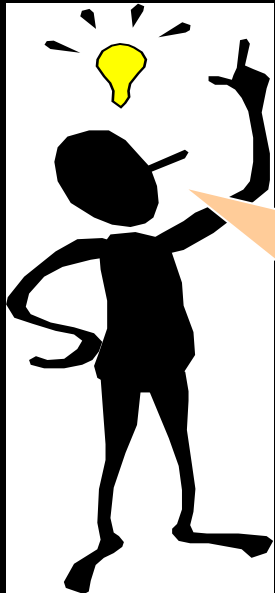




Lutz Landgraf
Diploma-Sports-Teacher and A-License-Coach since 1969
Sports-Scientist (University of Leipzig)
u.a.: EHF-Lecturer, DHB-Lecturer,
Coach of the military national team, since 1971 training-
coach of many National- and Bundesliga players (Stiebler,
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There is no philosopher's stone for
a successful handball game and
optimal training!

I would like to present new
knowledge coupled with experience
from a successful individual training
for almost 50 years.



Handball
Innovationen
Lutz Landgraf

**Games are decided
in the head
and by reactive
agility**



**Regardless of technique,
tactic, and fitness,
an athlete lacks
pronounced reactive
mobility,
he never perform to their
full ability.**



**A successful, individual, and
cooperative performance
requires faster as well as
more accurate
perception, decision-
making, and action.**

**The future of
handball**



„In the future, we should
focus on improving cognitive
Skills“ (Groß, 2013).

Our conclusions for the training:

... as well as analyzing and
training all factors of speed of
action



It is crucial, that the player in possession of the ball **is a scoring threat at any time.**



Before catching the ball, the player should:

- analyze the game situation
- optimize the timing for the in run
- decide on the most effective way to proceed with the game

While catching the ball, the player has 1 – 2 seconds to:

- analyse the changes in situation (especially the personal opponent)
- decide on the most effective way to proceed with the game
- to solve the game situation as fast as possible

... this is how fast a player needs to
perceive, decide, act:



Definition reactive agility (modified according to Bauer 1990, Weineck 1992)

Ability to react as fast as possible in a game situation including complex cognitive, techno-tactical, and conditional requirements.

Considering the high significance of the cognitive components, we are concerned with a **creative reactive agility**.



**Cognitive component
(information intake,
processing, and retention)**

Tactic

Mental abilities

Technical skills

Motoric components

Fitness

Coordination skills

**Muscular factors
(muscular balance)**

**Energetic factors
(diet appropriate for
athletes)**

**intra- and intermuscular
coordination**

**Reactive
Agility**



On the significance of the cognitive component



Wolfgang Friedrich 2005 in Optimales Sportwissen, Spitta-Verlag:

„Mental agility accounts for 70 to 80% of the time required for solving techno-tactical tasks. Mental agility can be improved first and foremost by training information intake and processing.“

Helmut Groß in 2013 on the future of football:

„In the future, we should focus on improving cognitive skills [of the players].“

Joachim Löw on the issue of a lack of speed in the game:

„It has nothing to do with the basic speed of individual players but with mental agility. That's the key.“

Cognitive components **(information intake, processing, and retention)**

Perception (speed, quality)
Process of vision (peripheral vision, neuroplasticity, visual attention)

Knowledge
of the situation, the course of movement, the focus for observation
Pattern recognition
Process of information acquisition, processing and assurance

Anticipation

Decision making (speed, quality)

Reaction

Triggering action: Bounce and following cross over-step to the left (right-handed thrower)



Times for each action:

Catch → Bounce:

0,43 s

Secure ball → jump in:

0,24 s

Jump in → step 1:

0,10 s

Step 1 → step 2 :

0,51 s



Triggering action stand in and following crossover step to right right-handed-thrower



Times for each action:

Catch → Bounce: 0,10 s

Bounce → secure ball: 1,34 s

Secure ball → step 1: 0,10 s

Step 1 → shift of centre of gravity: 0,27 s

Shift of centre of gravity → step 2 (crossover): 0,29 s

Neglected (?!):

The training concept of individualization:

All Attack and Defense actions begin and end in a **one-to-one situation** between an offensive player and a defensive player.

? Is this fact reflected within the training processes?

■ Are individual and team tactical training balanced?



Neglected (?!):The training concept of individualization:

Within a team there exist pronounced individual differences between the players (in all age groups on all levels),
among others regarding physical, athletical constitution, development of skills and abilities, characteristics of personality, learning behaviour and psychomotoric parameters.



Neglected (?!): The training concept of individualization:

To achieve an effective behaviour in the game, it is necessary to recognize, **analyz, and improve ideal individual executions of movement and actions.**

A player should be able act in order to maximize the probability of success depending on their situational constitution.

Neglected (?!): The training concept of individualization:

The personalized and individualized training is the deciding factor for a goal orientated performance build-up and successful behaviour in the game – it is the alternative solution to conventional team training.

A successful individual training **requires control instances which objectivize and document the performance development in addition to securing an effective communication of the training content.**



Successful execution of movement is individual!

For example attack-player **Step 2 during change of direction** in one-one

Cross-Over-Step



or



Side-Step with foot change



The **individual technique choice** is **determined** by the speed and the space gain in the second step as well as the success in the single game.

The most effective way to optimize this is using **visual monitoring**.



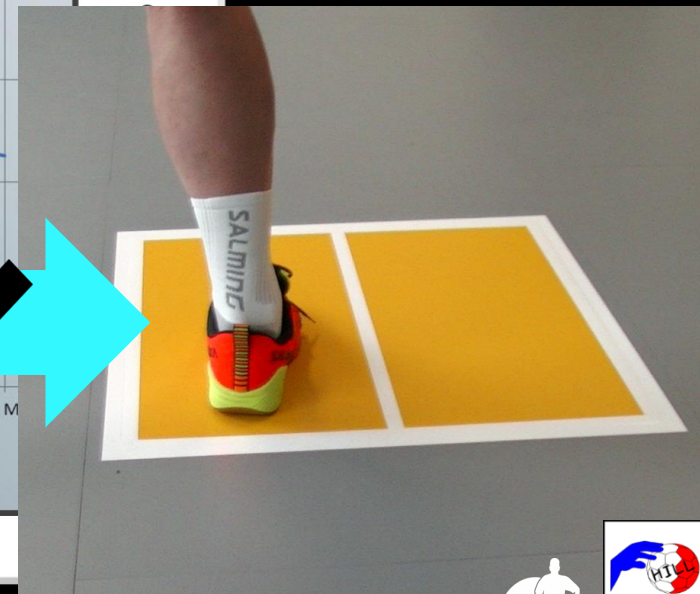
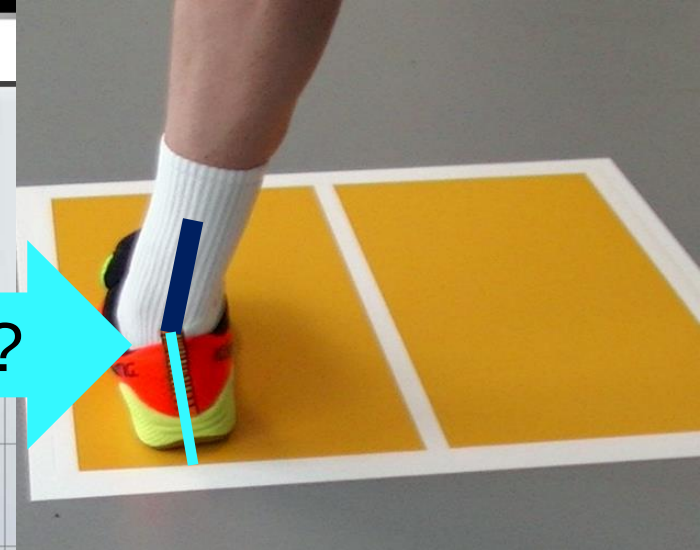
SpeedCourt® – 30 % improvement in performance of ground contact

development of the overall time for a specific test
of change of direction



improvement in quality of
ground contact

???



SpeedCourt® – 30 % improvement in performance of ground contact



improvement in quality of ground contact



Throw is accomplished by step2

left-handed thrower



Times for each action:

Catch → step 1 incl.
throwing position: 0,57 s

Throwing position →
throw: 0,12 s

Throw → Score 0,37 s

Triggering action: Throw and following crossover- step to right
(left-handed thrower)



Times for each action:

Catch → step 1 incl.
throwing position: 0,37 s

Throwing position →
step 2 (crossover-step):
0,36 s

The successful solution of a game situation is decided in hundredths of a second!



All contributing components of **Reactive agility** can be trained and measured, development is detectable!



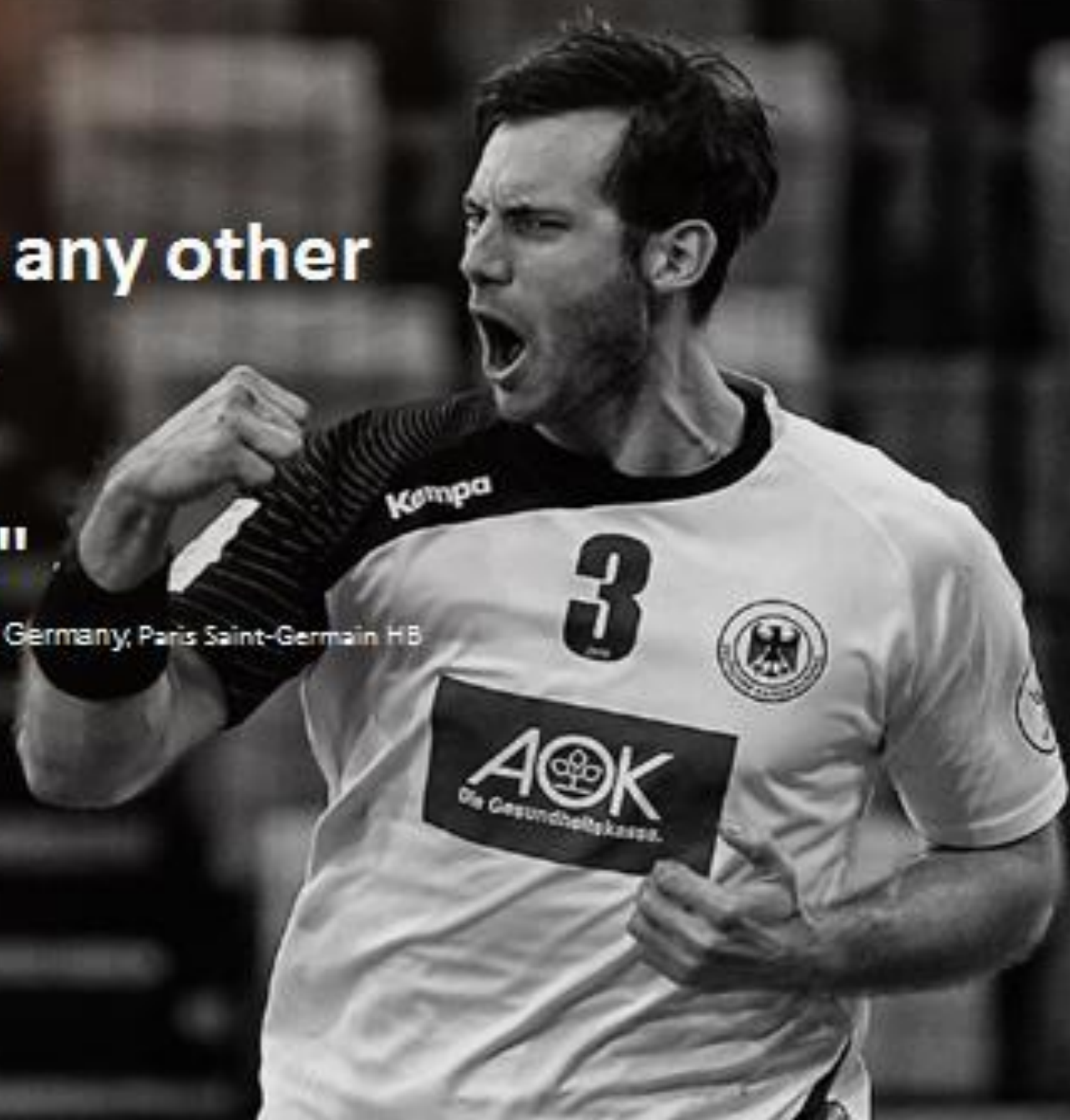
This requires:

- **Specific measured methods**
- Individual, systematic training and planning

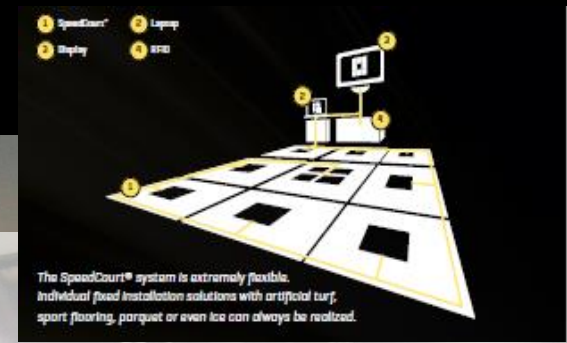
Ideal with the High-Tech system
Speed-Court

**"I don't know any other
system which
trains speed
as holistically"**

UWE GENSHEIMER, Nationalspieler Germany, Paris Saint-Germain HB



The SpeedCourt®



2. Monitor

- Displays task
- Immediate presentation of results
- Immediate ranking

1. Notebook / PC (Complete Touch Display)

- Preplanned tasks
- Creative programming

4. Control module (RFID)

3. SpeedCourt with integrated contact panels

- Different sizes (4x4 m, 5,5x5,5 m, 7x7 m)
- Different preplanned tasks and creative programming



Speed Court[®] in action



Speed Court® in action



The SpeedCourt® improves:

- + all cognitive components, explicitly:
- + perception and spatial awareness
- + information processing and adaption
- + decision-making processes under pressure
- + responsiveness
- + coordinative skills
- + REALSPEED



Features of SpeedCourt® structure:

- + exact to $\frac{1}{1000}$ of a second
- + automatic RFID identification of athletes
- + direct result via tablet or computer
- + creation of programs possible for user
- + defined and randomised runs
- + SpeedCheck and long term evaluation
- + individually or in groups

Athlete Profiling – objective performance analysis

transparent data

- motivate the athlete
- are necessary for documenting development
- are basis for team assessment
- **are basis for efficient training planning**



Team Profiling - Ranking

extraordinary

very good

good

average

below average

	Athlet	Pkt Ø	Punkte*
1		3,000	33
2		2,750	33
3		2,692	35
		2,692	35
5		2,615	34
		2,615	34
7		2,583	31
8		2,462	32
		2,385	31
10		2,308	30
11		2,250	27
12		2,231	29
13		1,917	23
14		1,846	24
15		1,769	23
		1,769	23
17		1,538	20
18		1,077	14
19		1,000	13

Team average
2,18



Team Profiling - Quality



extraordinary

very good

good

average

below average

Athlet	Pkt*	Pkt Ø	eFS	eR	WR 3m	eS	eSH	WS 1	WS 2	ES 1	ES 2	AS	HS ko1	HS ko2	WZ Ø
	13	1,000	14.912	0,670	00,727	13.697	5.508	26.865	5,50	0,599	29.102	21.087	11,3	15,1	0,3498
	31	2,583	18.905	1,060	00,749	35.732	4.994	19.309	***	0,406	26.927	14.423	6,0	5,9	0,339
	23	1,769	11.438	0,631	00,750	13.248	5.018	21.052	6,50	0,479	31.791	16.342	10,5	6,3	0,3024
	35	2,692	16.667	0,734	0,838	15.381	5.157	20.399	5,04	0,263	29.981	15.508	5,1	5,2	0,254
Average points Reaction 0,9	23	1,917	17.518		00,812	15.094	8.125	18.419	6,56	0,220	31.731	19.180	5,4	11,1	0,3834
	14	1,077	11.852	0,735	00,902	16.326	11.429	21.260	5,34	0,511	26.995	15.986	7,1	11,3	0,3984
	34	2,615	16.136	0,905	00,724	13.879	5.125	19.218	8,23	0,201	26.536	16.637	5,5	5,2	0,3632
	30	2,308	22.792	0,632	00,803	13.763	4.795	18.497	6,92	0,254	34.128	16.957	7,9	11,3	0,3196
	33	3,000	12.795		00,910	25.705	4.878	18.391	***	0,132	26.315	15.663	5,5	5,7	0,253
	35	2,692	13.502	0,554	00,712	17.933	4.748	16.490	1,25	0,570	24.989	17.340	6,2	7,6	0,2958
	33	2,750	17.284		00,783	13.680	8.167	18.327	6,43	0,065	21.936	16.092	7,8	7,3	0,25
	20	1,538	12.745	0,670	01,169	14.314	8.312	16.700	4,28	0,450	27.279	18.071	7,6	8,3	0,2994
	31	2,385	13.853	0,851	00,773	21.459	4.484	20.141	0,39	0,314	27.414	18.243	8,8	5,0	0,3208
	34	2,615	16.017	0,593	00,774	17.487	4.936	19.200	2,19	0,541	33.082	15.956	6,0	6,7	0,2936
	23	1,769	17.054		00,828	17.581	5.421	20.253	2,36	0,335	25.676	16.764	7,5	7,8	0,3304
	32	2,462	14.949	0,777	00,784	12.969	4.315	19.347	4,17	0,501	27.601	16.279	11,8	6,9	0,254
	27	2,250	20.707		00,758	18.121	5.080	21.637	2,33	0,047	26.761	15.109	15,1	8,1	0,352
	29	2,231	18.981	0,600	00,775	15.289	5.547	17.571	4,25	0,104	27.578	16.686	8,6	8,4	0,3518
	24	1,846	15.542	0,904	00,862	13.823	5.115	16.224	6,20	0,342	29.372	13.630	9,2	13,2	0,3614

Individual Profiling - Results



extraordinary

very good

good

average

below average

Information on	Points		Results *		Categories**					Test	Unit
	1	2	1	2	h	sg	g	m	u		
basic frequency	0		11,9		20	17,5	15	12	<12	Tapping	Coeffizient
basic reaction time	0		0,74		0,4	0,45	0,5	0,55	>0,55	Auge-Fuß	Time [s]
perception + start	2		0,902		0,7	0,8	0,9	1,0	>1,0	3m Zufall	Time [s]
basic speed	2		16,3		14	15	16	17	>17	Star Run fest	Time [s]
handball specific speed	0		11,4		4,5	4,8	5,1	5,4	>5,4	Abwehrlauf	Time [s]
perception time 1	0		21,3		15	17	19	21	>21	Speed Chase	Time [s]
perception time 2	2		5,3		1,3	3	4,5	6	>6	Star-Run (S-E)	Difference time S-E
decision time 1	0		0,5		0,1	0,2	0,3	0,4	>0,4	3m (S-E)	Difference time S-E
decision time 2	2		26,99		17	21	25	29	>29	Chase-Colour	Time [s]
speed with anticipation	4		15,99		14	16	18	20	>20	Chase-Next	Time [s]
complex cognitive speed 1	0		7,1		5,0	5,3	5,6	6,0	>6,0	Memory fest	Coeffizient
complex cognitive speed 2	0		11,3		6,0	6,5	7,0	7,5	>7,5	Memory free	Coeffizient
Change of direction Ø	0		0,398		0,2	0,25	0,3	0,35	>0,35	Different Tests	Contact time [s]
Change of direction left			0,30		0,2	0,25	0,3	0,35	>0,35	Different Tests	Contact time [s]
Change of direction right			0,417		0,2	0,25	0,3	0,35	>0,35	Different Tests	Contact time [s]

Sum points	12	
Ø points	0,92	

Focus for training (very good at anticipation):

- Basic handball specific speed plus change of direction
- Perception time
- Complex reactive agility
- Further observation on left-right misbalance of change of direction time

SpeedCourt® used for sport and training by:



Elite Sports Talent support & development Olympic training centres Sport hotels
Sports schools Universities Medicine / Rehabilitation Fitness/Fun



Mobile equipment for Profiling, Studies, and Training

SpeedCourt® References in Football and Science:



Bayer 04 Leverkusen



FC Bayern München



RB Leipzig



Red Bull Salzburg



FC Schalke 04



TSG 1899 Hoffenheim



Football National Team of Hungary



Real Madrid CF



FC Shandong Luneng, China



Eden-Clinic, Rehab-Centre of German FA

SpeedCourt® References in Football and Science:



FIFA Medical Center, Regensburg



FIFA Medical Center, Dubai



Olympic Centre of Stuttgart



Olympic Centre of Heidelberg



Shanghai University of Sport



University of Würzburg, Sports Institute



University of Paderborn, Sports Institute



University of Leipzig, IAT

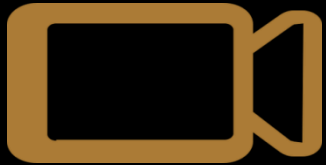


University of Magdeburg, Sports Institute

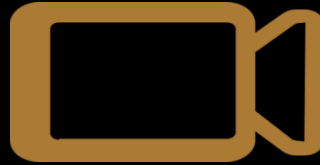


University of Münster, Medical Faculty

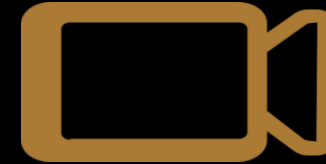
Training examples for training the Speed of action without high-tech



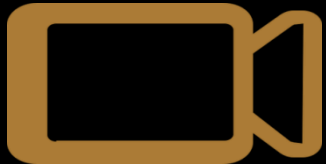
Rope Skipping
„Visitor“



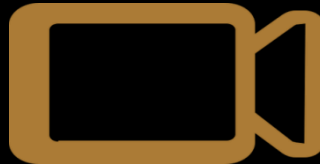
Numbers-
boxes



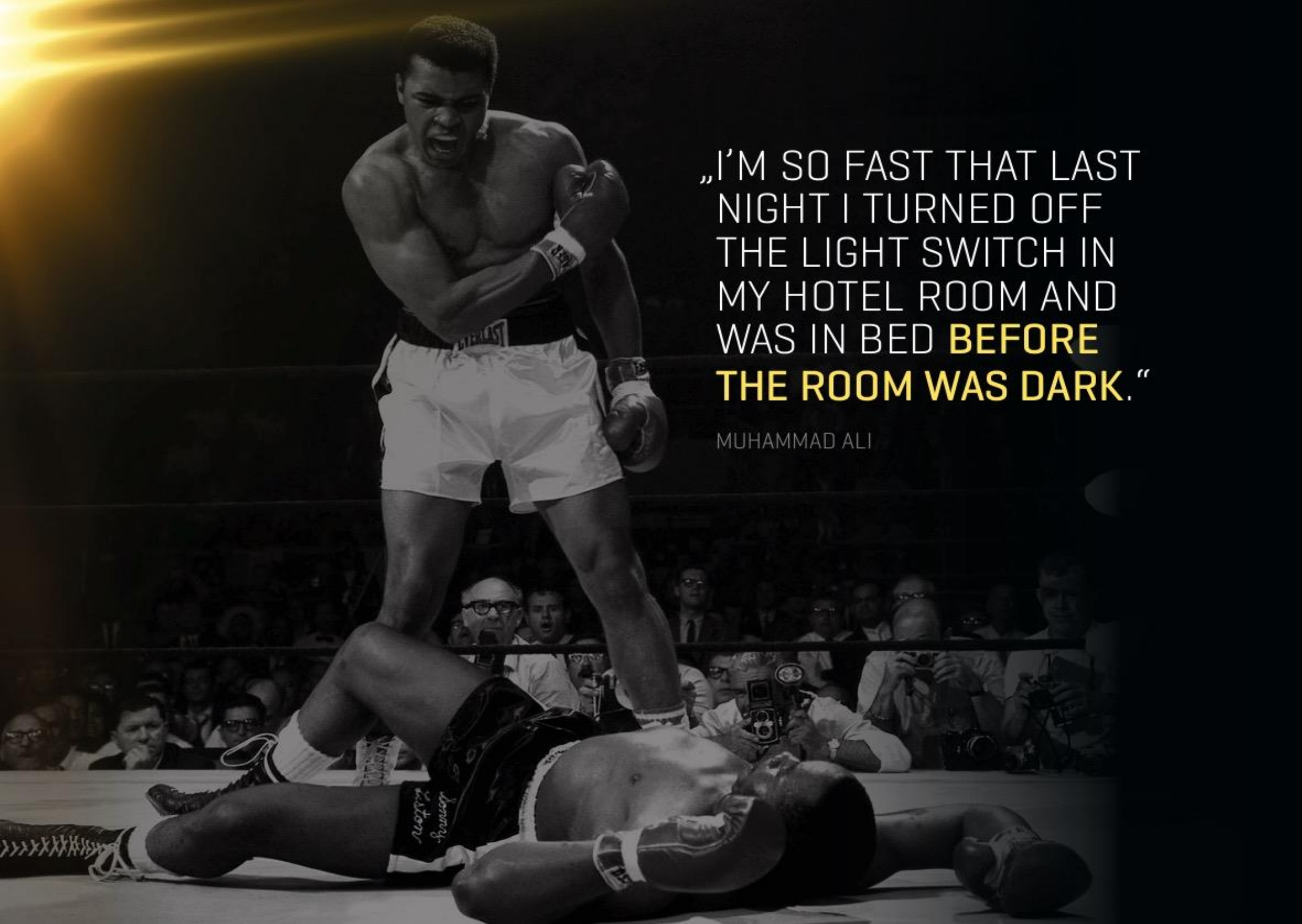
Decision throw
or pass



handball
pyramid



Action Chain 1: 1 Attack
- Play Around

A black and white photograph of Muhammad Ali in a boxing ring. He is standing over a fallen opponent, looking down with a determined expression. The opponent is lying on the canvas, with their head near the bottom center. The background shows a crowd of spectators and photographers with cameras. A bright light source is visible in the top left corner, creating a lens flare effect.

„I'M SO FAST THAT LAST
NIGHT I TURNED OFF
THE LIGHT SWITCH IN
MY HOTEL ROOM AND
WAS IN BED **BEFORE**
THE ROOM WAS DARK.“

MUHAMMAD ALI



Handball
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Sports-Scientist, EHF-Lecturer, DHB-Lecturer

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coach of many National- and Bundesliga players 0049-176-
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**Analyzes, profiles, training
sessions, camps - our service: **also
mobile with the SpeedCourt** at
clubs and associations!**