Medial Collateral Ligamentous Reconstruction

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Introduction

The medial collateral ligament (MCL) injury in elbow joint is the cause of medial instability. We evaluated the surgical outcomes of the reconstruction of the MCL.

Causes of the medial instability of the elbow joint can be classified into the bone injury type and ligament type. The bone injury type includes so-called Jeffery type injury as the valgus bone injury type, and the dislocation fracture type. The ligament type includes the traumatic injury type and the pure MCL injury without bone injury. Further, the derangement includes the single blunt trauma with the recognizable date of injury and the recurrent trauma without the recognizable date of injury. All cases of the valgus bone injury type and dislocation fracture type were the accidents at work, and their essences of injury were not the MCL. In this presentation, we would like to choose the MCL dysfunction as the subject, out of medial instabilities, and focus on the MCL injury without bone injury.

Materials and methods

We had treated 163 cases of the MCL injury in some 10 years during May 1990 to December 2000. The causes of injuries were sport activities in all cases. Ages distributed between 11 and 34 (avg.18.2) years. Traumatic cases such as valgus injury and dislocation by the violent fall during sport competitions or trainings were 21, and remaining 142 cases were derangements by repeated valgus stresses such as pitching. Fifteen out of 21 cases of trauma and 110 out of 142 cases of derangements, 125 cases in total, underwent surgical treatment.

Every cause of the traumas was a violent fall during sports. As to the case number by event, cases from the baseball, rugby, judo and snowboard accounted for 67%. Age distribution was 14 to 25, and the mean was 19.8 years. All of 110 cases who underwent surgery for sport derangements were male baseball players including 7 cases of professional baseball players. Their ages distributed between 13 and 34, and the mean was 18.5 years.

Along with "persistent local obstinate tenderness" and "feel pain at the first throw with his all power", arthrography, MRI and manual stress X-ray were included as the diagnostic criteria. The patient who was positive in one item or more out of these criteria was diagnosed as "injury positive". In all cases met these criteria, the injury was verified in the field of operation.

The reconstructive surgery has been improved step by step. Jobe's original method has been performed by anterior abrasion and inversion of the origin of flexor tendons, and the MCL was extended, characteristics of our method, however, are to separate the origin of flexor tendons to the direction of the fiber and to extend MCL just below. Dr. Jobe and his colleagues have also been performing operation according to this method since 1996. In the beginning, we interlaced the transplant tendon to the peripheral part of the remaining MCL, but, to secure the strength, improved

the method by fixing the transplant tendon to the bone holes made in both the medial epichondyle and tubercle on coronoid process of the ulna. Recently, we drive in a bone peg taken from the elbow head to fix the proximal portion of transplant tendon. Further, if the proximal bone fragment has an appropriate size, the distal MCL is tightly connected beyond expectation to the bone fragment. Using this as an anchor, we perform the reconstruction by wedging the transplant tendon into the MCL.

By classification of techniques, as a result of technique selection depending on the improvement and pathology, the technique to pass the transplant tendon through the bone holes made in the tubercle on coronoid process of the ulna and medial epichondyle and fix its medial epichondyle side using bone pegs was used in 54 cases, the most cases.

In traumatic cases, because of the rupture and cicatrization, cases for whom the primary suture is possible are scarce. In addition, without pulling up the cicatrizated MCL using Mitek etc., we performed reconstruction by the tendon transplant on this in every case.

As the post-operative program, after removal of the plaster fixation for 4 weeks, we assigned the active exercise and muscle strengthening exercise to them, and at 8th week, let them perform a tennis ball throwing close to their own feet recommended by Tokai to let them learn the throwing technique using the sufficient rotation of, not the hand, but the whole body. At the 4th month after operation, we let them start the catch ball, and depending on the patient's condition, at some 8th month after operation, let them make a complete comeback.

Results

Concerning to the processes of injury development in the derangement cases, while, in the students of junior-high school and high school, the cases with gradual increase in pain were dominant, in the professional baseball players, the injuries had tendency to develop rapidly with noises in many cases. The incidences of injury were the same between the college students and public persons. The injuries occurred at the time of pitching of the pitcher and long throw of the field player in many cases.

Concerning to the injury site that could be directly confirmed in the operational field, the injuries of full MCL length in the cases of trauma by the violent fall and derangements at the proximal portion of MCL were found most frequently. The avulsed bone fragments at childhood were found in the proximal origin in no small number of cases.

All cases of trauma returned to the sports before injury.

Among 110 cases who underwent surgery for sport injuries, cases for whom the direct examination could be performed by the post-operative course observation for 8 months or more were 74, and including the survey by inquiry thereafter, the post-operative follow-up studies of 17 months in average were conducted. 56 cases of 74 cases (76%) returned to the sport level before injury. In 18 cases with unfavorable results, there were complications and concurrent diseases (a loose shoulder, quadrilaterla space syndrome, ulnar nerve disorder, osteochondritis dissecans, osteochondritis, lumbago) before operatiom, other than 2 cases of reruptures post-operative fall and bone peg extrusion. post-operatively.

Discussion

Concerning to the processes of injury development, in the students of junior-high school and high school, the cases who had gradual development were dominant, and, in professional baseball players, the injuries had tendency to develop rapidly with noises in many cases. The developments of injuries may be caused by the fundamental changes in MCL due to years' stresses or a severe stress beyond the tolerance limit of MCL.

Considering as a whole, while it seems that improvement of the medial instability and that of sport performance do not necessarily go parallel, the reconstruction of endpoint that can sufficiently tolerate against the valgus stress at certain time point may not affect the performance. The factor that gives the greatest effect on the performance might be the existence of complications and concurrent diseases.

In the traumatic case requiring no throwing action, there is a little bit different impression from that, if the reduction in the range of motion is slight, the improvement of the medial instability leads to the favorable results.

Conclusions

In treatment of the medial instability in sports, not only the reconstruction of MCL, but also the treatment of complications should be sufficiently paid attention to. After return to the baseball, etc, the injury-inducing motions are repeated by every throwing, and complications in the soma and forequarter, etc. are found not to be scarcely. After reconstructive operation, the prevention of the development of further derangements should be endeavored in collaboration with the coach and trainer.