# REGENERATION OF THE TRIANGULAR FIBROCARTILAGE COMPLEX: SECOND-LOOK ARTHROSCOPY

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## SUMMARY

Purpose: The purpose of this study was to investigate whether the central avascular zone of TFCC has any healing potential. Methods: We examined 31 patients (32 wrists: Tears in the central major portion of the TFCC were identified in their first arthroscopy with ulnar shortening osteotomy) that underwent the second-look arthroscopy in their wrist. Results: Meticulous second-look arthroscopy revealed spontaneous regeneration of tears in 50% of studied wrists, but no significant differences were noted between each group in any assessed clinical items. Conclusions: This study clearly demonstrated that the avascular area of the TFCC possesses regenerating potentials. Although this study was unable to identify factors promoting TFCC regenerating, further investigation should be needed. Riv Chir Mano 2006; 3: 377-380

# **KEY WORDS**

Triangular fibrocartilage complex, regeneration, ulnar-shortening osteotomy, ulnocarpal wrist pain

# INTRODUCTION

The triangular fibrocartilage complex (TFCC) was first described by Palmer et al. (1) as a ligament-cartilage complex stabilizing the distal radioulnar joint (DRUJ) and holding the ulnar carpal bones. The central avascular zone of the TFCC is generally considered to have no potential to heal.

We had performed 75 second-look arthroscopies after ulnar-shortening osteotomy, and noticed that a significant percentage of TFCC tears in the avascularized area showed signs of healing. The purpose of this study was to investigate whether the central avascular zone of TFCC has any healing potential, and if so, whether ulnar-shortening osteotomy enhances this potential.

## **PATIENTS AND METHODS**

We examined 31 patients (18 men, 13 women) that underwent ulnar shortening osteotomy with a second-look arthroscopy in their wrist. Tears in the central major portion of the TFCC, were identified in their first arthroscopy. Mean age of patients was 35.1 years. One patient displayed bilateral lesions, while the right wrist only was involved in 16 patients and the left wrist only was involved in 14 patients. Range of motion and grip strength were recorded preoperatively and postoperatively.

All wrists underwent arthroscopy using standard wrist arthroscopic portals before ulnar shortening osteotomy. Post-operatively, the wrist was immobilized in an above-elbow cast for 6-8 weeks. All video images were later reviewed and damage of the

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TFCC reconfirmed. An original classification was designed to specify the location and shape of torn TFCC, to evaluate arthroscopic findings. Tears in the radial 1/3 potion were classified radial type, while residual portion (ulnar 2/3) tears were classified as central-ulnar type. A linear and fibrillated edge of the torn TFCC was classified as linear type and a round and smoother edge of the torn TFCC was classified as round type.

Second-look arthroscopy was performed at the time of plate removal after obtaining informed consent. All wrists underwent arthroscopy using the same methods. Plates were removed at a mean of 21.5 months (range, 11-56 months) after insertion. In 4 cases, biopsy of the regenerated central portion of the TFCC was performed.

Final wrist evaluation was made on the basis of the Modified Green and O'Brien Clinical Scoring System (2) after second-look operation.

#### RESULTS

During second-look arthroscopy, spontaneous regeneration of the torn central portion of the TFCC was confirmed in 16 of 32 (50%) wrists (Group A). Neither synovium nor vascular invasion was observed in the regenerated area. In the other 16 wrists, tears remained in the same location (Group B). At final follow-up, rating was excellent for 5 wrists, good for 5 wrists and fair for 6 wrists in Group A, compared to excellent in 4 wrists, good in 5 wrists, fair in 5 wrists and poor in 2 wrists in Group B. Although final clinical score was better in healed wrists than in non-healed wrists, no significant differences between groups in terms of age, sex, preoperative ulnar variance, follow-up period or surgical procedures employed were noted between these groups.

Traumatic tears of the TFCC (Palmer class I) were present in 7 of 16 wrists in each group. Round and central-ulnar tears tended to regenerate better than linear and radial tears. Significant differences were noted between groups in both localization and shape of torn TFCC. Histological examination of biopsy specimens showed that regenerated tissue contained both fibrous connective tissue and fibrocartilagenous components, with no infiltration of inflammatory cell.

#### DISCUSSION

The central part of the disc is composed mainly of fibrocartilage (3). The central portion of the TFCC is avascular, and no vessels cross the radial attachment (4). Given this structural characteristic, the central portion has been suggested to lack healing potential (5). In the present study, we revealed spontaneous regeneration of TFCC tears in 50% of studied wrists.

The central-ulnar 2/3 of the TFCC showed a greater regenerative potential than the radial 1/3. Since the central-ulnar side of the TFCC is closer to blood vessels than the radial side, the area seems to possess spatial advantages in spontaneous regeneration. Partial excision of damaged areas of the TFCC has been shown to provide significant pain relief in several studies (6, 7). However, no significant correlation was identified between patient clinical data and regenerating tendency of TFCC tear in this study. This may be partly attributable to 2 factors. First, the differences in each parameter were relatively small. Second, most cases displayed good clinical results after ulnar-shortening, regardless of healing capacity of the TFCC. Advantage of ulnar-shortening osteotomy is the tightening of the ulno-carpal ligamentous complex. Ulnar shortening changes the environment of the ulnar wrist, and may help with regenerating of the TFCC.

In conclusion, this study clearly demonstrated that the avascular area of the TFCC possesses regenerating potentials. Although this study was unable to identify factors promoting TFCC regenerating and the meaning of regenerating in the TFCC remains unclear, further investigation should be needed.

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