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Chronic anterior instability of the knee
(Artificial ligament versus patellar bone tendon bone autograft)

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Kronik anterior diz instabiliteleri
(Yapay ligamanla patellar kemik tendon oto greftlerinin karşılaştırılması)

Ön çapraz bağ rekonstrüksiyonunda yapay ligamanlar iyi bir çözüm olarak görülmekteydi ve Goretex ve Dacron bu amaşla kullanılan en popüler materyallerdir. Bu çalışmada ÖÇB için prostetik replasmanda kullanılan Dacron Proflexin sonuçları sunulmuştur. Bu sonuçlar otogreft olarak, patellar tendon kullanımıyla rekonstrüksiyon yapıldığı diğer vakaların sonuçlarıyla karşılaştırılmıştır. Dacron protez grubunda yüksek oranda ÖÇB yetmezliği saptanmıştır. Yırtılma ve sentetik materyal reaksiyonu olarak kronik sinovit düşünüldüğünde, bizce Dacron protezi 40 yaşın üstünde, sınırlı aktivite düzeyi ve ihtiyaçları olan hastalar veya daha önce yapılan biyolojik rekonstrüksiyonun başarısız kaldığı vakalar için saklanmalıdır.

Anahtar kelimeler: *Diz anterior instabilitesi, patellar otogreft*

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Artificial ligaments seemed to be the solution for ACL reconstruction and Goretex and Dacron were the most popular materials used for this purpose. In this paper we report the long-term results of the Dacron Proflex prosthetic replacement of the ACL. These results were compared with those achieved in another group of patients in whom the patellar-bone-tendon-bone autograft technique has been performed. A high rate of ACL insufficiency was observed in the Dacron prosthesis group. Considering the risk of rupture and the chronic synovitis related to the reaction to the synthetic material, we think that the Dacron prothesis could be indicated in patients over 40, with limited functional demands or in case of failure of previous biological reconstructions.

Keywords: *Anterior instability of the knee, patellar autograft*

In the past the use of biologic implants for ACL replacement created many ploblems in both the surgical technique and implant fixation. Medium and long term results were not satisfactory and recovery time was very long. In the early and middle Eighties, the use of artificial ligaments was very popular for ACL replacement.

Artificial ligaments seemed to be the solution for ACL reconstrucion. These devices avoided additional morbidity determined by the harvesting of autogenous ligament substitutes. Moreover, they avoided the risk of infections, such as HIV, due to allografts. The simple implantation technique, the strong bony fixation and the prompt recovery were important advantages offered by ACL prosthesis.

The artificial ligament needs to possess two fundamental characteristics:

- Biofunctionality, that is adequate mechanical strength and fatigue resistance.

- Biocompatibility, that is creation of host versus implant reaction.

Three kinds of artificial ligaments are available: The augmentation devices such as the Kennedy LAD for the reinforcement and the protection of biologic structures. The scaffolds such as the carbon fibers and the Leeds Keyo ligament that were claimed to be a substrate for the ingrowth of collagenic tissue with fibers oriented along the force lines, in order to create a neoligament. Prosthesis, completely replacing the ACL. Goretex and Dacron were the most popular materials used for this purpose. Dacron has good biotollerance confirmed by its use for many years in vascular and abdominal surgery.

The Dacron Proflex prosthesis has a mean tensile resistance of 4500 Newtons, which is much greater than the ACL's one. The Dacron prosthesis is composed by polyethylen terephthelate woven fibers and promotes good ingrowth of fibrous tissue in the neoligament, particularly in the bony tunnels.

In this paper the middle and long term results of the Dacron Proflex prosthetic replacement of the ACL is reported. These results have been compared with those achieved in another group of patients in whom the patellar-bone-tendon-bone autograft technique has been performed.

Between 1987 and 1990 103 patients underwent reconstruction of the ACL in our department. The mean age was 25 years (range 18 to 42 years); there were 81 males and 22 females. The right knee was involved in 59 cases; the left knee in 44 cases. Most of the patients were professional or amateur athletes that injuried their knees during sport activity; soccer and skiing were the two sports more commonly invol-

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ved. In 53 patients the reconstruction of ACL was performed using a Dacron Proflex prosthesis.

In 50 patients the reconstruction was accomplished using patellar-bone-tendon-bone autograft technique. The patients were divided into two random groups at the admission and operated by two different surgical teams.

At the time of this study 47 patients of the first group and 44 patients of the second group were reviewed. The mean follow-up was 57 months (range 36 to 80 months). 3 patients of the first group were not included in the study because the prosthetic ligament had to be removed for mechanical failure. In the first group 24 medial, 4 lateral and 12 both menisci were involved. The meniscal lesions of the patellar tendon group: medial 25, lateral 3, 8 both menisci. There were no significant difference between the two series of patients. The meniscal lesions were treated arthroscopically with partial meniscectomy.

Surgical technique and post-operatory treatment

In both groups the first surgical act was the arthroscopic examination of the knee and the treatment of the associated lesions. In the first group the Dacron ligament was implanted under arthroscopic control using a tibial 7. milimeters tunnel and femoral "over the top" technique. After tightening, the ligament was anchored to the bone with staples.

In the second group the patients underwent a median parapatellar arthrotomy and the tendon bone to bone autograft, harvested from the central third of the patellar tendon, was inserted through 9 milimeters tibial and femural tunnels. The bony fixation was obtained using interference screws.

In the first group passive motion and isometric exercises for the thigh muscles were started at the first post-operatory day. 20 days post operatively, weight bearing was allowed; the return to non-agonistic sport activity was permitted after 4 months. In patellar tendon group isometric exercises were started in the first post operatory day. Passive motion was begun after 2 weeks and weight bearing allowed within 45 to 60 days. Sport activity was never resumed before the 8th month. At follow-up all the patients were evaluated following the 100 points scoring scale of the Hospital for special surgery. Joint laxity was assessed using a KT 2000 arthrometer.

Results

On the left slide you can see results of the H. S. S. scoring scale for the first group and the second group. The average total score was significantly better in the patellar tendon group. On the right, the data on the subjective assessment (maximum scoring 45 points). The difference between the two groups is significant. The subjective assessment was greatly influenced by the return to sport activities.

More than 30% of the patients in whom the artificial Dacron ligament was used, returned to the same level of sport participation. This percentage was inferior in the patellar tendon group. In both group the 23% returned to previous sport activities, but at a lower level of performance. The 14% of the first group and the 36% of the second group shifted to different sports. 31% of the patients of the first group and 14% of the patients of the second group did not return to any sport. The clinical findings at follow up: the best scores were found in the patients of the patellar tendon group. At follow-up 10 patients of the first group had knee swelling. A swollen knee was observed in only 2 patients of the second group. Results of the KT 2000 testing. Significant results were obtained at 20 pounds load and maximum manual test evaluation. At the 20 pounds load test we can distinguish 3 degrees of laxity, comparing the knee of both sides. In the maximum manual load test the results are classified in 4 degrees. In both tests better results were found in the patellar tendon group.

Conclusions

A high rate of ACL insufficiency was observed in the Dacron prosthesis group. The patellar tendon autograft definitely led to better results. The risk of rupture of the artificial ligament (observed in 3 patients of our series) and the chronic synovitis related to the reaction to the synthetic material suggest to preserve the use of the ligament prosthesis for very rare and selected cases. In our opinion, the Dacron prosthesis could be indicated in patients over 40 years of age, with limited functional demands or in case of failure of previous biological reconstructions.

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