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Analysis of return to competition and repeat rupture for 298 anterior cruciate ligament reconstructions with patellar or hamstring tendon autograft in sportspeople

Analyse de la reprise du sport et des ruptures itératives chez le sportif compétiteur pour 298 ligaments croisés antérieurs opérés avec le tendon rotulien ou les ischiojambiers

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Abstract

Objectives. – To establish the influence of the type of surgical technique, competitive level, type of sport and the time before returning to competition on the reinjury rate after anterior cruciate ligament (ACL) surgery.
Methods. – The authors followed-up 540 competitive sportspeople who had undergone ACL surgery via patellar or hamstring tendon autograft (HTA) techniques in 2003 and 2004. The sportspeople (all of whom had competed at a regional or higher level) were asked to fill out a questionnaire during their fourth postoperative year.
Results. – The 298 respondees (reply rate: 55.1%) had the same characteristics as the initial (operated) population. The reinjury rates after HTA and patellar tendon autograft (PTA) were 12.7 and 6.1%, respectively. There was no statistically significant difference between these two values ($P = 0.14$). Age and gender were not correlated with the frequency of reinjury. The reinjury rate rose slightly with increasing competitive level (regional level: 8.1%; national level: 10.4%; international level: 12.5%) but these differences were not statistically significant. Soccer had the highest reinjury rate (20.8%). Regardless of the surgical technique, sportspeople returning to competition within seven months of surgery had a greater risk of reinjury than those returning after this time point (15.3 versus 5.2%, $P = 0.014$). The risk dropped from 13.9 to 2.6% ($P = 0.047$) for PTA and from 16.6 to 7.6% ($P = 0.2$) for HTA. Of the four reinjuries in sportspeople returning to competition with the first six months postoperative, three occurred within one month of resumption.
Conclusion. – Post-HTA reinjury rates are higher than post-PTA rates but the difference is not statistically significant. For sportspeople at a regional or higher level, the time interval before the return to competition has an influence on the risk of reinjury.

Keywords: Anterior cruciate ligament; Patellar tendon autograft; Hamstring tendon autograft; Reinjury; Sports

Résumé

Objectifs. – Déterminer l'influence du type de chirurgie, du niveau sportif, du type de sport et des délais de reprise de la compétition sur la fréquence des récidives.
Patients et méthode. – Les auteurs ont suivi par questionnaire 540 sportifs ayant bénéficié d'une chirurgie du ligament croisé antérieur de type tendon rotulien (OTR) ou aux ischiojambiers (DIDT) en 2003 et 2004. Tous sont compétiteurs, de niveau minimum régional, et ont reçu un questionnaire pendant la quatrième année postopératoire.
Résultats. – Les 298 sportifs ayant répondu ont les mêmes caractéristiques que ceux de la population initiale. Le taux de réponse est de 55,1 %. La fréquence des récidives après DIDT est de 12,7 %, tandis que la fréquence des récidives pour les OTR est de 6,1 %, sans différence significative ($p = 0{,}14$). L'âge et le sexe n'influencent pas la fréquence des récidives. La fréquence des récidives est en légère augmentation avec le niveau, sans

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différence significative : régional 8,1 %, national 10,4 %, et international 12,5 %. Le football est le sport ayant le taux de récidives le plus élevé (20,8 %). Toutes chirurgies confondues, les joueurs reprenant avant le septième mois ont un risque plus élevé de récidives (15,3 contre 5,2 %) que lorsqu'ils reprennent après le septième mois ($p = 0{,}014$). Ce risque évolue pour l'OTR de 13,9 à 2,6 % ($p = 0{,}047$) et pour le DIDT de 16,6 à 7,6 % ($p = 0{,}2$). Sur les quatre récidives survenues chez le sportif ayant repris avant six mois, trois ont eu lieu dans le mois de la reprise.
Conclusion. – Les taux de récidives après DIDT ne sont pas différents statistiquement de ceux après OTR, malgré un risque de récidives légèrement plus élevé. Pour le sportif compétiteur minimum de niveau régional, le délai de reprise influence le risque de récidives.

Mots clés : Ligament croisé antérieur ; Ligamentoplastie au tendon rotulien ; Ligamentoplastie aux ischiojambiers ; Récidive ; Sport

1. English version

There is little evidence in the literature of true differences in performance between the patellar tendon autograft (PTA) and hamstring tendon autograft (HTA) surgical techniques used in anterior cruciate ligament (ACL) reconstruction [1,5,9,11,13,37]. The PTA has been linked to more frequent anterior pain [5,9,11,21,37], whereas the HTA tends to result in greater residual knee laxity [5,13,50]. This lack of a clear difference means that surgeons choose one or other of the techniques as a function of their own experience.

Few studies have analyzed the reinjury rate as a function of the surgical technique [2,10,17,32,42,47,48] and even fewer [42,44] have focused on the influence of the type of sport on reinjury. This is surprising, since the goal of this type of surgery is to enable a return to competition.

Hence, we decided to study a population of competitive sportspeople (at a regional or higher level) and determine the influence of the type of ACL surgery on the return to competition and the reinjury rate. We also sought to identify risk factors for reinjury by looking at the type of sport and the time interval between surgery and the return to competition.

1.1. Patients and methods

1.1.1. Methods

We systematically monitored all the sportspeople having attended our rehabilitation centre after ACL surgery. The data were entered into a computerised database to enable follow-up of clinical, surgical and sporting parameters. After including the sportspeople (playing at a regional or higher level) having undergone PTA or HTA surgery for ACL reconstruction in 2003 and 2004, we sent them a questionnaire concerning the return to competition during their fourth postoperative year (mean: 3.5 years; range 36 to 48 months).

Only two surgical techniques had been concerned in our study subjects: PTA and HTA. The PTA technique involves transplantation of the patellar tendon and creation of a femoral tunnel and a tibial tunnel. The HTA technique requires two hamstring tendons (the semitendinosus and the gracilis) folded back over each other to perform a transplant with a femoral and a tibial tunnel. The operations had been performed by 48 surgeons throughout France, many of whom were specialists in orthopaedic surgery of the ACL; eight of the latter accounted for 40% of the operations.

The rehabilitation programmes performed during the sportspeople's stay in our centre and recommended on discharge were based on the postoperative recovery of joint amplitudes (0/0/120°), quadriceps contractions against gravity and gait without the use of technical aids in the three to six weeks following surgery. Depending on the surgeon's recommendations, a brace was worn for three to six weeks. Cardiovascular training (on a cycle ergometer, stepper and/or rowing machine) was implemented progressively. Crawl-style swimming was also initiated during this period. Resumption of running was authorized at around three or four months post-op, depending on the surgeon's recommendations. Resumption of the person's original sport was determined by the surgeon.

The questionnaires were sent out in two batches (at the end of 2006 and the end of 2007, respectively). Of the 540 recipients, 298 replied (55.1%). The population of respondees did not differ significantly from the initial (operated) population in terms of the surgical technique, the competitive level, the sport practised, age and gender.

We excluded sportspeople with a history of contralateral or repeat ruptures, osteotomy, chondroplasty, associated complex ligament damage and ligamentoplasty with extra-articular reinforcement.

Data on the age, gender, sport and type of surgery were obtained from the patient database. The questionnaire focused on repeat ruptures, whether or not the sportsperson had returned to competition, the time interval between surgery and the return to competition and the time required to return to the sportsperson's previous competitive level.

1.1.2. Statistical analysis

For qualitative variables, we used a two-tailed Chi-square test to compare subgroups. If the sample size was too small, we used a Student Test to compare quantitative variables. If the sample sizes in the groups were not equivalent, we applied a Mann-Whitney test. All analyses were performed by a statistician using Graph-Pad PRISM® 2007 software (version 5.00) and STATA software (version 8). The significance threshold was set to $P < 0.05$. Data missing from the questionnaires were not considered in the statistical analysis.

1.1.3. Material

We have analyzed the replies from 298 sportspeople (160 having undergone an HTA and 138 having undergone a PTA [Table 1]). The gender ratio was similar for each technique (HTA: 122 men and 38 women; PTA: 112 men and 26 women).