BIOMECHANICAL ASPECTS OF BALANCE IN ROLLER-SKATING

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INTRODUCTION

The roller-skating imports particularly engaging situations of balance, besides for the largest altitude of barycenter, for a lower friction between the supporting surface and the rollers (the parts of the gymnast in contact with it). What we have just claimed is based on the Third Law of Dynamics which regulates the actions and the reactions of contact (friction or adherence): to every force exerted against something corresponds an equal and opposite reaction (force acting back).

Practically, the friction leads to make adhere two bodies. It avoid doing slip and consequently permit the several forms of translocation (marching, run, gaits, etc.).

In the roller-skating for the lower friction is less the transmitted on the soil force and therefore the reaction is less (for ex. the jump), while the slidings are favoured (it suffices a relatively weak push to obtain a wide and fast shift), with the relative risks of fall.

When two and absolutely smooth bodies are in contact, for the static balance of the one on the other need the action and the reaction act along the common perpendicular at the surface of contact.

In any case the friction can be defined a force that opposes the motion of two bodies in contact.

It is determinable on the basis of the actions and the reactions of contact, as the cause is the attraction among the particles of the bodies.

The adhesive bonds act perpendicularly at the horizontal plane (of contact), while the friction have tangential direction. It coincides with that of the motion on the plane of contact, while the side is opposite to that of the force applied on the plane of contact, that determines the motion.

Was proved that static friction, present between two stand-still bodies, is greater than dynamical, acting between bodies in motion, mass and forces being equals.

ELEMENTAR ANALYSIS

In the roller-skating the friction of the rollers against the soil is lower of that of the foot in the walking, for which is lower the reaction. Besides, during the translocations and the rotations the lower friction is a element to which accommodate oneself, because the pushes have a lastinger effect and however it is unusual respect the normal walking.

The technical elements more significants of the artistic skating are whipping-tops and the jumps with rotation.

The whipping-tops consist of continuous rotations on themselves, preceded from a preparation (rectilinear translocation). The important is that the axis of rotation pass for the barycenter, to avoid losses of balance and falls. The angular acceleration during the flight is

biomechanically favoured by limbs closure, while the openings of the arms and of the free leg at the landing on the ground consent to control and to annul it rapidly.

The whipping-tops can be performed in erect station, gathered station or of angel. The difficulty increases passing from that inside back, to that outside back and outside forward (position outside of the body, and in the second open too), to those of angel.

The lower friction between supporting surface and soil, the moving basis, the larger altitude of supporting basis, the concealment of the holds of vision (visual references points), the relative psychological component are the elements that make the roller-skating particularly engaging.

EXPERIMENT

To stress the balance, we have made our pupils perform artistic compositions on not horizontal surfaces, but sloping at 5^{0}.

In such condition all the technical elements result altered, as the weight force acting on the body decomposes in a perpendicular component at the supporting surface and in another parallel the same. This last has one disturbing effect on the whipping-tops in fact, the body, to stay in balance during it, assumes a different position towards the supporting basis.

Besides, the flying phase of a jump is altered owing to the gradient between the take-off point and the landing point of the same.

Particularly, we have made our pupils perform an artistic composition formerly learnt, starting from the different corners, thus we make to exploit every diversity deriving from the rapport between composition and gradient.

After three weeks the execution is correct. At the end, one week after returning to the horizontal track we have noted a considerable improvement in the control and regulation of the body. The difference between a control group and a experimental group is evident.

METHODOLOGICAL CONCLUSIONS

Therefore in the roller-skating it needs starting at the aged of 4 years even, to get familiarity, playing, with the piece of equipment roller skates. This is the direction of the Uisp Campania Skating League.

Not frighten the fact that we speak of beginning at 4 years in the skating. Starting in such a case means to effect not a strict training, but jesting experiences of skating, of keep-fit exercises, of jumps, polyvalent and inserted in a multidisciplinary optics. It needs to prepare the pupil to the approach with the roller skates by balance exercises.

Example exercises:

to keep the balance on a foot, making "the angel", "the dwarf", etc.; walk on a set of near sticks, "on the frozen field"; on the tip of feet, like "a giant" or performing the previous movements;

all the same exercises with one's eyes shunt, "at night"; etc.

Afterwards, at beginning of the technical training, the child learns marching carrying the weight of body by a leg to another; lifting the skate and leaning it forward); then to slide, etc.

We hope they manage quantitative studies in roller-skating in Italy too.

Palmisciano V. is the author of the first three parts; Palmisciano G. is the author of the last part.

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