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Tendinous and muscular injuries of the elevation motion system of the knee in athletes

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1. Introduction

Since the ancient times there have been close links between sports and medicine. These links have been expressed in the development of a branch of medicine concerned with sports, seeking more physiological methods of training and helping athletes to achieve better sport results (4,5).

The record-seeking practice of sports often reaches the limit of endurance of the motor system, this frequently occurring contusion are the results of its overloading (overloading syndrome) (1,7,8,9).

On the such overloading syndromes is the injury of the quadriceps muscle and the tendon in the form of partial or complete tearing (1,2,4, 5, 8, 9, 10, 11). The injury affects mostly young athletes: jumpers, volleyball players, vaulters, sprinters and others. The damage in the elevation motion system of the knee is especially common in the athletes who started training after a longer break (1, 2, 4, 5, 7, 8, 9, 10);

The damage of the quadriceps muscle and its tendon mostly results from an indirect trauma, often a trivial one, e.g. while an athlete starts a run or falls on a bended knee while his quadriceps is tensed (2, 4, 5, 7, 8, 10). The disruption of the elevation system of the knee impairs the ambulatory process, causes considerable muscular atrophies and disturbs active extension in the knee joint and active flexion of the coxofemoral joint (2, 3, 4, 5, 7).

Because the injury affects young people, practising sports, we would like to present the results of treatment of this acute overloading syndrome in the patients in our hospital.

2. The authors' research.

In the years 1985 - 1994 an overall number of 10 athletes with injury of the quadriceps muscle and its tendon were treated at the Department of Accidents and Orthopaedics of the MSW Hospital in Bydgoszcz and at the Orthopaedic Clinic of the 10th Military Hospital in Bydgoszcz. In all of the cases the injury occurred during a sports competition.

In 9 cases operations were performed, and only in 1 case conservative treatment was applied - immobilisation in plaster cast (because the patient did not give his permission for the proposed operation) (Fig 1).

The post-operative diagnosis in 9 patients revealed:

a) in 1 case - abruption of the tubercle of the tibia;
b) in 1 case - disruption of the rectus head and medial head of quadriceps muscle and tearing of the broad fascia of the thigh;
c) in 3 cases - disruption of the rectus head of quadriceps muscle;
d) in 4 cases - abruption of rectus head of quadriceps muscle from the apex of patella (fig 2).

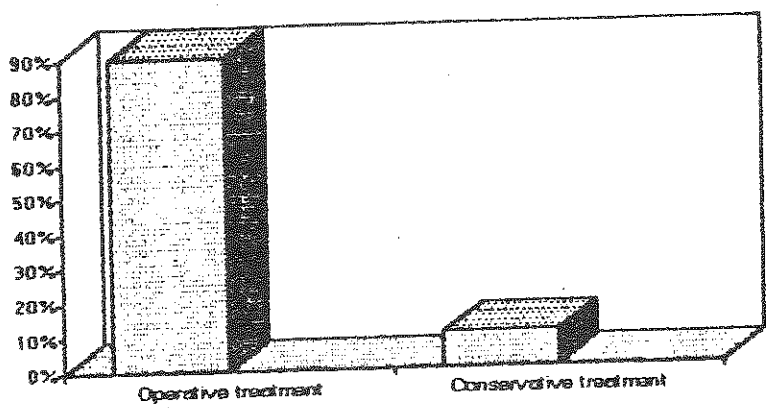
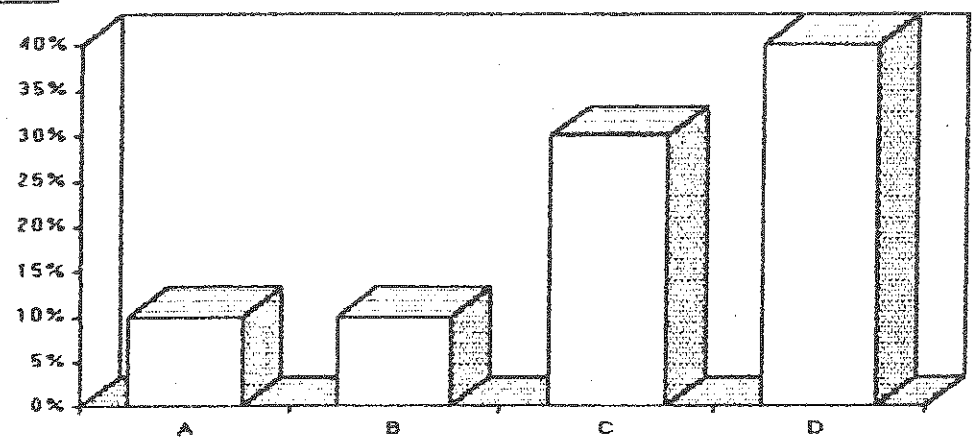


Fig. 1

The frequency of operative and conservative therapy in the treated patients.



The time of treatment varied from 2 to 5 months and after medical rehabilitation all the patients regained their full range of movements and the full strength of quadriceps muscle.

All the patients returned into active training within 6 months after the trauma.

3. Discussion

According to Schubert there are following kinds of the injury of the elevation motion system of the knee:

a) the abruption of the tubercle of the tibia - 2% of cases;
b) the damage of patellar ligament - 4% of cases;
c) the fracture of the patella - 91% of cases;
d) the damage within quadriceps muscle - 3% of cases.

Our study has focused on the damage of quadriceps muscle and its tendon, which is rarely observed (about 9% of all the cases of the injury of the elevation motion system of the knee) (2, 7, 11).

There are a few references concerning this problem in specialized literature, and various authors estimate the number of these cases at 6 - 10% (1, 2, 3, 4, 7, 10, 11).

The diagnosis of the injury of the quadriceps muscle and its tendon , though simple, is sometimes virtually impossible, and the injury is mistaken for the sprain of the knee joint or the damage of ligaments of the knee (2, 3, 4, 7, 10, 11).

It is very important to carry out a detailed functional examination which takes into consideration the mechanism of trauma and is accompanied by radiological and ultrasonagraphical examination 1, 2, 4, 5, 7, 10, 11). The radiological examination shows the lower position of the patella and sometimes the deviation of the upper pole of the patella from the femur (1, 4, 5). The ultrasonographical examination reveals the damage of the muscle resulting in liquid space (haematoma) or the signs of the disruption of the tendon (4, 11).

The treatment of the rupture of the quadriceps muscle and its tendon (except for slight tearing) is basically operative. According to Grucca, the best results are achieved by primary (within 48 hours after the trauma) suture of the muscle or the tendon (2, 4, 5, 6, 7). The lower limb is immobilized in plaster cast for 3 weeks, and after this the process of rehabilitation begins (3, 7).

4. Conclusion

1. The injury of the quadriceps and its tendon are rare traumas and affects chiefly athletes.
2. The diagnosis is based mainly on clinical and ultrasonographical examination.
3. The therapy at choice is operative treatment. The best being the one carried out within 48 hours after trauma.
4. The operative treatment accompanied by the process of rehabilitation gives very good results and brings back to active practising of sports.

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