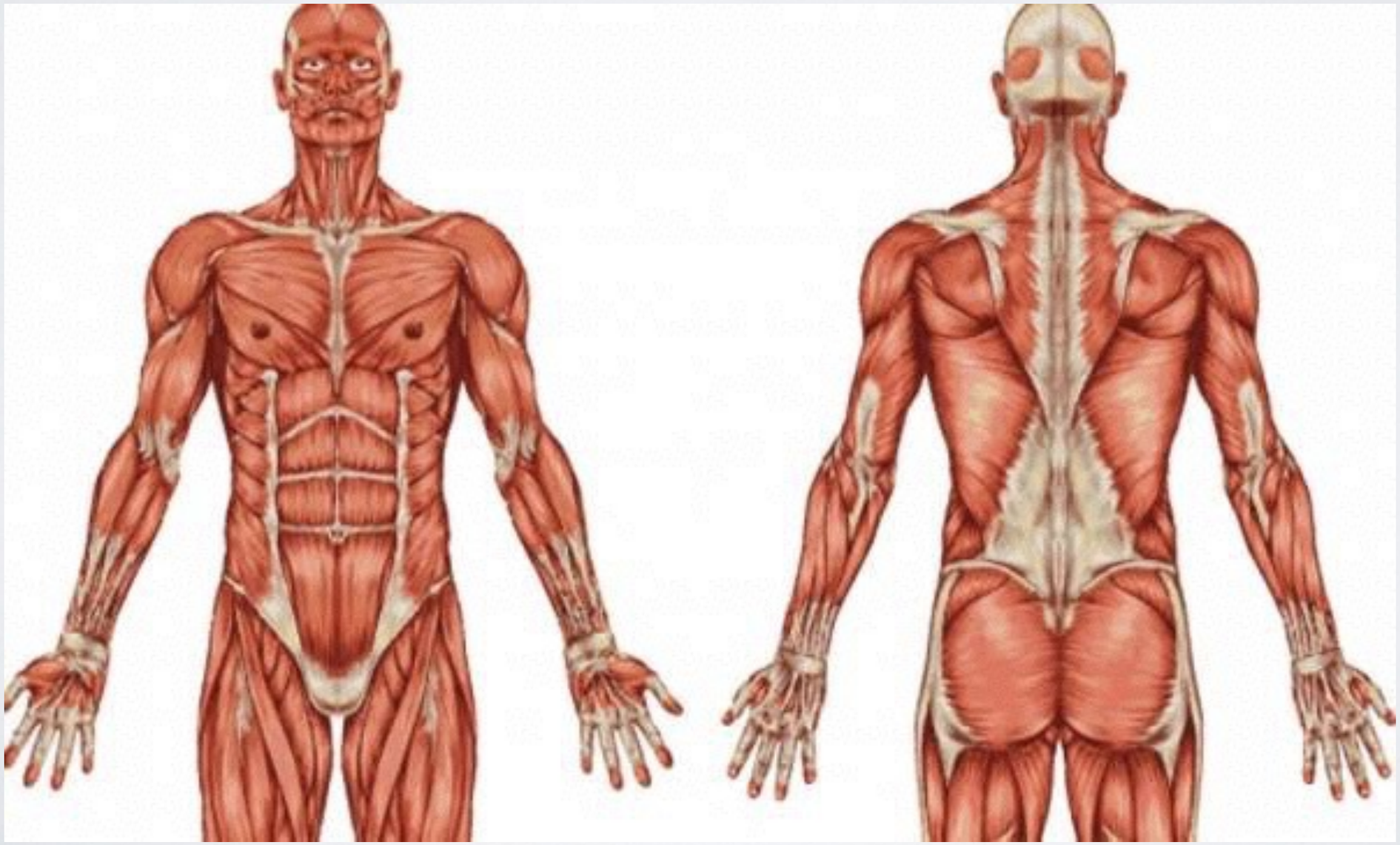
- term used usually to describe just about everything on your body that isn't your legs and arms.

- the core: glutes, hips, abdominal muscles, inner abdominal muscles, pelvic floor, and scapula.

- Your core is where your power is generated in order to carry out any movement. While abdominal and inner abdominal muscles do play a large roll in core stability, they don't make up the core all by themselves.

core

Our core has three-dimensional depth and functional movement in all three planes of motion. Many of the muscles are hidden beneath the exterior musculature people typically train.
The deeper muscles include the transverse abdominals, diaphragm, pelvic floor, and many other deeper muscles.



abdominal and inner abdominal muscles do play a large roll in core stability

Core Training

- control the balance in different situations, intensity, rythm, directions…

- optimal efficiency of movement

- less dysfunctions on high speed situations and therefore with high physical tension.

- optimal use of neuromuscular resources

- resources to be able to reach positions, angles, biomechanically advantageous

an « outdate » mistake

- A mistake many people make is **to think of their core as only being their abs,** and because of this, they go about training their core in **many ineffective ways.**

- Traditional ab exercises like crunches and sit ups are often used in hopes of achieving a stronger core and more defined abdominals, but this is not a good method.

- Not only does performing endless crunches and sit ups not strengthen your core or give you more defined abs, it can be hazardous to your spine.

core stability

We must look at core strength as the ability to produce force with respect to core stability, which is the ability to control the force we produce.

five different components of core stability: strength, endurance, flexibility, motor control, and function

It is important
- to first achieve core stability to protect the spine and surrounding musculature from injury in static and then dynamic movements.
-second, to effectively and efficiently transfer and produce force during dynamic movements while maintaining core stability.

Research has shown that athletes with higher core stability have a lower risk of injury.

Your core most often acts as a stabilizer and force transfer center rather than a prime mover.

Yet consistently people focus on training their core as a prime mover and in isolation.
This would be doing crunches or back extensions versus functional movements like deadlifts, overhead squats, and pushups, among **many other functional closed chain exercises.**

By training that way, not only you are missing out on a major function of the core, but also better strength gains, more efficient movement.

The main function of the abdominals is to support the spine and prevent it from spinning all the way around, breaking over backward, or flexing to the side. The crunching movement is a secondary function.

core stability : muscles need to work together as a team.

- In order to train the core effectively, we need to train all the muscles involved, starting slowly and building a foundation.

- **Think of developing your core stability** as building the concrete base for your home. This base provides structure and safety. It also cannot be rushed or overlooked.

- The same can be said for your body when it comes to developing your core.

basic exercise: plank position

planks or side planks

- The plank and side plank evaluate static core strength, while the knees to chest and toes to bar evaluate dynamic core strength.

- Most people are familiar with basic core exercises such as planks or side planks.

- those are two excellent core exercises for beginners.

- but need spec. adaptation /handball.

prevention

Strengthening **the lower limbs** is also important for injury prevention purposes.

- a training programme **combining strength training, proprioceptive training, jumping and landing exercises** can be effective in reducing injuries

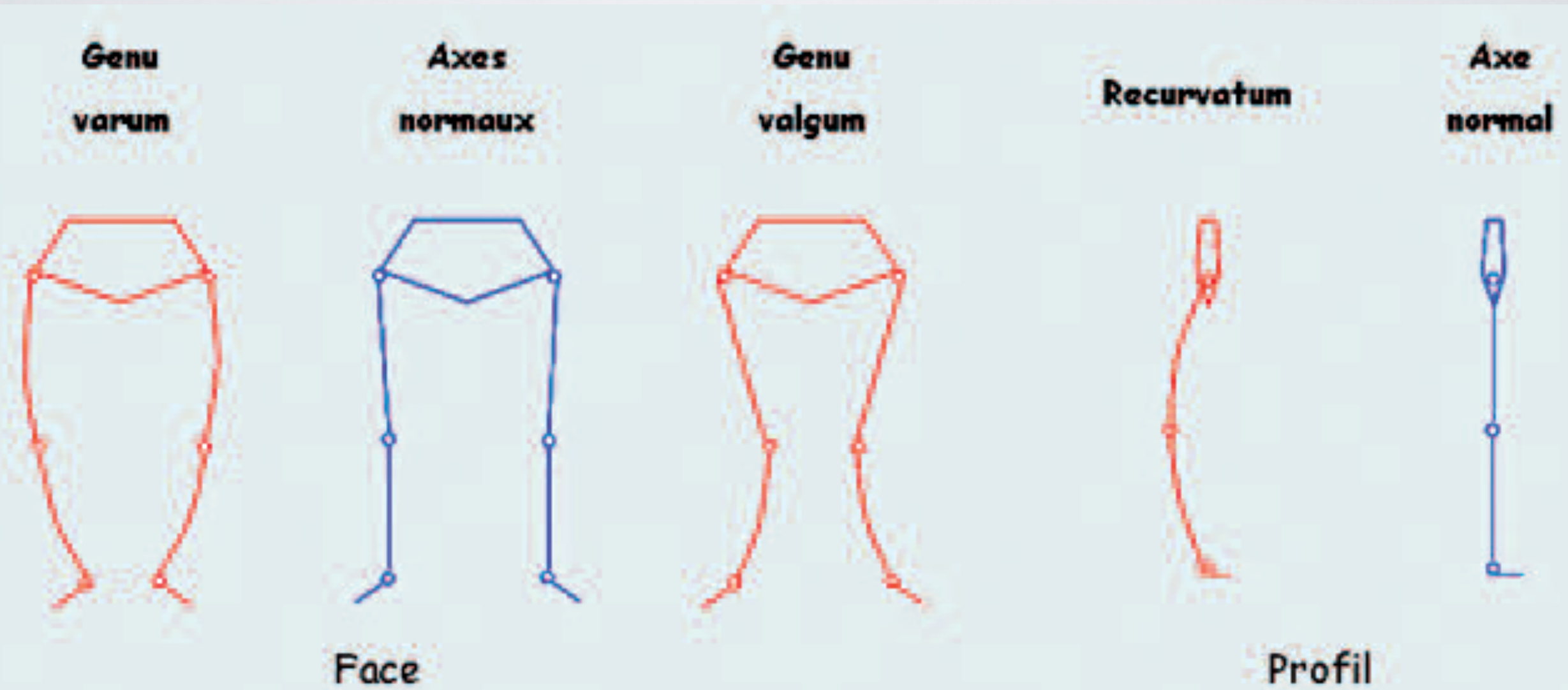
Core training plans designed with this approach have been shown previously to reduce the risks of injuries

- players should be able to perform rapid decelerations and accelerations in every direction with an appropriate movement pattern and control of the ankle and knee joint in order to reduce the chances of an injury.

Main deficiencies of the lower limbs' axis

red : deficiency

blue: normal



change of directions, rythm

Core training programmes should then be designed to include exercises with one and two limbs, landing and deceleration drills, generic proprioceptive-type of exercise on stable and unstable surfaces and eccentric and plyometric drills in various directions.

- Strengthening the lower limbs is in fact not only important for vertical jumps and jump shots but also to prepare the players to perform the rapid changes of directions and cutting movements.

High levels of strength are required to decelerate and then accelerate in another direction.

Balance and Coordination

Balance: the ability to control the center of gravity over the base of support in a given sensory environment.

Coordination: the ability to perform controlled movements (optimal interaction of muscle function).

Agility is the combination of coordination and speed
- allows the ability to perform activities that require a rapid change in movement or direction.

Coordination and agility are tied closely to balance.

Components of Balance Maintenance

Postural strategies – for a better standing balance

1- **Ankle strategy**: ankle flexor/extensor muscles are activated to counter anterior and posterior sway

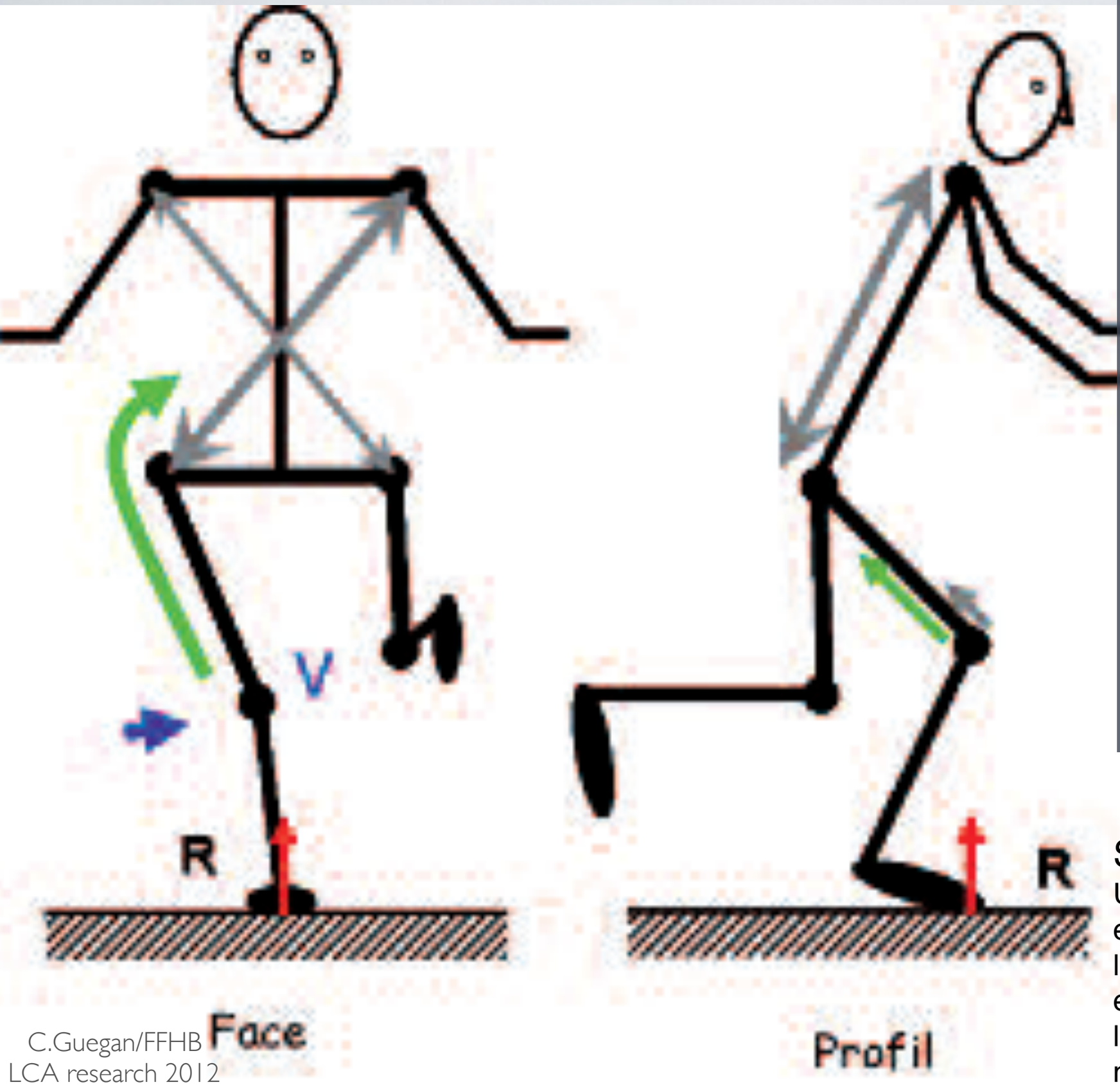
2- **Hip strategy** : hip flexion and extension used to redistribute C.O.G within the B.O.S.

3- **Stepping strategy**: taking a step to widen the B.O.S and create a new sway boundary

4- **Protective reactions** include the above strategies for standing balance and use of upper extremities for sitting balance

5- **Balance's reactions** include head/trunk postural movements in sitting and standing

Landing after jump-shot -pass…



C.Guegan/FFHB
LCA research 2012

knee flexed position, hip flexed and shoulder vertical/ knee and /forefoot allow an effective action hamstring and limiting the anterior tibial translation in the sprain mechanism.

Schéma 1. Réception après tir
Une position genou fléchi, hanche fléchie et l'épaule à la verticale du genou et de l'avant du pied permettent une action plus efficace des ischio-jambiers limitant ainsi la translation antérieure du tibia dans le mécanisme d'entorse.

duel one on one

The distance between steps: the feet too "inside or outside"
upper body movements (side, rotation, trunk's flexion / extension)
increase the constraint valgus (V) in the knee, exposing it with an
increased risk of sprain.

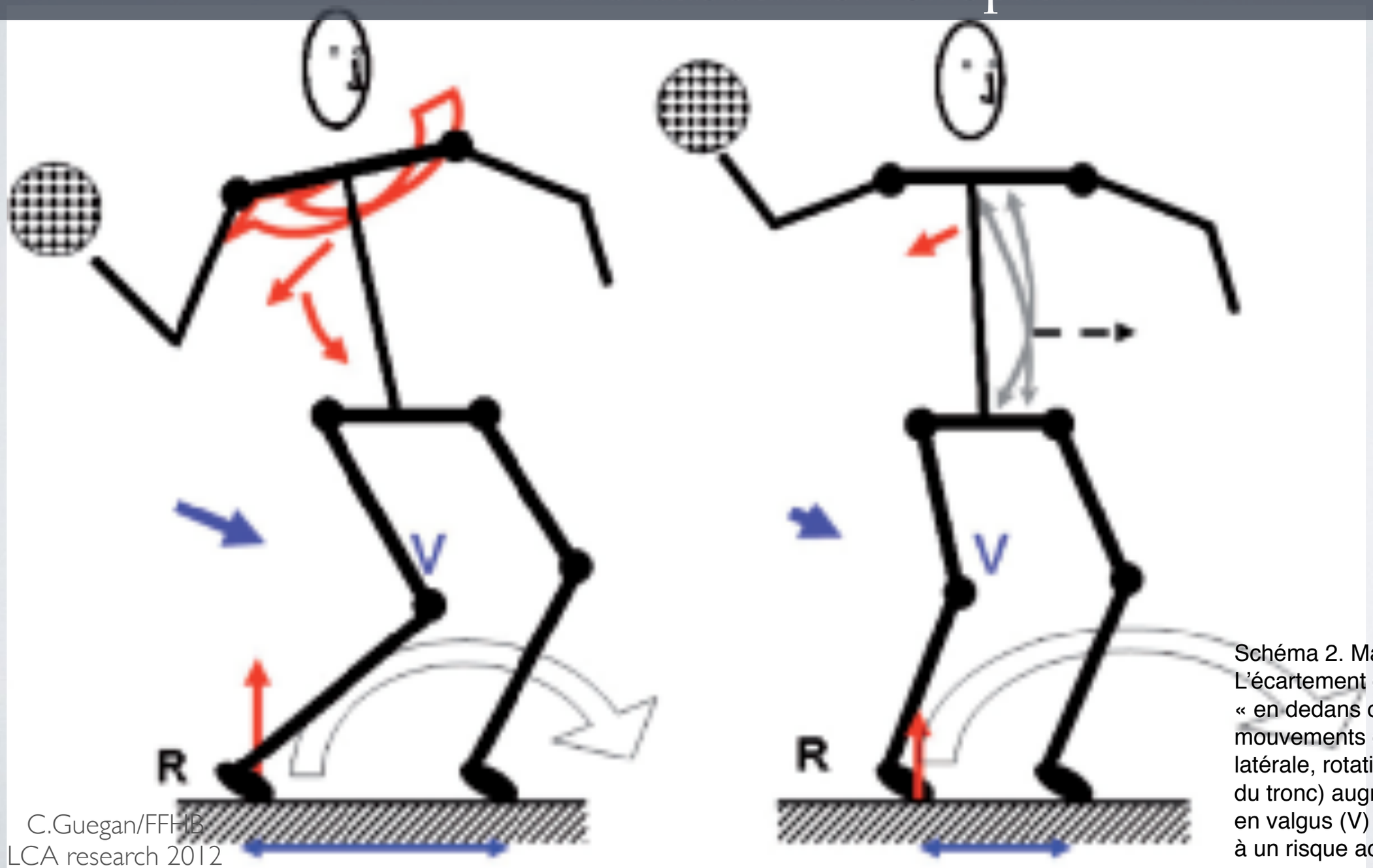


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Schéma 2. Manoeuvre de débordement. L'écartement des appuis, les pieds trop « en dedans ou en dehors », les mouvements du haut de corps (inclinaison latérale, rotation, flexion / extension du tronc) augmentent les contraintes en valgus (V) dans le genou, l'exposant à un risque accru d'entorse.

evolution

Greater core stability may benefit sports performance by providing a foundation for greater force production in the upper and lower extremities.

Traditional resistance exercises have been modified to emphasize core stability.

Such modifications **have included performing exercises:**

- on unstable rather than stable surfaces
- while standing rather than seated,
- with free weights rather than machines
- unilaterally rather than bilaterally.

SPEC. UPPER BODY CORE TRAINING

Upper body core training is essential for two main reasons:

1. throwing speed and reduction of the risks of the throwing shoulder's injury
2. ability to perform effective defensive interventions.

- Significant imbalances in shoulder muscles have, in fact, been shown in handball players as a consequence of their normal handball training and such imbalances presen a larger risk of injury.
- Therefore, the suggestion is to strengthen the shoulder and make sure that appropriate conditioning is in place before overloading it.

Schéma 3, Figure 2 : placement du bras armé
L'armé en position correcte est "omoplate et bras alignés" (b). Notez la zone de fragilité antérieure en cas de défaut technique.

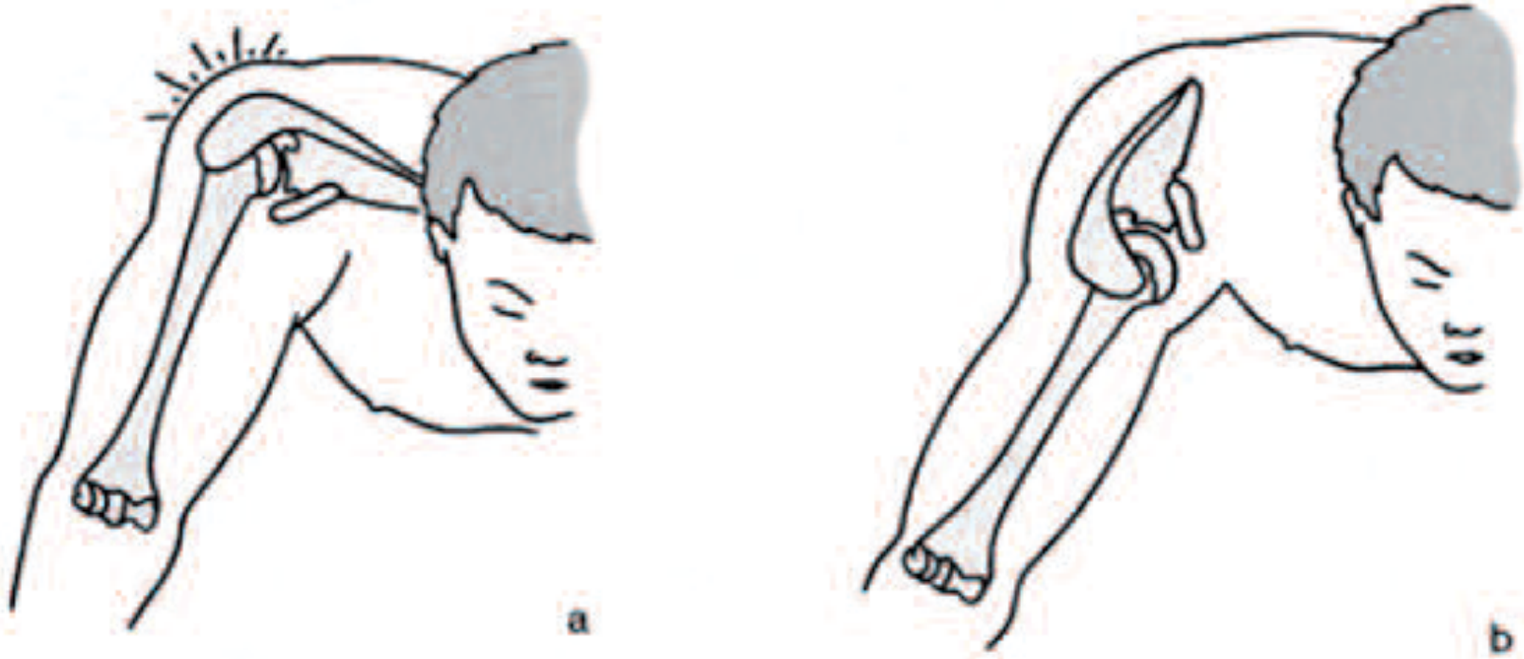


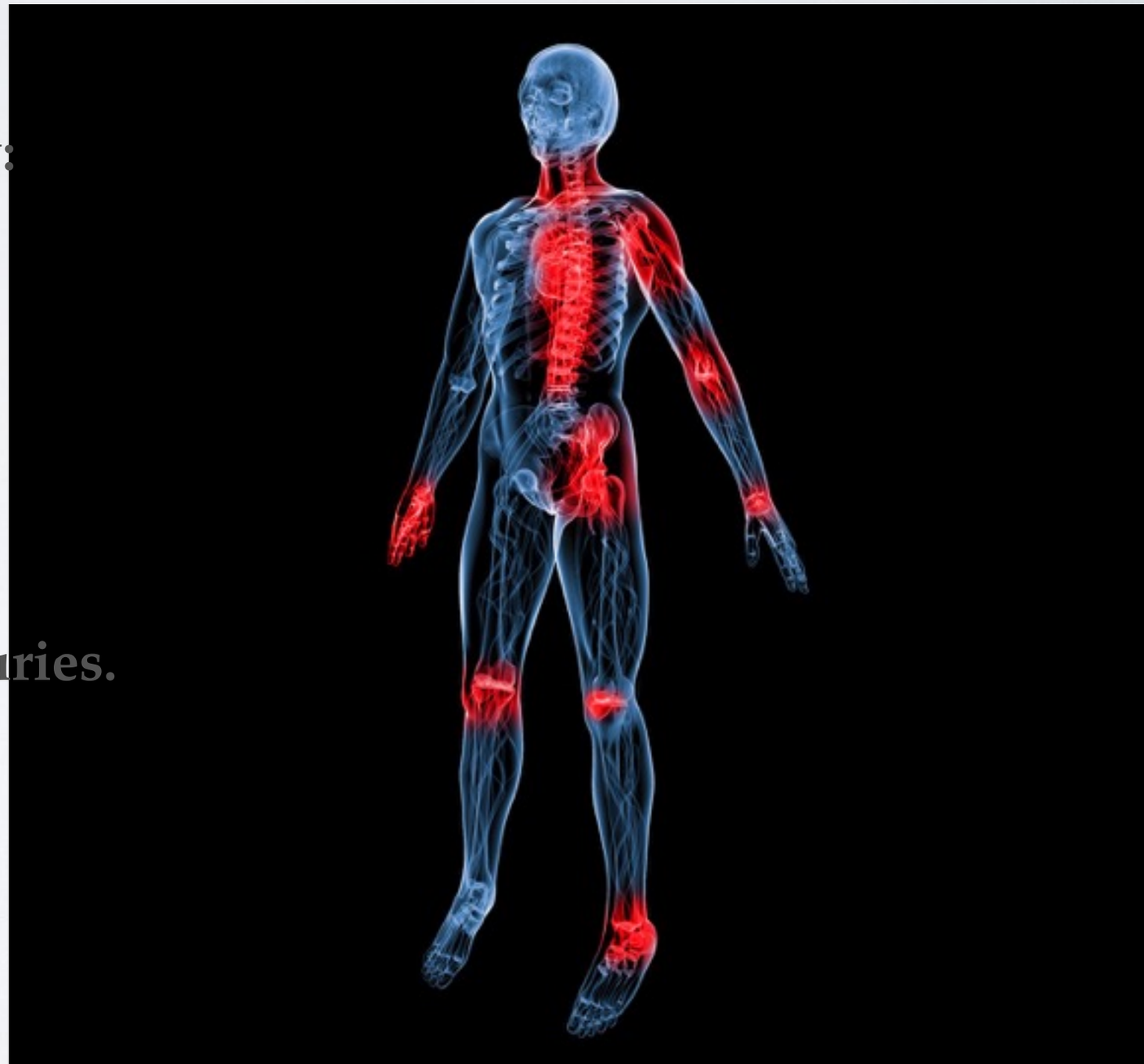
Schéma 3, Figure 1 : placement du bras défense
Le placement correct de l'épaule est vers l'avant "omoplate et bras aligné" (b). En cas de défaut de placement dans le duel défensif, la zone de fragilité est postérieure.

Functional evaluation

Functional evaluation of the movement:
an necessary approach used to evaluate
the quality of the basics movements, and
reduce the risk of injury.

This evaluation allows to identify:
- weaknesses
- asymmetries
- imbalances
- limitations and restrictions

If those problems persist,
it obviously favors the risk of injuries.



VIDEO