

the presence or absence of 0.5uM simvastatin. Real-time polymerase chain reaction (PCR) was used to quantify gene expression of BMP-2, BMP-7, SOX-9, COL1A2, and COL2A1.

Results: A gross representation of the reparative tissue bridging the cylindrical defects was shown in 4 out of 6 specimen of simvastatin group 4 weeks after surgery. Conversely, in control group, such bridging tissue was observed in 2 of 6 specimens. At 8 weeks, full thickness defect remained in 1 specimen in the simvastatin group while 3 in the control group. At 12 weeks, reparative tissues bridging the defects were shown in all specimens in the simvastatin group but in the control group, full-thickness defects remained in 2 of 6 specimens. According to the quantitative analysis, the volume of the regenerated tissue in the simvastatin group was greater than that in the control group at all end points, reaching significance at 8 and 12 weeks. Further, the quality scores for the regenerative tissue were superior in the simvastatin group at all end points. Immunohistochemical assays demonstrated a strongly positive staining for type-I collagen, type-II collagen, BMP-2 and BMP-7 in the reparative tissue at 12-week time point in the simvastatin group. In vitro The real-time PCR analysis showed that simvastatin significantly up-regulated BMP-2, BMP-7, and COL2A1 gene expression at 4 hours time-point.

Conclusions: The present study demonstrated that simvastatin stimulated reparative responses in the rabbit meniscal defect model. Immunohistochemical assay indicated that the reparative tissue was fibrocartilage according to the production of type-I and type-II collagen. Regarding the real-time PCR analysis, BMP-2, BMP-7, and COL2A1 gene expression were up regulated by the treatment of simvastatin, suggesting that the up-regulation of those genes might contribute to the enhanced meniscal healing by simvastatin. In sum, simvastatin could stimulate meniscus regeneration and healing.

428 TRIANGULAR FIBROCARILAGE COMPLEX INJURY ACCOMPANIED BY DISTAL RADIUS FRACTURE

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Purpose: Recently, open reduction and internal fixation (ORIF) with volar locking plate is the standard procedure for unstable or intra-articular distal radius fracture. However, the injury of triangular fibrocartilage complex (TFCC), which is associated with the instability of distal radioulnar joint (DRUJ) and the rotation of forearm, is prone to be ignored or underestimated at the operation. It might be lead to the osteoarthritis of radiocarpal joint (RCJ) or DRUJ if the serious injury of TFCC is untreated. The need and indication for the repair of TFCC at the initial operation is still unknown and controversial. In the present study, we analyzed the relationship among the preoperative radiographs of the wrist, the arthroscopic findings of TFCC in patients who underwent ORIF of the radius, and clinical outcome, and assessed the poor prognosis factors after ORIF.

Methods: We examined thirty wrists from thirty patients who underwent ORIF of the radius (mean age: 59.2; male: 13, female: 17). The types of fracture according to AO classification were as follows; A2: 3, A3: 8, B1: 1, B2: 1, B3: 2, C1: 10, C2: 2, and C3: 3. Mean follow up period after the operation was 7.8 months. Before the fixation of fracture, we observed the TFCC from the RCJ and DRUJ with the wrist arthroscopic scope, which was 2.7mm in diameter, and ORIF with volar locking plate was performed. In the present study, we performed the synovectomy and trimmed the edge of injured TFCC after the fixation, and the repairs of the disc proper/ligament were not done. Relationships among the ulnar factor from gadiographic findings such as the styloid fracture of ulna or sigmoid notch fracture of radius, arthroscopic findings of TFCC, and clinical outcome at the last visit using quick-DASH score (Japanese version) were assessed.

Results: In 30 patients, the styloid fractures of ulna were found in 16 cases (base of the styloid: 11, middle of the styloid: 1, and tip of the styloid: 4). Acute tear of TFCC were found in 12 cases (I-A: 2, I-B: 2, I-D: 8, respectively, according to Palmer classification) and degenerative tear of TFCC were found in 10 cases (II-A: 4, II-B: 1, II-C: 5, respectively, according to Palmer classification). Though there were 12 cases that had moderate symptom/disability with 15 and over points of quick-DASH score, all of them had the injury of TFCC (I-B: 1, I-D: 4, II-A: 1, II-B: 1, and II-C: 5, respectively). In 16 cases with the fracture of styloid of ulna, there were 8 cases (base of styloid: 6, and tip of the styloid: 2) which had moderate symptom/disability with 15 and over point of quick-DASH. All

distal radius fractures with styloid fracture and without TFCC tear showed good clinical outcomes under 15 points of quick-DASH score.

Conclusions: It is difficult to judge the prognosis from the presence and/or site of the fracture of the styloid of ulna and arthroscopic evaluation of TFCC is essential when the instability of TFCC is anticipated. Most of degenerative tear of TFCC in elder patients are perforations with chondromalacia of the lunage and/or ulna (Palmer class II-C) and we should strictly correct the plus variance of ulna. On the other hand, in younger patients, radial avulsions of TFCC (Palmer class I-D) were frequently seen. If the dorsal and/or volar radioulnar ligament was damaged, the repair of TFCC at the initial operation is desirable.

429 SURGERY, CARTILAGE INJURY AND PATIENT-REPORTED MEASURES WITHIN 4 WEEKS OF ACL RUPTURE ARE ASSOCIATED WITH 5 YEAR OUTCOME: EXPLORATORY ANALYSIS OF THE KANON TRIAL

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Purpose: Anterior cruciate ligament (ACL) rupture increases the risk of early-onset knee osteoarthritis, persistent pain, activity restrictions and poor quality of life (QOL). This study explores data from the KANON trial, an RCT of 121 ACL ruptured patients randomised to a strategy of rehabilitation with optional delayed ACL reconstruction (ACLR) or rehabilitation and early ACLR. Results from the KANON trial are ideal for investigating long-term outcome following ACL rupture. We explore the relationship between 5 year patient-reported outcome and (i) concomitant joint injury; (ii) surgical intervention; (iii) and baseline patient-reported measures.

Methods: We explored KANON data from baseline (within 4 weeks of injury) and 5 years. Between baseline and 5 years, 30 patients assigned to rehabilitation and optional ACLR underwent a delayed ACLR. One patient was lost to follow-up between baseline and 5 years (early ACLR), and 2 patients were excluded from analysis due to poor compliance or not receiving assigned treatment (early ACLR (n=59), delayed ACLR (n=30), no ACLR (n=29)). Meniscus partial resection or fixation was performed in all groups when indicated. Detailed study methodology has been published. In contrast to previous publications, this exploratory study will analyse early ACLR and delayed ACLR as one group (n=89). Five year outcomes included the Knee Injury and Osteoarthritis Outcome Score (KOOS) (pain, symptoms, sport/rec, QOL subscales) and KOOS individual item Q3 (trouble with knee confidence, none-to-mild vs. moderate-to-extreme). Baseline concomitant injuries confirmed by MRI included cartilage injury (yes/no), subchondral fracture (yes/no) and meniscus injury (yes/no). Treatment related factors included medial meniscus surgery (yes/no), lateral meniscus surgery (yes/no) and ACLR at baseline or during the 5 years follow-up (yes/no). Patient-reported measures at baseline included KOOS₄ (an aggregate score from KOOS pain, symptoms, sport/rec, and QOL subscales) and the SF-36 (physical component score (PCS) and mental component score (MCS)). Relationships were explored using Mann-Whitney U, Kruskal-Wallis ANOVA, Chi² and Spearman's rho (r) tests as appropriate. Data was non-normally distributed and reported values are median (IQR). The KOOS and SF-36 scores range from 0 to 100, worst to best. No corrections for multiplicity were done.

Results: Participants with baseline cartilage injury (27%) reported worse KOOS pain (93(79-100)) vs. 97(89-100)), symptoms (77(64-93) vs. 89(82-100)), sport/rec (78(58-90) vs. 85(70-100)), and QOL (72(39-81) vs. 75(56-88)) at 5 years compared to patients without cartilage injury. MRI diagnosed subchondral fracture (31%) and meniscus injury (53%) were not related to 5 year outcomes. Receiving medial meniscus surgery between baseline and 5 years (37%) was related to worse KOOS pain (93(81-97) vs. 97(91-100)), QOL (63(44-81) vs. 78(56-88)) and knee confidence (moderate-to-extreme trouble, 43% vs. 22%, p=0.01) at 5 years. Undergoing lateral meniscus surgery (35%) was not related to 5 year outcome. Receiving an ACLR resulted in worse KOOS symptom scores at follow-up (no ACLR: 96(84-100) vs. ACLR: 86(71-96)) (early ACLR: 86(75-96), delayed ACLR: 89(71-97)). Patients treated with rehabilitation alone reported more moderate-to-extreme trouble with knee confidence (no ACLR: 52% vs. ACLR: (23%) (early ACLR: 22%, delayed ACLR: 23%) at 5 years. Impaired baseline SF-36 PCS were associated with worse KOOS pain (r=.39), symptoms (r=.26), sport/rec (r=.28), QOL (r=.29), and knee confidence at 5 years. In comparison, baseline SF-36 MCS was only mildly related to knee pain at 5 years