

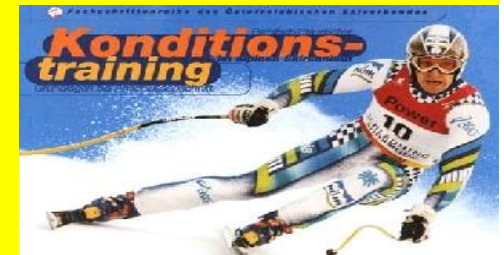
# Physical Training in Alpine Ski Racing

particularly for junior racers

Mag. Arno STAUDACHER

# Aims of physical training

- Increase in performance capacity = aspect of increasing performance
- Maintenance of physical health = preventive aspect

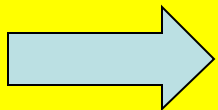


# Increase in performance

There is no relevant correlation between training volume and performance ability.

The training volume can only explain 9% of the differences of performance!

EHRICH/PITSCH 1998



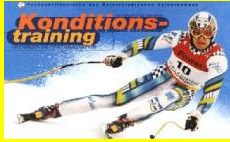
The quality of the training is decisive!



# Central Idea – long-term development

- The building up of the training has to be planned in a long-term way! In the so-called contact training, all skills up to the individual limits must be developed, in order to catch up with the world's best ski racers.
- This is just possible, if the basis is already approached in childhood and adolescence.
- If you have to make up fundamental skills in adolescence, you can lose 1-2 years!





# Everyday Theory

„A good skiing technique can not compensate a bad physical condition!

Rather with today`s ski material a proper technique can only be developed on the basis of good physical qualification!

technical skills

psychological conditions

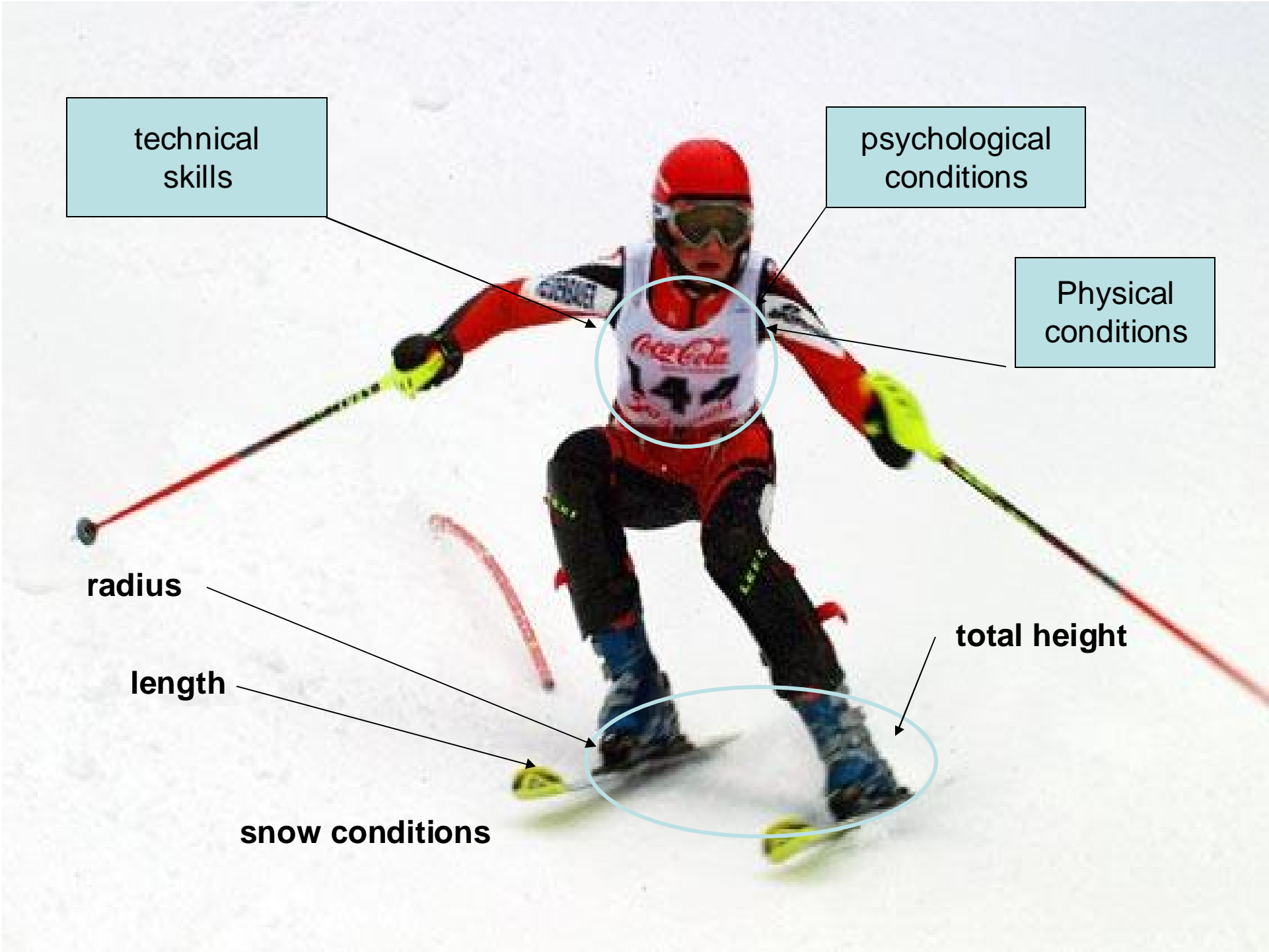
Physical conditions

radius

length

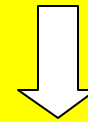
total height

snow conditions



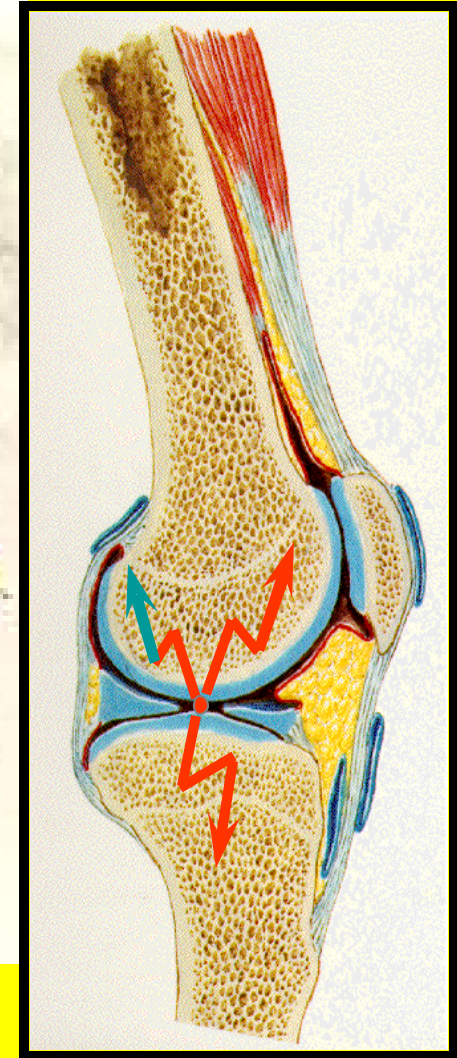


**new  
generation  
of ski racers**



**Higher outer forces**

!!!! STABILITY OF LEG AXIS IN PERIODS OF GROWTH !!!!

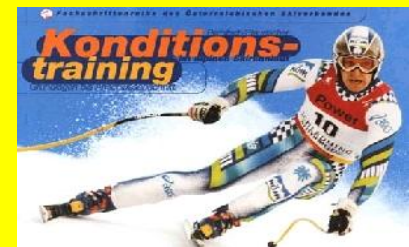


Prophylaxis of injuries ??





# TOTAL BODY STABILITY



# Motorische Fähigkeiten

## Konditionelle Fähigkeiten

Ausdauer

Kraft

Schnelligkeit

Beweglichkeit

## Koordinative Fähigkeiten

Gleichgewicht

Rhythmus

Orientierung

Differenzierung

Reaktion

# Coordinative orientated physical conditioning

- STRENGTH
- SPEED
- BALANCE ABILITY but also with
- ENDURANCE and FLEXIBILITY
- COORDINATION PLAYS A DECISIVE  
ROLE!

# Fundamental Methods

- Variation is the central aim
- Repeat without repetition
- Experience of contrast

# IMPORTANCE OF MOVEMENT COORDINATION

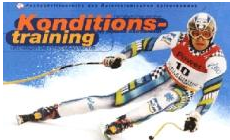
- Improved motor learning ability
- More economical movement – that means sparing metabolism

# **Significance of complex strength**

**Skiing sport is gradually developing to a strength sport because of the strong side cut and the elevating plates. As a result, the requirements in fitness training are changing.**

**A thick thigh is not sufficient for the specific forms of strength required with skiing (such as explosive strength or strength endurance).**

**Furthermore, skiing strains the total body. Therefore, corresponding forms of training must be applied (e.g. basic squats).**

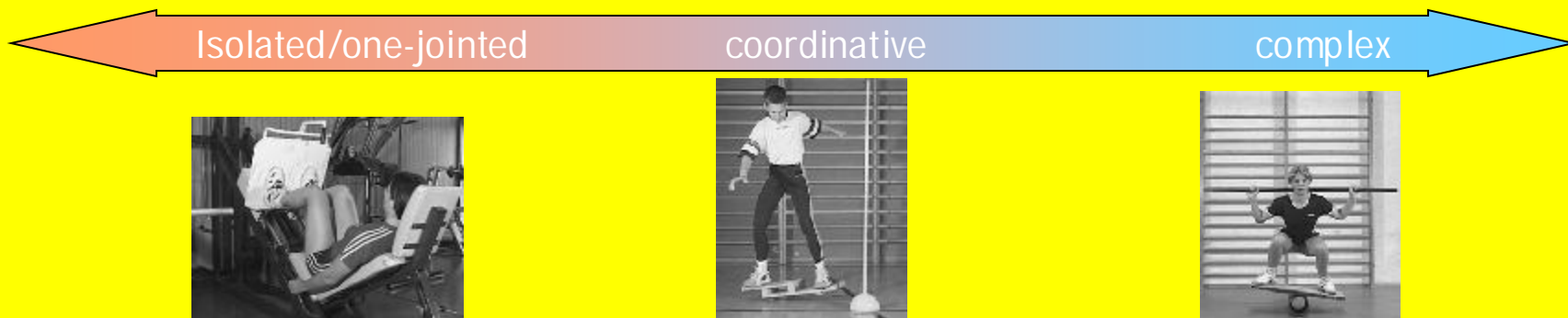


# Central Idea – Complex Strength

## Exercise Complexity



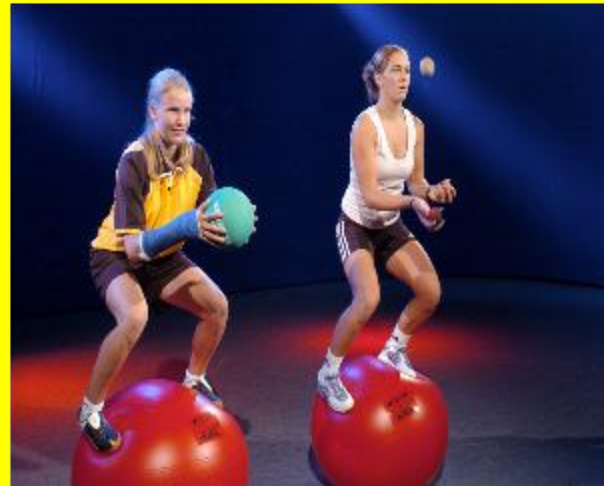
## Coordinative requirements



# Techniques to stabilize the leg axis



hurdles



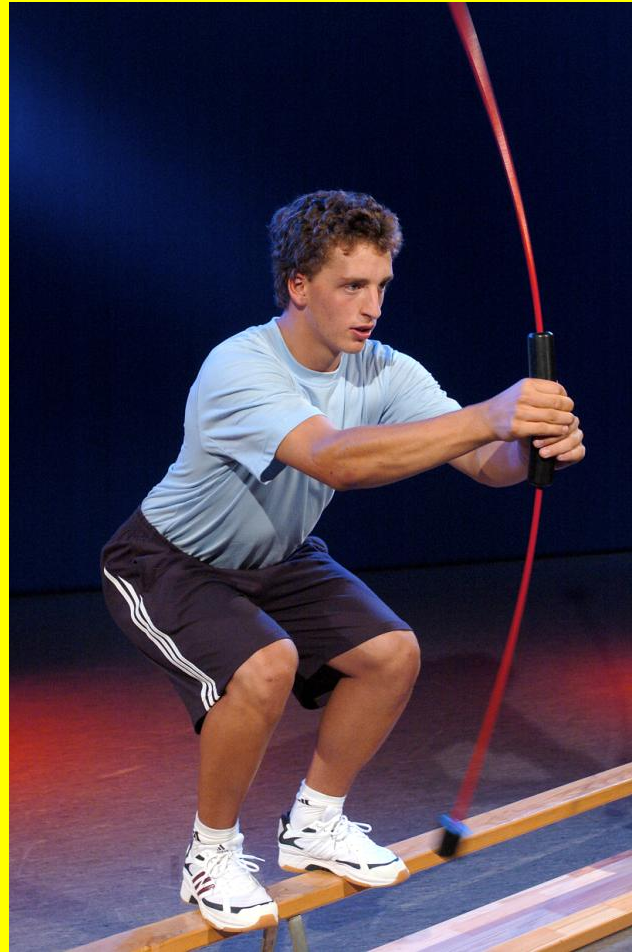
jogging



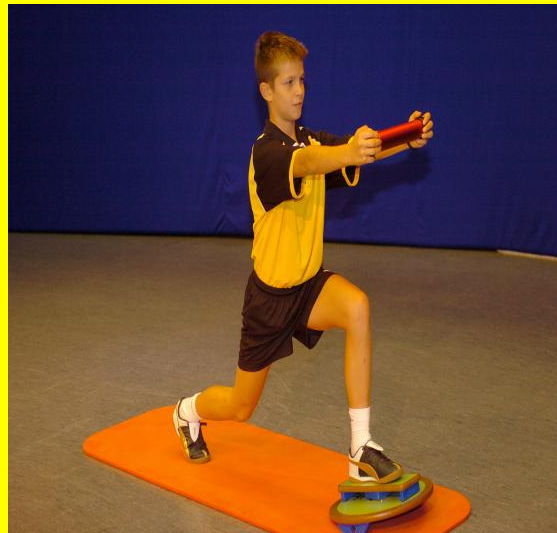
front squat



# FLEXIBAR



# „A step forward“



# Trunk Training



# Prof Dr. Schmidtbleicher – weight training in childhood and adolescence

- Beginning at the age of 8, weight training should be included within competitive sports – however, avoiding supramaximal excentric exercises and jumps with extra-weights.
- Special attention has to be paid to the first puberal phase: weight training during that period of extreme bone-growth may have detrimental effects on the epiphyseal lines.
- After puberty training needs to be adapted to the adult training – gradually.

# **consequences:**

- **Specific exercises are therefore essential for the abdominal as well as back muscles, especially for the primarily stabilising muscles close to the joints.**
- **This is especially important for weight training in childhood and adolescence**
- **Form is decisive!!! (technique)**

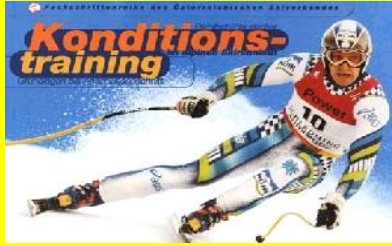


## **Résumé: why is it necessary to train the trunk for skiing?**

- **physiologically: an adequate trunk-training protects against too much strain on the spine**
- **ski-specifically: an adequate trunk-training enables the athlete to transfer forces onto skis**

# Mobility

- Dependent on the mobility in the joint itself and the stretching ability of the muscular system
- Shortened musculature provokes muscular dysbalances and even inflammations



# DEFICIENCIES

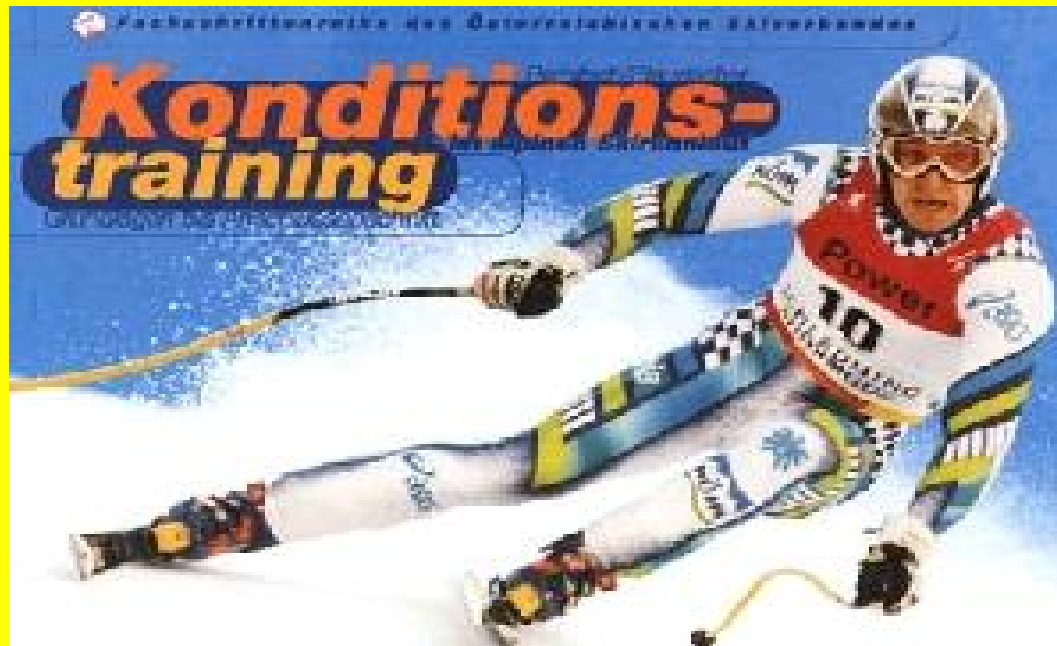
- Strength of the trunk - especially the straight musculature of the back
- Strength training technique: squat and jumping techniques
- gymnastics
- Flexibility – functional muscle tests



# Basic literature

- Pernitsch, Staudacher: „Konditionstraining im alpinen Skirennlauf“
- „Koordinationstraining“ Ski Austria und ÖFB
- „Sportmotorische Testbatterie“ 10-14 Jahre

you can order it: Österreichischer Skiverband Olympiastrasse 10,  
6020 Innsbruck; Tel. +4351233501



- Target group: coaches
- General principles
- 3 parts including examples:
  - Training content (K, S, A, B, Koo)
  - Training sessions
  - week-, period and year plan




# „Koordinationstraining“

- More than 200 exercises on film and foto
- „Coaches corner“
- Theoretical background
- Dignostic part

1/1


1



**BK in unterschiedlichen Tiefpositionen**  
Kniebeuge in hoher, mittlerer & tiefer Position

X


2



**Sitz stabil 1**  
Fersendruck, Armdruck unterstützt die Beckenaufichtung

X

3



**Handstütz rücklings auf erhöhter Unterlage**  
Kleingeräte als Erhöhungshilfe verwenden

X

**Datei:** \_\_\_\_\_

Neu...

**Öffnen/Speichern:** \_\_\_\_\_

Öffnen...

Speichern...

**Seitentitel:** \_\_\_\_\_

-- Seitentitel --

Ok

**Seitenlayout anpassen:** \_\_\_\_\_

- eine Übung pro Blatt
- zwei Übungen pro Blatt
- drei Übungen pro Blatt
- vier Übungen pro Blatt

Hochformat     Querformat

**Seiten hinzufügen/blättern:** \_\_\_\_\_

Seite hinzufügen

|< < > >|

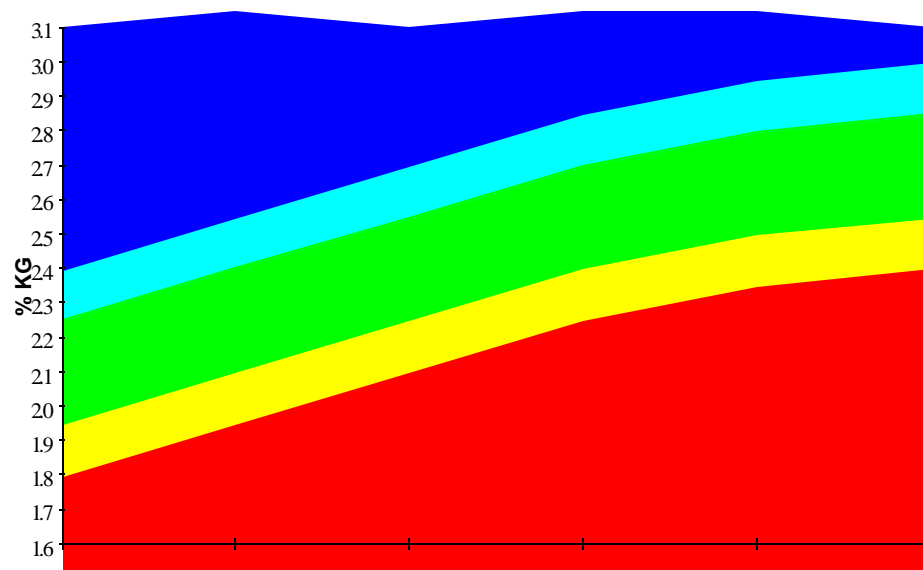
**Trainingsplan ausdrucken:** \_\_\_\_\_

Drucken...

9 sport motor tests  
standardized with tests with 8000  
pupils

- Hurdles Bumerang Test
- Jump and reach
- Stand and reach
- Standing long jump
- Gattertest

- Abdominal test
- Back test
- 45 sec. Jump
- Cooper test



# NORM FIGURES

| Jahre             | 14                 | 15                 | 16                 | 17                 | 18                 | 19                 |
|-------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| sehr gut          | 2,41 u. mehr       | 2,56 u. mehr       | 2,71 u. mehr       | 2,86 u. mehr       | 2,96 u. mehr       | 3,01 u. mehr       |
| gut               | 2,26 - 2,40        | 2,41 - 2,55        | 2,56 - 2,70        | 2,71 - 2,85        | 2,81 - 2,95        | 2,86 - 3,00        |
| befriedigend      | 1,96 - 2,25        | 2,11 - 2,40        | 2,26 - 2,55        | 2,41 - 2,70        | 2,51 - 2,80        | 2,56 - 2,85        |
| genügend          | 1,81 - 1,95        | 1,96 - 2,10        | 2,11 - 2,25        | 2,26 - 2,40        | 2,36 - 2,50        | 2,41 - 2,55        |
| nicht<br>genügend | 1,80<br>u. weniger | 1,95<br>u. weniger | 2,10<br>u. weniger | 2,25<br>u. weniger | 2,35<br>u. weniger | 2,40<br>u. weniger |



**THANK YOU**