

## NEED OF BASIC TECHNOLOGY OF SPEROSOMATOGRAPHY IN THE INITIAL STAGES OF TEACHING AND COACHING

**Czeslaw Wielki, Charles Noens**  
**U.C.L.Louvain-la-Neuve, Belgium**

### **INTRODUCTION**

Biomechanics is an indispensable tool ensuring the quality of training and thus the level of performance. Its use is however interdependent with other factors originating from psychology and pedagogy and then applied to sports sciences for men and women.

The improved Radius Method using the Intersection Point allowed the establishment of a Normative typology for young adults and was adapted to study the influence of different sports activities on the spinal curve of several kinds of athletes. The subject sample included top performers and indicated spinal changes influenced by sport activities due to functional adaptation.

The results raise a question for ethical reflection on the validity of some training methods. The problem will remain theoretical in the laboratory unless the teacher-trainer investigates the effect of the training on spinal changes.

An easily applied technology is required to measure spinal changes in conjunction with scientifically based methods of teaching and training.

### **METHODOLOGY**

The problem for the teacher and the trainer is to create a methodology to give pupils the possibility to optimize personal-collective, operating factors for all the sport sciences.

Psychomotoric deficiencies, difficulties in execution of some technical movements, non-adaptation of the equipment and facilities and insufficient psychological maturity are the reason for our reason.

### **RESULTS AND DISCUSSION**

Experimental studies and the observation of play movement from primary school up to University have showed that it is possible to organize teaching and training based on a natural approach. Fig. 1. The Preliminary Preparation (7 to 12), the Invitation Phase (7 to 9) are used to acquire, through play and movement, a series of motor skills. Ages 9 to 12 allows the child to explore his motor abilities to effect the technical movements in a simplified form of the game.

The Basic formation (12 to 15), is composed of two phases:

Apprenticeship followed by Orientation. The player is at first familiarized with all the technical forms. The natural enthusiasm of the adolescent motivates performance. The child analyses the reason for defeat or victory and looks for improvement not only in technical movement, but also in specific tasks. From the age of 15, the youth is ready for more intensive effort.

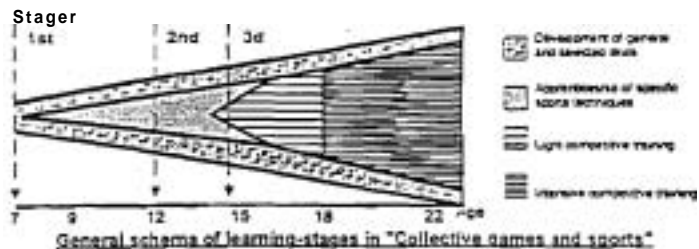


Figure 1.

- 1st Stage: Preliminary preparation
  - a) Invitation phase
  - b) Initiation phase
- 2nd Stage: Basic formation
  - a) Apprenticeship phase
  - b) Phase of spom orientation
- 3d Sage: Training
  - a) Schoolsport phase
  - b) Phase of intensive training

The somatic and psychological changes of puberty are practically over at 15 years. It is the suitable period to participate in intramural sport and light training during which he will find the experience to deal with the difficulties in the real game. At the end of this phase, the progression is to intensive total training to the age of 17-18 years.

This Natural Approach to step by step teaching and progressive training avoids overstress on the biomechanical and psychological aspects of growth. A rational yearly schema of total training, composed of five components is presented in Fig. 2

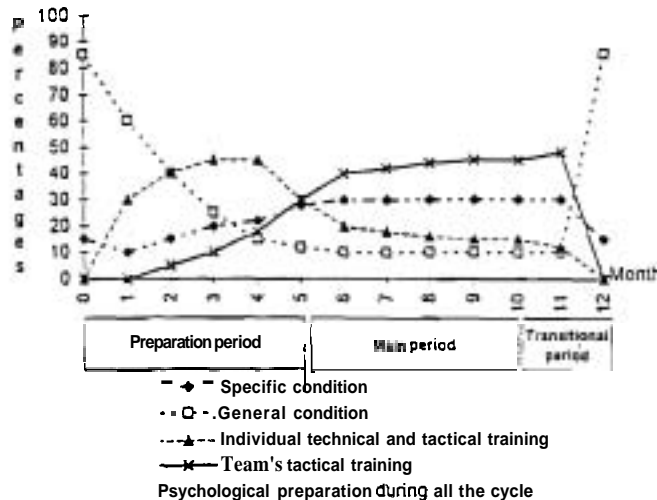
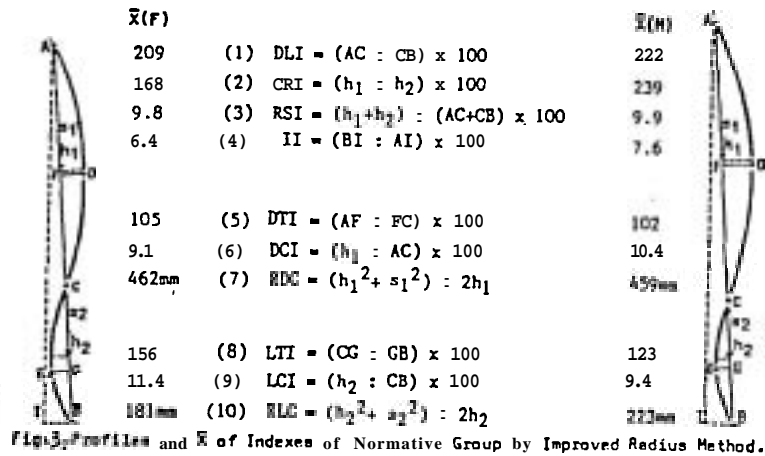


Figure 2. Yearly schema of top training.

The natural approach is also applied to Aquatic Education where children often start at a very early age-group with heavy training and competition. The "Improved Radius Method" had established the profiles and means of 10 indexes of a "Normative Group".



The profiles of spines are presented in Fig. 4. Two children aged 7 years 1Ch, and 2Ch.; 2 women national selected for Olympic Gymn. 3G0, 4G0; 2 male International Volleyball players 5VB, 6VB; 1 women Breast-stroke Olympic Medalist 7BR-8BR. are compared with the datas of the Normative Group.

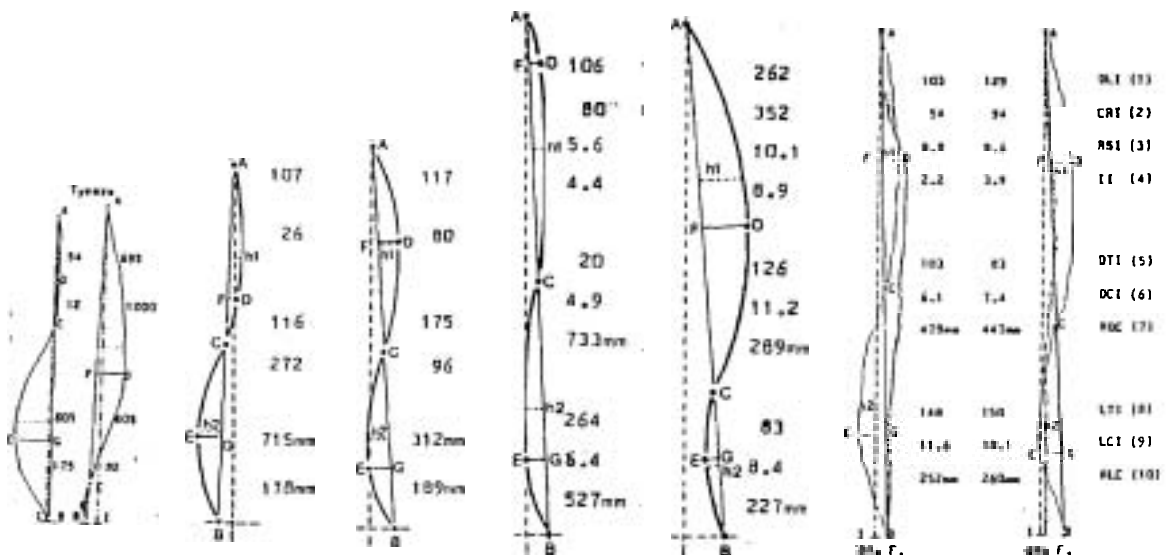


Figure 4. Examples of functional changing of the Rachii in some sports.

The Dorso-Lumbar Index DLI(1) is the relation of lengths of dorsal and lumbar curves. The Curve Relative Index CRI(2) is the relation between the heights of dorsal and lumbar parts. CH1.DLI=54, CRI=only 12 abnormally hyperlordotic CH2.DLI=695 CRI = 1000 - hyperkyphotic. The abnormal deformations are caused by failure to adapt to correct teaching activities at an early age. National Gymnast 3G0.DLI=107, CRI=26, belongs to Type "B"-Hyperlordotic, with deformation of the height of curves. National Gymnast 4G0-DLI=117, CRI=80 belongs to the Type "B" Lordotic toward Type "A" - Normal.

5VB-Volleyball Top Nat. Junior-major spiker, DLI=106; CRI=80; belongs to the Type "B" Lordotic. Great variation in the height of curves especially in the position of TopD and E which is abnormal. 6VB-Volleyball Top Nat. Junior-set up specialist DLI=262; CRI=352, nearly Type "A" Normal, with deformation of dorsal part D and Top of E lumbar changing in opposite direction 7 and 8. Breast stroke Olympic medalist with DLI=103; and CRI=54, changed to DLI=129 and CRI=94, after changing toward normal "A" Normative Group with unilateral scoliosis.

## CONCLUSIONS

There are two ways to use the Improved Radius Method. One is called direct because a computer with a suitable software calculates the indexes which are subject to analysis. In the other, indirect, the spheromatograph prints a reproduction of the curve and the functional adaptation or the deviation or the deformation is immediately visible. The indexes are calculated from the parameters. The visibility of the shape is very convenient for the trainer, the teacher and the subject who can draw immediate conclusions. The method is non-invasive, cheap and can be used almost anywhere. Two indexes are sufficient for a satisfactory evaluation by the trainer.

The teacher and the trainer must consult the biomechanician to solve the difficulties due to the non-adaptation of games rules for the young participants.

It is regrettable that there is no Normative age-group tables which should be developed through research.

A "Normative Typology" by age-group, is necessary in order to be able to make more accurate judgements and if possible elaborate a more or less Universal Typology for males and females. For the moment let us start with the apprenticeship and training of the youth and transfer the task to younger researchers.

## REFERENCES

Wielki, C. and Adrian, M. (1987). Aspects of spinal curve measurement of athletes. *Biomechanics in Sports III & IV*. pp. 397-408.

- Wielki, C. and Kruchoski, E. (1990). Spinal curves of selected swimmers according to the stroke. *Biomechanics in Sports VI*. pp. 383-392.
- Wielki, C. and Noens, C. (1993). Application of individual spherosomatograms in sportactivities, *Biomechanics in Sports, XI*. pp. 274-277.